4.0 Environmental Impacts

The future long-term effects described in this chapter are a comparison of the No Build Alternative and FWLE build alternatives conditions for the year 2035. This chapter discusses changes in regional facilities and travel, transit operations, arterial and local street operations, safety, parking, non-motorized facilities, and freight mobility and access. Changes to I-5 highway operations and safety are addressed in sections pertaining to regional facilities and travel (screenline performance), arterials and local street operations (I-5 ramp terminal intersection operations and off-ramp queues), and safety.

The effects of the build alternatives were analyzed assuming that light rail would extend to the Federal Way Transit Center, with potential interim termini locations at the Kent/Des Moines Station and S 272nd Street Station (Star Lake or Redondo). This chapter is organized to assess how the transportation network would change by comparing the No Build Alternative with the build alternatives. For analysis elements where the build alternatives would trigger mitigation, further discussion on proposed mitigation is provided in Chapter 7, Potential Mitigation Measures.

4.1 Regional Facilities and Travel

Regional travel patterns, including projected vehicle forecasts, traffic congestion, and person mode of travel, are discussed in detail in this section. For the purposes of reporting in the tables and exhibits in this section, results shown for the build alternatives are from the Preferred Alternative. All of the build alternatives would have similar regional impacts, and the Preferred Alternative is considered representative of all build alternatives. For I-5 ramp terminal operations and vehicle queuing analysis, refer to Section 4.3.5. For the I-5 safety analysis, refer to Section 4.4. Key findings of note include the following:

- Any of the FWLE build alternatives would reduce overall regional vehicles miles traveled (VMT) by 160,000 miles per day and vehicle hours traveled (VHT) by 10,000 hours per day.
- Screenline volumes and volume to capacity (v/c) ratios would be reduced slightly with any of the build alternatives.
- While vehicle trips are expected to decrease, person trips would increase with any of the build alternatives through the FWLE corridor. The percentage of these trips using transit is expected to increase slightly compared to the No Build Alternative.

The future arterial and local street system within the FWLE transportation study area (study area) includes a variety of roadway and transit projects that are planned and have identified sources of funding for construction. These reasonably foreseeable projects and transit service changes were incorporated into the transportation analysis for the 2035 No Build and build alternatives and include both regionally noteworthy projects (i.e., State Route [SR] 520 Bridge Replacement and Alaskan Way Viaduct and Seawall Replacement) and specific local transportation improvement projects. A detailed list of the assumed background projects is provided in Appendix A, *Federal Way Link Extension*

Transportation Technical Analysis Methodology and *Final EIS Transportation Technical Analysis Methodology Overview and Updates* memorandum. Listed below are highlights of the assumed background projects list:

- Light rail would be extended to Lynnwood Transit Center, Overlake Transit Center, and S 200th Street (Angle Lake Station).
- SR 509 Corridor Completion and Freight Improvement Project (SR 509 Extension).
- SR 167 Tacoma to Edgewood New Freeway Construction Project.
- 28th and 24th Avenues S would be connected between S 200th Street and S 208th Street through SeaTac with a five-lane arterial.
- Military Road S would be widened between S 272nd Street and S 304th Street to provide four or five lanes.
- The S 320th Street I-5 bridge would be widened, including adding high-occupancy vehicle (HOV) lanes and realigning ramps.

The only change to the transportation network included in the FWLE would be the build alternatives and any associated road improvements.

4.1.1 Vehicle Miles Traveled and Vehicle Hours Traveled

Table 4-1 shows the daily VMT, VHT, and vehicle hours of delay (VHD) for the No Build Alternative and build alternatives for 2035. Changes in VMT, VHT, and VHD would be similar between build alternatives; therefore, a representative alternative is highlighted in Table 4-1. With the extension of light rail south to Federal Way, regional VMT is expected to decrease by approximately 160,000 miles on a typical weekday compared to the No Build Alternative because some regional automobile trips are expected to shift to light rail with the FWLE. Almost 1/3 of this reduction would occur in the study area. The change in regional VMT represents a fairly small change and is generally attributable to approximately 8,000 new transit users with the FWLE.

TABLE 4-1
2035 Weekday Daily Vehicle Miles of Travel, Vehicle Hours of Travel, and Vehicle Hours of Delay

Alternative	VMT	VHT	VHD
No Build Alternative	113,690,000	4,075,000	861,000
Build Alternatives[a]	113,530,000	4,065,000	852,000
Change	-160,000	-10,000	-9,000

Source: PSRC, 2014a.
[a] Preferred Alternative is documented for comparison purposes. Other alternatives and station options would have similar regional impacts.

Forecasted VHT are expected to decrease by approximately 10,000 hours per day regionally with the FWLE. Approximately 25 percent of the regional reduction in VHT would occur within the study area. Forecasted VHD are expected to decrease by approximately 9,000 hours per day regionally.

4.1.2 Traffic Projections

Exhibit 4-1 categorizes the 2035 regional v/c ratios for major highway facilities between Federal Way and Seattle by three ranges. Most of the major highways are forecasted to carry more trips in 2035 than today. This increase in traffic volumes will in turn lead to higher levels of congestion in 2035. This increase in congestion is expected to make travel time to and from the study area from regional destinations longer and less reliable in 2035.

4.1.2.1 Traffic Volume Projections

Future year AM and PM peak hour traffic volume forecasts were developed for the FWLE based on the Puget Sound Regional Council's (PSRC) latest population and employment forecasts for the region. Overall, the growth in traffic volumes would be 20 percent in 22 years (2013 to 2035). Using compound growth rate calculations, traffic volumes in the study area are expected to increase by an average annual growth rate of approximately 0.83 percent in the AM and PM peak hours.

The average weekday projected increase in traffic volumes for all four cities in the study area (SeaTac, Kent, Des Moines, and Federal Way) is shown in Table 4-2. Growth on roadways within the FWLE study area is projected to be lower in some areas than others due to the background projects, which include the completion of major regional projects such as the SR 509 and SR 167 extension projects. The completion of these projects will result in a shift of traffic from study area intersections to the regional freeway system.

TABLE 4-2
2013 to 2035 Average Weekday Annual Volume Growth

City/Jurisdiction	AM Peak Hour	PM Peak Hour
Study Area	0.83%	0.83%
SeaTac	N/A	0.34%
Kent	1.12%	1.11%
Des Moines	0.60%	0.86%
Federal Way	1.47%	1.27%

Source: PSRC, 2014a.
N/A = not applicable

EXHIBIT 4-1
2030 No Build PM Highway Volume-to-Capacity Ratios

4.1.2.2 Facility Screenline Traffic Volume Projections

The AM and PM peak hour and daily traffic volumes and v/c ratios for three selected locations within the study area were analyzed to understand the relative differences in travel between the No Build and build alternatives. Exhibit 4-2 shows the project's three screenline locations.

Screenline volumes and v/c results are provided in Table 4-3. In general, when light rail is extended to Federal Way some people would change their mode of travel and use transit, thereby resulting in minor decreases in traffic volumes and congestion across all three screenlines in the FWLE corridor. Modest traffic volume decreases are expected in both the peak and off-peak directions of travel; however, most roads across the screenlines would still operate at or near capacity in the peak direction of travel with and without the extension of light rail under any of the build alternatives.

TABLE 4-3
2035 AM Peak Hour/PM Peak Hour/Daily Screenline Volumes and Volume-to-Capacity Ratios

Screenline	Direction	AM Peak Hour				PM Peak Hour				Daily	
		No Build		Build Alternatives[a]		No Build		Build Alternatives[a]		No Build	Build Alternatives[a]
		Volume (veh)	V/C	Volume (veh)	V/C	Volume (veh)	V/C	Volume (veh)	V/C	Volume (veh)	Volume (veh)
South of S 200th Street	NB	13,200	1.01	13,100	1.00	9,500	0.73	9,400	0.72	171,500	170,500
	SB	5,900	0.42	5,800	0.41	14,400	1.03	14,300	1.02	169,700	168,400
North of S 272nd Street	NB	18,200	1.19	18,000	1.18	10,600	0.69	10,600	0.69	209,500	208,000
	SB	6,100	0.36	6,100	0.36	19,000	1.11	18,800	1.10	205,800	204,100
South of S 312th Street	NB	14,200	1.03	14,100	1.02	9,200	0.67	9,100	0.66	173,400	172,500
	SB	5,800	0.42	5,800	0.42	15,200	1.10	15,100	1.09	172,100	171,000

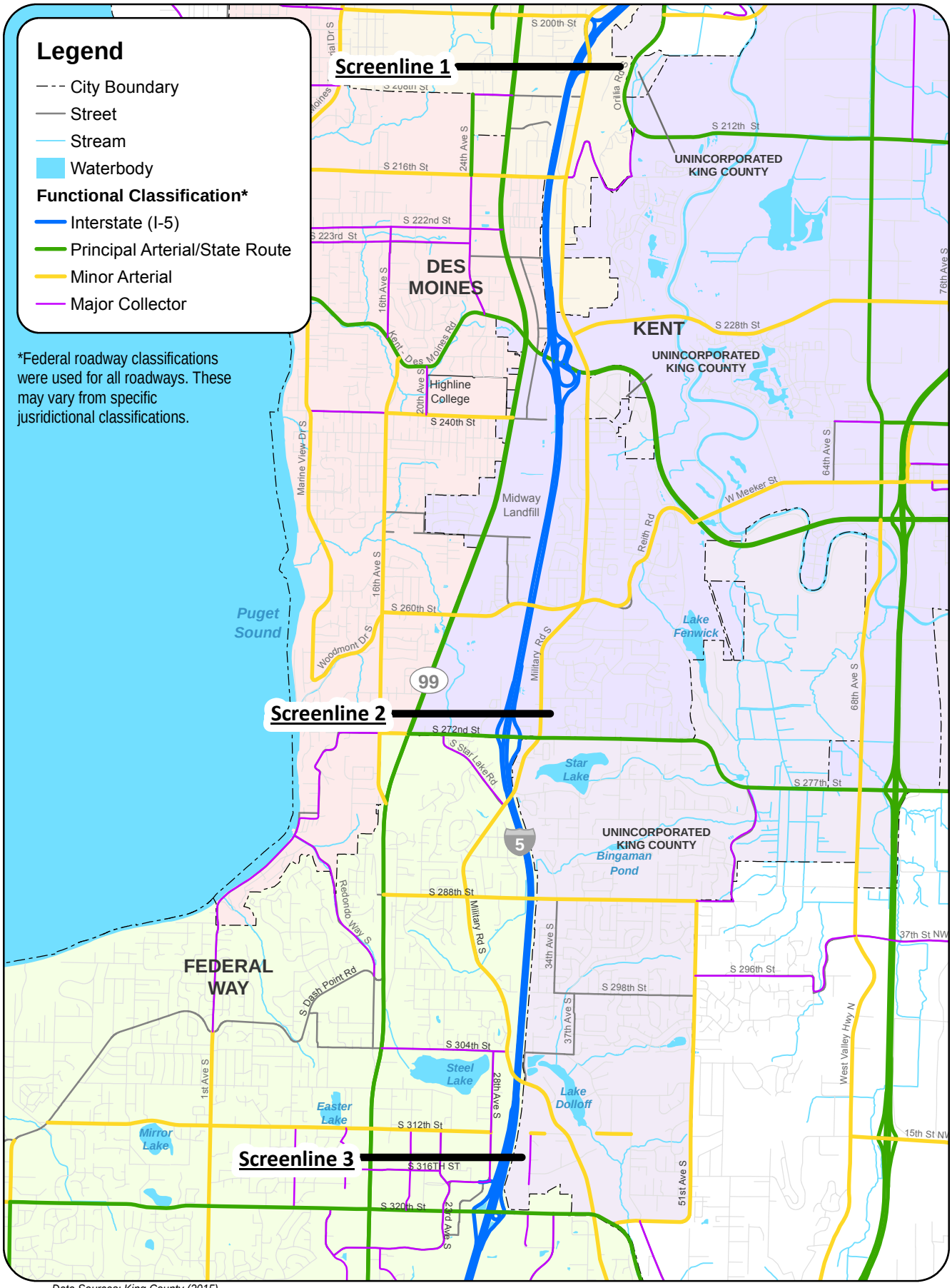
Source: PSRC, 2014a.
[a] Preferred Alternative is documented for comparison purposes. The other FWLE alternatives and station options would have similar regional impacts.
NB = northbound; SB = southbound; veh = vehicles

4.1.2.3 I-5 Screenline Traffic Volume Projections

Table 4-4 shows the projected peak hour and daily traffic volumes on the I-5 mainline under the No Build and build alternatives. Values presented in this table are a subset of the volumes shown in Table 4-3. Extension of light rail to Federal Way would result in a small decrease (less than 2 percent) in traffic volumes across I-5 in all three screenlines. This small decrease in traffic on I-5 would result in similar to slightly better traffic performance of I-5; therefore, traffic impacts on the I-5 mainline are not expected with any of the build alternatives.

4.1.2.4 Screenline Mode of Travel

Table 4-5 shows the total person demand and their mode of travel at the three screenline locations during the PM peak hour. The mode share for persons in the AM peak hour would be similar to the PM peak hour with northbound being the peak direction of travel in the morning.



Data Sources: King County (2015).

EXHIBIT 4-2
FWLE Transportation Study Area
Screenline Locations
Federal Way Link Extension

With the build alternatives, the number of persons traveling through the study area is expected to increase, with a higher proportion on transit modes. A slight decrease in SOV and HOV person demand is expected with the build alternatives as people shift from automobiles to light rail and other forms of transit. The transit mode share would increase with the build alternatives, from 3 to 4 percent to 4 to 6 percent for northbound travel and from 9 to 12 percent to 11 to 15 percent for southbound travel.

TABLE 4-4
2035 AM Peak Hour/PM Peak Hour/Daily I-5 Screenline Volumes (Vehicles)

Screenline	Direction	Travel Lane	AM Peak Hour (veh)		PM Peak Hour (veh)		Daily (veh)	
			No Build	Build Alternatives[a]	No Build	Build Alternatives[a]	No Build	Build Alternatives[a]
South of S 200th Street	NB	GP	7,100	7,000	5,800	5,800	101,000	100,500
		HOV	1,600	1,600	600	600	17,100	16,900
	SB	GP	4,300	4,300	7,700	7,600	99,800	99,000
		HOV	100	100	1,600	1,600	14,500	14,400
North of S 272nd Street	NB	GP	10,200	10,100	6,800	6,800	127,800	127,100
		HOV	1,800	1,800	1,000	1,000	21,300	21,100
	SB	GP	5,200	5,200	11,700	11,600	138,700	137,500
		HOV	200	200	1,700	1,700	17,300	17,200
South of S 312th Street	NB	GP	8,400	8,300	6,000	6,000	109,200	108,800
		HOV	1,900	1,900	800	800	20,000	19,800
	SB	GP	4,800	4,800	9,400	9,400	115,300	114,700
		HOV	100	100	2,100	2,000	18,600	18,500

Source: PSRC, 2014a.
[a] Preferred Alternative is documented for comparison purposes. The other FWLE alternatives and station options would have the same regional impacts.
GP = general purpose lane

TABLE 4-5
2035 PM Peak Hour Mode Share

Screenline	Direction	No Build Alternative				Build Alternatives[a]			
		Total Persons	SOV %	HOV %	Transit %	Total Persons	SOV %	HOV %	Transit %
South of S 200th Street	NB	11,700	70%	25%	4%	11,800	69%	25%	6%
	SB	20,700	54%	34%	12%	21,400	52%	33%	15%
North of S 272nd Street	NB	13,000	71%	25%	4%	13,000	70%	25%	5%
	SB	27,200	53%	37%	9%	27,500	52%	36%	11%
South of S 312th Street	NB	11,300	70%	27%	3%	11,400	69%	27%	4%
	SB	21,600	54%	36%	9%	22,000	53%	35%	11%

Source: Sound Transit, 2014b; PSRC, 2014a.
Note: Numbers may not add to 100 percent due to rounding.
[a] Preferred Alternative is documented for comparison purposes. The other FWLE alternatives and station options would have the same regional impacts.
SOV = single-occupant vehicle

4.2 Transit Operations

This section reviews transit service and circulation, regional and local bus transit, ridership, station area mode of access, transit level of service (LOS), bus and light rail travel time, and transit transfer rates. Key findings and observations include the following:

- Up to 39,500 daily transit riders would use the proposed FWLE.
- Transit LOS measures of effectiveness, including hours of service, service frequency, and passenger load would improve with light rail.
- Light rail would provide more reliable transit service because it would operate in an exclusive right-of-way with no at-grade vehicle crossing in the study area.
- The build alternatives would provide a comparable travel time to bus service from Downtown Seattle to the Federal Way Transit Center and would be noticeably faster between the Federal Way Transit Center and all regional destinations to the north and east of Seattle, due in part to having fewer required transfers and shorter transfer times.
- The proposed station locations in the study area would accommodate connections with non-motorized, transit transfer, and automobile access trips.

4.2.1 Transit Service Assumptions

A variety of changes could occur to both transit operations and facility improvements by 2035. Changes could include a new light rail station at Angle Lake and transit bus route and service modifications reflective of proposed changes within each of the local transit agency's long-range plans. Local transit agencies have identified conceptual transit bus service plans that could be integrated under the No Build and build alternatives. The information provided by these agencies represents a potential condition that could meet the foreseeable transit needs of the study area. It should be noted that actual changes to regional and local bus routes would require agency approval prior to implementation. Table 4-6 shows how transit service could operate in 2035 with the No Build and build alternatives.

All transit service that exists today is assumed to exist in 2035 with the No Build Alternative. Transit routes may be truncated or modified and have service frequency increased to better serve the study area. In addition to the existing services, Metro has identified two potential new local transit routes: (1) a route between Des Moines and Federal Way, and (2) a route between Milton and Federal Way. For Pierce Transit routes, more frequent service under the No Build Alternative is assumed. In addition to changes in bus service under the No Build Alternative, light rail would be extended south from its current terminus at Sea-Tac Airport to S 200th Street (Angle Lake Station). The Angle Lake Station will have 1,050 parking spaces and be the southern terminus of the light rail system until the FWLE is constructed. Regional bus service (Sound Transit Route 574) could be restructured to operate collaboratively with light rail at the Angle Lake Station and stops north of the Angle Lake Station, including the airport.

A variety of transit facility improvements are planned with the FWLE, including new light rail stations with new or expanded park-and-ride capacity and improved transit connectivity through the construction of multimodal transit hubs. This would further integrate bus, rail, automobiles, pedestrians, and bicyclists in one location. Regional bus service could be restructured to operate collaboratively with light rail within the study area. Transit agencies have identified preliminary, conceptual transit bus service (transit integration) assumptions that could be implemented along with light rail in the study area. The information provided by these agencies represents a potential future condition where routes might be truncated, eliminated, rerouted, or have their service frequency increased to integrate with light rail service. As part of the conceptual bus service plan, the Metro RapidRide A Line would continue to operate along SR 99 with the FWLE, providing local service between the stations and offering an opportunity for people to access the light rail transit system. Further discussion on how transit would change with the build alternatives is provided in Section 4.2.2.

TABLE 4-6
2035 Conceptual Transit Routes at Light Rail Stations

2035 No Build			2035 Build Alternatives		
	Headway (minutes)			Headway (minutes)	
Agency/ Routes	Peak Period	Off-Peak	Transit Service Area	Peak Period	Off-Peak
Metro RapidRide A	8	12	Revised[a]	Same as No Build	Same as No Build
Metro 121	15	-	Revised[a]	Same as No Build	Same as No Build
Metro 122[b]	15	30	Revised[a]	Same as No Build	Same as No Build
Metro 156	15	15	Revised[a]	Same as No Build	Same as No Build
Metro 158	30	-	Same as No Build	Same as No Build	Same as No Build
Metro 159	20	-	Same as No Build	Same as No Build	Same as No Build
Metro 166	15	15	Revised[a]	Same as No Build	Same as No Build
Metro 177	15	-	Deleted	-	-
Metro 178	15	-	Revised[a]	20	Same as No Build
Metro 179	20	-	Revised[a]	Same as No Build	Same as No Build
Metro 181	15	15	Same as No Build	Same as No Build	Same as No Build
Metro 182	30	30	Same as No Build	Same as No Build	Same as No Build
Metro 183	15	15	Revised[a]	Same as No Build	Same as No Build
Metro 187	30	30	Same as No Build	Same as No Build	Same as No Build
Metro 190	20	-	Deleted[b]	-	-
Metro 192	30	-	Revised	Same as No Build	Same as No Build
Metro 193	15	-	Same as No Build	Same as No Build	Same as No Build
Metro 197	15	-	Deleted	-	-
Metro 901	30	30	Same as No Build	Same as No Build	Same as No Build
Metro 903	30	30	Same as No Build	Same as No Build	Same as No Build
Metro Kent Des Moines – Federal Way[c]	30	30	Revised[d]	Same as No Build	Same as No Build
Metro Milton-Federal Way[d]	30	30	Same as No Build	Same as No Build	Same as No Build
ST 574	15	30	Revised[e]	Same as No Build	Same as No Build
ST 577	10	-	Same as No Build	Same as No Build	Same as No Build

TABLE 4-6
2035 Conceptual Transit Routes at Light Rail Stations

2035 No Build			2035 Build Alternatives		
	Headway (minutes)			Headway (minutes)	
Agency/ Routes	Peak Period	Off-Peak	Transit Service Area	Peak Period	Off-Peak
ST 578	30	20	Same as No Build	Same as No Build	Same as No Build
PT 402	30	30	Same as No Build	Same as No Build	Same as No Build
PT 500	30	30	Same as No Build	Same as No Build	Same as No Build
PT 501	30	60	Same as No Build	Same as No Build	Same as No Build

Source: Sound Transit, 2015.
[a] Revised – The course of transit routes are revised either to serve a proposed station, better serve neighborhoods, or serve additional transit stops. One or a combination of these is assumed in the revision of a route.
[b] Would be revised to begin/end at Star Lake if SR 99 Alternative is selected.
[c] Proposed new Metro route providing service between Des Moines and Federal Way via 16th Avenue S/S 272nd Street/ 51st Avenue S/S 320th Street.
[d] Proposed new Metro route providing service between Milton and Federal Way via Military Road S and S 320th Street.
[e] The ST 574 would terminate at Federal Way Transit Center Station for full-length and at Kent/Des Moines Station for the two interim conditions.
PT = Pierce Transit; ST = Sound Transit

4.2.2 Regional and Local Bus Transit Operations at Light Rail Stations

This section describes how regional and local buses would operate at each of the FWLE light rail station areas. Table 4-7 provides a summary of transit routes serving each station area.

TABLE 4-7
2035 Conceptual Transit Routes at Light Rail Stations

Station Area	Agency / Route
S 216th Street	Metro: RapidRide A Line, 156
Kent/Des Moines	Metro: RapidRide A Line, 121, 122, 156, 166
	ST: 574 (S 272nd and Kent/Des Moines interim terminus conditions)
S 260th Street	Metro: RapidRide A Line, Kent/Des Moines - Federal Way[a]
S 272nd Redondo	Metro: RapidRide A Line, 183, Kent/Des Moines - Federal Way[a]
S 272nd Star Lake	Metro: 183, 192, 193, Kent Des Moines–Federal Way[a]
	ST: 574 (S 272nd and Kent/Des Moines interim terminus conditions)
Federal Way Transit Center	Metro: RapidRide A Line, 179, 181, 182, 183, 187, 193, 901, 903, Milton–Federal Way[b], Kent/Des Moines–Federal Way[a]
	ST: 574, 577, 578
	PT: 402, 500, 501
S 320th Street Park-and-Ride	Metro: RapidRide A Line, 179, 182, 193, 903, Milton–Federal Way[b], Kent/Des Moines–Federal Way[a]
	ST: 574
	PT: 402, 500, 501

Source: Sound Transit, 2015.
[a] Proposed new Metro route providing service between Des Moines and Federal Way via 16th Avenue S/S 272nd St/ 51st Avenue S/S 320th Street.
[b] Proposed new Metro route providing service between Milton and Federal Way via Military Road S and S 320th Street.
PT = Pierce Transit; ST = Sound Transit

4.2.2.1 S 216th Station Options Area

With either the potential additional S 216th West or East station option, RapidRide A Line would continue to operate near the station location along SR 99. Metro Route 156 could be revised to operate along S 216th Street and SR 99 and use existing on-street bus zones near the station. Off-street bus stops are not planned at this station.

4.2.2.2 Kent/Des Moines Station Area

The Kent/Des Moines Station could serve as the main transit hub for Highline College and the surrounding land uses. With the Preferred Alternative or the other three build alternatives, local bus routes that currently terminate at the college along S 240th Street (Metro Routes 121/+122 and 156) could be extended to serve the Kent/Des Moines Station. Metro Route 166 could be rerouted to the station to provide a connection to light rail. The frequency of these local bus routes, which currently operate every 30 minutes, would be increased to 15 minutes in order to provide more service to light rail. Metro RapidRide A Line would still operate along SR 99 for the Kent/Des Moines Station with each alternative. Sound Transit Route 574, which serves South King County and Pierce County and currently terminates at the southern terminus of the existing Central Link light rail, could also serve this station in the Kent/Des Moines and S 272nd Street interim terminus conditions.

The Preferred Alternative would have on-street bus stops along the proposed S 236th Street. For the other three build alternatives, an off-street bus loop adjacent to the station platform would be provided. RapidRide A Line bus stops along SR 99 would be relocated to the S 236th Street intersection as part of the No Build Alternative. This relocation would provide better station access.

Station Options

Transit access to most of the station options for the Kent/Des Moines Station area would function in a similar way with all the build alternatives. Local bus routes could be extended to serve any of the station options. All station options would have an off-street bus loop in the station area. The RapidRide A Line would continue to operate along SR 99, with stops provided at the S 236th Street intersection, except for the Preferred Alternative Kent/Des Moines At-Grade Station Option, where the existing SR 99 stops near S 240th Street could serve the station.

4.2.2.3 S 260th Station Options Area

With either the potential additional S 260th West or East station option, transit service in this station area would be provided by the RapidRide A Line. This route would continue to operate near the potential station location along SR 99, and a new Metro route between Downtown Des Moines and Federal Way would be added with service along S 260th Street and SR 99. The RapidRide A Line stops could be relocated to facilitate a convenient transfer for riders between bus and light rail. Off-street bus stops are not planned at this station.

4.2.2.4 S 272nd Station Area

The Preferred Alternative and SR 99 to I-5 Alternative would serve the S 272nd Star Lake Station. Transit routes that would operate along S 272nd Street, including Metro Routes 183 and 192 as well as the potential new Metro route between Des Moines and Federal Way, could be relocated to a transit-only bus roadway within the station area. Metro Route 190, which currently serves the existing park-

and-ride, would be redundant to light rail and could be eliminated. RapidRide A Line would continue to operate along SR 99 with these alternatives and would not serve this station. Sound Transit Route 574 could continue to serve the S 272nd Star Lake Station if light rail terminates at this location or at the Kent/Des Moines Station under an interim terminus condition.

The SR 99 and I-5 to SR 99 alternatives would serve the S 272nd Redondo Station. Transit service at the station area could be similar to existing transit operations, with the potential for a new Metro route between Des Moines and Federal Way via S 272nd Street. Metro Route 190 could be truncated to terminate at the S 272nd Star Lake Station. The RapidRide A Line would continue to operate with on-street stops along SR 99 in this station area.

Station Option

The S 272nd Star Lake Elevated Station Option would be in the same general vicinity as the Preferred S 272nd Star Lake Station, with the elevated station option planned just to the north of the Preferred Alternative station location. The elevated station option access for bus service, park-and-ride, and non-motorized trips would be similar to the Preferred Alternative.

4.2.2.5 Federal Way Transit Center Station Area

With the Preferred Alternative, all bus routes would be redirected to bus stops adjacent to the light rail station west of 23rd Avenue S. The bus routes would circulate through the new street system between S 317th Street, S 320th Street, 21st Avenue S, and 23rd Avenue S. Several of these new roads could be designated transit-only. On-street bus stops could be provided in "zones" along the new street grid and directly adjacent to the station area. An ingress-only, transit-only roadway could also be provided at the S 317th Street and 23rd Avenue S intersection to improve transit travel time and access into the station area. The existing bus loop between 23rd Avenue S and 21st Avenue S could be repurposed to allow for both vehicular and bus traffic, with bus layover zones provided on one or both sides. With the other build alternatives, local bus routes could continue to be served by the existing bus loop provided at the Federal Way Transit Center.

Metro Routes 177 and 197 could be eliminated, while Metro Route 178 could be rerouted. The frequency of service for other routes that serve local jurisdictions, including Federal Way (Metro Route 182/187), Auburn (Metro Route 181), and Kent (Metro Route 183), could be increased to supply the higher frequency and capacity of light rail service in both the No Build and build alternatives.

Station Options

The Federal Way SR 99 and I-5 station options could both operate as extensions to the existing Federal Way Transit Center, with transit routes serving both transit areas. Therefore, the conceptual bus service described for the build alternatives could still apply for either of these options.

With the Federal Way S 320th Park-and-Ride Station Option, the existing Federal Way Transit Center would continue to service bus activity. Therefore, several transit routes could serve both transit areas to create a connection between the transit center and park-and-ride. Bus routes that could serve the S 320th Street Park-and-Ride are listed in Table 4-7.

4.2.3 Transit Travel Time

The following subsections describe forecasted transit travel times for bus and rail users between regional destinations in 2035 and discuss the difference in light rail travel times between the build alternatives and station options.

4.2.3.1 Study Area Light Rail Travel Time

Light rail travel times between the Federal Way Transit Center Station and the Angle Lake Station are presented in Exhibit 4-3 for the build alternatives and the station options. Travel times are expected to range between 12 and 14 minutes, depending on the selected alternative and station options. In general, alignments that are shorter in length and have fewer horizontal curves (e.g., Federal Way SR 99 Station Option and Federal Way I-5 Station Option) would have slightly faster travel times. Travel times would increase by less than a minute with an additional station at either S 216th Street and/or S 260th Street as a result of dwelling time at the station. The SR 99 Alternative with the potential additional S 216th and S 260th station options would have the longest travel time due to the additional stops.

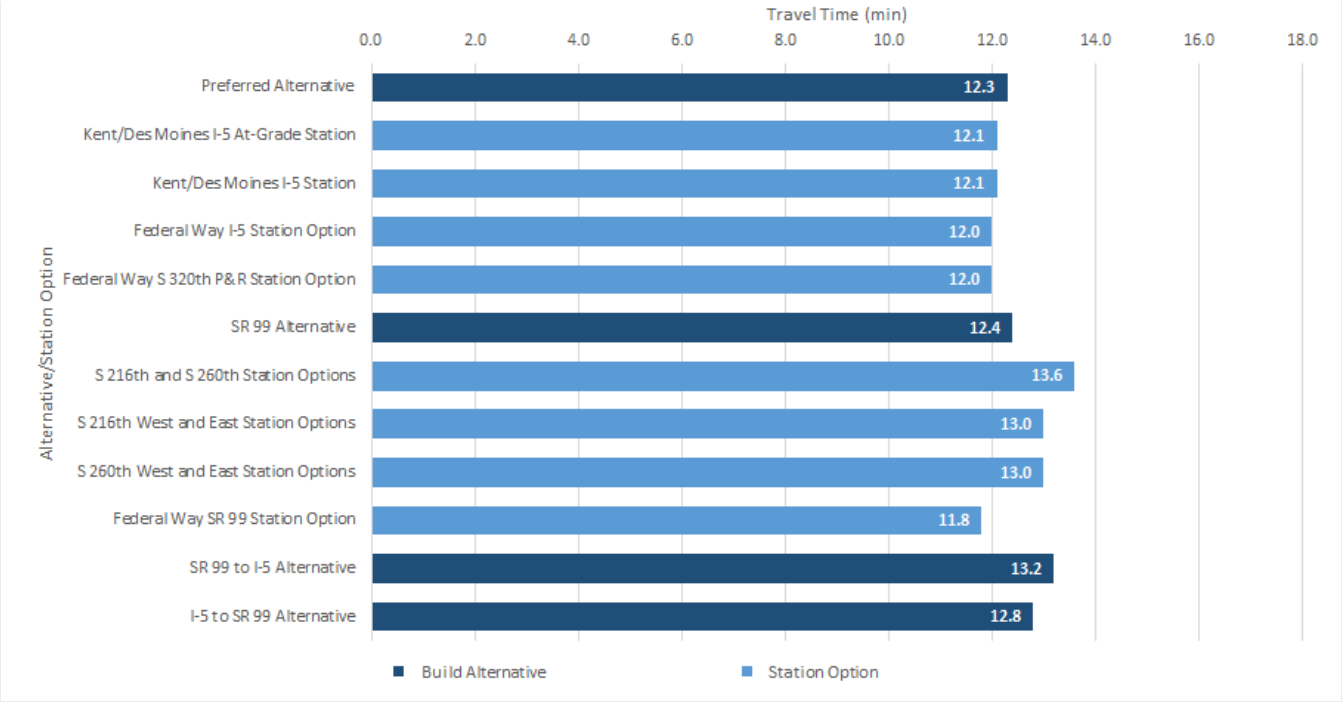


EXHIBIT 4-3
2035 FWLE Alternatives and Station Options Light Rail Travel Times: Angle Lake to Federal Way Transit Center

4.2.3.2 Transit Travel Time to Regional Destinations

Table 4-8 shows the estimated 2035 PM peak-period transit travel times between Federal Way and key regional Puget Sound destinations. The travel times assume three FWLE stations (Kent/Des Moines, S 272nd Street, and Federal Way Transit Center) and do not include the potential additional S 216th or S 260th West or East station options. Current bus travel times from Sea-Tac Airport and Downtown Seattle (International District) to Federal Way were obtained from Sound Transit's Trip Planner and factored to 2035 conditions based on forecasted congestion. No Build Alternative travel times between

Federal Way and regional centers east of Seattle (Bellevue and Overlake) include the travel time to Downtown Seattle via bus and then a transfer to the Link system at the International District/Chinatown Station. The travel time estimates include time required to make that transfer. The future light rail travel times account for factors such as station boarding and alighting times, transit transfer wait times, light rail train acceleration and deceleration, and system operating speeds and are shown in Table 4-8 for the Preferred Alternative.

TABLE 4-8
2035 PM Peak Period Transit Travel Times (minutes) and Transfers between Federal Way and Regional Centers

Origin	No Build Alternative[a]		Preferred Alternative[b]	
	Travel Time (minutes)	# of Transfers	Travel Time (minutes)	# of Transfers
Downtown Seattle (International District/Chinatown Station)	47[c]	0	46	0
Sea-Tac Airport	45[c]	0	15	0
Downtown Bellevue	75[d]	1	70[e]	1
University of Washington	66[d]	0	57	0
Northgate	74[d]	1	65	0
Lynnwood Transit Center	88[d]	1	79	0
Overlake	85[d]	1	80[e]	1

[a] No Build Alternative travel times calculated based on quickest route using bus and/or light rail service.
[b] Preferred Alternative travel times calculated using only light rail service.
[c] Sources: No Build Alternatives – Travel time for a representative bus route using Sound Transit's Trip Planner from February 2016 (Sound Transit, 2016). Travel times were factored to 2035 by using future estimated roadway congestion based on regional growth (PSRC, 2014a). Preferred Alternative and Central Link/East Link Travel Times – Sound Transit light rail travel time estimates (Sound Transit, 2014b).
[d] Trip assumes light rail taken to the International District/Chinatown, and an 8-minute transfer time was assumed to access a surface bus to Federal Way Transit Center.
[e] Trip assumes light rail taken to the International District/Chinatown, and a 4-minute transfer time was assumed to access light rail to Federal Way Transit Center.

A comparison of travel times for the No Build and Preferred Alternative shows a range of travel time savings for commuting between many regional destinations. The light rail travel time between Downtown Seattle to Federal Way would be 1 minute faster than under the No Build Alternative, and the travel time savings between Federal Way and Bellevue/Overlake area would be close to 5 minutes faster. The largest travel time improvement would be between Sea-Tac Airport and Federal Way. The travel time from Federal Way to Sea-Tac Airport is forecasted to be 45 minutes under the No Build Alternative. Bus routes between these two destinations stop frequently and are delayed by congestion and traffic signals on arterials, which increases travel time. Light rail would operate with fewer stops and would not be impaired by vehicular traffic, resulting in a 30-minute shorter travel time under the build alternatives.

Express bus service between Federal Way and Downtown Seattle (International District/Chinatown) would have a 47-minute travel time with the No Build Alternative. These routes have infrequent stops and use I-5 exclusively to Downtown Seattle. With the build alternatives, the light rail trip would have a 46-minute travel time to Downtown Seattle. Light rail would also serve South Seattle neighborhoods, have more stops, and operate at-grade along portions of the alignment, resulting in similar travel times

as bus trips. While bus service is frequent and generally a direct ride from Federal Way Transit Center to Downtown Seattle, the reliability of the trip depends on freeway and local roadway conditions. With light rail operating in a grade-separated guideway, this trip would be more reliable even though the overall travel times would be similar. Transit travel times between Eastside destinations and the Federal Way Transit Center would improve with the light rail alternatives by approximately 5 minutes. A transfer would be required in the No Build Alternative and Preferred Alternative for Eastside destinations; however, the transfer between Central Link and East Link light rail would occur inside the Downtown Seattle Transit Tunnel, resulting in a shorter and more desirable transfer. A comparable bus-to-rail transfer would occur between the surface streets and the tunnel by 2035 because the tunnel will be used for light rail only.

While travel times from the Federal Way Transit Center to the International District/Chinatown Station are documented in Table 4-8, a greater travel time savings would be realized as light rail continues north and serves more of Downtown Seattle and other key Seattle destinations (e.g., Westlake Center), compared with the No Build Alternative. The Downtown Seattle Transit Tunnel would be used exclusively by light rail, whereas buses would use city surface streets. Buses would be further slowed by traffic signals and congestion, which could result in higher travel times compared with light rail.

For destinations north of downtown Seattle, such as University of Washington, Northgate, and Lynnwood, light rail would save at least 9 minutes of travel time compared with the No Build Alternative. For the Northgate and Lynnwood destinations, a transfer from bus to light rail would be required under the No Build Alternative, thus increasing travel time, and may result in the potential to miss a connection.

4.2.4 Ridership

The ridership forecasts produced for the FWLE were consistent with regional planning and used the most up-to-date information available. This included land use forecasts released by PSRC in April 2014 that reflected the most current release available at the time the environmental analysis was being conducted. This land use set, referred to by PSRC as the "Land Use Targets data" forecasts, was created by PSRC to reflect local agencies' adopted plans, including population and employment forecasts.

Therefore, the land use data used in the PSRC travel demand model represent a regional development pattern consistent with what local jurisdictions are planning under the first set of VISION 2040-aligned local growth targets, such as the City of Kent's Midway Subarea Plan. Overall, these land uses assume a substantial growth pattern within the study area for the year 2035 (close to a 50 percent increase in employment and households surrounding the Kent/Des Moines Station area) and were used as the basis for ridership projections.

In addition to the updated land use forecasts, the Sound Transit Ridership model has also been updated with more recent transit survey (boarding information) data that have steadily increased since the Draft EIS was published. Also, as described previously in Section 4.2.1, a transit service integration plan that reflects the King County long-range planning efforts have been assumed for the future

forecasts, and it would result in a greater increase in services to the proposed FWLE stations than previously assumed in the Draft EIS.

4.2.4.1 Full-Length Alternatives

Table 4-9 shows the 2035 daily transit ridership for the No Build Alternative and build alternatives in the FWLE corridor. Table 4-9 also documents the expected daily ridership and change in the number of new transit riders with the build alternatives. Total daily trips (ridership) account for riders on the FWLE, regardless of where they would board the train.

TABLE 4-9
2035 FWLE Weekday Daily Transit Trips and FWLE Riders

Measure	No Build Alternative	Build Alternatives					
		Preferred	SR 99	SR 99 to I-5	I-5 to SR 99	SR 99 – Four Stations[a]	SR 99 – Five Stations[b]
Total Daily Transit Trips[c]	651,000	659,500	659,500	659,000	659,000	660,000	660,000
Total Daily Systemwide Link Boardings[d]	308,000	335,000	335,500	333,500	334,500	336,000 – 336,500	337,500
Total FWLE Light Rail Project Riders	N/A	36,500	36,500	35,000	35,500	37,500 - 38,000	39,500
2035 New Transit Riders	N/A	8,000	8,500	7,500	8,000	8,500	9,000

Source: Sound Transit, 2014b.
[a] Range provided assumes a station at S 216th Street or S 260th Street.
[b] Assumes SR 99 Alternative with additional stations at S 216th Street and S 260th Street.
[c] Includes both light rail and bus riders in the Sound Transit service area.
[d] Total daily systemwide boardings includes transfers between FWLE and the East Link. Therefore, the change in total boardings between the No Build Alternative and build alternatives is higher than the change in total boardings at the proposed FWLE stations.
N/A = not applicable

The FWLE alternatives would generate between 35,000 and 39,500 daily riders, and up to 9,000 would be new transit riders. Under all the build alternatives, the number of regional (Sound Transit service area) daily transit boardings is expected to increase by up to 1.4 percent.

Average 2035 weekday and PM peak period (3 p.m. to 6 p.m.) station boardings are shown in Exhibit 4-4 for the Preferred and other build alternatives and in Exhibit 4-5 for the station options. These boardings show only the trips starting at each FWLE station and the Angle Lake Station, while the total trips shown in Table 4-9 include all trips to or from any FWLE station. In these exhibits, potential stations are listed north to south, and the size of the circle represents the estimated number of the boardings at each station. The ridership at each station would vary, depending on the alternative and combination of stations.

For the Preferred Alternative, the total daily boardings in the study corridor would be 19,000 boardings per day, while the total daily boardings for the other build alternatives would range from 18,000 to 19,500 boardings per day (see Exhibit 4-4). In general, the ridership forecasts for the build alternatives are relatively similar because the station locations and their features, transit service connections, and light rail travel times would be similar.

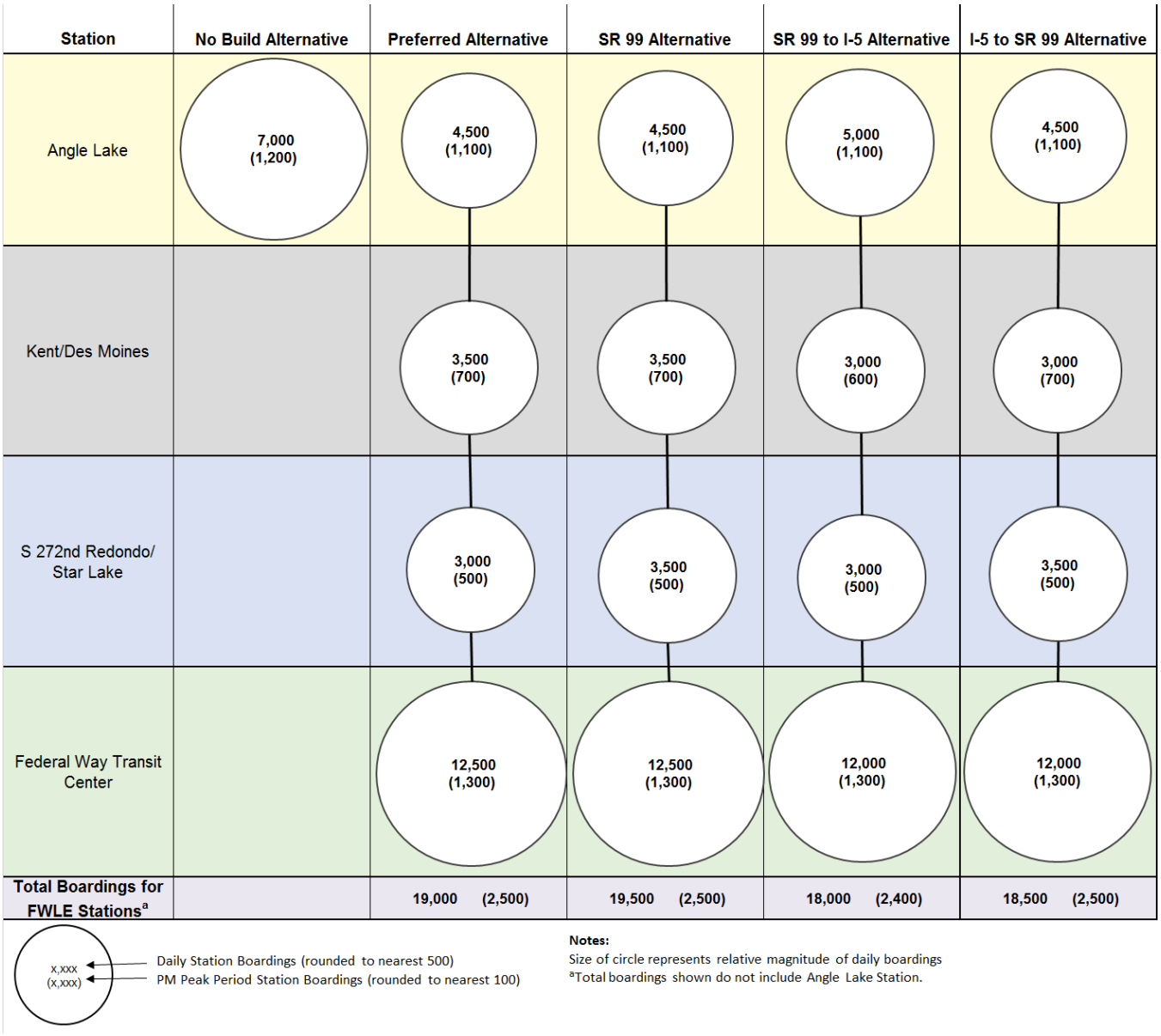


EXHIBIT 4-4
2035 FWLE Build Alternative Weekday Station Boardings

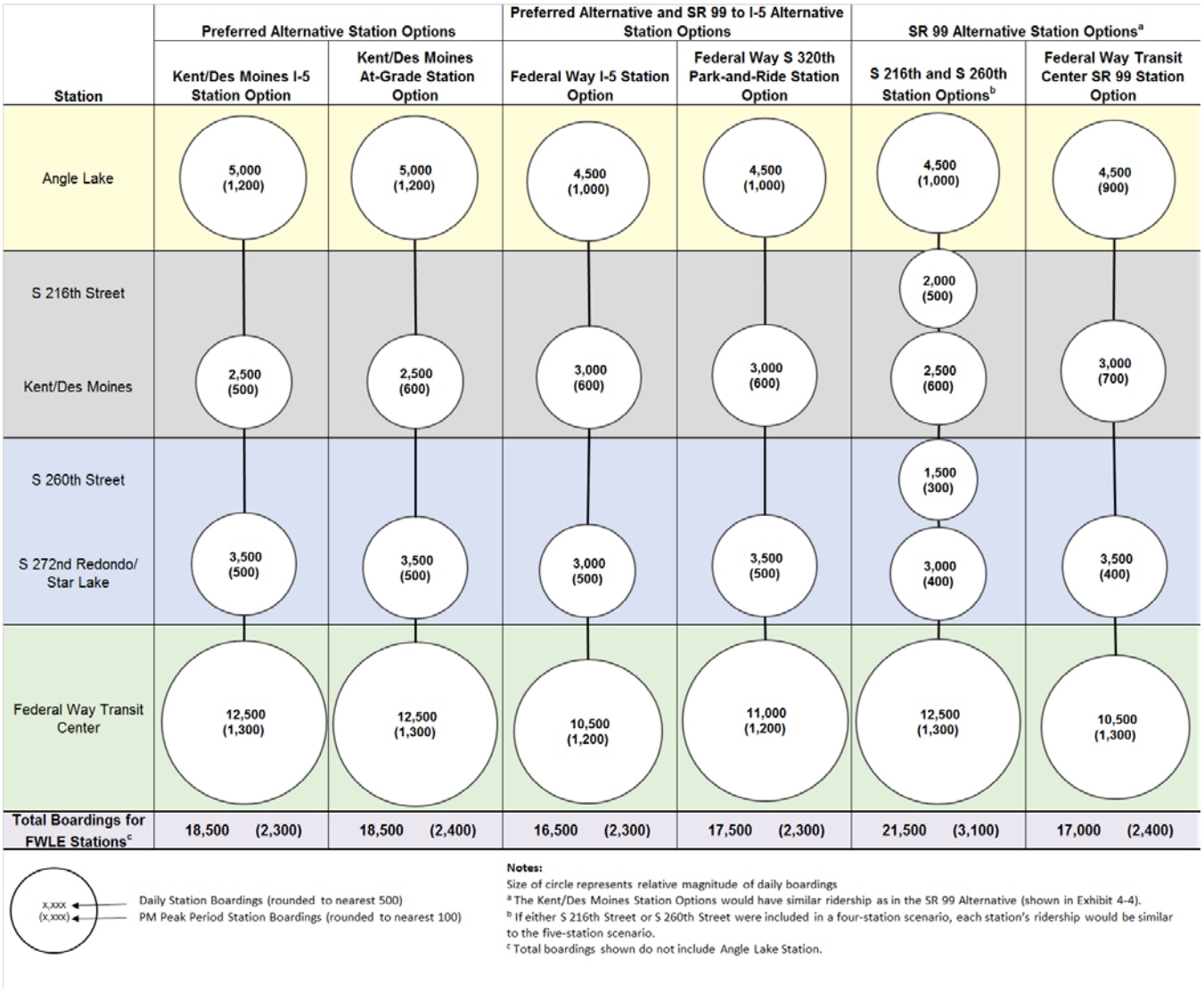


EXHIBIT 4-5
2035 FWLE Light Rail Station Options Weekday Station Boardings

The differences in boardings among the build alternatives and station options is influenced by a combination of factors, including the density of population and employment around the station, local and regional transit service connectivity, proximity to RapidRide A Line stops, station access and walkability, the amount of parking stalls at the station facilities, and the expected light rail operating speeds. For example, because the Preferred Alternative Kent/Des Moines I-5 and At-Grade station options would be farther from SR 99 and Highline College and not be directly served by the RapidRide A Line, these station options would have about 1/3 fewer boardings than station options along or closer to SR 99.

As noted in Section 4.2.1, Metro would continue to operate the RapidRide A Line on SR 99 and not directly serve the Kent/Des Moines I-5 or At-Grade station options. While RapidRide A Line riders may not access the Link system at these station options, they would likely continue to use transit and access the Link system at another nearby station.

For both the S 272nd Redondo and S 272nd Star Lake stations, bus feeder service (i.e., routes between the station and nearby areas) is assumed. In addition to feeder service, RapidRide A Line also provides bus service near the S 272nd Redondo Station location. This additional service would contribute to the difference in station boardings between these two stations (Exhibit 4-4).

The Federal Way Transit Center, as with other station locations, would have similar ridership under all alternatives (Exhibit 4-4). Ridership variations between alternatives are primarily due to the proximity of park-and-ride spaces relative to the station location and the ease of transfer opportunities from buses. Park-and-ride opportunities from existing spaces at the Federal Way Transit Center would be closer in proximity to the Preferred Alternative than the I-5 and SR 99 station options and would result in slightly higher ridership in the Preferred Alternative.

When considering station options, the highest ridership potential would occur with the SR 99 Alternative with five stations, with 21,500 boardings per day, and the lowest would be the Preferred Alternative with the Federal Way I-5 Station Option, with 16,500 boardings per day (see Exhibit 4-5). Although the addition of stations would add to the overall ridership, a portion of those additional station boardings would come from the other stations.

At the Angle Lake Station, daily station boardings is expected to be 7,000 boardings per day (1,200 boardings in PM peak period) under the No Build Alternative. With the FWLE build alternatives and station options, daily station boardings at the Angle Lake Station are expected to range from 4,500 to 5,000 boardings per day, a decrease of 2,000–2,500 boardings per day compared with the No Build Alternative, as light rail riders would be able to access the light rail system from the south with the FWLE.

4.2.4.2 Interim Terminus Conditions

Tables 4-10 and 4-11 include the forecasted transit ridership and new transit riders information for the build alternatives in the Kent/Des Moines Station and S 272nd Station interim conditions, respectively. Under all the FWLE interim terminus conditions, the number of regional transit trips would increase slightly. With a Kent/Des Moines interim terminus station, up to 1,500 new transit riders would be expected, and with the S 272nd interim terminus station, up to 3,500 new transit riders would be expected. With a Kent/Des Moines interim terminus station, the SR 99 Alternative would have the highest total FWLE corridor light rail riders (12,500), and the I-5 to SR 99 Alternative would have the lowest riders (9,000).

