3 TRANSPORTATION IMPACTS AND MITIGATION

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

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

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

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

3.1 Affected Environment

3.1.1 Regional Context and Travel Patterns

Transportation Facilities

The project area is served by a network of roadways consisting of a major interstate route (I-5), state highways (SR 99, SR 523, and SR 104), and other local arterials and roads. Figure 3-1 shows the street and highway network in the Lynnwood Link Extension study area, as well as the screenline volume-to-capacity (v/c) ratios during peak hours at selected locations (described below under Travel Demand and Patterns). Higher v/c ratios generally indicate more congested traffic conditions.

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





Total Peak Hour Traffic Volume Available Peak Hour Roadway Capacity

Figure 3-1 Existing Peak Hour Volume-to-Capacity (V/C) Ratios at Screenline Locations Several of the north-south arterials that connect neighborhoods and commercial districts in the project area include Greenwood Avenue North, Westminster Way North, Aurora Avenue North (SR 99), Meridian Avenue North, 5th Avenue NE, 15th Avenue NE, SR 522, 52nd Avenue West, and segments of Roosevelt Way North. Some of the major east-west trips are served by NE 130th Street, NE 145th Street, and NE 175th Street—all of which access I-5 with interchanges where congestion occurs regularly. North 117th Street, NE 155th Street, and NE 185th Street cross I-5 and connect business districts on each side. Within Lynnwood, 200th Street SW provides an arterial connection between SR 99 and the Lynnwood Transit Center.

Travel Demand and Patterns

Miles Driven and Hours Spent in Travel

Table 3-1 shows the vehicle miles traveled (VMT) and vehicle hours of travel (VHT) for the Puget Sound region as modeled with the Sound Transit Highway Model¹.

Table 3-1. Daily Vehicle Miles of Travel (VMT) and Vehicle Hours of Travel (VHT) in the Puget Sound Region for Base Year 2011

Alternative	VMT	VHT
Base Year (2011)	79,440,000	2,210,000

Source: Sound Transit Highway Model.

Vehicles Traveling through the Corridor

To help measure regional traffic conditions, Sound Transit set several screenlines in

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

The corridor's peak period traffic follows typical commute patterns. These commuter trips are heavily oriented southward toward jobs in Seattle in the morning peak period and northward back to the cities with large residential bases in the evenings. A "screenline" is an imaginary line across a section of freeway and/or arterials. Screenlines are often used in traffic analyses to determine how much volume is entering or exiting a particular area based on how much traffic crosses the screenline.

During the AM peak hour, the screenlines show the project corridor, including I-5 and north-south arterials, exceeds 90 percent of capacity in

¹ Sound Transit Highway Model is based on PSRC Regional Model: WSDOT Project Version.

the peak southbound direction and is consistently congested. Traffic in the reverse direction in the morning is much lighter.

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

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

People Traveling through the Corridor

Table 3-2 shows the number of persons traveling through the corridor during the PM peak period at two screenline locations in Base Year 2011. The person throughput includes trips on I-5, SR 99, and other north-south arterials via automobile and transit.

Screenline Location	Alternative	Northbound	Southbound	Total
	Transit	11,000	2,000	13,000
North of NE Northgate Way	Automobile	62,000	40,000	102,000
	Total	73,000	42,000	115,000
South of North 205th Straat	Transit	7,000	1,000	8,000
South of North 205th Street	Automobile	49,000	32,000	81,000
	Total	56,000	33,000	89,000

Table 3-2. Person Throughput—PM Peak Period for Base Year 2011

Source: Sound Transit Highway Model.

I-5 Congestion

I-5 is the most heavily traveled highway in the state, carrying from 159,000 to 196,000 vehicles on an average day in the project corridor. As a result of the high volume of travel and limited capacity in the project corridor, peak period traffic is consistently congested and travel times are unreliable.

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

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



Travel times (minutes) at posted speeds, peak travel times, and 95% reliable travel times *Central Puget Sound area, 2011*

Source: The 2012 Congestion Report (WSDOT 2012).

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

Unreliable travel on I-5 HOV lanes in the peak direction during the peak period affects transit because that is when most transit service occurs. The WSDOT-adopted HOV lane policy calls for HOV lanes to maintain an average speed of 45 mph or greater at least 90 percent of the time during the peak hour for both the morning and afternoon. The I-5 HOV lanes in the project corridor do not currently meet this performance standard. In addition to the peak direction, buses traveling in the non-peak direction (e.g., southbound during the PM peak period) must travel in general purpose lanes from Northgate to downtown Seattle because the reversible express lanes operate in the peak direction only. Thus, these bus trips are subject to general purpose traffic congestion for that portion of the trip.

HOV lane performance is also affected by the operation of the adjacent general purpose lanes. Travel in the HOV lane is often slowed when there is nearby slow traffic in the general purpose lane (i.e., "lane friction") due to the limited physical separation between the HOV lane and general purpose lanes, as well as non-standard lane widths and limited shoulder width to the left of the HOV lane. Drivers in the HOV lane are often reluctant to travel at faster speeds than vehicles in the next lane, and the different speeds make it difficult to move in and out of the HOV lane. In addition to high traffic volumes and congestion on I-5, the high frequency of collisions contributes to unreliable travel. Along the approximately 10-mile section of I-5 in the project area (Northgate to Lynnwood, milepost [MP] 172 to 182), over 80 percent of the collisions were rear-end or sideswipe collisions, and about 60 percent of the collisions occurred during the peak travel periods.

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

3.1.2 Transit

Regional Transit

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

Service Characteristics

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

In the Lynnwood Link Extension study area, there are three transit centers with park-and-ride facilities, and two additional locations with smaller park-and-ride lots. These facilities are listed in Table 3-3.

Transit Facility	Type of Facility	Park-and-Ride Stalls
Northgate Transit Center (includes adjacent facilities at Northgate Mall and Thornton Place)	Transit Center, Park-and-Ride	1,523
5th Avenue NE/NE 133rd Park-and-Ride (I-5 at NE 130th Street)	Park-and-Ride	46
North Jackson Park Park-and-Ride (I-5 at NE 145th Street)	Park-and-Ride	68
Mountlake Terrace Transit Center (I-5 at 236th Street SW)	Transit Center, Park-and-Ride	880
Lynnwood Transit Center	Transit Center, Park-and-Ride	1,370

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

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

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

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

These transit centers and park-and-ride facilities connect adjacent neighborhoods with transit service traveling along I-5 and regional arterials. These transit routes provide service to a variety of destinations, including downtown Seattle, University District, Northgate Transit Center, Aurora Village, and Mountlake Terrace Transit Center.

Ridership

Table 3-4 shows the daily bus ridership for regional bus routes on I-5 north of Northgate along with various locations on other key transit corridors in the region. Ridership on I-5 at the Ship Canal Bridge includes riders from north of Northgate, in addition to those boarding farther south between Northgate and the Ship Canal. This information shows that the project corridor currently carries the second highest bus ridership volumes in the region.

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

Table 3-4.	Daily Bus	Ridership o	on Select	Regional	Corridors-	–Base	Year	(2011)
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Source: Sound Transit Ridership Forecasting Model.

Transit Travel Times

Table 3-5 shows scheduled transit travel times during the peak period between Shoreline (I-5 at NE 145th Street) and Lynnwood (Lynnwood Transit Center) and other regional destinations. Longer transit travel times reflect congestion as well as the need to transfer between routes to reach some destinations. The longest trips are northbound in the evening. The greater evening congestion in the I-5 general purpose and HOV lanes causes lower speeds, more stop-and-go, and longer, less predictable travel times. In addition, the southbound transit trips are slower in the PM peak period for some origin/destination pairs due to congestion and because the I-5 express lanes are operating northbound. More detailed information on transit travel times is provided in the *Transportation Technical Report*.

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

Table 3-5. Peak Period Transit Travel Times (minutes)

Note: These transit travel times reflect the existing conditions on existing bus routes and, in many cases, include estimated transfer times where direct services is not available. In addition to these travel times, the total transit travel time would include the time to access the bus as a pedestrian, bicyclist, passenger, or driver, along with the wait time for a bus. The wait time for a bus would be dependent on the service reliability (adherence to schedule). If a bus arrival is unreliable, then the riders must arrive prior to the scheduled time and wait until the bus arrives on time or late.

^a Because the Northgate to Lynnwood route does not have direct service, travel times are longer than comparable trips. Source: King County Metro Trip Planner, <u>http://metro.kingcounty.gov/.</u>

Transit Level of Service

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

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

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

Local and Sub-regional Transit

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

3.1.3 Freeway Operations

Freeway operations were evaluated using traffic simulation software along I-5 between Northgate Way and the 196th Street SW interchange in Lynnwood. The traffic simulation model included the I-5 freeway mainline and all ramps along this segment of I-5. In addition to modeling the freeway and ramps, the ramp terminal intersections and adjacent arterial intersections were analyzed at key interchanges to capture the interaction between freeway and arterial traffic operations, including queuing activity and spill-back effects (queuing from a congested location that extends and affects operations at the next interchange or intersection). The ramp and arterial intersections were modeled at interchanges such as the NE 130th Street, NE 145th Street, 220th Street SW, 44th Avenue West, and 196th Street SW interchanges. The analysis considered travel times, mainline speeds, vehicle throughput, and LOS. Section 4.3.3 of the *Transportation Technical Report* provides more detail on I-5 freeway operations.

During the AM peak hour, average speeds along southbound I-5 within the traffic simulation area from Northgate to Lynnwood range from 24 mph approaching the NE 130th Street on-ramp to 58 mph in Lynnwood. Congested conditions are caused by high volumes of merging traffic at NE 130th Street, NE 145th Street, NE 175th Street, and SR 104, as well as heavy merging and weaving maneuvers south of the project area. In the northbound direction, I-5 is generally uncongested, with an average speed of approximately 55 mph.

During the PM peak hour, average northbound I-5 peak period speeds within the traffic simulation area range from 18 mph between Northgate and the NE 130th Street off-ramp to 51 mph in Lynnwood. Northbound I-5 is operating under highly congested conditions with high volumes of merging, diverging, and weaving traffic at all of the study interchanges along the broader I-5 traffic simulation corridor. Field observations and model analysis results for southbound I-5 show speeds on I-5 ranging from 45 mph approaching the NE 145th Street off-ramp to 58 mph farther north approaching Lynnwood. In general, southbound I-5 is operating well, except for the area approaching NE 145th Street, where high southbound off-ramp volumes cause delays and queues that sometimes extend onto the freeway mainline. In areas south of the NE 130th Street interchange, at the Northgate interchange, and farther south, I-5 slows down in the PM peak hour, in part due to HOV-lane traffic entering the general purpose lanes (due to the express lanes operating northbound during this time frame). This segment of I-5 can often be congested from this location into downtown Seattle and continuing to the south. More details on I-5 freeway operations for the entire simulation area can be found in Section 4.3.3 of the Transportation Technical Report.

3.1.4 Arterials and Local Streets Traffic Operations

Arterial and local street traffic operations were analyzed using traffic simulation software based on the Transportation Research Board's *Highway Capacity Manual* methodology, which calculates peak hour LOS at signalized and unsignalized intersections, and calculates v/c ratios along arterials (TRB 2000). LOS ratings range from LOS A to LOS F; LOS A represents the best operation and LOS F the poorest operation. Arterial v/c ratios range from a low of 0.0 to a high of 1.0. A v/c ratio near 1.0 is considered a highly congested condition.

The arterial and local street traffic operations analysis covers locations most likely to be affected by the project alternatives, such as by a roadway change or signal control, or areas likely to be affected by trips to light rail stations. Figure 3-3 shows locations of the evaluated intersections; a complete list is in the *Transportation Technical Report*.

Intersections were analyzed to determine whether they are currently operating at acceptable levels or failing. Arterials within the Shoreline city limits were also analyzed to determine whether they meet City of Shoreline concurrency standards, which are intended to ensure that adequate transportation facilities will be in place as new developments occur. Intersections and arterials are considered failing when they do not operate at or better than the governing jurisdiction's performance standard. Table 3-6 summarizes the performance standards for the relevant jurisdiction. Sound Transit calculated LOS for existing traffic operations throughout the project corridor for the PM peak hour when traffic is highest. The agency also examined AM peak hour conditions for intersections with high volumes or intersections in critical locations, such as near a freeway interchange. Figure 3-4 shows the locations that currently do not meet LOS standards.

