3 TRANSPORTATION ENVIRONMENT AND CONSEQUENCES

3.1 Summary

The intent of this chapter is to inform the public about the potential transportation effects of the West Seattle Link Extension Project (the project) alternatives, provide for a comparison of alternatives, and identify potential mitigation strategies or approaches where potential project impacts are identified. This transportation analysis identifies and evaluates the project alternatives' potential construction-period and long-term impacts for the following transportation elements:

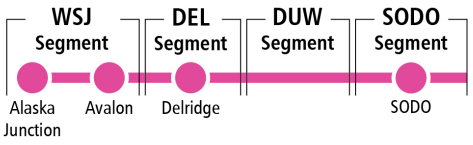
- Regional system and travel, including vehicle miles of travel, vehicle hours of travel, vehicle hours of delay, and mode share
- Transit services, including regional and local services, project and station ridership, and transit quality and performance levels of service (L.O.S.)
- The arterial and local street system, including property access, local traffic circulation, and intersection L.O.S.
- Parking, including the loss of parking due to project facilities, changes in curb use functions near stations, and potential hide-and-ride parking impacts near stations
- Non-motorized facilities (bicycle and pedestrian) around stations and on major bicycle or pedestrian trails affected by the alternative or alternatives
- Safety (all modes)
- Navigation
- Freight (truck, rail, and water)

Potential indirect impacts are discussed in Section 3.12.

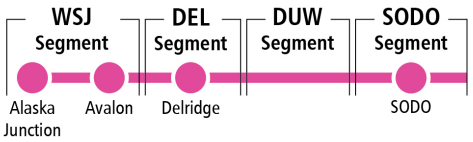
Table 3-1 summarizes key transportation findings discussed later in this chapter. The Transportation Technical Report included as Appendix N.1 to this Final Environmental Impact Statement (EIS) provides further information supporting the results and conclusions described in this chapter.

Table 3-1. Transportation Key Findings

Transportation Element	Key Findings
Regional System and Travel (Section 3.3)	• The project would reduce average weekday vehicle miles of travel by approximately 17,000 by year 2042. • The number of persons traveling through the study area is expected to increase with the project. A greater percentage of these persons would use transit compared to the No Build Alternative. • Construction-related impacts to regional roadways are expected to be short in duration and/or limited to nights and weekends. • For all Build Alternatives, construction of the new SODO Station may require closure of the existing SODO Station for multiple years. Sound Transit is exploring options to retain regional transit access in the SODO Station area that could include shuttle service or reroutes to King County Metro (Metro) buses to connect to the Stadium Station. A feasibility study of an interim station near the existing SODO Station is also proposed.



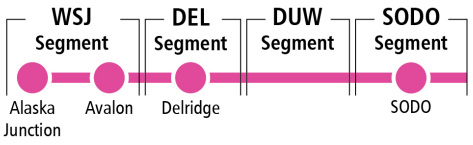
Transportation Element	Key Findings
Transit (Sections 3.4 and 3.11)	• In total, the project would carry between 24,000 and 27,000 daily riders by 2042. The addition of the West Seattle Link Extension to the regional transit system would result in about 2,000 net new daily transit trips by 2042. • Transit service quality, including daily hours of operation, frequency, reliability, and passenger load, would improve with the project. • The project travel time from the Alaska Junction Station to downtown would be approximately 50 percent faster in the p.m. peak than No Build bus travel between these areas. • The SODO Busway would be permanently closed for some SODO alternatives and closed for multiple years during construction for all SODO alternatives. This closure would impact more buses during the construction period, causing additional travel time. • Construction of the guideway, stations, and support infrastructure could disrupt Metro bus operations and access to transit for several years. Roadway, travel lane, bus stop, layover, and sidewalk and bike facility closures would be coordinated between Sound Transit, Metro, and the City of Seattle to identify alternative bus routes, bus stops, layover areas, and transit access locations. Sound Transit would implement mitigation for adverse impacts to Metro operations and access to transit caused by the construction activities.
Arterials and Local Streets Operations (Sections 3.5 and 3.11)	• In general, the presence of West Seattle Link Extension stations would increase activity on the streets around them. The predominant West Seattle Link Extension station mode of access is walking/biking and riders transferring to and from other transit services. The number of automobiles accessing stations would be limited as there are no park-and-rides with the project. • Project Build Alternatives that are elevated within the roadway would have some property access and circulation impacts; however, these are expected to be for short roadway segments as the alignments are all in exclusive guideway and mainly outside of roadway operations. • In the study area, no intersections in the SODO and Duwamish segments would be operationally affected by the project based on the project's L.O.S. threshold. The Delridge Segment would have up to three intersections affected, and the West Seattle Junction Segment would have up to five intersections operationally affected by the project alternatives. The preferred alternative would affect five study intersections. • During project construction, some local and arterial streets would be partially or fully closed in all segments, increasing traffic congestion on adjacent streets for durations of short periods (nights and weekends) up to multi-year closures. Among the preferred alternative roadway closures, most effects would be in the SODO and West Seattle Junction segments.
Parking (Sections 3.6 and 3.11)	• There is the potential for hide-and-ride parking where there is unrestricted parking near the proposed project stations, but the long-term impact is expected to be minimal as the City of Seattle and Sound Transit would implement parking management strategies within the station areas, as appropriate. • The preferred alternative would permanently remove between 120 and 305 on-street parking stalls and would temporarily remove between 245 and 595 additional on-street parking stalls during construction. • The other Build Alternatives could permanently remove between 45 and 315 on-street parking stalls and temporarily remove between 125 and 750 additional stalls, depending on the alternative in each segment.
Non-motorized Facilities (Sections 3.7 and 3.11)	• The project stations would be located in neighborhoods with generally well-connected pedestrian and bicycle networks, though there are some gaps as well as existing facilities not meeting Americans with Disabilities Act or the City's Seattle Streets Illustrated standards. • The SODO Station and Alaska Junction Station would have the highest pedestrian and bicycle activity—about 700 riders during the p.m. peak hour. • The pedestrian L.O.S. would generally be acceptable for all alternatives and station options, with all crosswalks and sidewalks operating at L.O.S. E or better. • Construction would result in closed or modified non-motorized facilities for various durations throughout the project. Some street connections would be permanently closed, requiring pedestrians and cyclists to use alternate routes.



Transportation Element	Key Findings
Safety (Sections 3.8 and 3.11)	• The project would shift up to 2,000 daily trips from auto or other non-transit modes to transit, resulting in fewer roadway conflicts. • Stations would be designed to accommodate the forecasted level of activity, and access would be at signalized, controlled locations and/or would be grade-separated. • During construction, overall crashes in the project corridor would be similar between the build and no build conditions, however the location of those crashes could change as traffic shifts to alternate routes.
Navigation (Sections 3.9 and 3.11)	• The bridge over the West Waterway would have the same or greater clearance as the West Seattle Bridge. All vessels that currently travel under the bridge in the West Waterway could continue to do so. The vertical clearance proposed over the East Waterway would also allow all vessels that currently use the East Waterway to continue to do so. Alternative DUW-2 would cross over a navigation channel in the East Waterway approximately 150 feet north of the Spokane Street (fixed) Bridge, which has a vertical clearance of 5 feet and blocks the majority of vessels from navigating under the bridge and would reduce the horizontal clearance and the area available for navigation and maneuvering. Option DUW-1b would permanently displace moorage on the Duwamish Waterway, and all alternatives would temporarily displace moorage during construction. All alternatives would result in short-term closures of the East and West waterways and require intermittent closures of all or part of the navigation channel during construction. All alternatives would temporarily reduce portions of the planned vertical clearance over both waterways during construction.
Freight Mobility and Access (Sections 3.10 and 3.11)	• All Build Alternatives would retain clearance envelopes for truck streets, roads in the City of Seattle's Over-Legal Network, and railroad tracks; access to freight properties would be maintained. • All Build Alternatives could affect 4th Avenue South, a Major Truck Street, between South Massachusetts Street and South Spokane Street, where transit improvements would be constructed to accommodate buses diverted from the SODO Busway. Improvement options being considered include bus queue jumps at key intersections, business access and transit lanes, and/or a freight and bus lane that could be shared by buses and trucks. The first two transit improvement options could increase delays to truck traffic on 4th Avenue South, and the third could reduce delays for truck traffic. • During project construction, freight routes would be impacted with partial or full roadway closures. Alternate routes would be available but would require some out-of-direction travel for trucks. • For locations where commercial load zones would be eliminated, Sound Transit would coordinate with the City of Seattle to locate alternative commercial load zones, where feasible. • Spur tracks along the SODO Busway north of South Lander Street would be removed with all alternatives. The BNSF storage tracks on the west side of the SODO Busway between the vicinity of South Hinds Street and South Lander Street would also be eliminated. Loading and lead tracks on the east side of the SODO Busway south of South Lander Street, including those that serve Franz Bakery and the 7th Avenue South lead tracks, would be retained.

3.2 Introduction and Methodology and Assumptions

The West Seattle and Ballard Link Extensions (WSBLE) Draft EIS, published in January 2022, reflected an existing year condition of 2019. For consistency, this Final EIS continues to use 2019 as the base year. Section 3.3 describes the existing (2019) conditions, future long-term (operation) conditions, and construction impacts for the project on the regional system and travel, as well as their potential mitigation. Sections 3.4 through 3.10 describe the affected environment and operation impacts under existing and future year 2042 long-term conditions for the West Seattle Link Extension for each of the remaining seven transportation elements listed in Section 3.1; the future long-term condition compares the No Build Alternative and the Build



Alternatives. Section 3.11 presents the construction-period impacts of the project on the transportation system for each of the non-regional transportation elements.

The 2042 future condition for the transportation analysis represents Sound Transit's long-range plans, when the Sound Transit 3 program, including the project, would be complete. The delivery of the Sound Transit 3 program is a key future assumption within this Final EIS. The Sound Transit Board in summer 2021 adopted a Sound Transit 3 realignment plan that modifies the delivery of the projects within the Sound Transit 3 program. As part of the adopted realignment target and affordable schedules, the West Seattle Link Extension would still be constructed by 2032. In addition, most of the other projects in the Sound Transit 3 program would be constructed by the 2042 horizon year, with the exception of non-Link light rail projects outside of Seattle. Therefore, the adopted Sound Transit 3 realignment schedule would not have any noticeable effect on this Final EIS analysis.

Some transportation elements also analyze 2032 for the construction-period analysis. Potential mitigation for construction-period and long-term project impacts on the regional roadway system is discussed in Section 3.3.3. Mitigation for operation impacts on each of the seven remaining transportation elements is discussed in those individual sections; mitigation for construction impacts is discussed in Section 3.11.6.

The study area for this transportation analysis generally extends 0.5 mile from the project alternatives (including stations). Some transportation elements require a modified study area, and in those cases, the modified study area is defined in the applicable section. Figure 3-1 shows the general transportation study area for the project.