With the S 272nd Station interim terminus condition, the SR 99 and I-5 to SR 99 alternatives would have slightly higher light rail riders (17,500–19,000) than the Preferred Alternative and SR 99 to I-5 Alternatives (15,500–16,500). The SR 99 and I-5 to SR 99 alternatives would attract more ridership due to the S 272nd Station's proximity to the RapidRide A Line. The Preferred Alternative would have slightly higher light rail riders (16,500) than the SR 99 to I-5 Alternative (15,500) due to faster travel times on light rail.

TABLE 4-10
2035 Kent/Des Moines Station Interim Terminus Weekday Ridership and FWLE Riders

Measure	2035 No Build	2035 Build Alternative			
		Kent/Des Moines Station Interim Terminus			
		Preferred	SR 99	SR 99 to I-5	I-5 to SR 99
Total Regional Daily Transit Trips[a]	651,000	652,500	653,000	652,000	652,000
Total Daily Systemwide Link Boardings[b]	308,000	313,000	314,000	312,500	312,000
FWLE Light Rail Riders	N/A	11,000	12,500	10,500	9,000
2035 New Transit Riders	N/A	1,000	1,500	1,000	1,000

Source: Sound Transit, 2014b.
[a] Includes both light rail and bus riders in the Sound Transit service area.
[b] Total daily systemwide boardings includes transfers between the FWLE and East Link. Therefore, the change in total boardings between the No Build Alternative and build alternatives is higher than the change in total boardings at the proposed FWLE stations.
N/A = not applicable

TABLE 4-11
2035 S 272nd Station Interim Terminus Weekday Ridership and FWLE Riders

Measure	2035 No Build	2035 Build Alternative			
		S 272nd Station Interim Terminus			
		Preferred	SR 99	SR 99 to I-5	I-5 to SR 99
Total Regional Daily Transit Trips[a]	651,000	654,000	654,500	653,500	653,500
Total Daily System-wide Link Boardings[b]	308,000	317,500	320,500	317,000	319,000
FWLE Light Rail Riders	N/A	16,500	19,000	15,500	17,500
2035 New Transit Riders	N/A	2,500	3,500	2,500	2,500

Source: Sound Transit, 2014b.
[a] Includes both light rail and bus riders in the Sound Transit service area.
[b] Total daily systemwide boardings includes transfers between the FWLE and East Link. Therefore, the change in total boardings between the No Build Alternative and build alternatives is higher than the change in total boardings at the proposed FWLE stations.
N/A = not applicable

Table 4-12 presents the 2035 interim terminus station boardings for the four build alternatives. The expected boardings under the Kent/Des Moines Station interim terminus condition would vary between 5,000 and 6,500 among the build alternatives. Under the S 272nd Station interim terminus condition, the Redondo and Star Lake stations would have similar boardings (6,000 to 6,500) with any of the build alternatives. Under both the Kent/Des Moines and S 272nd station interim terminus conditions, differences in ridership among alternatives at the Kent/Des Moines Station would be due to transfers related to both the RapidRide A Line and Sound Transit Route 574. Specifically, if there is a station at Star Lake, the RapidRide A Line would not have access there and transfers between RapidRide A Line and light rail would occur at the Kent/Des Moines Station. With a light rail station at Redondo, RapidRide A Line transfers with light rail would occur at the S 272nd Redondo Station rather than at the Kent/Des Moines Station. Similarly, if there is a station at Redondo, Route 574 would not have access there and transfers between Route 574 and light rail would occur at the Kent/Des Moines

Station. More park-and-ride opportunities at the S 272nd Station alternatives in the interim terminus condition would also affect the ridership at the Kent/Des Moines Station among the alternatives.

TABLE 4-12
2035 Interim Terminus Weekday Station Boardings

Interim Terminus Station	Alternative	Station Boardings	
		Kent/Des Moines	S 272nd (Redondo or Star Lake)
Kent/Des Moines	Preferred	6,000	n/a
	SR 99	6,500	n/a
	SR 99 to I-5	6,000	n/a
	I-5 to SR 99	5,000	n/a
S 272nd (Redondo or Star Lake Stations)	Preferred	2,500	6,500
	SR 99	4,000	6,000
	SR 99 to I-5	2,500	6,000
	I-5 to SR 99	3,500	6,000

Source: Sound Transit, 2014b.

Similar to the full-length alternatives, differences in boardings among the alternatives during the interim terminus condition would typically be influenced by a combination of factors, including the density of population and employment around the station area, local and regional transit service connectivity, station access and walkability, the number of parking stalls at the stations, and expected light rail operating speeds and travel times.

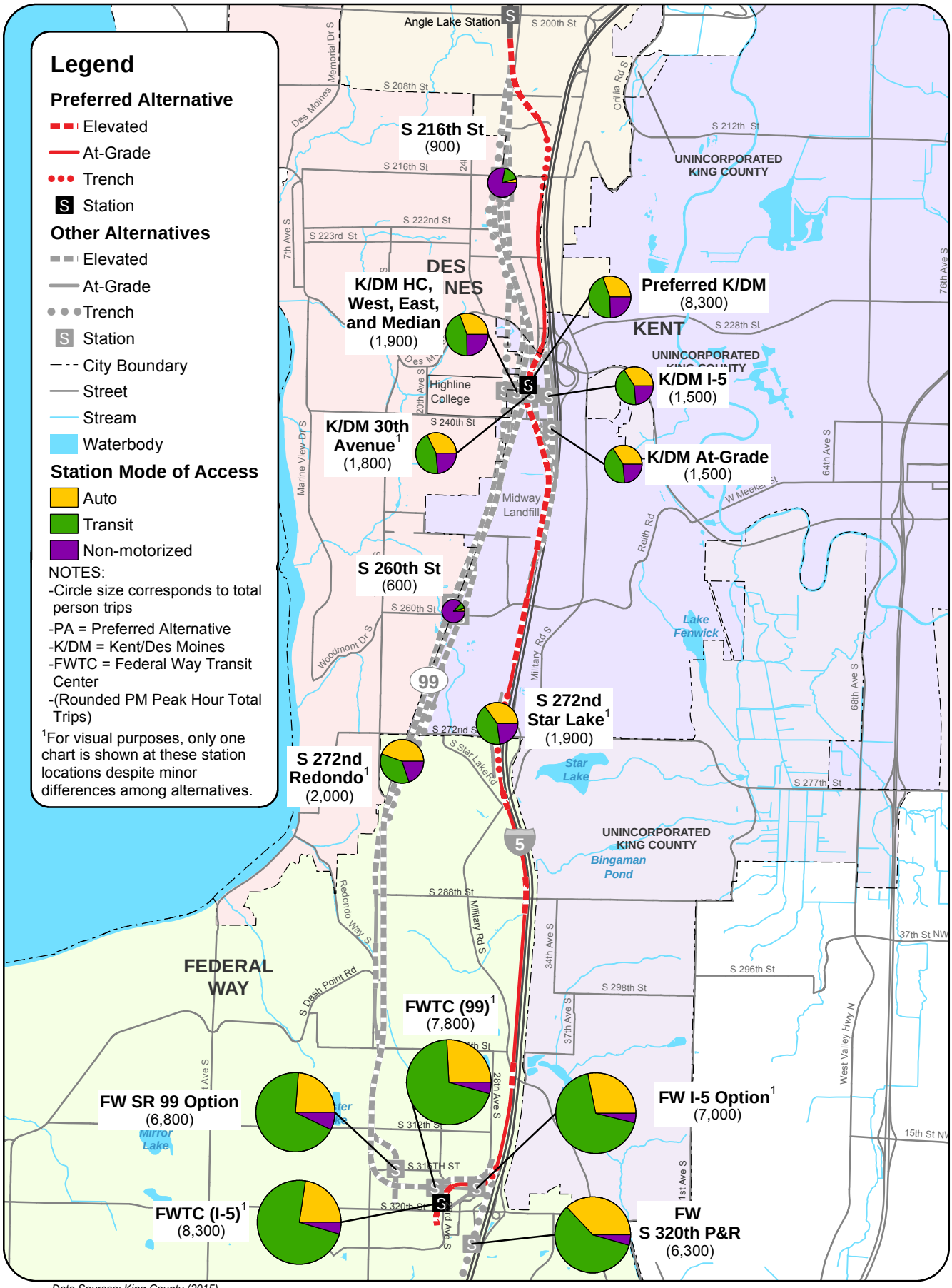
4.2.5 Station Mode of Access for Full-Length Build Alternatives

Station area travel mode of access was analyzed for each type of person trip at a station. Mode of access can be characterized by the following types of trips:

- Automobile (includes park-and-ride trips as well as passenger drop-off/pick-up)
- Transit (bus to rail, rail to bus, and bus to bus)
- Non-motorized (includes both walking and bicycling to transit)

In addition to station boarding information, the Sound Transit Ridership Model provides an estimate of the various modes of access that would occur at each station except passenger drop-off/pick-up trips. Based on research from the Tukwila International Boulevard Station, it was assumed that 10 percent of all transit (rail and bus) alightings during the PM peak hour would be passenger drop-off/pick-up trips. These trips were reallocated from the other travel modes described above. The model also provides data regarding park-and-ride trips based on the relative attractiveness for automobile access, available parking at the station area, and accessibility.

Exhibit 4-6 shows the expected mode of access to each station area during the PM peak hour for the four build alternatives and also highlights how the mode of access would change with the station options. The pie chart sizes on Exhibit 4-6 are indicative of the relative number of boardings at each station area. The information shown in Exhibit 4-6 represents the total station area activity, including



Data Sources: King County (2015).

EXHIBIT 4-6
2035 Build Alternatives Station
PM Peak Hour Mode of Access
Federal Way Link Extension

all trips to and from transit, which includes both light rail and buses. These totals are different than those shown in Exhibits 4-4 and 4-5, which only include boardings to light rail. Detailed mode share percentages are provided in Appendix C of this report.

4.2.5.1 S 216th Station Options

The mode of access at either the potential additional S 216th West or East station option is expected to be primarily non-motorized because transit feeder service to this station area would be limited to two bus routes and no parking is proposed at the station. While some transit transfers would occur at this station, likely riders on these bus routes would choose to transfer to light rail at other light rail stations. As noted above, a small portion of the trips at this station would be passenger drop-off/pick-up trips, representing the only type of automobile access trips at this station.

4.2.5.2 Kent/Des Moines Station

At the Kent/Des Moines Station, a majority of the station activity would involve transit transfers for all station locations. The Kent/Des Moines Station is assumed to be in the same general vicinity under all build alternatives and station options, at locations around SR 99, 30th Avenue S, and S 240th Street. Under all alternatives, buses, with the exception of RapidRide A Line, would be routed to serve the station. RapidRide A Line would be revised to include stops at S 236th Street for alternatives where that would provide better proximity to the light rail station than the current stops at S 240th Street. However, RapidRide A Line would not deviate from its routing along SR 99 for the alternatives that are on 30th Avenue S or for the I-5 station options near S 240th Street.

The magnitude of non-motorized and automobile-based trips is forecasted to be similar across all the build alternatives at this station area. However, the non-motorized trips would be lower for alternatives with the station located farther away from SR 99.

4.2.5.3 S 260th Station Options

The mode of access at either the potential additional S 260th West or East station option is expected to be predominantly non-motorized. Transit service to this station area would be limited to the RapidRide A Line. While some transit transfer would occur near this station area, the number of riders who would board between S 272nd and S 260th streets would be limited because of the fairly short distance between the two stations. A small portion of the trips at this station would be passenger drop-off/pick up trips, representing the only type of automobile access trips at this station.

4.2.5.4 S 272nd Star Lake Station

The mode of access to the S 272nd Star Lake Station is expected to be very similar with either the Preferred Alternative or the SR 99 to I-5 Alternative. Similar to the Kent/Des Moines Station, local and regional transit routes would serve this station area either inside the station area or adjacent to the station, with bus stops located on the I-5 southbound off-ramp and I-5 northbound on-ramp with S 272nd Street. Bus service would provide coverage to surrounding neighborhoods and communities. Approximately 42 percent of the 1,900 total PM peak hour trips would access the station via transit. The same modes of access would occur with the S 272nd Star Lake Elevated Station Option.

4.2.5.5 S 272nd Redondo Station

The majority of station activity at the S 272nd Redondo Station would involve transit transfers and automobile access. Bus service at this station would be limited to RapidRide A Line and planned local Metro bus service, but these bus routes would have high ridership, which would result in a large number of transit transfers. Therefore, the overall PM peak hour trips at this station would be similar to the S 272nd Star Lake Station (2,100 at Redondo compared to 1,900 at Star Lake). The same modes of access would occur with the S 272nd Redondo Trench Station Option.

4.2.5.6 Federal Way City Center Stations

The Federal Way Transit Center station would continue to serve as a major regional transit center with any of the build alternatives and is forecasted to operate with a very high percentage of transit transfers and automobile-based trips. Although land uses in this station area are forecasted to change from the current commercial focus to more mixed use, due to the frequent and high level of connecting transit service and connections with the regional highway system, the predominant mode of access at this station would be transit and automobile trips with a smaller share of pedestrian- and bicycle trips. This station would operate as a terminus location and attract more persons who would be willing to drive from south King County and north Pierce County. Pedestrian-based trips would be a very small percentage of the total ridership.

The Federal Way SR 99 Station Option would have similar mode of access percentages compared to the Federal Way station options located near the existing Federal Way Transit Center. However, with the Federal Way SR 99 Station Option, the proportion of non-motorized trips would slightly increase due to land uses near the station that could generate higher levels of non-motorized activity.

The Federal Way S 320th Park-and-Ride Station Option would generate a higher percentage of auto-based trips compared to the other Federal Way station options. At this site, a large number of parking spaces would be available for light rail users and fewer transit routes would serve the station area, resulting in a lower percentage of transit transfers and a higher percentage of auto-based trips.

4.2.6 Station Mode of Access for Build Alternatives Interim Terminus Conditions

Exhibit 4-7 shows the expected mode of access to each station area for the four build alternatives under the interim terminus conditions.

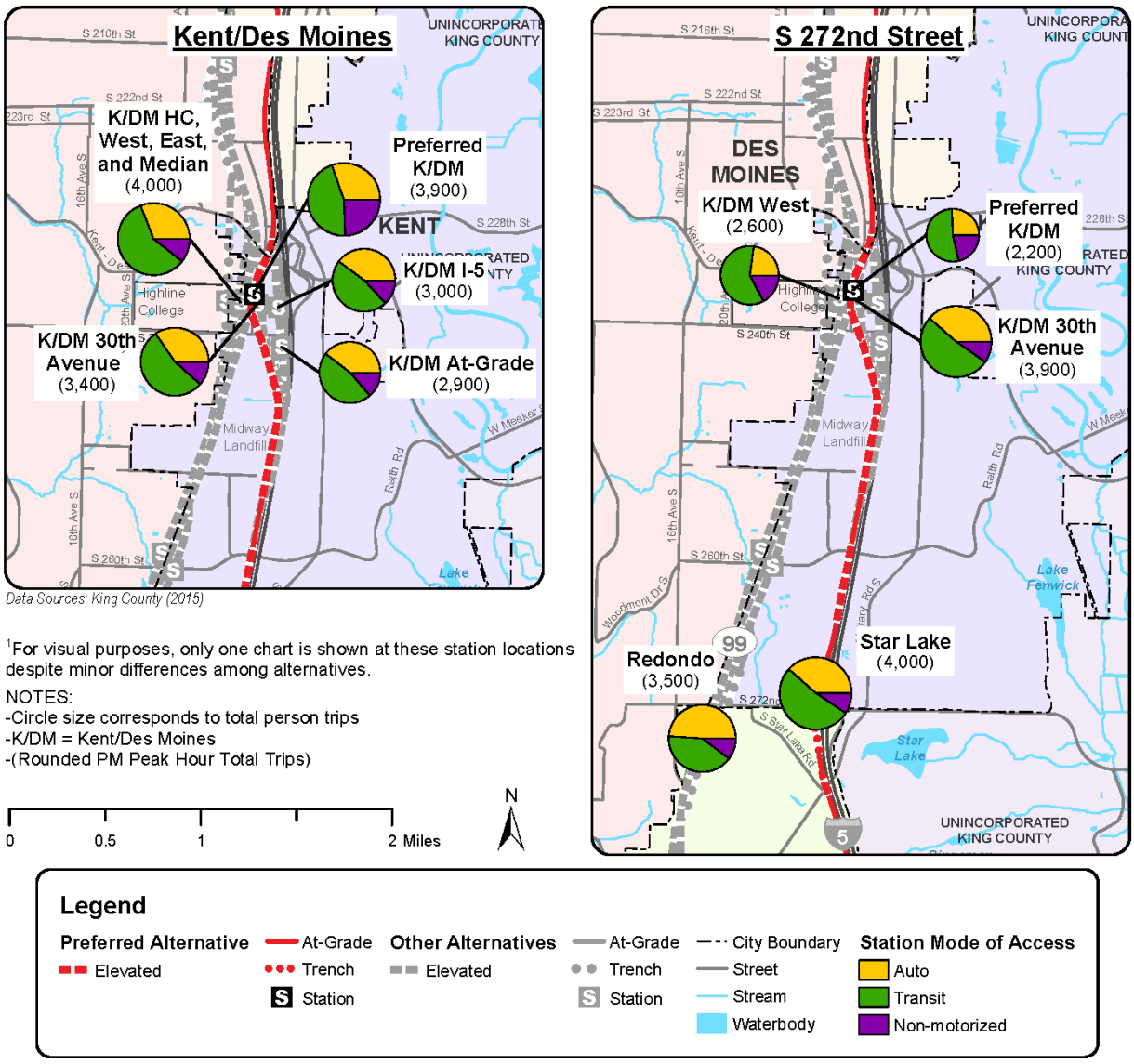


EXHIBIT 4-7
2035 Light Rail Alternatives Interim Terminus Conditions Station Mode of Access Person Trips

4.2.6.1 Kent/Des Moines Station

Under the Kent/Des Moines Station interim terminus condition, the mode of access to the station would include a greater percentage of transit transfer trips compared to the full-length build alternatives. More bus-to-rail transfers from feeder bus routes, including the Metro RapidRide A Line and Sound Transit Route 574, would be expected. The park-and-ride capacity at this location would be greater than with the full-length build alternatives; therefore, the magnitude of automobile-based trips would also increase.

4.2.6.2 S 272nd Station

Similar to the Kent/Des Moines Station, under the S 272nd Station interim terminus condition, the mode of access to the station would include a greater percentage of transit transfer trips. The S 272nd Street Station interim terminus condition would likely also have similar station modes of access as the

Kent/Des Moines Station (automobile or non-motorized) and would still have more transit transfers compared with the full-length build alternatives.

4.2.7 Transit LOS Measures

Transit LOS was analyzed for service frequency, hours of service, passenger loads, and reliability to describe transit performance in the No Build and build alternatives for the year 2035. The transit LOS methodology used the same procedures and metrics described in Section 3.2.4 in Chapter 3, Affected Environment. The results are reported for the Preferred Alternative because all of the build alternatives would have similar results, and the Preferred Alternative is representative of all build alternatives.

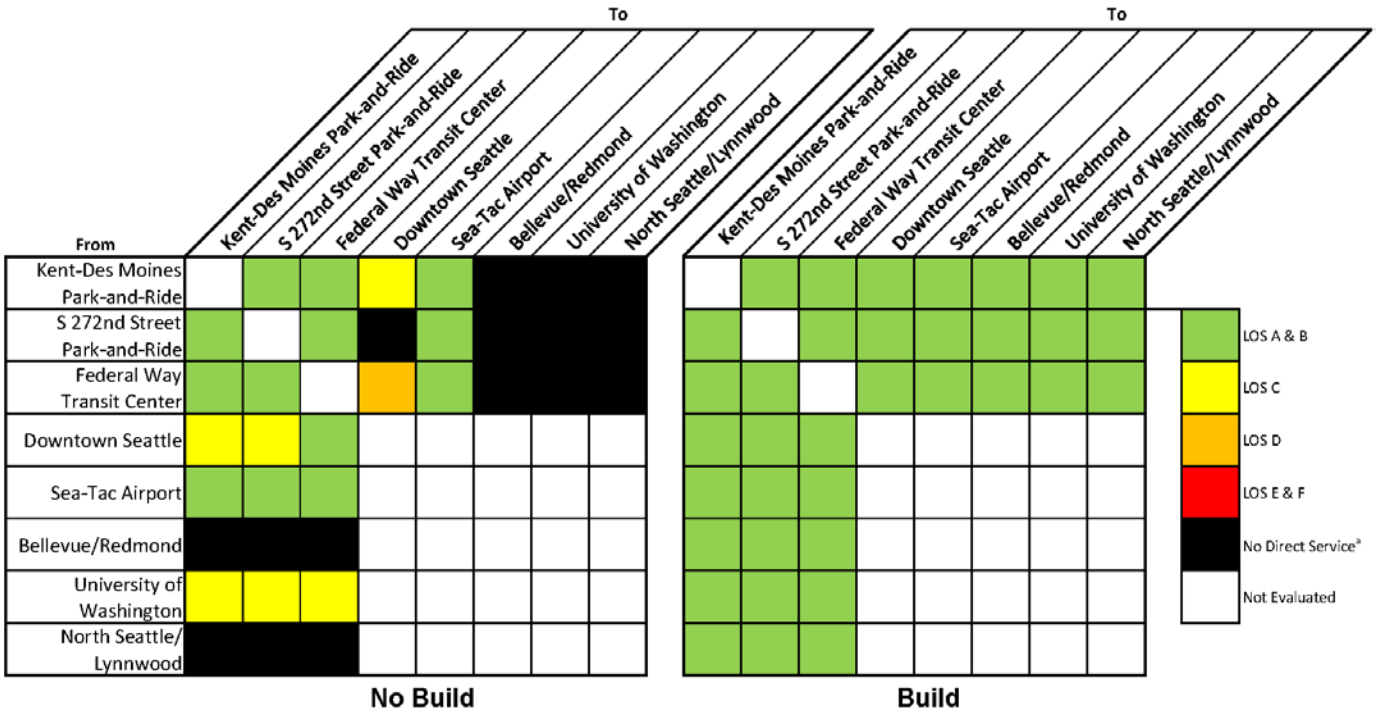
4.2.7.1 Service Frequency

Exhibit 4-8 shows the LOS for service frequency for the 2035 No Build and build alternatives during the PM peak hour. The 2035 No Build service frequency is expected to have a slightly better LOS when compared to existing conditions. Direct transit service to regional destinations outside of Downtown Seattle would generally be limited and only be provided in the southbound (peak) direction of travel. Direct transit service (not requiring a transfer) between the FWLE study area and North Seattle (Northgate and Lynnwood) and Bellevue/Redmond areas would not be available with the No Build Alternative.

With the build alternatives, overall service frequency would improve to LOS A for connections between Federal Way, Kent, Des Moines, SeaTac, and many of the Puget Sound regional destinations. The FWLE would still require a transfer to regional destinations east of Lake Washington (Bellevue/ Redmond); however, the frequency of the rail service and the ease of transfer between light rail lines would minimize the transfer time.

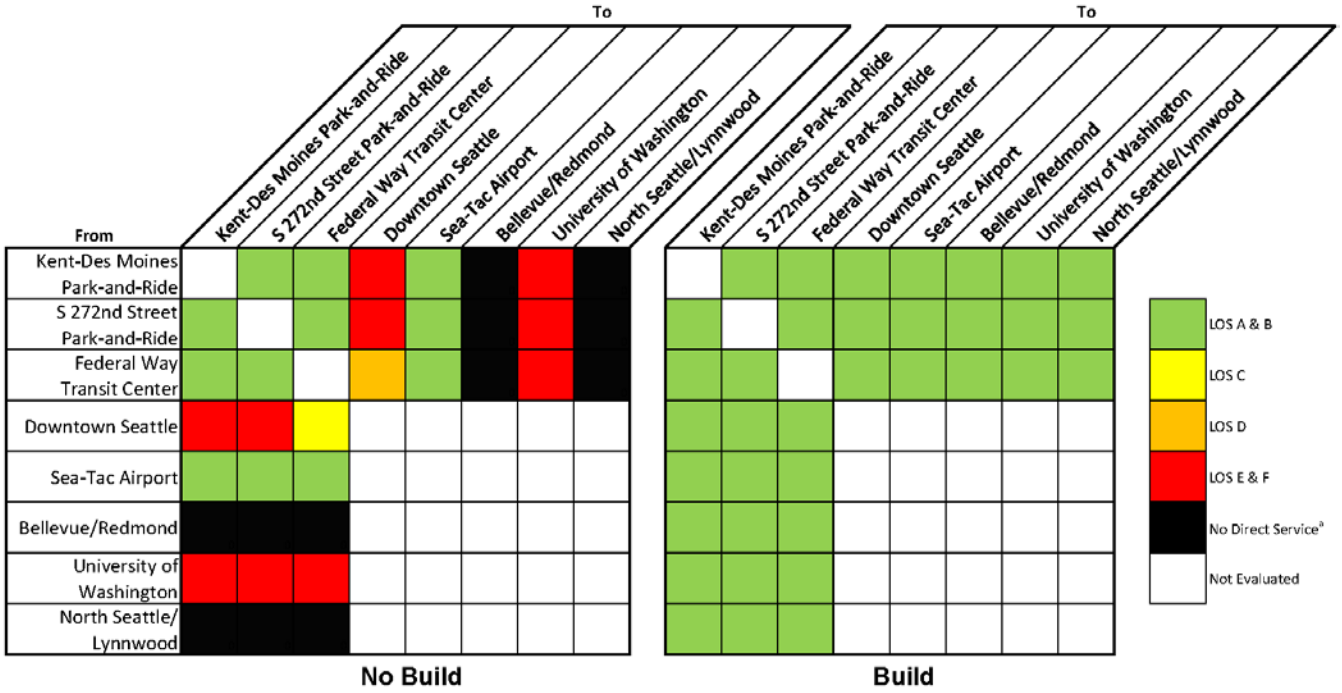
4.2.7.2 Hours of Service

Exhibit 4-9 shows the LOS for hours of service for the 2035 No Build and build alternatives. The 2035 No Build transit hours of service are assumed to remain the same as existing transit operations. With the No Build Alternative, the hours of service to Downtown Seattle from the Federal Way Transit Center and the Redondo Heights/Star Lake service areas would be LOS D and LOS F, respectively. Eastside destinations (Downtown Bellevue and Redmond) and North Seattle/Lynnwood would not have direct transit service with the No Build Alternative. With the build alternatives, continuous, two-way service for 20 hours would result in LOS A for all evaluated origin-destination pairs.



[a]No direct service or requires one or more bus transfers.
At LOS A, passengers are assured a transit vehicle will arrive soon after they arrive at a stop (>6 bus/hr), while the threshold between LOS E and F is service once per hour.

EXHIBIT 4-8
2035 No Build Alternative and Build Alternatives PM Peak Hour Transit Level of Service for Service Frequency



[a]No direct service or requires one or more bus transfers.
At LOS A, service is available most or all day (>19 hr) while at LOS F, transit service is only offered for a few hours a day (<3 hr).

EXHIBIT 4-9
2035 No Build Alternative and Build Alternatives Transit Level of Service for Hours of Service

4.2.7.3 Passenger Load

Passenger load LOS for the No Build and build alternatives was analyzed using estimated PM peak period passenger volume forecasts from the Sound Transit ridership model (Sound Transit, 2014b). Table 4-13 compares the passenger load LOS for the No Build and build alternatives at the three project screenline locations. Integrating the conceptual bus service plan and estimated passenger loads, a LOS was calculated in accordance with the *Transit Capacity and Quality Service Manual* (TCQSM) guidelines. A detailed assessment of each transit route LOS is also provided in Appendix C of this technical report.

In the PM peak period under the No Build Alternative, transit passenger load is expected to be at LOS B in the northbound direction of travel. Traveling southbound from trip origins such as Downtown Seattle and the University of Washington, the passenger load LOS is expected to be LOS C or LOS D with the No Build Alternative. On average, buses would not exceed their seating capacity during the PM peak period. However, many key peak routes from Seattle would operate at LOS E or LOS F (e.g., Sound Transit Routes 574 and 578). At LOS E, a transit vehicle will be as full as passengers will normally tolerate, and LOS F represents crush loading levels. With the build alternatives, additional transit capacity would be provided that would accommodate the expected ridership demand. As a result, bus transit service is expected to have a passenger load LOS A, and light rail would have LOS A to D. At LOS C, all passengers can still sit, and at LOS D, some passengers will be required to stand.

TABLE 4-13
2040 No Build and FWLE PM Peak-Hour Level of Service for Passenger Load

Screenline Location	Direction	No Build Alternative	Build Alternatives	
		Bus LOS	Bus LOS	Light Rail LOS
South of 200th Street	NB	B	A	A
	SB	C	A	D
South of 272nd Street	NB	B	A	A
	SB	D	A	C
South of 317th Street	NB	B	A	A
	SB	C	A	C

Source: Sound Transit, 2014b.

4.2.7.4 Reliability and On-time Performance

The future reliability of bus service with the No Build Alternative is expected to degrade compared with existing conditions. Current bus service already operates at LOS F at most transit hubs in the study area during the PM peak hour. By 2035, speeds on key roadways such as I-5, I-5 HOV lanes, and major arterial streets are expected to decrease by up to 40 percent during the PM peak period. Furthermore, crowded buses result in longer boarding and alighting times, which leads to more delay and lower schedule reliability at bus stops. If buses are at capacity, as many are forecasted to be in the future No Build conditions, bus drivers might be forced to skip picking up additional passengers. Poor bus reliability could result in passengers becoming less confident of arriving at the scheduled time. As a

result, passengers might need to take an earlier trip to ensure getting to their destination on-time or shift to another mode of travel.

With the build alternatives, light rail would provide more reliable transit service because it would operate in an exclusive right-of-way with no at-grade vehicle crossing conflicts in the study area. However, light rail reliability in the FWLE corridor could be affected by unexpected delays at station areas or by system delays outside of the FWLE corridor, where light rail would be operating at-grade with traffic.

4.2.7.5 Transit Transfers

Transfers include trips between multiple buses or between a bus and light rail/commuter rail. Transit transfers can be the result of making service more efficient for operators; however, increases in travel time, the potential to miss a connection, and increased complexity of a transit trip is likely less convenient for passengers. In other words, transferring makes an overall trip less convenient. Therefore, in general, increases in transfers typically result in fewer trips made on transit. Transfers may be used successfully in a transit system by providing reliable, quick transfer connections. In general, short transfers are more acceptable and might only be a minor inconvenience to riders.

Several hubs in the Sound Transit region, including the Federal Way Transit Center, are considered "multi-centered" route hubs where bus routes converge so transfers can be made to multiple destinations at one location. As shown in Table 4-14, the transfer rate with the No Build Alternative would be 1.62 boardings per trip in 2035 and would be similar with any of the build alternatives.

TABLE 4-14
Transit Transfer Rates for the No Build Alternative and Build Alternatives (2035)

Measure of Effectiveness	No Build Alternative	Build Alternatives		
		Full Length	Interim – Kent/ Des Moines	Interim – S 272nd Street
Daily Transit Boardings	1,055,500	1,068,000-1,075,000-	1,054,500-1,058,500	1,060,000-1,063,500
Daily Transit Trips	651,000	658,000-660,000	651,500-653,000	654,000-654,500
Transfer Rate	1.62	1.63	1.62	1.62

Source: Sound Transit, 2014b.

4.3 Arterial and Local Street Operations

This section describes the effects of the No Build and build alternatives on arterial and local streets in the study area. This section includes 2035 traffic volume forecasts; expected traffic generated at stations; intersection operations; and changes in access, circulation, and traffic control.

Key findings and observations include the following:

- The S 272nd Star Lake and S 272nd Redondo stations would provide the greatest increase in park-and-ride spaces (up to 700) with the full-length build alternatives. Under interim terminus conditions, the Kent/Des Moines Station would provide up to 1,000 parking spaces.

- Vehicle trip generation at stations with park-and-rides would range from approximately 260 additional trips in the PM peak hour at the Kent/Des Moines Station to up to 700 additional trips in the PM peak hour with the S 272nd Redondo Station interim terminus condition.
- Property access and circulation impacts are expected to be minimal because the FWLE would be located in an exclusive guideway outside of roadway operations. Where needed, additional access roads and traffic control would enhance circulation.
- All full-length build alternatives are expected to contribute to an unacceptable level of service (LOS) at 9 of the 63 intersections evaluated. Proposed mitigation would improve operations at all of these locations to be similar or better than under the No Build Alternative.
- The interim terminus conditions would affect the same intersections as the full-length alternatives near the FWLE stations that are constructed. The S 272nd Redondo Station interim terminus would affect one additional intersection that would not be affected by the full-length alternatives.

4.3.1 Traffic Forecasts

4.3.1.1 No Build Alternative

Year 2035 AM and PM peak hour traffic volume forecasts were developed for the FWLE based on the Puget Sound Regional Council's (PSRC) current population and land use forecasts and were assigned to the 2035 transportation network. Intersection traffic volumes were developed by using National Cooperative Highway Research Program 255 methodology, which uses existing turn movements and growth derived from the regional travel demand model to develop 2035 AM and PM peak hour intersection turning movement volumes. Overall, by 2035, traffic volumes in the study area are expected to increase by an average annual growth rate of approximately 0.8 percent in the AM and PM peak hours. Additional information is provided in Appendix A, Transportation Technical Analysis Methodology.

4.3.1.2 Build Alternatives

For the build alternatives, the anticipated vehicular trip generation was calculated at each station based on information from Sound Transit's Ridership Model (Sound Transit, 2014b) and station characteristics. The total trip generation is comprised of three different vehicle trip types: park-and-ride vehicle trips, passenger drop-off/pick-up trips, and bus service. The change in vehicle trips that would occur from the FWLE were then added to No Build Alternative traffic volume forecasts (described in Section 4.1) to develop an estimate of the traffic volumes with the build alternatives. This conservative trip generation estimate does not account for people changing their mode of travel from driving under the No Build Alternative to using transit with the FWLE.

TABLE 4-15
Existing and Proposed Park-and-Ride Capacity and Available Parking for Transit Riders

Station Area	Station/Station Option	Alternative[a]	Park-and-Ride Capacity (# of spaces)			Existing Underutilized Parking[c,d] (# of spaces)	Total Available Parking for FWLE[e] (# of spaces)
			Existing	Proposed Increase[b]	With FWLE[b]		
S 216th Street	S 216th West, S 216th East	SR 99, SR 99 to I-5	N/A	0	0	N/A	0
Kent/Des Moines	Preferred, At-Grade, I-5, SR 99 West, HC Campus, SR 99 Median, SR 99 East, 30th Avenue East, 30th Avenue West	Preferred, SR 99, SR 99 to I-5, I-5 to SR 99	N/A	+500 (+1,000)	500 (1,000)	N/A	+500 (+1,000)
S 260th Street	S 260th West, S 260th East[f]	SR 99, I-5 to SR 99	N/A	0	0	N/A	0
S 272nd Redondo	Redondo, Redondo Trench	SR 99, I-5 to SR 99	697	+700 (+700)	1,397 (1,397)	634	+1,334 (+1,334)
S 272nd Star Lake	Star Lake, Star Lake Elevated	Preferred, SR 99 to I-5	540	+700 (+700)[g]	1,240 (1,240)[g]	258	+958 (+958)
Federal Way	Federal Way SR 99	SR 99, I-5 to SR 99	N/A	+400 (N/A)	400 (N/A)	N/A	+400 (N/A)
	Federal Way Transit Center	Preferred, SR 99, SR 99 to I-5, I-5 to SR 99	1,190	+400 (N/A)	1,590 (N/A)	16	+416 (N/A)
	Federal Way I-5	Preferred, SR 99 to I-5	N/A	+400 (N/A)	400 (N/A)	N/A	+400 (N/A)
	Federal Way S 320th Park-and-Ride	Preferred, SR 99 to I-5	877	+400 (N/A)	1,277 (N/A)	541	+941 (N/A)

[a] S 216th and S 260th Station options are not part of any of the analyzed alternatives but they could be included in the alternatives listed in this column.
[b] Full-length build alternative parking spaces shown outside parentheses. Interim terminus conditions park-and-ride capacity shown inside parentheses.
[c] Source: Metro, 2016.
[d] These are existing parking spaces not generally occupied at existing park-and-ride facilities.
[e] Total available parking assumes park-and-ride capacity with FWLE and any existing unused parking at existing park-and-ride lots.
[f] No park-and-ride assumed at these potential additional stations; only includes passenger drop-off/pickup and bus transit vehicle trips.
[g] Depending on how the FWLE project is constructed, up to 700 additional parking stalls would be provided for a total of 1,240 spaces.

Table 4-15 shows the existing and proposed park-and-ride capacities associated with each station area by build alternative. Park-and-ride lots would be provided at the three main stations, and the potential additional stations at S 216th Street and S 260th Street would not include park-and-ride spaces. A total of 1,600 new parking spaces would be allocated between the three main stations in the full-length condition, with the most new parking allocated at the S 272nd Station (up to 700 spaces). At the Kent/Des Moines Station, the assumed parking capacity is expected to change between the interim and full-length conditions. Under the interim condition, approximately 1,000 new parking stalls are assumed. As light rail is extended south beyond the Kent/Des Moines Station, a portion of the station parking area could be redeveloped through the removal of some portion of the interim parking, which could result in approximately 500 total parking stalls at the Kent/Des Moines Station in the long term.

For the S 272nd Redondo and Star Lake stations, the increase in parking stalls is assumed to be the same in both the interim and full length conditions.

To provide a conservatively high estimate of traffic impacts near the stations, all stations that include a park-and-ride were assumed to have full parking lots within a 3-hour peak period. For the year 2035, it was assumed that for each improved existing park-and-ride facility, unused spaces in the existing condition that become used under a build alternative, in addition to additional stalls provided by the project, would be available for station users.

Trip generation at each station would not be constant during the 3-hour peak period; rather, more traffic would occur during a peak hour. For this traffic analysis, which analyzed only the worst peak hour, slightly less than half (45 percent) of the total trips were assumed to occur during the peak hour. These rates were determined from a review of existing park-and-ride data in the study area, an assessment of the Tukwila International Boulevard light rail station, and the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (ITE, 2012). Furthermore, the traffic analysis assumed the highest peak hour trip generation at the station would coincide with the surrounding roadway peak hour, which does not always occur—especially in the mornings when a park-and-ride lot is typically already full during the peak morning commute.

Passenger drop-off/pick-up trips were calculated differently than park-and-ride trips and are dependent on the stations' total ridership and mode of access. Data from the Tukwila International Boulevard Station indicate that approximately 10 percent of light rail riders are dropped off or picked up during the PM peak period. This same percentage was applied to each of the FWLE stations. Bus service at each station was based on the conceptual bus service plans (see Section 4.2.1) developed by Metro, Sound Transit, and Pierce Transit service planners, which included potential changes to bus headways and/or routing to serve the appropriate station areas.

Table 4-16 shows the full-length alternatives total vehicle trip generation associated with each station option. Table 4-17 shows the total vehicle trip generation associated with a Kent/Des Moines interim terminus condition, while Table 4-18 shows the total vehicle trip generation associated with a S 272nd interim terminus condition. Values listed outside the parentheses in Tables 4-16 through 4-18 represent the No Build Alternative, and the number within the parentheses represents the change from the No Build with the build alternatives. In general, station areas that would have the greatest increase in parking supply would also have the greatest increase in vehicular traffic.

The number of vehicle trips at the Kent/Des Moines Station would not vary substantially among the build alternatives or station options because the parking and transit services would be similar among the alternatives and station options. Bus trips would increase at the Kent/Des Moines Station because routes that currently terminate at Highline College (Metro routes 121, 122, and 156) would be extended to serve the station area.

Among the build alternatives, the S 272nd Redondo Station would have the highest increase in vehicle trip generation because it is currently underused and the project proposes to add 700 stalls to the existing facility. Bus route changes are assumed to be the same with all of the full-length alternatives,

as described in the proposed transit integration plan discussed in Section 4.2.1. Bus trips would increase slightly at the S 272nd Redondo Station as some bus services would be added or rerouted to serve the station. However, some bus routes along I-5 are proposed to be eliminated under the transit integration plan because they would duplicate light rail service. Since more bus routes that travel along I-5 currently stop at the S 272nd Star Lake station area than the S 272nd Redondo station area, elimination of duplicate service would slightly decrease bus service at the S 272nd Star Lake Station.

TABLE 4-16
AM and PM Peak-Hour Vehicle Trip Generation Summary by Alternative and Station Option (Full Length)

Station Area	Alternative	Station/ Station Options[a]	Trip Type	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
S 216th Street	SR 99	S 216th West, S 216th East	Drop-off/Pick-Up	0 (16)	0 (16)	0 (32)	0 (16)	0 (16)	0 (32)
			Buses	16 (8)	16 (8)	32 (16)	16 (8)	16 (8)	32 (16)
			Total	**16 (24)**	**16 (24)**	**32 (48)**	**16 (24)**	**16 (24)**	**32 (48)**
Kent/Des Moines	Preferred	Preferred Kent/Des Moines	Park-and-ride	0 (169)	0 (56)	0 (225)	0 (56)	0 (169)	0 (225)
			Drop-off/ Pick-Up	0 (41)	0 (41)	0 (82)	0 (41)	0 (41)	0 (82)
			Buses	0 (28)	0 (36)	0 (64)	0 (36)	0 (28)	0 (64)
			Total	**0 (238)**	**0 (133)**	**0 (371)**	**0 (133)**	**0 (238)**	**0 (371)**
		I-5, At-Grade	Park-and-ride	0 (169)	0 (56)	0 (225)	0 (56)	0 (169)	0 (225)
			Drop-off/Pick-Up	0 (45)	0 (45)	0 (90)	0 (45)	0 (45)	0 (90)
			Buses	0 (28)	0 (36)	0 (64)	0 (36)	0 (28)	0 (64)
			Total	**0 (238)**	**0 (133)**	**0 (371)**	**0 (133)**	**0 (238)**	**0 (371)**
	SR 99	SR 99 West, HC Campus, SR 99 Median, SR 99 East	Park-and-ride	0 (169)	0 (56)	0 (225)	0 (56)	0 (169)	0 (225)
			Drop-off/Pick-Up	0 (46)	0 (46)	0 (93)	0 (46)	0 (46)	0 (93)
			Buses	0 (28)	0 (36)	0 (64)	0 (36)	0 (28)	0 (64)
			Total	**0 (238)**	**0 (133)**	**0 (371)**	**0 (133)**	**0 (238)**	**0 (371)**
	SR 99 to I-5	30th Avenue East	Park-and-ride	0 (169)	0 (56)	0 (225)	0 (56)	0 (169)	0 (225)
			Drop-off/Pick-Up	0 (44)	0 (44)	0 (87)	0 (44)	0 (44)	0 (87)
			Buses	0 (28)	0 (36)	0 (64)	0 (36)	0 (28)	0 (64)
			Total	**0 (232)**	**0 (127)**	**0 (359)**	**0 (127)**	**0 (232)**	**0 (359)**
	I-5 to SR 99	30th Avenue West	Park-and-ride	0 (169)	0 (56)	0 (225)	0 (56)	0 (169)	0 (225)
			Drop-off/Pick-Up	0 (42)	0 (42)	0 (85)	0 (42)	0 (42)	0 (85)
			Buses	0 (28)	0 (36)	0 (64)	0 (36)	0 (28)	0 (64)
			Total	**0 (239)**	**0 (134)**	**0 (374)**	**0 (134)**	**0 (239)**	**0 (374)**
S 260th Street	SR 99	S 260th West, S 260th East	Drop-off/Pick-Up	0 (11)	0 (11)	0 (22)	0 (11)	0 (11)	0 (22)
			Buses	20 (0)	20 (0)	40 (0)	20 (0)	20 (0)	40 (0)
			Total	**20 (11)**	**20 (11)**	**40 (22)**	**20 (11)**	**20 (11)**	**40 (22)**

TABLE 4-16

AM and PM Peak-Hour Vehicle Trip Generation Summary by Alternative and Station Option (Full Length)

Station Area	Alternative	Station/ Station Options[a]	Trip Type	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
S 272nd Redondo	SR 99	Redondo, Redondo Trench	Park-and-ride	18 (453)	6 (151)	24 (604)	6 (151)	18 (453)	24 (604)
			Drop-off/Pick-Up	14 (48)	14 (48)	28 (96)	14 (48)	14 (48)	28 (96)
			Buses	16 (4)	19 (1)	35 (5)	19 (1)	16 (4)	35 (5)
			Total	**48 (505)**	**39 (200)**	**87 (705)**	**39 (200)**	**48 (505)**	**87 (705)**
	I-5 to SR 99	Redondo, Redondo Trench	Park-and-ride	18 (453)	6 (151)	24 (604)	6 (151)	18 (453)	24 (604)
			Drop-off/Pick-Up	14 (47)	14 (47)	28 (95)	14 (47)	14 (47)	28 (95)
			Buses	16 (4)	19 (1)	35 (5)	19 (1)	16 (4)	35 (5)
			Total	**48 (504)**	**39 (199)**	**87 (704)**	**39 (199)**	**48 (504)**	**87 (704)**
S 272nd Star Lake	Preferred	Preferred S 272nd Star Lake, Star Lake Elevated	Park-and-ride	105 (314)	35 (105)	140 (419)	35 (105)	105 (314)	140 (419)
			Drop-off/Pick-Up	20 (36)	20 (36)	40 (72)	20 (36)	20 (36)	40 (72)
			Buses	23 (-7)	25 (-7)	48 (-14)	25 (-7)	23 (-7)	48 (-14)
			Total	**148 (343)**	**80 (134)**	**228 (477)**	**80 (134)**	**148 (343)**	**228 (477)**
	SR 99 to I-5	Star Lake	Park-and-ride	105 (314)	35 (105)	140 (419)	35 (105)	105 (314)	140 (419)
			Drop-off/Pick-Up	20 (36)	20 (36)	40 (72)	20 (36)	20 (36)	40 (72)
			Buses	23 (-7)	25 (-7)	48 (-14)	25 (-7)	23 (-7)	48 (-14)
			Total	**148 (343)**	**80 (134)**	**228 (477)**	**80 (134)**	**148 (343)**	**228 (477)**
Federal Way	Preferred	Preferred Federal Way Transit Center	Park-and-ride	398 (139)	133 (46)	531 (185)	133 (46)	398 (139)	531 (185)
			Drop-off/Pick-Up	43 (196)	43 (196)	86 (392)	43 (196)	43 (196)	86 (392)
			Buses	73 (-8)	73 (-8)	146 (-16)	73 (-8)	73 (-8)	146 (-16)
			Total	**0 (231)**	**0 (118)**	**0 (350)**	**0 (118)**	**0 (231)**	**0 (350)**
		Federal Way I-5	Park-and-ride	398 (139)	133 (46)	531 (185)	133 (46)	398 (139)	531 (185)
			Drop-off/Pick-Up	43 (131)	43 (131)	86 (262)	43 (131)	43 (131)	86 (262)
			Buses	73 (-8)	73 (-8)	146 (-16)	73 (-8)	73 (-8)	146 (-16)
			Total	**514 (262)**	**249 (169)**	**763 (431)**	**249 (169)**	**514 (262)**	**763 (431)**
		Federal Way S 320th Park-and-Ride[b]	Park-and-ride	132 (299)	44 (100)	176 (399)	44 (100)	132 (299)	176 (399)
			Drop-off/Pick-Up	35 (170)	35 (170)	69 (339)	35 (170)	35 (170)	69 (339)
			Buses	31 (14)	31 (14)	62 (28)	31 (14)	31 (14)	62 (28)

TABLE 4-16

AM and PM Peak-Hour Vehicle Trip Generation Summary by Alternative and Station Option (Full Length)

Station Area	Alternative	Station/ Station Options[a]	Trip Type	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
			Total	**198 (483)**	110 (284)	307 (766)	110 (284)	198 (483)	307 (766)
	SR 99	Federal Way Transit Center	Park-and-ride	398 (139)	133 (46)	531 (185)	133 (46)	398 (139)	531 (185)
			Drop-off/Pick-Up	43 (180)	43 (180)	86 (361)	43 (180)	43 (180)	86 (361)
			Buses	73 (-8)	73 (-8)	146 (-16)	73 (-8)	73 (-8)	146 (-16)
			Total	**514 (311)**	**249 (218)**	**763 (530)**	**249 (218)**	**514 (311)**	**763 (530)**
		Federal Way SR 99	Park-and-ride	398 (139)	133 (46)	531 (185)	133 (46)	398 (139)	531 (185)
			Drop-off/Pick-Up	43 (115)	43 (115)	86 (230)	43 (115)	43 (115)	86 (230)
			Buses	73 (-8)	73 (-8)	146 (-16)	73 (-8)	73 (-8)	146 (-16)
			Total	**514 (246)**	**249 (153)**	**763 (399)**	**249 (153)**	**514 (246)**	**763 (399)**
	SR 99 to I-5	Federal Way Transit Center	Park-and-ride	398 (139)	133 (46)	531 (185)	133 (46)	398 (139)	531 (185)
			Drop-off/Pick-Up	43 (186)	43 (186)	86 (373)	43 (186)	43 (186)	86 (373)
			Buses	73 (-8)	73 (-8)	146 (-16)	73 (-8)	73 (-8)	146 (-16)
			Total	**514 (317)**	**249 (224)**	**763 (542)**	**249 (224)**	**514 (317)**	**763 (542)**
	I-5 to SR 99	Federal Way Transit Center	Park-and-ride	398 (139)	133 (46)	531 (185)	133 (46)	398 (139)	531 (185)
			Drop-off/Pick-Up	43 (176)	43 (176)	86 (352)	43 (176)	43 (176)	86 (352)
			Buses	73 (-8)	73 (-8)	146 (-16)	73 (-8)	73 (-8)	146 (-16)
			Total	**514 (307)**	**249 (214)**	**763 (521)**	**249 (214)**	**514 (307)**	**763 (521)**

Notes:
Values listed outside the parentheses represent the No Build Alternative values, while inside the parentheses represents the change from No Build with the FWLE. The trip generation for the build alternatives assumes the park-and-ride lot is full.
[a] Trip generation for the SR 99 to I-5 and I-5 to SR 99 alternative station options would be similar to the Preferred and SR 99 Alternatives, respectively.
[b] Trip generation values represent only the S 320th Street Park-and-Ride. Trip generation at the Federal Way Transit Center is not assumed to change from No Build conditions with this station option.

TABLE 4-17
Peak-Hour Vehicle Trip Generation Summary (Kent/Des Moines Interim Terminus Condition)

Station Area	Alternative	Trip Type	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Kent/ Des Moines	Preferred, SR 99, SR 99 to I-5, I-5 to SR 99	Park-and-ride	0 (338)	0 (56)	0 (451)	0 (56)	0 (338)	0 (451)
		Drop-off/Pick-Up	0 (105)	0 (105)	0 (210)	0 (105)	0 (105)	0 (210)
		Buses	0 (28)	0 (36)	0 (64)	0 (36)	0 (28)	0 (64)
		Total	**130 (0)**	**366 (0)**	**235 (0)**	**366 (0)**	**130 (0)**	**235 (0)**

Note: Values listed outside the parentheses represent the No Build Alternative values, while inside the parentheses represents the change from No Build. The trip generation for the build alternatives assumes the park-and-ride lot is full.

TABLE 4-18
Peak-Hour Vehicle Trip Generation Summary (S 272nd Interim Terminus Condition)

Station Area	Alternative	Trip Type	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Kent/Des Moines	Preferred, SR 99, SR 99 to I-5, I-5 to SR 99	Park-and-ride	0 (338)	0 (113)	0 (451)	0 (113)	0 (338)	0 (451)
		Drop-off/Pick-Up	0 (98)	0 (98)	0 (196)	0 (98)	0 (98)	0 (196)
		Buses	0 (28)	0 (36)	0 (64)	0 (36)	0 (28)	0 (64)
		Total	**130 (0)**	**366 (0)**	**235 (0)**	**366 (0)**	**130 (0)**	**235 (0)**
S 272nd Star Lake	Preferred, SR 99 to I-5	Park-and-ride	18 (453)	6 (151)	24 (604)	6 (151)	18 (453)	24 (604)
		Drop-off/Pick-Up	14 (96)	14 (96)	28 (192)	14 (96)	14 (96)	28 (192)
		Buses	16 (4)	19 (1)	35 (5)	19 (1)	16 (4)	35 (5)
		Total	**133 (0)**	**355 (0)**	**238 (0)**	**355 (0)**	**133 (0)**	**238 (0)**
S 272nd Redondo	SR 99, I-5 to SR 99	Park-and-ride	105 (314)	35 (105)	140 (419)	35 (105)	105 (314)	140 (419)
		Drop-off/Pick-Up	20 (99)	20 (99)	40 (198)	20 (99)	20 (99)	40 (198)
		Buses	23 (1)	25 (1)	48 (2)	25 (1)	23 (1)	48 (2)
		Total	**133 (0)**	**371 (0)**	**238 (0)**	**371 (0)**	**133 (0)**	**238 (0)**

Note: Values listed outside the parentheses represent the No Build Alternative values, while inside the parentheses represents the change from No Build. The trip generation for the build alternatives assumes the park-and-ride lot is full.