Segment A: Seattle to Shoreline

In Segment A, Sound Transit conducted PM peak hour analysis of 31 intersections in Seattle and 38 intersections in Shoreline. For the AM peak hour, Sound Transit conducted analysis at 15 intersections in Seattle and 11 intersections in Shoreline. The seven intersections listed below do not currently meet LOS standards during the AM and/or PM peak hour:

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



Analysis Intersections

Figure 3-3 Analysis Intersections

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Preferred Alternative (PA)

Other Light Rail Alternatives
 Other Alternative Station Location

Preferred Alternative Station Location

Preferred Alternative and Other Alternatives



Arterial Segment

Preferred Alternative and Other Alternatives

Lynnwood Link Extension

Agency	Minimum Performance Standard
WSDOT	LOS D for Highways of Statewide Significance (HSS)
	LOS E/mitigated for regionally significant state highways (non-HSS)
City of Lynnwood	LOS E for city center arterials
	LOS D for non-city center arterials
City of Mountlake Terrace	 LOS D for signalized intersections with the following exceptions (LOS E): 212th Street SW 244th Street SW 220th Street SW between SR 99 and I-5 LOS E for unsignalized intersections
City of Shoreline	 LOS D for signalized intersections LOS D for unsignalized intersecting arterials Volume-to-capacity ratio of 0.90 or lower for principal and minor arterials with the following exceptions: 5th Avenue NE from NE 145th Street to the I-5 on-ramps; exempt from City concurrency standard 15th Avenue NE from NE 150th Street to NE 175th Street; underse to see an exempt in a full 40 on lower
City of Seattle	LOS D (goal)

Table 3-6.	Arterials and Loca	I Street Performance	Standards in th	e Project Corridor
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In addition, the following arterial does not meet the City of Shoreline's concurrency standard of 0.90 or lower for principal and minor arterials during the PM peak hour:

• Meridian Avenue North from North 175th Street to North 185th Street northbound

Segment B: Shoreline to Mountlake Terrace

In Segment B, Sound Transit conducted PM peak hour analysis of 19 intersections in Mountlake Terrace. For the AM peak hour, Sound Transit conducted analysis at six intersections. Only one, the 236th Street SW and 56th Avenue West intersection, operated below standard during the AM peak hour, but a local improvement is in place to improve conditions.

Segment C: Mountlake Terrace to Lynnwood

In Segment C, Sound Transit conducted PM peak hour analysis of 20 intersections in Lynnwood. AM peak hour analysis was also conducted at 10 intersections. All of these intersections currently meet LOS standards during the AM and PM peak hours.

3.1.5 Property Access and Local Circulation

The property access and local circulation analysis focused on streets, driveways, and connections most likely to be affected by the project alternatives. The evaluation of existing conditions includes descriptions of the physical characteristics of local street facilities near the proposed stations and along the proposed guideways in each segment. An inventory of the roadway characteristics is in the *Transportation Technical Report*.

3.1.6 Nonmotorized Facilities

The Cities of Seattle, Shoreline, Mountlake Terrace, and Lynnwood have detailed inventories of their pedestrian and bicycle facilities, which Sound Transit used, along with field visits, to define existing facilities and conditions. A general depiction of regional multi-use trails and bicycle facilities is shown in Figure 3-5, based on geographic information system (GIS) database information from King County, Snohomish County, WSDOT, and Sound Transit. A detailed inventory of pedestrian and bicycle facilities near each proposed station is in the *Transportation Technical Report*.

Pedestrian Facilities

The inventory of pedestrian facilities includes arterials within a 0.5 mile radius of each proposed station.

Segment A: Seattle to Shoreline

In this segment, sidewalks or paths are along one or both sides of the street on most arterials within 0.5 mile of the proposed NE 130th Street, NE 145th Street, NE 155th Street, and NE 185th Street Stations. However, many sidewalks are substandard and do not meet the current ADA standards.

Segment B: Shoreline to Mountlake Terrace

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

Segment C: Mountlake Terrace to Lynnwood

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



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

Lynnwood Link Extension

Bicycle Facilities

The inventory for bicycle facilities includes arterials and multi-use trails within 1 mile of each proposed station location.

Segment A: Seattle to Shoreline

In Seattle, arterials such as 1st Avenue NE, NE 117th Street, and 5th Avenue NE have wide curb lanes adjacent to sidewalks or paved shoulders. However, many of

the roadways surrounding the proposed NE 130th Street and NE 145th Street Stations lack constructed bicycle facilities. There are sharrows along portions of 1st Avenue NE, Roosevelt Way NE, and NE 125th Street. In Shoreline, bicycle lanes or striped and paved shoulders exist on parts of North 155th Street, 15th Avenue NE, NE 185th Street, 10th Avenue NE, and NE Perkins Way. A planned project by the City of Shoreline will provide sharrows along 10th Avenue NE, and on NE 180th Street between 10th Avenue NE and 15th Avenue NE.

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

Segment B: Shoreline to Mountlake Terrace

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

Segment C: Mountlake Terrace to Lynnwood

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

3.1.7 Freight Mobility and Access

Freeways, arterials, and local roadways carry freight in and through the study area. The Washington State Freight and Goods Transportation System (FGTS) classifies highways, county roads, and city streets according to the average annual gross truck tonnage they carry. Classifications range from T-5, which includes roadways that carry over 20,000 tons in 60 days and less than 100,000 tons per year, to T-1, which includes roadways that carry over 10 million tons per year.

I-5 is the principal freight route (classified as T-1) through the Puget Sound region. For further details and maps showing the FGTS and City freight route classifications by segment, refer to the *Transportation Technical Report*.

3.1.8 Parking

Parking surveys were conducted to inventory the available on- and off-street parking and midday utilization of on- and off-street parking within approximately 0.25 mile of the proposed station locations and along the proposed footprint of the light rail alignments. Table 3-7 lists the existing unrestricted on-street and off-street parking and supply information near the proposed stations. For further detail and maps showing the area that was inventoried for each station, refer to the *Transportation Technical Report*.

Table 3-7. Existing Unrestricted On-Street and Off-Street Parking Supply and	
Midday Utilization by Station	
	_

	On-Street			Off-Street ^a			
			Percent			Percent	
Station	Supply	Utilization	Utilization	Supply	Utilization	Utilization	
Segment A: Seattle to S	horeline						
Along the proposed light	130	12	9%	19	12	63%	
rail alignment							
NE 130th Street ^b	430	60	14%	290	40	14%	
NE 145th Street	450	120	27%	350	250	71%	
NE 155th Street	580	100	17%	200	50	25%	
NE 185th Street	700	80	11%	300	130	43%	
Segment B: Shoreline to	o Mountlak	e Terrace					
Along the proposed light	NA	NA	NA	NA	NA	NA	
rail alignment							
Mountlake Terrace	440	70	16%	990	870	88%	
I ransit Center							
Mountlake Terrace Freeway Station	640	50	8%	990	870	88%	
220th Street SW	610	70	11%	1,300	680	52%	
Segment C: Mountlake	Ferrace to	Lynnwood					
Along the proposed light rail alignment	30	7	23%	305	235	77%	
Lynnwood Park-and- Ride	0	0	NA	3,020	2,050	68%	
Lynnwood Transit Center	10	10	100%	3,720	2,410	65%	
200th Street SW Station	90	40	44%	4,420	2,510	57%	

Note: Data were collected in May 2012 on all roads within 0.25-mile radius of the stations. Utilization was

counted between 9 am and 11 am and between 1 pm and 4 pm.

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

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

3.1.9 Safety

To describe safety conditions in the study area and to identify locations with higher rates of accidents, Sound Transit collected accident data from local jurisdictions and WSDOT for the 4-year period 2010 to 2013 for the same intersections and roadway segments identified for operational analysis, and for I-5 between Northgate and Lynnwood. Accident rates were calculated (in accidents/year, along with traffic volumes) to give an indication of high accident occurrence.

Along I-5, between 80 to 85 percent of the accidents were congestion-related, involving rear-end collisions from slowing or stopped traffic, or sideswipe collisions from merge or weave movements, and these occurred most often during peak periods. Other collisions, involving vehicles leaving the roadway, and fixed object collisions, made up the remaining incidents, and tended to be at nighttime.

The City of Seattle identifies collision analysis locations (CALs) for future safety improvements at signalized intersections experiencing more than 10 collisions per year, and at unsignalized intersections with 5 collisions per year. For other jurisdictions, locations where the accident rate is at or exceeds 1.0 accidents per million entering vehicles were identified as CALs. Figure 3-6 shows the existing CALs. These CALs are concentrated around the following areas: 196th Street SW, 200th Street SW, 220th Street SW, Aurora Avenue North, and North/NE 145th Street. Details of the full analysis are in the *Transportation Technical Report*.

3.2 Long-Term Impacts

3.2.1 Regional Travel

Miles Driven and Hours Spent in Travel

By 2035, ridership on the Preferred Alternative and other light rail alternatives would help reduce automobile travel in the region by approximately 300,000 miles per day compared to the No Build Alternative (a reduction of approximately 0.3 percent), and about 25,000 fewer hours per day would be spent traveling by automobile (a reduction of approximately 0.8 percent). A significant portion of this reduction is expected to occur within the project corridor as new riders shift from automobile to transit. Table 3-8 shows the systemwide vehicle miles of travel and vehicle hours of travel in the Puget Sound region for the No Build Alternative, Preferred Alternative, and other light rail alternatives in forecast year 2035.



O In Seattle, signalized locations with greater than 10 collisions per year

In Seattle, unsignalized locations with greater than 5 collisions per year

O All other jurisdictions, signalized locations with greater than 1.0 accidents per million entering vehicles (MEV)

□ All other jurisdictions, unsignalized locations with greater than 1.0 accidents per million entering vehicles (MEV)

Existing Collision Analysis Locations in Study Area

Alternative	VMT	VHT
No Build Alternative	100,600,000	3,140,000
Preferred Alternative and Other Light Rail Alternatives	100,310,000 - 100,330,000	3,115,000 - 3,117,000

Table 3-8. Daily Vehicle Miles of Travel and Vehicle Hours of Travel in the PugetSound Region for Forecast Year 2035

Source: Sound Transit Highway Model.

VMT = vehicle miles of travel, VHT = vehicle hours of travel

Vehicles Traveling through the Corridor

During the AM and PM peak hours, the improved transit service provided by the Preferred Alternative and other light rail alternatives would attract more trips to transit, and hence slightly reduce vehicle volumes and congestion in the corridor. Table 3-9 shows year 2035 peak hour vehicle volumes and peak hour v/c ratios at north-south screenlines crossing the project corridor. This also reflects, in part, the additional HOV lane capacity made available for other vehicles with the truncation of bus routes that currently operate in the I-5 HOV lanes. Approximately 550 to 600 daily bus trips would be removed from the I-5 HOV lanes. The *Transportation Technical Report* has additional information, including daily vehicle volumes and v/c ratios for these three north-south screenlines and one east-west screenline.

2035 Preferred Alternative and Other 2035 No Build Alternative Light Rail Alternatives AM Peak Hour V/C^a PM Peak Hour V/C^a AM Peak Hour V/C^a PM Peak Hour V/C^a **Screenline Location** NB SB NB SB NB SB NB SB North of NE Northgate Way 0.47 1.03 1.13 0.71 0.45 1.00 1.09 0.70 (8.600)(19,300)(21,000) (13,300) (8,400)(18,800)(20,500)(13, 100)South of North 205th Street 0.44 0.98 0.98 0.74 0.43 0.95 0.94 0.72 (7,200) (15,900)(7.300)(14.800)(16.400)(11, 200)(14.400)(11,000)South of 196th Street SW 0.55 0.95 1.04 0.73 0.54 0.94 1.03 0.73 (6.500)(11, 100)(12,200)(8.500)(6.400)(10,900)(11.900)(8.500)

Table 3-9. Screenline Volumes and Volume-to-Capacity Ratios

^a Peak hour traffic volumes shown in parentheses ().

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

Source: Sound Transit Highway Model.

People Traveling through the Corridor

Compared to the No Build Alternative, the Preferred Alternative and other light rail alternatives would allow the project corridor to carry more people (person throughput) during the peak periods, as measured by screenlines across the corridor.² The PM peak (northbound) direction is projected to have the largest increase (Table 3-10) in total trips by all modes on I-5, SR 99, and other north-south arterials. The total person throughput in both directions would increase by approximately 3 percent north of NE Northgate Way and by 4 percent south of North 205th Street. On I-5 only, up to a 10 percent increase in person throughput is expected with the Preferred Alternative and other light rail alternatives compared with the No Build Alternative.

² Sound Transit Highway Model is based on the PSRC Regional Model: WSDOT Project Version.