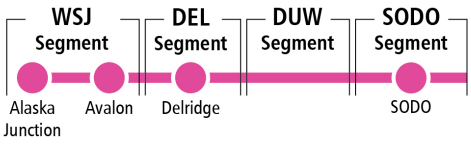
The methodology and assumptions used to analyze the transportation impacts of the projects have been compiled in the *West Seattle Link Extension Transportation Technical Analysis Methodology* report, which is provided in Attachment N.1A of Appendix N.1. That report presents the following information:

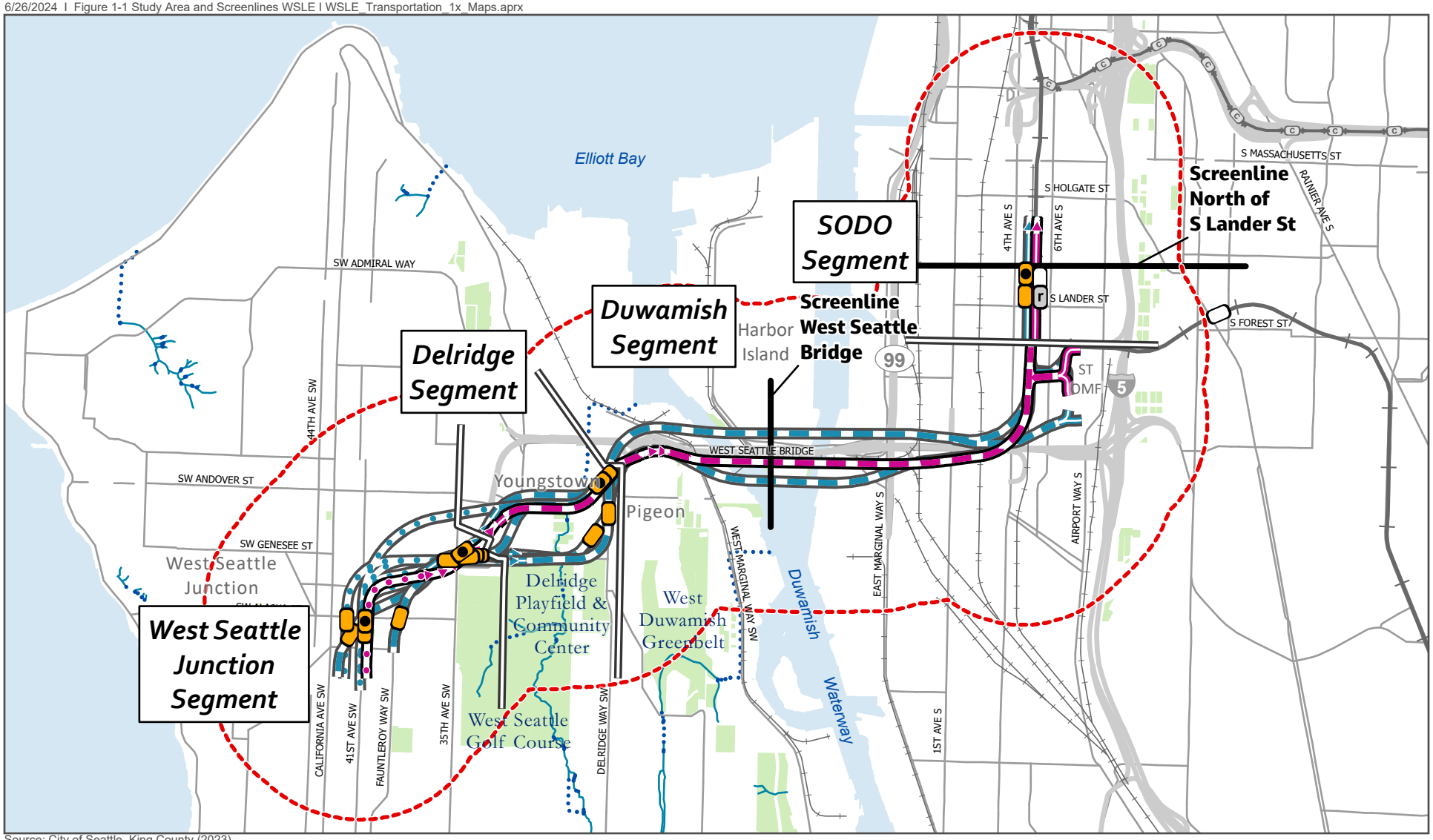
- Agency guidelines and regulations regarding the transportation analysis
- Transportation analysis methodology, including relevant definitions, data collection, regional traffic analysis, intersection impact analysis, and safety assessments
- Methods for traffic forecasting and transit ridership estimates
- Methods for assessing project impacts related to light rail stations, parking, non-motorized facilities and modes, property access and circulation, freight (truck and rail), transit, navigation, and construction
- Specific roadways, intersections, transit facilities, and waterways analyzed

Analysis of the West Seattle Link Extension minimum operable segment (M.O.S.) is presented where the M.O.S. would have effects that exceed the full-build Build Alternatives. The following elements include discussion of the M.O.S.:

- Transit
- Arterial and local street operations
- Non-motorized facilities

In addition to the relevant regulations, plans, and policies considered in all environmental analyses, the transportation analysis was guided by laws and regulations relevant to transportation and informed by the policy direction established in the numerous plans and policy documents adopted within the project corridor. These documents are listed in the *West Seattle Link Extension Transportation Technical Analysis Methodology* report (Attachment N.1A of Appendix N.1).





Source: City of Seattle, King County (2023).

Preferred Alternative
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Other Alternatives
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station (● *Indicates Preferred Alternative*)
- New
- Relocated
- Existing

- Segment Line
- Sound Transit Operations and Maintenance Facility (ST OMF)
- Existing Link Light Rail
- East Link Light Rail (Under Construction)
- Railroad
- Stream
- Piped Stream
- Park
- Screenlines
- Study Area

0 0.5 1 Mile

N

FIGURE 3-1
Study Area and Screenlines

West Seattle Link Extension

3.3 Regional Context and Travel

This section describes the existing and anticipated future conditions of the regional roadway system through the project study area.

3.3.1 Affected Environment and Operation Impacts

The City of Seattle has designated the West Seattle Junction neighborhood as a hub urban village, and Puget Sound Regional Council has designated Downtown Seattle as a regional growth center, meaning that these areas would continue to add housing and jobs over the next 20 years as a matter of policy. The project corridor also includes the Puget Sound Regional Council- and City-designated Duwamish Manufacturing/Industrial Center. See Section 4.2, Land Use, for further discussion of land uses and a map of this area.

The regional facilities within the study area include the West Seattle Bridge, State Route 99, and Interstates 5 and 90. Major arterials include Fauntleroy Way Southwest, 35th Avenue Southwest, Delridge Way Southwest, 1st Avenue South, 4th Avenue South, 6th Avenue South, Airport Way South, South Lander Street, and South Holgate Street.

In 2019, within the central Puget Sound region, there were over 88 million vehicle miles traveled and 3.1 million vehicle hours traveled daily (King, Kitsap, Pierce, and Snohomish counties). Approximately 815,000 of those vehicle hours traveled represent delay due to congestion. Approximately 17 million total daily trips occurred in the Puget Sound region, with single-occupancy vehicles and freight making up over 40 percent of the travel in the region. High-occupancy vehicles with two or more people were used for nearly 40 percent of the travel in the region, with walking and bicycling used for approximately 14 percent and transit use at around 5 percent.

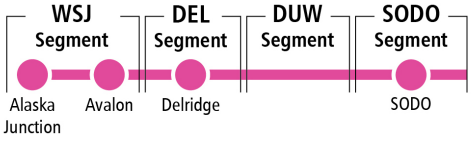
Screenlines are imaginary boundaries drawn crossing major roadways within the study area. Data at these screenlines provide a snapshot of traffic operations (such as volumes and travel mode share) along each corridor, based on the travel demand estimated from Puget Sound Regional Council and Sound Transit regional models. Two screenline locations were developed for the project: the West Seattle Bridge and north of South Lander Street (Figure 3-1).

Vehicle volume-to-capacity ratio is a performance measure used to assess travel conditions on the regional facilities in the study area.

A ratio of greater than 0.9 suggests the roadway is approaching capacity, and a ratio of greater than 1.0 indicates demand is exceeding the capacity and the road cannot effectively accommodate all traffic, leading to substantial congestion restricting the movement of people and goods. During the p.m. peak hour, both regional screenlines are over capacity in the peak travel direction, with volume-to-capacity ratios greater than 1.0. Transit mode share is relatively high in the p.m. peak hour peak direction with mode share between 17 to 21 percent across the two screenlines. Single-occupancy vehicle travel accounts for at least 50 percent of all trips across both screenlines in both directions.

3.3.1.1 No Build Alternative

The No Build Alternative describes anticipated future land use and transportation conditions if the project was not built. Between the existing condition and 2042, Puget Sound Regional Council's travel demand forecast model forecasts up to 2.5 percent growth in p.m. peak hour vehicle trips across the two screenlines. Total screenline p.m. peak hour person trips are forecasted to increase between 2 and 29 percent (see Tables 2-2 and 2-6 in Section 2 of



Appendix N.1). A number of planned and funded regional transportation improvements are assumed to be completed during the same timeframe; these include light rail expansion, bus corridor projects, and the City of Seattle Waterfront Improvement Program. For a list of assumed future projects, see the *West Seattle Link Extension Transportation Technical Analysis Methodology* report, Attachment N.1A of Appendix N.1.

While the West Seattle Link Extension would not be implemented with the No Build Alternative, the Ballard Link Extension, Downtown Redmond Link Extension, Lynnwood Link Extension, Everett Link Extension, Federal Way Link Extension, South Kirkland-Issaquah Link Extension, and Tacoma Dome Link Extension are assumed to be completed by 2042 as part of the No Build Alternative. Transit routing is assumed to generally conform to King County's 2050 Metro Connects long-range service vision, with an average of 1 percent annual growth in service hours per year (the number of hours of active bus service) (Metro 2021).

3.3.1.2 Build Alternatives

This section discusses regional transportation conditions in 2042 with the project in operation. Because all the full-build project alternatives have equivalent effects on travel patterns at the regional scale, a single representative set of analysis results (based on modeling of the preferred alternative) is presented here for comparison to the No Build Alternative.

The definition of the Build Alternative in this section includes the operations described in Chapter 2, Alternatives Considered.

3.3.1.2.1 Vehicle Miles Traveled and Vehicle Hours Traveled

Table 3-2 shows average weekday vehicle miles traveled, vehicle hours traveled, and vehicle hours of delay for the Build Alternatives and No Build Alternative in year 2042.