Trip generation at the Federal Way Transit Center is expected to vary, with a modest increase in vehicle trips. However, this station would have a noticeable increase in passenger drop-off/pick-up trips (up to 395 vehicles per hour) because it is the end-of-the line station. In accordance with the conceptual bus service plan, bus trips at the Federal Way Transit Center are expected to decrease slightly due to the elimination of some bus routes that would duplicate light rail service. The Federal Way S 320th Street Park-and-Ride Station Option would have the highest increase in vehicle activity among the Federal Way City Center station options. The current park-and-ride has 540 unused stalls; therefore, with the additional 400 parking spaces, there would be up to 940 available spaces for station users. The

potential additional S 216th and S 260th East and West station options would have the lowest vehicle trip generation because parking would not be provided at these locations.

4.3.1.3 Interim Terminus Conditions

The Kent/Des Moines Station interim terminus condition assumes 1,000 parking stalls. The additional stalls provided in the interim terminus condition and an overall increase in station activity with it being an end-of –the-line station would generate more trips under an interim terminus condition compared to the full-length condition.

The number of parking stalls provided with the S 272nd Star Lake and Redondo stations would not change between interim terminus and full-length conditions. Even so, there would be an increase in the passenger drop-off/pick-up trips at these two stations in the interim terminus condition because it would be an end-of-the-line station.

4.3.2 Traffic Circulation, Property Access, and Traffic Control

The build alternatives could have some impact on property access, traffic circulation patterns, and traffic control, depending on the alternative and station options. The traffic circulation, property access, and traffic control discussion in this section is based on the conceptual light rail guideway and station area plans.

4.3.2.1 Preferred Alternative

All station locations would have changes to property access, traffic circulation, and/or signal control resulting from the Preferred Alternative. Specific changes along the alignment and within each station area are described in the subsections below.

Even though most of the Preferred Alternative alignment would be adjacent to I-5, there would be no circulation or access impacts on I-5 because the number and configuration of freeway lanes, interchange access points, and freeway shoulders would be maintained. This alternative would be located near three I-5 interchanges: Kent-Des Moines Road, S 272nd Street, and S 317th Street, but would be grade-separated (either above or below) from the interchange ramps and cross streets; therefore, no changes to intersection control or traffic circulation would result.

WSDOT requires access to perform routine maintenance activities along I-5. Maintenance activities generally include mowing, stormwater facility maintenance, spraying noxious weeds, accessing Intelligent Transportation System equipment and signs, and removing invasive plant species. Typical maintenance activities, such as mowing, are generally performed adjacent (within a 10-foot-wide area) to the edge of pavement. To perform these maintenance activities, WSDOT will typically park vehicles in the shoulder and provide advance warning signage to drivers. The current design of the Preferred Alternative would not affect this type of maintenance activity because WSDOT could continue to perform maintenance activites between I-5 and the light rail guideway from the I-5 shoulder.

For maintenence access west of the guideway, such as servicing stormwater facilities and removing invasive weeds, access from I-5 would be provided beneath the guideway, where there would be vertical clearances of 16.5 feet or more or from local streets.

The Preferred Alternative would result in some localized changes to property access and local circulation outside of station areas. Between S 212th Street and the Highline Water District property, 32nd Avenue S would be shifted west; however, property access would be maintained. New or reconstructed cul-du-sacs would be provided at the eastern end of S 211th Street, S 220th Street, S 221st Street, S 224th Street, S 252nd Street, and 266th Street, west of I-5. The Preferred Alternative would also include the reconstruction of the bus turnaround at Mark Twain Elementary School.

Kent/Des Moines Station

With the Preferred Alternative Kent/Des Moines Station, S 236th Street would be extended from SR 99 to 30th Avenue S to provide access to the station. The future three-leg traffic signal at the intersection of SR 99 and S 236th Street would be modified to a four-leg intersection to accommodate this extension. Between SR 99 and 30th Avenue S, S 236th Street would have one travel lane in each direction, left-turn lanes, and curbside transit bays. The intersection of 30th Avenue S and S 236th Street would be a four-way stop. From approximately S Kent-Des Moines Road to S 240th Street, 30th Avenue S would be improved from a two-lane to a three-lane road that includes a two-way left-turn lane. In addition, two new east-west roads (S 234th Street and S 238th Street) are proposed between SR 99 and 30th Avenue S to improve station area access and circulation within the Midway area for redevelopment potential. These two new roads would be two-lane roads, and their access with SR 99 would accommodate right-in and right-out turn movements. A southbound left-in movement would also be allowed at S 238th Street.

Access to the parking garage for this station would be provided along 30th Avenue S and S 236th Street. On-street parking would be provided in the vicinity of the station platform and would be used for passenger drop-off/pick-up, paratransit, and short-term parking. Appendix F, Conceptual Design Drawings, of the Final EIS shows the extent of roadway improvements near the station area.

Under the interim condition, temporary surface parking lots are proposed between 234th Street and 236th Street and also between 236th Street and 238th Street. Access to the temporary parking lots would be provided from 30th Avenue S for both parking lots and S 234th Street for the north surface lot, and S 238th Street for the south surface lot.

S 272nd Station

The Preferred Alternative's S 272nd Star Lake Station would be located at the existing Star Lake Park-and-Ride. Access to the station would be provided via 26th Avenue S, which is the current access point for the park-and-ride; however, the road would be reconfigured with the revised station access. No new access would be provided via S 272nd Street. Three driveways to the station would be provided from 26th Avenue S—two serving the park-and-ride garage and passenger drop-off/pick-up and one dedicated for transit (bus) service. In addition, 26th/28th Avenue S would be realigned north of the station, and additional travel lanes would be provided between the station area and S 272nd Street. However, no change in property access is anticipated for properties adjacent to this station.

The S 272nd Street/26th Avenue S intersection would be improved to accommodate additional station area traffic and to improve access to the property located immediately south of the intersection. Intersection improvements include providing an additional southbound left-turn lane, westbound

left-turn lane, and westbound right-turn lane and would also extend the existing eastbound left-turn lane. The south leg of the intersection would be signalized to improve access and for safety.

Federal Way Transit Center Station

With the Preferred Alternative, new streets would be constructed between S 317th Street, 23rd Avenue S, S 320th Street, and 21st Avenue S to provide access to the relocated transit center. The existing Federal Way Transit Center bus loop would be relocated closer to the station platforms, and S 317th Street would be extended to 21st Avenue S for general purpose travel. Furthermore, S 318th Street and S 319th Street would be new streets in this area to facilitate automobile and transit access to the station. One new north-south street (22nd Avenue S) would connect between S 317th Street and S 320th Street and would also intersect with the new east-west roads. Intersections within the new grid would be stop-controlled. A few segments of these roads adjacent to the station could be restricted for transit-only use.

Access to the new 400-stall parking structure for this station would be provided via S 317th Street between 22nd Avenue S and 23rd Avenue S. No change in access to the existing Federal Way Transit Center parking structure north of S 317th Street is proposed. Access to the passenger drop-off/pick-up area would be located east of 22nd Avenue S.

The intersection of 23rd Avenue S and S 317th Street would be converted from a four-leg signal to a five-leg, multi-lane roundabout. The proposed southwest leg would directly connect to the station and would be ingress-only and restricted to transit use.

Kent/Des Moines Station Options

With the Kent/Des Moines I-5 Station Option, S 236th Street would be extended between SR 99 and the station area. The future three-leg traffic signal at the intersection of SR 99 and S 236th Street would be modified to a four-leg intersection to accommodate this extension. Access to the parking areas with this station would be provided along 30th Avenue S via S 236th Street and S 240th Street. Both S 236th Street and 30th Avenue S would be improved to provide station access. Appendix F, Conceptual Design Drawings, of the Final EIS shows the extent of roadway improvements near the station area. The passenger drop-off/pick up area would be located along a new access road adjacent to the south station entry.

The Kent/Des Moines At-Grade Station Option would be located adjacent to I-5 south of S 240th Street. Primary station access would be from S 240th Street. Property access, circulation, and traffic control north of S 240th Street would remain the same as under the No Build Alternative. A new road, S 242nd Street, would extend between SR 99 and the station area and provide access to the station's parking areas. Access at SR 99 and S 242nd Street would be only for right-in, right-out movements. An additional access road would be provided to connect S 240th Street and S 242nd Street. This road would provide access to the transit bus service and passenger drop-off/pick-up areas.

Landfill Median Alignment Option

With the Landfill Median Alignment Option, the elevated guideway could encroach over the I-5 shoulder and, potentially, the travel lanes in a few locations; however, traffic circulation, property access, and traffic control would not be affected with this option.

With the Landfill Median Alignment Option, in sections of the corridor where guardrail would be required, breaks in the guardrail may be needed to allow access for maintenance equipment. Beyond this, the Landfill Median Alignment Option would not affect property access and traffic circulation on I-5.

S 272nd Star Lake Elevated Station Option

The S 272nd Star Lake Elevated Station Option would have local traffic circulation, property access, and traffic control similar to the Preferred S 272nd Star Lake Station.

S 317th Elevated Alignment Option

With the S 317th Elevated Alignment Option, the elevated guideway would cross S 317th Street at 28th Ave S through the roundabout, thus reducing construction impacts. Local traffic circulation, property access, and traffic control would not be affected with this alignment option.

Federal Way City Center Station Options

The Federal Way I-5 Station Option would provide a station east of the existing Federal Way Transit Center. This station would be located south of S 317th Street and east of 23rd Avenue S. Transit access would be provided along S 317th Street. Access to the parking area would be provided along 23rd Avenue S. Access to the passenger drop-off/pick-up area would be provided along S Gateway Center Plaza. Therefore, drop-off/pick-up trips from the north would be required to travel around the station and use S 320th Street to access the drop-off area. No change in traffic circulation, property access, or traffic control beyond the station area is expected with this station option.

The Federal Way S 320th Park-and-Ride Station Option would be located at the existing S 320th Street Park-and-Ride. Access to the station would remain along 23rd Avenue S via two full-access driveways. Access would also continue to be provided along 25th Avenue S but would be modified so vehicles leaving the station could also use this road. Currently, this street provides bus egress out of the park-and-ride. Roads inside the station area would be modified to provide access to two parking areas and a passenger drop-off/pick up area located on the northeast corner of the station area.

Bus routes accessing this station would use S 320th Street, 23rd Avenue S, and 25th Avenue S. The existing transit-only egress from the southbound I-5 on-ramp would be removed. No changes to traffic circulation, property access, or intersection control at the existing Federal Way Transit Center are expected with this station option.

4.3.2.2 SR 99 Alternative

The SR 99 Alternative and its station options are not expected to substantially affect private property access and vehicular circulation, except around the Kent/Des Moines Station area where specific access improvements are identified. These access improvements are described for each Kent/Des Moines station option described below. The S 272nd Redondo and Federal Way Transit Center stations

would be located at existing park-and-ride facilities, and minimal changes to vehicle circulation and access are expected.

In general, the SR 99 Alternative would operate in an exclusive right-of-way, grade-separated within the existing SR 99 median. This alternative would transition to either the west or east side of SR 99 to serve station areas, except for the Kent/Des Moines SR 99 Median Station Option. When light rail operates in the SR 99 median, all existing mid-block turn locations would be maintained, although their location could shift slightly to provide adequate sight distance between the columns. All existing property access would be maintained or improved.

Most SR 99 intersections would be reconstructed to accommodate the light rail median alignment while maintaining the existing channelization and turn pocket storage lengths. Crosswalk lengths and pedestrian volumes across SR 99 would increase around station areas. Some vehicle turn movements (e.g., right turns) would be delayed because of increased pedestrian activity in crosswalks near stations. As a result, traffic signal timings would be modified to accommodate increased pedestrian volumes. No additional traffic control measures would be required with the SR 99 Alternative except for a new traffic signal at the SR 99/S 236th Street intersection, with the various Kent/Des Moines station options described below.

Kent/Des Moines SR 99 West Station

With the Kent/Des Moines SR 99 West Station, S 236th Street would be reconstructed between Highline College and 30th Avenue S. Under the No Build Alternative, a three-legged signal would be built by others at the S 236th Street/SR 99 intersection; under the Kent/Des Moines SR 99 West Station Option, this traffic signal would be modified to facilitate all traffic movements at this intersection, including the S 236th Street extension. Access to the station's parking areas would be provided via S 236th Street, S 240th Street, 30th Avenue S, and driveways along SR 99. S 236th Street and 30th Avenue S would be improved to provide station access. Appendix F, Conceptual Design Drawings, of the Final EIS shows the extent of roadway improvements near the station area.

S 272nd Redondo Station

The S 272nd Redondo Station would be located at the existing Redondo Heights Park-and-Ride, and access would be similar to existing conditions, with full access provided at the SR 99/S 276th Street intersection and right-in, right-out access provided along S 272nd Street. Internal traffic circulation would be improved with an access road connecting S 272nd Street and S 276th Street. Vehicles could use this road to access S 272nd Street. No changes in traffic control are proposed.

Federal Way Transit Center Station

With the Federal Way Transit Center Station, new driveways would be provided for the transit layover and parking area along 21st Avenue S and 23rd Avenue S south of the existing transit center. The passenger drop-off/pick-up area would have access from 21st Avenue S. No changes to the existing transit center access and traffic circulation are proposed.

S 216th Station Options

Access to the station at S 216th Street (West option) would be provided via a full access driveway along S 216th Street and a right-in, right-out driveway along SR 99. The station access road could potentially be used by vehicles traveling east on S 216th Street that turn south onto SR 99 to bypass a traffic signal at the intersection of these two road. Access to the potential additional station at S 216th Street (East option) would be provided along S 216th Street, with a right-in, right-out driveway at 28th Avenue S. Station-related traffic arriving at the station from the east or heading west out of the station would use S 218th Street, S 219th Street, and 29th Avenue S.

Kent/Des Moines Station Options

With the Kent/Des Moines HC Campus Station Option, access and circulation would be similar to the Kent/Des Moines SR 99 West Station, except access to parking would not be provided on S 240th Street. Access to the passenger drop-off/pick-up area would be provided along S 236th Street and SR 99.

With the Kent/Des Moines SR 99 Median Station Option, access and circulation would be similar to the Kent/Des Moines SR 99 West Station. Because the SR 99 median between the S 236th Street and S 240th Street intersections would be widened, pedestrians would cross SR 99 in two separate pedestrian crossing intervals—one to the west of the median and one to the east of the median at the S 236th Street and S 240th Street intersections.

With the Kent/Des Moines SR 99 East Station Option, S 236th Street would be extended between SR 99 and 30th Avenue S and a traffic signal at the S 236th Street/SR 99 intersection would be modified. Access to the parking areas with the SR 99 East Station Option would be provided via S 236th Street, 30th Avenue S, S 240th Street, and a driveway along SR 99. S 236th Street and 30th Avenue S would be improved to provide station access. Appendix F, Conceptual Design Drawings, of the Final EIS shows the extent of roadway improvements near the station area.

S 260th Station Options

Access to the S 260th West Station Option would be provided by a full access driveway located on the north side S 260th Street, west of SR 99. Property access, local circulation, and existing traffic control would be maintained. Access to the S 260th East Station Option would be provided by a full access driveway located on S 260th Street, east of SR 99. Existing local traffic circulation, property access, and traffic control would be maintained.

S 272nd Redondo Trench Station Option

The S 272nd Redondo Trench Station Option would operate in an exclusive right-of-way trench east of SR 99 between S 260th Street and S 276th Street. Access to the station would be similar to the S 272nd Redondo Station, with full access provided along SR 99 at S 276th Street and a right-in, right-out access provided along S 272nd Street. Compared with the S 272nd Redondo Station, the passenger drop-off/pick-up area would be located farther south along the access road adjacent to the north station entry. No substantial impacts on traffic circulation, property access, and traffic control are anticipated with this station option.

Federal Way SR 99 Station Option

A new east-west access road would be provided between the existing Federal Way Transit Center and the Federal Way SR 99 Station Option. This access road would allow buses to connect between the two transit facilities. This facility could operate as a transit-only corridor between 19th Avenue S and 21st Avenue S. An access road between S 316th Street and S 314th Street would be provided to allow entry to the station property and passenger drop-off/pick up area north of 316th Street. Access to the 400-stall parking lot would be provided along Pete Von Reichbauer Way S and S 316th Street.

4.3.2.3 SR 99 to I-5 Alternative

The SR 99 to I-5 Alternative would have traffic circulation, property access, and traffic control similar to the SR 99 Alternative north of S 224th Street. At S 224th Street, this alternative would transition to the east side of SR 99 and continue toward I-5, then be similar to the Preferred Alternative south of the Midway Landfill except at the two station areas. At the S 272nd Station, three driveways to the station would be provided along 26th Avenue S, one for the park-and-ride structure, another to serve a transit bus loop, and a third driveway for passenger drop-off/pick-up. Compared with the Preferred Alternative, no additional travel lanes would be provided along 26th Avenue S and the S 272nd Street/26th Avenue S intersection would not be improved. Traffic circulation, property access, and traffic control at the Federal Way Transit Center Station would be the same as described above for this station under the SR 99 Alternative. No impacts are expected on the I-5 mainline or any ramp terminals with the SR 99 to I-5 Alternative.

Traffic circulation, property access, and traffic control for the Kent/Des Moines 30th Avenue East Station would be similar to the Kent/Des Moines SR 99 East Station Option described above under the SR 99 Alternative, except driveways would not be provided along SR 99.

Station Options

The SR 99 to I-5 Alternative would have the same S 216th station options described above under the SR 99 Alternative, and the Federal Way City Center station options described above under the Preferred Alternative. Traffic circulation, property access, and traffic control at these stations would be the same for each of these options as described for the alternatives.

4.3.2.4 I-5 to SR 99 Alternative

North of the Kent-Des Moines Road, the I-5 to SR 99 Alternative would have similar traffic circulation, property access, and traffic control as the Preferred Alternative. Near the Kent-Des Moines Road, this alternative would transition to the west until it reaches SR 99 near S 231st Street. South of this location, the alternative then becomes similar to the SR 99 Alternative. No impacts are expected to the I-5 mainline or any ramp terminals with the I-5 to SR 99 Alternative.

Traffic circulation, property access, and traffic control at the Kent/Des Moines 30th Avenue West Station would be similar to the Kent/Des Moines SR 99 East Station described above under the SR 99 Alternative. Traffic circulation, property access, and traffic control at the S 272nd Redondo and Federal Way Transit Center stations would be the same as described above under the SR 99 Alternative.

Station Options

The I-5 to SR 99 Alternative would include the S 260th West or East station options, the S 272nd Redondo Trench Station Option, and the Federal Way SR 99 Station Option as described for the SR 99 Alternative. Property access, local circulation, and traffic control at these stations would be the same for each of these options as described above under the SR 99 Alternative.

4.3.3 Traffic Operations

For the 2035 traffic operations analysis, the No Build Alternative is compared with the build alternatives and their station options. With input from the local jurisdictions, Sound Transit selected 63 intersections for analysis in the PM peak hour (see Exhibit 1-2 in Chapter 1, Introduction, of this report). These locations include intersections that would be directly affected by the FWLE, including intersections with changes to channelization, roadway width, or signal control as well as intersections that would be indirectly affected, such as by a change in vehicular or pedestrian activity due to proximity to light rail stations. Therefore, the intersections analyzed are more concentrated around station areas because these areas would experience an increase in vehicle and/or non-motorized activity.

A 2035 AM peak hour analysis was also conducted but with a smaller study area that focused on I-5 ramp terminals and intersections adjacent to stations with park-and-ride locations. The LOS definitions shown for the AM and PM peak hours are based on the standards in the *Highway Capacity Manual* (TRB, 2010); these standards are provided in Appendix B, Level of Service Definitions used for Federal Link Extension Analysis, of this technical report.

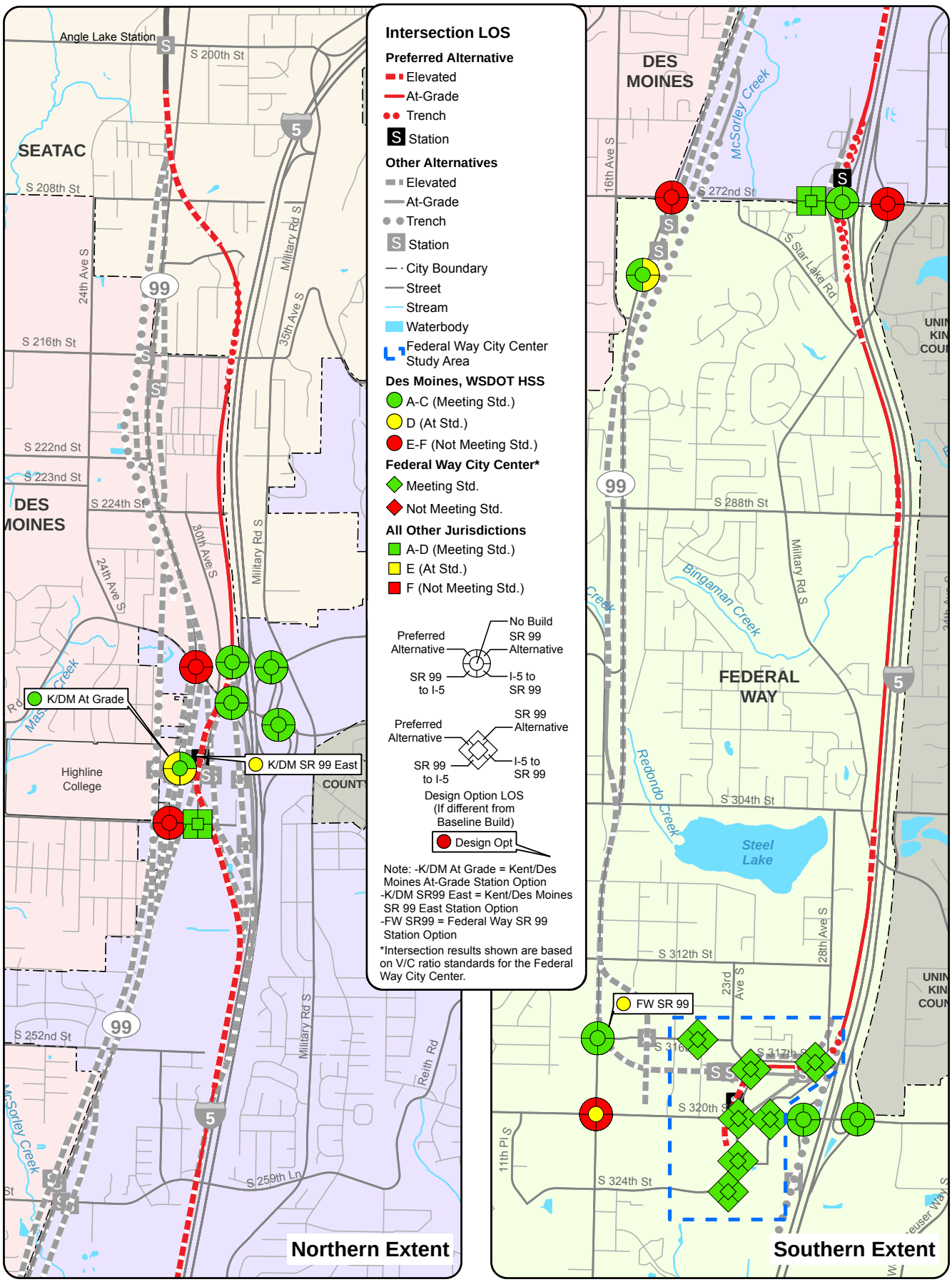
Level of service standards, based on vehicle delay, for each jurisdiction are presented in Table 3-11 in Chapter 3, Affected Environment of this technical report. For locations where a state roadway is within a local jurisdictional boundary, the most conservative LOS standard is considered when determining whether the FWLE would cause any impacts. For the City of Des Moines and the City of Federal Way, intersection v/c ratios are used in their LOS standard, and those standards are presented in Appendix B of this report.

In general, intersections near light rail stations are expected to operate at an LOS similar to the No Build Alternative. A few exceptions would occur around the Kent/Des Moines, S 272nd Street, and Federal Way Transit Center station areas. A few other isolated locations show a LOS degradation that would depend on a particular station design. Exhibits 4-10 through 4-12 present the 2035 AM and PM peak hour intersection LOS for the No Build Alternative and build alternatives.

At I-5 ramp terminals, vehicle queue lengths on the off-ramps were analyzed to assess whether they would extend onto the I-5 mainline. This analysis is presented under *I-5 Ramp Terminal Operations* later in this section.

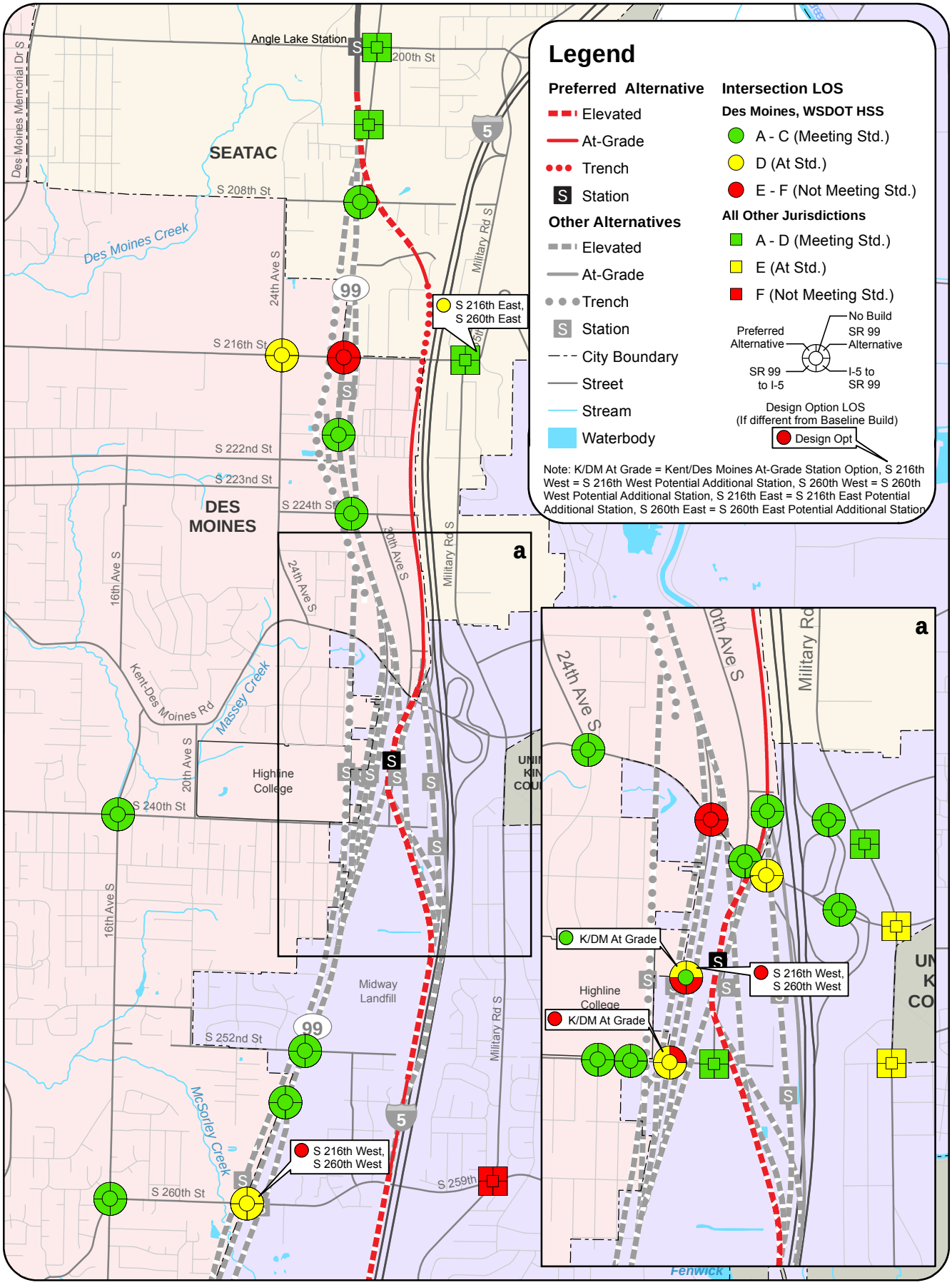
4.3.3.1 No Build Alternative

For the No Build Alternative analysis, a number of projects were taken into account. Projects include improvements such as additional or widened roadways, intersection improvements, and the addition of traffic signalization. A few intersections show improved intersection operations in the 2035 No Build



Data Sources: King County (2015)
HSS = Highway of Statewide Significance

EXHIBIT 4-10
2035 AM No Build and Build Alternatives Level of Service Northern and Southern Study Area Extents
Federal Way Link Extension

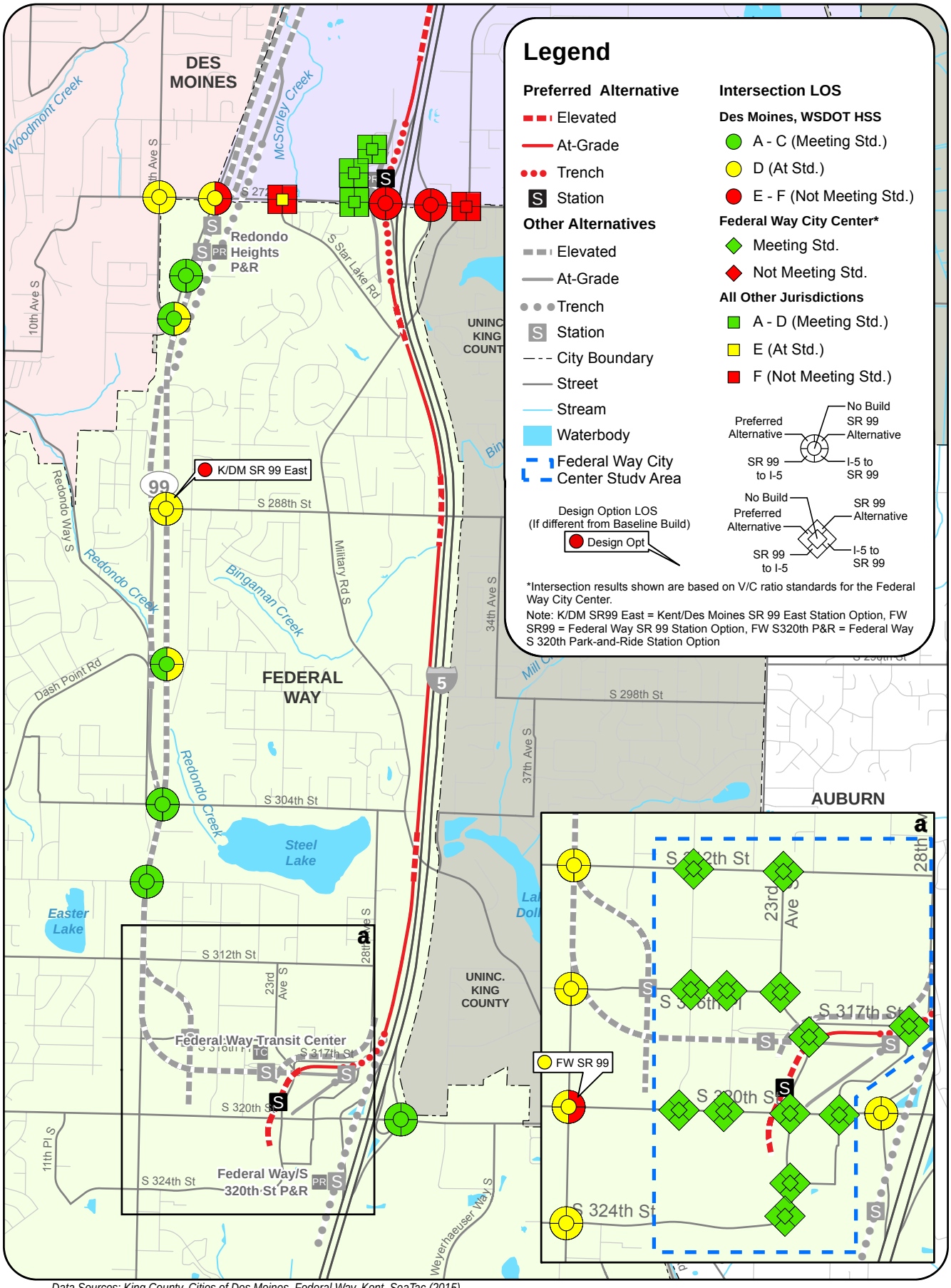


Data Sources: King County, Cities of Des Moines, Federal Way, Kent, SeaTac (2015).
HSS = Highway of Statewide Significance

N

0 0.25 0.5 1 Miles

EXHIBIT 4-11
2035 PM No Build and Build Alternatives
Level of Service Northern Study Area Extent
Federal Way Link Extension



Data Sources: King County, Cities of Des Moines, Federal Way, Kent, SeaTac (2015).
HSS = Highway of Statewide Significance

N

0 0.25 0.5 1 Miles

EXHIBIT 4-12
2035 PM No Build and Build Alternatives
Level of Service Southern Study Area Extent
Federal Way Link Extension

conditions compared with existing conditions. The planned addition of signals at the intersection of SR 99/S 236th Street would improve intersection operations from LOS C to LOS B, respectively, under the No Build Alternative. The intersection operations at I-5 southbound ramps/S Kent-Des Moines Road would also improve in 2035 No Build condition from existing operations as a result of the planned SR 509 Extension. Some intersections would also noticeably degrade in the future compared with the existing conditions as traffic volumes increase. For example, intersections along S 272nd Street would operate worse as additional traffic is expected along this corridor with the planned SR 509 Extension.

Of the intersections analyzed for the FWLE, the following eight intersections would not meet the applicable jurisdictional LOS standard in the No Build condition in the AM or PM peak hour:

- SR 99/S 216th Street (PM Peak only)
- SR 99/Kent-Des Moines Road (AM and PM Peak)
- I-5 northbound ramps/S 272nd Street (AM and PM Peak)
- I-5 southbound ramps/S 272nd Street (PM Peak only)
- SR 99/S 240th Street (AM Peak only)
- SR 99/S 272nd Street (AM Peak only)
- Military Road S/259th Place S/S Reith Road (PM Peak only)
- Military Road S/S 272nd Street (PM Peak only) Full-Length Build Alternatives

4.3.3.2 Full-Length Build Alternatives

Preferred Alternative

The majority of the intersections analyzed for the full-length Preferred Alternative would operate similar to the No Build Alternative. The intersections that would not meet jurisdictional LOS standards in the No Build Alternative would continue to not meet standards under the Preferred Alternative.

Kent/Des Moines Station Area

Table 4-19 presents the intersection LOS for the Preferred Kent/Des Moines Station and station options. Most intersections analyzed in the Kent/Des Moines Station area would operate similarly to the No Build Alternative. The main access to the station area at the SR 99/S 236th Street intersection would operate at LOS D with the Preferred Alternative. The following intersections would not meet agency LOS standards and operate worse than the No Build Alternative in the area surrounding the Kent/Des Moines Station under the Preferred Alternative and both Kent/Des Moines station options:

- SR 99/Kent-Des Moines Road (AM and PM Peak)
- SR 99/S 240th Street (AM Peak only)
- Military Road S/259th Place S/S Reith Road (PM Peak only)

These three intersections would operate with higher delay than under the No Build Alternative due to an increase in traffic volume generated by the station. The SR 99/S 216th Street intersection would not meet LOS standards under both the No Build and Preferred alternatives, although intersection delays would not increase with the FWLE. The roadway improvements described in Section 4.3.2.1 are assumed in the LOS results for the Preferred Alternative.

TABLE 4-19

No Build and Preferred Alternative Intersection Level of Service: Kent/Des Moines Station Area

Intersection	LOS Standard[a]	No Build, AM LOS (PM LOS)	Station/Station Options		
			Preferred, AM LOS (PM LOS)	I-5, AM LOS (PM LOS)	At-Grade, AM LOS (PM LOS)
SR 99 and S 200th St	E	-- (D)	-- (D)	-- (D)	-- (D)
SR 99 and S 204th St	E	-- (C)	-- (C)	-- (C)	-- (C)
SR 99 and S 208th St	E	-- (C)	-- (C)	-- (C)	-- (C)
Military Rd S and S 216th St	E	-- (D)	-- (D)	-- (D)	-- (D)
24th Ave. S and S 216th St	E	-- (D)	-- (D)	-- (D)	-- (D)
SR 99 and S 216th St	D	-- (E)	-- (E)	-- (E)	-- (E)
S 220th St and SR 99	D	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and S 224th St	D	-- (B)	-- (B)	-- (B)	-- (B)
25th Ave. S/24th Ave S and Kent-Des Moines Rd	D	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and Kent-Des Moines Rd	D	E (F)	E (F)	E (F)	E (F)
30th Ave. S and Kent-Des Moines Rd	D	-- (B)	-- (B)	-- (B)	-- (B)
16th Ave. S and S 240th St	D	-- (B)	-- (B)	-- (B)	-- (B)
28th Ave. S/Highline College Driveway and S 240th St	D	-- (B)	-- (B)	-- (B)	-- (B)
S 240th St and Highline College Drop-Off Loop	D	-- (B)	-- (B)	-- (B)	-- (B)
Military Rd S and Kent-Des Moines P&R	E	-- (D)	-- (D)	-- (D)	-- (D)
I-5 Southbound Ramps and Kent-Des Moines Rd	D	C (D)	C (D)	C (D)	C (D)
I-5 Northbound Ramps and Kent-Des Moines Rd	D	C (B)	C (B)	C (B)	C (B)
Military Rd S and Kent-Des Moines Rd	E	-- (E)	-- (E)	-- (E)	-- (E)
SR 99 and S 236th Street	D	A (B)	D (D)	D (D)	A (B)
SR 99 and S 240th St	D	E (D)	E (D)	E (D)	F (E)
S 240th St and 30th Ave S	E	B (B)	B (B)	B (B)	C (C)
Military Rd S and S 240th St	E	-- (E)	-- (E)	-- (E)	-- (E)
SR 99 and S 252nd St	D	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and Fred Meyer	D	-- (C)	-- (C)	-- (C)	-- (C)
SR 99 and S 260th St	D	-- (D)	-- (D)	-- (D)	-- (D)
Military Rd S and 259th Pl/S Reith Rd	E	-- (F)	-- (F)	-- (F)	-- (F)
16th Ave. S and S 260th St	D	-- (C)	-- (C)	-- (C)	-- (C)
I-5 NB Ramps and Veterans Dr	D	C (C)	C (C)	C (C)	C (C)
I-5 SB Ramps and Veterans Dr	D	B (C)	B (C)	B (C)	B (C)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume-to-capacity ratio was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
-- = not analyzed

S 272nd Star Lake Station Area

LOS analysis results are shown in Table 4-20 for the Preferred S 272nd Star Lake Station and Star Lake Elevated Station Option. Of the intersections analyzed near the S 272nd Star Lake Station, the following intersections would not meet agency LOS standards:

- SR 99/S 272nd Street (AM Peak only)
- S Star Lake Road/S 272nd Street (PM Peak Only)
- I-5 southbound ramps/S 272nd Street (PM Peak Only)
- I-5 northbound ramps/S 272nd Street (AM and PM Peak)
- Military Road S/S 272nd Street (PM Peak Only)

Except for Star Lake Road at S 272nd Street, these intersections also would not meet agency LOS standards in the No Build Alternative. In some cases however, there would be additional delay with the Preferred Alternative caused by an increase in traffic volumes traveling to and from the station. The main access to the station area at 26th Avenue S/S 272nd Street intersection would operate at LOS C with the Preferred Alternative. The roadway improvements described in Section 4.3.2.1 are assumed in the LOS results for the Preferred Alternative.

TABLE 4-20
No Build and Preferred Alternative Intersection Level of Service: S 272nd Station

Intersection	LOS Standard[a]	Alternative	
		No Build, AM LOS (PM LOS)	S 272nd Star Lake[b], AM LOS (PM LOS)
16th Ave. S and S 272nd St	D	-- (D)	-- (D)
SR 99 and S 272nd St	D	F (D)	F (D)
S Star Lake Rd and S 272nd St	E	-- (E)	-- (F)
26th Ave. S and Star Lake P&R North Driveway	E	-- (A)	-- (A)
26th Ave. S and Star Lake P&R South Driveway	E	-- (A)	-- (B)
S 272nd St and 26th Ave. S	E	A (B)	C (C)
I-5 Southbound Ramps and S 272nd St	D	C (E)	C (E)
I-5 Northbound Ramps and S 272nd St	D	E (E)	F (E)
Military Rd S and S 272nd St	E	-- (F)	-- (F)
SR 99 and S 276th St	D	B (B)	B (C)
SR 99 and 16th Ave. S	D	-- (C)	-- (C)
SR 99 and S 288th St	D	-- (D)	-- (D)
SR 99 and Dash Point Rd	D	-- (C)	-- (C)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume-to-capacity ratio was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
[b] The intersection LOS results with the S 272nd Star Lake Elevated Station Option would be similar to the S 272nd Star Lake Station.
-- = not analyzed

Federal Way Transit Center Station Area

Results for the AM and PM peak hour analysis used to evaluate the Federal Way Transit Center station area are shown in Table 4-21. All intersections surrounding the Federal Way Transit Center Station,

with the exception of SR 99/S 320th Street, would operate better than the relevant LOS standard in both the No Build and Preferred alternatives, including the two station options. The main access to the station area at the S 317th Street/23rd Avenue S intersection would operate at LOS A with the Preferred Alternative. Under the S 320th Park-and-Ride Station Option, the intersection of 23rd Avenue S/S 320th Street would operate at LOS F in the PM peak hour but the jurisdictional LOS standard would still be met. The roadway improvements described in Section 4.3.2.1 are assumed in the LOS results for the Preferred Alternative.

TABLE 4-21

No Build and Preferred Alternative Intersection Level of Service: Federal Way Transit Center Station Area

Intersection	LOS Standard[a]	Alternative/Station Options			
		No Build, AM LOS (PM LOS)	Preferred, AM LOS (PM LOS)	Federal Way I-5, AM LOS (PM LOS)	Federal Way S 320th P&R, AM LOS (PM LOS)
SR 99 and S 304th St	D	-- (C)	-- (C)	-- (C)	-- (C)
SR 99 and S 308th St	D	-- (C)	-- (C)	-- (C)	-- (C)
SR 99 and S 312th St	D	-- (D)	-- (D)	-- (D)	-- (D)
Pete von Reichbauer Way S and S 312th St	F[b]	-- (B)	-- (B)	-- (B)	-- (B)
23rd Ave. S and S 312th St	F[b]	-- (C)	-- (C)	-- (C)	-- (C)
SR 99 and S 316th St	D	B (D)	B (D)	B (D)	B (D)
Pete von Reichbauer Way S and S 316th St	F[b]	-- (C)	-- (C)	-- (C)	-- (C)
21st Ave. S and S 316th St	F[b]	A (B)	B (B)	B (B)	A (B)
23rd Ave. S and S 316th St	F[b]	-- (A)	-- (A)	-- (B)	-- (A)
23rd Ave. S and S 317th St	F[b]	A (C)	A (A)	B (C)	B (C)
S 317th St and 28th Ave. S	F[b]	A (B)	A (B)	A (B)	A (B)
SR 99 and S 320th St	D	D (D)	E (D)	E (D)	E (D)
Pete Von Reichbauer Way S and S 320th St	F[b]	-- (C)	-- (C)	-- (C)	-- (C)
21st Ave. S and S 320th St	F[b]	-- (B)	-- (D)	-- (C)	-- (C)
23rd Ave. S and S 320th St	F[b]	C (E)	D (E)	D (E)	D (F)
25th Ave. S and S 320th St	F[b]	B (C)	B (C)	B (D)	B (C)
I-5 Southbound Ramps and S 320th St	D	B (D)	B (D)	B (D)	B (D)
I-5 Northbound Ramps and S 320th St	D	B (C)	B (C)	B (C)	B (C)
23rd Ave. S and S 322nd St	F[b]	A (B)	A (B)	A (B)	B (B)
SR 99 and S 324th St	D	-- (D)	-- (D)	-- (D)	-- (D)
P&R and 23rd Ave. S/S 324th St	F[b]	B (B)	B (B)	B (B)	C (C)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume-to-capacity ratio was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
[b] City of Federal Way LOS standard is based on volume-to-capacity (v/c) ratio, as described in Table 3-11 in Chapter 3 of this document. For purposes of this table, a LOS F standard represents an average V/C ratio of 1.1 for the City Center area. Detailed v/c ratio calculations are provided in Appendix D.
-- = not analyzed

SR 99 Alternative

The majority of the intersections analyzed for the SR 99 Alternative would operate similar to the No Build Alternative. The intersections that would not meet jurisdictional LOS standards in the No Build Alternative would continue to not meet standards under the SR 99 Alternative.

Kent/Des Moines Station Area

Table 4-22 provides the AM and PM peak hour LOS for each intersection for the Kent/Des Moines Station and station options under the SR 99 Alternative compared with the No Build Alternative. The potential additional S 216th and S 260th station options were not included in this station area analysis and are discussed later in this subsection.

Most intersections analyzed in the Kent/Des Moines Station area would operate similarly to the No Build Alternative. Compared with the No Build Alternative, no additional intersections would operate below LOS standards in the Kent/Des Moines Station area with this alternative. The main access to the station area at the SR 99/S 236th Street intersection would operate either at LOS C or LOS D, depending on the SR 99 Alternative station option. The roadway improvements described in Section 4.3.2.2 are assumed in the LOS results for the SR 99 Alternative. The following intersections would operate below jurisdictional LOS standard and worse than the No Build Alternative in the station area:

- SR 99/Kent-Des Moines Road (AM and PM Peak)
- SR 99/S 240th Street (PM Peak only)
- Military Road S/259th Place S/S Reith Road (PM Peak only)

The other locations are expected to experience additional delay with the FWLE resulting from increases in traffic volumes traveling to and from the station. The above intersections would operate similarly with the SR 99 Alternative Kent/Des Moines Station and station options.

TABLE 4-22
2035 AM/PM No Build and SR 99 Alternative Intersection Level of Service: Kent/Des Moines Station Area

Intersection	LOS Standard[a]	Alternative/Station Options				
		No Build, AM LOS (PM LOS)	SR 99, AM LOS (PM LOS)	HC Campus, AM LOS (PM LOS)	SR 99 Median, AM LOS (PM LOS)	SR 99 East , AM LOS (PM LOS)
SR 99 and S 200th St	E	-- (D)	-- (D)	-- (D)	-- (D)	-- (D)
SR 99 and S 204th St	E	-- (C)	-- (C)	-- (C)	-- (C)	-- (C)
SR 99 and S 208th St	E	-- (C)	-- (C)	-- (C)	-- (C)	-- (C)
Military Rd S and S 216th St	E	-- (D)	-- (D)	-- (D)	-- (D)	-- (D)
24th Ave. S and S 216th St	E	-- (D)	-- (D)	-- (D)	-- (D)	-- (D)
SR 99 and S 216th St	D	-- (E)	-- (E)	-- (E)	-- (E)	-- (E)
S 220th St and SR 99	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and S 224th St	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
25th Ave. S/24th Ave S and Kent-Des Moines Rd	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and Kent-Des Moines Rd	D	E (F)	E (F)	E (F)	E (F)	E (F)
30th Ave. S and Kent-Des Moines Rd	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)

TABLE 4-22
2035 AM/PM No Build and SR 99 Alternative Intersection Level of Service: Kent/Des Moines Station Area

Intersection	LOS Standard[a]	Alternative/Station Options				
		No Build, AM LOS (PM LOS)	SR 99, AM LOS (PM LOS)	HC Campus, AM LOS (PM LOS)	SR 99 Median, AM LOS (PM LOS)	SR 99 East , AM LOS (PM LOS)
16th Ave. S and S 240th St	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
28th Ave. S/HC Driveway and S 240th St	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
S 240th St and HC Drop-Off Loop	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
Military Rd S and Kent-Des Moines P&R	E	-- (D)	-- (D)	-- (D)	-- (D)	-- (D)
I-5 Southbound Ramps and Kent-Des Moines Rd	D	C (D)	C (D)	C (D)	C (D)	C (D)
I-5 Northbound Ramps and Kent-Des Moines Rd	D	C (B)	C (C))	C (C	C (C)	C (C)
Military Rd S and Kent-Des Moines Rd	E	-- (E)	-- (E)	-- (E)	-- (E)	-- (E)
SR 99 and S 236th St	D	A (B)	C (D)	C (C)	C (D)	D (D)
SR 99 and S 240th St	D	E (D)	E (E)	E (E)	E (E)	E (E)
S 240th St and 30th Ave. S	E	B (B)	B (B)	B (B)	B (B)	B (B)
Military Rd S and S 240th St	E	-- (E)	-- (E)	-- (E)	¨ (E)	-- (E)
SR 99 and S 252nd St	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and Fred Meyer	D	-- (C)	-- (C)	-- (C)	-- (C)	-- (C)
SR 99 and S 260th St	D	-- (D)	-- (D)	-- (D)	¨ (D)	-- (D)
Military Rd S and 259th Pl/S Reith Rd	E	-- (F)	-- (F)	-- (F)	¨ (F)	-- (F)
16th Ave. S and S 260th St	D	-- (C)	-- (C)	-- (C)	-- (C)	-- (C)
I-5 Northbound Ramps and Veterans Dr	D	C (C)	C (C)	C (C)	C (C)	C (C)
I-5 Southbound Ramps and Veterans Dr	D	B (C)	B (C)	B (C)	B (C)	B (C)

Notes:
Volume-to-capacity was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
Gray shading indicates intersection does not meet LOS standard.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
HC = Highline College
-- = not analyzed

S 272nd Redondo Station Area

Table 4-23 provides the intersection analysis results for the SR 99 Alternative S 272nd Redondo Station. Of the intersections analyzed near the S 272nd Redondo Station, five intersections would not meet agency LOS standards within this area. These intersections are:

- SR 99/S 272nd Street (AM and PM Peak)
- S Star Lake Road/S 272nd Street (PM Peak Only)
- I-5 southbound ramps/S 272nd Street (PM Peak Only)
- I-5 northbound ramps/S 272nd Street (AM and PM Peak)
- Military Road S/S 272nd Street (PM Peak Only)

Except for Star Lake Road at S 272nd Street, these intersections also would not meet agency LOS standards with the No Build Alternative, although in some cases there would be additional delay with the SR 99 Alternative from an increase in traffic volumes traveling to and from the station. The main

access to the S 272nd Redondo Station at the SR 99/S 276th Street intersection would operate at LOS D or better. The roadway improvements described in Section 4.3.2.2 are assumed in the LOS results for the SR 99 Alternative.

TABLE 4-23
No Build and SR 99 Alternative Intersection Level of Service: S 272nd Redondo Station

Intersection	LOS Standard[a]	Alternative	
		No Build, AM LOS (PM LOS)	S 272nd Redondo Station[b], AM LOS (PM LOS)
16th Ave. S and S 272nd St	D	-- (D)	-- (D)
SR 99 and S 272nd St	D	F (D)	F (E)
S Star Lake Rd and S 272nd St	E	-- (E)	-- (F)
26th Ave. S and Star Lake P&R North Driveway	E	-- (A)	-- (A)
26th Ave. S and Star Lake P&R South Driveway	E	-- (A)	-- (A)
S 272nd St and 26th Ave. S	E	A (B)	A (B)
I-5 Southbound Ramps and S 272nd St	D	C (E)	C (E)
I-5 Northbound Ramps and S 272nd St	D	E (E)	F (F)
Military Rd S and S 272nd St	E	-- (F)	-- (F)
SR 99 and S 276th St	D	B (B)	D (B)
SR 99 and 16th Ave S	D	-- (C)	-- (D)
SR 99 and S 288th St	D	-- (D)	-- (D)
SR 99 and Dash Point Rd	D	-- (C)	-- (D)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume to-capacity ratio was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
[b] The intersection LOS results with the 272nd Redondo Trench Station Option are similar to the S 272nd Redondo Station.
-- = not analyzed

Federal Way Transit Center Station Area

Results for the AM and PM peak hour analysis used to evaluate the Federal Way Transit Center Station area are shown in Table 4-24 for each intersection in the station area. With the SR 99 Alternative and Federal Way SR 99 Station Option, all intersections except for the SR 99/S 320th Street intersection under Federal Way Transit Center Station would operate better than the jurisdictional LOS standard. The west access to the Federal Way SR 99 Station Option at the SR 99/S 316th Street intersection would operate at LOS D or better. With the SR 99 Alternative Federal Way Transit Center Station, the main access to this station at 23rd Avenue S and S 317th Street would operate at LOS C. The roadway improvements described in Section 4.3.2.2 are assumed in the LOS results for the SR 99 Alternative.