Screenline Location	Alternative	Northbound	Southbound	Total
North of NE Northgate	No Build Alternative	86,000	48,000	134,000
	Light Rail Alternatives	89,000	49,000	138,000
South of North 205th	No Build Alternative	66,000	39,000	105,000
Street	Light Rail Alternatives	69,000	40,000	109,000

Table 3-10.	Projected Person	Throughput-Pl	M Peak Period fo	r Forecast Year 2035
	1 10,00000 1 010011	in oughput i		

Source: Sound Transit Highway Model.

3.2.2 Transit

Regional Transit

Overall regional transit use (on both bus and rail) would increase by up to 22,000 daily transit trips with light rail in place, compared with the No Build Alternative (an increase of approximately 4 percent). There would be direct light rail service from Lynnwood to Northgate, the University District, Capitol Hill, downtown Seattle, south of downtown Seattle, the Rainier Valley, and Sea-Tac Airport. Light rail connections would also be provided to Bellevue, Bel-Red, and Overlake. In addition, light rail in the I-5 corridor would substantially improve transit service reliability to LOS A compared to LOS C or worse with the No Build Alternative. The frequency of transit throughout the day would also improve because light rail would operate with midday headways of 5 to 10 minutes, compared with midday headways of 15 minutes on the most frequent bus routes. Light rail would also provide service for more hours of the day and to more destinations, such as Shoreline and the Mountlake Terrace Transit Center.

Transit Facility and Service Characteristics

With the light rail alternatives, a number of transit facility improvements would be implemented, including new light rail stations and new or expanded park-and-ride and bus layover facilities at some of the stations. Proposed park-and-ride facilities are discussed in Section 3.2.7. Other bus facility improvements are discussed in the Transportation Technical Report. Before the project begins operation, Sound Transit would work with the other transit providers in the project area to revise service plans to avoid duplicating service and to provide improved or new connections to the Lynnwood Link Extension. Sound Transit worked with King County Metro, Community Transit, and Sound Transit Express to outline representative bus operations plans that could be used to serve the Lynnwood Link Extension stations to evaluate the effects of potential service changes for the EIS. Detailed service planning would be conducted before the system opens to the public, and any changes to service would go through a public comment process before each agency would proceed with service changes. The conceptual bus operations plans developed by the transit providers have low and high service scenarios, covering a range of potential future revenue scenarios. The low service scenarios were assumed for the ridership forecasting effort to avoid overpredicting the number of people taking buses to the station, while the higher service scenarios were used to conservatively establish the size of the bus facilities at each station. More details on these plans are provided in the *Transportation Technical Report* and the *Ridership Forecasting Technical Report*.

Ridership

Transit ridership forecasts for the Lynnwood Link Extension range from 63,000 to 74,000 daily trips on the Lynnwood Link Extension in 2035 (the total of all three segments with any combination of alternatives), which would be more than double the bus ridership in the No Build Alternative. The median ridership for the Preferred Alternative would be approximately 68,000 daily riders. The Lynnwood Link Extension would add up to 22,000 new daily transit trips (on both bus and rail) throughout the region. Table 3-11 shows daily transit trips (ridership) in the project corridor in Base Year 2011 compared with the No Build Alternative, Preferred Alternative, and other light rail alternatives in 2035. Total daily trips (ridership) account for riders on the Lynnwood Link Extension, regardless of where they board the train. The forecasts for the Preferred Alternative and other light rail alternatives assume there would be no bus service on I-5 north of Northgate because light rail would replace I-5 bus routes serving areas between Northgate and Lynnwood, and I-5 routes north of Lynnwood would feed to the Lynnwood Transit Center Station.

Table 3-11. Daily Corridor Transit Riders in Base Year (2011) and Forecast Y	Year (2035	<i>i</i>)
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	В	us Riders	Light Rail Project Riders		
Bus Route/Light Rail Ridership (measured by individual trips)	Base Year (2011)	No Build Alternative (2035)	Light Rail Alternatives (2035)		
I-5 Bus Routes North of Northgate	19,400	32,000 to 34,000			
Daily Light Rail Riders North of Northgate			63,000 to 74,000		

Source: Sound Transit Ridership Model.

Figure 3-7 shows the average weekday boardings in 2035 by station under different station combinations for the Preferred Alternative and optional stations, as well as all other light rail alternative station combinations. Figure 3-7 also includes the Northgate Station (which would already be in place under all alternatives) to show how boardings at stations to the north would affect boardings at Northgate. These boardings show only the trips starting at each Lynnwood Link Extension station, while the total trips shown in Table 3-11 count all trips to or from any station for the project. Figure 3-7 shows how the number of boardings at several of the stations would vary depending on the combination of segment alternatives and the number of total stations that would be in place.



Figure 3-7 2035 Average Weekday Station Boardings for the Preferred Alternative and Options

Lynnwood Link Extension

There would not be large differences in ridership among the alternatives, but there would be some minor ridership trade-offs among the different station combinations. Some of the key trade-offs for the Preferred Alternative and its optional stations include:

- Adding the NE 130th Street Station as a third Segment A station would result in a net increase of 500 daily boardings in Segment A because it would provide additional access to the transit network. Approximately 1,200 of the daily boardings at the NE 130th Street Station would shift from the Northgate Station.
- Adding the 220th Street SW and NE 130th Street optional stations to the Preferred Alternative is projected to reduce daily boardings at the Lynnwood Transit Center Station by 700. Part of the reason for the net loss at the Lynnwood Transit Center, compared with a project without these two optional stations, is that adding the two optional stations would increase travel time for the light rail trip, which would be less attractive for riders traveling to and from Lynnwood. In addition, approximately 200 of the forecasted daily boardings would shift from the Lynnwood Transit Center to the new 220th Street SW Station.

The difference in boardings between alternatives is influenced by a combination of factors. These factors include the density of population and employment near stations, the amount of parking available at stations, local bus service connections at stations, additional travel time caused by additional stations elsewhere in the corridor, and distance between stations. Additional information on 2035 daily boardings for the Preferred Alternative, Preferred Alternative with options, and other light rail alternatives (including options) is in the *Transportation Technical Report*.

Transit Travel Times

Travel times to all regional destinations would be shorter with the Preferred Alternative and other light rail alternatives compared with the No Build Alternative. Tables 3-12 and 3-13 show estimated peak period transit travel times in forecast year 2035 between Shoreline and Lynnwood and regional destinations for the AM and PM peak periods for the No Build Alternative and light rail alternatives with four to six stations. Travel times under the No Build Alternative are expected to increase compared with existing conditions due to increased congestion. While the No Build Alternative travel times between destinations would vary between the AM and PM peak period due to different congestion levels, the travel times for light rail would be the same during the AM and PM peak period because light rail would not be affected by traffic congestion. The low end of the range represents travel times for the alternatives with fewer stations, and the higher end represents the alternatives with the most stations.

Table 3-12. Transit Travel Times from Shoreline and Lynnwood—AM Peak Period Southbound (minutes) for Forecast Year 2035

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

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

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

Table 3-13. Transit Travel Times to Shoreline and Lynnwood—PM Peak PeriodNorthbound (minutes) for Forecast Year 2035

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

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

Sources: King County Metro Trip Planner, http://metro.kingcounty.gov/, Lynnwood Link Extension Project Highway Model, light rail travel time estimates.

Transfers

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

Overall, future transfer rates with the light rail alternatives would be lower than the No Build Alternative. There would be fewer transfers because the Lynnwood Link Extension would connect with the Northgate Link Extension (under construction) and provide a no-transfer, one-seat transit trip between more destinations, including Shoreline/Lynnwood and the University District or downtown Seattle. Transfers

may be required to travel to future light rail destinations to the east, including downtown Bellevue and Overlake, although some trains may continue through to those destinations. Also, transfers in some parts of the regional system could increase as more riders use light rail for a part of their trip because it could reduce their overall travel times.

Transit Level of Service

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

Service Frequency

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

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

Hours of Service

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

The Preferred Alternative and other light rail alternatives would provide more than 19 hours of service daily for North Seattle, Shoreline, Mountlake Terrace Transit Center, and Lynnwood Transit Center, giving them higher level of service ratings compared to the No Build Alternative.

Passenger Load

To measure passenger comfort and how easily a rider can find a seat, transit operators calculate the passenger load. When the passenger load exceeds the number of seats or available standing space, transit is overcrowded and offers a poor level of service (LOS E or F) for the passenger load; therefore, the transit service provider may need to increase service frequency. Lighter passenger loads with readily available seats or ample standing room are given high ratings (LOS A or B). With the Preferred Alternative and other light rail alternatives, the passenger loads on buses and light rail would improve compared with the No Build Alternative. Table 3-14 shows the PM peak hour passenger load LOS ratings for transit in the corridor at three locations for the No Build Alternative, Preferred Alternative, and other light rail alternatives in forecast year 2035. With the No Build Alternative, the passenger load LOS for bus service on I-5 is expected to be between LOS D and F, while the Preferred Alternative and other light rail alternatives would improve conditions to LOS A in most locations.

		No Build Alternative	Preferred Alternative and Other ve Light Rail Alternatives			
Screenline Location	Direction	Bus	Bus	Light Rail		
North of NE Northgate Way	Northbound	D	А	С		
	Southbound	F	А	А		
South of North 205th Street	Northbound	E	А	А		
	Southbound	F	А	А		
North of 212th Street SW	Northbound	D	А	А		
	Southbound	F	А	А		

Table 3-14. PM Peak Hour Passenger Load Level of Service in Forecast Year 2035

Source: Sound Transit Ridership Model, 2011.

Reliability and On-time Performance

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

Local and Regional Transit

With any of the light rail alternatives, Sound Transit would work with King County Metro and Community Transit to consider local or regional service revisions integrated with light rail service. A large number of light rail riders would access the system via local and/or regional bus service. Preliminary service integration plans by King County Metro and Community Transit were used to develop bus station requirements.

3.2.3 Freeway Operations

Freeway operations for the No Build Alternative, Preferred Alternative, and other light rail alternatives were evaluated using traffic simulation software along I-5

between the Northgate Way interchange in Seattle and 196th Street SW interchange in Lynnwood. Freeway traffic volumes for 2035 used for this analysis were estimated using growth rates derived from the Sound Transit Highway Model. Additional discussion, including traffic volume forecasts and traffic operations results, is in the *Transportation Technical Report*.

No Build Alternative

By 2035, freeway operations are projected to worsen over today's already congested conditions. I-5 traffic volumes between the NE 130th Street interchange and the 196th Street SW interchange in Lynnwood are expected to increase between 3 and 8 percent over existing conditions except for the northbound (off-peak) direction in the AM peak hour, which would increase between 10 and 15 percent over existing conditions. These traffic volume forecasts generally reflect higher growth, particularly in the northbound direction during the AM peak hour because this section of I-5 is currently not operating at capacity and therefore has greater potential for growth in vehicular demand.

During the AM peak hour, average vehicular speeds on southbound I-5 between the NE 130th Street interchange and south of the SR 104 interchange are expected to be 35 mph or slower, which means the freeway would be operating at LOS F. North of the SR 104 interchange, I-5 speeds are forecasted to be higher, with freeway operations at LOS C or D. Similar to existing conditions, during the AM peak period southbound, freeway congestion would be caused by the high volumes of entering and exiting traffic, specifically at the two southbound on-ramps from NE 145th Street and SR 104. Traffic from these ramps are forecast to influence mainline vehicular speeds at critical merging areas. In the northbound (off-peak) direction, I-5 would continue to be relatively uncongested with average speeds ranging from 44 mph near the SR 104 interchange to 56 mph and would operate at LOS C or D (free-flow conditions).

During the PM peak hour, average northbound peak period speeds would range from approximately 17 mph north of the NE 145th Street on-ramp to approximately 51 mph in Lynnwood. I-5 would continue to operate under highly congested conditions (LOS E and F), with high volumes of merging and diverging traffic. In particular, merging and diverging activity near the off-ramps to NE 130th Street, NE 175th Street, and SR 104 would cause noticeable mainline disruptions with average speeds expected to decrease to 20 mph or less.

In the southbound (off-peak) direction, speeds on I-5 are projected to range from approximately 45 to 55 mph approaching the 220th Street SW off-ramp and the NE 145th Street off-ramp. I-5 would operate relatively well (LOS D), except for the area approaching NE 145th Street and 220th Street SW, where high southbound off-ramp volumes are projected in the No Build conditions and would cause delays and

queues that could extend onto the freeway mainline at times. Similar to typical existing operations, I-5 traffic south of the NE 130th Street and NE Northgate Way interchanges would slow noticeably in the PM peak hour.