With the project, daily vehicle miles traveled, vehicle hours traveled, and vehicle hours of delay are forecasted to decrease compared to the No Build Alternative.

Table 3-2. Average Weekday Vehicle Miles Traveled, Vehicle Hours Traveled, and Vehicle Hours of Delay in 2042

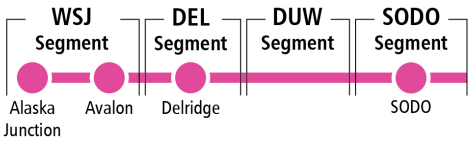
Alternative	Vehicle Miles Traveled	Vehicle Hours Traveled	Vehicle Hours of Delay
No Build Alternative	96,874,600	3,430,600	965,500
Build Alternative	96,858,000	3,429,800	965,000
Change	-16,600	-800	-500
Percent Change	-0.02%	-0.02%	-0.05%

Source: Puget Sound Regional Council and Sound Transit regional models (2042 No Build and Build).

Note: Regional measures include travel by passenger vehicles, freight, and buses.

3.3.1.2.2 Screenline Performance

The project would increase transit ridership and slightly decrease traffic volumes and congestion across the two study area screenlines. Modest vehicle volume decreases (up to 1 percent) during the p.m. peak hour are expected in both the peak and reverse peak directions with the project, but most roads across the screenlines would operate at or near capacity (i.e., volume-to-capacity ratio equal to or greater than 0.90), with or without the project. The number of persons traveling across the West Seattle Bridge screenline via transit during the p.m. peak hour is expected to increase. Travel via transit across the north of South Lander Street



screenline is expected to remain the same. The shifts to transit with the Build Alternative would cause a slight decrease in single-occupancy-vehicle and high-occupancy-vehicle travel for the West Seattle Bridge screenline. The daily transit mode share across the two screenlines have transit percentages between 14 and 19 percent with the No Build Alternative. With the project, daily transit mode share at the West Seattle Bridge screenline would increase by 1 percent and stay the same at the North of South Lander Street screenline.

3.3.2 Construction Impacts

All Duwamish Segment alternatives would require short-duration (less than 48 hours), partial closures of regional facilities such as State Route 99 and the West Seattle Bridge. The closures would be limited to nights and weekends. Alternative DEL-7 would have a 3- to 6-month partial closure of the West Seattle Bridge just south of the Southwest Andover Street pedestrian bridge. For more details, including exact closure locations, refer to Attachment N.1D, Permanent and Temporary Transportation Facility Closures, in Appendix N.1.

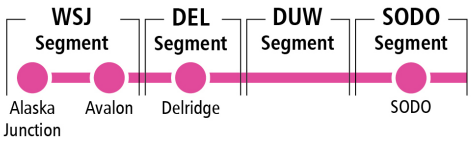
Some arterials in the study area would be fully or partially closed for longer periods, potentially affecting the adjacent regional roadways. The project travel demand model, described in Attachment N.1A of Appendix N.1, was used to assess potential impacts of closures of 1 year or longer. Construction roadway closures may reduce access capacity to regional facilities at some locations, which would result in some vehicles accessing the regional facilities at different on- and off-ramps. However, overall volumes on the regional facilities are not expected to substantially vary. The model predicted minimal effects on regional roadway volumes relative to the No Build Alternative, with peak hour volume changes of roughly 10 vehicles on State Route 99 and Interstate 5 and 20 vehicles on the West Seattle Bridge during construction. Therefore, regional roadways would not be noticeably affected by diverted traffic during the project construction period.

For all alternatives, there would be potential construction-related impacts to 1 Line operations and access. Details of construction phasing would not be finalized until final design, but a long-term (greater than 1 year) closure of the existing SODO Station may be needed while the 1 Line operates on a temporary track around the construction area. There could also be short-term service interruptions for 1 Line service to relocate overhead catenary system wires and adjust the track and other related roadway and station construction. These short-term service interruptions could result in longer headways during single-track operations or complete service interruptions during nights and weekends.

3.3.3 Mitigation

There would be no permanent impacts to regional facilities due to the project, so no long-term mitigation would be needed during light rail operations.

Mitigation for short-term (less than 1-year) construction closures of regional roadways would consist of Sound Transit providing information to drivers about closure timing and alternate routes using communication methods such as detour signs, website updates, and email or text alerts. Because closures of nearby arterials would not result in impacts to regional facilities, no other mitigation is needed beyond what is identified in Section 3.5, Affected Environment and Impacts during Operation – Arterials and Local Street Operations, for the arterials themselves.



3.4 Affected Environment and Impacts during Operation – Transit

This section discusses transit service and facilities; regional and local bus transit; project, segment, and station-level ridership; transit L.O.S. measures; and bus and light rail travel time for the No Build Alternative and Build Alternatives for the project. Section 3 in Appendix N.1 provides additional discussion and data regarding the transit elements described in this section.

3.4.1 Affected Environment

3.4.1.1 Transit Service and Facilities

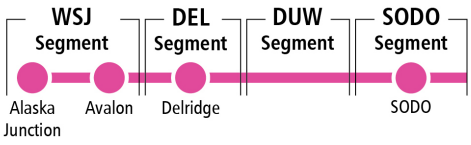
Existing transit service in the project study area is provided by Metro buses. Approximately 22 bus routes operate within the study area. The study area is also served by the King County Water Taxi.

Within the study area, all-day service between Downtown Seattle and West Seattle is provided by the RapidRide C Line and RapidRide H Line, which are both among Metro's highest ridership routes at approximately 7,500 trips per weekday for each route. The RapidRide C Line runs between South Lake Union and West Seattle, through Downtown Seattle, SODO, and Alaska Junction. The RapidRide H Line runs between Downtown Seattle and Burien through Delridge. Within the SODO Segment, bus routes provide frequent service south to locations including Renton, Tukwila, Kent, and Federal Way, and the 1 Line light rail provides service every 8 minutes (peak) and 10 minutes (off-peak) north to the Northgate Station and south to Sea-Tac Airport and Angle Lake Station. In 2019, there was an average of 72,000 weekday boardings on the 1 Line, and by 2023 that had increased to approximately 80,000.

Transit facilities in the study area include the SODO Busway, which runs between South Spokane Street and South Royal Brougham Way and includes dedicated right-of-way for rail and buses; the light rail transitions to the Downtown Seattle Transit Tunnel north of the busway. The nearby BNSF Railway tracks provide service to freight and commuter trains. The SODO Busway also includes approximately 1,700 feet of layover area for buses and a comfort station (a facility used by transit staff) near South Holgate Street. In West Seattle, bus-only lanes are provided along portions of the RapidRide C and RapidRide H Line pathways, including portions of Southwest Alaska Street, 35th Avenue Southwest, Southwest Avalon Way, Delridge Way Southwest, and the West Seattle Bridge. There are two park-and-rides within the study area: Southwest Spokane Street under the West Seattle Bridge near Delridge Way Southwest and the Airport & Spokane park-and-ride under the Spokane Street Viaduct.

3.4.1.2 Transit Travel Time

There are numerous bus routes within the study area, but the RapidRide C Line follows a similar path for a Downtown Seattle-to-West Seattle trip that could be taken on light rail with the project (although the RapidRide C Line does not serve the Delridge or SODO station areas). Between Downtown Seattle (Westlake Station) and West Seattle (Fauntleroy Way Southwest and Southwest Alaska Street), this trip on the RapidRide C Line takes an average of 22 minutes in the peak direction during the peak period, which is about 50 percent longer than during the off-peak period. The same trip by private automobile would take about 16 minutes. Due to congestion and other factors that impact reliability on the route, travel times can vary substantially from these averages.



3.4.1.3 Transit Levels of Service

The performance of existing transit service in the study area was evaluated using L.O.S. measures for frequency, span of service, reliability, and passenger load. L.O.S. A reflects ideal conditions for the measure in question (e.g., all-day service, high frequency, and ample seating), while L.O.S. F reflects poor conditions (e.g., limited hours, long headways, overcrowding). These measures were adapted from the 2013 Transportation Research Board *Transit Capacity and Quality of Service Manual*, 3rd edition, and more information on their definition and how they were applied can be found in Appendix N.1.

Routes were analyzed at two screenline locations along the proposed alignment: the West Seattle Bridge and north of South Lander Street in SODO (Figure 3-1). The a.m. peak period is defined as 5 a.m. to 9 a.m. and the p.m. peak period is 3 p.m. to 7 p.m (Metro 2019).

3.4.1.3.1 Frequency

The RapidRide C Line—which follows a similar route to the project between West Seattle and Downtown Seattle—is a high-frequency route, with peak headways of 6 minutes, or L.O.S. A. Other high-frequency, L.O.S. A routes operating in the project corridor include the RapidRide H Line, Route 21, and Route 125. The average p.m. peak headway for all-day routes, which serve the majority of trips, is 11 minutes (L.O.S. B) at the West Seattle Bridge screenline and 17 minutes (L.O.S. C) at the South Lander Street screenline. For peak-only routes, which generally operate at lower frequencies, those headways are 41 minutes and 35 minutes, respectively (both L.O.S. D). The 1 Line light rail, which crosses the north of South Lander Street screenline, operates at 8-minute headways in the peak, or L.O.S. A.

3.4.1.3.2 Span

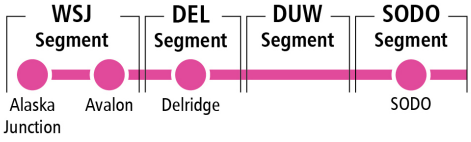
Span of service refers to the number of hours per day a transit service operates. The RapidRide C Line provides service 24 hours a day, every day, and the overall average span of service for all-day bus routes at both screenlines is 20 hours (L.O.S. A) on weekdays and 19 hours (L.O.S. A) on weekends. For weekday peak-only routes, the average span is 7 hours, or L.O.S. D. The 1 Line light rail operates 20 hours a day, 7 days a week (L.O.S. A).

3.4.1.3.3 Reliability

Most of the bus routes in the project corridor operate in general purpose lanes, which are prone to congestion during peak periods. As a result, the average reliability for bus routes in the study area is poor in the a.m. and p.m. peak hours (L.O.S. D through F) in both the inbound (heading toward Downtown Seattle) and outbound (leaving Downtown Seattle) directions. The RapidRide C Line, which generally follows the project alignment, operates at L.O.S. E. By contrast, the 1 Line, which operates in exclusive right-of-way, has high reliability (L.O.S. A).

3.4.1.3.4 Passenger Load

Most transit routes in the study area operate at passenger load L.O.S. A or B; however, some high frequency, high-ridership routes are more crowded in peak directions during peak periods. During the p.m. peak period, the RapidRide C Line operates at L.O.S. D (standing room-only) in the peak (outbound) direction, the RapidRide H Line and Route 21 operate at L.O.S. C, and the 1 Line operates at L.O.S. E.