TABLE 4-24

No Build and SR 99 Alternative Intersection Level of Service: Federal Way Transit Center Station Area

Intersection ID	LOS Standard[a]	Alternative/Station Option		
		No Build, AM LOS (PM LOS)	SR 99 , AM LOS (PM LOS)	Federal Way SR 99, AM LOS (PM LOS)
SR 99 and S 304th St	D	-- (C)	-- (C)	-- (C)
SR 99 and S 308th St	D	-- (C)	-- (C)	-- (C)
SR 99 and S 312th St	D	-- (D)	-- (D)	-- (D)
Pete von Reichbauer Way S and S 312th St	F[b]	-- (B)	-- (B)	-- (B)
23rd Ave. S and S 312th St	F[b]	-- (C)	-- (C)	-- (C)
SR 99 and S 316th St	D	B (D)	B (D)	C (D)
Pete von Reichbauer Way S and S 316th St	F[b]	-- (C)	-- (C)	-- (C)
21st Ave. S and S 316th St	F[b]	A (B)	B (B)	A (B)
23rd Ave. S and S 316th St	F[b]	-- (A)	-- (A)	-- (A)
23rd Ave. S and S 317th St	F[b]	A (C)	B (C)	B (C)
S 317th St and 28th Ave. S	F[b]	A (B)	A (B)	A (B)
SR 99 and S 320th St	D	D (D)	E (E)	D (D)
Pete von Reichbauer Way S and S 320th St	F[b]	-- (C)	-- (C)	-- (C)
21st Ave. S and S 320th St	F[b]	-- (B)	-- (C)	-- (C)
23rd Ave. S and S 320th St	F[b]	C (E)	D (E)	C (E)
25th Ave. S and S 320th St	F[b]	B (C)	B (C)	B (C)
I-5 Southbound Ramps and S 320th St	D	B (D)	B (D)	B (D)
I-5 Northbound Ramps and S 320th St	D	B (C)	B (C)	B (C)
23rd Ave. S and S 322nd St	F[b]	A (B)	A (B)	A (B)
SR 99 and S 324th St	D	-- (D)	-- (D)	-- (D)
P&R and 23rd Ave. S/S 324th St	F[b]	B (B)	B (B)	B (B)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume to-capacity ratio was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis result.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
[b] City of Federal Way LOS standard is based on volume-to-capacity (v/c) ratio, as described in Table 3-11 in Chapter 3 of this technical report. For purposes of this table, an LOS F standard represents an average v/c ratio of 1:1 for the City Center area. Detailed v/c ratio calculations are provided in Appendix D.
-- = not analyzed

Potential Additional Stations

S 216th Station Options

Intersection LOS results for potential additional S 216th (West or East) station option areas are shown in Table 4-25. The intersection operations surrounding these station areas would be similar to the SR 99 Alternative because the vehicle activity expected at the station would be relatively low. Therefore, no additional intersection operations would degrade below the jurisdictional LOS standard with either of these station options.

TABLE 4-25
No Build and SR 99 Alternative Intersection Level of Service: S 216th Station Options

Intersection	LOS Standard[a]	Alternative/Station Options			
		No Build, AM LOS (PM LOS)	SR 99, AM LOS (PM LOS)	S 216th West, AM LOS (PM LOS)	S 216th East, AM LOS (PM LOS)
SR 99 and S 200th St	E	-- (D)	-- (D)	-- (D)	-- (D)
SR 99 and S 204th St	E	-- (C)	-- (C)	-- (C)	-- (C)
SR 99 and S 208th St	E	-- (C)	-- (C)	-- (C)	-- (C)
Military Rd S and S 216th St	E	-- (D)	-- (D)	-- (D)	-- (E)
24th Ave. S and S 216th St	E	-- (D)	-- (D)	-- (D)	-- (D)
SR 99 and S 216th St	D	-- (E)	-- (E)	-- (E)	-- (E)
S 220th St and SR 99	D	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and S 224th St	D	-- (B)	-- (B)	-- (B)	-- (B)
25th Ave. S/24th Ave S and Kent-Des Moines Rd	D	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and Kent-Des Moines Rd	D	E (F)	E (F)	E (F)	E (F)
30th Ave. S and Kent-Des Moines Rd	D	-- (B)	-- (B)	-- (B)	-- (B)
16th Ave. S and S 240th St	D	-- (B)	-- (B)	-- (B)	-- (B)
28th Ave. S/HC Driveway and S 240th St	D	-- (B)	-- (B)	-- (B)	-- (B)
S 240th St and HC Drop-Off Loop	D	-- (B)	-- (B)	-- (B)	-- (B)
Military Rd S and Kent-Des Moines P&R	E	-- (D)	-- (D)	-- (D)	-- (D)
I-5 Southbound Ramps and Kent-Des Moines Rd	D	C (D)	C (D)	C (D)	C (D)
I-5 Northbound Ramps and Kent-Des Moines Rd	D	C (B)	C (C)	C (C)	C (C)
Military Rd S and Kent-Des Moines Rd	E	-- (E)	-- (E)	-- (E)	-- (E)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume-to-capacity ratio was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
-- = not analyzed

S 260th Station Options

Intersection LOS results for potential additional S 260th (West or East) station option areas are shown in Table 4-26. The intersection operations surrounding these station areas would be similar compared with the SR 99 Alternative because the vehicle activity expected at the station would be low. Therefore, no additional intersection operations would degrade below the jurisdictional LOS standard in association with either of these station areas.

TABLE 4-26
No Build and SR 99 Alternative Intersection Level of Service: S 260th Station Options

Intersection	LOS Standard[a]	Alternative/Station Options			
		No Build, AM LOS (PM LOS)	SR 99, AM LOS (PM LOS)	S 260th West, AM LOS (PM LOS)	S 260th East, AM LOS (PM LOS)
SR 99 and S 236th Street	D	A (B)	C (D)	C (D)	C (D)
SR 99 and S 240th St	D	E (D)	E (E)	E (E)	E (E)
S 240th St and 30th Ave. S	E	B (B)	B (B)	B (B)	B (B)

TABLE 4-26
No Build and SR 99 Alternative Intersection Level of Service: S 260th Station Options

Intersection	LOS Standard[a]	Alternative/Station Options			
		No Build, AM LOS (PM LOS)	SR 99, AM LOS (PM LOS)	S 260th West, AM LOS (PM LOS)	S 260th East, AM LOS (PM LOS)
Military Rd S and S 240th St	E	-- (E)	-- (E)	-- (E)	-- (E)
SR 99 and S 252nd St	D	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and Fred Meyer	D	-- (C)	-- (C)	-- (C)	-- (C)
SR 99 and S 260th St	D	-- (D)	-- (D)	-- (D)	-- (D)
Military Rd S and 259th Pl/S Reith Rd	E	-- (F)	-- (F)	-- (F)	-- (F)
16th Ave. S and S 260th St	D	-- (C)	-- (C)	-- (C)	-- (C)
16th Ave S and S 272nd St	D	-- (D)	-- (D)	-- (D)	-- (D)
SR 99 and S 272nd St	D	F (D)	F (E)	F (E)	F (E)
S Star Lake Rd and S 272nd St	E	-- (E)	-- (F)	-- (F)	-- (F)
26th Ave S and Star Lake P&R North Driveway	E	-- (A)	-- (A)	-- (A)	-- (A)
26th Ave S and Star Lake P&R South Driveway	E	-- (A)	-- (A)	-- (A)	-- (A)
S 272nd St and 26th Ave S	E	A (B)	A (B)	A (B)	A (B)
I-5 Southbound Ramps and S 272nd St	D	C (E)	C (E)	C (E)	C (E)
I-5 Northbound Ramps and S 272nd St	D	E (E)	F (F)	F (F)	F (F)
Military Rd S and S 272nd St	E	-- (F)	-- (F)	-- (F)	-- (F)

Note: Gray shading indicates intersection does not meet LOS standard. Volume-to-capacity was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
-- = not analyzed

SR 99 to I-5 Alternative

Level of service results for the SR 99 to I-5 Alternative are provided in Tables D-9 thru D-11 in Appendix D, Existing and Future Intersection Level of Service Results. The SR 99 to I-5 Alternative would have intersection LOS results similar to the SR 99 Alternative within the Kent/Des Moines Station area. South of the Kent/Des Moines Station area, intersection LOS results would be similar to the Preferred Alternative. No additional intersections, beyond those identified under the Preferred and SR 99 alternatives, are expected to operate below jurisdictional LOS standards. The following eight intersections would operate worse than the No Build Alternative and would not meet the applicable LOS standard:

- SR 99/Kent-Des Moines Road (AM and PM Peak)
- SR 99/S 240th Street (AM Peak only)
- Military Road S/259th Place S/S Reith Road (PM Peak only)
- SR 99/S 272nd Street (AM Peak only)
- S Star Lake Road/S 272nd Street (PM Peak Only)
- I-5 southbound ramps/S 272nd Street (PM Peak Only)
- I-5 northbound ramps/S 272nd Street (AM and PM Peak)
- SR 99/S 320th Street

At these intersections, increased vehicle volume as a result of vehicles traveling to and from the station areas are expected to increase vehicle delays.

I-5 to SR 99 Alternative

Level of service results for the I-5 to SR 99 Alternative are provided in Tables D-12 thru D-14 in Appendix D of this technical report. The I-5 to SR 99 Alternative would have intersection LOS results similar to the Preferred Alternative in the Kent/Des Moines Station area and intersection LOS results similar to the SR 99 Alternative south of this station. No additional intersections, beyond those identified under the Preferred and SR 99 alternatives, are expected to operate below jurisdictional LOS standards. The following intersections would operate worse than the No Build Alternative and would not meet the jurisdictional LOS standard due to the increased trips traveling to and from the station area:

- SR 99/Kent-Des Moines Road (AM and PM Peak)
- SR 99/S 240th Street (AM Peak only)
- Military Road S/259th Place S/S Reith Road (PM Peak only)
- SR 99/S 272nd Street (AM and PM Peak)
- S Star Lake Road/S 272nd Street (PM Peak Only)
- I-5 southbound ramps/S 272nd Street (PM Peak Only)
- I-5 northbound ramps/S 272nd Street (AM and PM Peak)
- Military Road S/S 272nd Street (PM Peak Only)
- SR 99/S 320th Street (AM and PM Peak)

4.3.3.3 Interim Terminus Condition Analysis

Intersection LOS analyses were also conducted for the Kent/Des Moines and S 272nd station (Redondo or Star Lake, depending on the alternative) interim terminus conditions for the FWLE. See Exhibits 4-13 through 4-16 for the AM and PM peak hour intersection LOS results for the two interim terminus station conditions.

Preferred Alternative

With both the Kent/Des Moines and S 272nd station interim terminus conditions, the same Intersections identified with the full-length Preferred Alternative as not meeting agency LOS standards and operating worse than the No Build Alternative would also be affected.

Kent/Des Moines Station Interim Terminus Conditions

Table 4-27 shows LOS analysis interim terminus condition results for the Preferred Kent/Des Moines Station and station options. With the Kent/Des Moines interim terminus condition, no additional intersections beyond those identified under the full-length Preferred Alternative are expected to operate below jurisdictional LOS standards. The following intersections would not meet agency LOS standards and would operate worse than the No Build Alternative:

- SR 99/Kent-Des Moines Road (AM and PM Peak)
- SR 99/S 240th Street (AM Peak only)
- Military Road S/259th Place S/S Reith Road (PM Peak only)

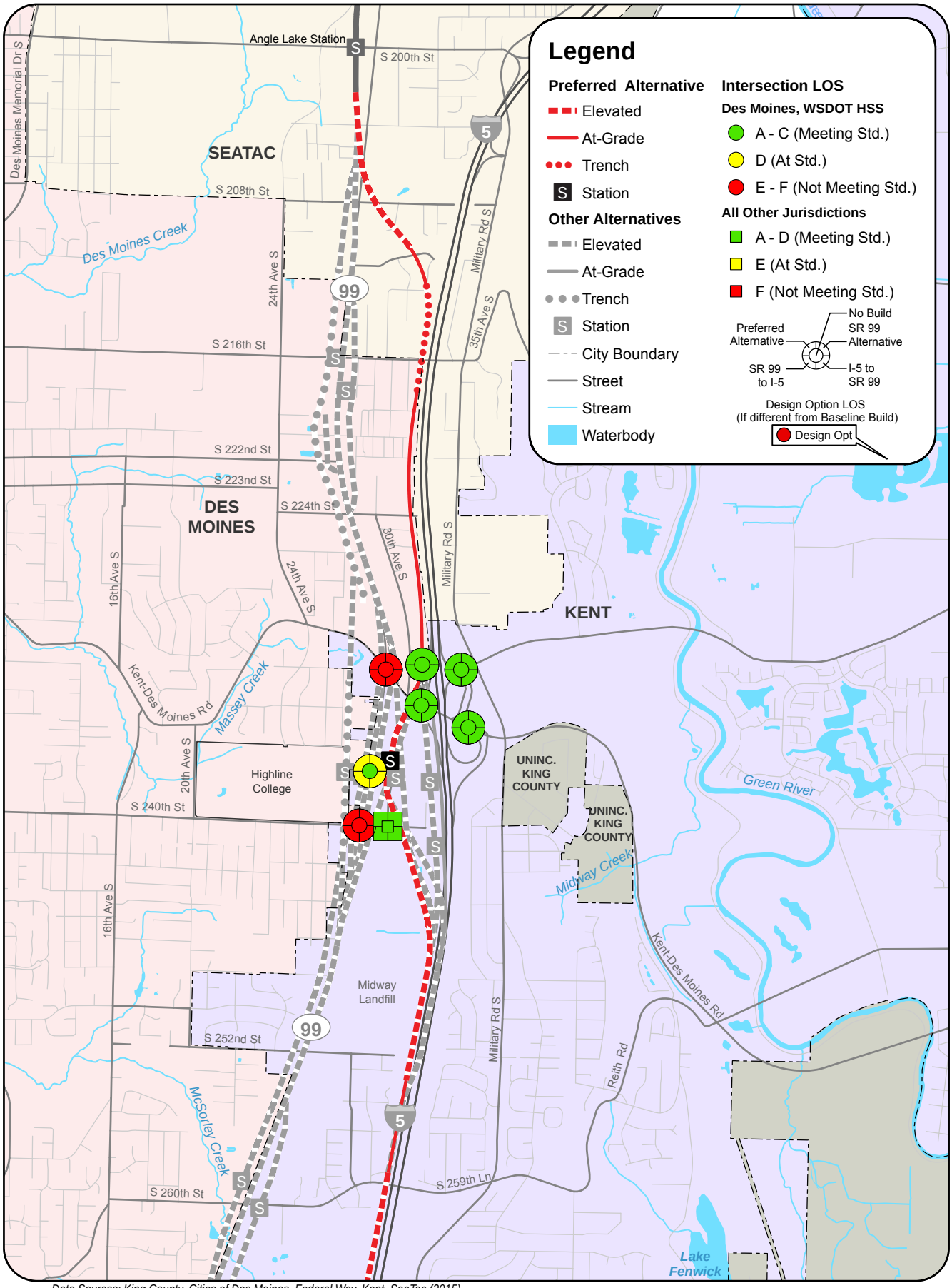
Compared with the full-length condition, the amount of delay at these locations would be greater because more vehicles would be traveling to and from the station area because of greater parking supply. The SR 99/S 216th Street intersection would not meet agency LOS standards under both the No Build and Preferred alternatives, although intersection delays would not increase with the FWLE.

TABLE 4-27

No Build and Preferred Alternative Intersection Level of Service: Kent/Des Moines Station Interim Terminus Conditions

Intersection	LOS Standard[a]	No Build, AM LOS (PM LOS)	Station/Station Option		
			Preferred, AM LOS (PM LOS)	I-5, AM LOS (PM LOS)	At-Grade, AM LOS (PM LOS)
SR 99 and S 200th St	E	-- (D)	-- (D)	-- (D)	-- (D)
SR 99 and S 204th St	E	-- (C)	-- (C)	-- (C)	-- (C)
SR 99 and S 208th St	E	-- (C)	-- (C)	-- (C)	-- (C)
Military Rd S and S 216th St	E	-- (D)	-- (D)	-- (D)	-- (D)
24th Ave. S and S 216th St	E	-- (D)	-- (D)	-- (D)	-- (D)
SR 99 and S 216th St	D	-- (E)	-- (E)	-- (E)	-- (E)
S 220th St and SR 99	D	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and S 224th St	D	-- (B)	-- (B)	-- (B)	-- (B)
25th Ave. S/24th Ave S and Kent-Des Moines Rd	D	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and Kent-Des Moines Rd	D	E (F)	F (F)	F (F)	F (F)
30th Ave. S and Kent-Des Moines Rd	D	-- (B)	-- (B)	-- (B)	-- (B)
16th Ave. S and S 240th St	D	-- (B)	-- (B)	-- (B)	-- (B)
28th Ave. S/Highline College Driveway and S 240th St	D	-- (B)	-- (B)	-- (B)	-- (B)
S 240th St and Highline College Drop-Off Loop	D	-- (B)	-- (B)	-- (B)	-- (B)
Military Rd S and Kent-Des Moines P&R	E	-- (D)	-- (D)	-- (D)	-- (D)
I-5 Southbound Ramps and Kent-Des Moines Rd	D	C (D)	C (D)	C (D)	C (D)
I-5 Northbound Ramps and Kent-Des Moines Rd	D	C (C)	C (C)	C (C)	C (C)
Military Rd S and Kent-Des Moines Rd	E	-- (E)	-- (E)	-- (E)	-- (E)
SR 99 and S 236th Street	D	A (B)	D (D)	D (D)	A (B)
SR 99 and S 240th St	D	E (D)	E (E)	E (E)	E(F)
S 240th St and 30th Ave. S	E	B (B)	B (B)	B (B)	C (D)
Military Rd S and S 240th St	E	-- (E)	-- (E)	-- (E)	-- (E)
SR 99 and S 252nd St	D	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and Fred Meyer	D	-- (C)	-- (C)	-- (C)	-- (C)
SR 99 and S 260th St	D	-- (D)	-- (D)	-- (D)	-- (D)
Military Rd S and 259th Pl/S Reith Rd	E	-- (F)	-- (F)	-- (F)	-- (F)
16th Ave. S and S 260th St	D	-- (C)	-- (C)	-- (C)	-- (C)
I-5 NB Ramps and Veterans Dr	D	C (C)	C (C)	C (C)	C (C)
I-5 SB Ramps and Veterans Dr	D	B (C)	B (C)	B (C)	B (C)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume-to-capacity ratio was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
-- = not analyzed

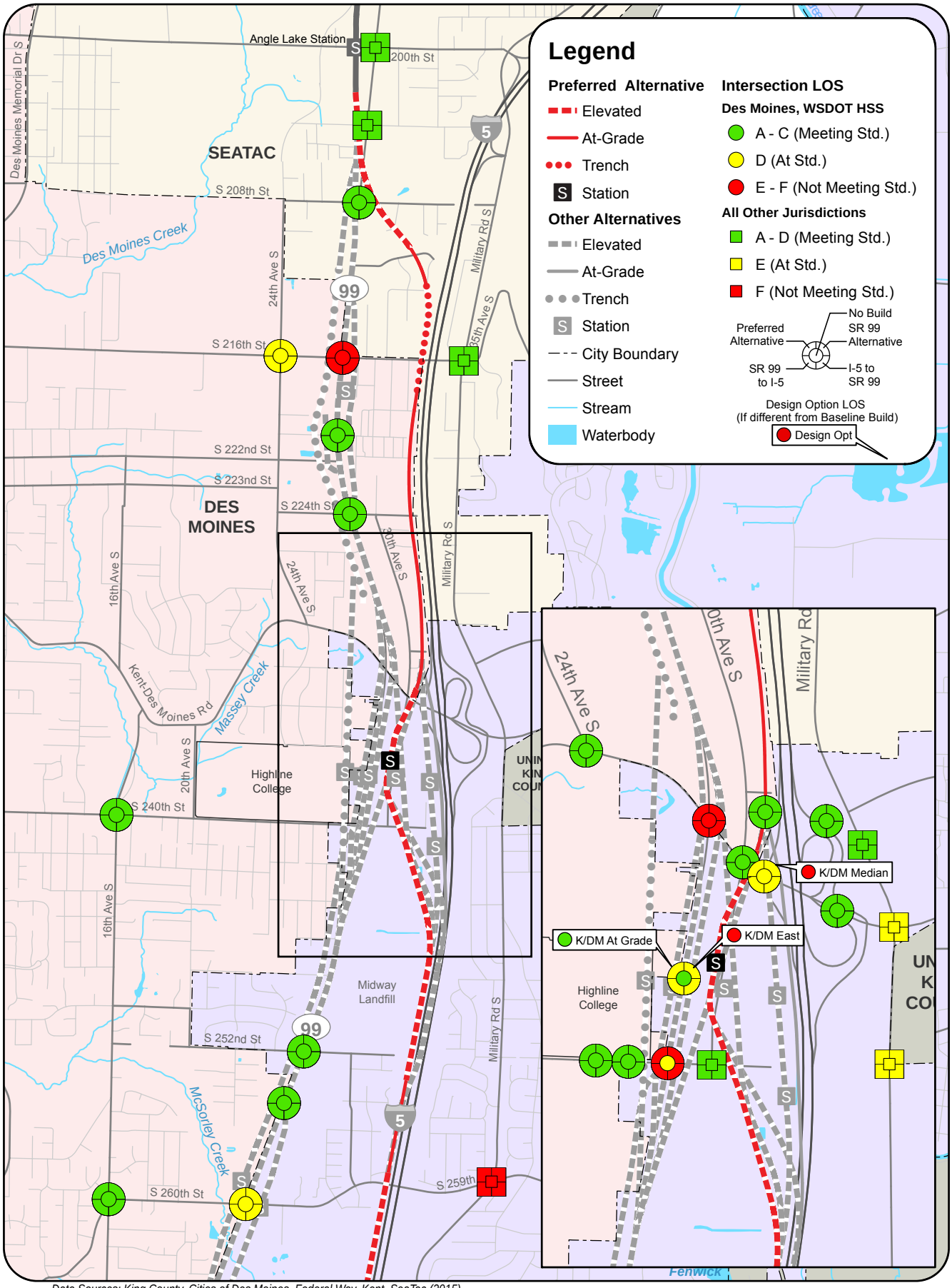


Data Sources: King County, Cities of Des Moines, Federal Way, Kent, SeaTac (2015).
HSS = Highway of Statewide Significance

N

0 0.25 0.5 1 Miles

EXHIBIT 4-13
2035 AM Kent/Des Moines Interim Terminus
Intersection Level of Service
Federal Way Link Extension

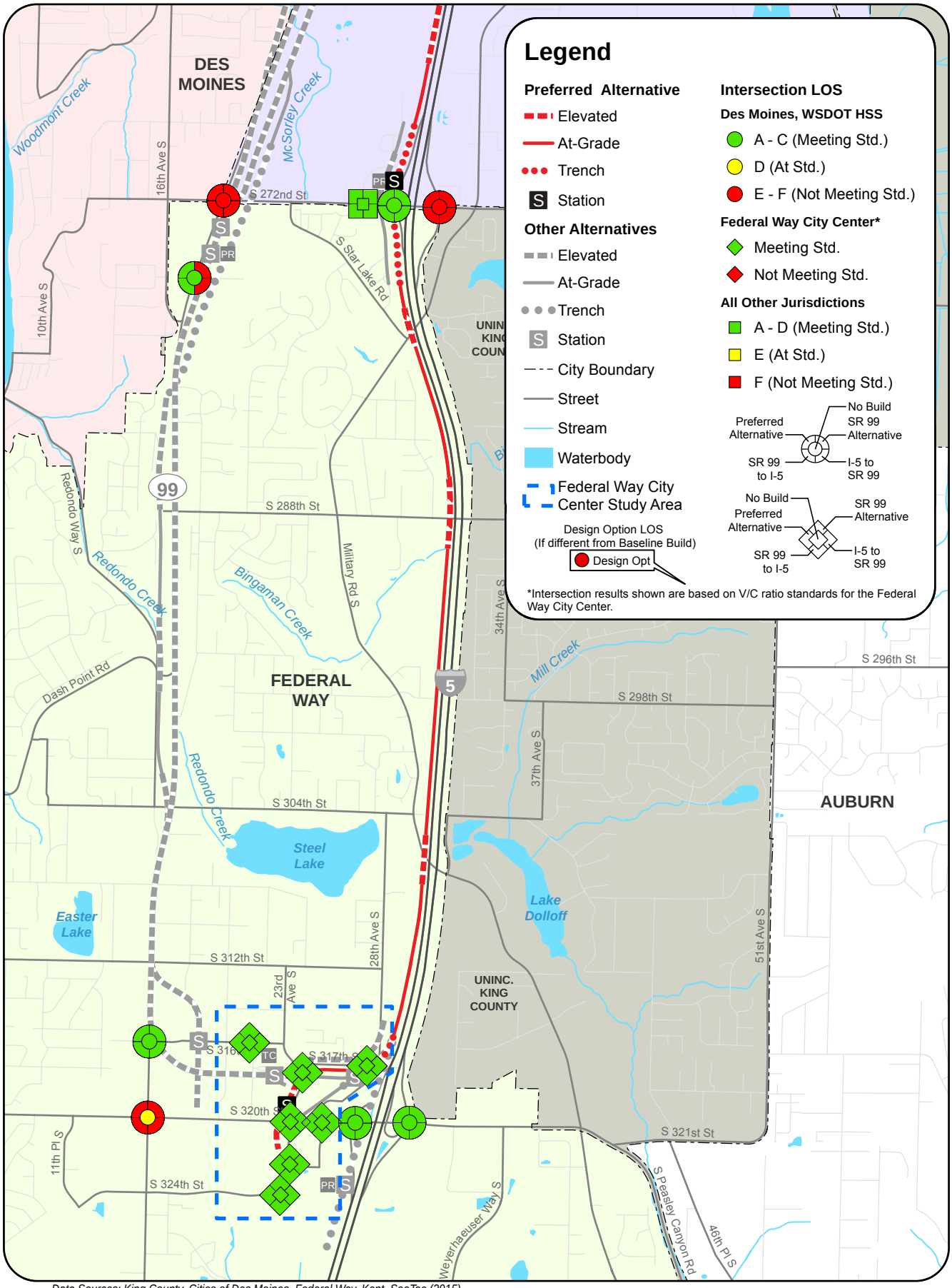


Data Sources: King County, Cities of Des Moines, Federal Way, Kent, SeaTac (2015).
HSS = Highway of Statewide Significance

N

0 0.25 0.5 1 Miles

EXHIBIT 4-14
2035 PM Kent/Des Moines Interim Terminus
Intersection Level of Service
Federal Way Link Extension

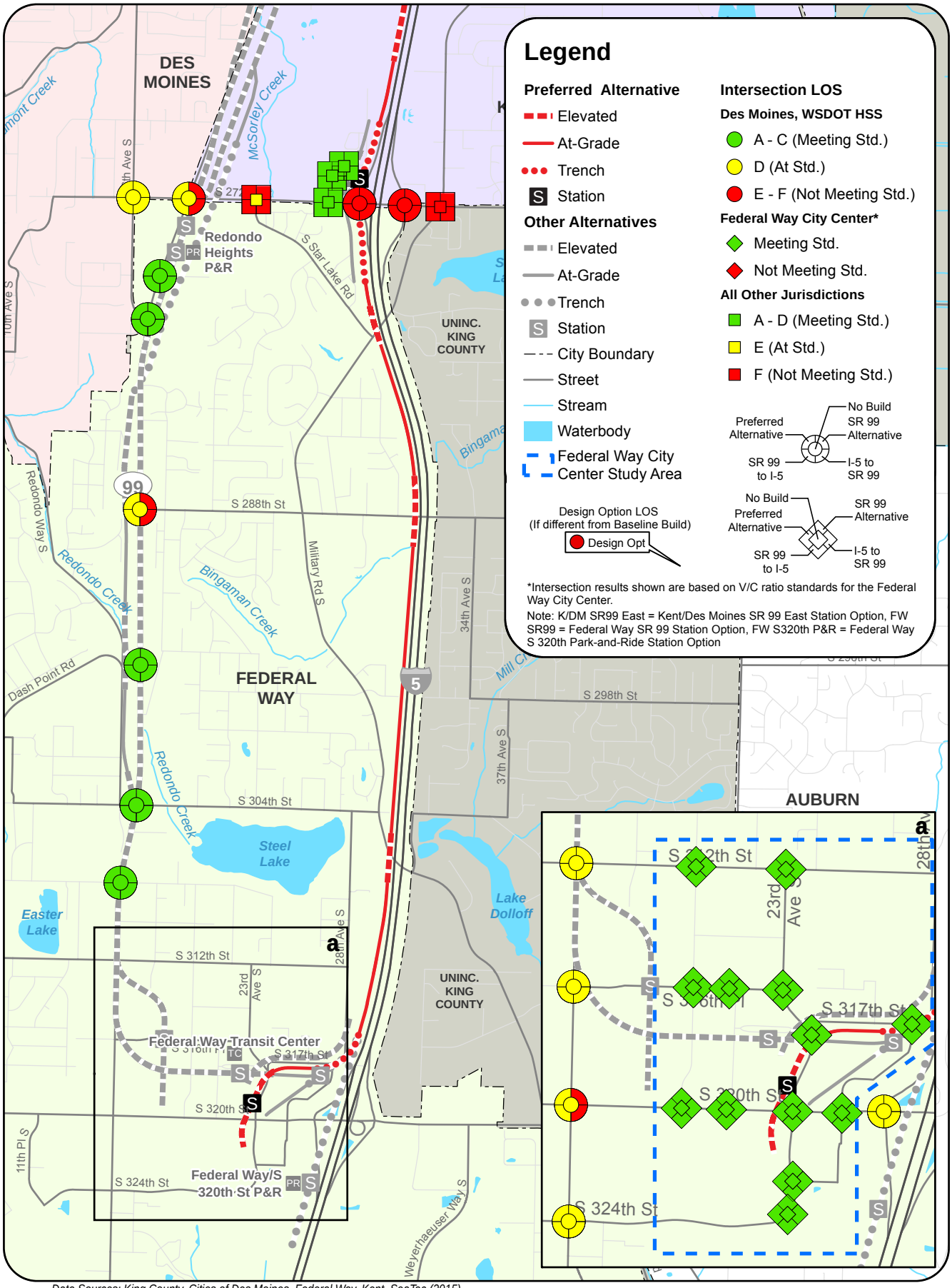


Data Sources: King County, Cities of Des Moines, Federal Way, Kent, SeaTac (2015).
HSS = Highway of Statewide Significance

N

0 0.25 0.5 1 Miles

EXHIBIT 4-15
2035 AM S 272nd Street Interim Terminus
Intersection Level of Service
Federal Way Link Extension



Data Sources: King County, Cities of Des Moines, Federal Way, Kent, SeaTac (2015).
HSS = Highway of Statewide Significance

N

0 0.25 0.5 1 Miles

EXHIBIT 4-16
2035 PM S 272nd Street Interim Terminus
Intersection Level of Service
Federal Way Link Extension

S 272nd Station Interim Terminus Conditions

Table 4-28 shows the LOS analysis interim terminus condition results for the intersections around the S 272nd Star Lake Station area. With the S 272nd Station interim terminus condition, no additional intersections beyond those identified under the full-length Preferred Alternative are expected to operate below jurisdictional LOS standards or the No Build Alternative. In addition to the three intersections in the Kent/Des Moines station area under the full-length Preferred Alternative identified as not meeting agency LOS standards, the following intersections around the S 272nd Station area would also not meet agency LOS standards and would operate worse than the No Build Alternative:

- SR 99/S 272nd Street (AM Peak only)
- S Star Lake Road/S 272nd Street (PM Peak Only)
- I-5 southbound ramps/S 272nd Street (PM Peak Only)
- I-5 northbound ramps/S 272nd Street (AM and PM Peak)
- Military Road S/S 272nd Street (PM Peak Only)

Compared to the full-length condition, the amount of delay at these locations is expected to be greater because more vehicles would be traveling to and from the S 272nd Station as it would be the southern terminus station in the light rail system.

TABLE 4-28
No Build and Preferred Alternative Intersection Level of Service: S 272nd Station Interim Terminus Conditions

Intersection	LOS Standard[a]	Alternative	
		No Build, AM LOS (PM LOS)	Preferred S 272nd Star Lake[b], AM LOS (PM LOS)
16th Ave. S and S 272nd St	D	-- (D)	-- (D)
SR 99 and S 272nd St	D	F (D)	F (D)
S Star Lake Rd and S 272nd St	E	-- (E)	-- (F)
26th Ave. S and Star Lake P&R North Driveway	E	-- (A)	-- (A)
26th Ave. S and Star Lake P&R South Driveway	E	-- (A)	-- (C)
S 272nd St and 26th Ave. S	E	A (B)	C (C)
I-5 Southbound Ramps and S 272nd St	D	C (E)	C (E)
I-5 Northbound Ramps and S 272nd St	D	E (E)	F (F)
Military Rd S and S 272nd St	E	-- (F)	-- (F)
SR 99 and S 276th St	D	B (B)	B (C)
SR 99 and 16th Ave. S	D	-- (C)	-- (C)
SR 99 and S 288th St	D	-- (D)	-- (D)
SR 99 and Dash Point Rd	D	-- (C)	-- (C)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume-to-capacity was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
[b] The intersection LOS results with the 272nd Star Lake Elevated Station Option are similar to the Preferred S 272nd Star Lake Station.
-- = not analyzed

SR 99 Alternative

With both the Kent/Des Moines and S 272nd Redondo interim terminus station, the same intersections identified with the full-length SR 99 Alternative as not meeting agency LOS standards and operating worse than the No Build Alternative would also be affected.

Kent/Des Moines Station Interim Terminus Conditions

Table 4-29 shows LOS results for the SR 99 Alternative Kent/Des Moines Station and station options. With the Kent/Des Moines interim terminus condition, no additional intersections beyond those identified under the full-length SR 99 Alternative are expected to operate below jurisdictional LOS standards or the No Build Alternative. The intersections listed below that are identified for the full-length SR 99 Alternative as not meeting agency LOS standards and operating worse than the No Build Alternative would also be affected in the Kent/Des Moines Station interim terminus condition:

- SR 99/Kent-Des Moines Road (AM and PM Peak)
- SR 99/S 240th Street (AM Peak only)
- Military Road S/259th Place S/S Reith Road (PM Peak only)

When compared with the full-length alternative, more vehicles traveling to and from the Kent/Des Moines Station would increase intersection delays at these locations because the station under the interim terminus condition would include additional park-and-ride spaces. The S 216th Street/SR 99 intersection would not meet agency LOS standards, but traffic operations at this intersection with the SR 99 Alternative would not operate worse than with the No Build Alternative.

TABLE 4-29

No Build and SR 99 Alternative Intersection Level of Service: Kent/Des Moines Station Interim Terminus Conditions

Intersection	LOS Standard[a]	Alternative/Station Options				
		No Build, AM LOS (PM LOS)	SR 99 Baseline, AM LOS (PM LOS)	HC Campus, AM LOS (PM LOS)	SR 99 Median, AM LOS (PM LOS)	SR 99 East, AM LOS (PM LOS)
SR 99 and S 200th St	E	-- (D)	-- (D)	-- (D)	-- (D)	-- (D)
SR 99 and S 204th St	E	-- (C)	-- (C)	-- (C)	-- (C)	-- (C)
SR 99 and S 208th St	E	-- (C)	-- (C)	-- (C)	-- (C)	-- (C)
Military Rd S and S 216th St	E	-- (D)	-- (D)	-- (D)	-- (D)	-- (D)
24th Ave. S and S 216th St	E	-- (D)	-- (D)	-- (D)	-- (D)	-- (D)
SR 99 and S 216th St	D	-- (E)	-- (E)	-- (E)	-- (E)	-- (E)
S 220th St and SR 99	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and S 224th St	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
25th Ave. S/24th Ave S and Kent-Des Moines Rd	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and Kent-Des Moines Rd	D	E (F)	F (F)	F (F)	F (F)	F (F)
30th Ave. S and Kent-Des Moines Rd	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
16th Ave. S and S 240th St	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
28th Ave. S/HC Driveway and S 240th St	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
S 240th St and HC Drop-Off Loop	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)

TABLE 4-29
No Build and SR 99 Alternative Intersection Level of Service: Kent/Des Moines Station Interim Terminus Conditions

Intersection	LOS Standard[a]	Alternative/Station Options				
		No Build, AM LOS (PM LOS)	SR 99 Baseline, AM LOS (PM LOS)	HC Campus, AM LOS (PM LOS)	SR 99 Median, AM LOS (PM LOS)	SR 99 East, AM LOS (PM LOS)
Military Rd S and Kent-Des Moines P&R	E	-- (D)	-- (D)	-- (D)	-- (D)	-- (D)
I-5 Southbound Ramps and Kent-Des Moines Rd	D	C (D)	C (D)	C (D)	C (D)	C (D)
I-5 Northbound Ramps and Kent-Des Moines Rd	D	C (B)	C (C)	C (C)	C (C)	C (C)
Military Rd S and Kent-Des Moines Rd	E	-- (E)	-- (E)	-- (E)	-- (E)	-- (E)
SR 99 and S 236th Street	D	A (B)	D (D)	D (D)	C (D)	D (D)
SR 99 and S 240th St	D	E (D)	F (F)	E (F)	F (F)	E (F)
S 240th St and 30th Ave. S	E	B (B)	B (B)	B (B)	B (B)	B (B)
Military Rd S and S 240th St	E	-- (E)	-- (E)	-- (E)	-- (E)	-- (E)
SR 99 and S 252nd St	D	-- (B)	-- (B)	-- (B)	-- (B)	-- (B)
SR 99 and Fred Meyer	D	-- (C)	-- (C)	-- (C)	-- (C)	-- (C)
SR 99 and S 260th St	D	-- (D)	-- (D)	-- (D)	-- (D)	-- (D)
Military Rd S and 259th Pl/S Reith Rd	E	-- (F)	-- (F)	-- (F)	-- (F)	-- (F)
16th Ave. S and S 260th St	D	-- (C)	-- (C)	-- (C)	-- (C)	-- (C)
I-5 Northbound Ramps and Veterans Dr	D	C (C)	C (C)	C (C)	C (C)	C (C)
I-5 Southbound Ramps and Veterans Dr	D	B (C)	B (C)	B (C)	B (C)	B (C)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume-to-capacity was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
-- = not analyzed

S 272nd Station Interim Terminus Conditions

LOS results are shown in Table 4-30 for the No Build Alternative and SR 99 Alternative with the S 272nd Redondo Station interim terminus condition. With the S 272nd Redondo Station interim terminus condition, one additional intersection (in the AM peak hour) beyond those identified under the full-length SR 99 Alternative is expected to operate below both jurisdictional LOS standards and the No Build Alternative: the main station access at the SR 99/S 276th Street intersection.

The intersection LOS results north of this station near the Kent/Des Moines Station would be similar to the results for the full-length SR 99 Alternative. In addition to the three intersections described under the full-length SR 99 Alternative as not meeting agency LOS standards at the Kent/Des Moines station area, the following intersections around the S 272nd Redondo Station would also not meet agency LOS standards and would operate worse than the No Build Alternative:

- SR 99/S 272nd Street (AM Peak only)
- S Star Lake Road/S 272nd Street (PM Peak Only)
- I-5 southbound ramps/S 272nd Street (PM Peak Only)

- I-5 northbound ramps/S 272nd Street (AM and PM Peak)
- Military Road S/S 272nd Street (PM Peak Only)

Compared with the full-length condition, the amount of delay at these locations is expected to increase in the interim terminus condition because more vehicles would be traveling to and from the S 272nd Redondo Station, the southern terminus station in the Link light rail system.

TABLE 4-30
No Build and SR 99 Alternative Intersection Level of Service: S 272nd Redondo Station Option Interim Terminus Conditions

Intersection	LOS Standard[a]	Alternative	
		No Build, AM LOS (PM LOS)	S 272nd Redondo[b], AM LOS (PM LOS)
16th Ave. S and S 272nd St	D	-- (D)	-- (D)
SR 99 and S 272nd St	D	F (D)	F (E)
S Star Lake Rd and S 272nd St	E	-- (E)	-- (F)
26th Ave. S and Star Lake P&R North Driveway	E	-- (A)	-- (A)
26th Ave. S and Star Lake P&R South Driveway	E	-- (A)	-- (A)
S 272nd St and 26th Ave. S	E	A (B)	A (B)
I-5 Southbound Ramps and S 272nd St	D	C (E)	C (E)
I-5 Northbound Ramps and S 272nd St	D	E (E)	F (F)
Military Rd S and S 272nd St	E	-- (F)	-- (F)
SR 99 and S 276th St	D	B (B)	E (B)
SR 99 and 16th Ave. S	D	-- (C)	-- (C)
SR 99 and S 288th St	D	-- (D)	-- (D)
SR 99 and Dash Point Rd	D	-- (C)	-- (C)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume-to-capacity was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
-- = not analyzed

SR 99 to I-5 Alternative

With both the Kent/Des Moines and S 272nd Redondo station interim terminus conditions, the same intersections identified in these station areas with the full-length SR 99 to I-5 Alternative as not meeting agency LOS standards and operating worse than the No Build Alternative would also be affected.

Kent/Des Moines Station Interim Terminus Conditions

Table 4-31 shows the LOS analysis interim condition results for the intersections around the SR 99 to I-5 Alternative Kent/Des Moines 30th Avenue East Station. Intersection operations under the SR 99 to I-5 Alternative Kent/Des Moines Station interim terminus condition would be similar to the SR 99 Alternative. The following intersections would operate below the jurisdictional LOS standard and worse than the No Build Alternative:

- SR 99/Kent-Des Moines Road (AM and PM Peak)
- SR 99/S 240th Street (PM Peak Only)
- Military Rd S/259th Place/S Reith Rd (PM Peak Only)

More vehicles traveling to and from the station area are expected under the interim terminus conditions compared to the full-length alternative, which would result in higher intersection delays at each of these intersections.

TABLE 4-31
No Build and SR 99 to I-5 Alternative Intersection Level of Service: Kent/Des Moines Station Interim Terminus Conditions

Intersection ID	LOS Standard[a]	Alternatives	
		No Build, AM LOS (PM LOS)	SR 99 to I-5, AM LOS (PM LOS)
SR 99 and S 200th St	E	-- (D)	-- (D)
SR 99 and S 204th St	E	-- (C)	-- (C)
SR 99 and S 208th St	E	-- (C)	-- (C)
Military Rd S and S 216th St	E	-- (D)	-- (D)
24th Ave. S and S 216th St	E	-- (D)	-- (D)
SR 99 and S 216th St	D	-- (E)	-- (E)
S 220th St and SR 99	D	-- (B)	-- (B)
SR 99 and S 224th St	D	-- (B)	-- (B)
25th Ave. S/24th Ave S and Kent-Des Moines Rd	D	-- (B)	-- (B)
SR 99 and Kent-Des Moines Rd	D	E (F)	F (F)
30th Ave. S and Kent-Des Moines Rd	D	-- (B)	-- (B)
16th Ave. S and S 240th St	D	-- (B)	-- (B)
28th Ave. S/Highline College Driveway and S 240th St	D	-- (B)	-- (B)
S 240th St and Highline College Drop-Off Loop	D	-- (B)	-- (B)
Military Rd S and Kent-Des Moines P&R	E	-- (D)	-- (D)
I-5 Southbound Ramps and Kent-Des Moines Rd	D	C (D)	C (D)
I-5 Northbound Ramps and Kent-Des Moines Rd	D	C (B)	C (C)
Military Rd S and Kent-Des Moines Rd	E	-- (E)	-- (E)
SR 99 and S 236th Street	D	A (B)	D (D)
SR 99 and S 240th St	D	E (D)	E (E)
S 240th St and 30th Ave. S	E	B (B)	B (B)
Military Rd S and S 240th St	E	-- (E)	-- (E)
SR 99 and S 252nd St	D	-- (B)	-- (B)
SR 99 and Fred Meyer	D	-- (C)	-- (C)
SR 99 and S 260th St	D	-- (D)	-- (D)
Military Rd S and 259th Pl/S Reith Rd	E	-- (F)	-- (F)
16th Ave. S and S 260th St	D	-- (C)	-- (C)

TABLE 4-31
No Build and SR 99 to I-5 Alternative Intersection Level of Service: Kent/Des Moines Station Interim Terminus Conditions

Intersection ID	LOS Standard[a]	Alternatives	
		No Build, AM LOS (PM LOS)	SR 99 to I-5, AM LOS (PM LOS)
I-5 Northbound Ramps and Veterans Dr	D	C (C)	C (C)
I-5 Southbound Ramps and Veterans Dr	D	B (C)	B (C)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume-to-capacity was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
-- = not analyzed

S 272nd Station Interim Terminus Conditions

Table 4-32 shows interim terminus condition LOS results for the intersections around the S 272nd Star Lake Station area under the SR 99 to I-5 Alternative. Intersection operations near this station are expected to operate similarly to the Preferred S 272nd Station interim terminus condition. North of this station, intersection operations around the Kent/Des Moines Station area would be similar to the full-length SR 99 to I-5 Alternative. The following intersections around the S 272nd Star Lake Station area would operate below jurisdictional LOS standards and the No Build Alternative:

- SR 99/S 272nd Street (AM Peak only)
- S Star Lake Road/S 272nd Street (PM Peak Only)
- I-5 southbound ramps/S 272nd Street (PM Peak Only)
- I-5 northbound ramps/S 272nd Street (AM and PM Peak)
- Military Road S/S 272nd Street (PM Peak Only)

More vehicles traveling to and from the station area are expected under the interim terminus conditions compared with the full-length SR 99 to I-5 alternative, which would result in higher intersection delays at each of these locations.

I-5 to SR 99 Alternative

With both the Kent/Des Moines and S 272nd Redondo station interim terminus conditions, the same intersections identified in these station areas with the full-length I-5 to SR 99 Alternative as not meeting agency LOS standards and operating worse than the No Build Alternative would also be affected.

TABLE 4-32
No Build and SR 99 to I-5 Alternative Intersection Level of Service: S 272nd Station Interim Terminus Conditions

Intersection ID	LOS Standard[a]	Alternative	
		No Build, AM LOS (PM LOS)	S 272nd Star Lake, AM LOS (PM LOS)
16th Ave. S and S 272nd St	D	-- (D)	-- (D)
SR 99 and S 272nd St	D	F (D)	F (D)
S Star Lake Rd and S 272nd St	E	-- (E)	-- (F)
26th Ave. S and Star Lake P&R North Driveway	E	-- (A)	-- (A)
26th Ave. S and Star Lake P&R S Driveway	E	-- (A)	-- (C)
S 272nd St and 26th Ave. S	E	A (B)	C (C)
I-5 Southbound Ramps and S 272nd St	D	C (E)	C (E)
I-5 Northbound Ramps and S 272nd St	D	E (E)	F (F)
Military Rd S and S 272nd St	E	-- (F)	-- (F)
SR 99 and S 276th St	D	B (B)	B (C)
SR 99 and 16th Ave. S	D	-- (C)	-- (C)
SR 99 and S 288th St	D	-- (D)	-- (D)
SR 99 and Dash Point Rd	D	-- (C)	-- (C)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume-to-capacity was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
-- = not analyzed

Kent/Des Moines Station Interim Terminus Conditions

Table 4-33 shows LOS analysis interim terminus condition results for the intersections around the Kent/Des Moines Station. Intersection operations with the I-5 to SR 99 Alternative Kent/Des Moines Station interim terminus condition would be similar to the full-length I-5 to SR 99 Alternative. No additional intersections beyond those identified under the Preferred Alternative are expected to operate below jurisdictional LOS standards or the No Build Alternative. The following intersections would operate below the jurisdictional LOS standard and worse than the No Build Alternative:

- SR 99/Kent-Des Moines Road (AM and PM Peak)
- SR 99/S 240th Street (AM Peak only)
- Military Road S/259th Place S/S Reith Road (PM Peak only)

More vehicles traveling to and from the station area are expected under the interim terminus conditions, which would result in higher intersection delays at each of these intersections.

TABLE 4-33

No Build and I-5 to SR 99 Alternative Intersection Level of Service: Kent/Des Moines Station Interim Terminus Conditions

Intersection	LOS Standard[a]	Alternatives	
		No Build, AM LOS (PM LOS)	30th Avenue West, AM LOS (PM LOS)
SR 99 and S 200th St	E	-- (D)	-- (D)
SR 99 and S 204th St	E	-- (C)	-- (C)
SR 99 and S 208th St	E	-- (C)	-- (C)
Military Rd S and S 216th St	E	-- (D)	-- (D)
24th Ave. S and S 216th St	E	-- (D)	-- (D)
SR 99 and S 216th St	D	-- (E)	-- (E)
S 220th St and SR 99	D	-- (B)	-- (B)
SR 99 and S 224th St	D	-- (B)	-- (B)
25th Ave. S/24th Ave S and Kent-Des Moines Rd	D	-- (B)	-- (B)
SR 99 and Kent-Des Moines Rd	D	E (F)	F (F)
30th Ave. S and Kent-Des Moines Rd	D	-- (B)	-- (B)
16th Ave. S and S 240th St	D	-- (B)	-- (B)
28th Ave. S/Highline College Driveway and S 240th St	D	-- (B)	-- (B)
S 240th St and Highline College Drop-Off Loop	D	-- (B)	-- (B)
Military Rd S and Kent-Des Moines P&R	E	-- (D)	-- (D)
I-5 Southbound Ramps and Kent-Des Moines Rd	D	C (D)	C (D)
I-5 Northbound Ramps and Kent-Des Moines Rd	D	C (B)	C (C)
Military Rd S and Kent-Des Moines Rd	E	-- (E)	-- (E)
SR 99 and S 236th Street	D	A (B)	D (D)
SR 99 and S 240th St	D	E (D)	F (E)
S 240th St and 30th Ave. S	E	B (B)	B (B)
Military Rd S and S 240th St	E	-- (E)	-- (E)
SR 99 and S 252nd St	D	-- (B)	-- (B)
SR 99 and Fred Meyer	D	-- (C)	-- (C)
SR 99 and S 260th St	D	-- (D)	-- (D)
Military Rd S and 259th Pl/S Reith Rd	E	-- (F)	-- (F)
16th Ave. S and S 260th St	D	-- (C)	-- (C)
I-5 Northbound Ramps and Veterans Dr	D	C (C)	C (C)
I-5 Southbound Ramps and Veterans Dr	D	B (C)	B (C)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume-to-capacity ratio was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
-- = not analyzed

S 272nd Station Interim Terminus Conditions

Table 4-34 shows the LOS analysis interim terminus condition results for the intersections in the S 272nd Redondo Station area. Intersection operations near the S 272nd Redondo Station are expected to operate similarly to the SR 99 Alternative S 272nd Station interim terminus condition. North of this station, intersection operations around the Kent Des Moines Station area would be similar to the full-length I-5 to SR 99 Alternative. The following intersections around the S 272nd Redondo Station area would operate below jurisdictional LOS standards and the No Build Alternative:

- SR 99/S 272nd Street (AM and PM Peak)
- S Star Lake Road/S 272nd Street (PM Peak Only)
- I-5 southbound ramps/S 272nd Street (PM Peak Only)
- I-5 northbound ramps/S 272nd Street (AM and PM Peak)
- Military Road S/S 272nd Street (PM Peak Only)
- SR 99/S 276th Street (AM Peak Only)

More vehicles traveling to and from the station area are expected under the interim terminus conditions, which would result in higher intersection delays at each of these intersections.