Although change to WSDOT's HOV policy was not explicitly evaluated, HOV lane speeds and performance are also expected to degrade, particularly in the peak direction, which would affect reliability and travel times for carpools and buses.

Light Rail Alternatives

While systemwide VMT and VHT in the Puget Sound region is forecast to decrease with the Preferred Alternative and other light rail alternatives (as described in Section 3.2.1), peak hour volumes along the I-5 mainline and ramps would be similar to the No Build Alternative. Traffic traveling to and from the proposed park-and-ride lots is projected to originate primarily from the local street system and would not create noticeable increases in I-5 volumes or affect AM/PM peak hour freeway speeds and performance (e.g., LOS). A small amount of the park-and-ride trips, less than 5 percent, is assumed to be heading north on I-5 from the Lynnwood Transit Center.

During the AM peak hour, northbound and southbound freeway operations and speeds for all light rail alternatives would be similar to conditions under the No Build Alternative. The majority of impacts caused by the proposed light rail stations and park-and-ride lots would be to local arterials instead of I-5 operations (see the discussions below under Arterial and Local Streets).

During the PM peak hour, the Preferred Alternative and three other light rail alternatives (Alternatives A1, A5, and A10) would improve freeway operations along northbound I-5 due to the reconfiguration of the northbound NE 130th Street offramp. The proposed reconfiguration and grade separation of the northbound NE 130th Street off-ramp with southbound 5th Avenue NE would allow the removal of the off-ramp stop-control. Northbound I-5 speeds just south of the NE 130th Street off-ramp would improve by approximately 5 mph. Although the freeway level of service would remain at LOS F, the traffic density would improve. Speeds north of the NE 130th Street off-ramp could decrease because more traffic would be able to get through the improved configuration at the NE 130th Street off-ramp; this increased volume could add to congestion near the NE 145th Street off-ramp. Alternatives A7 and A11, with a station at NE 130th Street but without the updated off-ramp reconfiguration, would experience speeds similar to conditions under the No Build Alternative on I-5 south of the NE 130th Street off-ramp.

During the PM peak hour in the southbound direction, operations and speeds on I-5 for the Preferred Alternative and other light rail alternatives (A1, A3, and A11) would not change compared with the No Build Alternative. The project design includes street and intersection improvements near the NE 145th Street interchange that accommodate the added traffic from the park-and-ride and maintain or improve

local street operations compared to No Build conditions; this in turn allows operations on the freeway and ramps to be the same or better than No Build conditions. The local street improvements include relocation and signalization of the northbound on-ramp intersection to the north as well as adding a westbound rightturn lane on NE 145th Street at 5th Avenue NE.

The one exception is with Alternative A10, which has a different station layout and more parking spaces (650 total) at the proposed park-and-ride. The added traffic drawn to the larger parking facility would require further mitigation to the arterial system to avoid a small decrease in I-5 speeds approaching the NE 145th Street southbound off-ramp. See Section 5.3.1 of the *Transportation Technical Report* for more detail on the light rail alternatives' effects on arterial levels of service and I-5 speeds in this area.

In addition, the Preferred Alternative and other light rail alternatives would reduce the number of buses in the I-5 HOV lanes (approximately 550 to 600 daily bus trips would be removed), which would create additional HOV capacity and improve HOV operations and speeds compared with the No Build Alternative.

3.2.4 Arterials and Local Streets

This subsection describes the effects of the No Build Alternative, Preferred Alternative, and other light rail alternatives on arterial and local street operations. The project's potential effects on traffic volumes, intersection LOS, and property access and circulation are also discussed. The *Transportation Technical Report* provides a detailed discussion of traffic volume forecasts as well as impact analysis assumptions and results.

Traffic Forecasts and Station Trips

To evaluate the impacts of the No Build Alternative and the light rail alternatives on arterials and local streets, Sound Transit forecasted traffic conditions in 2035 to determine the number of vehicles on local roadways with or without the project. Forecast year 2035 traffic volumes were developed using the Sound Transit Highway Model, which reflects PSRC's current population and land use forecasts.

Overall, by 2035, peak hour traffic volumes for the No Build Alternative in the study area are predicted to increase by an average 0.7 percent to as high as 1.3 percent per year. The Lynnwood Link Extension could increase trips to station areas, but at the same time it could reduce automobile trips in other parts of the study area as people shift from private automobiles to light rail.

For the Preferred Alternative and other light rail alternatives, Sound Transit predicted the number of trips that would be generated by each station, including automobile trips to and from the park-and-ride facilities, passenger drop-off/pick-up trips, and new bus trips. The traffic analysis assumes all park-and-rides would be full. The predicted trip generation rates to the park-and-rides are consistent with survey data from Sound Transit's commuter rail stations, Central Link light rail parkand-rides, as well as national sources. The Sound Transit Ridership Model predicted which travel mode (e.g., bus, bicycle, pedestrian, passenger drop-off/pick-up, or drive alone) people were likely to use to access each station.

In general, the stations generating the highest number of vehicle trips are those with the highest number of new park-and-ride spaces. These include the NE 145th Street, NE 155th Street, NE 185th Street, and Lynnwood Transit Center stations. Overall, the Lynnwood Transit Center Station is expected to generate the highest number of vehicle trips. This station would be the northern terminus of the project, with the highest overall number of park-and-ride spaces and the most light rail patrons.

Traffic Operations

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

The analysis results indicate most intersections in the Preferred Alternative and other light rail alternatives would operate at an LOS similar to that of the No Build Alternative. Some intersections around stations may degrade below the jurisdiction's LOS standard without effective improvements. The impact would be caused by traffic to and from park-and-ride facilities and by passenger drop-off/pick-up activity. Figures 3-8a, 3-8b, 3-9a, and 3-9b summarize the PM and AM peak hour LOS analysis results for the No Build Alternative (in forecast year 2035), and indicate where the Preferred Alternative and other light rail alternatives would cause LOS to degrade below standards. Locations where LOS would operate below standards in 2035 are described in the following subsections and the *Transportation Technical Report*.

Segment A: Seattle to Shoreline

Tables 3-15 and 3-16 list the locations in Segment A that would operate below LOS standards in forecast year 2035 with the No Build Alternative, Preferred Alternative, and/or other light rail alternatives during the PM and AM peak hours, respectively. As shown in Table 3-15, 17 of the 67 intersections evaluated in Segment A would operate below LOS standards with the No Build Alternative during the PM peak hour. An additional two intersections would degrade below LOS standards during the PM peak hour with the Preferred Alternative, and between three and seven

intersections would degrade with the other light rail alternatives. For the AM peak hour (Table 3-16), four intersections would operate below LOS standards with the No Build Alternative. One additional intersection would degrade below LOS standards during the AM peak hour with Alternatives A1 and A3 (5th Avenue NE and I-5 northbound off-ramp).

Table 3-15.	Segment A Intersections not Meeting LOS Standards for Forecast Year 2035 During
PM Peak Ho	bur

	-				Alter	native				
Nearest Station and Intersection	LOS Standard	No Build	Preferred Alternative	Preferred Alternative + Option	A1	A3	A5	A7	A10	A11
NE 130th Street										
Station	-	_	_	_	_		_	_	_	_
North 130th Street/ Aurora Avenue North	D	E	E	E	E	*	E	E	E	E
5th Avenue NE and I-5 Northbound Off-ramp	D	F	*	*	*	*	*	F	*	F
NE 125th Street and 15th Avenue NE	D	Е	E	E	Е	*	Е	Е	Е	Е
<u>NE 145th/NE 155th</u> Street Stations										
North 145th Street and Aurora Avenue North	D	Е	Е	E	Е	Е	*	*	Е	Е
North 145th Street and 1st Avenue NE	Е	D	D	F	F	F	*	*	F	F
NE 145th Street and 3rd Avenue NE	Е	F	F	F	F	F	*	*	F	F
NE 145th Street and 5th Avenue NE	Е	D	D	E	F	F	*	*	Е	Е
5th Avenue NE and I-5 Northbound Off-ramp	D	F	F	F	F	F	*	*	F	F
NE 145th Street and 6th Avenue NE	Е	E/F	E/F	E/F	E/F	E/F	*	*	E/F	E/F
NE 145th Street and 10th Avenue NE	Е	F	F	F	F	F	*	*	F	F
NE 145th Street and 12th Avenue NE	E	F	F	F	F	F	*	*	F	F
NE 145th Street and Lake City Way NE	D	F	F	F	F	F	*	*	F	F
North 155th Street and Aurora Avenue North	D	Е	*	*	*	*	Е	Е	*	*
North 155th Street and Meridian Avenue North	D	D	*	*	*	*	E	E	*	*
North 155th Street and 1st Avenue NE	D	F	*	*	*	*	F	F	*	*
NE 155th Street and 8th Avenue NE	D	Е	*	*	*	*	F	F	*	*
NE 155th Street and 15th Avenue NE	D	E	*	*	*	*	F	F	*	*
NE 165th Street and 5th Avenue NE	D	F	*	*	*	*	F	F	*	*
<u>NE 185th Street</u> <u>Station</u>										
North 185th Street and SR 99	D	Е	E	E	E	Е	Е	Е	E	E
North 185th Street and Meridian Avenue North	D	D	E	E	E	Е	E	E	E	E
NE 185th Street and 2nd Avenue NE	D	С	E	E	Е	Е	Е	Е	Е	E

Chapter 3 Transportation

		Alternative								
Nearest Station and Intersection	LOS Standard	No Build	Preferred Alternative	Preferred Alternative + Option	A1	A3	A5	A7	A10	A11
NE 185th Street and 7th Avenue NE	D	D	A	A	С	C	F	С	F	С
NE 185th Street and 8th Avenue NE	D	С	С	С	С	E	D	E	D	E
North 175th Street and Meridian Avenue North	D	Е	E	E	E	Е	Е	E	E	Е
North 175th Street and I-5 Northbound Ramps	D	Е	E	E	Е	Е	Е	Е	E	Е

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

Notes: LOS results highlighted in BOLD and grey shading indicate intersection locations where LOS with the light rail

alternatives would degrade intersections to levels that do not meet the jurisdiction's LOS standard (see Section 3.6.4) or would worsen delays at intersections already below the jurisdiction's LOS standards with the No Build Alternative.

* Location not analyzed for specified alternative. Intersection would be expected to operate similar to No Build Alternative.

Table 3-16. Segment A Intersections not Meeting LOS Standards for Forecast Year 2035 During AM **Peak Hour**

	_	Alternative								
Nearest Station and Intersection	LOS Standard	No Build	Preferred Alternative	Preferred Alternative + Option	A1	A3	A5	A7	A10	A11
NE 130th Street Station										
5th Avenue NE and I-5 Northbound Off-ramp	D	Е	*	*	*	*	*	E	*	E
NE 145th/NE 155th Street Stations										
NE 145th Street and I-5 Southbound Ramps	D	F	E	F	F	F	*	*	F	F
NE 145th Street and 5th Avenue NE	E	F	F	F	F	F	*	*	F	F
5th Avenue NE and I-5 Northbound Off-ramp	D	D	D	D	E	E	*	*	D	D
North 155th Street and Meridian Avenue North	D	D	*	*	*	*	E	Е	*	*
NE 185th Street Station										
North 185th Street and SR 99	D	F	F	F	F	F	F	F	F	F
North 185th Street and Meridian Avenue North	D	D	E	E	E	E	E	E	E	E

Notes: LOS results highlighted in **BOLD** and grey shading indicate intersection locations where LOS with the light rail alternatives would degrade intersections to levels that do not meet the jurisdiction's LOS standard (see Section 3.6.4)

or would worsen delays at intersections already below the jurisdiction's LOS standards with the No Build Alternative. * Location not analyzed for specified alternative. Intersection would be expected to operate similar to No Build Alternative.



and Project Alternative(s) increase delay.







City of Shoreline Arterial LOS

For the City of Shoreline, several arterials were evaluated for forecast year 2035 PM peak hour v/c ratios to ensure consistency with the City's concurrency standards. The v/c ratios for these arterials were compared with the City's v/c standard of 0.90 or lower for most principal and minor arterials. The following arterial segments would not meet the City of Shoreline's concurrency standard for principal and minor arterials with the No Build Alternative:

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

In addition, the following arterial segments are projected to degrade to levels below the City of Shoreline's concurrency standards during the PM peak hour with the Lynnwood Link Extension:

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

Segment B: Shoreline to Mountlake Terrace

Table 3-17 lists the one location evaluated in Segment B that is expected to operate below LOS standards in 2035 with the No Build Alternative or any light rail alternatives during the PM peak hour. All of the evaluated intersections would meet LOS standards in the AM peak hour.