3.4.2 Environmental Impacts of the No Build Alternative

The West Seattle Link Extension transit system was assessed for 2042 with both the No Build Alternative and Build Alternatives. These effects are measured in terms of transit service and facilities; regional, project, and segment/station ridership forecasts; transit travel time; and transit L.O.S. Temporary impacts during construction were also assessed and are presented in Section 3.11.

The No Build Alternative assumes that all the projects in the Sound Transit 3 plan would have been implemented (including light rail extensions north to Everett and Ballard, east to Redmond, and south to Tacoma) with the exception of the West Seattle Link Extension. In this condition, the 1 Line is assumed for modeling purposes to operate between Ballard Station and Tacoma Dome Station, and the 3 Line is assumed to operate between Everett Station and Stadium Station.

Bus service assumptions for both the No Build Alternative and Build Alternatives were developed by Metro and Sound Transit as part of the project's Transit Service Integration Technical Memorandum (see Attachment N.1A, Appendix B, in Appendix N.1). The Transit Service Integration memorandum was based on Metro Connects (Metro 2021), which provides a long-range vision for bus service in King County, integrating with future Sound Transit light rail and bus rapid transit services. The Transit Service Integration memorandum considers the bus routing networks as well as the frequency of service consistent with the planned growth in service hours in Metro Connects. With the No Build Alternative, the bus network in the West Seattle Extension study area is similar to existing conditions, although some frequencies are assumed to be higher due to the overall growth in bus service hours envisioned in Metro Connects.

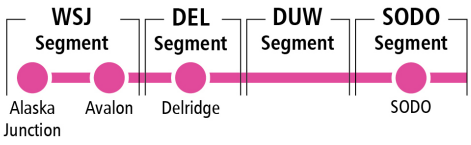
For land use and trip growth assumptions, see Chapter 2, Regional Context and Travel, of Appendix N.1.

3.4.3 Environmental Impacts of the Build Alternatives

3.4.3.1 Transit Service and Facilities

3.4.3.1.1 Impacts Common to All Alternatives and Segments

The 2042 Build Alternatives assume changes to bus service in the project corridor, to integrate with the new light rail line. The service changes are based on Metro Connects and coordination with Metro regarding this project. Most RapidRide, frequent, and express routes from Burien, White Center, High Point, and other areas south of Alaska Junction would end at Alaska Junction or continue to Alki Beach via Alaska Junction. For example, RapidRide C Line service would likely be restructured so its service hours could be repurposed to serve the light rail stations. Similarly, bus services in the Delridge Segment, such as the RapidRide H Line, would serve the station but not continue to Downtown Seattle. In all alternatives, local routes would connect to all three West Seattle stations. As part of the M.O.S., where the Delridge Station is the terminus station, bus services from the west (Alaska Junction area) and south would be rerouted to serve the Delridge Station. The M.O.S. would incorporate additional active bays (where passengers get on and off buses) and layover areas (where buses stop at the end of the route before beginning a new trips) to accommodate the increased level of bus transfer activity at Delridge Station compared to the full-length alternatives.



The removing, rerouting, or truncating of service allows bus service hours to be redeployed to optimize connections and frequencies to the light rail stations, consistent with Metro's service guidelines and the Metro Connects vision. A discussion of Build Alternative transit networks can be found in Appendix N.1.

Some bus stops and layover areas would be added or relocated to serve the proposed stations, potentially including waiting areas for riders transferring to buses. Most bus stop relocation would be focused at the new light rail stations to provide safe and efficient transfer access. Paratransit access would be added immediately adjacent to each light rail station. See the conceptual station drawings in Appendix J for proposed bus stops and, if applicable, layover areas at the stations.

3.4.3.1.2 SODO Segment

For Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b, the SODO Busway would be permanently closed to buses to accommodate the light rail guideway. Under this condition, bus routes (between 30 to 40 buses in each peak hour) would use adjacent streets (i.e., 4th Avenue South or 6th Avenue South). Closure of the busway would also eliminate all existing layover areas and the comfort station along the SODO Busway and increase bus travel times to the bases, as described in Appendix N.1. For Alternative SODO-2, the busway would remain open to buses.

Removal of the SODO Busway for Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b could affect formula funding[1] for transit providers that use that facility.

There would be a multi-year period between the opening of the West Seattle Link Extension and the opening of the Ballard Link Extension, which would connect the West Seattle Link Extension directly to the existing light rail system. During that period, West Seattle Link Extension riders who wish to continue their trip on light rail would have to transfer to the 1 Line at the SODO Station. The RapidRide C and H Lines would continue to provide a one-seat ride to Downtown Seattle and South Lake Union during this time period. After the Ballard Link Extension opens, riders from West Seattle could continue north on the 3 Line without a transfer.

3.4.3.1.3 Duwamish Segment

There would be no substantial changes to transit service or facilities unique to any of the Build Alternatives in the Duwamish Segment.

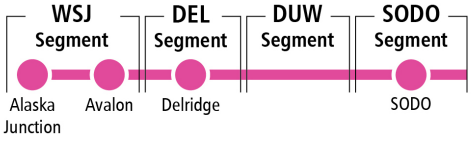
3.4.3.1.4 Delridge Segment

For all Delridge Segment alternatives except Alternatives DEL-3 and DEL-4, bus routes would deviate away from Delridge Way Southwest to serve the Delridge Station as described in Appendix N.1. This deviation would make transfers between bus and rail more convenient because bus riders would not need to cross any streets to access the station; however, it would add several additional minutes of travel to bus riders not accessing the station. Alternatives DEL-1a and DEL-3 could also affect access to the eastbound bus stop on Southwest Genesee Street near 30th Avenue Southwest, which could require improved crossing access of Southwest Genesee Street or a relocation of this bus stop.

3.4.3.1.5 West Seattle Junction Segment

None of the Build Alternatives would result in a transit service or facilities impact compared to the No Build Alternative.

[1] Federal Transit Administration (FTA) formula funding includes a number of FTA programs and grants that fund public transit and that are distributed to urbanized areas according to a pre-specified formula.



3.4.3.2 Transit Travel Time

In the 2042 no build condition, riders using bus service that runs along the surface streets between Downtown Seattle (Westlake Station) and West Seattle (Fauntleroy Way Southwest and Southwest Alaska Street) would have longer travel times, as congestion is anticipated to worsen. This in-vehicle travel time could be up to 30 minutes on average during the peak periods in the peak direction, whereas with the project, the light rail train would travel between Downtown Seattle and West Seattle in about 16 minutes, which is a nearly 50 percent travel time savings. Beyond the in-vehicle rail travel times, a rider's trip time would vary depending on the station platform's vertical distance from the street level. Some of the higher elevated stations (e.g., with Alternative DEL-1a or Option DEL-1b) or deeper tunnel stations (e.g., with Alternative WSJ-3a or Option WSJ-3b) would take approximately 1 additional minute to 90 seconds for a rider to walk within the station between the train platform and the ground-level entrance, relative to access times for the other alternatives in those segments. Use of the elevator could reduce this extra walk time, depending on wait times. See Section 3.3.2.1, Long-term Impacts, of Appendix N.1 for more information about transit travel times.

3.4.3.3 Ridership

3.4.3.3.1 Impacts Common to All Alternatives

This section describes the forecasted average daily light rail ridership for the West Seattle Link Extension in 2042 for the project as a whole and at the segment and station levels. Ridership forecasts were produced using the Sound Transit Incremental Ridership Model.

Systemwide Ridership

Transit ridership was forecasted for the Sound Transit service area in King, Pierce, and Snohomish counties. About 764,000 trips would be taken on the system with the No Build Alternative, and with the preferred alternative there would be 766,000 trips, for a net increase of 2,000 daily trips. See Section 3.3.2.1 of Appendix N.1 for more information.

New Transit Trips

The FTA defines new transit trips as the total number of trips shifted to transit from another mode (e.g., single occupancy vehicle, carpool, walk, or bike) as a result of the project when compared to a No Build alternative.

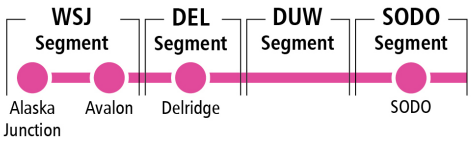
Project Ridership

The previous section describes total ridership in the Sound Transit service area and the number of new daily transit trips that would be generated in the region by the project. In 2042, total daily trips on the project itself would range between 24,000 and 27,000 for all Build Alternatives depending on land use, economic, and bus service level assumptions.

With the M.O.S., which would terminate at the Delridge Station and not serve the West Seattle Junction Segment, ridership would be 17,000 daily riders.

3.4.3.3.2 SODO Segment

The SODO Segment has the existing SODO light rail station, and a second station would be constructed next to it as part of the project.



In 2042, light rail boardings in the SODO Segment are expected to more than triple with the project (Table 3-3). The SODO Station is the first stop where Tacoma riders could transfer to reach the Stadium Station, and it is also the first opportunity for 3 Line riders from West Seattle to transfer to the 1 Line (Ballard to Tacoma). Because all the station alternatives are relatively close to each other and have similar transit integration profiles, boardings are forecasted to be similar for all SODO Segment alternatives.

Table 3-3. 2042 SODO Segment Station Daily Boardings

Station	No Build Alternative	Full-Build Alternatives	M.O.S.
SODO (proposed)	Not Applicable	7,300	6,100
SODO (existing)	4,400	7,300	6,300
Segment Total	**4,400**	**14,600**	**12,400**

3.4.3.3.3 Duwamish Segment

There would be no stations in the Duwamish Segment.

3.4.3.3.4 Delridge Segment

In 2042, daily boardings would be similar for most full-build Build Alternatives, at 5,400 daily boardings. Alternative DEL-7, which would only connect to Alternative WSJ-6 in the West Seattle Junction Segment, would have slightly fewer daily boardings (5,300) because of bus network changes associated with no Avalon Station in the West Seattle Junction Segment. Ridership would be about 50 percent higher with the M.O.S. (8,400 daily boardings) because the Delridge Station would be the terminus station and would be served by additional bus connections, thus generating more bus-rail transfers.

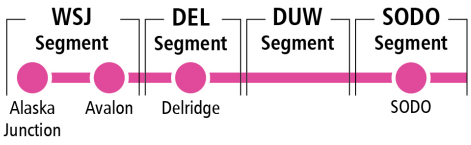
3.4.3.3.5 West Seattle Junction Segment

In 2042, the number of boardings at the Avalon and Alaska Junction stations with most full-build Build Alternatives is expected to be similar (see Table 3-4). Of the two, the Alaska Junction Station is forecasted to have higher ridership because of its role as a bus-to-rail transfer hub and the denser land use around the station. Elimination of the Avalon Station with Alternative WSJ-6 would shift some riders from that station to the Alaska Junction Station, and segment ridership would be modestly higher for Alternative WSJ-2, driven by higher numbers of walk, bike, and drop-off/pick-up trips at Alaska Junction Station.