TABLE 4-34
No Build and I-5 to SR 99 Alternative Intersection Level of Service: S 272nd Station Interim Terminus Conditions

Intersection	LOS Standard[a]	Alternative	
		No Build, AM LOS (PM LOS)	S 272nd Redondo[b], AM LOS (PM LOS)
16th Ave. S and S 272nd St	E	-- (D)	-- (D)
SR 99 and S 272nd St	D	F (D)	F (E)
S Star Lake Rd and S 272nd St	E	-- (E)	-- (F)
26th Ave. S and Star Lake P&R North Driveway	E	-- (A)	-- (A)
26th Ave. S and Star Lake P&R South Driveway	E	-- (A)	-- (A)
S 272nd St and 26th Ave. S	E	A (B)	A (B)
I-5 Southbound Ramps and S 272nd St	D	C (E)	C (E)
I-5 Northbound Ramps and S 272nd St	D	E (E)	F (F)
Military Rd S and S 272nd St	E	-- (F)	-- (F)
SR 99 and S 276th St	D	B (B)	E (B)
SR 99 and 16th Ave. S	D	-- (C)	-- (C)
SR 99 and S 288th St	D	-- (D)	-- (D)
SR 99 and Dash Point Rd	D	-- (C)	-- (C)

Notes:
Gray shading indicates intersection does not meet LOS standard.
Volume-to-capacity was also used in assessing LOS impacts for intersections in Federal Way and Des Moines. See Appendix D, Existing and Future Intersection Level of Service Results, for detailed intersection analysis results.
[a] LOS designation based on local jurisdiction or WSDOT HSS/Non-HSS Standards.
[b] The intersection LOS results with the 272nd Redondo Trench Station Option are similar to the S 272nd Redondo Station.
-- = not analyzed

4.3.4 I-5 Ramp Terminal Operations

The intersections at I-5 interchanges (Kent-Des Moines Road, S 272nd Street, and S 320th Street) in the study area were analyzed in the AM and PM peak hours, based on their proximity to future FWLE stations and the potential for a high number of vehicle trips using these interchanges and to assess the change in vehicle queue lengths at off-ramps compared with the No Build Alterative.

Compared with the No Build Alternative, 2035 vehicle queue lengths on I-5 southbound and northbound off-ramps at Kent-Des Moines Road, Veterans Drive, S 272nd Street, and S 320th Street would be similar to queue lengths with all of the full-length build alternatives and interim terminus conditions. Forecasted queue lengths using Synchro software for each station option are provided in Appendix E, I-5 Ramp Terminal Queue Length Results.

Additional analysis was performed for the Preferred Alternative using SimTraffic to validate intersection operations and vehicle queue results near the I-5 and Kent/Des Moines and S 272nd Street interchanges. Further explanation of this analysis is discussed in Chapter 7, Mitigation.

4.4 Safety

This section describes the effects of the No Build and build alternatives on arterial and local street safety in the study area. This section includes a discussion on SR 99 and I-5 safety, including impacts on the I-5 clear zone and I-5 interchanges.

Clear Zone

The Roadside Design Guide defines a clear zone as an unobstructed, relatively flat area beyond the edge of the traveled way that allows a driver to stop safely or regain control of a vehicle that leaves the traveled way (AASHTO, 2011).

Key findings and observations include the following:

- As described in Section 4.2.4, the FWLE would shift up to 9,000 people per day from driving or taking another non-transit mode to using transit and reduce the amount of VMT in the region by up to 160,000. A shift of mode where people use transit and travel less would inherently have a safety benefit because fewer crashes would be expected.
- Safety effects are expected to be minimal because the FWLE would be located in an exclusive guideway outside of roadway operations. With all build alternatives and station options, there would be an increase in vehicle and non-motorized activity around the station areas, which would increase the potential for conflicts between different travel modes.
- The southbound I-5 clear zone would be maintained under all FWLE alternatives within the I-5 right-of-way. The Preferred Alternative is not expected to have any quantifiable impact on the safety of the I-5 mainline. The Landfill Median Alignment Option would introduce fixed objects that may diminish safety; however, the project would provide guardrails and barriers to protect mainline traffic from light rail columns. Adding barriers could result in an increase of up to one crash per year.
- The three I-5 interchanges within the study area (Kent-Des Moines Road, S 272nd Street, and S 320th Street) are each predicted to experience increases of less than two crashes per year due to the increase in volumes with the Preferred Alternative and all other alternatives and station options.

- As described in Chapter 7, Potential Mitigation Measures, improvements are proposed at up to 10 intersections to improve intersection LOS with the FWLE. At these locations, it is expected that there would be the same or less congestion than in the No Build condition and therefore fewer crashes would be expected.

4.4.1 Impacts Common to All Build Alternatives

The safety of the transportation system is expected to be minimally affected by the FWLE because all light rail alternatives would be grade-separated and operate in exclusive right-of-way, with no direct conflicts with vehicles, pedestrians, or bicyclists.

The light rail design would adhere to both light rail and roadway standards to minimize the potential effects on traffic safety. For example, infrastructure elements of the light rail guideway, such as walls and columns, would be designed to current standards for fixed objects, vertical and horizontal clearances, and other infrastructure-related safety elements. If the FWLE were to remove or modify transportation infrastructure, these facilities would be replaced or upgraded to ensure that the transportation system would operate similar to or better than the No Build conditions.

4.4.2 Preferred Alternative

The Preferred Alternative overall would have minimal effects on traffic safety in the study area. There would be an increase in vehicle and non-motorized activity around the station areas, which would increase the potential for conflicts among different travel modes. In some locations (such as I-5), a slight increase in the number of crashes (one or two per year) could occur due to increased traffic volumes resulting from the project. Vehicle queues at the I-5 ramp terminal intersections are expected to increase in some locations due to increased trips to and from station areas compared to the No Build Alternative. However, queues are not expected to back up to the I-5 or SR 509 mainlines, or affect how vehicles decelerate from freeway to ramp speeds except at the I-5 southbound off-ramp to S 272nd Street. Queues at the S 272nd Street southbound off-ramp are expected to spill back onto the I-5 mainline under the No Build Alternative but would not worsen (i.e., increase in length) under the Preferred Alternative.

The light rail guideway would be elevated, at-grade, or in a trench west of or within the WSDOT right-of-way for I-5. It would occasionally cross public streets, private driveways, and property access with grade-separated crossings; however, the number of these crossings would be less frequent with the Preferred Alternative than with other build alternatives. The Preferred Alternative design would adhere to current design standards.

4.4.2.1 I-5 Clear Zone Safety Analysis

A roadside clear zone assessment of the I-5 mainline was completed for the No Build Alternative and Preferred Alternative located within the I-5 right-of-way. Table 4-35 summarizes the clear zone lengths with and without a barrier along southbound I-5 between S 211th Street and S 317th Street with the No Build Alternative, Preferred Alternative, and the Landfill Median Alignment Option. A detailed inventory of where the Preferred Alternative would affect the I-5 clear zone is also provided in Appendix J, I-5 Clear Zone Analysis.

As shown in Table 4-35, the potential future available clear zone would be the same with the Preferred Alternative compared to the No Build Alternative. The Preferred Alternative alignment is located entirely outside of the potential future I-5 clear zone, or, where it is located in the clear zone, it would be shielded by barriers or guardrails proposed as part of the SR 509 Extension Project. The entire I-5 guideway alignment is designed so as to not preclude WSDOT's ability to provide future clear zones where they do not currently meet minimum standards.

TABLE 4-35
Southbound I-5 No Build and Preferred Alternative Clear Zone Summary (between S 211th Street and S 317th Street)

Clear Zone Condition	Length of Clear Zone (feet)		
	No Build	Preferred Alternative	Landfill Median Alignment Option
Barrier Provided[a]	20,900	20,900 (+0)	22,800 (+1,900)
Available Clear Zone[b]	15,100	15,100	13,200
Total Segment Length	36,000	36,000	36,000

( ) Values shown in parenthesis represents the additional length of the corridor where the FWLE would be located in an existing clear zone. Mitigation, such as barrier or guardrails, may be required with the project in these locations.

[a] Represents areas where barriers currently exist or are proposed with the SR 509 Extension. These areas include shielding to protect highway infrastructure, tree stands, steep sideslopes, and other landscaping elements or are used to protect grade-separated crossings.

[b] Represents areas where existing or future conditions meet the definition of a clear zone.

The potential for increased collisions on the I-5 mainline and ramps was also evaluated for the Preferred Alternative using a methodology described in the *Highway Safety Manual* (HSM) (AASHTO, 2014). This analysis included a review of highway geometric conditions associated with the No Build and build alternatives, including I-5 travel lane widths, shoulder widths, and locations of roadside barriers/fixed objects. A percent change in crash frequency for the I-5 mainline was determined based on these highway characteristics and applicable crash data. This percent change was then applied to historical crash rates in the study area to estimate the potential change in crash frequency that could occur with the No Build and Preferred alternatives.

Based on HSM analysis findings for the FWLE, any objects located beyond 30 feet from the outside edge of traveled way would not have any effect on the potential for collisions along the I-5 mainline. In addition, if a barrier is present, it does not matter how far away any other objects are located from the traveled way because the barrier becomes the object of focus for the analysis. The Preferred Alternative and options, except short segments of the Landfill Median Alignment Option, are located outside of the potential future clear zone and more than 30 feet away from the future edge of traveled way and would not introduce any new barrier; therefore, the Preferred Alternative is not expected to have any quantifiable impact on the safety of the I-5 mainline. A further discussion of clear zone and the potential for collisions associated with the Landfill Median Alignment Option is provided below.

4.4.2.2 I-5 Interchange Safety

I-5 interchanges in the study area were analyzed to assess the safety impact between the No Build Alternative and build alternatives. Because the FWLE is not proposing to modify the interchange configuration, only increases in traffic volumes would have an effect on safety at each interchange. The HSM safety performance functions for ramp segments and ramp terminal intersections were used to calculate predicted crash frequencies. The difference between the No Build Alternative and each build alternative represents the predicted change in crashes due to the project. For each interchange, the safety performance for all ramps and ramp terminal intersections were combined to provide an estimate of the predicted crash frequency for the entire interchange.

For the Preferred Alternative, the Kent-Des Moines Road/I-5 interchange crash frequency (including the proposed SR 509/Veterans Drive ramps and ramp terminals proposed as part of the SR 509 Extension) is predicted to increase by less than two crashes per year due to the changes in volume at the interchange. The S 272nd Star Lake Station would be located at the existing Star Lake Park-and-Ride and be outside the I-5 right-of-way; therefore, no change in I-5 mainline safety is expected with the station adjacent to I-5. Some increases in traffic volume are expected in the interchange as people would access the station area via the interchange ramps or travel east-west through the interchange area. This is predicted to increase crashes at the S 272nd Street/I-5 interchange by less than one crash per year. Traffic volumes at the S 320th Street/I-5 interchange are also expected to increase because of the Federal Way Transit Center Station. The increased traffic volumes are predicted to increase crashes at the interchange by about one crash per year.

4.4.2.3 Kent/Des Moines Station

With the Preferred Alternative, S 236th Street would be extended from SR 99 and connect to 30th Avenue S with a proposed traffic signal at SR 99. This traffic signal would provide a new crossing across SR 99 for pedestrians and bicyclists to discourage jaywalking between the station, the Highline College campus, and other land uses across from the station.

A portion of the pedestrians traveling to and from each station would be pedestrians transferring between bus and light rail. At the Kent/Des Moines Station, the increase in transfers between the RapidRide A Line and the station as well as increased activity from Highline College would result in increased pedestrian activity around the station area and pedestrians crossing SR 99. As described in Section 4.6, Non-motorized Facilities, later in this chapter, crosswalks would be maintained at all signalized intersections near the station to facilitate pedestrians across SR 99. Crossings would also include additional pedestrian safety features where possible, including wide crosswalks, shorter signal cycle lengths, protected left-turn phasing, and other similar features. The proposed bus stops located along S 236th Street and paratransit along 30th Avenue South would be adjacent to the station entrances and minimize the potential for conflict among buses, pedestrians, and vehicles.

4.4.2.4 S 272nd Star Lake Station

At the S 272nd Star Lake Station under the Preferred Alternative, there would be an increase in pedestrians transferring between buses that currently use the I-5 flyer stops and the station. For riders

transferring from buses traveling on northbound I-5, pedestrians would be required to cross both signalized ramp terminal intersections at the S 272nd Street interchange, thus increasing the potential for conflicts with vehicles. Pedestrians transferring between buses traveling south on I-5 would have direct access between the station and the I-5 southbound off-ramp with no increased conflicts with vehicles.

The proposed bus and paratransit access area within the station would be designed to minimize the potential for conflict among buses, pedestrians, and vehicles. The proposed parking garage driveways could increase the potential for conflicts between travel modes, but the separate access for buses and paratransit would minimize the potential conflicts among buses and other vehicles. Pedestrians would still need to cross the bus access road to travel between the parking garage and light rail station, but crosswalks would be provided along with other design treatments to ensure pedestrian visibility.

4.4.2.5 Federal Way Transit Center Station

For the Federal Way Transit Center Station under the Preferred Alternative, the amount of non-motorized activity around the station area is expected to increase, which would could lead to more conflicts among pedestrians, vehicles, and buses. Pedestrians would need to make at least one crossing to access transit from the parking provided at the station, which may increase conflicts with transit vehicles. Crosswalks would be provided for all of these crossing locations. There is also expected to be increased pedestrian activity coming from S 320th Street. Sidewalks and crosswalks would be included throughout the station area to ensure refuge and safe passage for pedestrians through the station.

4.4.2.6 Kent/Des Moines Station Options

All of the Kent/Des Moines station options would have similar impacts compared to the Preferred Kent/Des Moines Station, except for the Kent/Des Moines At-Grade Station Option. For this station option, S 236th Street would not be further developed by Sound Transit east of SR 99. A right-in, right-out access road between SR 99 and the station is proposed at S 242nd Street. This new access road would increase the potential for vehicle and pedestrians conflicts along SR 99 but would be designed to roadway standards. Furthermore, most bicyclists and pedestrians transferring to/from transit would generally travel along S 240th Street and cross SR 99 at the existing signal-controlled crosswalks at the SR 99 and S 240th Street intersection.

As with the Preferred Kent/Des Moines Station, all Kent/Des Moines station options would be located outside the I-5 right-of-way; therefore, no change in I-5 mainline safety is expected. The ramp and ramp terminal safety performance is also expected to be similar to the Preferred Kent/Des Moines Station because similar increases in traffic volumes are expected with the station options.

4.4.2.7 Landfill Median Alignment Option

The Landfill Median Alignment Option would transition into the I-5 median for approximately 1/2 mile from south of S 240th Street to approximately S 252nd Street. This option would place guideway columns in the median without altering the existing travel lanes or median width. If approved by the Federal Highway Administration (FHWA) and WSDOT, Sound Transit would include a barrier along the inside shoulder of I-5 southbound and northbound mainlines to prevent errant vehicles from colliding

with the guideway columns. Furthermore, as the guideway transitions to and from the I-5 median, barrier would be required along the southbound I-5 outside shoulder (up to 600 feet for the northernmost transition section and up to 500 feet for the southernmost transition section) to shield the guideway. Based on a safety analysis using the HSM, adding a barrier (such as guardrail) through the median section of both directions of I-5 and along the southbound I-5 outside shoulder could result in an increase of up to one crash per year.

4.4.2.8 S 272nd Star Lake Elevated Station Option

The S 272nd Star Lake Elevated Station Option would have impacts similar to those described for the Preferred S 272nd Star Lake Station. While the alignment would be shifted slightly to the east (toward I-5) to accommodate this station, the alignment shift would be along the southbound off-ramp to S 272nd and not affect I-5 mainline safety. In addition, since there is already barrier along this ramp, there would be no impact on ramp safety either. The ramp terminal safety performance is also expected to be similar to the Preferred S 272nd Star Lake Station because similar increases in traffic volumes are expected with this station option.

4.4.2.9 S 317th Elevated Alignment Option

The S 317th Elevated Alignment Option would have impacts similar to those described for the Preferred Alternative alignment. This option would move the track alignment slightly west (away from I-5) as the alignment turns off I-5 at S 317th Street and would not affect I-5 mainline safety. Because the guideway would stay elevated crossing over the S 317th Street roundabout, as with the Preferred Alternative, no safety impacts are expected on intersections or roadway segments in this area.

4.4.2.10 Federal Way Transit Center Station Options

The distance between the Federal Way I-5 Station Option and the existing Federal Way Transit Center could lead to an increase in the amount of pedestrian activity between these areas. Access between the existing transit center and the new station would be provided along the south side of S 317th Street, which could create additional conflicts among pedestrians, vehicles, and buses, but would be designed to roadway standards. Within the station area, the pedestrian activity and conflicts would be similar to the Preferred Federal Way Transit Center Station. Due to the increased distance from the existing transit center and the need to cross S 23rd Avenue, there would likely be an even greater increase in the potential for pedestrian conflicts with this option.

The Federal Way S 320th Park-and-Ride Station Option would be grade-separated from the S 320th interchange and therefore would have no impacts on the vehicle or pedestrian activity at or near the interchange. The current design of the station would require the removal of the existing bus access via the I-5 southbound on-ramp to the station. Eliminating this access from the on-ramp would remove slow-moving buses where other vehicles are accelerating to get onto I-5. Part of the parking provided at the station would be placed so that pedestrians accessing the platform would not be required to cross any roads, thus minimizing the interaction between pedestrians and all vehicles. The other portion of the station parking would require pedestrians to cross one street to access the bus loop or light rail platform. This would increase the potential for pedestrian-vehicle crashes, but overall, the

station option would likely have a smaller increase in pedestrian conflicts than the Preferred Federal Way Transit Center Station.

As with the Preferred Federal Way Transit Center Station, both Federal Way City Center station options would be located outside the I-5 right-of-way; therefore, no change in I-5 mainline safety is expected. Some increases in traffic volume are expected because people would drive between the station area and I-5. The ramp and ramp terminal safety performance is also expected to be similar to the Preferred Federal Way Transit Center Station because similar increases in traffic volumes are expected with either station option.

4.4.3 SR 99 Alternative

Similar to the increase expected with the Preferred Alternative, there would be an increase in vehicle and non-motorized activity around the stations. This would increase the potential for conflicts between different travel modes, including vehicle, pedestrian, and bicycle. These conflicts are not expected to noticeably affect crash rates.

The light rail guideway would be elevated along the entire corridor and occasionally cross public streets, private driveways, and property accesses. When the guideway is in the SR 99 median, the roadway would generally need to be widened to accommodate guideway columns, and this would increase pedestrian crossing distances and the potential for vehicle-pedestrian crashes. The design of the median alignment adheres to current design standards; therefore, vehicle sight distance guidelines are expected to be achieved. If transportation infrastructure such as mid-block U-turns, medians, and intersection channelization are removed or modified with the FWLE, these facilities would be replaced or upgraded to ensure that the transportation system would not be considerably affected.

4.4.3.1 S 216th Station Options

The SR 99 Alternative potential additional S 216th West and East station options would have minimal potential to affect the safety of the transportation system. These station options would have relatively low increases in traffic volumes compared with other stations that would have park-and-ride facilities. While non-motorized activity would increase at the station areas and at nearby signalized intersections, it would be accommodated within the existing transportation facilities.

As with all station options, riders transferring between RapidRide A Line and light rail would increase the number of pedestrians crossing SR 99. Crosswalks would be maintained at the signalized intersections near the station to facilitate pedestrian movements across SR 99 to the station area. Bus and paratransit service and access have been designed to minimize potential conflicts between buses, pedestrians, and vehicles.

The S 216th West station option would be in a trench under S 216th Street instead of being elevated across S 216th Street within the SR 99 median, as with the SR 99 Alternative. This is not expected to change the safety conditions of the transportation system compared with the SR 99 Alternative because the alignment would continue to be grade-separated from traffic and be designed to agency standards.

4.4.3.2 Kent/Des Moines Station Options

Pedestrian activity is expected to increase at all of the SR 99 Alternative Kent/Des Moines station options. A portion of the pedestrians traveling to and from the station would be riders transferring between transit modes. There is expected to be a similar amount of non-motorized activity with all the SR 99 Alternative Kent/Des Moines station options compared with the SR 99 Alternative.

At all SR 99 Kent/Des Moines station options, the increase in transfers between RapidRide A Line and light rail would result in more pedestrians crossing SR 99, and the impacts would be similar to those described for the Preferred Alternative. The future traffic signal at the SR 99/ S 236th Street intersection would be modified with all of the SR 99 Alternative Kent/Des Moines station options. This traffic signal would include crossings across SR 99 for pedestrians and bicyclists to discourage jaywalking between the station, the Highline College campus, and other land uses across from the station.

The Kent/Des Moines SR 99 Median Station Option would require widening SR 99 to accommodate the station/platform area and would substantially increase the pedestrian crossing distances at the SR 99/S 236th Street and SR 99/S 240th Street intersections. To completely cross SR 99, two separate pedestrian crossings would be required. The Kent/Des Moines HC Campus Station Option and SR 99 East Station Option would have similar impacts compared with the SR 99 Alternative Kent/Des Moines SR 99 West Station.

The proposed bus and paratransit access for all Kent/Des Moines station options would be designed to minimize conflicts among buses, pedestrians, and vehicles. A transit-only signal at the driveway to the proposed bus loop may be provided to allow for the safe movement of buses in and out of the bus loop.

4.4.3.3 S 260th Station Options

The potential additional S 260th station options (West and East) would have minimal potential to affect the safety of the transportation system. These station options would have relatively low increases in traffic volumes compared with other station areas that would have park-and-ride facilities. While non-motorized activity would increase at and nearby the station areas, it would be accommodated within the existing transportation facilities.

As with both S 260th station options, riders transferring between the RapidRide A Line and light rail would increase the number of pedestrians crossing SR 99. Crosswalks would be maintained at all signalized intersections to facilitate these pedestrian movements across SR 99 to the station area. Bus and paratransit service and access would be designed to minimize potential conflicts among buses, pedestrians, and vehicles.

4.4.3.4 S 272nd Redondo Trench Station Option

At the S 272nd Redondo Station, riders transferring between RapidRide A Line and light rail would increase the number of pedestrians crossing SR 99. Crosswalks would be maintained at signalized intersections to facilitate these pedestrian movements across SR 99 to the station area. The off-street

bus and paratransit access would be designed to minimize conflicts among buses, pedestrians, and vehicles.

The S 272nd Redondo Trench Station Option would be underneath SR 99 instead of elevated across SR 99 with the SR 99 Alternative S 272nd Redondo Station. This is not expected to change the safety conditions of the transportation system compared with the SR 99 Alternative S 272nd Redondo Station because the light rail guideway would continue to be grade-separated from traffic and designed to agency standards.

4.4.3.5 Federal Way Transit Center Station Option

With the Federal Way Transit Center Station, the level of increased non-motorized activity around the station area would increase the potential for non-motorized conflicts with cars and buses. The light rail station would be adjacent to the existing transit center, which would minimize the potential conflicts among pedestrians, buses, and vehicles.

The distance between the Federal Way SR 99 Station Option and the existing transit center would lead to more pedestrians walking between these two facilities, but this increase would be accommodated within the proposed transit access road connecting the SR 99 station and the existing Federal Way Transit Center. The transit access road would create additional conflicts between pedestrians, buses, and vehicles at the SR 99 intersections with 21st Avenue S and 20th Avenue S but would be designed to roadway standards. The off-street bus loop and paratransit access for the SR 99 Alternative and SR 99 Federal Way Transit Center station option would be designed to minimize conflicts among buses, pedestrians, and vehicles.

4.4.4 SR 99 to I-5 Alternative

The SR 99 to I-5 Alternative would have the same safety conditions as the SR 99 Alternative and station options north of the Kent/Des Moines Station and the same impacts as the Preferred Alternative and alignment and station options south of the Kent/Des Moines Station. There would be no additional safety impacts associated with the Kent/Des Moines 30th Avenue East Station compared to the SR 99 and Preferred alternatives.

4.4.5 I-5 to SR 99 Alternative

The I-5 to SR 99 Alternative would have the same safety conditions as the Preferred Alternative and station options north of the Kent/Des Moines Station and the same impacts as the SR 99 Alternative and station options south of the Kent/Des Moines Station. There would be no additional impacts associated with the Kent/Des Moines 30th Avenue West Station compared to the SR 99 and Preferred alternatives.

4.4.6 Interim Termini

4.4.6.1 Kent/Des Moines Interim Terminus Conditions

The Kent/Des Moines Interim Terminus condition would have the same safety conditions as the Preferred Alternative north of the Kent/Des Moines Station. The only exception would be for the Kent-Des Moines Road/I-5 interchange ramps and ramp terminals, where the volume increase associated with the larger station park-and-ride capacity could increase the predicted crash frequency by slightly

over two crashes per year. The crash frequency at the S 272nd Street/I-5 and S 320th Street/I-5 interchanges are not expected to be different than under the No Build Alternative for this interim terminus condition.

4.4.6.2 S 272nd Street Interim Terminus Conditions

The S 272nd Street Interim Terminus condition would have the same safety conditions as the Preferred Alternative north of the S 272nd Star Lake Station, and would have one crash more per year than the No Build Alternative at the Kent-Des Moines Road/I-5 interchange. In addition, increases in traffic volumes could result in an increase in crashes at the S 272nd Street/I-5 interchange by less than two crashes per year. The crash frequency at the S 320th Street/I-5 interchange is not expected to be different than under the No Build Alternative for this interim terminus condition.

4.5 Parking

The build alternatives assume that station users would either use existing parking spaces or, where proposed, additional park-and-ride stalls. This section documents the amount of existing public (on-street) and private (off-street) parking that would be removed by the build alternatives and assesses the potential for the station parking demand to exceed capacity. In areas where parking demand may exceed available supply at the stations, the potential for spillover to nearby on-street parking that surrounds the station areas is assessed.

The main findings related to parking include the following:

- The build alternatives would remove between 0 and 20 public parking spaces. All of this parking loss would be near S 212th Street and is associated with the Preferred Alternative or the I-5 to SR 99 Alternative.
- The build alternatives would result in a loss of 140 to 470 parking stalls on private properties. Individual station and alignment options could remove up to an additional 580 stalls.
- The 1,600 stall park-and-ride capacity that would be provided with the FWLE has been sized to accommodate the forecasted parking demand. The potential for hide-and-ride exists at some stations, although it is expected to be low except for at the potential additional S 216th East Station Option. The S 216th East Station Option would have the greatest potential for hide-and-ride activity due to the availability of on-street parking surrounding the station.
- At the Kent/Des Moines Station, the park-and-ride could be used by Highline College students because of its proximity to the Highline College campus. Sound Transit could consider a parking management program at this location to maximize the parking capacity for transit riders.

4.5.1 Parking Impacts

All of the build alternatives would affect the availability of private, off-street parking. Table 4-36 summarizes the number of public on-street and private parking spaces that would be removed by each build alternative compared with the No Build Alternative. Public off-street parking would not be removed with the build alternatives and any station or alignment options. Private parking spaces within properties that are expected to be entirely acquired by Sound Transit for an alternative are not

included in this analysis because there would be no demand for these spaces. When private parking is removed due to partial property acquisitions, business opportunities could be reduced in these situations. If the removed parking was deemed to make the property unviable, it was considered a full acquisition and was not included in the parking impacts assessment.

TABLE 4-36
Parking Impacts by Build Alternative

Alternative	Removed Public (On-Street) Parking Spaces	Removed Private Parking Spaces	Total
Preferred Alternative	**20**	**140**	**160**
Kent/Des Moines Station Options			
Kent/Des Moines At-Grade	--	-10	-10
Kent/Des Moines I-5	--	-10	-10
Landfill Median Alignment Option	--	--	--
S 272nd Star Lake Elevated Station Option	--	--	--
S 317th Elevated Alignment Option	**--**	-60	-60
Federal Way City Center Station Options			
Federal Way I-5	--	-110	-110
Federal Way S 320th Street Park-and-Ride	--	-110	-110
SR 99 Alternative	**0**	**410**	**410**
S 216th Station Options			
S 216th West	--	+100	+100
S 216th East	--	+20	+20
Kent/Des Moines Station Options			
Kent/Des Moines HC Campus	--	+420	+420
Kent/Des Moines HC Campus Station from 216th W	--	+580	+580
Kent/Des Moines SR 99 Median	--	-50	-50
Kent/Des Moines SR 99 East	--	+20	+20
S 260th Station Options			
S 260th West	--	-10	-10
S 260th East	--	-20	-20
S 272nd Redondo Trench Station Option	--	**+10**	**+10**
Federal Way SR 99 Station Option	--	**+100**	**+100**
SR 99 to I-5 Alternative	**0**	**170**	**170**
S 216th Station Options			
S 216th West	--	+100	+100
S 216th East	--	+20	+20
Landfill Median Alignment Option	--	0	0
Federal Way City Center Station Options			
Federal Way I-5	--	-70	-20
Federal Way S 320th Street Park-and-Ride	--	-70	-20
I-5 to SR 99 Alternative	**20**	**470**	**490**
S 260th Station Options			
S 260th West	--	-10	-10

TABLE 4-36
Parking Impacts by Build Alternative

Alternative	Removed Public (On-Street) Parking Spaces	Removed Private Parking Spaces	Total
S 260th East	--	-20	-20
S 272nd Redondo Trench Station Option	--	**+10**	**+10**
Federal Way SR 99 Station Option	--	**+100**	**+100**

Note: Parking numbers are rounded up to the nearest 10 stalls.
Parking spaces removed with the alignment and station options are changes from the build alternatives.

In general, the build alternatives would have minimal impact on public on-street parking, other than the 20 spaces removed with the Preferred and I-5 to SR 99 alternatives. These public on-street parking spaces that would be removed are all along 32nd Avenue S near S 212th Street. The amount of private parking removed under the build alternatives would be between 140 and 470 parking stalls. The I-5 to SR 99 Alternative would remove the greatest amount of private parking spaces, and the Preferred Alternative would remove the least. Considering alignment and station options, the amount of parking removed would adjust to be between 20 and 1,200. The Preferred Alternative with either of the Kent/Des Moines station options, the S 317th Elevated Alignment Option, and either of the Federal Way City Center station options would remove the least amount of private parking, and the SR 99 Alternative with the potential additional S 216th West Station Option, the Kent/Des Moines HC Campus Station Option, the S 272nd Redondo Trench Station Option, and the Federal Way SR 99 Station Option would remove the most. Parking impacts for each alternative are described in the following sections.

4.5.1.1 Preferred Alternative

Under the Preferred Alternative, up to 20 public on-street parking spaces would be removed along 32nd Avenue S just south of S 212th Street. Approximately 140 private parking spaces would be acquired. Most of the private parking acquisitions would be in Federal Way at Gateway Center off of S 317th Street (approximately 70 spaces) and at the Commons Mall (40 spaces).

Station and Alignment Options

Compared with the Preferred Alternative, both Kent/Des Moines station options (At-Grade and I-5) would have up to 10 fewer private parking spaces removed because these stations would be located closer to I-5 and would affect fewer private properties with parking. The Landfill Median Alignment Option and S 272nd Elevated Star Lake Station Option would have the same parking impacts as the Preferred Alternative. The S 317th Elevated Alignment Option would reduce parking impacts at the Gateway Center by 60 spaces. Both the Federal Way I-5 and S 320th Park-and-Ride station options would remove up to 110 fewer stalls than the Preferred Alternative because they would either fully acquire or avoid the Gateway Center and both options would avoid impacts on the Commons Mall.

4.5.1.2 SR 99 Alternative

Under the SR 99 Alternative, there would be no public on-street parking impacts. Approximately 410 private parking spaces would be acquired. Most parking acquisitions would be in the northern two-thirds of the alignment, with approximately 170 spaces removed between S 200th Street and S 260th

Street and 200 spaces between S 260th Street and Dash Point Road. The remaining 40 spaces are between Dash Point Road and S 320th Street. Within each of these areas, specific areas may have a higher concentration of parking acquisition. Approximately 60 spaces would be acquired at retail properties located on the west side of SR 99 between S 248th Street and S 252nd Street. Just south of the S 272nd Redondo Station, approximately 100 parking spaces would be acquired from properties between S 276th Street and 16th Avenue S.

Station Options

No public parking spaces would be removed with any of the SR 99 Alternative station options. For private parking spaces, the station options would remove more parking spaces than the SR 99 Alternative, except for the Kent/Des Moines SR 99 Median Station Option and the potential additional S 260 West and East station options.

The potential additional S 216th West Station Option would remove an additional 100 spaces compared to the SR 99 Alternative. These spaces are located at properties north and west of the SR 99 and S 216th Street intersection. For the potential additional S 216th East Station, 20 additional stalls would be acquired compared to the SR 99 Alternative; all these parking stalls are located at the parcel on the northeast corner of SR 99 and S 220th Street.

For the Kent/Des Moines station options, up to 580 additional private parking spaces would be removed compared to the SR 99 Alternative. The Kent/Des Moines SR 99 Median Station Option would have 50 fewer spaces removed compared to the SR 99 Alternative, thus maintaining spaces for properties along SR 99 just south and west of Kent-Des Moines Road. In contrast, the Kent/Des Moines HC Campus and SR 99 East station options would require additional parking acquisition. For the Kent/Des Moines HC Campus Station Option, up to 420 additional parking spaces would be acquired near Highline College. For the Kent/Des Moines HC Campus Station from S 216th West Station Option, 580 additional parking spaces would be acquired, the highest of all the SR 99 options. The Kent/ Des Moines SR 99 East Station Option would acquire 20 additional parking spaces compared to the SR 99 Alternative, and most would be acquired from the Lowe's property south of S 240th Street.

Either of the two potential additional S 260th station options (West or East) would result in a modest decrease in removed private parking spaces, with a range from a net difference of 20 fewer stalls removed with the S 260th Street East Station Option and 10 fewer stalls removed with the S 260th West Station Option compared to the SR 99 Alternative. The S 260th East Station Option would require more full property acquisitions compared to the SR 99 Alternative; therefore, parking removed at properties that would be partial acquisitions under the SR 99 Alternative near S 260th Street would become full acquisitions under the S 260th East Station Option. The majority of the S 260th Street West Station Option removed spaces would be at properties west of SR 99 between S 242nd Street and S 252nd Street.

The Federal Way SR 99 Station Option would remove 100 more private parking spaces than the SR 99 Alternative. The majority of the removed spaces would occur at two properties located south of S 316th Place.

4.5.1.3 SR 99 to I-5 Alternative

Under the SR 99 to I-5 Alternative, no public on-street parking impacts would occur. This alternative would have the fewest private parking spaces removed, with approximately 170 spaces. The highest concentration of parking removed (90 spaces) would be north of S 240th Street. The remaining spaces removed are on property located south of S 317th Street. Some parking removals would occur with the SR 99 to I-5 Alternative that would not occur with other build alternatives or station options. Up to 50 private parking spaces would be removed at properties along 30th Avenue S between Kent-Des Moines Road and S 240th Street, including approximately 20 spaces removed at the Midway Sewer District property.

Station Options

Either of the two potential additional stations at S 216th Street would remove the same private parking spaces as the SR 99 Alternative. At the Federal Way Transit Center, the stations options would have 20 fewer private parking spaces removed.

4.5.1.4 I-5 to SR 99 Alternative

Under the I-5 to SR 99 Alternative, up to 20 public on-street parking spaces would be removed along 32nd Avenue S just south of S 212th Street. Approximately 470 private parking spaces would be removed, the largest amount among the build alternatives. The highest concentration of private parking acquisitions would be along SR 99 between S 240th Street and S 260th Street (approximately 190 spaces) and south of the Redondo Heights Park-and-Ride (approximately 100 spaces).

Station Options

No additional public parking spaces would be removed with the I-5 to SR 99 Alternative station options. For I-5 to SR 99 Alternative station options, the Federal Way Transit Center and either of the two potential additional stations at S 260th Street would remove the same private parking spaces as they would with the SR 99 Alternative.

4.5.2 Station Area Parking

All of the light rail station areas that currently have existing park-and-ride facilities would have additional parking to accommodate the forecasted parking demand with the FWLE. The parking demand was assessed along the entire FWLE corridor and allocated to the most compatible station areas. This was based on the adjacent land uses and modal accessibility, proximity to regional highways, population density, access to transit, non-motorized facilities, and the local street network and transit-oriented development potential. The parking was allocated across three station areas (Kent/Des Moines, S 272nd, and Federal Way Transit Center) to provide a reasonable estimate of potential impacts on each station location. In total, all of the full length build alternatives would include about 1,600 more park-and-ride stalls at the stations than what currently exists at the park-and-ride facilities. No parking would be provided at the potential additional S 216th West or East and S 260th West or East station options.

Hide-and-Ride

This activity occurs when transit users park in neighborhoods surrounding transit stations and is generally caused by insufficient parking at the transit station.

4.5.2.1 Full-Length Build Alternatives

The station area forecasted demand, parking supply, and available nearby public on-street potential hide-and-ride spaces are summarized in Table 4-37 for the FWLE build alternatives and station options. The forecasted park-and-ride transit demand (bus and light rail) is based on estimates predicted with the Sound Transit Ridership Model at each station area. This demand is calculated differently than the trip generation demand described in Section 4.3.1, which assumes all park-and-ride facilities would be full during the peak period.

At the Kent/Des Moines Station, approximately 500 stalls would be provided in a parking garage. At either the S 272nd Star Lake or Redondo stations, up to 700 parking spaces would be provided in addition to the current park-and-ride supply. At any of the proposed Federal Way stations, about 400 additional spaces would be provided adjacent to the light rail station. At the existing Federal Way Transit Center, the 1,190 existing spaces would remain and at the S 320th Park-and-Ride, the 877 existing spaces would remain. The S 320th Park-and-Ride spaces are only included in the parking available for the Preferred Federal Way Transit Center Station because it would be located closer to this park-and-ride than for the other Federal Way City Center stations (except the S 320th Park-and-Ride Station Option). The FWLE would not provide parking at the S 216th Street West or East or S 260th Street West or East station options because they were intended to serve as neighborhood stations.

TABLE 4-37
Summary of Station Area Parking Facilities – Full-Length Alternatives

Alternative	Station	Existing Park-and-Ride Stalls[a]	Number of Proposed Park-and-Ride Stalls[a]	Forecasted Park-and-Ride Demand[a,b]	Available On-street Parking Stalls[c]
SR 99, SR 99 to I-5	S 216th West or East Station Option	0	0	0	51
Preferred ,SR 99, , SR 99 to I-5, I-5 to SR 99	Kent/Des Moines Station	0	500	500	0
SR 99, I-5 to SR 99	S 260th West or East Station Option	0	0	0	10
SR 99, I-5 to SR 99	S 272nd Redondo Station	697	1,397	800	15
Preferred, SR 99 to I-5	S 272nd Star Lake Station	540	1,240[d]	600	24
Preferred	S 272nd Star Lake Elevated Station Option	540	1,240[d]	600	24
SR 99, I-5 to SR 99	Federal Way SR 99 Station Option	1,190	1,590	1,400	21
SR 99, SR 99 to I-5, I-5 to SR 99	Federal Way Transit Center Station	1,190	1,590	1,800	21
Preferred	Federal Way Transit Center Station	2,067	2,467	2,200	21
Preferred, SR 99 to I-5	Federal Way I-5 Station Option	1,190	1,590	1,800	21
	Federal Way S 320th Park-and-Ride Station Option	877	1,277	2,100	21

[a] Includes park-and-ride supply and demand within 1/4 mile walk distance.
[b] Source: Sound Transit, 2014b. Demand is rounded to the nearest 100.
[c] Existing on-street unrestricted parking spaces within 1/4 mile of each station area.
[d] Depending on how the FWLE project is constructed, up to 1,240 parking stalls would be provided at the S 272nd Star Lake Station.

Hide-and-ride parking is more likely to occur when there is a combination of easily accessible on-street public parking near the station and the forecasted park-and-ride demand is greater than the park-and-ride supply. Hide-and-ride parking could also occur if other parking lots (public or private) are located adjacent to the station and do not have appropriate parking controls (such as time-restricted parking) to deter hide-and-ride activity.

No hide-and-ride parking is expected near any of the Kent/Des Moines stations because vehicle demand is not forecasted to exceed the parking supply. The proposed design for 30th Avenue S with the Kent/Des Moines Station would not preclude the ability to provide some public on-street parking; however, parking controls could be considered to restrict park-and-ride users from parking on-street. Private parking lots would not be adjacent to the station but would likely be located nearby. For the Preferred Alternative, the 500-stall parking garage would be located on the northeast corner of S 236th Street and 30th Avenue S. Other Kent/Des Moines station options would also have a parking garage located near the station.

For all alternatives, there is a potential that the park-and-ride at the Kent/Des Moines Station could be used by Highline College students due to its proximity to the campus. According to the 2014 Highline College Master Plan, the Highline College east parking lot, which is located closest to the potential light rail station, has approximately 800 spaces and is the most used Highline College parking lot (Highline College, 2014). Moreover, in a parking utilization study completed by Highline College in 2010, they found that during peak periods, parking demand exceeded available parking capacity by 100 to 350 vehicles across the entire campus.

Currently, Highline College charges students a fee to park on campus. The proximity of the proposed park-and-ride lot to the Highline College campus could affect the number of parking spaces available for transit riders and affect ridership at this station because Highline College parking demand exceeds available capacity. Sound Transit could consider a parking management program at this location to maximize the parking capacity available for transit riders.

The S 272nd stations are forecasted to have excess parking supply with the Preferred and all other build alternatives; therefore, hide-and-ride activity is not expected. For the Preferred Alternative and the SR 99 to I-5 Alternative, the parking supply could exceed parking demand by up to 690 parking spaces. For the SR 99 and I-5 to SR 99 alternatives, the parking supply could exceed the parking demand by approximately 460 spaces.

For the Preferred Alternative, the potential for hide-and-ride activity is low at the Federal Way Transit Center Station even though the total parking demand is expected to be about 2,200 vehicles. The existing Federal Way Transit Center parking lot (1,190 parking spaces) and a new parking garage (400 parking spaces) would provide a total of about 1,600 parking spaces within a 1/8-mile walk from the station platform. The S 320th Street Park-and-Ride is within a 1/4-mile walk and would provide approximately 900 additional park-and-ride spaces as well as frequent transit service via several bus routes (e.g., RapidRide A line) that would serve both the park-and-ride and the light rail station. Furthermore, there is limited availability of public on-street parking spaces surrounding the Federal

Way Transit Center Station location, and excess parking supply would be provided at the S 272nd Star Lake Station, thus providing light rail users another station for parking.

Except for the Federal Way SR 99 Station Option, parking demand would exceed supply at the Federal Way City Center station locations with the other build alternatives and station options. For reasons similar to the Preferred Alternative, noted in the prior paragraph, the potential for hide-and-ride activity would be low with the Federal Way SR 99 Station Option. There are several private parking lots located within walking distance of any of the Federal Way City Center station locations, including the Commons Mall, which could attract some hide-and-ride activity. However, most of these developments have parking controls in place to deter unauthorized use.

The potential additional S 216th West or East and S 260th West or East station options would have the potential for hide-and-ride activity because no parking would be provided at the station. However, the hide-and-ride potential would be minimized at the S 216th West or either S 260th West or East station option because there is a low amount of easily accessible on-street public spaces near these potential additional station locations. Some hide-and-ride potential is present at the S 216th East Station Option area because of the station location's proximity to available public on-street parking for the single-family and multi-family residences east and south of the location.

4.5.2.2 Interim Terminus Conditions

Table 4-38 shows the forecasted demand, parking supply, and available nearby public on-street potential hide-and-ride spaces for the Kent/Des Moines and S 272nd interim terminus conditions. Under the Kent/Des Moines interim terminus condition, an additional 500 parking spaces would be provided at the Kent/Des Moines Station, for a total of 1,000 parking spaces. The additional 500 interim parking stalls would accommodate the increase in vehicle demand over the full-length condition. These additional 500 parking spaces would likely be in surface lots near the station. For the Kent/Des Moines Station interim terminus condition, the parking supply would accommodate the forecasted demand; therefore, hide-and-ride activity is not expected.

Under the S 272nd Street interim terminus condition, the parking supply at the Kent/Des Moines Station would be reduced by about 500 spaces. However, because the terminus station would be located farther south, the parking demand at the Kent/Des Moines Station would also decrease as some park-and-ride activity would shift to the S 272nd Station. Therefore, hide-and-ride activity is not expected near the Kent/Des Moines Station. No additional parking would be provided at either the S 272nd Star Lake or Redondo stations under the S 272nd interim terminus condition beyond the 700 additional parking spaces previously described.

TABLE 4-38
Summary of Station Area Parking Facilities – Interim Terminus Conditions

Alternative	Station	Existing Park-and-Ride Stalls[a]	Number of Proposed Park-and-Ride Stalls[a]	Forecasted Park-and-Ride Demand[a,b,c]	Available On-street Parking Stalls[d]
Kent/Des Moines Interim Condition					
Preferred ,SR 99, SR 99 to I-5, I-5 to SR 99	Kent/Des Moines Station	0	1,000	1,000	0
S 272nd Street Redondo Heights Interim Condition					
Preferred ,SR 99, SR 99 to I-5, I-5 to SR 99	Kent/Des Moines Station	0	500	500	0
SR 99, I-5 to SR 99	S 272nd Redondo Station	697	1,397	1,500	15
S 272nd Street Star Lake Interim Condition					
Preferred ,SR 99, SR 99 to I-5, I-5 to SR 99	Kent/Des Moines Station	0	500	500	0
Preferred, SR 99 to I-5	S 272nd Star Lake Station	540	1,240[e]	1,300	24

[a] Includes Park-and-Ride supply and demand within a 1/4 mile walk distance.
[b] Source: Sound Transit, 2014b.
[c] Demand is rounded to the nearest 100.
[d] Existing on-street unrestricted parking spaces within 1/4 mile of each station area.
[e] Depending on how the FWLE project is constructed, up to 1,240 parking stalls would be provided at the S 272nd Star Lake Station.

The S 272nd Redondo or Star Lake Station is forecasted to have slightly more parking demand than supply under the S 272nd Street interim terminus condition. However, riders who are not able to find a parking space would be likely to go to the Kent/Des Moines Station, where excess capacity is expected. For the Preferred Alternative and the SR 99 to I-5 Alternative with this interim condition, the parking demand could exceed parking supply by up to 100 parking spaces. However, hide-and-ride potential is low because of the limited amount of accessible on-street public parking space and because residential parking zone controls are present in the development north of the station. For the SR 99 Alternative and I-5 to SR 99 Alternative, the parking demand could exceed parking supply by approximately 260 spaces. Hide-and-ride potential is also low at this station location because there is limited nearby on-street parking.

4.6 Non-motorized Facilities

This section discusses the future non-motorized conditions (year 2035) with the No Build Alternative and the anticipated non-motorized conditions with the build alternatives. The different FWLE station options could also affect surrounding land uses and the way pedestrians access and circulate within each of the station areas. A discussion of future pedestrian and bicycle facilities and mobility, non-motorized trip activity at the stations, and crosswalk operations (level of service [LOS]) are presented in this section. Key findings include the following:

- For most stations, I-5 is a major barrier to walking and bicycle activity and could deter non-motorized trips from accessing stations. Other major roads, including SR 99, S 272nd Street, and S 320th Street, have high volumes, higher vehicle speeds, and are wider roadways with long pedestrian crossings. These characteristics can be uncomfortable for pedestrians and bicyclists to access the station if it's located near these roadways.

- The Federal Way S 320th Park-and-Ride Station Option would have the highest pedestrian activity (all pedestrians walking to and from the station as well as within the station for mode transfers) during the PM peak hour (1,840 persons) with the full-length alternatives. The potential additional S 260th Street West or East station options would have the lowest pedestrian activity (about 250 persons) during the PM peak hour. Under the interim terminus condition, the Kent/Des Moines Station would have up to 1,900 persons per hour during the PM peak hour.
- Out of all FWLE stations and station options, the Kent/Des Moines Station, potential additional S 216th (West or East) Station, and potential additional S 260th (West or East) Station would have the highest number of people walking and biking to and from the station from the surrounding areas.
- Pedestrian LOS would degrade where pedestrians would need to cross the street to reach park-and-ride facilities or transit stops that are not located adjacent to light rail stations. However, pedestrian LOS would generally be acceptable (between A and D) with all FWLE alternatives and station options.

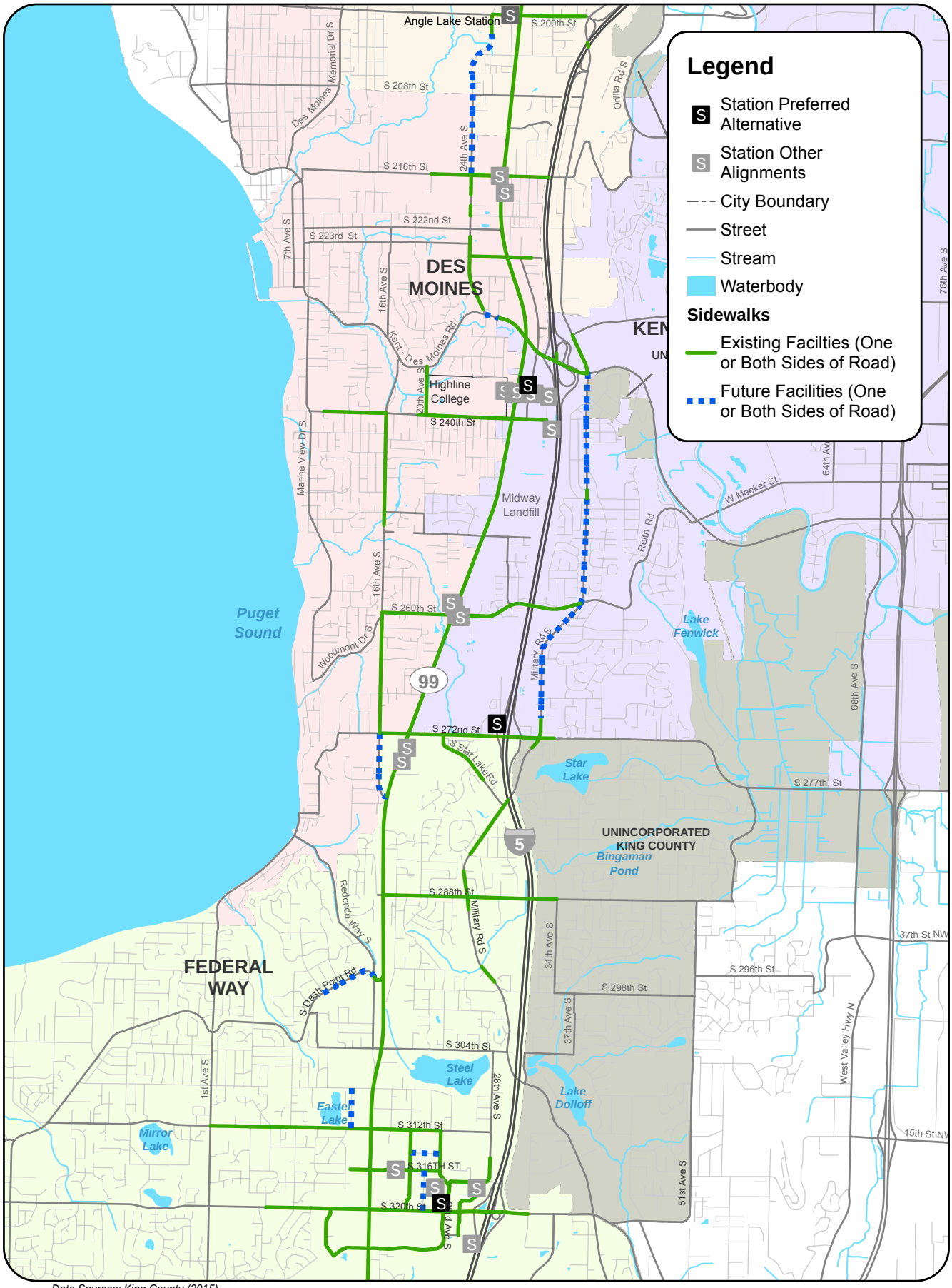
4.6.1 Non-motorized Elements

Future pedestrian and bicycle facilities in the FWLE corridor are shown in Exhibits 4-17 and 4-18, respectively. New facilities that are planned with identified funding were included in the analysis. New facilities are generally not located within the direct vicinity of FWLE station areas with the exception of the proposed/improved roadways as part of the station options. A detailed list of the assumed non-motorized background projects in the study area are also provided in Appendix A, Transportation Technical Analysis Methodology. The non-motorized facilities were inventoried and evaluated for a walkshed of 1/2 mile and a bikeshed of 1 mile around each station. This distance assumes an actual walk or bicycle distance using the roadway and/or trail system surrounding the station area. This area reflects the potential population and employment base that could directly access the light rail system without requiring motorized travel. The availability of sidewalks and non-motorized use trails were considered for the walkshed analysis, while streets were also considered in the bikeshed analysis. The absence of non-motorized facilities or the presence of major geographic barriers, such as I-5, affects how much area can be covered with a 1/2-mile walk or 1-mile bike ride from each station. Other natural barriers, such as topography, were not included as part of the walkshed and bikeshed analysis. However, they could make non-motorized travel less attractive.