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

			Alternative							
Nearest Station and Intersection	LOS Standard	No Build	Preferred Alternative ¹	B1	B1 ¹	B2A	B4			
220th Street SW Station										
220th Street SW and SR 99	E	F	F	*	F	F	*			

* Location not analyzed for specified alternative. Intersection would be expected to operate similar to No Build Alternative.

¹ Similar effects with or without options (220th Street SW Station for the Preferred Alternative; added parking at Mountlake Terrace Station for Alternative B1).

Segment C: Mountlake Terrace to Lynnwood

Tables 3-18 and 3-19 list the locations in Segment C that are projected to operate below LOS standards in 2035 with the No Build Alternative, the Preferred Alternative, or other light rail alternatives during the PM and AM peak hours. As shown in Table 3-18, five out of the 22 intersections evaluated in Segment C would operate below LOS standards with the No Build Alternative during the PM peak hour. With the Preferred Alternative and other light rail alternatives, most of these intersections would operate with delays similar to the No Build Alternative. The two exceptions with the Preferred Alternative are the intersections at 200th Street SW and 48th Avenue West and 52nd Avenue West and 204th Street SW, which would have higher delays than the No Build Alternative. In the Final EIS, an option is being reviewed for the Preferred Alternative to have an additional 400 park-and-ride parking spaces at the Lynnwood Transit Center Station, which would also cause the intersection of 200th Street SW and 50th Avenue West to fall below operating standards in comparison with the No Build Alternative. This is due to the increased vehicle trips associated with the additional parking stalls. The intersection of 200th Street SW and 50th Avenue West would have higher delay than No Build for all light rail alternatives except for the Preferred Alternative. For the AM peak hour (Table 3-19), none of the intersections would operate below LOS standards with the No Build Alternative, but two intersections (200th Street SW/48th Avenue West and 200th Street SW/50th Avenue West) would degrade below LOS standards with the Preferred Alternative. For all other light rail alternatives, 200th Street SW and 44th Avenue West would degrade below LOS standards during the AM peak hour.

		Alternative						
Nearest Station and Intersection	LOS Standard	No Build	Preferred Alternative	Preferred Alternative + Option	C1	C2	C3	
Lynnwood Station								
196th Street SW and 50th Avenue West	E	F	F	F	F	F	F	
196th Street SW and 44th Avenue West	E	F	F	F	F	F	F	
196th Street SW and 36th Avenue West	D	F	E	E	E	Е	Е	
200th Street SW and 50th Avenue West	D	D	D	E	E	Е	Е	
200th Street SW and 48th Avenue West	D	D	E	E	D	D	D	
52nd Avenue West and 204th Street SW	E	Е	F	F	F	F	F	
52nd Avenue West and 208th Street SW	E	F	F	F	F	F	F	
52nd Avenue West and 212th Street SW	Е	F	F	F	F	F	F	

Table 3-18. Segment C Intersections not Meeting LOS Standards for Forecast Year 2035 During PM Peak Hour Peak Hour

Notes: LOS results highlighted in **BOLD** and grey shading indicate intersection locations where LOS with the light rail alternatives would degrade intersections to levels that do not meet the jurisdiction's LOS standard (see Section 3.6.4) or would worsen delays at intersections already below the jurisdiction's LOS standards with the No Build Alternative.

Table 3-19. Segment C Intersections not Meeting LOS Standards for Forecast Year 2035 During AM Peak Hour

		Alternative						
Nearest Station and Intersection	LOS Standard	No Build	Preferred Alternative	Preferred Alternative + Option	C1	C2	C3	
Lynnwood Station								
200th Street SW and 44th Avenue West	Е	Е	E	F	F	F	F	
200th Street SW and 50th Avenue West	D	С	F	С	С	С	С	
200th Street SW and 48th Avenue West	D	С	E	D	D	D	D	

Notes: LOS results highlighted in **BOLD** and grey shading indicate intersection locations where LOS with the light rail alternatives would degrade intersections to levels that do not meet the jurisdiction's LOS standard (see Section 3.6.4) or would worsen delays at intersections already below the jurisdiction's LOS standards with the No Build Alternative.

Property Access and Local Circulation

The alignment and station locations for the Preferred Alternative and other light rail alternatives could modify access for certain nearby properties, but these properties would still retain functional access. If access to a given property cannot be maintained, then the property would be acquired and identified as a displacement. Displacements are discussed in more detail in Section 4.1, Acquisitions, Displacements, and Relocations. The Preferred Alternative and other light rail alternatives would require some reconstruction of roadways adjacent to the elevated or at-grade alignments, but these areas are limited because most of the alignments are along I-5, and no long-term closures of existing roads are anticipated.

There could be cut-through traffic on neighborhood streets to access the stations via local streets, especially near stations where there is more congestion on the primary arterials serving the station, and where neighborhood streets could offer an alternative route, such as at the NE 155th Street Station, the NE 185th Street Station, and near the 220th Street Station. Property access and local circulation are discussed further in the *Transportation Technical Report*.

Circulation is currently compromised for side streets along NE 145th Street because of the difficulty in turning left from 6th Avenue NE, 10th Avenue NE, and 12th Avenue NE. With the No Build Alternative and all light rail alternatives, this movement would become more difficult in the future as volumes on NE 145th Street increase.

3.2.5 Nonmotorized Facilities

The evaluation of potential impacts on existing and future planned nonmotorized facilities resulting from the Lynnwood Link Extension are presented in this section. With the No Build Alternative, pedestrian activity near station areas would modestly increase over time as planned changes in land use occur and as future pedestrian improvements are implemented.

The Lynnwood Link Extension would increase the number of pedestrians in and around station areas within a typical 0.5-mile walking distance from the station. These increases would include walk trips to and from the following areas: light rail station platforms, park-and-ride facilities, designated passenger drop-off/pick-up areas, nearby bus stops, and surrounding neighborhoods. The Preferred Alternative and other alternatives would meet or exceed local jurisdictional, Sound Transit, and ADA design standards for pedestrian facilities fronting the station areas and roadways that are reconstructed as part of the project.

A more detailed description of pedestrian volumes at and near station areas is based on the projected number of patrons getting on or off the trains during the PM peak hour. Pedestrian volumes and LOS by alternative are summarized in the *Transportation Technical Report*. Specific locations where increased sidewalk widths are needed to accommodate peak pedestrian volumes are identified in the *Transportation Technical Report*. Design details will be further refined during final design.

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

The Preferred Alternative and other light rail alternatives are expected to increase the number of bicycles in the station areas, but they would not remove or otherwise adversely affect any of the existing or planned bicycle routes or facilities in the study area. This includes existing and planned facilities in the April 2014 *Seattle Bicycle Master Plan,* City of Shoreline 2011 *Bicycle System Plan,* and the *City of Shoreline Transportation Master Plan* (City of Seattle 2007; City of Shoreline 2011). Secure and covered bicycle parking and access would be provided at each station. In general, existing and planned bicycle facilities, implemented with reconstructed roadways, would sufficiently serve the increased levels of bicycle trips to the stations. Bicycle parking would generally be available at both ends of the stations to ease access for bicycle users. This would also minimize potential conflicts with pedestrians at stations.

3.2.6 Freight Mobility and Access

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

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

3.2.7 Parking

The Lynnwood Link Extension stations would include new, replacement, and additional park-and-ride capacity. Both on-street and off-street parking spaces are anticipated to be removed due to the placement of the light rail stations, surrounding roadway modifications, and modifications along the light rail alignment. As described in Chapter 2, Alternatives Considered, additional park-and-ride lots have generally been sized to accommodate forecasted parking demand. However, there is a possibility for parking spillover to occur at these stations if demand exceeds their capacity, particularly at the NE 130th Street Station.

At the NE 145th Street, NE 155th Street, and NE 185th Street Stations, a relatively large amount of unrestricted on-street parking exists in the vicinity of the stations; however, the potential for spillover parking is low due to the relatively large supply of parking spaces proposed for the park-and-rides. In station areas that currently lack available on-street parking supply, such as near the Lynnwood, 220th Street SW, and Mountlake Terrace station options, the potential for "hide-and-ride" parking activity (i.e., on-street parking by transit users in neighborhoods surrounding stations) would be limited. In these cases, if spillover parking occurred, it would likely be on privately owned off-street parking facilities. The potential for spillover parking impacts is discussed further in the *Transportation Technical Report*.

Changes in parking supply with the proposed park-and-ride parking spaces for each segment and alternative are described below. As part of this analysis, Sound Transit considered parking supplies within approximately 0.25 mile of each proposed station.

Additional detail, including maps showing the area that was inventoried for each station, is in the *Transportation Technical Report*.

Segment A: Seattle to Shoreline

Table 3-20 summarizes the parking impacts along Segment A by alternative, not including removal of any existing park-and-ride lots and any off-street parking spaces associated with properties that might be acquired by the project. Parking at the Latvian Evangelical

Table 3-20.	Segment A	Parking	Impacts
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	Parking Spaces Removed ^a						
Alternative	On-Street	Off-Street ^b	Total				
Preferred Alternative	69	0	69				
Preferred Alternative with option	69	0	69				
Alternative A1	69	0	69				
Alternative A3	73	0	73				
Alternative A5	89	0	89				
Alternative A7	77	0	77				
Alternative A10	96	0	96				
Alternative A11	84	0	84				

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

Lutheran Church would be modified but parking supply would be maintained. The Preferred Alternative would remove 69 parking spaces, while the other light rail alternatives would remove between 69 and 96 parking spaces due to column placement for the guideway.

Table 3-21 shows the proposed change in park-and-ride capacity at stations under each light rail alternative.

Station	Alternative	Total Existing Parking Spaces	Removed Parking Spaces ^a	Proposed New Parking Spaces	Parking Spaces after Project	Net Change in Parking Spaces
NE 130th Street Station, with Park-and-Ride	Preferred Alternative with option, A5	46	46	100 ^b	100 ^b	+54
NE 130th Street Station, no Park-and-Ride	A10	46	46	0	0	-46
NE 130th Street Station	A7, A11	46	4	100	142	+96
NE 145th Street Station	A1	68	68	500	500	+432
NE 145th Street Station	A10	68	68	650	650	+582
NE 145th Street Station	Preferred Alternative, A3, A11	68	68	500	500	+432
NE 155th Street Station	A5, A7	0	0	500	500	+500
NE 185th Street Station	Preferred Alternative, A1, A3, A7, A11	0	0	500	500	+500
NE 185th Street Station	A5, A10	0	0	350	350	+350

Table 3-21.	Segment A	Park-and-Ride	Impacts a	nd Proposed	New Parking Spaces
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^a Includes parking spaces removed for column placement where applicable.

 $^{\rm b}$ Possible surface parking lot available for lease located near the station.

The discussion below focuses on areas where existing parking spaces would be removed; in other locations, the alternatives would add parking where a new station is proposed. The Preferred Alternative and Alternatives A5, A10, A7, and A11 would remove parking at the 5th Avenue NE/NE 133rd Park-and-Ride lot (46 spaces) and additional on-street parking near NE 145th Street, but these losses would be replaced with a new 500-space park-and-ride garage near the NE 145th Street Station. The Preferred Alternative would add a 500-space park-and-ride garage west of I-5 near the NE 185th Street Station.

For Alternatives A7 and A11, and an option for the Preferred Alternative, a NE 130th Street Station would remove the 5th Avenue NE/NE 133rd Park-and-Ride lot (46 spaces). The lot would also be removed with Alternatives A5 and A10. A nearby surface lot would replace the removed park-and-ride lot. Alternatives A7 and A11 would maintain the 5th Avenue NE/NE 133rd Park-and-Ride lot but columns would remove four of its parking spaces.

Table 3-22. Segment B Parking Impacts

With the construction of the NE 145th Street Station, the Preferred Alternative and Alternatives A1, A3, A10, and A11 would remove the North Jackson Park Park-and-Ride lot (68 spaces), but a new 500- or 650space garage would be added near the NE 145th Street Station, depending on the alternative.

Segment B: Shoreline to Mountlake Terrace

	Parking Spaces Removed ^a						
Alternative	On-Street	Off-Street ^b	Total				
Preferred Alternative	0	0	0				
Preferred Alternative with option	0	0	0				
Alternative B1	0	0	0				
Alternative B2A	11	0	11				
Alternative B4	0	0	0				

^a Includes parking spaces removed for column placement where applicable.