Table 3-4. 2042 West Seattle Junction Segment Station Daily Boardings

Station	Ridership – All Build Alternatives Except Alternatives WSJ-2 and WSJ-6	Alternative WSJ-2 – Elevated Fauntleroy	Alternative WSJ-6 – No Avalon Station Tunnel
Avalon	2,300	1,200	Not applicable
Alaska Junction	5,300	6,900	7,500
Segment Total	**7,600**	**8,000**	**7,500**

Note: Totals may not exactly equal the sum of addends due to rounding.



3.4.3.4 Station Mode of Access

Based on the station ridership information presented in the previous section as well as rider survey data, the project's Transit Service Integration Technical Memorandum (Attachment N.1A, Appendix B, in Appendix N.1), and station and surrounding land use characteristics, Sound Transit calculates mode of access information for each station area. The station mode of access was developed for three different types of trips:

- Passenger drop-off and pick-up (including transportation network companies)
- Riders transferring between other transit services, such as buses
- Walk and bicycle trips (non-motorized trips)

This mode of access information was then used to assess the traffic operations, parking, and non-motorized conditions around each station in Sections 3.5.3, 3.6.3, and 3.7.3, respectively.

Table 3-5 presents the 2042 p.m. peak hour trip forecasts at proposed and existing stations in the study area by mode for full-length Build Alternatives and the M.O.S. In 2042, the existing and proposed SODO stations would collectively have the greatest number of boardings (riders entering a train) and alightings (riders exiting a train), but most of the trips would be rail-to-rail transfers within their station areas. At the Delridge Station, most users would be transferring from buses.

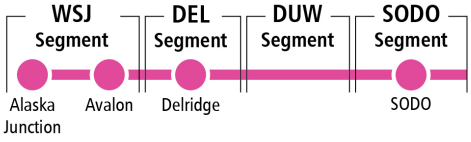
Table 3-5. 2042 P.M. Peak Hour Station Trip Generation by Mode (Boardings and Alightings)

Segment	Station	Alternative	Walk and Bike Trips	Drop-off and Pick-up Trips [a]	Transit Transfers	Total Station Trips [b]
SODO	SODO – Build and (No Build) [c]	All Alternatives except M.O.S.	700 (600)	40 (40)	2,900 (400)	3,700 (1,100)
SODO	SODO – Build and (No Build) [c]	M.O.S.	700 (600)	40 (40)	2,300 (400)	3,000 (1,100)
Delridge	Delridge	All Alternatives except M.O.S.	150	30	1,200	1,400
Delridge	Delridge	M.O.S.	150	30	1,900	2,100
West Seattle Junction	Avalon	Preferred Option WSJ-5b, Alternative WSJ-1, Alternative WSJ-3a, Option WSJ-3b, Alternative WSJ-4, Alternative WSJ-5a	300	50	250	600
West Seattle Junction	Avalon	Alternative WSJ-2	150	30	100	250
West Seattle Junction	Alaska Junction	Preferred Option WSJ-5b, Alternative WSJ-1, Alternative WSJ-3a, Option WSJ-3b, Alternative WSJ-4, Alternative WSJ-5a	500	100	600	1,200
West Seattle Junction	Alaska Junction	Alternative WSJ-2	700	100	800	1,600
West Seattle Junction	Alaska Junction	Alternative WSJ-6	700	20	900	1,700

[a] Includes transportation network companies (e.g., Uber and Lyft).

[b] Due to rounding, some totals may not exactly match the sum of the values in their rows.

[c] Values in parentheses indicate forecasted ridership for the existing station only under the 2042 no build condition. Values without parentheses represent the build condition and include both the proposed and existing stations.



The Avalon Station would have the lowest trip activity of the project's stations, with an approximately even numbers of walk/bike trips and bus transfers. At the Alaska Junction Station, ridership would be roughly evenly split between transit transfers and walk/bike trips.

With the M.O.S., the project would terminate at the Delridge Station, with increased bus transfer activity at that station compared to the full-build Build Alternatives.

3.4.3.5 Transit Levels of Service

All of the transit L.O.S. measures (frequency, span, reliability and passenger load) apply to all of the project Build Alternatives. The a.m. peak period is defined as 5 a.m. to 9 a.m., and the p.m. peak period is 3 p.m. to 7 p.m. The analysis is presented in more detail in Section 3.3, Environmental Impacts, of Appendix N.1.

3.4.3.5.1 Frequency

In 2042, the West Seattle Link Extension would provide direct, high-frequency light rail service from West Seattle to Downtown Seattle, with service running at 6-minute headways during the peak periods. This is equivalent to the RapidRide C Line's anticipated peak headway with the No Build Alternative. In addition to the high-frequency service provided by the project itself, the surrounding bus network would be restructured and optimized with an emphasis on frequent routes. As a result all transit riders crossing the West Seattle Bridge screenline would experience frequency L.O.S. of A or B, and the frequency of non-express (all-day) bus routes would improve by about 15 percent in the p.m. peak, from an average of 15 minutes (L.O.S. B) with the No Build Alternative to 13 minutes (L.O.S. B) with the project. All riders at the north of South Lander Street screenline would experience L.O.S. A or B with the project, and the frequency of non-express bus routes would improve by about 20 percent, from an average of 16 minutes (L.O.S. C) to 13 minutes (L.O.S. B).

3.4.3.5.2 Span

With the 2042 No Build Alternative, non-express bus routes crossing the West Seattle Bridge and north of South Lander Street screenlines would have an average span of service between 17 and 18 hours per day, or L.O.S. B. With the project, these would run for an average of 18 hours to 19 hours per day (L.O.S. A). The 3 Line (project) would operate for 20 hours per day, or L.O.S. A.

3.4.3.5.3 Reliability

The reliability of bus service in the study area would be poor with the 2042 No Build Alternative, with most routes operating at L.O.S. E and F due to traffic congestion in the corridor (see Section 3.5.3.3, Arterial and Local Street Operations). Bus transit speed and reliability improvements are planned for some roadways in the project corridor, but bus reliability is not expected to improve substantially beyond existing conditions with the No Build Alternative as buses would continue to mainly operate in general purpose lanes.

The project would improve transit reliability in the study area as light rail would operate at L.O.S. A in exclusive right-of-way.

3.4.3.5.4 Passenger Load

With the 2042 No Build Alternative, buses would operate with light to moderate passenger loads, on average (Table 3-6), with some individual routes seeing higher loads (see Attachment N.1B, Existing and Future Transit Routes and Levels of Service, in Appendix N.1). With the Build Alternatives, passenger loads would improve for most bus riders due to some passengers switching to ride light rail and future investments in bus service. Passenger loads on the 3 Line (project) would be L.O.S. A in all times and directions, while the 1 Line would operate at L.O.S. A in the off-peak direction and L.O.S. E in peak direction, which would be the same as the No Build Alternative.

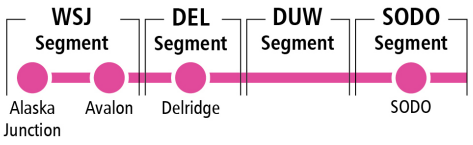


Table 3-6. Bus Passenger Load Level of Service – 2042

Screenline Location	Direction [a]	No Build L.O.S. (bus)	Preferred Alternative Build L.O.S. (bus)	Alternative WSJ-6 No Avalon Build L.O.S. (bus)	M.O.S. Build L.O.S (bus)
West Seattle Bridge	P.M. Inbound/ A.M. Outbound	A	A	A	A
West Seattle Bridge	P.M. Outbound/ A.M. Inbound	C	A	A	B
North of South Lander Street	P.M. Inbound/ A.M. Outbound	B	A	A	A
North of South Lander Street	P.M. Outbound/ A.M. Inbound	B	A	B	A

[a] Inbound direction is towards Downtown Seattle, outbound direction is heading away from Downtown Seattle. The p.m. peak hour travel direction is westbound for the West Seattle Bridge screenline and southbound for the north of South Lander Street screenline.

3.4.4 Mitigation for Operation Impacts

Sound Transit would continue to coordinate with transit service providers as the project advances to maintain efficient transit operations, including refinements to the transit service planning documented in Section 3.4, Potential Mitigation Measures, of Appendix N.1. Impacts to specific transit facilities were identified, including permanent closures of layover spaces, comfort stations, key transit pathways, and the SODO Busway. Impacts to bus stop access were also identified. These impacts would be addressed through ongoing coordination between Sound Transit, the City of Seattle, Metro, and the FTA to identify capital, routing, and access management strategies that would be implemented before transit service operations would be affected. Sound Transit would implement agreed-upon improvements that mitigate impacts directly associated with the project.

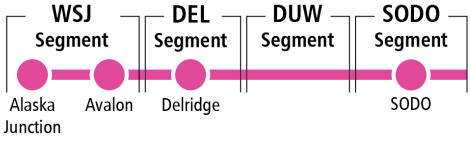
3.5 Affected Environment and Impacts during Operation – Arterial and Local Street Operations

This section presents existing operations of the arterials and local roadways in the study area and their intersection L.O.S., future No Build Alternative and Build Alternatives traffic forecasts, and peak hour intersection L.O.S. compared to project-specific L.O.S. thresholds and potential effects on local access to adjacent properties and traffic circulation with the Build Alternatives.

3.5.1 Affected Environment

3.5.1.1 Property Access and Circulation

In the SODO Segment, the roadway system consists of a grid network of arterials that serves industrial land uses, with vehicles traveling predominately north and south. Important routes in this segment are 1st Avenue South and 4th Avenue South, which provide connections between Downtown Seattle and State Route 99, the West Seattle Bridge, and Interstate 90. East-west circulation is limited to a few major east-west arterials including South Spokane Street, South Holgate Street, and South Lander Street. There are at-grade BNSF mainline track and light rail track crossings at these locations, which can cause delays. The South Lander Street overpass was recently constructed between 1st Avenue South and 4th Avenue South to reduce the rail conflict on the BNSF mainline track (after the 2019 base year used in this Final EIS).



The east-west connections across the Duwamish Waterway include Southwest Spokane Street (also known as the “lower bridge”), which connects SODO to West Seattle, Harbor Island, and the Terminal 5 Port of Seattle facilities, and the West Seattle Bridge, which connects SODO to West Seattle through Fauntleroy Way Southwest. On Harbor Island, access roads cross active freight tracks at multiple at-grade locations.