Walkshed and Bikeshed

A walkshed or bikeshed is a walkable (or bikeable) area around a particular point of interest. For the FWLE stations, the walkshed is defined as a 1/2 mile actual walk distance, while a bikeshed is defined as a 1 mile bike distance via streets and non-motorized use trails to a station.

Table 4-39 shows the forecasted population and employment in 2035 contained within the station area walksheds and bikesheds. All of the Kent/Des Moines stations and station options would have very similar population and employment near each station because the station locations are fairly close to each other. The S 272nd Street stations and station option would have the least employment within a 1/2-mile walk; however, within a 1-mile bicycle ride, the S 272nd Redondo Station would provide

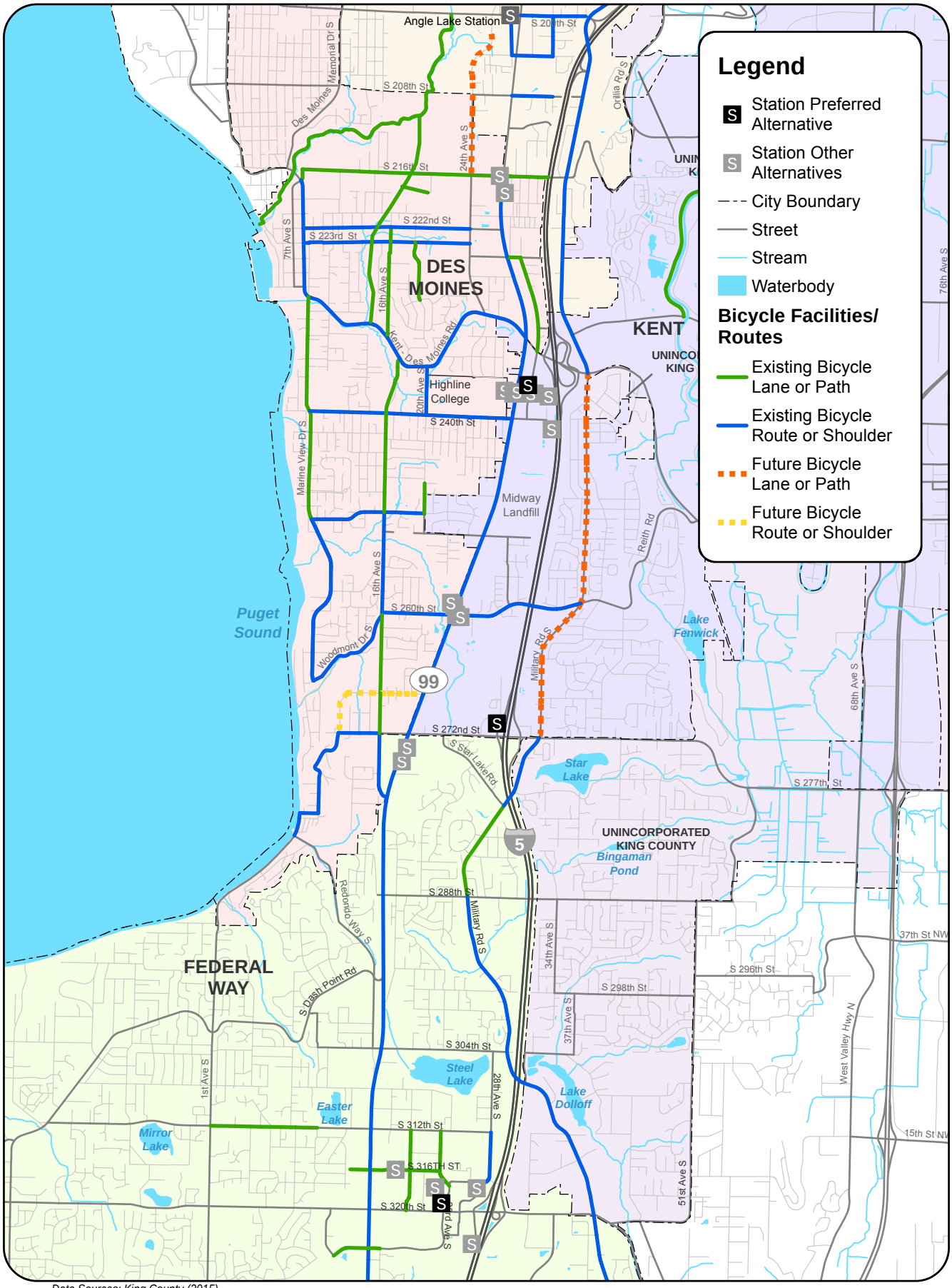


Data Sources: King County (2015).

N

0 0.5 1 2 Miles

EXHIBIT 4-17
Existing and Future Sidewalk Locations
Federal Way Link Extension



Data Sources: King County (2015).

N

0 0.5 1 2 Miles

EXHIBIT 4-18
Existing and Future Bicycle Facilities and Routes
Federal Way Link Extension

greater accessibility to nearby businesses than the S 272nd Star Lake Station. The Federal Way Transit Center would serve the highest amount of both employment and population based on a 1/2-mile walk, while the Federal Way SR 99 Station Option would serve the highest population and employment based on a 1-mile bicycle ride.

4.6.2 Pedestrian Trip Generation

For the No Build Alternative, future pedestrian volumes were developed at the study area intersections from the existing data and population and employment growth forecasts surrounding each station area.

For the build alternatives, the number of pedestrians within a station area is based on an estimate of transit users that would walk to or from the following:

- A park-and-ride facility
- A passenger drop-off/pick-up area
- A transfer between transit modes (bus to bus, or bus to rail)
- Surrounding land uses

TABLE 4-39
Walkshed and Bikeshed Population and Employment for Year 2035

Station[a]	Walkshed		Bikeshed	
	Employment	Population	Employment	Population
S 216th West and East	600	1,900	2,600	7,300
Kent/Des Moines Preferred, SR 99 Options, and 30th Avenue West[b]	2,700	2,600	5,600	6,400
Kent/Des Moines At-Grade	2,200	2,100	5,300	5,200
Kent/Des Moines 30th Ave East/ I-5 Option	2,300	2,200	5,400	6,600
S 260th West and East	1,300	1,700	500	3,200
S 272nd Star Lake[c]	200	1,100	600	4,100
S 272nd Redondo[d]	200	1,900	3,400	5,600
Federal Way Transit Center	3,600	3,200	7,100	6,400
Federal Way I-5	2,800	2,400	5,500	5,500
Federal Way S 320th Park-and-Ride	2,200	2,000	6,500	5,800
Federal Way SR 99	2,400	2,300	8,100	8,100

Note: Population and employment numbers rounded to the nearest 100.
[a] Groupings are consistent with walk- and bikeshed exhibits in this section.
[b] Includes Preferred, SR 99 West, HC Campus Station, SR 99 Median Station, Kent/Des Moines SR 99 East, and 30th Avenue West stations.
[c] Includes the S 272nd Star Lake Elevated Station Option.
[d] Includes the S 272nd Redondo Trench Station Option.

The Sound Transit Ridership Model provided the PM peak hour mode of access information. Trips were distributed between the platforms and the facilities listed above within and surrounding the station areas. Non-motorized trips were distributed to and from each station based on an assessment of adjacent land uses and an estimate of where non-motorized based trips would be generated. These trips were added to the No Build pedestrian forecasts to estimate the pedestrian activity at each of the stations for the build alternatives.

4.6.3 Pedestrian Level of Service

A pedestrian LOS analysis was conducted for signalized intersections located within 300 feet of the FWLE station areas for the 2035 PM peak hour. An LOS analysis for crosswalks inside station areas was not conducted. The analysis for the signalized intersections was conducted using *Highway Capacity Manual 2010* (TRB, 2010) methodology, which analyzes each crosswalk and holding area (corner) separately. The analysis focused on three components of the pedestrian experience:

- Intersection corner circulation area
- Crosswalk circulation area
- Pedestrian LOS score

The first two components are based on the concept of circulation area and describes the space available to pedestrians. The first element focuses on the amount of area provided to pedestrians while they wait at an intersection corner. The other measure focuses on the experience while walking within the crosswalk. Intuitively a larger area for each of these is desirable from a pedestrian perspective. As the volume of pedestrians increase, the area available for maneuverability and comfort decreases. For these two measures of effectiveness, LOS C or better represents that pedestrians can move at desired speeds. At LOS D or worse, the speed and ability to pass slower pedestrians becomes more restricted. At LOS F, speed is severely restricted and contact with other pedestrians is frequent. This is typical of dense urban areas.

The last component analyzed, the pedestrian LOS score, is an indication of the typical pedestrian's perception of the overall crossing experience and was analyzed for signalized intersections. This score considers crossing length, average pedestrian delay, pedestrian and vehicular volume, and pedestrian refuge locations. Level of service thresholds for each of these measures of effectiveness are provided in Appendix B, Level of Service Definitions used for Federal Way Link Extension Analysis.

4.6.3.1 No Build Alternative and Build Alternatives

Pedestrian facilities in the vicinity of the FWLE light rail stations are expected to operate at LOS A for the intersection corner quality of service and crosswalk circulation area for all signalized intersections under the No Build Alternative. The overall pedestrian LOS score is expected to range between LOS A and LOS D under the No Build Alternative. Most LOS C and LOS D crosswalks are across SR 99 and S 272nd Street, which require longer crossing distances due to the width of these streets. For the build alternatives, pedestrian and bicycle activity and the accessibility to the station areas would be a major contributor to the non-motorized mode share at the stations. The presence of sidewalks, bicycle lanes, and other non-motorized facilities would enable connections to the transit system with the

surrounding land uses. The location of crossings, bus stops, drop-off/pick-up areas, and park-and-ride lots are design elements that also would affect the way pedestrians circulate within the station areas.

Tables 4-40 through 4-43 show the estimated total pedestrian trips generated at stations for the build alternatives and station options during the PM peak hour, respectively. Table 4-44 shows the estimated pedestrian trip generation for the interim terminus conditions during the PM peak hour. Pedestrian activity was classified into two categories: outside the station area and within the station area. Trips considered to occur outside the station area include all walk and bike trips to or from the station. Depending on the station site configuration, these trips could include park-and-ride walk trips, and certain transit transfer trips, in particular RapidRide A Line transfers that require a person to cross a major arterial street to access the station platform. Trips within the station area include park-and-ride trips, transit transfer trips to/from bus bays adjacent to the station platform area, and passenger drop-off/pick-up trips.

With the build alternatives, pedestrian volumes were developed based on the pedestrian trip generation at each station and the No Build pedestrian volumes. Based on the trip generation presented in Tables 4-40 through 4-42, the FWLE would result in considerably more pedestrian and bicycle activity in and around the stations than the No Build Alternative. The pedestrian LOS results are provided in Appendix F, Pedestrian Level of Service. Generally, the pedestrian LOS for the FWLE alternatives would range between LOS A and LOS D for all three components of the pedestrian experience. For most intersections, a lower LOS rating would be attributed to a noticeable increase in pedestrian volume (e.g., where the park-and-ride facilities or transit stops are not located adjacent to light rail stations). A detailed discussion of the non-motorized elements and pedestrian LOS are discussed in the following subsections for each station area.

TABLE 4-40
2035 PM Peak Hour Pedestrian Trip Generation at Build Alternatives Stations

Station Area	Alternative	Total Pedestrian Trips (persons/hr)	Automobile500500 (persons/hr)[a]	Walk/Bike (persons/hr)[b]	Transit (persons/hr)[b]
Kent/Des Moines	Preferred	900	300	210	390
	SR 99	920	300	220	400
	I-5 to SR 99	860	290	210	360
	SR 99 to I-5	850	300	190	360
S 272nd Star Lake	Preferred	760	500	100	160
	SR 99 to I-5	760	500	100	160
S 272nd Redondo	SR 99	1,100	720	80	300
	I-5 to SR 99	1,080	720	70	290
Federal Way Transit Center	Preferred	1,600	420	50	1,130
	SR 99	1,650	400	50	1,200
	I-5 to SR 99	1,620	400	50	1,170
	SR 99 to I-5	1,520	410	50	1,060

Note: The trips by mode may not add up to total trips due to rounding of trip numbers to the nearest 10.
[a] Based on Parking Stall Estimate and Passenger Drop-off/Pick-up forecasts.
[b] Source: Sound Transit, 2014b.

TABLE 4-41

2035 PM Peak Hour Pedestrian Trip Generation at Build Alternatives Station Options

Station Area	Alternative	Station Option	Peak Hour Project Pedestrian Trip Generation			
			Total Pedestrian Trips (persons/hr)	Automobile (persons/hr)[a]	Walk/Bike (persons/hr)[b]	Transit (persons/hr)[b]
Kent/Des Moines	Preferred	At-Grade	760	290	170	300
		I-5	900	300	210	390
	SR 99	HC Campus	920	300	220	400
		SR 99 Median	920	300	220	400
		SR 99 East	920	300	220	400
S 272nd Street	Preferred	Star Lake Elevated	760	500	100	160
	SR 99	Redondo Trench	1,100	720	80	300
Federal Way Transit Center or City Center	Preferred, SR 99 to I-5	Federal Way I-5	1,130	350	20	760
		Federal Way S 320th Park-and-Ride	1,840	620	<10	1,220
	SR 99, I-5 to SR 99	Federal Way SR 99	1,310	330	120	860
S 216th Street	SR 99, SR 99 to I-5	West	420	20	330	70
		East	420	20	330	70
S 260th Street	SR 99, I-5 to SR 99	West	250	10	220	20
		East	250	10	220	20

Note: The trips by mode may not add up to total trips due to rounding of trip numbers to nearest 10.
[a] Based on Parking Stall Estimate and Passenger Drop-off/Pick-up forecasts.
[b] Source: Sound Transit, 2014b.

TABLE 4-42

2035 PM Peak Hour Pedestrian Trip Generation at FWLE Stations (Interim Terminus Conditions)

Station Area	Alternative	Station Option	Peak Hour Project Pedestrian Trip Generation			
			Total Pedestrian Trips (persons/hr)	Auto (persons/hr)[a]	Walk/Bike (persons/hr)[b]	Transit (persons/hr)[b]
Kent/Des Moines	Preferred	I-5	1,810	600	190	1,020
		At-Grade	1,370	580	180	610
	SR 99	SR 99 West	1,880	610	200	1,070
		Highline College Campus	1,880	610	200	1,070
		SR 99 Median	1,880	610	200	1,070
		East SR 99	1,880	610	200	1,070
	SR 99 to I-5	30th Avenue East	1,670	600	190	880
	I-5 to SR 99	30th Avenue West	1,620	590	190	840

TABLE 4-42
2035 PM Peak Hour Pedestrian Trip Generation at FWLE Stations (Interim Terminus Conditions)

Station Area	Alternative	Station Option	Peak Hour Project Pedestrian Trip Generation			
			Total Pedestrian Trips (persons/hr)	Auto (persons/hr)[a]	Walk/Bike (persons/hr)[b]	Transit (persons/hr)[b]
S 272nd Redondo	SR 99, I-5 to SR 99	Redondo, Redondo Trench	1,420	770	50	600
S 272nd Star Lake	Preferred, SR 99 to I-5	Star Lake, Star Lake Elevated	1,380	570	70	740

Note: The trips by mode may not add up to total trips due to rounding of trip numbers to nearest 10.
[a] Based on Parking Stall Estimate and Passenger Drop-off/Pick-up forecasts.
[b] Sound Transit, 2014b.

4.6.4 Station Areas

4.6.4.1 Kent/Des Moines Station Area

Non-motorized Facilities

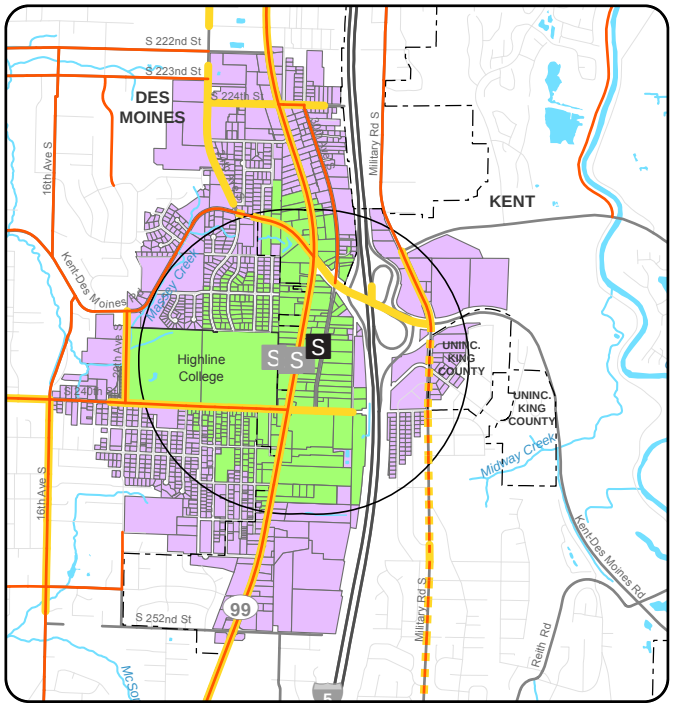
Exhibit 4-19 shows the walk- and bikesheds for the build alternatives and station options in the Kent/Des Moines Station area. In general, all the Kent/Des Moines alternatives and station options in the Kent/Des Moines area would have a fairly similar walk- and bikeshed.

With each of the four build alternatives, I-5 would be a major barrier to walking and bicycle trips east of I-5. This would be the same with any of the station options because Kent-Des Moines Road provides the only crossing over I-5 near this station area. This effectively removes a majority of the land uses east of I-5 from the station area walk- or bikesheds. Although the bikeshed for all build alternatives shows a large area north and south of the station areas, high travel speeds and volumes on SR 99 and a lack of dedicated bicycle facilities would make it uncomfortable for bicyclists to access the station from these areas. SR 99 pedestrian crossings would be provided at the existing S 240th Street and Kent-Des Moines Road signalized intersections. The signal at SR 99 and S 236th Street would be modified to provide pedestrian crossings on all four approaches as well as to other pedestrian safety enhancements with all Kent/Des Moines stations and station options except the Kent/Des Moines At-Grade Station Option.

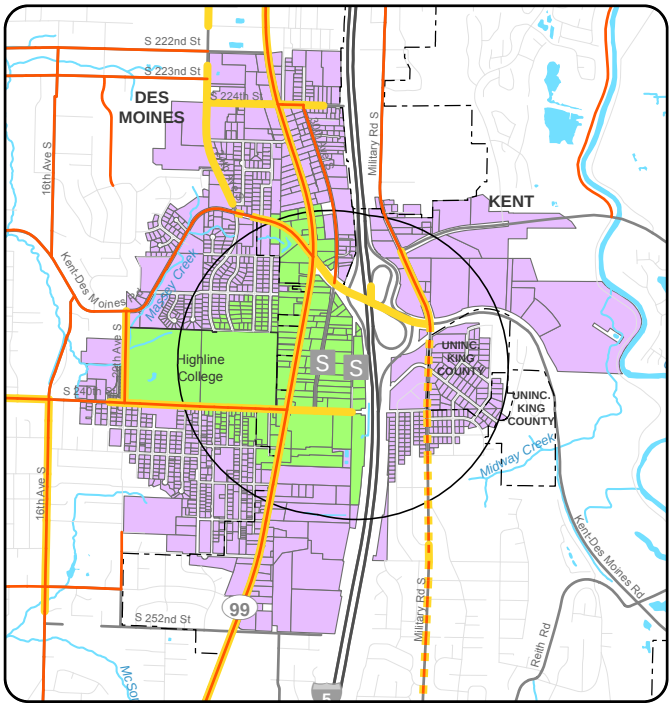
Compared with other station options, the Kent/Des Moines At-Grade Station Option would be located farther from major nearby land uses, such as Highline College. Therefore, the Highline College campus would be on the outer limits of a 1/2-mile walkshed.

Pedestrian Trip Generation

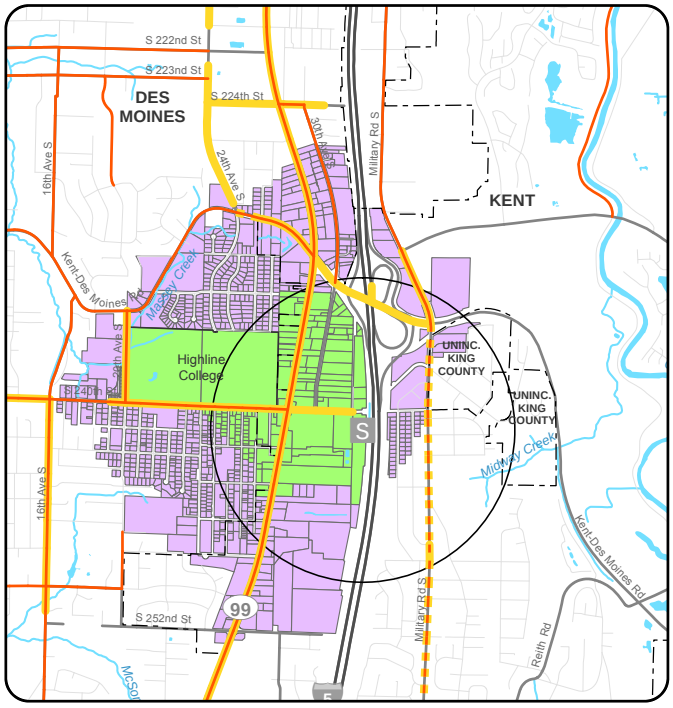
The total pedestrian activity is expected to range from 760 pedestrian trips per hour for Kent/Des Moines stations and station options located close to I-5 to up to 920 pedestrian trips per hour for station options along SR 99. Of the total pedestrian activity, up to 220 people during the PM peak hour would walk or bike to the station for all alternatives and station options. With the Preferred Alternative



Kent/Des Moines Station, SR 99 West Station, 30th Avenue West Station, and SR 99 East, SR 99 Median, and HC Campus Station Options



30th Avenue East Station and I-5 Station Option



At-Grade Station Option

Legend

Stations

- S — Station Preferred Alternative
- S — Station Other Alignments
- City Boundary
- Street
- Stream
- Water Body
- 1/2-Mile Walkshed Parcels
- 1-Mile Bikeshed Parcels
- 1/2-Mile Buffer

Bike Facilities

- Existing Bike Facilities
- Future Bike Facilities

Sidewalks

- Existing Sidewalks
- Future Sidewalks

Notes:
-Bike facility types include: lanes, routes, shared roadways, paths, and trails.
-Sheds were calculated based on roadway network and on-road distances.
-HC = Highline College

N

EXHIBIT 4-19
Kent/Des Moines Station Area
Walksheds and Bikesheds
Federal Way Link Extension

and station options, the highest share of pedestrian trips would be generated by transit transfers, in part due to the nearby Metro RapidRide A Line. With the station located farther east of SR 99, transfers between light rail and RapidRide A Line would diminish because of the longer walking distance between transit modes, which would reduce pedestrian volumes.

With some Kent/Des Moines station options, transit riders would walk outside the station area to and from park-and-ride facilities. In these situations, the park-and ride would be located across a street, such as SR 99 or S 236th Street, from the station platform area, thus requiring pedestrians to walk longer distances and make longer crossings at an intersection to get to the station.

Pedestrian Level of Service

The intersection corner quality of service is expected to be at LOS A with the No Build and all build alternatives and station options. The crosswalk circulation score would be LOS A or LOS B with all the build alternatives and station options, except with the Kent/Des Moines SR 99 Median Station Option. With this station option, the south crosswalk at the SR 99/S 236th Street intersection would be LOS D. The overall pedestrian LOS score is expected to be LOS D or better at the SR 99/S 236th Street intersection and the SR 99/S 240th Street intersection near the Kent/Des Moines Station. For crosswalks across SR 99, a LOS D is expected due to the longer crossing distances. Side street crossings are expected to be LOS B.

4.6.4.2 S 272nd Star Lake Station Area

Non-motorized Facilities

The Preferred and SR 99 to I-5 alternatives would serve the S 272nd Star Lake Station area. The walkshed and bikeshed for this station area are focused west of the station because of limited public walk and bicycle facilities south and north of S 272nd Street. Similar to the Kent/Des Moines Station area, I-5 presents a barrier to walk and bicycle trips east of I-5. Exhibit 4-20 shows the walkshed and bikeshed for the S 272nd Star Lake Station area. Pedestrian crossings with safety enhancements near the station area would be provided along S 272nd Street at 26th Avenue S and the I-5 northbound and southbound ramps with the Preferred and SR 99 to I-5 S 272nd Star Lake Station and S 272nd Star Lake Elevated Station Option.

Pedestrian Trip Generation

The pedestrian activity with the S 272nd Star Lake Station would be approximately 760 persons per hour for the Preferred and SR 99 to I-5 alternatives. Of the total pedestrian activity, approximately 100 persons during the PM peak hour would walk or bike to the station and would likely be traveling to and from areas west of the station. The majority of the pedestrian activity at this station would be people walking to or from their vehicle at the park-and-ride and would be contained within the station area. Some riders transferring between rail and bus would walk between the station and bus stop located on the I-5 ramps.

Pedestrian Level of Service

The intersection corner quality of service and crosswalk circulation score is expected to be at LOS A with the S 272nd Star Lake Station under the No Build, Preferred, and SR 99 to I-5 alternatives.

The overall pedestrian LOS would be between LOS B and LOS C at the S 272nd Street/26th Avenue S intersection under the No Build, Preferred, and SR 99 to I-5 alternatives.

4.6.4.3 S 272nd Redondo Station Area

Non-motorized Facilities

Exhibit 4-20 shows the walkshed and bikeshed for the S 272nd Redondo Station. The SR 99 and I-5 to SR 99 alternatives would serve the S 272nd Redondo Station area just south of S 272nd Street. This station area would be walkable to some of the residential neighborhoods west of SR 99. The walkshed for the residential neighborhoods southeast of the station area is limited due to a lack of direct sidewalk connectivity to SR 99 or S 272nd Street. Although the bikeshed stretches north and south of the station area, high travel speeds and volumes on SR 99 and a lack of dedicated bicycle facilities would make it uncomfortable for bicyclists to access the station from the north or south. Similar to the Kent/Des Moines Station area, I-5 presents a barrier to bicycle trips east of I-5. SR 99 pedestrian crossings would be provided at the S 276th Street and S 272nd Street signalized intersections.

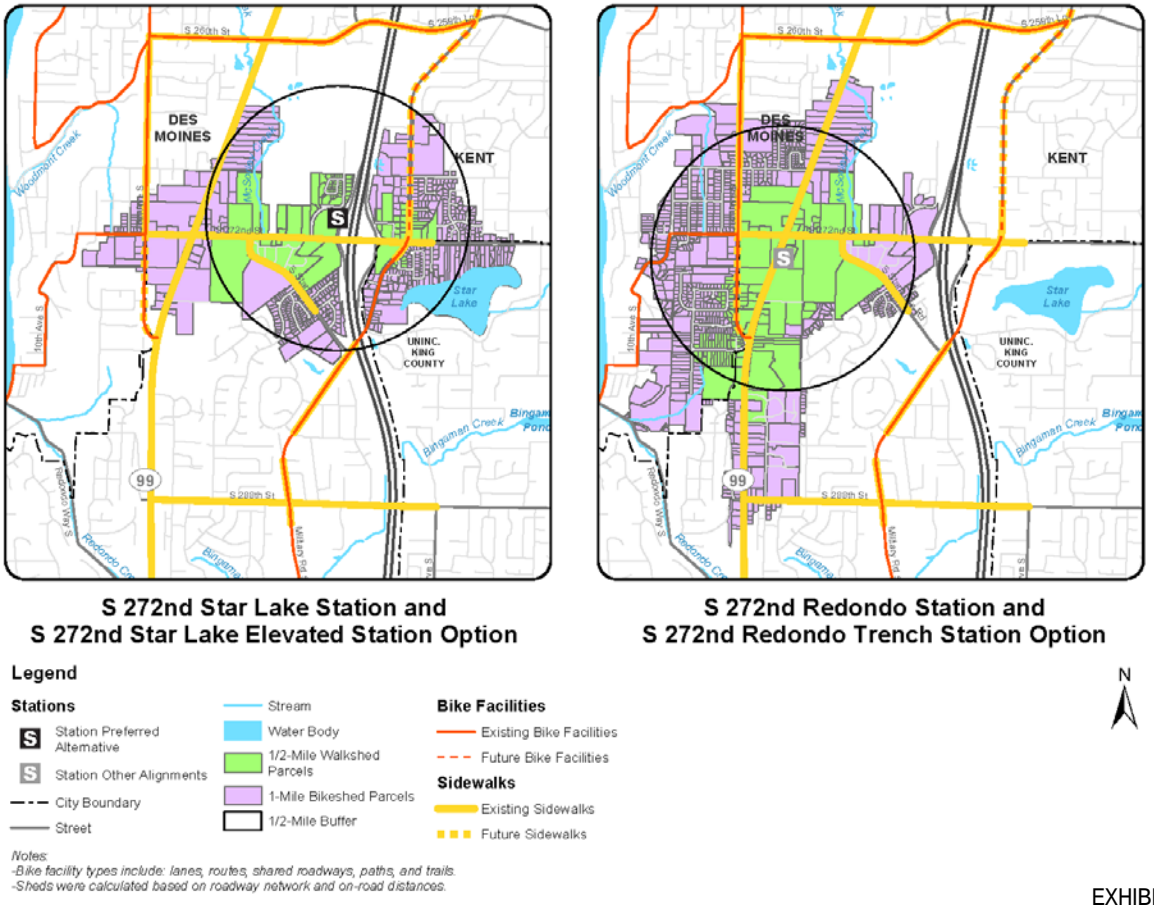


EXHIBIT 4-20
S 272nd Station Area Walksheds and Bikesheds

Pedestrian Trip Generation

The pedestrian activity at the S 272nd Redondo Station would be approximately 1,100 pedestrian trips per hour for the SR 99 and I-5 to SR 99 alternatives. Of the total pedestrian activity, up to 80 persons during the PM peak hour would walk or bike to the station. Most of the remaining activity would be

transit riders who walk to and from a vehicle at the park-and-ride and transfer from the RapidRide A Line.

Pedestrian Level of Service

The intersection corner quality of service and crosswalk circulation score is expected to be at LOS A with the S 272nd Redondo Station under the No Build, SR 99, and I-5 to SR 99 alternatives. For all the build alternatives and station options, the pedestrian LOS would be between LOS B and LOS D. With the SR 99 or I-5 to SR 99 alternatives, a few approaches at these two intersections are expected to be at LOS D due to a noticeable increase in pedestrian volumes and an increase in conflicting vehicle volumes (northbound right turns and westbound left turns).

4.6.4.4 Federal Way Transit Center and City Center Stations

Non-motorized Facilities

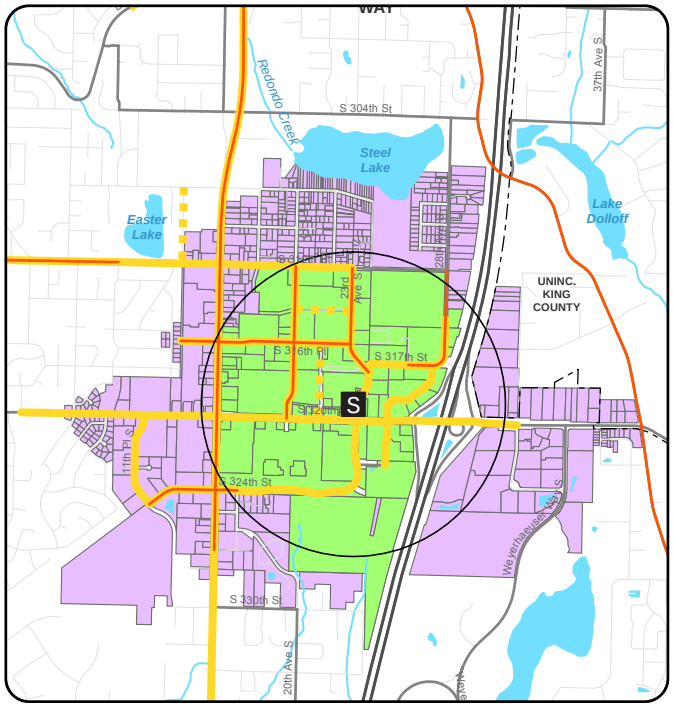
The majority of commercial development surrounding the existing Federal Way Transit Center Station area is accessible by sidewalks, but the area lacks bicycle facilities. The walkshed and bikeshed around the station area is generally dominated by commercial properties, with access to residential neighborhoods north of S 312th Street on the outer edge of the walkshed. The location of the station area between SR 99 and I-5 generally limits the walkshed and bikeshed between those two regional facilities. High traffic volumes and long pedestrian crossings along S 320th Street present a potential barrier to land uses south of S 320th Street, including the Federal Way Commons shopping center. Exhibit 4-21 shows the walkshed and bikeshed for the Federal Way Transit Center area.

The Federal Way S 320th Park-and-Ride Station Option walkshed and bikeshed would include a larger share of the land uses south of S 320th, including the Federal Way Commons shopping mall. Similar to the stations north of S 320th Street, pedestrian and bicycle activity across S 320th Street could be hindered and would limit the accessibility of the land uses north of S 320th Street from the station.

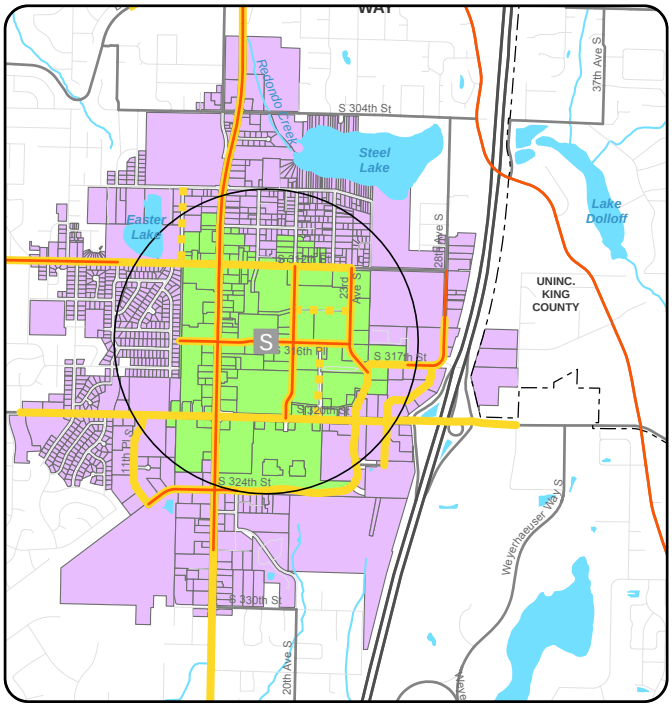
The Federal Way SR 99 Station Option walkshed and bikeshed are similar to the walkshed and bikeshed for the Federal Way Transit Center Station, but the station option's proximity to SR 99 would increase the amount of accessible land uses west of SR 99. Despite this, high travel speeds and traffic volumes on SR 99 combined with long crossing distances would make it uncomfortable for pedestrians or bicyclists to access this station option from west of SR 99. The walkshed and bikeshed with the Federal Way I-5 Station Option are slightly more limited than the Federal Way Transit Center Station. With the station area located farther east of the other Federal Way City Center stations, the walkshed would not reach SR 99. Additionally, I-5 is a barrier that limits walk or bicycle trips to and from the east, which limits the accessibility of this station option for land uses east of I-5.

Pedestrian Trip Generation

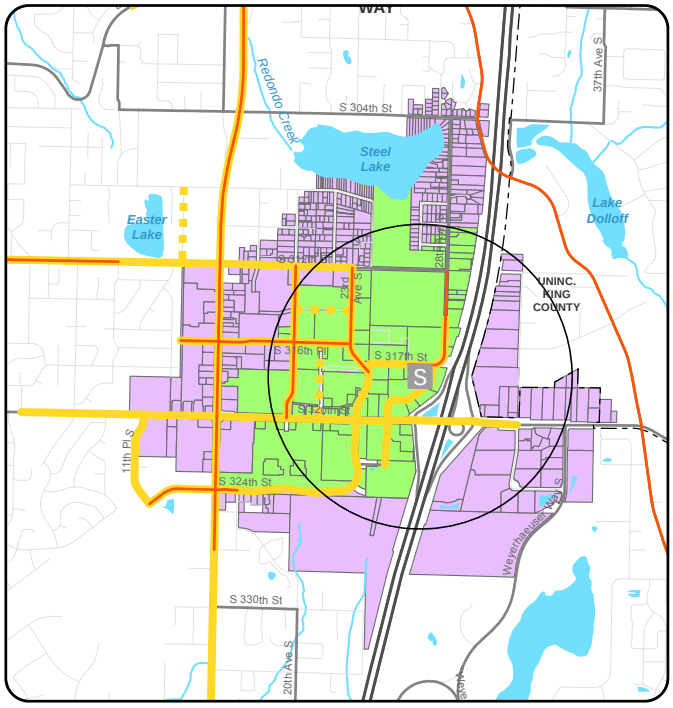
The build alternatives would generate approximately 1,100 to 1,800 pedestrians per hour for all Federal Way station options. The S 320th Street Park-and-Ride Station Option would be the highest pedestrian trip generator, with approximately 1,800 pedestrians per hour, because the walkshed and bikeshed would include a larger share of the land uses south of S 320th Street, including the Federal Way Commons shopping mall. The Federal Way I-5 Station Option would be the lowest generator, with approximately 1,100 pedestrians per hour. For the Preferred Alternative and Federal Way City Center



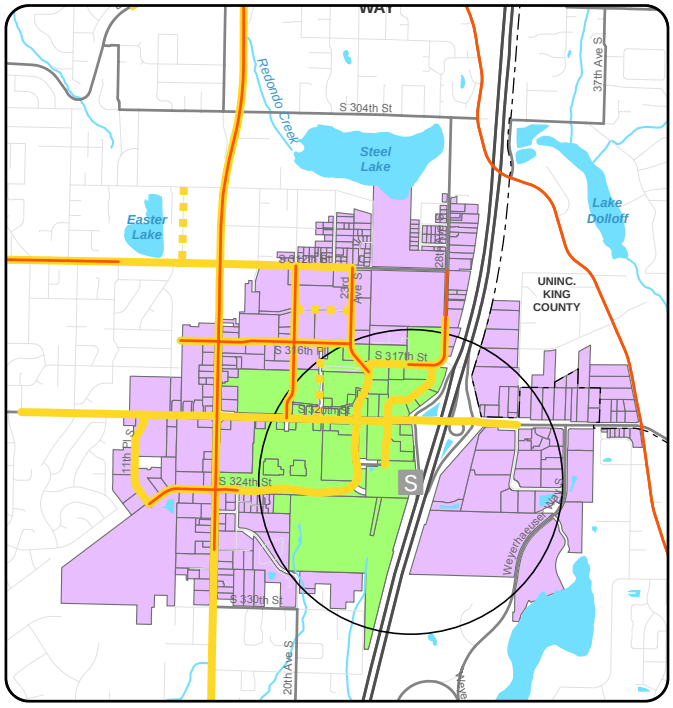
Federal Way Transit Center Station



SR 99 Station Option



I-5 Station Option



S 320th Park-and-Ride Station Option

Legend

Stations

- S — Station Preferred Alternative
- S — Station Other Alignments
- City Boundary
- Street
- Stream
- Water Body
- 1/2-Mile Walkshed Parcels
- 1-Mile Bikeshed Parcels
- 1/2-Mile Buffer

Bike Facilities

- Existing Bike Facilities
- Future Bike Facilities

Sidewalks

- Existing Sidewalks
- Future Sidewalks

Notes:
-Bike facility types include: lanes, routes, shared roadways, paths, and trails.
-Sheds were calculated based on roadway network and on-road distances.

N

EXHIBIT 4-21
Federal Way Transit Center Station Area
Walksheds and Bikesheds
Federal Way Link Extension

station options, the majority of the activity would be within the station area because pedestrians would transfer between light rail and bus and walk to and from their vehicles at the park-and-ride. Walking and bicycle trips with the Federal Way station areas would be lower compared with all other FWLE station areas due to a lack of adjacent residential land uses. Land uses that promote transit-oriented development could encourage more walk and bicycle-based trips.

Pedestrian Level of Service

The intersection corner quality of service and crosswalk circulation score is expected to be at LOS A or LOS B, regardless of the Federal Way station location under the No Build and build alternatives. With Federal Way station locations north of S 320th Street, the overall pedestrian LOS score would be the same as the No Build Alternative (LOS A to LOS D) for crosswalks at signalized intersections. With the Federal Way S 320th Park-and-Ride Station Option, the pedestrian LOS score would change from LOS B to LOS C at the S 322nd Street/23rd Avenue S intersection for all crosswalks with the exception of the west crosswalk leg.

4.6.4.5 S 216th Station and S 260th Station Options

Non-motorized Facilities

The potential additional S 216th and S 260th West or East station options would have connections to non-motorized facilities that provide access in all directions. I-5 could be a barrier for potential bicycle trips east of I-5 and would limit the walkshed mostly to the neighborhoods between SR 99 and I-5. High travel speeds and traffic volumes and the lack of bicycle facilities on SR 99 could limit the attractiveness for north-south bicycle trips along SR 99. At the S 216th Street station, the Des Moines Gateway Project would provide sidewalk and bicycle lanes along 24th Avenue S and S 216th Street, which could improve connections between the station and adjacent neighborhoods. Exhibit 4-22 shows the walksheds and bikesheds for these potential additional station areas. Pedestrian crossings along SR 99 would be provided at the signalized intersections of S 216th Street and S 220th Street for the S 216th Street West or East Station and at S 260th Street for the S 260th Street West or East Station.

Pedestrian Trip Generation

The pedestrian activity at the potential additional S 216th and S 260th West or East station options would be the lowest (approximately 250 to 400 trips per hour) of all station options because no park-and-ride facilities would be provided and there are fewer bus connections to these two station areas than to other locations. Therefore, the majority of the pedestrian activity would be people walking and bicycling to and from the station. Transit transfer trips would be limited because only one or two transit routes are expected to serve each station. Automobile-based (passenger drop-off/pick-up trips) activity is expected to be modest.

Pedestrian Level of Service

The intersection corner quality of service and crosswalk circulation score is expected to be at LOS A or LOS B, regardless of the FWLE station location under the No Build Alternative, S 216th West or East station options, and S 260th West or East station options. The overall pedestrian LOS score with these potential additional stations would be the same as with the No Build Alternative (LOS A to LOS C) for

crosswalks at signalized intersections, except for the north leg of the S 216th Street/SR 99 intersection for the S 216th West or East stations, where the overall crosswalk score would be LOS D.

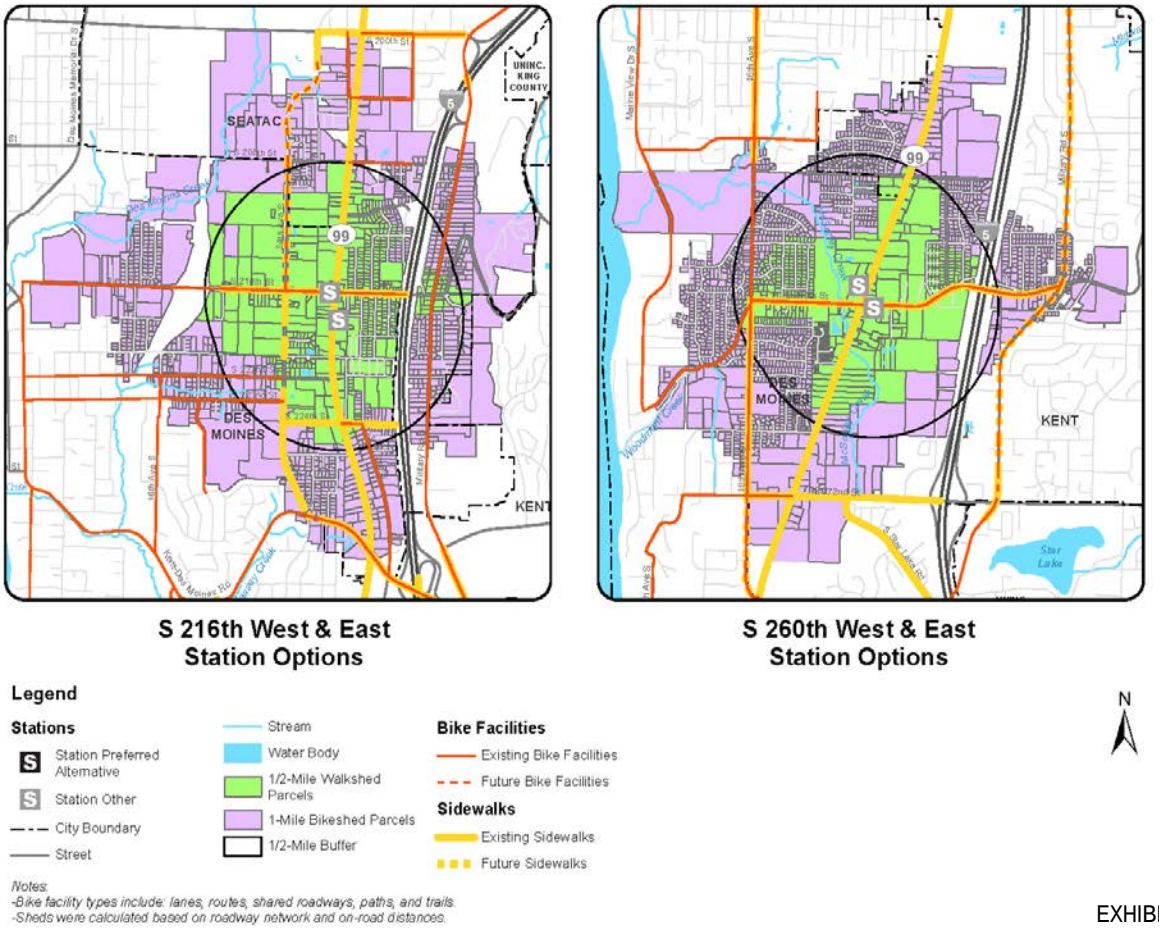


EXHIBIT 4-22
S 216th and S 260th West and East Station Areas Walkshed and Bikesheds

4.6.4.6 Kent/Des Moines Interim Terminus Condition

Non-motorized Facilities

Non-motorized facilities under the Kent/Des Moines interim terminus conditions would be the same as with the full-length build alternatives and station options.

Pedestrian Trip Generation

The pedestrian trip generation with the Kent/Des Moines interim terminus condition is expected to range from about 1,350 persons per hour to 1,900 persons per hour with the build alternatives. Of the total pedestrian activity, approximately 200 persons would walk or bike to the station in the PM peak hour. Compared with the full-length alternatives, pedestrians walking between the station and park-and-ride would likely double because the park-and-ride capacity would be higher. Where the park-and-ride is located across a street (such as SR 99, 30th Avenue S, or S 236th Street) from the station, pedestrians would walk longer distances and/or be required to cross a street at an intersection.

Transit transfer trips would also more than double in the interim terminus condition at this station. Similar to the full-length build alternatives and station options, stations located adjacent to SR 99 would have the highest amount of pedestrian trips transferring from bus to rail because of the proximity of the station to the RapidRide A Line. With a station located farther east of SR 99 (e.g., Kent/Des Moines I-5 Station Option), the desire to make a bus-to-rail transfer would diminish due to the longer walking distance between transit modes.

Pedestrian Level of Service

For the interim terminus condition, the intersection corner quality of service and crosswalk circulation at the Kent/Des Moines Station would generally be between LOS A and LOS C. With the SR 99 Alternative Kent/Des Moines SR 99 East and SR 99 Median station options, the east and south crosswalk legs at the S 236th Street/SR 99 intersection would be LOS D due to more pedestrian trips transferring from the bus and the park-and-ride compared with the full-length condition. At this intersection under the Kent/Des Moines interim terminus condition, crosswalk and sidewalks widths would be designed to exceed standards to accommodate the increased number of pedestrians. To accommodate the increased number of pedestrians, Sound Transit recommends that crosswalks be at least 12 feet wide at the S 236th Street/SR 99 intersection for all Kent/Des Moines station options.

4.6.4.7 S 272nd Interim Terminus Condition

Non-motorized Facilities

Non-motorized facilities with the S 272nd Star Lake and S 272nd Redondo station areas interim terminus condition would be same as with the full-length build alternatives and station options.

Pedestrian Trip Generation

Both the S 272nd Star Lake and S 272nd Redondo stations would generate about 1,400 pedestrians per hour during the PM peak hour. Of the total pedestrian activity, less than 100 people during the PM peak hour would walk or bike to the S 272nd Star Lake or S 272nd Redondo stations. Compared with the full-length build alternatives, the increased pedestrian activity would be attributed to a noticeable increase in transit transfer trips and a modest increase in automobile (passenger drop-off/pick up) trips. All automobile-based pedestrian trips would remain internal to the station area for all S 272nd Street area stations, while a portion of the transit transfer activity would access the station from bus stops located at the nearby I-5 interchange for the S 272nd Star Lake Station.

Pedestrian Level of Service

Pedestrian LOS for signalized intersections around either the S 272nd Star Lake or the S 272nd Redondo stations in the interim terminus condition would be similar to the full-length build alternatives, even though pedestrian trip generation is expected to be higher under the interim terminus condition.

4.7 Freight Mobility and Access

Freight mobility and access are expected to improve under the No Build Alternative compared with existing conditions, as the SR 509 and SR 167 extension projects will create new regional highway connections to I-5. With the existing highway system, these new highway facilities will improve freight

mobility between major freight activity centers (such as Port of Seattle and Tacoma) when completed and therefore would likely be major freight routes. These two highway extension projects are planned to be completed by 2031. Within the study area, the SR 509 Extension is expected to remove some of the truck traffic that currently uses SR 99 because freight will be able to travel on this new highway extension to reach their destinations. In addition, the 28th/24th Avenue S Extension Project, planned for completion in 2017 in the cities of SeaTac and Des Moines, will be a T-2 freight route (see Table 3-17 in Chapter 3, Affected Environment). This facility will enhance north-south freight mobility in the study area and serve Sea-Tac Airport and industrial and commercial land uses along the FWLE corridor. Even with these planned background projects, roadway congestion will continue to occur as traffic volumes increase in the transportation study area.

With the FWLE build alternatives on either I-5 or SR 99, truck traffic would still be expected to use the currently (and expected) designated freight facilities. The distribution of trucks on SR 99, SR 509, and I-5 would be similar to the No Build conditions. Because the build alternatives would be either grade-separated or travel in an exclusive light rail guideway outside the roadway travel lanes, freight mobility and access would be similar to automobile mobility and access. No at-grade crossings of freight rail tracks would occur with the FWLE. Isolated freight movements could experience a benefit with the FWLE through project improvements and/or mitigation at some locations (see Chapter 7, Potential Mitigation Measures). Any modifications to the roadway system are not anticipated to affect truck circulation or change truck route designations on the regional and local street system.

5.0 Construction

This chapter provides an overview of potential construction impacts and mitigation measures for regional transportation facilities and travel, transit, arterials and local streets, parking, non-motorized facilities, and freight mobility and access that would be caused by construction of the FWLE build alternatives. Construction activities for the FWLE would include civil construction, systems installation, testing, and startup activities. Civil construction includes site preparation and utility relocations as well as the construction of the physical infrastructure. Activities would be most intense in the initial part of construction, with later years involving station finishing and systems installations.

For all build alternatives, construction would likely be staged and occur in approximately 1/2-mile-long work zones. Construction activities expected to have roadway impacts are utility relocation, street reconstruction, foundation and column construction, guideway placement, truck hauling, demolition, and construction staging. The impacts from truck hauling were evaluated based on the number of truck trips and potential haul routes, as discussed in the following subsection.