Table 3-22 summarizes the parking changesalong Segment B by alternative.Alternative

^b Off-street does not include park-and-ride spaces.

B2A would result in the loss of 11 on-street spaces. Table 3-23 shows the proposed changes in park-and-ride capacity at stations under each alternative.

Station	Alternative	Total Existing Parking Spaces	Removed Parking Spaces	Proposed New Parking Spaces	Parking Spaces after Project	Net Change in Parking Spaces
Mountlake Terrace Transit Center Station	B1, Preferred Alternative, B2A	880	0	0	880	0
Mountlake Terrace Transit Center Station	B1 with Option	880	220	500	1,160	+280
Mountlake Terrace Freeway Station	B4	880	0	0	880	0
220th Street SW Station	Preferred Alternative with Option, B2A	0	0	200	200	+200

Table 3-23.	Seament B	Park-and-Ride	Impacts and	Proposed N	ew Parking Sı	paces
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Segment C: Mountlake Terrace to Lynnwood

Table 3-24 summarizes the parking impacts along Segment C by alternative, not including removal of any existing park-and-ride spaces because all of the removed park-and-ride spaces would be replaced. None of the light rail alternatives, including the Preferred Alternative, would remove on-street parking. The Preferred Alternative would remove 27 off-street parking spaces along the south side of 200th Street SW between 48th and 44th Avenues West.

Table 3-24. Segment C Parking Impacts

	Parking Spaces Removed ^a						
Alternative	On-Street	Off-Street ^b	Total				
Preferred Alternative	0	27	27				
Preferred Alternative with option	0	27	27				
Alternative C1	0	8	8				
Alternative C2	0	4	4				
Alternative C3	0	0	0				

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

Alternatives C1 and C2 would remove eight and four off-street parking spaces,

respectively. There are several locations along Segment C where the alignment or light rail station would acquire a building. The parking associated with these locations was not considered a parking impact. Table 3-25 shows the proposed changes in park-and-ride capacity at stations under each alternative.

Station	Alternative	Total Existing Parking Spaces	Removed Parking Spacesª	Proposed New Parking Spaces	Parking Spaces after Project	Net Change in Parking Spaces
Lynnwood Transit Center— Modified Alternative	Preferred Alternative	1,370	1,120	1,650	1,900	+530
Lynnwood Transit Center— Modified Alternative with Additional Parking	Preferred Alternative with option	1,370	1,120	2,050	2,300	+1,030
200th Street SW Station	C1	1,370	370	900	1,900	+530
Lynnwood Transit Center	C2	1,370	670	1,200	1,900	+530
Lynnwood Transit Center	C3	1,370	1,120	1,650	1,900	+530

 Table 3-25.
 Segment C Park-and-Ride Impacts and Proposed Parking Spaces

^a Includes parking spaces removed for column placement where applicable.

At the Lynnwood Transit Center, the Preferred Alternative and other light rail alternatives would remove existing surface park-and-ride spaces and replace them with a new garage for a net total of 1,900 park-and-ride spaces. The Preferred Alternative also has an option that would maintain the surface lot west of 46th Street SW, for a net total of 2,300 park-and-ride spaces.

3.2.8 Safety

The Preferred Alternative and other light rail alternatives would have minimal effects on traffic safety in the project corridor because the alignments would be completely grade-separated from the street and highway networks, and the station areas would be designed for multimodal access and to minimize the potential for traffic conflicts.

The alternatives would not change the configuration of the I-5 roadway itself, nor would they affect traffic-operating conditions on the roadway; therefore, no operating impacts on I-5 related to safety are anticipated. The collision information on I-5 shows that most incidents are congestion-related due to slowing or stopped traffic in lanes, or from merge and weave actions. The Transportation Technical Report summarizes the collision data for I-5.

The alternatives involve structural and visual changes to parts of the I-5 roadside environment, which could affect safety conditions. New retaining walls, safety barrier, guardrails, or columns would be constructed along the roadway. The amount of increased hazard presented by these changes along I-5 differs by location, and depends on factors such as the highway configuration, traffic volumes, speeds, topography, the presence of shoulders or refuges, safety barriers or guardrails, and the distance between the lanes and a new structure or barrier. While design measures may help reduce a safety concern, they may not fully remove it. For example, a guardrail in front of a structure may reduce the hazard presented by a new column along the roadway, but guardrails are also potential hazards. Such features of the project within the I-5 right-of-way must conform with FHWA's regulatory requirements for managing the right-of-way. The project would undergo a detailed safety analysis and further consideration of hazard minimization measures during final design as part of WSDOT and FHWA review and approval processes for the use of I-5 right-of-way.

Pedestrian and bicycle volumes are expected to increase at intersections near the proposed stations, which could result in an increased potential for pedestrian/vehicle, bicycle/vehicle, or pedestrian/bicycle conflicts. Bus trips would also increase near stations. The design of the station areas incorporates design features and standards that would reduce conflicts between travel modes.

The Preferred Alternative and other at-grade light rail alternatives are proposing stations and other improvements, including interchange modifications near existing collision analysis locations (CALs), notably near NE 145th Street, 220th Street SW, and the Lynnwood Transit Center. With the reconstruction of the NE 130th Street interchange and grade separating the northbound off-ramp from I-5 to 5th Avenue NE, the Preferred Alternative would remove an existing conflict point.

Multiple CALs are near the NE 145th Street Station. These include the northbound I-5 off-ramp to 5th Avenue NE, NE 145th Street at 5th Avenue NE, northbound I-5 on-ramp from 5th Avenue NE, and the southbound I-5 ramp terminal at NE 145th Street. The Preferred Alternative would improve safety for geometric modifications and access changes with a new signal at the I-5 northbound on-ramp at 5th Avenue NE. Other light rail alternatives with a NE 145th Street Station could also improve safety near this interchange because they would add a signal at the on-ramp.

Two CALs are near 220th Street SW, with one location near the proposed 220th Street SW Station in the Preferred Alternative with options. The intersection of 220th Street SW at 66th Avenue West is signalized and could experience an increase in potential conflicts between travel modes with a proposed station and park-and-ride at this location under Alternative B2A and an option to the Preferred Alternative.

Multiple CALs are near the Lynnwood Transit Center. Five of the locations are along 196th Street SW and would have similar conditions with the No Build Alternative, the Preferred Alternative, and other light rail alternatives. The two CALs along 200th Street SW adjacent to the Lynnwood Transit Center Park-and-Ride at 48th Avenue West and 46th Avenue West would be affected by the Preferred Alternative and other light rail alternatives. These intersections could experience an increase in volumes by all modes.

3.3 Construction Impacts

Construction of the Preferred Alternative or other light rail alternatives would affect local and regional traffic operations. These impacts would include increased congestion, traffic diversions caused by temporary road closures and detours, increased truck traffic associated with construction activity, and temporary changes in I-5 operations and roadside characteristics that could affect safety. Impacts could also result from the intrusion of non-local traffic into residential areas as a result of temporary street closures and traffic detours, disruptions to vehicular and pedestrian access, and the temporary loss of on- or off-street parking.

As part of normal construction planning and permitting, Sound Transit, WSDOT, FHWA, and the Cities would work to minimize the duration and impact of lane closures and reductions by (a) maintaining the same number of travel lanes on roadways affected by the project, where practical, except for short-duration closures that would occur on nights and weekends; (b) establishing detour routes on nearby arterials for short-duration closures; (c) maintaining WSDOT traffic management systems—closed circuit television (CCTV) cameras and monitoring, ramp metering, data stations, and variable message signing; and (d) providing mitigation through supplemental WSDOT incident response team service and Transportation Demand Management strategies.

The project's construction along I-5, which includes crossing over the freeway under all alternatives north of the Mountlake Terrace Transit Center, would involve temporary changes to I-5 roadway operations. It would also introduce features affecting shoulders as well as the roadside environment. There would be temporary nighttime lane closures along I-5 in some locations to allow Sound Transit to place safety barriers between the edge of the pavement and adjacent construction zones. With some alternatives, potential shoulder reductions and narrowed lanes in some locations would reduce the availability of the shoulder refuge for breakdowns and incidents. Construction access to and from I-5 would be from on-ramps and offramps as opposed to directly from the mainline, thereby minimizing the effects construction vehicles would have on I-5 general purpose traffic. Portions of the alignment would have construction access from the local arterials and streets in lieu of or in addition to access from on- and off-ramps. However, freeway capacity would be reduced by varying degrees due to the construction activity, resulting in increased congestion with some alternatives. The potential loss of highway shoulders with some alternatives would also affect safety. A Maintenance of Traffic plan that addresses all travel modes will be prepared at final design for FHWA and WSDOT approval and implementation during construction. This plan would include detailed design drawings establishing all physical and operating characteristics for staging, access, lane or shoulder closures and transitions, hauling, traffic management, detours, lane modifications, and other construction zones or activities. The plan would incorporate

WSDOT's established guidance for best practices and methods to be applied during construction periods, many of which are focused on reducing congestion impacts and minimizing safety hazards. For example, typical measures include signage, traveler advisories, special lighting for work zones and travel lanes, scheduling work during lower volume travel times, detailed contractor requirements, a variety of traffic and travel demand management strategies, and procedures for any construction directly affecting the active roadway.

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

Reconstruction of I-5 overcrossings and overcrossing closures during construction would require lane closures, or temporary full closures, and detours. All alternatives would require reconstruction of the pedestrian bridge over I-5 at NE 195th Street. Detours could have secondary impacts on general purpose traffic, bus transit, bicyclists, and pedestrians on other facilities. Strategic phasing or sequencing of overcrossing closures, coupled with other mitigation measures described in Section 3.6, Potential Mitigation Measures, would minimize the cumulative impacts of closures. Lane closures on overcrossings would not occur for more than one bridge at a time within a segment.

Generally, construction truck traffic traveling to station construction sites would use city streets. Appendix F, Conceptual Plans, shows the potential construction staging areas and truck haul routes. The highest number of truck trips are expected during peak earthwork operations and concrete delivery for both guideway and station construction. For at-grade construction, 4 to 12 trucks per hour are estimated from each work zone. For elevated guideway construction, peak truck trips are estimated at 4 to 8 trucks per hour for the concrete delivery. Multiple work zones may be used during peak operations that would result in higher total project peak truck trips on I-5; however, these trips would generate from 12 to 36 truck trips per hour. Segment B and Segment C would generate from 8 to 24 truck trips per hour. The estimated number of truck trips on I-5 would be from 20 to 60 truck trips; however, the actual truck trips on any specific segment of I-5 would be based on the origin and destination of the truck as it travels to and from the work zone.

Typical construction activity for surface and elevated guideways and stations would occur on a 6-day-per-week work schedule. Limits on hours of construction could occur when street detours are involved and/or construction periods need to be abbreviated to reduce impacts. Periodic nighttime and weekend construction could occur during demolition of I-5 overcrossings and placement of new bridge girders for overcrossings.

Parking for construction workers will be provided on site with access from city streets. The contractor will provide shuttle service when off-site parking is needed. Parking could occur on city streets where parking is unrestricted.

Some loss of parking spaces at park-and-ride lots could occur during construction but would be minimized with construction phasing and temporary parking. Temporary lost parking spaces at park-and-ride lots would shift demand to other park-and-rides or cause a change in mode of access for patrons.

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

Impacts on general purpose traffic, transit operations, nonmotorized travel, and parking are summarized for each segment below and in Table 3-26. Refer to the *Transportation Technical Report* for more details on general corridor-wide and segment-specific construction impacts for the Preferred Alternative and other light rail alternatives.

Segment A Alternatives

Construction of the Preferred Alternative and other light rail alternative alignments in Segment A would primarily be conducted from staging areas within the I-5 freeway/WSDOT right-of-way and city streets between Northgate and NE 145th Street. Barriers would be installed at the edge of the pavement to establish work zone areas for the contractor. The Preferred Alternative and other light rail alternatives within Segment A would involve rebuilding overpass bridges or ramps at one or more locations.

Overpass bridge or ramp reconstruction affecting I-5 is expected at NE 117th Street, NE 130th Street, and NE 185th Street, and could require closure of one lane in each direction of I-5 during nights and weekends. The Preferred Alternative and Alternatives A1, A5, and A10 would involve nighttime closures of I-5 in the vicinity of NE 130th Street for up to 1 month for one lane southbound and one lane northbound.