Delridge Way Southwest, a north-south arterial, is one of the main access roads to the West Seattle Bridge in the Delridge Segment. Southwest Genesee Street is the main east-west street in the Delridge Segment. Southwest Andover Street and Southwest Yancy Street are east-west roads that provide access to the Nucor Steel property and connect Southwest Avalon Way and Delridge Way Southwest. Southwest Avalon Way also connects to the West Seattle Bridge, lower Spokane Street, and the West Seattle Water Taxi terminal. Other east-west travel is limited due to the terrain and park properties.

Since publication of the WSBLE Draft EIS, Delridge Way Southwest has been modified for the RapidRide H Line. This included removing the center turn lane south of Southwest Dakota Street, converting a parking lane to a business access and transit lane, and decreasing the speed limit. In addition, Southwest Avalon Way was re-channelized to add protected bicycle lanes and remove the center turn lane. Because these projects occurred after the 2019 Final EIS base year, these assumptions are not included in the existing year analysis.

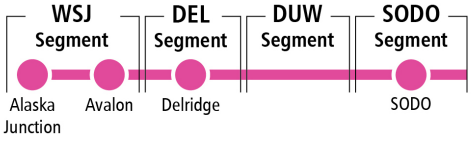
In the West Seattle Junction Segment, the street network is a combination of arterials and local streets that serve the mixed residential and commercial land uses. Fauntleroy Way Southwest is a north-south arterial that provides access to the West Seattle Bridge and links most neighborhoods in West Seattle. California Avenue Southwest connects Alaska Junction and Admiral Junction, and 35th Avenue Southwest connects the West Seattle Bridge to communities to the south. These arterials are also major transit corridors. Southwest Alaska Street is the main east-west arterial, connecting West Seattle neighborhoods to Alaska Junction and Fauntleroy Way Southwest.

3.5.1.2 Intersection Operations

Intersections surrounding potential station areas were evaluated during peak hours to better understand existing traffic operations. Detailed L.O.S. results are provided in Section 4.2, Affected Environment, of Appendix N.1. All studied intersections were evaluated with the peak 1-hour traffic count for each intersection during the a.m. and p.m. peak hours (between 6 and 8 a.m. and between 4 and 6 p.m.). While the p.m. peak hour generally represents the most congested period of the day, some locations may have worse a.m. operations as a result of local land uses and traffic patterns. Intersection operations are described in terms of L.O.S., ranging from A to F, where L.O.S. A represents little to no congestion with under-used lane capacity and free-flow travel speeds, while L.O.S. E represents conditions that are at capacity and L.O.S. F represents poor operating conditions where demand exceeds the intersection’s capacity, with vehicle queuing and frequent stop-and-go travel.

In the SODO and Duwamish segments, all study intersections operate at L.O.S. D or better during both the a.m. and p.m. peak periods, although higher vehicle delays can be experienced from nearby port and terminal operations near the East Marginal Way and South Spokane Street intersection.

In the Delridge Segment, traffic congestion is concentrated on the arterials that provide connections to the West Seattle Bridge. East of Delridge Way Southwest, there are more residential land uses with lower traffic volumes. During the p.m. peak hour, the southbound vehicle queues on Delridge Way Southwest can extend to the West Seattle Bridge, while during the a.m. period, the northbound vehicle queues can extend multiple blocks to access the West Seattle Bridge. Two intersections operate at L.O.S. E or F in either a.m. or p.m. peak hours.



In the West Seattle Junction Segment, Fauntleroy Way Southwest, California Avenue Southwest, and Southwest Alaska Street experience high traffic volumes. Five intersections operate at L.O.S. E or F in either the a.m. or p.m. peak hours.

3.5.2 Environmental Impacts of the No Build Alternative

As part of the No Build Alternative, other transportation projects in the study area assumed to be completed include the following:

- The City's Vision Zero project to convert one northbound general purpose lane of 4th Avenue South to a freight and bus lane from South Holgate Street to Royal Brougham Way in the SODO Segment
- The Southwest Spokane Street/West Marginal Way/Terminal 5 intersection modification as part of the Port of Seattle Terminal 5 redevelopment project in the Duwamish Segment
- The recently completed 35th Avenue Southwest/Southwest Avalon Way Repaving Project in the Delridge and West Seattle Junction segments
- The Fauntleroy Way Southwest Boulevard Project in the West Seattle Junction Segment

For a complete list of the background transportation projects with the No Build Alternative, see Attachment N.1A, Transportation Technical Analysis Methodology, of Appendix N.1.

Traffic volumes for the No Build Alternative were forecasted for the 2042 a.m. and p.m. peak hours using Puget Sound Regional Council's population and land use forecasts (Puget Sound Regional Council 2019). Peak hour traffic volumes forecasted in the study area are predicted to have an average annual traffic volume growth rate of up to approximately 0.4 percent during the a.m. and p.m. peak hours. Because of this traffic growth, intersection operations are expected to operate with more congestion in the future with the No Build Alternative compared to the existing conditions. By 2042, 12 intersections in the a.m. peak hour and 12 intersections in the p.m. peak hour are expected to operate at L.O.S. E or F in the No Build Alternative.

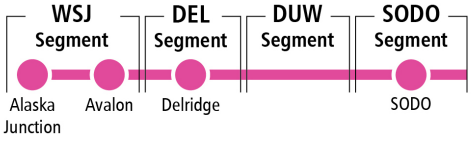
3.5.3 Environmental Impacts of the Build Alternatives

3.5.3.1 Property Access and Circulation

This section describes the main roadway modifications and traffic circulation changes proposed with each Build Alternative by segment. For example, roadway modifications may be needed to accommodate elevated guideway columns within the roadway or modifications to the street network surrounding stations. In these situations, left-turn access to properties may be restricted, with guideway columns proposed in the roadway median. To maintain property access, vehicles would either be able to recirculate using the surrounding street grid system, or U-turn movements, where feasible, would be provided at adjacent intersections. The Final EIS drawings in Appendix J show additional detail about each alternative.

3.5.3.1.1 SODO Segment

Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b would build a new South Lander Street vehicle overpass above the light rail tracks between 4th Avenue South and 6th Avenue South. The overpass could affect access to the United States Postal Service Carrier Annex and Distribution Center/Terminal Post Office garage; alternative access to this garage would be provided on 4th Avenue South. Sound Transit is working with the United States Postal



Service and the City of Seattle to ensure trucks and other vehicles are able to access the parking garage facility. The South Lander Street overcrossing would eliminate an existing at-grade conflict with the existing 1 Line light rail, which interrupts the east-west traffic flow. See Section 3.5.3.3 for effects to traffic operations and Section 3.4.3 for more information on transit service. Preferred Option SODO-1c and Alternative SODO-1a would add a new traffic signal at South Stacy Street and 6th Avenue South. Alternative SODO-1a and Option SODO-1b would provide access to the SODO Station at the South Stacy Street/4th Avenue South intersection.

3.5.3.1.2 Duwamish Segment

The Build Alternatives in this segment would not change the existing roadway channelization. All traffic movements would remain along public roadways and at private property access points. There could be some traffic circulation and property access changes after construction related to properties that have been fully or partially acquired during construction, including using different streets. However, access to Terminal 18 would be the same as current conditions, and there would be no changes in access to the redeveloped Terminal 5 or to properties along West Marginal Way Southwest from the Duwamish River Bridge to Terminal 5, also known as the Quiet Zone project area.

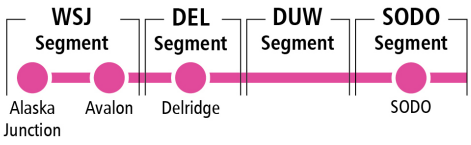
3.5.3.1.3 Delridge Segment

Preferred Option DEL-6b would add a new traffic signal at the realigned intersection of Delridge Way Southwest with Southwest Charlestown Street and 23rd Avenue Southwest. This would serve as the main access point for freight and employees accessing Nucor Steel as well as potential transit-oriented development (TOD) adjacent to the station. The existing Southwest Charlestown Street and Southwest Andover Street driveway would become one-way northbound and accessible for transit buses and paratransit only. Sound Transit is coordinating with the City of Seattle and Metro to select appropriate transit treatments to facilitate northbound bus movements from the existing bus lanes on Delridge Way Southwest into the Delridge Station, including a transit queue jump (a bus-only signal and dedicated transit lane that allows buses to proceed through an intersection before general purpose traffic) at either Southwest Andover Street or Southwest Dakota Street. For analysis purposes, it is assumed the queue jump would be located at Southwest Andover Street, but the final design would be selected in coordination with agency partners.

The elevated guideway would transition to at-grade track to the west toward the West Seattle Junction Segment at 32nd Avenue Southwest, south of Southwest Andover Street. This would result in permanent cul-de-sacs on 32nd Avenue Southwest to the north and south of the tracks. As a residential street with single-family housing, up to 45 peak hour trips could be shifted to Southwest Genesee Street. Intersection operations are expected to be similar to the No Build Alternative.

Alternative DEL-1a would construct a median to support the elevated light rail guideway columns on Southwest Genesee Street west of 26th Avenue Southwest. Option DEL-1b would construct a median to support the columns under the elevated light rail guideway along Southwest Genesee Street west of the Longfellow Creek crossing. Left-turn access in these sections could be restricted, but the street grid network would allow traffic to recirculate, such as using Southwest Nevada Street, for access to the affected properties.

Alternative DEL-2a would close 25th Avenue Southwest between Southwest Dakota Street and Southwest Genesee Street below the station to through traffic. The street grid network would allow traffic to recirculate, such as using 26th Avenue Southwest, Southwest Nevada Street, or Delridge Way Southwest, maintaining access to the affected properties.



Option DEL-2b would close 30th Avenue Southwest north of Southwest Genesee Street, and would also close 25th Avenue Southwest between Southwest Dakota Street and Southwest Genesee Street. The street grid network would allow traffic to recirculate, such as using Southwest Nevada Street, Delridge Way Southwest, or 26th Avenue Southwest, maintaining access to the affected properties.

Alternative DEL-3 and Alternative DEL-4 are not expected to affect traffic circulation or access.

Alternative DEL-5 would construct guideway columns within the median or adjacent to Southwest Avalon Way between Southwest Yancy Street and Southwest Genesee Street, which could restrict some left-turn access to properties. The street grid network would allow traffic to recirculate, and vehicles could potentially travel on 30th Avenue Southwest or 32nd Avenue Southwest, maintaining access to the affected properties.

Alternative DEL-6a would construct a new median on Southwest Andover Street west of 26th Avenue Southwest to place guideway columns for short portions of Southwest Andover Street, which would restrict some left-turn access. The street grid network would allow traffic to recirculate, such as using Southwest Nevada Street or Southwest Dakota Street, maintaining access to the affected properties.

Alternative DEL-7 would be similar to Preferred Option DEL-6b in the Delridge Station area. However, the 32nd Avenue Southwest cul-de-sac would only be on the south side of the guideway crossing, and 32nd Avenue Southwest would no longer connect to Southwest Andover Street.