SR 509 Extension Project

This project proposed by WSDOT would include extending the SR 509 freeway from South 188th Street/12th Place South to a connection with I-5 near South 210th Street; improving I-5 between South 210th and South 320th streets; improving southern access to and from Sea-Tac Airport by a new roadway; and improving related local traffic circulation patterns.

The SR 509 Corridor Completion Project (SR 509 Extension) might substantially change some of the impacts with some FWLE alternatives. The SR 509 Extension received a Record of Decision in 2003, and it is funded through the "Connecting Washington" transportation bill passed in 2015. The 2003 project design was included in the No Build Alternative for the FWLE analysis. However, WSDOT is revising the project as part of the Puget Sound Gateway Program. It is likely that the SR 509 Extension construction period will overlap during a portion of the FWLE construction period (see Exhibit 5-1). While some construction activities for both the FWLE and WSDOT's SR 509 Extension may occur simultaneously, it is assumed the peak FWLE construction would occur prior to SR 509 construction. Due to the uncertainty of the timing/sequencing of major construction activities for the SR 509 Extension, this chapter only analyzes FWLE project construction impacts. Potential combined impacts of both projects being constructed at the same time are discussed in Chapter 8, Cumulative Impacts.

Construction of the build alternatives would result in temporary impacts on the roadways, transit service, sidewalks, bicycle routes and parking within most construction zones. The overall construction duration would be about 3.5 to 5 years if conducted all at once or for each area between stations if constructed in phases. Most impacts would occur during the civil construction period, which would range from 1 to 4 years. To reduce the overall project construction period, the contractor could use multiple work crews/work zones along the FWLE corridor at any given time.

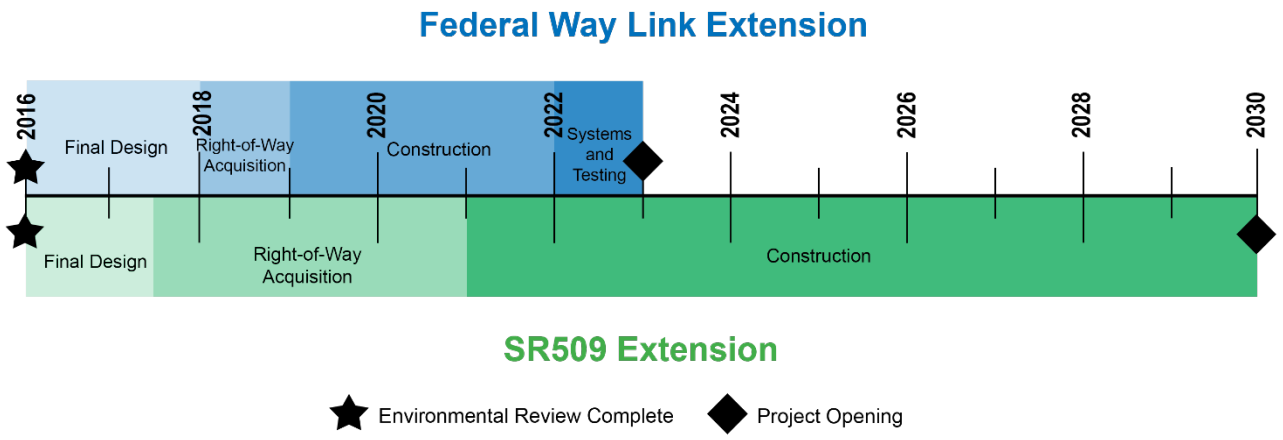


EXHIBIT 5-1
FWLE and SR 509 Construction Schedule

Following is the general schedule durations for the construction activities discussed above:

- The utility relocation phase would last approximately 3 to 6 months for all relocations in a 1/2-mile-long segment.
- Street reconstruction would last approximately 6 months for a 1/2-mile-long segment of roadway.
- Foundation and column construction would last approximately 6 to 8 months for each 1/2-mile-long segment. Construction of longer guideway spans would take longer, up to 1.5 years.
- The last major construction activity with roadway impacts—guideway placement—would last approximately 18 to 24 months for a 1/2-mile-long segment.

Most of the construction activities listed above may include temporary lane or full roadway closures and require traffic control plans to maintain circulation and property access.

Key observations and findings related to the construction of the build alternatives include the following:

- Wherever an elevated guideway alignment is constructed over a street, nighttime and/or weekend full closures of lanes would be required for portions of the construction period.
- Truck access to the guideway construction would be along city arterials leading to streets adjacent to the guideway. Access is not expected directly from the I-5 mainline, except for with the Preferred Alternative when the S 216th Street bridge structure would need to be widened; for the Puget Sound Energy transmission relocation across I-5; for removal of trees adjacent to I-5; for sporadic, occasional delivery of construction materials; and for the Landfill Median Alignment Option when the light rail guideway is constructed within the I-5 median.
- For the S 216th Street temporary bridge widening, access and work area would require closure of the shoulder and possibly one I-5 southbound mainline lane. Tree removal along the I-5 corridor would likely require shoulder closure and possibly one outside lane closure during the day

periodically over several months to safely remove trees. Trucks may use I-5 for trips to and from other locations in the region. For these trips, access would be from existing on- and off-ramps.

- During construction, where the light rail alignment is parallel to the I-5 mainline (from approximately S 211th Street to S 317th Street), a temporary construction barrier would be placed near the southbound I-5 edge of pavement where barriers are not already present. This addition of a roadside fixed object could result in an increase of up to three crashes per year.
- Construction of the light rail station at either the S 272nd Redondo Trench Station Option or S 272nd Star Lake Station park-and-rides would temporarily reduce or eliminate park-and-ride spaces available for use by transit patrons.
- Trenching under S 216th Street, S 240th Street, S 272nd Street, S 317th Street, and SR 99 would be completed in stages to maintain traffic through the construction area. Construction could result in the temporary narrowing or closure of lanes, periodic nighttime or weekend closures, removal of dedicated turn lanes, and roadway realignments.

5.1 Maintenance of Traffic, Truck Volumes, and Haul Routes

Appendix G, Construction Preliminary Impacts, Staging Areas, and Haul Route Assumptions, shows the proposed construction staging areas and truck haul routes for each FWLE alternative and option. In general, the potential construction staging areas and truck haul routes would include and be adjacent to where alignment construction would occur and in the vicinity of the station areas. For the elevated guideway construction, peak truck trips are estimated at 10 to 15 trucks per hour for concrete delivery, or between 80 and 240 trips per day, assuming 8 to 16 hours per day of active construction. The duration of this truck activity would vary between a few nights to several months at a given location, depending on the type of construction. A similar level of truck activity is expected for earthwork activities, but this would be focused on trucks hauling material during excavation and backfill operations and would occur at a different time.

Construction impacts along SR 99 or I-5 for all FWLE alternatives and station options are discussed in Section 5.2, Regional Facilities and Travel. Construction impacts on other roads in the study area for the Preferred Alternative are discussed in Section 5.4, Arterials and Local Streets Operations.

Generally, construction truck traffic would use I-5 (via on- and off-ramps), SR 99, Military Road, and/or, if required, other arterials to access the construction areas. There would be no direct access via the I-5 mainline except for the following conditions:

- Construction of the S 216th Street temporary bridge abutment for the Preferred Alternative
- Transmission and distribution electrical line relocations across I-5
- I-5 Landfill Median Alignment Option construction between S 240th Street and S 259th Place
- Tree removal along I-5

- Temporary construction vehicle access (such as material deliveries) that would occur sporadically during construction

Access directly from the I-5 mainline would be coordinated and approved by WSDOT. Tree removal along I-5 would likely require closure of the southbound shoulder and possibly one lane periodically over several months for safety purposes. This activity is only expected to occur during the day. It is expected that trucks would use I-5 for a portion of their trip between the construction area and other locations in the region.

A Maintenance of Traffic Plan that addresses all modes would be prepared during subsequent FWLE design and construction phases for agency approval. The Maintenance of Traffic Plan would include detailed design drawings that establish all physical and operating characteristics for staging, access, lane or shoulder closures and transitions, hauling, traffic management (including general purpose traffic, transit, bicycle, and pedestrian traffic), detours, lane modifications, and other construction zones or activities. The plan would incorporate guidance in the Federal Highway Administration's (FHWA) *Manual on Uniform Traffic Control Devices* and WSDOT's Transportation Management Plan strategies in Chapter 1010 of the *Design Manual* (WSDOT, 2016) to be applied during construction periods.

5.2 Regional Facilities and Travel

5.2.1 Impacts Common to All Alternatives

SR 99 and I-5 are the two key regional facilities that serve the study area. All build alternatives would have some impact on travel along SR 99 and could affect short portions of regional travel through the study area. Approval would be needed from FHWA, WSDOT and/or local jurisdictions for traffic control plans on SR 99 and I-5 for all alternatives. Impacts specific to each alternative are described below.

5.2.2 Impacts by Alternative

5.2.2.1 Preferred Alternative

Road and Lane Closures

I-5 Lane Closures

The Preferred Alternative would generally be constructed west of the I-5 mainline, would not go over or under the I-5 travel lanes and would not impact I-5 mainline operations, except for:

- The S 216th Street bridge undercrossing, where access to the FWLE construction site would be required from southbound I-5 and would involve use of the outside shoulder and possibly one outside general purpose lane to construct the bridge abutment. Some increase in congestion would be noticeable along the I-5 mainline during daytime lane closure but would not occur with a nighttime lane closure.
- The transmission and distribution electrical lines crossing I-5 that require relocations and short-term, full, or directional closure of the mainline may be required during nights. This work would need to be further coordinated with Puget Sound Energy (PSE) and WSDOT to determine specific utility relocation and traffic control methods.

- Tree removals along the I-5 corridor would likely require shoulder closure and possibly one outside lane closure during the day periodically over several months to safely conduct this work.

I-5 Ramps

Short-term ramp closures would be needed as follows:

- Kent-Des Moines Road, west of I-5 southbound ramps, would need to be closed for the elevated guideway construction during nights and weekends, which would restrict southbound right turns at the southbound ramp terminal intersection and close the I-5 northbound off-ramp to westbound Kent-Des Moines Road.
- The I-5 high-occupancy vehicle (HOV)/bus access ramps at S 317th Street would need to be closed temporarily during nights and weekends for preparation of the guideway cut-and-cover construction and conversion to a stop-controlled intersection at S 317th Street and 28th Avenue S. The temporary conversion of this intersection from a roundabout to a stop-controlled intersection during construction is not expected to result in impacts on the I-5 mainline because this intersection typically has low traffic volumes.
- The I-5 southbound on- and off-ramps at S 320th Street would require night and/or weekend closures for the construction of stormwater pipes under the ramps.

SR 99 Lane Closures

Construction of the Preferred Alternative guideway over SR 99 near S 208th Street would require periodic nighttime and weekend closures of SR 99 and lane reductions during other hours periodically for up to 3 months. The construction of a center roadway column in the median of SR 99 would require the closure of one northbound and one southbound lane adjacent to the median. The existing southbound SR 99 HOV lane in this construction area would be converted to allow access for general-purpose vehicle trips during construction. SR 99 is expected to operate under capacity with these closures. Full night closures and weekend closures of all northbound lanes and southbound lanes could be required when guideway construction is occurring over these lanes.

Detours

Guideway construction near I-5 interchanges (Kent-Des Moines Road and S 272nd Street) would require periodic nighttime and weekend closures of Kent-Des Moines Road and S 272nd Street, and some traffic would be detoured to use other arterials and/or interchanges, which could increase or decrease volumes on the I-5 mainline for certain areas. The additional traffic on northbound I-5 could result in the facility being over-capacity during the weekend closures. Additionally, at the S 272nd Street southbound off-ramp, the channelization at the ramp terminal could be modified from a left-turn lane, left-through shared lane and right-turn lane, to a left-through lane and a right-turn lane for up to 4 months while construction activity is ongoing west of this ramp. Additional discussion of detour routes and roadway capacities is described in Section 5.4.2.1.

Construction Access

During peak construction activities such as concrete deliveries and earthwork hauling, up to 15 trucks per hour could access the construction area via arterials, local streets, and I-5 interchanges. The duration of this truck activity would vary between a few days to several months, depending on the location and type of construction activity. This increase in trucks could cause a small increase in delay during peak periods at the ramp terminal intersections but would not be expected to impact I-5 mainline operations.

Station and Alignment Options

Kent/Des Moines Station Options

The Kent/Des Moines At-Grade and I-5 station options would have the same regional facilities impacts as the Preferred Kent/Des Moines Station.

Landfill Median Alignment Option

Construction over the southbound lanes of I-5 would have impacts on I-5 traffic operations during installation of the girders for the guideway bridges. Cast-in-place construction methods, if used, could require a shoring tower within the southbound I-5 mainline to support the straddle bents while they are being constructed. Sound Transit would coordinate with WSDOT to either close one or two lanes for about 2 months or restripe the southbound I-5 mainline travel lanes around the construction area for the Landfill Median Alignment Option. With a narrower shoulder and lower speeds and construction activity, capacity on I-5 southbound could be slightly reduced even if the southbound I-5 travel lanes could be fully maintained and temporarily restriped around the construction area.

Using precast cap beams across southbound I-5 would avoid the need for shoring towers but would require the full closure of southbound I-5 for multiple overnight and/or weekends for each span. If I-5 southbound is closed, the likely detour route would use the Kent/Des Moines interchange to SR 99 and/or Military Road, with traffic rerouted back to I-5 at S 272nd Street. During off-peak periods and weekends, traffic volumes along these routes are generally lower than during peak commute periods, and detour routes would have additional capacity to accommodate some traffic from I-5, but it is expected that congestion on the detour routes would increase during this period. Either of these revisions to I-5 southbound mainline would require advanced signage and restriping to ensure safe operations through this construction area.

Construction vehicle access to the median construction area would be provided directly from the northbound and/or southbound I-5 mainline. Construction access points, closures, and changes in I-5 operations would require approval from WSDOT. Vertical clearance would be maintained on I-5.

S 272nd Star Lake Elevated Station Option

The S 272nd Star Lake Elevated Station Option would avoid I-5 ramp lane closures associated with the Preferred S 272nd Star Lake Station, thus reducing impacts at this location. Closure of S 272nd Street west of the south-bound off and on-ramps would still be needed while constructing the guideway across S 272nd Street. Westbound turns from the I-5 off-ramp would be restricted during this closure.

S 317th Elevated Alignment Option

The S 317th Elevated Alignment Option would avoid reconstruction of the roundabout at S 317th Street and 28th Avenue S, thus reducing impacts at this location. Closure of S 317th Street and 28th Avenue S would be required while constructing over these roadways, similar to other elevated road crossings with the Preferred Alternative. This would require temporary closure of the S 317th Street I-5 direct access ramps.

Federal Way I-5 Station Option

The Federal Way I-5 Station Option would have the same regional facilities impacts as the Preferred Federal Way Transit Center Station.

Federal Way S 320th Park-and-Ride Station Option

The Federal Way S 320th Park-and-Ride Station Option would have similar impacts on regional facilities as the Preferred Federal Way Transit Center Station, except the S 320th Street southbound ramps would require night and weekend closures for guideway construction. The two-lane off-ramp would also need to be reconfigured in two phases during construction and would have a long-term construction impact that would reduce the southbound off-ramp right-turn pocket storage length by approximately 250 feet for a substantial portion of the construction period. The off-ramp would be restored to existing conditions after construction is complete. The temporary reduction in the right turn pocket length would not likely cause traffic to back up onto the I-5 mainline because the off-ramp has approximately 760 feet of available vehicle storage.

5.2.2.2 SR 99 Alternative

Under the SR 99 Alternative, the major civil construction within the median of SR 99 would likely occur in 1/2-mile-long segments over approximately 1 year, including reconstruction of SR 99 (up to 6 months) and guideway construction (6 to 8 months). Construction of the SR 99 Alternative in the median of SR 99 would require the closure of adjacent travel lanes. On SR 99, during peak hours, one travel lane in each direction of travel would likely be closed directly adjacent to the construction area. It is expected that this lane closure would have temporary impacts on traffic operations along SR 99. Therefore, within the construction area, the existing HOV lanes would be converted to allow access for general vehicles during the construction.

During peak periods, many intersections along SR 99 operate at level of service (LOS) D or worse; therefore, a reduction in capacity (especially in the peak vehicle direction) would increase congestion and travel time through the construction area. This impact would be less in the non-peak direction because volumes are lower. Converting the HOV lane to allow all vehicles access would provide some congestion relief for the 1/2-mile-long segment being constructed. In general, during off-peak periods and overnight, up to two lanes in each direction would be closed for construction activities because traffic volumes along SR 99 would be lower—especially overnight.

Where the guideway transitions to and from the SR 99 median, a direction of SR 99 could be closed or the travel lanes could be realigned when installing box girders. This would be a short-term closure that would likely occur during nights or over a weekend. When the girders are installed, at least two lanes of traffic would be maintained in each direction during peak periods for the remaining long-term civil

construction period. During construction, vertical clearance would be maintained on SR 99. To reduce the overall project construction periods, the contractor may be required to use multiple work crews/work zones along the corridor at any given time. Any changes in SR 99 operations would require approval from WSDOT.

As the guideway transitions from the SR 99 median into the Federal Way Transit Center from approximately S 308th Street to S 316th Street, the construction period would increase and may require short-term closures of SR 99 because the guideway width would be wider through this section. Detour routes may include 14th Avenue S and 18th Avenue S.

At signalized intersections within the construction zone, left-turning vehicles from SR 99 would be restricted and vehicles would be rerouted to a nearby intersection. These vehicles could either turn in advance of the construction zone or make a U-turn after the construction zone. Midblock U-turns would also be closed within the construction area, and vehicles would be rerouted to another intersection. Depending on the intersection and detour routes, congestion could increase at some intersections.

With SR 99 lane closures, some traffic may divert to parallel roads, including I-5, Military Road, 24th Avenue S, 30th Avenue S, and 16th Avenue S, to avoid delays on SR 99. If a portion of SR 99 is temporarily closed for nights and/or weekends, the traffic detour routes for SR 99 north of Kent-Des Moines Road would likely include 24th Avenue S west of SR 99 and 30th Avenue S and possibly Military Road east of SR 99. South of Kent Des-Moines Road, 16th Avenue S could serve as a detour route west of SR 99, but there would be limited detour options east of SR 99 and the detour would likely require the use of Military Road S. During off-peak periods and weekends, traffic volumes are generally lower than during peak commute periods, and detour routes would have more capacity to handle increased traffic from SR 99. Traffic impacts on arterials and local streets are discussed further in Section 5.4.2.

Similar to the Preferred Alternative, up to 15 trucks per hour would access the construction area along SR 99. For station construction and staging areas, 4 to 15 trucks per hour are estimated from each work area. The duration of this truck activity would vary between a few nights to several months, depending on the location and type of construction. These trucks include construction material deliveries (steel, concrete, and other miscellaneous materials), haul excavation and backfill vehicles, and contractor vehicles. For elevated guideway construction, peak truck trips are estimated at 4 to 8 trucks per hour for concrete delivery. The increase in trucks could cause a small delay increase at intersections along the haul route.

Station Options

S 216th Station Options

Impacts on regional facilities with the potential additional S 216th West or East station option would be the same as with the SR 99 Alternative.

Kent/Des Moines HC Campus Station Option

Impacts on regional facilities with the Kent/Des Moines HC Campus Station Option would be the same as with the SR 99 Alternative.

Kent/Des Moines HC from S 216th W Station Option

From S 208th Street to approximately 1/4 mile north of Kent-Des Moines Road, the Kent/Des Moines HC from S 216th W Station Option would not have any impacts on SR 99 because the guideway would be located west of SR 99. This station option would have the same impacts as the SR 99 Alternative south of S 242nd Street.

Kent/Des Moines SR 99 Median Station Option

The Kent/Des Moines SR 99 Median Station option would be constructed in multiple phases and would shift southbound traffic to the east or west of the median, depending on the construction phase. Northbound traffic would be rerouted to 30th Avenue S at S 240th Street and rerouted back on to SR 99 at S 236th Street. Congestion would occur along S 240th Street, 30th Avenue S, and S 236th Street for most weekdays and weekends. Additional rerouting is discussed in Section 5.4.2.2. This station option would have the same impacts as the SR 99 Alternative north of Kent-Des Moines Road and south of S 242nd Street.

Kent/Des Moines SR 99 East Station Option

Impacts on regional facilities with the Kent/Des Moines SR 99 East Station Option would be the same as with the SR 99 Alternative.

S 260th Station Options

Impacts on regional facilities from the potential additional S 260th West or East station option would be the same as with the SR 99 Alternative.

S 272nd Redondo Trench Station Option

Construction activities for the trench under SR 99 south of S 279th Street for the S 272nd Redondo Trench Station Option would likely be completed in stages in order to maintain traffic on SR 99 in all directions during trench construction. Construction would likely require the narrowing of lanes and the median to shift traffic through the construction zone in order to maintain two lanes in each direction during peak periods. Congestion may occur through the work zone during weekday peak periods and midday Saturdays due to higher traffic volumes. Plates over the guideway construction area may be required on SR 99. The trenching under SR 99 would likely occur over a period of up to 1 year.

From 16th Avenue S to S 308th Street, this station option would not impact SR 99 because the guideway is located west of SR 99.

Federal Way SR 99 Station Option

Impacts on regional facilities with the Federal Way SR 99 Station Option would be the same as for the SR 99 Alternative, except south of S 312th Street. Impacts on this segment of SR 99 would be minimized because the guideway would transition out of the SR 99 median at this location and would not require any substantial closures of SR 99 during construction besides occasional nights or weekends.

5.2.2.3 SR 99 to I-5 Alternative

North of Kent-Des Moines Road, where the SR 99 to I-5 Alternative would be located on SR 99, impacts would be similar to those described for the SR 99 Alternative. South of S 240th Street, where the alternative would be within the I-5 right-of-way, impacts would be similar to the Preferred Alternative, including for the Landfill Median Alignment Option. There would be no additional impacts on regional facilities between Kent-Des Moines Road and S 240th Street where the alternative transitions from SR 99 to I-5.

5.2.2.4 I-5 to SR 99 Alternative

North of Kent-Des Moines Road, where the I-5 to SR 99 Alternative would be the same as the Preferred Alternative, impacts would be similar to the Preferred Alternative. South of S 240th Street, where the SR 99 to I-5 Alternative is located on SR 99, impacts would be similar to those described for the SR 99 Alternative. There would be no additional impacts on regional facilities between Kent-Des Moines Road and S 240th Street where the alternative transitions from SR 99 to I-5.

5.2.3 Potential Mitigation Measures

During FWLE construction, Sound Transit would work with WSDOT and the local agencies to develop a construction plan. This plan would coordinate construction activities, such as incident management, construction staging, and traffic control, where the light rail construction might affect either I-5 or SR 99. Sound Transit would also coordinate with WSDOT to disseminate construction closure information to the public as needed. Refer to Section 5.4.3 for additional construction mitigation measures.

5.3 Transit Operations

5.3.1 Impacts Common to All Alternatives

All FWLE build alternatives would involve some level of lane closures, bus stop relocations, partial or full temporary closures of park-and-ride facilities, and sidewalk impacts that would have some impact on the transit operations within the FWLE study area during construction. Impacts of each alternative are described in this section.

5.3.2 Impacts by Alternative

5.3.2.1 Preferred Alternative

Nearly all the construction for the Preferred Alternative would have minimal or short-term impacts on transit service because the guideway would be located west of the I-5 southbound mainline, with the exception of the Star Lake Park-and-Ride. Some or all of the parking would be closed at the Star Lake Park-and-Ride lot during construction, and transit service within the facility may need to be relocated. Temporary parking would be provided as needed and where feasible to mitigate the impacts. For example, transit service could be relocated to the existing stops along S 272nd Street and the I-5 ramps adjacent to the park-and-ride, the Redondo Heights Park-and-Ride, and/or the Kent-Des Moines Park-and-Ride during the station construction. The additional travel time for buses could lead to longer transit travel times for riders accessing transit service at this station location.

Construction of the Preferred Alternative guideway over SR 99 near S 208th Street would require periodic nighttime and/or weekend closures of SR 99. Nighttime and/or weekend closures of SR 99 would require the RapidRide A Line to detour to 24th Avenue S or other roads. This may cause the temporary relocation of transit stops at the SR 99/S 208th Street intersection and could result in longer travel times. Furthermore, the conversion of the existing southbound SR 99 HOV lane to general purpose traffic in the construction area could lead to longer transit travel times.

Trenching under the S 317th Street roundabout would be constructed in stages. During the initial preparation of construction, the roundabout would be removed and temporary roads would be constructed. During this time, nighttime and/or weekend closures are anticipated. Buses would be detoured to the S 320th Street interchange, which could result in increased bus travel times. In addition, after the temporary roadways are constructed, the S 317th Street and 28th Avenue S intersection would continue to operate but would be temporarily converted into a stop-controlled intersection, which could also result in an increase in bus travel times.

Other temporary night and weekend road closures in the study area for guideway construction could result in the reroute of some transit routes, the temporary closure or relocation of affected transit stops, and longer transit travel times.

Transit operations would be maintained at the Federal Way Transit Center at all times during station construction. The existing transit facility along S 317th Street would continue to operate during the construction of the Federal Way Transit Center Station platform, and access via 23rd Avenue S and S 317th Street would be maintained. When the station construction is reasonably complete, the new transit center and street system would be constructed. After construction of the new transit center and street system, transit operations would relocate to the new transit center. Additional construction activities, including constructing the new 400-stall parking garage and the proposed roundabout at 23rd Avenue S and S 317th Street, would continue for up to a year and could affect transit operations at the new transit facility.

Station Options

Kent/Des Moines Station Options

The Kent/Des Moines At-Grade and I-5 station options would have the same impacts as the Preferred Kent/Des Moines Station.

Landfill Median Alignment Option

The closure of the inside shoulder of I-5 between S 240th Street and S 259th Place with the Landfill Median Alignment Option may result in slightly slower speeds in the HOV lane through this 1/2-mile-long segment. Night and weekend closures of I-5 southbound for guideway girder placement across I-5 southbound would also require transit to use a detour route, resulting in longer transit travel times.

S 272nd Star Lake Elevated Station Option

The S 272nd Star Lake Elevated Station Option would have the same impacts on transit as the Preferred S 272nd Star Lake Station.

S 317th Elevated Alignment Option

The S 317th Elevated Alignment Option would avoid reconstruction of the roundabout at S 317th Street and 28th Avenue S, thus reducing impacts at this location. Some road closures would still be needed while constructing the guideway across the roundabout, similar to other elevated road crossings with the Preferred Alternative, which would still affect transit but not to the same extent.

Federal Way I-5 Station Option

The Federal Way I-5 Station Option would require the S 317th Street and 28th Avenue S roundabout to be removed temporarily during construction. A phased long-term closure of both 28th Avenue S and S 317th Street would be required, resulting in a transit reroute to S 312th Street or S 320th Street or other roads and an increase in transit travel times.

Federal Way S 320th Park-and-Ride Station Option

The Federal Way S 320th Park-and-Ride Station Option could potentially construct the guideway under the roundabout at S 317th Street in fewer stages compared to the Preferred Alternative, resulting in fewer impacts on transit through this area.

At the S 320th Street Park-and-Ride, construction of the light rail station would require the temporary closure of the park-and-ride and transit service would be rerouted to other transit centers, such as the Federal Way Transit Center. Bus routes that currently only serve the S 320th Park-and-Ride may have a longer travel time if they are rerouted to the Federal Way Transit Center or another location.

5.3.2.2 SR 99 Alternative

Bus operations and transit riders traveling on SR 99 would be affected in the construction areas by the decrease in road capacity and increase in delay that would result from the reduced number of lanes within the 1/2-mile-long construction area. Bus stops along SR 99 would be maintained where feasible but may need to be temporarily relocated during construction in some instances. The use of the existing HOV lane for all traffic would affect the speed and reliability of buses in these construction areas and would make bus schedules less reliable as congestion and delay increase, in particular in the northbound direction during the morning weekday commute and southbound during the evening weekday commute. Some bus routes may require rerouting when left-turn restrictions are in place at intersections or when side streets are closed.

Service at the Redondo Park-and-Ride lot would be disrupted during construction of the S 272nd Redondo Station; however, bus routes serving this transit center could be relocated to the Star Lake Park-and-Ride during the station construction period. Bus service at the existing Federal Way Transit Center is not expected to be disrupted with construction of the Federal Way Transit Center Station.

Station Options

S 216th Station Options

Impacts on transit with either potential additional S 216th West or East Station Option would be similar to the SR 99 Alternative.

Kent/Des Moines HC Campus Station Option

Impacts on transit with the Kent/Des Moines HC Campus Station Option would be similar to the SR 99 Alternative.

Kent/Des Moines HC from S 216th West Station Option
Impacts on transit with the Kent/Des Moines HC from S 216th West Station Option would be less than with the SR 99 Alternative. No impacts on transit would occur along SR 99 between S 216th Street and Kent-Des Moines Road because the guideway would be located west of SR 99.

Kent/Des Moines SR 99 Median Station Option
The Kent/Des Moines SR 99 Median Station Option would be constructed in multiple phases and would shift southbound traffic to the east or west of the median, depending on the construction phase. Northbound traffic, including transit, would be rerouted to 30th Avenue S at S 240th Street and rerouted back on to SR 99 at S 236th Street. This would result in longer transit travel times and the relocation of transit stops along SR 99 in this area.

Kent/Des Moines SR 99 East Station Option
Impacts on transit with the Kent/Des Moines SR 99 East Station Option would be similar to the SR 99 Alternative.

S 260th Station Options
Impacts on transit with either potential additional S 260th West or East Station Option would be similar to the SR 99 Alternative.

S 272nd Redondo Trench Station Option
The S 272nd Redondo Trench Station Option would have more impacts on transit than would the SR 99 Alternative S 272nd Redondo Station. Because the guideway would be located west of SR 99 between S 279th Street and S 304th Street, no impacts on transit would occur through this segment. However, impacts on transit where the trench alignment crosses under SR 99 near 16th Avenue S would be longer in duration (up to a year) compared with the SR 99 Alternative.

Federal Way SR 99 Station Option
Impacts on transit with the Federal Way SR 99 Station Option would be similar to the SR 99 Alternative.

5.3.2.3 SR 99 to I-5 Alternative

North of Kent-Des Moines Road, where the SR 99 to I-5 Alternative would be located on SR 99, impacts would be similar to those described for the SR 99 Alternative. South of S 240th Street, where the alternative would be within the I-5 right-of-way, impacts would be similar to the Preferred Alternative except this alternative does not include the new roundabout at 23rd Avenue S and S 317th Street because the Federal Way Transit Center Station would use the existing transit center bus circulation area and no change in bus access would be necessary. There would be no additional transit impacts between Kent-Des Moines Road and S 240th Street.

5.3.2.4 I-5 to SR 99 Alternative

North of Kent-Des Moines Road, where the I-5 to SR 99 Alternative would be the same as the Preferred Alternative, impacts would be similar to the Preferred Alternative. South of S 240th Street, where the SR 99 to I-5 Alternative is located on SR 99, impacts would be similar to those described for the SR 99 Alternative. There would be no additional transit impacts between Kent-Des Moines Road and S 240th Street.

5.3.3 Potential Mitigation Measures

During construction within street rights-of-way, buses would either continue service on the street or be rerouted to nearby roadways, where appropriate, to maintain transit service. Bus stops would be maintained in their existing location where possible, but may need to be relocated temporarily in construction areas. Access between the surrounding land uses and the bus stops would be maintained to the extent feasible.

Transit service modifications would be coordinated with Metro, Pierce Transit, and Sound Transit to minimize impacts and disruptions to bus facilities and service during construction. These measures could include posting informative signage before construction at existing transit stops that would be affected by construction activities and developing modified service plans to accommodate park-and-ride closures during construction of stations at those locations.

5.4 Arterials and Local Streets Operations

5.4.1 Impacts Common to All Alternatives

With each of the FWLE alternatives, construction would require local road closures, lane closures, traffic detours, and property access modifications to maintain traffic flow. Streets that intersect the light rail alignment would require full and/or partial closures for short durations to construct the guideway, roadway, or other associated features. If driveway closures are required, temporary alternate access to these properties would be provided. If alternative access is not available, then the specific construction activity would be reviewed to determine whether it could occur during non-business hours. Specific construction activities, including long term roadway closures, would be reviewed in coordination with local jurisdictions, WSDOT, and Sound Transit during the final design and permitting phases of the project and would be agreed upon prior to implementing any long-term road closures. The Maintenance of Traffic Plan and construction truck traffic are discussed in Section 5.1. Appendix G, Construction Preliminary Impacts, Staging Areas, and Haul Route Assumptions, shows the proposed construction staging areas and truck haul routes for each FWLE alternative and option.

5.4.2 Impacts by Alternative

5.4.2.1 Preferred Alternative

Construction of the guideway over (or under) local streets and arterials would occur at S 208th Street, S 216th Street (under), Kent-Des Moines Road, 30th Avenue S (two locations), S 240th Street, S 259th Street, S 272nd Street, Military Road (two locations), S 288th Street, S 317th Street (under), 23rd Avenue S, and S 320th Street. All roads where the FWLE guideway crosses would require a full road closure for part of the construction period except for the crossings at S 208th Street and S 240th Street, where traffic could be shifted around the work areas using a temporary road. In general, road and lane closures would occur during periodic weekend (9:00 p.m. Friday to 5:00 a.m. Monday) and nighttime (9:00 p.m. to 5:00 a.m.) periods.

The potential closure of the Star Lake Park-and-Ride during construction would change traffic circulation patterns around S 272nd Street. Vehicle trips would likely relocate to the Redondo Heights Park-and-Ride, and some intersections near this park-and-ride could have additional congestion.

For the two locations where the guideway is proposed to be under the roadways (S 216th Street and S 272nd Street), construction would be phased/sequenced to maintain traffic. This would be necessary due to the duration required to build the trenched guideway and to maintain traffic during construction. During the initial phases, these roadways would need to be closed and traffic detoured. After temporary roadways are built, traffic can be maintained during most of the trenched construction by shifting traffic from one side of the road to the other, in phases. When the guideway construction is completed, the roadways would be reconstructed back to their current location and configuration.

In addition to these locations, the roundabout at S 317th Street and 28th Avenue S would require removal and reconstruction where the guideway crosses under the intersection. Construction is proposed to occur in two phases and would convert the existing roundabout into a stop-controlled intersection. Both S 317th Street and 28th Avenue S would be temporarily reconfigured. The temporary conversion of this intersection from a roundabout to a stop-controlled intersection would likely increase vehicle delay. Intermittent night and weekend closures of the intersection may be required and would be coordinated with the appropriate jurisdictions. When the guideway construction is completed, the roundabout would be reconstructed in its current location and configuration.

The Federal Way Transit Center Station would be constructed in three phases. During the first phase, the station platform would be constructed and is expected to take approximately 12 to 18 months. Both 23rd Avenue S and S 317th Street would continue to operate without lane or road closures. When the station platform construction is reasonably complete, construction activities would shift to constructing the new transit center and station area street system, which would take an additional 6 to 10 months. After completion of the new transit center and street network, bus operations would relocate to the new bus facility. The final phase, which would take approximately 12 months, would decommission the existing Federal Way Transit Center bus bays and connect S 317th between 23rd Avenue S and 21st Avenue S for vehicle access. The new 400-stall parking garage and the proposed roundabout at 23rd Avenue S and S 317th Street would also be constructed during this last phase and likely require lane closures on both roads.

Conceptual detour routes where guideway construction would result in a temporary road closure are listed in Appendix G. The signed detour routes would use arterials and avoid local and collector streets to discourage impacts on neighborhoods wherever possible. The following roads are proposed as detour routes:

- SR 99
- Military Road S
- 23rd Avenue S
- 28th Avenue S/24th Avenue S
- 51st Avenue S
- 55th Avenue S
- S 324th Street
- I-5 mainline and ramps
- Kent-Des Moines Road
- S 240th Street
- S 272nd Street
- S Star Lake Road

- S 200th Street
- S 216th Street
- S 304th Street
- S 320th Street

A quantitative capacity analysis was conducted for construction of the Preferred Alternative to assess whether affected roadways could accommodate capacity reductions from lane/road closures or additional traffic due to traffic detours. If roadway traffic volumes exceed available capacity, increases in vehicle delay and queuing could occur. Traffic delay could also occur when detour roadways operate under capacity; however, delays would be less noticeable and queuing should be minimized. For this analysis, the year 2021 was assumed because it would be within the proposed heavy civil construction period. Although construction of the SR 509 Extension may begin around 2021, for purposes of this analysis it is assumed that the SR 509 Extension will not be under construction or built by the time FWLE is under construction. The combined impacts of concurrent construction are discussed in Chapter 8, Cumulative Impacts. The results of this analysis are shown in Appendix G of this technical report.

As shown in Appendix G, most roads on detour routes would operate under capacity during temporary night or weekend road closures, with a few exceptions. The closure of SR 99 north of S 208th Street during weekends may result in S 216th Street operating over capacity during peak periods. A weekend closure of Kent-Des Moines Road may result in Military Road S and I-5 ramps at S 200th Street and Kent-Des Moines Road and S 272nd Street operating over capacity. The closure of S 260th Street could result in Military Road S operating over capacity during the weekend.

The closure of Military Road S (north crossing) during weekends may cause traffic on S Star Lake Road to be over capacity during some of the closure period. Similarly, weekend closure of S 288th Street may cause traffic on Military Road S, 51st Avenue S, and 55th Avenue S to be over capacity during certain periods of the closure. The closure of S 320th Street during weekends may cause congestion on 23rd Avenue S and S 324th Street during periods of the closure. None of these closures are expected to be concurrent.

The proposed detour routes would use arterials and avoid local and collector streets to discourage traffic impacts through neighborhoods. Because of the limited number of crossings over I-5, many detour routes could be circuitous. With some road closures (such as S 272nd Street, S 288th Street, and Military Road near S 304th Street), local and collector streets could provide a more direct route than the signed detour routes and drivers may choose to use alternate routes other than the proposed detour routes. Sound Transit would work with the local jurisdictions to minimize these potential impacts. Detour routes would ultimately be determined as the project advances through design and in coordination with the contractor and affected jurisdictions.

Construction vehicle access for the Preferred Alternative and station options would be provided via a temporary construction road adjacent to the guideway that could be up to 30 feet wide to allow for two-way construction traffic. Access to the construction road would be provided from arterials, local streets (although minimized where possible), and/or I-5 interchange areas. Potential primary access points to the temporary construction road include the following roads:

- 28th Avenue S
- S 204th Street
- SR 99 (multiple locations)
- S 200th Street
- S 208th Street
- S 216th Street
- I-5 near 216th Street (short term)
- S 224th Street
- 30th Avenue S (multiple locations)
- S 240th Street
- S 252nd Street
- S 259th Place
- 26th Avenue S
- Military Road (three locations)
- S 288th Street
- 28th Avenue S
- S 312th Street
- 23rd Avenue S (two locations)
- 21st Avenue S
- S 317th Street

Direct access from I-5 would be provided temporarily at S 216th Street when the S 216th Street bridge structure would need to be widened. Access from I-5 would also occur for the Puget Sound Energy transmission relocation across I-5, for removal of trees adjacent to I-5, for occasional delivery of construction materials, and for the Landfill Median Alignment Option during construction of the light rail guideway within the I-5 median.

Secondary access points may be provided via local roads to allow 1/2-mile spacing between access points. While these access points would primarily be intended to provide emergency access to the construction site, some truck traffic may use these locations. If these access locations were problematic for larger construction vehicles, these vehicles would be rerouted to primary access points. The contractor may propose modifications to the construction road and access during the development of the Maintenance of Traffic Plan.

Station and Alignment Options

Kent/Des Moines Station Options

The Kent/Des Moines At-Grade and I-5 station options would have the same local street and arterial impacts as the Preferred Kent/Des Moines Station.

Landfill Median Alignment Option

The Landfill Median Alignment Option would have the same local street and arterial impacts as the Preferred Alternative. Potential impacts on the I-5 mainline are discussed in Section 5.2.2.1.

S 272nd Star Lake Elevated Station Option

The S 272nd Star Lake Elevated Station Option would reduce disturbance to S 272nd Street and the duration of lane closures for this road compared with the Preferred S 272nd Star Lake Station because the light rail guideway would be constructed over the roadway instead of under.

S 317th Elevated Alignment Option

The S 317th Elevated Alignment Option would avoid reconstruction of the roundabout at S 317th Street and 28th Avenue S, thus reducing impacts at this location. Some road closures would still be needed while constructing the guideway across the roundabout, similar to other elevated road crossings with the Preferred Alternative.

Federal Way I-5 Station Option

The roundabout at S 317th Street and 28th Avenue S would require reconstruction where the guideway crosses under the intersection. The intersection would be reconstructed in two phases and would convert the existing roundabout into a through street. The first phase would close S 317th Street and traffic would reroute to S 312th Street or S 320th Street, thus increasing vehicle delays on these facilities. The second phase would require the closure of 28th Avenue S. Both phases would last between 6 and 9 months. During construction of the roundabout modification, both the I-5 mainline and the S 317th Street direct access ramps would not likely experience any impacts. When the guideway construction is complete, the roundabout would be reconstructed in its current location.

Federal Way S 320th Park-and-Ride Station Option

The Federal Way S 320th Park-and-Ride Station Option would have the same local street and arterial impacts as the Preferred Federal Way Transit Center Station, except construction of the guideway under the roundabout at S 317th Street may be completed in fewer stages compared with the Preferred Federal Way Transit Center Station. Completion in fewer stages would occur because the impacts would be farther east of the roundabout under the S 317th Street direct access ramp, thus resulting in less impacts than the Preferred Federal Way Transit Center Station because guideway construction would not affect 23rd Avenue S and 28th Avenue S.

5.4.2.2 SR 99 Alternative

Construction of the guideway overcrossings would create impacts at the arterial and local cross streets that intersect SR 99 between S 200th Street and S 316th Street. Street crossings of note would occur at S 208th Street, S 216th Street, Kent-Des Moines Road, S 240th Street, S 260th Street, S 272nd Street, S 288th Street, S 304th Street, S 312th Street, and S 316th Street.

Depending on the type and length of guideway, construction over arterials, local streets, and driveways along SR 99 might require temporary nighttime and weekend closures and detours for local traffic to other nearby arterials during the installation of the girders for the guideway bridges. Detours would result in impacts on traffic, buses, bicyclists, and pedestrians. Construction activities might also reduce or restrict property access during construction; however, the contractor would need to maintain access during construction when possible and could minimize impacts on access via nighttime and weekend closures where allowed. Highline College access would be provided from SR 99, either via S 240th Street, or from completion of the S 236th Street extension.

Local roads along the guideway between S 308th Street and S 316th Street may have closures or access modifications that would extend for a longer duration because of the larger construction area required for this segment of the guideway. Construction of the guideway and station near the Federal Way Transit Center would require temporary nighttime closures of S 316th Street and Pete Von Reichbauer Way S during guideway construction. South of the existing transit center, 21st Avenue S would likely require temporary nighttime or weekend closures during construction of the station and guideway.

Construction vehicle access for the SR 99 Alternative and station options would be located along SR 99. Generally, construction truck traffic to the construction and staging areas would use arterials and local streets. Up to 15 trucks per hour could use SR 99, arterials, and local streets, and intersection delays

may increase slightly. Haul routes to and from SR 99 would include I-5 and the three major east-west streets with I-5 interchanges—Kent-Des Moines Road, S 272nd Street, and S 320th Street. Potential construction staging areas would be located at the three station areas—Kent/Des Moines, S 272nd Redondo, and Federal Way Transit Center.

The potential temporary closure of the Redondo Heights Park-and-Ride during construction would change traffic circulation patterns around S 272nd Street. Vehicle trips would likely relocate to the Star Lake Park-and-Ride, and some intersections near these two park-and-rides may have increased congestion. However, the current transit demand at the Redondo Heights Park-and-Ride is relatively low, so any traffic impacts caused by this closure would likely be minimal.

Station Options

For station options that have portions of the guideway located in a trench, the use of temporary plates and lane reductions would be required to maintain traffic flow on cross streets over the trench for up to a year. For roads that have two or more lanes in each direction, at least one lane in each direction would be kept open during construction. For some station options, roads that have only one lane in each direction may be closed for certain periods during construction.

S 216th Station Options

Generally, the construction of the potential additional S 216th West Station Option or S 216th East Station Option would have minimal impacts on traffic in the station vicinity and would occur over a period of 18 to 30 months. Construction of the trench under S 216th Street for the S 216th Street West Station Option would likely require narrowing of the travel lanes, removal of dedicated turn lanes, and/or the closure of one through lane in each direction. Some nighttime and weekend closures of S 216th Street may be required for placement of plates. Local traffic could be detoured along S 220th Street to avoid delays through the construction area. Congestion on S 220th Street could increase during construction.

Kent/Des Moines HC Campus Station Option

Impacts on local streets with the Kent/Des Moines HC Campus Station Option would be the same as the SR 99 Alternative except across S 240th Street. To maintain traffic flow, plates would be required on S 240th Street for up to 1 year, and may require turn restrictions and lane closures. However, access to Highline College would be provided from SR 99, either via S 240th Street, or from the completion of the S 236th Street extension.

Kent/Des Moines HC from S 216th W Station Option

With the Kent/Des Moines HC from S 216th W Station Option, trenching would be required across several roads, including S 216th Street, S 220th Street, S 222nd Street, S 224th Street, and S 226th Street. For S 216th Street, at least one lane in each direction would be kept open during construction, which may occur for up to a year. The remaining roads could be closed during construction; however, construction would be phased to maintain reasonable detour routes. For example, S 220th Street may be closed during construction; however, S 224th Street could remain open and would be signed as a detour route. Then when construction is complete on S 220th Street, it could be used as a detour route when S 224th Street is closed.

Construction of this station option would also require trenching adjacent to properties, and the use of plates over the guideway would be temporarily required to maintain business access. Night and weekend closures may be required for placement of plates. If alternate access to a business is not available, then the specific construction activity would be reviewed to determine if it could occur during non-business hours. Highline College access would be provided from SR 99, either via S 240th Street, or from the completion of the S 236th Street extension.

Kent/Des Moines SR 99 Median Station Option

Construction of the Kent/Des Moines SR 99 Median Station Option would occur over a period of 18 to 30 months and would require completely reconstructing SR 99 in each direction. This would result in a wider roadway and would require part of the SR 99 reconstruction to occur within existing private property outside of the existing right-of-way. During the construction period, there would be lane reductions in each direction of SR 99 as lanes are shifted, and speed reductions would likely be required. Northbound SR 99 would also be closed during a portion of station construction. The main detour route would be 30th Avenue S, a low-volume road. Traffic would be routed from SR 99 to 30th Avenue S via S 240th Street. S 236th Street between SR 99 and 30th Avenue S would be constructed and completed prior to closing northbound SR 99, and traffic would be rerouted back onto SR 99 via this new road connection. Some of the SR 99 northbound traffic would likely continue north on 30th Avenue S to eastbound Kent-Des Moines Road and I-5. During the peak period, traffic volumes on this detour route could increase by over 1,000 vehicles per hour, and without temporary widening of 30th Avenue S, traffic congestion would be expected. Drivers could potentially avoid this area by using other roads in the area, which could increase congestion on those streets.

Kent/Des Moines SR 99 East Station Option

The Kent/Des Moines SR 99 East Station Option would likely require the closure of 30th Avenue S between S 236th Street and S 240th Street during station construction; this street is currently a low-volume facility, and traffic would likely be detoured to SR 99. During the closure, local business access would be provided.

S 260th Station Options

The arterial and local street impacts with these potential additional stations (S 260th West or East) would be the same as the SR 99 Alternative except at S 260th Street with the S 260th East Station Option. Construction of the station at this location would require the closure of S 260th Street, which provides access across I-5. The nearest detour route with access across I-5 would be at S 272nd Street. Local traffic would likely be detoured via S 252nd Street, S 272nd Street, and Military Road, and congestion on these roads would likely increase.

S 272nd Redondo Trench Station Option

With the S 272nd Redondo Trench Station Option, construction activities for the trench under S 272nd Street just east of SR 99 would likely be completed with cut-and-cover construction in order to maintain traffic lanes on a portion of the existing roadway. S 272nd Street is currently two lanes in each direction, with dual westbound left-turn lanes at the intersection of SR 99. Removal of one westbound left-turn lane at SR 99 and S 272nd Street would likely be required to allow for two lanes in

each direction during construction. The reduction in left-turn capacity would result in increased vehicle queues and delays. Specific impacts on SR 99 are discussed above in Section 5.2.2.2.

Construction activities might reduce or restrict property access during construction; however, the contractor would need to maintain access during construction where possible and could minimize access impacts via nighttime and weekend closures.

Federal Way SR 99 Station Option

The Federal Way SR 99 Station Option would span S 316th Street west of Pete Von Reichbauer Way S. During station construction, S 316th Street between SR 99 and Pete Von Reichbauer Way S would likely require a full closure during construction of the station. The likely detour route for traffic traveling to and from the north on SR 99 would be via S 312th Street to Pete Von Reichbauer Way S.

5.4.2.3 SR 99 to I-5 Alternative

Impacts with the SR 99 to I-5 Alternative north of Kent-Des Moines Road would be the same as under the SR 99 Alternative. South of S 240th Street, impacts would be similar to the Preferred Alternative. Between Kent-Des Moines Road and S 240th Street, construction would have impacts on 30th Avenue S and would likely require its temporary closure north of the proposed S 236th Street. The local traffic using this road would be detoured to SR 99, with local property access maintained.

5.4.2.4 I-5 to SR 99 Alternative

Impacts with the I-5 to SR 99 Alternative north of Kent-Des Moines Road would be similar to the Preferred Alternative. South of S 240th Street, impacts would be similar to the SR 99 Alternative. Between Kent-Des Moines Road and S 240th Street, construction would have impacts on 30th Avenue S and would likely require its temporary closure north of the proposed S 236th Street. The local traffic using this road would be detoured to SR 99, with local property access maintained.

5.4.3 Potential Mitigation Measures

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

- Conform to the *Manual on Uniform Traffic Control Devices* (FHWA, 2009) and jurisdictional agency requirements for all maintenance of traffic plans.
- Install advance warning signs and highly visible construction barriers and use flaggers where needed.
- Consider a variety of traffic and travel demand management strategies.
- Clearly sign and provide reasonable detour routes when cross streets are closed for elevated guideway and trench construction. The contractor would be required to keep nearby parallel facilities open to facilitate access and mobility.

- Use lighted or reflective signage to direct drivers to truck haul routes to ensure visibility during nighttime work hours. Use special lighting for work zones and travel lanes, where required.
- Communicate public information through tools such as print, radio, posted signs, websites, and email to provide information regarding street closures, hours of construction, business access, and parking impacts. Sound Transit would provide this plan.
- Coordinate access closures with affected businesses and residents. The contractor would be required to perform this task in coordination with Sound Transit staff. If access closures are required, property access to residences and businesses would be maintained to the extent possible. If access to the property cannot be maintained, the specific construction activity would be reviewed to determine if it could occur during non-business hours, or if the parking spaces and users of this access (for example, deliveries) could be provided at an alternative location.
- Post advance notice signs prior to construction in areas where construction activities would affect access to surrounding businesses.
- Provide regular updates to schools, emergency service providers, local agencies, solid waste utilities, and postal services, and assist public school officials in providing advance and ongoing notice to students and parents concerning construction activity near schools.
- Schedule traffic lane closures and high volumes of construction truck traffic during off-peak hours to minimize delays, where practical.
- Cover potholes and open trenches, where possible, and use protective barriers to protect drivers from open trenches.
- For the Kent/Des Moines SR 99 Median Station Option, improve 30th Avenue S and S 236th Street prior to the station construction to accommodate increased traffic from SR 99 when lanes are closed.

5.5 Safety

5.5.1 Impacts Common to All Alternatives

With each of the FWLE alternatives, traffic diversion and detours caused by light rail guideway construction would lead to additional traffic increases on those roads. The additional traffic volumes and construction activity (such as lane closures and column construction) could lead to a potential increase in collision frequency. In locations where there would be no physical change to the roadway, the types of crashes could also remain similar to existing conditions. Currently, the majority of crashes in the study area are property damage only.

5.5.2 Impacts by Alternative

5.5.2.1 Preferred Alternative

The guideway construction area with the Preferred Alternative would be located near the I-5 pavement edge in several locations. Full travel lane and shoulder widths along I-5 would be maintained except during a few construction activities. Construction of the S 216th Street bridge abutment would require

closing the I-5 southbound shoulder for a short duration. Relocating electrical lines over I-5 would require short-term full or directional closure of the I-5 mainline during the day to maintain public safety. Tree removal along the west side of the I-5 corridor would likely require shoulder closure and possibly one outside lane closure during the day periodically over several months to safely conduct this work.