Local street construction activity could include nighttime closures, intermittent daytime closures, and lane closures in one direction. Depending upon the light rail alternative, local streets affected include 1st Avenue NE, NE 117th Street, 5th Avenue NE, NE 130th Street, NE 145th Street, NE 155th Street, NE 175th Street, and NE 185th Street. Options that include construction of an elevated guideway over vehicular traffic would require nighttime closures of the affected facility (i.e.,

street, ramps, or I-5). Table 3-26 summarizes the major roadway closures for Segments A, B, and C.

Bus operations and transit riders traveling on I-5 could be affected by the increase in delay that would result from increased congestion. Bus schedules could also be less reliable as congestion and delay increase. For the alternatives with lane closures of I-5, to replace bridges over the freeway, transit would have increased travel time impacts, although maintaining an HOV lane could reduce the impacts.

All alternatives would close parking at the NE 135th Street/5th Avenue NE parkand-ride, and several alternatives would also close the existing NE 145th Street parkand-ride.

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

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

On-street parking would be lost temporarily along reconstructed street segments that have on-street parking and along roadways adjacent to the guideway construction.

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

Table 3-26. Summary of Construction Impacts									
	Roadway Closure ^a			Parking Loss					
Alternative	I-5 Mainline	I-5 Interchanges	Arterial/Local Streets ^b	Construction Truck Traffic ^c	Park-and- Ride Spaces ^d	On-street (Yes/No)	Regional Bus Facilities	Multimodal Neighborhood Mobility ^e	
Segment A									
Preferred Alternative	Partial (short), Nighttime ^e	Nighttime	Nighttime – Partial (long)	Low	46	Yes	Minor	Moderate	
Alternative A1	Partial (short), Nighttime ^f	Nighttime	Nighttime – Partial (long)	Low	46	Yes	Minor	Moderate	
Alternative A3	Nighttime	Nighttime	Nighttime	Low	46	Yes	Minor	Low	
Alternative A5	Partial (short), Nighttime	Nighttime	Nighttime – Partial (long)	Low	46	Yes	Minor	Moderate	
Alternative A7	Nighttime	Nighttime	Nighttime	Low	46	Yes	Minor	Low	
Alternative A10	Partial (short), Nighttime	Nighttime	Nighttime – Partial (long)	Low	46	Yes	Minor	Moderate	
Alternative A11	Nighttime	Nighttime	Nighttime	Low	46	Yes	Minor	Low	
Segment B									
Preferred Alternative	Nighttime	Nighttime	Partial (short)	Low	225	No	3 to 6 months plus nighttime closure of transit ramps	Moderate ^f	
Alternative B1	Nighttime	Nighttime	Nighttime	Low	225	No	3 to 6 months plus nighttime closure of transit ramps	Moderate ^g	
Alternative B2A	Nighttime	Nighttime	Partial (short)	Low	225	No	3 to 6 months plus nighttime closure of transit ramps	Moderate ^g	
Alternative B4	Partial (short)	Nighttime	Nighttime	Low	0	No	Permanently closed when construction starts	Low ^g	

Table 3-26. Summary of Construction Impacts

	Roadway Closure ^a				Parking Loss			
Alternative	I-5 Mainline	I-5 Interchanges	Arterial/Local Streets⁵	Construction Truck Traffic ^c	Park-and- Ride Spaces ^d	On-street (Yes/No)	Regional Bus Facilities	Multimodal Neighborhood Mobility ^e
Segment C								
Preferred Alternative	Nighttime	Nighttime	Nighttime	Low	560	No	Nighttime closure, direct access ramp	Low ^h
Preferred Alternative— Option to add 400 parking spaces at Lynnwood Transit Center	Nighttime	Nighttime	Nighttime	Low	560	No	Nighttime closure, direct access ramp	Low ^g
Alternative C1	Nighttime	None	Nighttime	Low	250	No	Minor	Low ^g
Alternative C2	Nighttime	None	Nighttime	Low	560	No	Nighttime closure, direct access ramp	Low ^g
Alternative C3	Nighttime	Nighttime	Nighttime	Low	560	No	Nighttime closure, direct access ramp	Low ^g

^a Partial road closure assumes one lane is closed to traffic. Short-term duration is 2 months or less cumulative total (including intermittent periods of little activity). Long-term duration is 2 months to 12 months cumulative total, with potentially intermittent periods of little activity.

^b Local access will be maintained throughout construction.

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

^d Loss of parking during construction. Additional detail and potential mitigation, if provided, is in the Transportation Technical Report.

• Neighborhood mobility impacts include local transit route impacts and access to transit, pedestrian and bicycle mobility, traffic impacts due to construction, and neighborhood intrusion due to construction activities and parking.

^f Nighttime periodic closures for the placement of the bridge girders.

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

^h Detours required of Interurban Trail.

Segment B Alternatives

All light rail alternatives within Segment B would have construction adjacent to the east side of I-5 between NE 195th Street and the SR 104 interchange ramp. Construction would occur within the I-5/WSDOT right-of-way. Concrete barriers would be installed to define the work zone along the edge of the pavement. Construction access in this segment would primarily occur from local streets, the Mountlake Terrace Park-and-Ride, and the SR 104 interchange ramps.

Construction through the SR 104 interchange area would include construction work within the cloverleaf interchange. This activity is expected to have some impacts on traffic operations due to proximity of the construction near the interchange ramps. The ramps would also be closed periodically at night during construction of the guideway as it crosses over the ramps.

The Preferred Alternative and Alternatives B1 and B2A would require minor reconstruction of 236th Street SW along the curb/sidewalk area near the station. This would require short and periodic lane restrictions managed by flaggers.

North of the Mountlake Terrace Station, each alternative would require nighttime closures of I-5 at the overcrossings to install girders and construct the guideway bridges. Detours to local streets would be planned for these nighttime closures. For all alternatives, median or west-side construction would require staging and possible lane closures or nighttime full closures on cross streets such as 212th Street SW under I-5. For Alternative B2A and the Preferred Alternative, lane restrictions or partial closures could also affect 60th Avenue West.

Bus operations and transit riders traveling on I-5 could be affected by increased congestion resulting from construction activity adjacent to I-5 on the east side (south of the Mountlake Terrace Transit Center). There would be short-term closures (6 to 9 months plus nighttime closures) of the direct access ramps to the freeway station with the Preferred Alternative and Alternatives B1 and B2A to construct the alignment within the median north of the freeway station. Alternative B4 would permanently close the direct access ramps at the beginning of construction. With the closure of the freeway bus ramps to the Mountlake Terrace Freeway Station, buses may be rerouted to the park-and-ride, increasing travel time. However, some buses could remain on I-5 and skip the Mountlake Terrace Freeway Station.

The Preferred Alternative and all other light rail alternatives would require replacement of the NE 195th Street pedestrian bridge over I-5. The reconstruction of the NE 185th Street overcrossing or approach, located approximately 0.5 mile south of the NE 195th Street pedestrian bridge, would need to be completed at a different time than when the NE 195th Street pedestrian bridge is closed to maintain nonmotorized access across I-5 in this area.

For the Preferred Alternative and Alternatives B1 and B2A, part or all of the surface lot could be closed, reducing parking spaces during construction. No on-street parking spaces would be lost due to construction in Segment B.

Segment C Alternatives

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

Construction phasing and temporary parking would be used to minimize loss of parking at the Lynnwood Park-and-Ride. A loss of parking spaces would shift demand to other park-and-rides, cause a shift in mode of access, or increase the potential for transit patrons to park in other locations in the vicinity. Several large park-and-ride lots with capacity are located along I-5 north of the Lynnwood Park-and-Ride and could either capture the users upstream or result in some drivers traveling north to access transit.

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

3.4 Indirect Impacts

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

3.5 Cumulative Impacts

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

Sound Transit is evaluating potential sites for an OMSF, as described in Chapter 2. One of the sites under consideration is located in Lynnwood (Segment C) north of I-5 and east of 52nd Avenue West/Cedar Valley Road. However, the transportation effects of the OMSF would be limited. The light rail trains would enter and leave the facility via a grade-separated dedicated light rail guideway. While employees, service vehicles, and shipments would arrive using local streets, the traffic is not expected to change conditions because the facility would occupy an area that is already largely developed with office and light industrial uses, and trips related to the displaced facilities would no longer occur. There would be no notable difference in the transportation effects of the OMSF related to Segment C alternatives—all of which have stations and park-and-rides that primarily would be accessed using different streets than 52nd Avenue West, which would be the street access point for the OMSF Lynnwood site alternative. In July 2014, the Sound Transit Board identified a Bellevue site as the Preferred Alternative. A final decision on the OMSF site will be made after publication of that project's Final EIS.

The Edmonds School District owns the property being considered for the Lynnwood site alternative for the operations and maintenance facility; the District has a master plan to develop the site for a support services center. This center will include administrative functions and an operations base with storage, maintenance, and fueling for the Edmonds' school bus fleet. If developed, the services center could increase traffic volumes along 52nd Avenue West, including during the morning peak period and in afternoons when the school buses are deployed. However, this added volume would not notably change the traffic impacts or mitigation measures of the Lynnwood Link Extension, which are largely focused on access points to the Lynnwood Park-and-Ride and station.

Sound Transit has started construction of the Northgate Link Extension, which would extend light rail from the University of Washington to Northgate. While this project is scheduled to be completed and in operation prior to completion of the Lynnwood Link Extension, some construction periods would likely overlap. To address this overlap with potential traffic construction impacts in the Northgate Mall area. Maintenance of Traffic plans for the two projects would be coordinated. Additionally, King County is planning to construct high-density transit-oriented development adjacent to the planned Northgate light rail station. This development may be under construction at the same time as the Lynnwood Link Extension, potentially creating additional construction-related impacts in the area. Construction of this development will need to be coordinated with construction of the light rail extensions in order to minimize overall impacts.

Other unfunded regional and local transportation projects and development projects could have localized effects on transit ridership and travel patterns within the project area, including traffic operations near the proposed stations. However, implementation of potential plans such as new, managed, or tolled lanes in the I-5 corridor could alter transportation conditions anticipated for the No Build Alternative and the light rail alternatives; in general, these plans would be more likely to increase the use of transit. Otherwise, the transportation conditions would remain similar to those already described, with no material cumulative effects.

3.6 Potential Mitigation Measures

The following sections discuss measures Sound Transit would take to mitigate the impacts of the light rail alternatives. They also describe measures that Sound Transit proposes to take but which require the agreement of other parties. For instance, Sound Transit has identified certain intersection improvements, traffic management, safety, and parking strategies to mitigate project-related impacts, but the agency does not have the sole authority to make those improvements when the facilities are owned and managed by others. Others may also have alternative plans or projects to address project future conditions with or without the project. In these cases, Sound Transit would coordinate with these other agencies and jurisdictions to further define and implement improvements to mitigate the Lynnwood Link Extension's impacts.

3.6.1 Regional Travel

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

3.6.2 Transit

Mitigation for transit service would not be required because the project would improve the regional transit system and, by freeing up existing bus service resources, may allow King County Metro's and Community Transit's integration plans to provide coordinated bus service with the light rail system. To mitigate the temporary loss of park-and-ride spaces, Sound Transit would coordinate with local jurisdictions, transit providers, FHWA, and WSDOT to develop and implement plans for replacement parking and alternative access measures.

3.6.3 Freeway Operations

No mitigation would be necessary along the I-5 mainline. The Preferred Alternative and other light rail alternatives would have similar peak hour volumes and freeway operations along the I-5 mainline and ramps as the No Build Alternative. For I-5 near the NE 145th Street interchange, the intersection and arterial improvements already included in the project design (or offered in mitigation for Alternative A10) would result in the same or better conditions than would occur with the No Build Alternative; therefore no further mitigation is needed.

3.6.4 Arterials and Local Streets

For impacts on arterials and local streets, mitigation is potentially required at intersections where the intersection LOS with the light rail alternatives, compared with the No Build Alternative, would degrade to levels that do not meet jurisdictional LOS standards. For locations that would operate below LOS standards with the No Build Alternative in forecast year 2035, improvements were assumed to be needed if the light rail alternatives result in substantial increases in delays compared with the No Build Alternative. Potential mitigation measures for improvements at intersections are described below.

To mitigate intersections operating below local standards due to the project, or notably below No Build conditions that are already below local standards, Sound Transit would provide these improvements or other improvements as agreed to by the local jurisdiction. The intersection improvements would improve the AM and PM peak hour intersection delay to meet LOS standards, or for intersections that would be below standards with the No Build Alternative, to achieve the same level of service or better. In lieu of constructing the improvement proposed, Sound Transit could instead contribute to a local jurisdiction's project to improve intersection performance where the No Build Alternative would already be below standards, as agreed to with local jurisdictions.