3.5.3.1.4 West Seattle Junction Segment

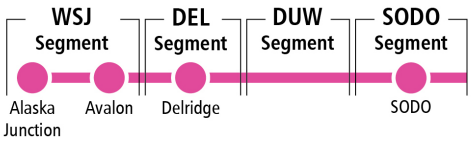
Preferred Option WSJ-5b would close Southwest Genesee Street just east of 35th Avenue Southwest. Station access would occur at Southwest Avalon Way and Southwest Genesee Street at a new road connection between the station and Southwest Avalon Way, east of 35th Avenue Southwest. Preferred Option WSJ-5b, along with all other Build Alternatives except Alternative WSJ-6 that would not have an Avalon Station, would also modify the northbound approach at the Southwest Avalon Way and Southwest Genesee Street intersection to allow left-turn access to the drop-off and pick-up locations on Southwest Genesee Street near the Avalon Station. A new traffic signal would be installed at Southwest Alaska Street and 41st Avenue Southwest to provide direct access to the Alaska Junction Station.

Alternatives WSJ-1, WSJ-3a, WSJ-4, and WSJ-5a would also add a new traffic signal at Southwest Alaska Street and 41st Avenue Southwest intersection to provide direct access to the Alaska Junction Station.

Alternative WSJ-2 would construct a median on Fauntleroy Way Southwest, north of Southwest Alaska Street, thus slightly reducing the length for the inside southbound through lane.

Alternative WSJ-4 would close 38th Avenue Southwest north of Southwest Oregon Street and 37th Avenue Southwest north of Fauntleroy Way Southwest, with cul-de-sacs to allow vehicle to turn around. The existing street grid network in this area would allow vehicles to use other streets, such as 39th Avenue Southwest, to reach their destination.

Property access and circulation impacts for Alternative WSJ-5a would be the same as Preferred Option WSJ-5b around the Avalon Station.



3.5.3.2 Travel Demand Forecasts

For the Build Alternatives, station characteristics and information from the Sound Transit Incremental Ridership Model (Sound Transit 2019) were used to calculate the anticipated vehicular trip generation for each station area. To estimate traffic volumes for the Build Alternatives, the increase in vehicle and non-motorized trips generated at each station were added to the No Build Alternative traffic forecast. The station mode of access information for the Build Alternatives is described in Section 3.4.3.4. This process is conservative, because it does not reduce the No Build traffic volumes to account for people changing from driving in the No Build Alternative to using transit with the project. The traffic forecasts for the No Build Alternative are previously described in this section.

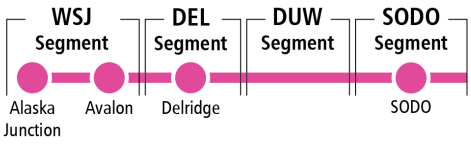
Passenger drop-off and pick-up and bus trips are vehicle trips that are assigned to the surrounding streets. Trips were allocated to each access mode based on recent market trends, potential future growth of transportation network company services, stations' placement on the light rail line, and variations in the local bicycling infrastructure.

Bus service modifications are described in Section 3.4.3.1, Transit Service and Facilities, as well as in the Transit Service Integration Technical Memorandum (Attachment N.1A, Appendix B in Appendix N.1). Station walk and bicycle trips were assigned based on the location of the station facilities, such as transit stops, pick-up and drop-off spaces, and entrances, and were incorporated in the traffic analysis. These trips were also included in the pedestrian L.O.S. assessment in Section 3.7.3, Environmental Impacts of the Build Alternatives. None of the stations include park-and-ride lots.

3.5.3.3 Arterial and Local Street Operations

Affected intersections for 2042 are shown on Figures 3-2 and 3-3 in Sections 3.5.3.3.4 and 3.5.3.3.5, respectively, for the Delridge and West Seattle Junction segments. As described in the subsequent sections, no study intersections are expected to be affected in the SODO or Duwamish segments. Detailed 2042 L.O.S. results for all Build Alternatives are provided in Appendix N.1. In the absence of an adopted City of Seattle intersection L.O.S. threshold, intersections that operate at L.O.S. E and L.O.S. F are identified as failing. With the Build Alternatives, affected intersections are defined as locations expected to degrade from L.O.S. D or better in the No Build Alternative to L.O.S. E or F with the project, or if the intersection already operates at L.O.S. E or F in the No Build Alternative and have noticeably worse vehicle delays in the Build Alternative (10 percent or higher vehicle delay than in the No Build Alternative).

Sound Transit is also planning for the Ballard Link Extension, which would be a light rail extension from SODO Station to Ballard. The 2042 analysis assumes that both the West Seattle Link Extension and Ballard Link Extension would be open. However, there would be a multi-year period between the opening of the West Seattle Link Extension and the opening of the Ballard Link Extension during which the West Seattle Link Extension would terminate at the SODO Station. During that period, background traffic volumes and station-generated trips would be lower than the 2042 condition with both the West Seattle Link Extension and Ballard Link Extension open. Therefore, the period between the openings of the West Seattle Link Extension and Ballard Link Extension is expected to have fewer impacts to the arterial and local streets system than the 2042 condition analyzed in this Final EIS.



3.5.3.3.1 Impacts Common to All Alternatives

Most affected intersections with the Build Alternatives are a result of increased vehicle trips for pick-up/drop-off and pedestrian and bicycle activity that increase delays near station access points. Project-affected intersections are described in this section, with a more detailed discussion, including a.m. peak hour analysis results, in Section 4.3, Environmental Impacts, of Appendix N.1.

3.5.3.3.2 SODO Segment

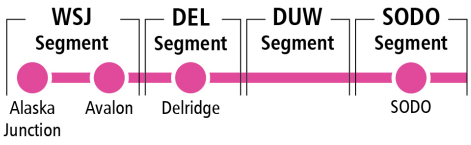
With the 2042 Build Alternatives, the SODO Station is expected to generate relatively few additional vehicle trips in either the a.m. or p.m. peak hours, as most of the transit trips at the SODO Station are transit transfers from other routes or walk-access. All Build Alternatives would have most study intersections operate at the same L.O.S. grade compared to the No Build Alternative. The proposed signalized intersection at 6th Avenue South/South Stacey Street in Preferred Option SODO-1c and Alternative SODO-1a would improve operations compared to the No Build Alternative. The SODO Busway/South Lander Street intersection would have no vehicle delay with the proposed new overpass in all Build Alternatives except for Alternative SODO-2, where it would remain a signalized intersection operating at the same L.O.S. grade as the No Build Alternative.

Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b would permanently close the SODO Busway, a dedicated transit-only facility, with the closure shifting 30 to 40 total buses in the peak hour to parallel streets. Most bus trips were assumed to shift to 4th Avenue South. Intersection L.O.S. results would not change noticeably compared to the No Build Alternative. See Section 3.4.3.1.2 for more information on the SODO Busway closure.

The new South Lander Street overpass between 4th Avenue South and 6th Avenue South (with Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b) would provide similar capacity to the No Build Alternative, resulting in similar L.O.S. conditions.

A more detailed traffic microsimulation model, called VISSIM, was created to evaluate the 4th Avenue South corridor operations with the permanent SODO Busway closure. With Preferred Option SODO-1c, no study intersections are expected to be affected during the a.m. or p.m. peak hours compared to the 2042 No Build Alternative. However, an impact to transit travel times is expected with the permanent closure of the SODO Busway, which would require buses to shift and travel with mixed traffic on 4th Avenue South or 6th Avenue South corridors. The mitigation measures being considered for the transit impact would modify arterial configurations and traffic signal operations, potentially resulting in impacts to arterial operations. The mitigation measures being considered include transit queue jumps (a bus-only signal and dedicated transit lane that allows buses to proceed through an intersection before general purpose traffic), business access and transit lanes, and freight and bus lanes. Specific mitigation for the permanent closure of the SODO Busway would be determined through coordination between Sound Transit, City of Seattle, Port of Seattle, Northwest Seaport Alliance, and Metro.

For the purposes of this analysis, dedicated freight and bus lanes in both directions along 4th Avenue South between South Spokane Street and South Holgate Street were tested as mitigation for transit impacts. This configuration would require removing all parking along both sides of 4th Avenue South and one northbound general purpose lane (refer to Section 3.6.3.2, Permanent Removal of Parking, for discussion of parking effects). With this transit mitigation in place, L.O.S impacts are expected at the intersections of 4th Avenue South with South Lander Street during the a.m. and p.m. peak hours and at South Spokane Street during the a.m. peak hour. Although there would be increases in delay for general purpose traffic, the freight and bus lanes could reduce travel time for buses and freight. This potential impact would also occur under Alternative SODO-1a and Option SODO-1b; traffic operations findings are anticipated to be similar to Preferred Option SODO-1c.



3.5.3.3.3 Duwamish Segment

With the No Build Alternative, the Southwest Spokane Street and 11th Avenue Southwest intersection is expected to operate at L.O.S. E in the a.m. period; all the other intersections operate at L.O.S. D or better. Because there are no stations in the Duwamish Segment, intersections in this segment are predominantly influenced by trips going to or from the SODO and Delridge stations. However, none of the alternatives result in a substantial change in delay or L.O.S. All the other intersections would operate at L.O.S. D or better.

3.5.3.3.4 Delridge Segment

With the No Build Alternative, five intersections in the Delridge Segment area operate at L.O.S. E or F in either or both of the a.m. or p.m. peak hours. Figure 3-2 shows the study intersections expected to be affected by each Build Alternative in 2042.

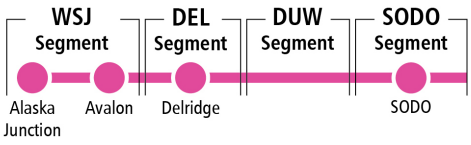
Preferred Option DEL-6b was evaluated using VISSIM, a more detailed microsimulation traffic operations software. Transit speed and reliability improvements at the Delridge Way Southwest and Southwest Andover Street intersection were incorporated with a modified intersection layout and a bus queue jump for northbound buses.