The construction area for the Preferred Alternative would be near the I-5 pavement edge in several locations. During construction, the highway clear zone would be reduced or eliminated along most of I-5 southbound through the study area. It would be entirely eliminated south of Kent-Des Moines Road. Where the light rail alignment parallels the I-5 mainline—from approximately S 211th Street to S 317th Street—a temporary construction barrier would be placed near the southbound I-5 edge of pavement (where barriers are not already present) to separate the construction activity from traffic on I-5 for the full guideway construction duration (1 to 4 years). An increase of up to three crashes per construction year could be expected (most likely property damage only based on the severity distribution of the existing crash history).

During construction, partial and/or full closures along with lane shifts are expected along S 272nd Street near the I-5 southbound ramps. These modifications would result in minor safety impacts along S 272nd Street in the study area.

If the SR 509 Extension were built before the FWLE south of Kent-Des Moines Road, the light rail construction south of Kent/Des Moines Station would be adjacent to the planned I-5 pavement edge in two places—in the Midway Landfill between S 246th and S 252nd streets, and next to the McSorley Creek Wetlands near S 272nd Street. There would be no direct construction impact on the I-5 mainline travel lanes, but these areas would require short-term I-5 shoulder reductions, which could reduce vehicle speeds through the construction areas.

Converting the S 317th Street and 28th Avenue S roundabout to a temporary stop-controlled intersection would increase the potential for crashes, as suggested in the *Highway Safety Manual*. The roundabout has a low crash frequency (three crashes over 5 years) at this location, with the potential for crashes to increase by up to 65 percent (AASHTO, 2014) with the temporary stop-controlled intersection configuration during the construction period. This could result in up to one crash per year at this location.

Station and Alignment Options

Kent/Des Moines Station Options

The Kent/Des Moines At-Grade and I-5 station options would have the same safety impacts as the Preferred Kent/Des Moines Station.

Landfill Median Alignment Option

Construction of the guideway with the Landfill Median Alignment Option would require short-term, temporary narrowing of the inside I-5 shoulder to provide adequate construction space between approximately S 240th Street and S 252nd Street. Temporary shoulder closures could occur intermittently over a period of 4 to 6 months. Construction barriers would be placed along the median

for northbound and southbound I-5, and after construction, a permanent barrier would be provided. The addition of a median barrier could result in up to one crash a year on I-5.

As mentioned in Section 5.2.2.1, if cast-in-place construction methods are used, a shoring tower in the middle of southbound I-5 to support the straddle bents may be required. This would require closure of one to two lanes or restriping southbound I-5 mainline travel lanes around the construction area. The addition of a fixed object in the roadway could increase the crash potential more than the Preferred Alternative; however, this construction area would be designed to minimize any safety impacts.

S 272nd Star Lake Elevated Station Option
The S 272nd Star Lake Elevated Station Option would have similar or fewer safety impacts compared with the Preferred S 272nd Star Lake Station.

S 317th Elevated Alignment Option
The S 317th Elevated Alignment Option would avoid reconstruction of the roundabout at S 317th Street and 28th Avenue S, thus eliminating the potential safety impact at this location.

Federal Way City Center Station Options
The Federal Way I-5 and S 320th Park-and-Ride station options would have the same safety impacts as the Preferred Federal Way Transit Center Station.

5.5.2.2 SR 99 Alternative

Access modifications (such as right-in, right-out) and left-turn restrictions at intersections along SR 99 would occur in FWLE construction areas. This would eliminate some vehicle conflicts at these locations. Detour routes would change the traffic circulation and could lead to driver confusion and a possible increase in the potential for crashes. Signing and advanced communication of these changes to travel patterns and detours would minimize the potential safety impacts and would be addressed in the Maintenance of Traffic Plan described in Section 5.1. Other measures that would be used to minimize safety impacts through construction areas are described in Section 5.4.3.

There would be no additional safety impacts with any of the SR 99 Alternative station options.

5.5.2.3 SR 99 to I-5 Alternative

Safety impacts north of Kent-Des Moines Road with the SR 99 to I-5 Alternative would be the same as with the SR 99 Alternative. South of S 240th Street, impacts would be similar to the Preferred Alternative. No additional impacts would occur between Kent-Des Moines Road and S 240th Street.

5.5.2.4 I-5 to SR 99 Alternative

Safety impacts north of Kent-Des Moines Road with the I-5 to SR 99 Alternative would be similar to the Preferred Alternative. South of S 240th Street, impacts would be the same as under the SR 99 Alternative. No additional impacts would occur between Kent-Des Moines Road and S 240th Street.

5.5.3 Potential Mitigation Measures

As described in Section 5.1, a Maintenance of Traffic Plan will be developed based on FHWA's *Manual on Uniform Traffic Control Devices* and WSDOT's Transportation Management Plan strategies in Chapter 1010 of the *Design Manual* (WSDOT, 2016). Items that would be included are described in Section 5.1, Maintenance of Traffic, Truck Volumes, and Haul Routes, and other mitigation sections

(e.g., Section 5.4.3) in this chapter. With FWLE alternatives near I-5, potential mitigation measures include placing a temporary construction barrier near the southbound I-5 edge of pavement where barriers are not already present to separate construction activity from I-5 mainline traffic. Refer to Section 5.4.3 for additional construction mitigation measures.

5.6 Parking

5.6.1 Impacts Common to All Alternatives

Parking for construction workers would be provided within the FWLE construction areas where possible. It is expected that some worker parking could be accommodated at the staging areas and along the alignment construction area. Construction workers could also park on local streets and arterials where parking is unrestricted. Construction worker parking near designated construction staging areas could affect the nearby parking supply during heavy construction periods. Contractors are generally responsible for providing parking for construction workers where necessary.

5.6.2 Impacts by Alternative

5.6.2.1 Preferred Alternative

A limited amount of on-street parking in neighborhoods west of I-5 in the Kent/Des Moines Station area is allowed along the length of the Preferred Alternative alignment. This parking would be removed during FWLE construction.

Station construction at the Star Lake Park-and-Ride would likely take 18 to 30 months to complete. The existing park-and-ride facility is approximately 52 percent utilized today, with approximately 285 of the 540 parking stalls being occupied. The park-and-ride would be partially or fully closed during the construction period while the station and parking structure are being built. Some parking would be unavailable, and temporary parking would be provided where necessary and where feasible to mitigate the impacts. If bus service at the Star Lake Park-and-Ride were rerouted to the Redondo Heights Park-and-Ride, this location would have enough capacity (approximately 640 spaces) to accommodate the displaced riders from the Star Lake Park-and-Ride. Other possible parking locations include some of the nearby leased park-and-ride lots as well as the other park-and-ride lots along the FWLE corridor, such as Kent-Des Moines Park-and-Ride, Federal Way Transit Center, and S 320th Street Park-and-Ride.

Construction activities at the Federal Way Transit Center Station could have minor impacts on parking. The existing transit facility parking garage would remain open with its full supply of parking available for transit patrons during the entire construction period. However, the existing on-street parking along 21st Avenue S would be removed during construction at the Federal Way Transit Center Station for up to 30 months.

Station and Alignment Options

Kent/Des Moines Station Options

The Kent/Des Moines At-Grade and I-5 station options would have the same parking impacts as the Preferred Kent/Des Moines Station.

Landfill Median Alignment Option
Construction worker parking would not be allowed in the I-5 median; therefore, the Landfill Median Alignment Option would have the same parking impacts as the Preferred Alternative

S 272nd Star Lake Elevated Station Option
The S 272nd Star Lake Elevated Station Option would have the same parking impacts as the Preferred S 272nd Star Lake Station.

S 317th Elevated Alignment Option
The S 317th Elevated Alignment Option would have the same parking impacts as the Preferred Alternative.

Federal Way I-5 Station Option
The Federal Way I-5 Station Option would have the same parking impacts as the Preferred Federal Way Transit Center Station except that parking along 21st Avenue S would not be removed.

Federal Way S 320th Park-and-Ride Station Option
There would be impacts on parking at the existing Federal Way S 320th Park-and-Ride lot during the construction of this station option. The existing park-and-ride would be partially or fully closed while the station and parking structure are being constructed. The existing Federal Way S 320th Park-and-Ride is currently 38 percent utilized, with almost 366 of the 877 parking stalls occupied. Displaced riders would need to use the Federal Way Transit Center, which is currently at capacity, or other facilities that are under capacity, such as the Star Lake Park-and-Ride. Parking along 21st Avenue S would not be removed.

5.6.2.2 SR 99 Alternative

Loss of available parking at the Redondo Heights Park-and-Ride lot is expected during construction of the SR 99 Alternative. The existing park-and-ride facility would be partially or fully closed while the parking structure is constructed. The facility is currently underutilized, with less than 10 percent use, which equals approximately 60 spaces. The Star Lake Park-and-Ride would likely have enough capacity (approximately 240 spaces available) to accommodate any displaced riders with the closure of the Redondo Heights Park-and-Ride.

The Federal Way Transit Center Station parking garage would remain open with its full supply of parking available for transit patrons during the entire construction period. There would be no additional transit and/or public parking impacts with any of the station options.

There is no on-street parking allowed along the length of SR 99. The available on-street parking is generally located along the streets east and west of SR 99 and would not likely be affected by construction activity.

There would be no additional private parking impacts with any of the station options except for the Kent/Des Moines HC Campus Station Option. During construction and FWLE operation, some Highline College student parking would be removed from a highly utilized Highline College parking lot. Permanent replacement parking for Highline College would be provided by Sound Transit prior to station construction.

5.6.2.3 SR 99 to I-5 Alternative

Impacts north of Kent-Des Moines Road would be the same as with the SR 99 Alternative. South of S 240th Street, impacts would be similar to the Preferred Alternative, including impacts at the Star Lake Park-and-Ride. Between Kent-Des Moines Road and S 240th Street, no additional parking impacts were identified.

5.6.2.4 I-5 to SR 99 Alternative

Parking impacts north of Kent-Des Moines Road with the I-5 to SR 99 Alternative would be similar to the Preferred Alternative. South of S 240th Street, impacts would be the same as with the SR 99 Alternative, including impacts at the Redondo Heights Park-and-Ride. Between Kent-Des Moines Road and S 240th Street, no additional parking impacts were identified.

5.6.3 Potential Mitigation Measures

Depending on the alternative and station options selected, the existing Star Lake, Redondo Heights, or S 320th Street park-and-ride lots could be fully closed. Measures to mitigate the loss of parking at these locations could include the following:

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

5.7 Non-motorized Facilities

5.7.1 Impacts Common to All Alternatives

All FWLE alternatives would either close sidewalks or reduce the sidewalk width within the construction areas. Impacts specific to each alternative are described in this section.

5.7.2 Impacts by Alternative

5.7.2.1 Preferred Alternative

Under the Preferred Alternative, non-motorized travel could be affected in the vicinity of station construction and from construction of the elevated guideway over arterials and local streets. The limited number of roads crossing I-5 restricts the pedestrian and bicycle activity in the study area. Therefore, non-motorized facilities on roads crossing I-5 would be maintained to the extent feasible.

Crosswalks located at signalized intersections would remain open, except when SR 99 or side streets would be temporarily closed and prohibit pedestrian access. Near the Kent/Des Moines Station, S 236th Street would be extended from SR 99 to 30th Avenue S to provide access to the station. The future three-legged traffic signal at the SR 99/ S 236th Street intersection would be modified to a four-legged intersection to accommodate this extension. These improvements may result in minor impacts on non-motorized travel in the study area during construction. The Kent/Des Moines Station and most of the guideway would be located along 30th Avenue S where non-motorized facilities are currently

not provided; therefore, impacts on non-motorized travel in this area would be minimal during construction.

During the S 272nd Star Lake Station construction, sidewalks on the north side of S 272nd Street may be closed or a protected sidewalk would be provided next to the station. In addition, 26th Avenue S would be realigned adjacent to the station and sidewalks may be closed during construction. The construction of the 26th Avenue S and S 272nd Street intersection would require the closure of the east crosswalk; however, the north and west crosswalks would remain open. Crosswalks would remain open at the two signalized I-5 ramp terminal intersections adjacent to the station area, thus allowing pedestrians to use the I-5 transit flyer stops during construction.

During the Federal Way Transit Center Station construction, sidewalks and bicycle lanes would be maintained, except along portions of S 317th Street, 25th Avenue S, 23rd Avenue S, 21st Avenue S, and S 320th Street, where non-motorized facilities may be temporarily closed or protected through the construction area.

Station and Alignment Options

Kent/Des Moines Station Options

The Kent/Des Moines I-5 Station Option would have similar impacts on non-motorized facilities as the Preferred Kent/Des Moines Station. The Kent/Des Moines At-Grade Station Option would have less impacts on non-motorized facilities than the Preferred Kent/Des Moines Station because no improvements would occur along S 236th Street and 30th Avenue S with this station option. During construction of the future S 242nd Street with the Kent/Des Moines At-Grade Station Option, minor non-motorized impacts may occur in the study area.

Landfill Median Alignment Option

The Landfill Median Alignment Option would have similar impacts on non-motorized facilities as the Preferred Alternative.

S 272nd Star Lake Elevated Station Option

The S 272nd Star Lake Elevated Station Option would have similar non-motorized impacts as the Preferred S 272nd Star Lake Station.

S 317th Elevated Alignment Option

The S 317th Elevated Alignment Option would have similar non-motorized impacts as the Preferred Alternative.

Federal Way I-5 Station Option

The Federal Way I-5 Station Option would have similar impacts on non-motorized facilities as the Preferred Federal Way Transit Center Station, except no non-motorized impacts would occur on 23rd Avenue S and portions of Gateway Center Boulevard may have sidewalk closures.

Federal Way S 320th Park-and-Ride Station Option

The Federal Way S 320th Park-and-Ride Station Option would have less impacts on non-motorized facilities than the Preferred Federal Way Transit Center Station because no non-motorized impacts would occur near the existing Federal Way Transit Center with this station option. During the

construction of improvements at the 25th Avenue S/S 322nd Street intersection with this station option, sidewalk closures may occur in the study area.

5.7.2.2 SR 99 Alternative

There would be some impact on non-motorized travel modes from constructing the elevated guideway within the SR 99 median, including for very short periods where crosswalks may be closed for construction in the area, although crosswalks would remain open to the extent feasible. Non-motorized travel would also be affected in areas where roadway reconstruction includes sidewalks. Protected sidewalks next to the construction area would be provided when detour routes are not feasible. Short sections of sidewalks may need to be closed during construction on the roadway and would require pedestrians to detour to the closest signalized crossing of SR 99. Because of the spacing of SR 99 crossings, detours for pedestrians could be circuitous.

Bicycle routes and lanes adjacent to the construction areas, such as those located along S 216th Street, may be temporarily removed during construction. Non-motorized travel would also be affected in the vicinity of station construction, as well as from construction of the elevated guideway over local arterials.

Crosswalks located at signalized intersections would remain open, except when SR 99 or side streets would be temporarily closed and prohibit pedestrian access. The midblock pedestrian crossing north of Kent-Des Moines Road would be closed during the construction period and would require pedestrians to detour to another crossing. Near the Kent/Des Moines Station, S 236th Street would be built prior to station construction to provide an additional SR 99 pedestrian crossing that would minimize pedestrian impacts near the Highline College campus if sidewalks are temporarily closed. In addition, a protected pathway along S 236th Street or S 240th Street would be provided to facilitate pedestrian movement to and from the Highline College campus and SR 99 through the construction area.

During the S 272nd Redondo Station construction, sidewalks on the east side of SR 99 may be closed or a protected sidewalk would be provided next to the station. If sidewalks are closed on the east side of SR 99, such closures may require a circuitous reroute for pedestrians because the nearest SR 99 crossings are at S 260th Street and S 288th Street. Other sidewalks would remain open at the two signalized intersections adjacent to the station area (S 272nd Street and S 276th Street).

During the Federal Way Transit Center Station construction, sidewalks would be maintained, except along short portions of Pete Von Reichbauer Way S, 21st Avenue S, and 23rd Avenue S, where the sidewalks may be temporarily closed or a protected sidewalk would be provided through the construction area.

Station Options

S 216th Station Options

With either of the potential additional S 216th station options (West or East), the impacts on non-motorized facilities would be similar to the SR 99 Alternative.

Kent/Des Moines HC Campus Station Option
The impacts on non-motorized facilities of the Kent/Des Moines HC Campus Station Option would be similar to the SR 99 Alternative except that the midblock pedestrian crossing on SR 99 between S 226th Street and Kent-Des Moines Road would remain open. A protected pathway along S 236th Lane would be provided to facilitate pedestrian movement between Highline College campus and SR 99 through the construction area.

Kent/Des Moines HC from S 216th W Station Option
The midblock pedestrian crossing on SR 99 between S 226th Street and Kent-Des Moines Road would remain open with the Kent/Des Moines HC from S 216th W Station Option. Sidewalks along SR 99 would not be affected with this option between S 216th Street and Kent-Des Moines Road. Along S 240th Street, a sidewalk on at least one side of the street would remain open during construction. Students accessing the Highline College campus may be required to use alternate routes to avoid the construction area.

In addition, a protected pathway along S 236th Lane would be provided to facilitate pedestrian movement between the Highline College campus and SR 99 through the construction area.

Kent/Des Moines SR 99 Median Station Option
The impacts on non-motorized facilities with the Kent/Des Moines SR 99 Median Station Option would be similar to the SR 99 Alternative.

Kent/Des Moines SR 99 East Station Option
The impacts on non-motorized facilities with the Kent/Des Moines East SR 99 Station Option would be similar to the SR 99 Alternative, except pedestrian movement to and from the Highline College campus should not be affected.

S 260th Station Options
With either of the potential additional S 260th Street station options (West or East), the impacts on non-motorized facilities would be similar to the SR 99 Alternative.

S 272nd Redondo Trench Station Option
The impacts on non-motorized facilities with the S 272nd Redondo Trench Station Option would be the same as the SR 99 Alternative.

Federal Way SR 99 Station Option
The impacts on non-motorized facilities with the Federal Way SR 99 Station Option would be similar to the SR 99 Alternative except no non-motorized impacts would occur on Pete Von Reichbauer Way S, 21st Avenue S, and 23rd Avenue S.

5.7.2.3 SR 99 to I-5 Alternative

Impacts on non-motorized facilities north of Kent-Des Moines Road with the SR 99 to I-5 Alternative would be the same as with the SR 99 Alternative. South of S 240th Street, impacts would be similar to the Preferred Alternative, except near the Federal Way Transit Center, where sidewalks would be impacted along Pete Von Reichbauer Way S but would not be impacted along S 320th Street. Between Kent-Des Moines Road and S 240th Street, no additional impacts would occur.

5.7.2.4 I-5 to SR 99 Alternative

Impacts on non-motorized facilities north of Kent-Des Moines Road with the I-5 to SR 99 Alternative would be similar to the Preferred Alternative. South of S 240th Street, impacts would be the same as with the SR 99 Alternative. Between Kent-Des Moines Road and S 240th Street, no additional impacts would occur.

5.7.3 Potential Mitigation Measures

Most of the non-motorized impacts during construction would be related to the closure of sidewalks along SR 99 and other arterial and local streets. Sound Transit would minimize potential impacts on pedestrian and bicycle facilities by providing detours within construction areas, such as protected walkways, and would notify the public as appropriate.

5.8 Freight Mobility and Access

5.8.1 Impacts Common to All Alternatives

Impacts on the movement of trucks carrying freight would be approximately the same as impacts on general traffic, as described in Sections 5.2 and 5.4.

Some of the short-term (nights and weekends) road closures would affect freight. In addition, freight would be affected with the Preferred Alternative and the S 320th Park-and-Ride Station Option because a short-term (nights and weekends) southbound on-ramp closure at the S 320th Street interchange would be required. This would require rerouting or rescheduling freight trips during these periods. Detour routes for freight would need to be approved by affected jurisdictions. Construction activities with the Landfill Median Alignment Option could have short-term travel impacts on freight because of increased congestion on I-5 or along any detour routes.

The SR 99 lane closures within the construction areas could temporarily affect freight mobility in a manner similar to general purpose traffic. When partial lane closures are necessary during construction on SR 99, the intended purpose of any provided detour routes is to provide an alternate route for general purpose traffic. It is expected that freight would continue to travel on SR 99 or on other designated freight corridors. Temporary closures of access for some businesses could also occur, thus affecting freight (such as deliveries). If driveway closures are required, access to these properties would be maintained to the extent possible. With driveway closures, detours for freight would be treated similar to what is described for the general traffic.

5.8.2 Potential Mitigation Measures

To minimize potential freight impacts, Sound Transit would coordinate with affected businesses throughout the construction period to notify them of lane and/or access closures and maintain business access as much as possible.

For any construction activities that might have possible I-5 impacts, Sound Transit would coordinate with freight stakeholder groups and provide construction information to WSDOT for use in the state's freight notification system. Sound Transit would provide information in a format required by WSDOT.

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6.0 Indirect Impacts

This chapter discusses indirect transportation impacts that would be caused by the FWLE.

6.1 Regional Facilities and Travel

The completion of the FWLE would provide reliable light rail service between Federal Way and a majority of the region's urban centers. Light rail service could 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 travel modes, thus affecting transit, local traffic volumes, parking demand, and non-motorized users.

6.2 Transit Operations

Beyond the future conceptual bus service plan assumed for each build alternative, other changes in transit service within the FWLE corridor that are not yet planned or anticipated in response to the FWLE could also result in shifts in ridership. For instance, Sound Transit and King County Metro Transit (Metro) could redeploy and/or reinvest in bus service that would be replaced by light rail service above and beyond what has been assumed in the FWLE Final EIS.

Light rail service could facilitate a concentration of residential and commercial land uses, known as transit-oriented development, surrounding the stations. The population and employment projections used in Sound Transit's ridership forecasting model were the Puget Sound Regional Council's (PSRC) 2014 Land Use Targets data. These plans forecast a substantial amount of population and employment growth in and around the FWLE study area by 2035.

Land Use Targets Data

PSRC's 2014 Land Use Targets data reflect a dataset based on local growth targets developed by each county to align with VISION 2040's Regional Growth Strategy. The Land Use Targets data were developed based on local planned development capacities and regional policies adopted in VISION 2040. It represents a regional development pattern consistent with what local jurisdictions are planning for under the first set of VISION 2040-aligned local growth targets (PSRC, 2014b)

Because the Sound Transit and PSRC models already include adopted land use changes, the overall FWLE ridership is not expected to substantially change as a result of concentrated development (transit-oriented) around future light rail stations. However, the mode of access to and from stations may shift to a greater percentage of non-motorized access and lower percentage of automobile access as the population and employment densities increase within station walksheds and bikesheds. For example, if development were to be focused around the Kent/Des Moines Station, or any other light rail station in the FWLE corridor, this could result in an increase in the walk access trips, which would likely be offset by a reduction of park-and-ride or bus-transfer riders and/or small ridership decreases in other parts of the system or region. Also, in general, door-to-door travel times would be shorter for residents within walking distance to stations.

The PSRC's Forecast Analysis Zone that encompasses the Kent/Des Moines Station area includes almost a 40 percent increase in population and employment in the next 20 years. This equates to over

7,000 more jobs and households by 2035. This projected growth is already captured in the Sound Transit ridership model. Within the Midway subarea, the City of Kent's Transportation Master Plan forecasts employment and household increases of less than 2,000 by 2031 (City of Kent, 2011). Since then, the City of Kent's Midway Subarea Plan identified a "land use capacity" for the area that is beyond the 2,000 employment and household forecast in the City's Transportation Master Plan. These land use capacities are expected to be achieved beyond the FWLE's year 2035 planning horizon. Even so, the 7,000 more jobs and households forecasted by PSRC in the Midway subarea could incorporate all of the City of Kent's Transportation Master Plan forecast as well as additional development in line with the vision of the Midway Subarea Plan.

Any development beyond the PSRC's adopted population and employment land use forecasts for 2035 would require further regional and local planning and policy decisions and could result in additional increases in overall ridership in the FWLE corridor.

6.3 Arterial and Local Streets Operations

Increased automobile and bus trips to and from the station areas could result from potential increases in land use development around the light rail stations along the corridor. The increase in traffic could cause additional impacts on the arterials and local streets. Mode shifts from automobile transit, bicycle, and pedestrian could also result from increased development along the FWLE corridor.

6.4 Safety

The potential for increases in residential and employment uses around the light rail stations could lead to an increase in non-motorized activity and further conflicts between all travel modes (automobile, transit, and non-motorized).

6.5 Parking

Increase in parking demand around station areas along the FWLE corridor might result from the potential increase in land use development surrounding these areas. The demand for park-and-ride spaces beyond 1/4 mile from the stations could increase because riders could park along feeder bus routes and travel to the station by bus. Loss in park-and-ride demand on parallel corridors could result from riders shifting to the light rail service.

6.6 Non-motorized Vehicles

Additional pedestrian and bicycle trips to the station could result from potential increases in higher-density residential and commercial developments. Light rail ridership at the affected station could potentially increase. These trips could travel along older streets that lack Americans with Disabilities Act accessibility but could encourage improvements to these facilities by local jurisdictions as increased usage becomes evident.

6.7 Freight Mobility and Access

Increased automobile and bus trips to and from the station areas could result from potential increases in land use development around the light rail stations along the FWLE corridor. The increase in traffic could cause additional impacts on the arterials and local street operations near stations, which could affect freight mobility and access on local roadways. Any impacts on freight would be similar to those for automobiles.

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7.0 Potential Mitigation Measures

This chapter describes whether mitigation would be needed with the FWLE and describes potential mitigation measures for the transportation elements analyzed in this report.

7.1 Regional Facilities and Travel

No transportation impacts were identified for regional facilities as a result of the FWLE; therefore, no mitigation would be needed for these elements.

7.2 Transit Service and Operations

Mitigation for transit services and operations with the FWLE would not be expected. The FWLE would improve the regional transit system and provide Sound Transit, King County Metro Transit (Metro), and Pierce Transit the ability to develop bus service integration plans that coordinate bus service with the regional light rail system. Sound Transit would also provide expanded park-and-ride facilities to accommodate the expected increase in transit ridership with the project.

7.3 Arterial and Local Street Operations

Mitigation could be required at intersections where the intersection level of service (LOS) would be worse than with the No Build Alternative and would not meet the applicable agency LOS standard. If an intersection is not expected to meet agency LOS standards with the No Build Alternative, mitigation could be required if the FWLE would further degrade the intersection performance. Under this condition, improvements were identified if the build alternatives would result in noticeable vehicle delay increases (over 10 percent) at intersections compared with the No Build Alternative.

Potential improvements for up to 10 intersections not meeting the described LOS and delay thresholds are summarized in Table 7-1. As the project advances in design, Sound Transit will continue to work with local jurisdictions and agencies to evaluate potential mitigation strategies for safe and efficient operations. Final mitigation would be determined and agreed upon by Sound Transit and the affected jurisdiction(s) and agency(s). Sound Transit will work with affected agencies during the permitting process to determine Sound Transit's contribution to improve intersections, which may include contributing a proportionate share of costs to improve intersections affected by the FWLE. This could be determined by the project's proportionate ratio of trips at the intersection or another equitable method.

As part of the transportation analysis for the Final EIS, the *Final EIS Transportation Technical Analysis Methodology Overview and Updates* document was developed and is included in Appendix A of this technical report. This methodology identified other projects in the area that would be reasonably and foreseeably built by 2035. Included in that list of projects is the full build-out of the 2003 design for the WSDOT SR 509 Extension Project. If there are design modifications to this project proposed by WSDOT, those changes would be reviewed by Sound Transit and an updated analysis of the transportation

system may be warranted at a later time. Based on the SR 509 Extension schedule, this is expected to occur during FWLE final design.

7.3.1 Full-Length Build Alternatives

As noted in Table 7-1, the following intersections would be affected by all build alternatives and require mitigation:

- SR 99/Kent-Des Moines Road
- SR 99/S 240th Street
- Military Road S/259th Place S/S Reith Road
- SR 99/S 272nd Street
- I-5 Northbound Ramps/S 272nd Street
- I-5 Southbound Ramp/S 272nd Street
- Military Road S/S 272nd Street
- Star Lake Road/S 272nd Street
- SR 99/S 320th Street

The first three intersections listed above would have impacts associated with the Kent/Des Moines Station, the next five intersections would have impacts associated with the S 272nd Street stations, and the last intersection would have impacts associated with the Federal Way Station. The SR 99/S 320th Street intersection would meet the City of Federal Way LOS standards but would be slightly below WSDOT's LOS/delay standard for the AM peak hour.

No additional mitigation is proposed with the potential additional stations at S 216th Street and S 260th Street as the trips associated with these stations would be low. Therefore, the intersections nearby the station area would operate the same as, or better, than under the No Build Alternative or would meet jurisdictional LOS standards.

Table 7-2 identifies how the nine affected intersections listed above would operate with mitigation under the build alternatives and station options. A tenth intersection, SR 99/S 276th Street, would require mitigation under both the SR 99 and I-5 to SR 99 alternatives S 272nd Redondo Station interim terminus condition and is described in Section 7.3.2.2. Vehicle queue lengths are also expected to be similar or improved compared with the No Build Alternative at intersections with potential mitigation.

7.3.2 Interim Terminus Conditions

7.3.2.1 Kent/Des Moines Station Interim Terminus Conditions

In the Kent/Des Moines Station interim terminus condition, mitigation is proposed at the following intersections, regardless of alternative or station option:

- SR 99/Kent-Des Moines Road
- SR 99/S 240th Street
- Military Road S/259th Place S/S Reith Road

TABLE 7-1
Potential Transportation Mitigation

Intersection	FWLE Alternative/ Option Requiring Mitigation	Full-Length Condition	Kent/Des Moines Interim Terminus Condition	S 272nd Interim Terminus Condition
SR 99/Kent-Des Moines Road	All alternatives and Kent/Des Moines station options	Provide a second northbound right-turn and a left-turn pocket.	Provide a second northbound right-turn and a left-turn pocket. Provide a northbound right-turn signal overlap phase. Restrict the westbound U-turn movement.	Same as full-length condition.
SR 99/S 240th Street	All alternatives and Kent/Des Moines station options	Provide protected plus permissive signal phasing for eastbound and west bound approaches.	Same as full-length condition except with the Preferred Kent/Des Moines At-Grade Station Option, which proposes an additional southbound left-turn pocket and widening S 240th Street to provide an eastbound receiving lane. Also provide westbound and northbound right-turn pockets.	Same as full-length condition.
Military Road S/259th Place S/S Reith Road	All alternatives	Provide a westbound and a southbound right-turn pocket.	Same as full-length condition.	Same as full-length condition.
SR 99/S 272nd Street	All alternatives	Provide a northbound right-turn pocket. SR 99 Alternative requires an additional southbound right-turn pocket.	N/A	Same as full-length condition. SR 99 Alternative interim terminus condition requires an additional northbound and southbound right-turn signal overlap phasing.
I-5 Northbound Ramps/S 272nd Street	All alternatives	Provide a northbound left-turn pocket.	N/A	Same as full-length condition.
I-5 Southbound Ramps/S 272nd Street	All alternatives	Provide an additional southbound right-turn pocket. Re-channelize the southbound approach to a shared left/through and right-turn only lane.	N/A	Same as full-length condition.
Military Road S/S 272nd Street	All alternatives	Provide a southbound right-turn pocket.	N/A	Same as full-length condition.
Star Lake Road/S 272nd Street	All alternatives	Provide eastbound and westbound left-turn pockets.	N/A	Same as full-length condition.
SR 99/S 320th Street	All alternatives and Federal Way Transit Center Station Options	Provide a northbound right-turn pocket.	N/A	N/A
SR 99/S 276th Street	SR 99 and I-5 to SR 99 alternatives (S 272nd Station interim terminus condition only)	No mitigation required.	N/A	Provide a northbound right-turn pocket.

TABLE 7-2

Comparison of Intersection LOS for No Build and Mitigated Full-Length Build Alternatives

Alternative[a]	SR 99/ Kent-Des Moines Road	SR 99/S 240th Street	SR 99/S 272nd Street	I-5 Northbound Ramps/S 272nd Street	I-5 Southbound Ramps/S 272nd Street	Military Road S/S 272nd Street	Star Lake Road/S 272nd Street	SR 99/S 320th Street	Military Road S/ 259th Place S/ S Reith Road
LOS Standard	D	D	D	D	D	E	E	D	E
FWLE Alternatives									
No Build Alternative	E / F	E / D	F / D	E / E	C / E	-- / F	-- / E	D / D	-- / F
Preferred Alternative	E(D) / F(F)	E(D) / D(D)	F(F) / D(D)	F(D) / E(B)	C(C) / E(C)	--(--) / F(E)	--(--) / F(B)	E(D) / D(D)	--(--) / F(F)
SR 99 Alternative	E(D) / F(F)	E(D) / E(D)	F(E) / E(D)	F(D) / F(B)	C(C) / E(C)	--(--) / F(F)	--(--) / F(B)	E(D) / E(D)	--(--) / F(F)
SR 99 to I-5 Alternative	E(D) / F(E)	E(D) / D(C)	F(E) / D(D)	F(D) / E(B)	C(C) / E(D)	--(--) / F(F)	--(--) / F(B)	E(E) / D(D)	--(--) / F(F)
I-5 to SR 99 Alternative	E(D) / F(E)	E(D) / D(C)	F(E) / E(D)	F(D) / F(B)	C(C) / E(D)	--(--) / F(F)	--(--) / F(B)	E(E) / E(D)	--(--) / F(F)
Preferred Alternative: Kent/Des Moines Station Options									
At-Grade	E(E) / F(F)	F(E) / E(D)	F(E) / D(D)	F(D) / E(B)	C(C) / E(C)	--(--) / F(E)	--(--) / F(B)	E(D) / D(D)	--(--) / F(F)
Kent/Des Moines I-5	E(D) / F(E)	E(D) / D(C)	F(E) / D(D)	E(D) / E(B)	C(C) / E(C)	--(--) / F(E)	--(--) / F(B)	E(D) / D(D)	--(--) / F(F)
Preferred Alternative: Federal Way Station Options									
Federal Way I-5	E(D) / F(F)	E(D) / D(C)	F(E) / D(D)	F(D) / E(B)	C(C) / E(C)	--(--) / F(E)	--(--) / F(B)	E(D) / D(D)	--(--) / F(F)
Federal Way S 320th Park-and-Ride	E(D) / F(F)	E(D) / D(C)	F(E) / D(D)	F(D) / E(B)	C(C) / E(C)	--(--) / F(E)	--(--) / F(B)	E(E) / D(D)	--(--) / F(F)
SR 99 Alternative: Kent/Des Moines Station Options									
Kent/Des Moines HC Campus	E(D) / F(E)	E(D) / E(D)	F(E) / E(D)	F(D) / F(B)	C(C) / E(D)	--(--) / F(F)	--(--) / F(B)	E(D) / E(D)	--(--) / F(F)
Kent/Des Moines SR 99 Median	E(D) / F(E)	E(D) / E(C)	F(E) / E(D)	F(D) / F(B)	C(C) / E(D)	--(--) / F(F)	--(--) / F(B)	E(D) / E(D)	--(--) / F(F)
Kent/Des Moines SR 99 East	E(D) / F(E)	E(D) / E(C)	F(E) / E(D)	F(E) / F(B)	C(C) / E(D)	--(--) / F(F)	--(--) / F(B)	E(D) / E(D)	--(--) / F(F)
SR 99 Alternative: Federal Way Station Options									
Federal Way SR 99	E(D) / F(F)	E(D) / E(D)	F(E) / E(D)	F(D) / F(B)	C(C) / E(D)	--(--) / F(F)	--(--) / F(B)	D(D) / D(D)	--(--) / F(F)

Notes:
Data in table formatted as AM LOS Unmitigated (AM LOS Mitigated) / PM LOS Unmitigated (PM LOS Mitigated).
LOS designation based on local jurisdiction or WSDOT Standards.

[a] The intersection LOS results with the 272nd Redondo Trench Station Option are similar to the SR 99 Alternative. Intersection LOS results with the Star Lake Elevated Station Option are similar to the preferred Alternative.

N/A = not applicable; mitigation not proposed for intersection.

In the build condition, intersection operations would degrade at these intersections compared with the No Build Alternative and would not meet LOS standards. The potential mitigation identified in Table 7-1 would improve intersection operations to either meet LOS standards or operate the same as, or better, than under the No Build Alternative. Table 7-3 provides mitigated LOS results for each of the improved intersections under the Kent/Des Moines Station interim terminus condition.

TABLE 7-3
Comparison of Standard, No Build, and Mitigated Build Intersection LOS for Kent/Des Moines Interim Terminus Condition

Alternative	SR 99/Kent-Des Moines Road	SR 99/S 240th Street	Military Road S/259th Place S/ S Reith Road
LOS Standard	D	D	E
FWLE Alternatives			
No Build Alternative	E / F	E / D	-- / F
Preferred Alternative	F(D) / F(F)	E (D) / E (D)	--(--) / F (E)
SR 99 Alternative	F(D) / F(F)	F(D) / F (D)	--(--) / F (E)
SR 99 to I-5 Alternative	F(D) / F(F)	E (D) / E (D)	--(--) / F (E)
I-5 to SR 99 Alternative	F(D) / F(F)	F (D) / E (D)	--(--) / F (E)
Preferred Alternative: Kent/Des Moines Station Options			
Kent/Des Moines At-Grade	F(D) / F(F)	E(D) / F (D)	--(--) / F (E)
Kent/Des Moines I-5	F(D) / F(F)	E(D) / E (D)	--(--) / F (E)
SR 99 Alternative: Kent/Des Moines Station Options			
Kent/Des Moines HC Campus	F(D) / F(F)	E (D) / F (D)	--(--) / F (E)
Kent/Des Moines SR 99 Median	F(D) / F(F)	F (D) / F (D)	--(--) / F (E)
Kent/Des Moines SR 99 East	F(D) / F(E)	E (D) / F (D)	--(--) / F (E)

Notes:
Data in table formatted as AM LOS Unmitigated (AM LOS Mitigated) / PM LOS Unmitigated (PM LOS Mitigated).
LOS designation based on local jurisdiction or WSDOT Standards.

N/A = not applicable; mitigation not proposed for intersection.

7.3.2.2 S 272nd Redondo Station Interim Terminus Conditions

SR 99 Alternative and I-5 to SR 99 Alternative

In the S 272nd Redondo Station interim terminus condition, mitigation is proposed at the following intersections with the SR 99 and the I-5 to SR 99 alternatives:

- SR 99/Kent-Des Moines Road
- SR 99/S 240th Street
- SR 99/S 272nd Street
- I-5 Northbound Ramps/S 272nd Street
- I-5 Southbound Ramps/S 272nd Street
- Military Road S/S 272nd Street
- Star Lake Road/S 272nd Street

- Military Road S/259th Place S/S Reith Road
- SR 99/S 276th Street

In the build condition, intersection operations would degrade at these intersections relative to the No Build Alternative and would not meet LOS standards. The potential mitigation identified in Table 7-1 would improve operations at these intersections to meet the jurisdictional LOS standards or No Build Alternative conditions. Table 7-4 provides mitigated LOS results for each of the improved intersections under the S 272nd Redondo Station interim terminus condition.

7.3.2.3 S 272nd Star Lake Station Interim Terminus Conditions

Preferred Alternative and SR 99 to I-5 Alternative

In the S 272nd Star Lake Station interim terminus condition, mitigation is proposed at the following intersections with the Preferred and the SR 99 to I-5 alternatives:

- SR 99/Kent-Des Moines Road
- SR 99/S 240th Street
- SR 99/S 272nd Street
- I-5 Northbound Ramps/S 272nd Street
- I-5 Southbound Ramps/S 272nd Street
- Military Road S/S 272nd Street
- Star Lake Road/S 272nd Street
- Military Road S/259th Place S/S Reith Road

The potential mitigation identified in Table 7-1 would improve intersection operations to operate the same as, or better than, under the No Build Alternative. Table 7-4 provides mitigated LOS results for each of the improved intersections under the S 272nd Star Lake Station interim terminus condition.

7.3.3 I-5 Ramp Terminal Operations

Additional analysis was completed using SimTraffic to validate the intersection operations and vehicle queue results with mitigation near the I-5 and Kent-Des Moines Road and S 272nd Street interchanges. This analysis was conducted for the No Build Alternative and Preferred Alternative Kent/Des Moines Station interim terminus and S 272nd Station interim terminus conditions. The Preferred Alternative interim terminus conditions were evaluated because this scenario would generate the highest number of peak hour trips in these two interchange areas. The analysis was conducted with the potential mitigation improvements recommended for the Preferred Alternative.

TABLE 7-4

Comparison of Standard, No Build, and Mitigated Build Intersection LOS for S 272nd Interim Terminus Condition

Alternative	SR 99/Kent-Des Moines Road	SR 99/S 240th Street	SR 99/S 272nd Street	I-5 Northbound Ramps/ S 272nd Street	I-5 Southbound Ramps/S 272nd Street	Military Road S/S 272nd Street	Star Lake Road/S 272nd Street	Military Road S/259th Place S/S Reith Road	SR 99/S 276th Street
LOS Standard	D	D	D	D	D	E	E	E	D
No Build Alternative	E / F	E / D	F / D	E / E	C / E	-- / F	-- / E	-- / F	B / B
Preferred Alternative	E(E) / F(F)	E(D) / D(D)	F(E) / D(D)	F(E) / F(E)	C(C) / E(D)	--(--) / F(F)	--(--) / F(E)	--(--) / F(F)	B(B) / C(C)
SR 99 Alternative	E(D) / F(F)	E(D) / E(D)	F(E) / E(D)	F(E) / F(C)	C(C) / E(D)	--(--) / F(F)	--(--) / F(C)	--(--) / F(F)	E(D) / B(B)
SR 99 to I-5 Alternative	E(D) / F(E)	E(D) / D(C)	F(E) / E(C)	F(E) / -F(D)	C(C) / -E(B)	--(--) / F(F)	--(--) / F(B)	--(--) / F(F)	N/A

Notes:
Data in table formatted as AM LOS Unmitigated (AM LOS Mitigated) / PM LOS Unmitigated (PM LOS Mitigated).
LOS designation based on local jurisdiction or WSDOT Standards.

N/A = not applicable; mitigation not proposed for intersection.

The SimTraffic analysis results indicate that overall AM and PM peak hour queue lengths on the I-5 ramps in the Kent-Des Moines Road interchange area with the FWLE would be lower than with the No Build Alternative, and the queues would not extend onto the I-5 mainline. In the S 272nd Street interchange area, the SimTraffic results also indicate that overall AM and PM peak hour queue lengths on the I-5 ramps with the FWLE would be lower than with the No Build Alternative, and the queues would not extend onto the I-5 mainline, with one exception. The PM peak hour queue length on the I-5 southbound ramp would extend onto the I-5 mainline; however, the queue length under the Preferred Alternative would still be shorter than with the No Build Alternative. Forecasted queue lengths from the SimTraffic analysis are provided in Appendix E, I-5 Ramp Terminal Queue Length Results, to this technical report.

7.4 Safety

The FWLE alternatives would have no effect on transportation safety that would require mitigation. Even though there would be a slight increase in the expected number of crashes at the I-5 interchanges from increased traffic volumes accessing the light rail stations, the FWLE would shift up to 9,000 people per day from driving or taking another non-transit mode to using transit. This would result in a reduction of up to 160,000 vehicles miles traveled (VMT) per day in the region. A shift of mode where people use transit and travel less would inherently have a safety benefit because fewer crashes would be expected.

Project elements, such as the placement of guideway columns, would be designed to roadway standards, thereby eliminating the need for safety-related mitigation. As noted in Section 4.4, Safety, the I-5 southbound mainline in the FWLE study area has about 11,500 feet of existing guardrail, walls, or barriers that would shield vehicles from FWLE light rail columns.

The proposed mitigation measures outlined in Table 7-1 would not adversely affect transportation safety in the study area. In some cases, as a result of these measures, intersection safety could be improved. With the intersection mitigation defined for the Preferred Alternative in Table 7-1, interchange operations and queue lengths at the interchange ramps would be similar or less than with the No Build Alternative. Therefore, the FWLE would require no additional mitigation along I-5 to address safety. Interchange operations and queues lengths are described in Section 4.3.5, and no additional mitigation would be needed with the FWLE along I-5 to address safety.

7.5 Parking

For acquired off-street parking resulting from partial property acquisitions, business opportunities might be reduced. The value of acquired parking depends on the quantity of spaces lost and the business type. Sound Transit would work with private business owners to determine fair market value of the acquired spaces.

The potential additional S 216th West or East and S 260th West or East station options also would have the potential for hide-and-ride activity because no parking would be provided at these stations;

however, the hide-and-ride potential would be minimized at the S 216th West or either S 260th Station because there is a low amount of easily accessible on-street public spaces near these station locations.

A greater likelihood for hide-and-ride parking exists near the potential additional S 216th East Station and may require mitigation. Sound Transit would work with local jurisdictions to evaluate and, if necessary, implement hide-and-ride mitigation around any of the stations. If requested by local jurisdictions, Sound Transit would inventory on-street parking around a station before and after the start of light rail revenue service, and would then determine where mitigation measures would be needed in coordination with the local jurisdiction. Potential parking control measures include parking meters, restricted parking, passenger and truck load zones, and residential parking zones (RPZs). For parking controls agreed to with local jurisdictions, Sound Transit would be responsible for the cost of installing the parking controls agreed to with the local jurisdictions for 1 year after the opening of the FWLE. The local jurisdictions would be responsible for monitoring the parking controls and providing all enforcement and maintenance, including ongoing RPZ-related costs. Off-street private lot owners would be responsible for monitoring and preventing potential hide-and-ride parking within their own lots.

At the Kent/Des Moines Station, Sound Transit could consider a parking management program to maximize the parking capacity and to deter Highline College students from parking at the station parking areas. The parking management program could include restricted parking signage, permit parking only, priced parking similar to Highline College pricing rates, and/or working with Highline College to develop on-campus pricing strategies that make on-campus parking more attractive.

7.6 Non-motorized Facilities

The FWLE would not result in any adverse impacts on existing non-motorized facilities because all of the non-motorized analyses indicate an LOS D or better near the stations. At stations, Sound Transit would provide pedestrian and bicycle improvements to safely accommodate the projected increase in pedestrian and bicycle travel associated with the FWLE in accordance with Sound Transit System Access Policy. Sound Transit would also work with local agencies to determine which pedestrian and bicycle improvements would be most appropriate to support station access and safety. Any new facilities would be expected to meet local and federal design standards for pedestrian and bicycle facilities.

7.7 Freight Mobility and Access

No transportation impacts were identified for freight mobility and access as a result of the FWLE; therefore, no mitigation would be needed for these elements.

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8.0 Cumulative Impacts

This chapter discusses potential cumulative transportation mobility impacts that would be caused by the FWLE. The analysis of the No Build Alternative and the FWLE alternatives is inherently cumulative because it is based on regional forecasts that assume future funded projects and future growth in population and employment, located in designated growth centers, and consistent with adopted land use plans. However, there could be differences in impacts based on the details of other individual transportation or development projects and the actual rate and timing of population or employment growth in a given community.

8.1 Regional Facilities and Travel

Based on the latest state, regional, and surrounding local agencies' transportation plans, several transportation projects are assumed to be constructed by 2035, and therefore are included in the No Build and build alternatives analysis. The background project list includes the Washington State Department of Transportation (WSDOT) Puget Sound Gateway Program, which includes the SR 509 and SR 167 extension projects, the I-5/SR 161/SR 18 Federal Way Triangle vicinity improvements, and other local agency intersection and roadway projects. The FWLE analysis assumed the design included in the 2003 *SR 509: South Corridor Completion/I-5/South Access Road Final EIS* is constructed by 2035 under both the No Build and Build alternatives. WSDOT is currently considering design modifications to the SR 509 Extension Project. These modifications could alter the travel patterns in the study area and therefore could increase or decrease the FWLE's impacts.

Beyond these projects, WSDOT could continue to implement lane management strategies, such as express tolled lanes on the highway system. Depending on how lane management strategies were administered, managed lanes could improve travel conditions on the highway system for some travel modes. Since there have been no studies of lane management strategies along I-5 nor specific legislative authorization, Sound Transit has maintained the current I-5 high-occupant vehicle (HOV) designation for the future analysis. This analysis provides a forecast that would likely generate the most amount of trips in the study area since strategies to manage the demand on I-5 are not assumed.

8.2 Transit Service and Operations

Future extensions of the regional mass transit network are depicted in Sound Transit's *Regional Transit Long-Range Vision* and include an extension south to Tacoma (Sound Transit, 1996a). If voters approve funding for construction of additional transit extensions, transit accessibility for the communities in the FWLE corridor would be increased through connections to additional regional destinations. King County Metro (Metro) is currently developing a Long-Range Plan that proposes substantial changes to the region's future bus service. Sound Transit and Metro have developed a conceptual bus service plan for the FWLE that assumes some of the proposed Long-Range Plan changes. If the Metro Long Range Plan was fully implemented, additional buses within the study area would provide increased transit service at the FWLE stations that could increase overall light rail ridership. If the Kent/Des Moines

Station is an interim terminus, Sound Transit may consider rerouting some of their I-5 bus service to this station, which would increase light rail ridership.

8.3 Arterial and Local Street Operations

The future transportation impacts discussed in Chapter 4, Environmental Impacts, of this technical report were based on the results of traffic and ridership modeling that incorporates funded and approved future actions as well as projected growth that would include development in the region. Other planned, but not funded, regional and local transportation and development projects could have some impacts on transit ridership and travel patterns within the study area, including traffic operations near the FWLE stations. This includes potential transit-oriented development, which could change how people access the stations, with a likely increase in people walking or biking to the station as nearby development occurs.

The 2003 design of the SR 509 Extension proposes closing S 208th Street east of SR 99 and extending S 211th Street east to 32nd Lane S to maintain neighborhood access to SR 99. With the Preferred or I-5 to SR 99 alternatives, roadway improvements in this area proposed as part of the SR 509 Extension would need to be redesigned to maintain neighborhood access and maintain a grade-separated light rail guideway in this area. Sound Transit would coordinate with WSDOT on potential alternatives to the current roadway design for S 211th Street.

8.4 Safety

The future safety impacts under the No Build and Preferred alternatives, discussed in Chapter 4 of this technical report, includes reasonably foreseeable future transportation projects. Other development would not likely affect safety in the study area.

8.5 Parking

Parking within the FWLE corridor could be affected by land use and transportation roadway changes that are not reflected in this analysis. In particular, transportation projects that increase roadway capacity could increase parking demand within the corridor. Conversely, increases in regional transit service and connections could decrease parking demand as travelers shift their modes of travel.

8.6 Non-motorized Facilities

Future unfunded projects or local growth could add more pedestrian and bicycle trips to the street network surrounding the light rail stations. These future projects could improve non-motorized facilities within the FWLE study area.

8.7 Freight Mobility and Access

As described in Chapter 4, none of the build alternatives would have long-term travel impacts on automobile or truck traffic in the Puget Sound Region because the light rail guideway would operate in its own right-of-way. Therefore, there would be no potential cumulative transportation impacts on freight mobility and access with any of the build alternatives.

8.8 Construction

Chapter 5, Construction, covers the impacts of FWLE construction assuming that the FWLE would be constructed prior to the SR 509 Extension. Based on the current project construction schedules (see Exhibit 1 in Appendix A of this technical report), FWLE construction would begin about 2 years before SR 509 Extension construction, but some construction activities could be concurrent. If the FWLE and SR 509 Extension were constructed simultaneously, the number of trucks on I-5, SR 99, and other major roadways in the area and the number and duration of road closures would increase, thereby affecting all modes of transportation. Overall, it would increase impacts on the roadway capacity, transit service, sidewalks, and parking within most construction zones.

Sound Transit would coordinate with WSDOT on the timing of any road closures to minimize traffic impacts. As project designs advance, Sound Transit and WSDOT would coordinate on opportunities to combine construction of some project elements to minimize impacts and potentially reduce project costs.

Similar to the SR 509 Extension, construction of other WSDOT projects, including I-5/SR 161/SR 18 Triangle and SR 167 Extension projects, could overlap with the FWLE construction. If so, truck volumes are expected to increase on I-5 but, in general, would not affect the number and duration of road closures in the FWLE study area. Regardless, Sound Transit would coordinate with WSDOT on the timing of any road closures to minimize traffic impacts.

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