Segment A

In Segment A, several intersections in the cities of Seattle and Shoreline could potentially require improvements to adjust for additional trips and changes in travel patterns to and from the proposed light rail stations. Tables 3-27 and 3-28 summarize the improvements Sound Transit proposes to bring intersection operations to acceptable levels. Intersection LOS results without the potential mitigation improvements are summarized in Tables 3-15 and 3-16.

	Alternative										
Nearest Station/ Intersection	LOS Standard	No Build	Preferred Alternative	Preferred Alternative + Options	A1	A3	A5	A7	A10	A11	- Potential Improvements
NE 145th/NE 155th Street Station											
NE 145th Street and 1st Avenue NE	Е	D	D	D ^a	D^{a}	D^{a}	*	*	D^{a}	D^{a}	
NE 145th Street and 5th Avenue NE	E	D	D	D	D	D	*	*	D	D	A1, A3, A10, A11 – Add a westbound right-turn lane and overlap phase
North 155th Street and Meridian Avenue North	D	D	*	*	*	*	С	С	*	*	A5, A7 – Add left- turn pockets to the northbound and southbound approaches
North 155th Street and 1st Avenue NE	D	F	*	*	*	*	С	С	*	*	A5, A7 – Add a right-turn pocket to the northbound approach
NE 155th Street and 8th Avenue NE	D	E	*	*	*	*	С	С	*	*	A5, A7 – Add a two- way left-turn lane or refuge area on NE 155th Street
NE 165th Street and 5th Avenue NE	D	F	*	*	*	*	В	В	*	*	A5, A7 – Add a second northbound through lane
NE 185th Street Station											-
North 185th Street and Meridian Avenue North	D	D	D	D	D	D	D	D	D	D	All Alternatives – Add protected- permissive phasing to the northbound and southbound left turns
NE 185th Street and 2nd Avenue NE	D	С	С	С	С	С	С	С	С	С	All Alternatives – Add a two-way left- turn lane or refuge area on NE 185th Street
NE 185th Street and 7th Avenue NE	D	D	A	А	С	С	С	С	С	С	A5, A10 – add a two–way left-turn lane or refuge area on NE 185th Street
NE 185th Street and 8th Avenue NE	D	С	С	С	С	С	D	С	D	С	A3, A7, A11 – add a two-way left-turn lane or refuge area on NE 185th Street

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

Notes:

^a Intersection operations are improved based on mitigation at nearby or adjacent intersections. Mitigation is not proposed at this individual intersection.
 * Location not analyzed for specific alternative. Intersection would be expected to operate similar to No Build Alternative.

LOS = level of service

Table 3-28. Forecast Year 2035 AM Peak Hour Intersection LOS with PotentialMitigation Improvements—Segment A

		Alternative									
Nearest Station/ Intersection	LOS Standard	No Build	Preferred Alternative	Preferred Alternative + Options	A1	A3	A5	A7	A10	A11	Potential Improvements
<u>NE 145th/NE</u> 155th Street Station											
5th Avenue NE and I-5 Northbound Off-ramp	D	D	D	D	Dª	Dª	*	*	D	D	
North 155th Street and Meridian Avenue North	D	D	*	*	*	*	С	С	*	*	A5, A7 - Add left-turn pockets to the northbound and southbound approaches
<u>NE 185th</u> Street Station											
North 185th Street and Meridian Avenue North	D	D	D	D	D	D	D	D	D	D	All Alternatives - Add protected- permissive phasing to the northbound and southbound left turns

Notes:

^a Intersection operations are improved based on mitigation at nearby or adjacent intersections. Mitigation is not proposed at this

individual intersection. * Location not analyzed for specific alternative. Intersection would be expected to operate similar to No Build Alternative.

LOS = level of service

Segment B

In Segment B, the project would not cause intersection impacts requiring mitigation.

Segment C

In Segment C, four intersections in Lynnwood could potentially require improvements to adjust for additional trips and changes in travel patterns to and from the proposed light rail stations. Tables 3-29 and 3-30 summarize the potential improvements Sound Transit proposes to bring intersection operations to acceptable levels in the PM and AM peak hours. Intersection LOS results without the potential mitigation improvements are in Tables 3-18 and 3-19.

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		Alternative							
Nearest Station/ Intersection	LOS Standard	No Build	Preferred Alternative	Preferred Alternative + Options	C1	C2	C3	Potential Improvements	
Lynnwood Station									
200th Street SW and 50th Avenue West	D	D	Cª	D	С	С	С	Preferred Alternative + Options, C1, C2, C3 – Add overlap phase to northbound right-turn movement	
200th Street SW and 48th Avenue West	D	D	D	D	D	D	D	Preferred Alternative, Preferred Alternative + Options – Add an eastbound right-turn pocket. Preferred Alternative + Options – Add a southbound right-turn pocket	
52nd Avenue West and 204th Street SW	E	E	A	A	A	A	A	All Alternatives - Change traffic control from two-way stop control to signal or roundabout	

Table 3-29. Forecast Year 2035 PM Peak Hour Intersection LOS with Potential Mitigation Improvements—Segment C

Notes:

^a Intersection operations are improved based on mitigation at nearby or adjacent intersections. Mitigation is not proposed at this individual intersection.

LOS = level of service

Table 3-30. Forecast Year 2035 AM Peak Hour Intersection LOS with Potential Mitigation Improvements—Segment C

		Alternative							
Nearest Station/ Intersection	LOS Standard	No Build	Preferred Alternative	Preferred Alternative + Options	C1	C2	C3	Potential Improvements	
Lynnwood Station									
200th Street SW and 44th Avenue West	E	E	E	D	D	D	D	Preferred Alternative + Options, C1, C2, C3 – Add a second northbound left-turn lane and extend the eastbound right-turn pocket back to the P&R driveway	
200th Street SW and 50th Avenue West	D	С	Cª	С	С	С	С	Preferred Alternative + Options, C1, C2, C3 – Add overlap phase to northbound right-turn movement	
200th Street SW and 48th Avenue West	D	С	D	D	D	D	D	Preferred Alternative, Preferred Alternative + Options – Add an eastbound right-turn pocket. Preferred Alternative + Options – Add a southbound right-turn pocket	

Notes:

^a Intersection operations are improved based on mitigation at nearby or adjacent intersections. Mitigation is not proposed at

this individual intersection. LOS = level of service, P&R = park-and-ride

3.6.5 Property Access and Local Circulation

In areas where property access and local circulation would be modified by the project, Sound Transit would work with local jurisdictions to develop and implement plans to maintain safe and effective access and circulation. In areas near modified interchanges, FHWA and WSDOT would also be involved.

To discourage cut-through traffic that may occur on residential streets in station areas, Sound Transit would work with local jurisdictions to define and implement appropriate neighborhood traffic controls.

3.6.6 Nonmotorized Facilities

The Lynnwood Link Extension alternatives would have no impact on nonmotorized facilities; therefore, no mitigation would be required.

3.6.7 Freight Mobility and Access

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

3.6.8 Parking

Where the project would remove off-street private parking spaces, Sound Transit would work with property owners to provide compensation or replacement parking.

To discourage transit patrons from parking outside of designated park-and-ride facilities, Sound Transit would work with local jurisdictions to evaluate and, if necessary, implement hide-and-ride mitigation. Sound Transit would inventory onstreet parking around each station before and after the start of light rail revenue service, and would then work with the local jurisdictions to determine where mitigation measures would be needed. Potential parking control measures include parking meters, restricted parking signage, passenger and truck load zones, and residential parking zone programs.

Sound Transit would be responsible for the cost of installing the signage or other parking controls for 1 year after the light rail extension begins operation. The local jurisdiction would be responsible for monitoring, enforcing, and maintaining the parking controls.

3.6.9 Safety

To address potential safety concerns related to the placement of project structures in the I-5 right-of-way, Sound Transit will coordinate with FHWA and WSDOT during final design and will secure highway-related design approvals before construction.

3.6.10 Construction

Transit

Construction would affect the existing 5th Avenue NE/NE 133rd, North Jackson Park, Mountlake Terrace Transit Center, and Lynnwood Transit Center park-and-ride lots. Mitigation measures would include the following, as appropriate, or other measures developed in coordination with transit agencies:

- Implement service increases or other measures to encourage transit trips that do not require automobile access.
- Redirect transit riders who use these locations to nearby park-and-ride lots.
- Develop temporary parking for transit riders to use during construction.
- Use construction phasing strategies to build new park-and-ride spaces before the loss of existing spaces.
- Lease parking lots and/or new parking areas near the closed park-and-ride lots.

During construction, Sound Transit would mitigate partial closures of the Mountlake Terrace Transit Center and Lynnwood Transit Center. Transit service mitigation would include the following, as appropriate, or other measures developed in coordination with transit agencies and local jurisdictions:

- Relocate transit stops to adjacent streets.
- Provide a temporary transit center at a nearby off-street location.
- Revise transit services (including temporary service between Mountlake Terrace and destinations in King County due to temporary closure of the Mountlake Terrace Freeway Station).

Transit service mitigation measures for partial or full closures of streets would include rerouting of buses, where appropriate, to maintain transit service. Sound Transit would coordinate with King County Metro, Community Transit, and private transit service providers to minimize construction impacts and disruptions to bus facilities and services. Sound Transit would coordinate with these providers to inform passengers about changes with measures such as signage at existing transit stops and using website information, rider information systems, emails, and agency mailing lists.

Freeway Operations and Safety

As part of the WSDOT and FHWA approval process for construction within the I-5 right-of-way, and to minimize safety and operational impacts during construction, Sound Transit would collaborate with WSDOT and FHWA to develop and

implement the project's Maintenance of Traffic Plan. Sound Transit would coordinate construction with incident management, construction staging, and traffic control in places where the light rail construction would affect freeway traffic or involve changes to the roadside environment. Sound Transit would also coordinate with WSDOT to disseminate construction closure information to the public as needed.

Arterials and Local Streets

The adverse transportation impacts that would occur during construction include temporary lane or roadway closures during peak hours, temporary increases in truck traffic, and temporary loss of parking in some construction staging areas. Sound Transit would develop and implement detailed construction mitigation plans in close coordination with local jurisdictions and WSDOT during the final design and permitting phases of the project. Sound Transit would:

- Develop the Maintenance of Traffic Plan to conform to the *Manual on Uniform Traffic Control Devices* and jurisdictional agency requirements for traffic control.
- Use lighted or reflective signage to direct drivers to truck haul routes to ensure visibility during nighttime work hours.
- Use temporary reflective truck prohibition signs on streets with a high likelihood of cut-through truck traffic.
- Communicate public information about construction activities through tools such as print, radio, posted signs, Web sites, email, and direct communication with other agencies and affected parties; ongoing communications would update interested parties regarding street or freeway lane closures, detours, hours of construction, business access, and parking impacts.
- Coordinate access closures with affected businesses and residents. If access closures are required, property access to residences and businesses would be maintained to the extent possible. If access to the property cannot be maintained, the specific construction activity would be reviewed to determine if it could occur during non-business hours, or if the parking spaces and users of this access (for example, deliveries) could be provided at an alternative location.
- Require the contractor to provide parking areas for construction workers, where necessary. This may include remote parking with shuttle service to and from the construction site if sufficient on-site parking cannot be provided.
- Post signs prior to construction in areas where surface construction activities would affect access to surrounding businesses.

- Schedule traffic lane closures and high volumes of construction truck traffic during off-peak hours.
- Evaluate and limit concurrent construction to minimize construction impacts.
- Cover potholes and open trenches, where possible, and use protective barriers to protect drivers from trenches remaining open.
- Provide temporary parking to mitigate loss due to construction staging or work activities, as appropriate.

Parking

In locations where Sound Transit would remove off-street private parking spaces, Sound Transit would provide property owners with compensation or replacement parking.

Nonmotorized Facilities

Sound Transit would minimize potential impacts on pedestrian and bicycle facilities by providing detour routes through construction areas. Sound Transit would also notify the public of these changes. Multi-use trails that might be affected by construction would generally be kept open. 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. Closures or restrictions of I-5 overcrossings would be sequenced to maintain travel across I-5 at the next nearest crossing.

Freight Mobility and Access

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

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

Cumulative Construction Impacts

To mitigate cumulative impacts of potentially overlapping construction periods in the Northgate area, Sound Transit would coordinate the construction activities of the Northgate Link and Lynnwood Link extensions, and would also coordinate with the King County Metro transit-oriented development project.