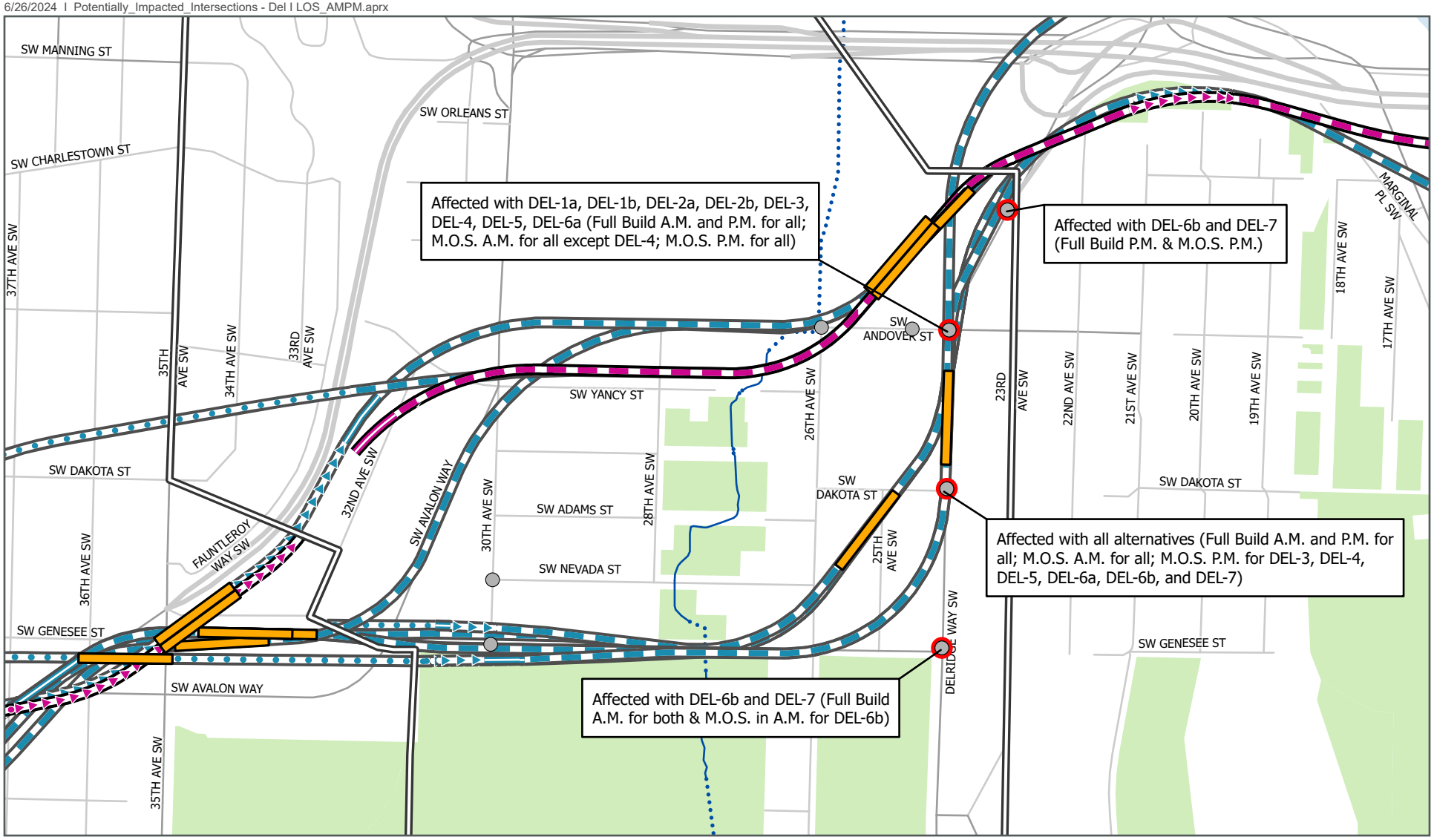
Preferred Option DEL-6b would construct a new traffic signal at Delridge Way Southwest and 23rd Avenue Southwest for improved transit circulation, access to Nucor Steel, and access for potential TOD adjacent to the station. This intersection would operate at L.O.S. F in the p.m. peak hour. Long southbound queues extending back to the West Seattle Bridge are expected with both the No Build Alternative and Preferred Option DEL-6b; however, queues would likely be longer with Preferred Option DEL-6b. In the a.m. peak hour, the intersection would operate at L.O.S. B. Northbound queues would still extend to Southwest Dakota Street and would be slightly shorter than with the No Build Alternative. The Delridge Way Southwest and Southwest Genesee Street intersection would be affected in the a.m. peak hour, and the Southwest Dakota Street and Delridge Way Southwest intersection would be affected in both peak hours with the increased vehicle trips to and from the station area.

South of Southwest Andover Street, 32nd Avenue Southwest would be permanently closed, resulting in cul-de-sacs on 32nd Avenue Southwest to the north and south of the proposed tracks. Up to 45 peak hour trips could shift to Southwest Genesee Street and would result in similar traffic operations as the No Build Alternative.

For all other Build Alternatives, Delridge Way Southwest intersections with Southwest Dakota Street and Southwest Andover Street would be affected in both peak hours due to additional vehicle trips associated with the proposed station.

Option DEL-1b and Option DEL-2b would result in either street-ends created on 30th Avenue Southwest and/or left-turn restrictions on portions of Southwest Genesee Street. A relatively low number of vehicles are expected to detour using 26th Avenue Southwest or Southwest Nevada Street. Intersection operations are expected to be similar to the No Build Alternative. The 30th Avenue Southwest Street-end would result in the highest volume diversion of up to 70 peak hour trips shifting to other roads.





Source: City of Seattle, King County (2023).

Preferred Alternative
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Other Alternatives
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station (● *Indicates Preferred Alternative*)
- New

- Segment Line
- Stream
- Piped Stream
- Park
- Affected Study Intersection
- Study Intersection

Figure 3-2
2042 Affected Intersections
Delridge Segment

West Seattle Link Extension

0 500 1,000 Feet

N

Alternative DEL-7 would have the same affected intersections as Preferred Option DEL-6b because the alternatives are the same except Alternative DEL-7 would be entering a tunnel portal east of the West Seattle Bridge. The 32nd Avenue Southwest closure would be just south of Southwest Andover Street, so there would be a cul-de-sac only on the south side of the guideway.

With the M.O.S. in 2042, each alternative would have increased bus service and similar pick-up and drop-off vehicle trip activity at the Delridge Station compared to the full-length project. For each Build Alternative, the same intersections affected with the full project would also be affected with the M.O.S. All Build Alternatives would affect the stop-controlled Southwest Dakota Street/Delridge Way Southwest intersection for one or both peak periods. All Build Alternatives, except Preferred Option DEL-6b and Alternative DEL-7, would affect the Southwest Andover Street and Delridge Way Southwest intersection. Preferred Option DEL-6b and Alternative DEL-7 would affect the Southwest Genesee Street and Delridge Way Southwest intersection in the a.m. period. Preferred Option DEL-6b and Alternative DEL-7 would also affect the Delridge Way Southwest and 23rd Avenue Southwest intersection in the p.m. peak period. See Section 4.3.2.3, West Seattle Junction Segment, of Appendix N.1 for further information on the intersection L.O.S. results for the M.O.S.

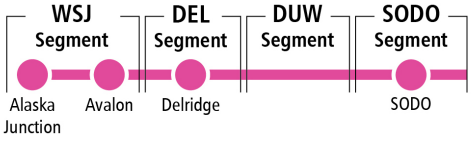
3.5.3.3.5 West Seattle Junction Segment

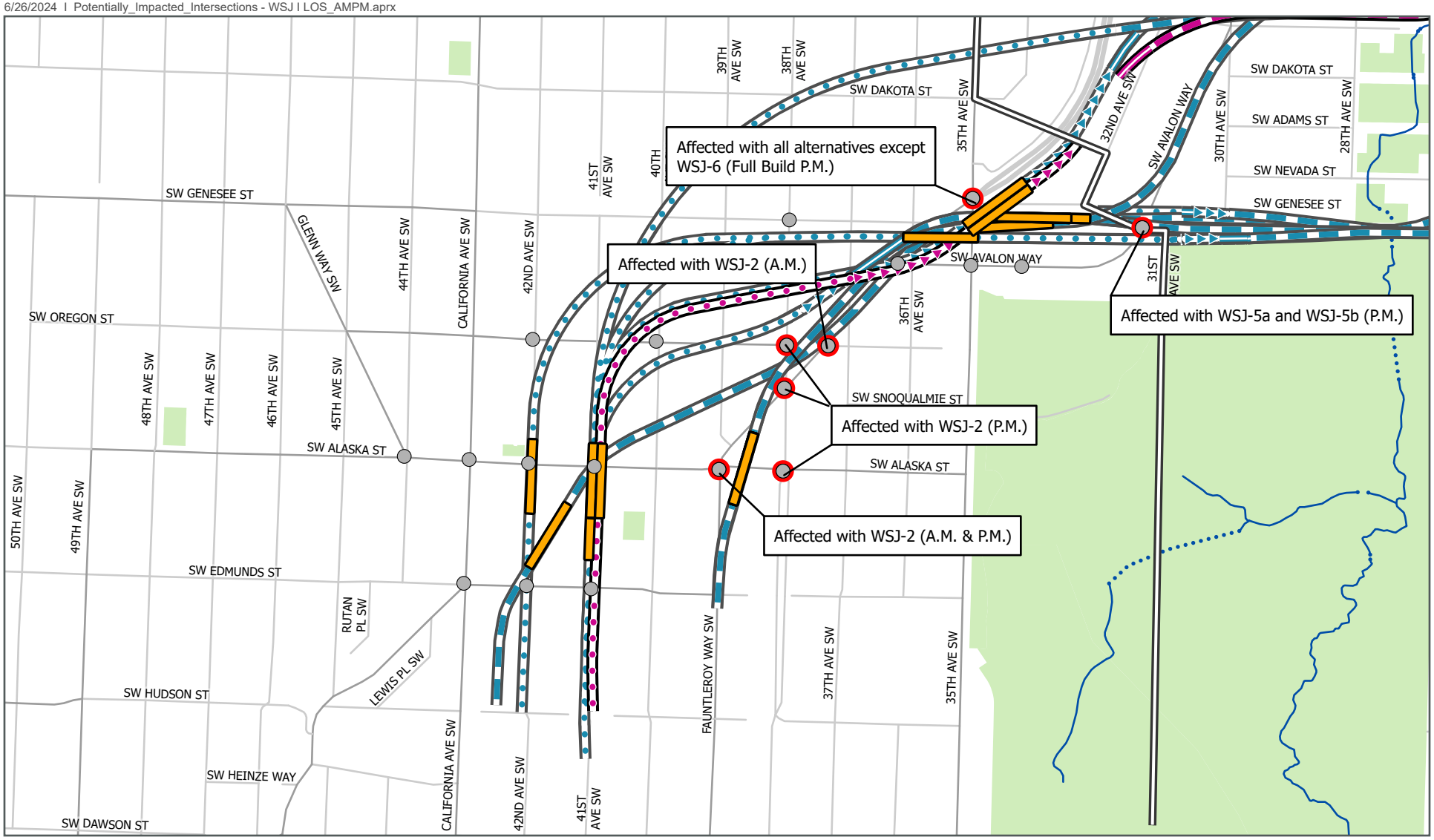
With the 2042 No Build Alternative, seven intersections in the West Seattle Junction Segment area operate at L.O.S. E or F in either a.m. or p.m. or both peak hours. Figure 3-3 shows the study intersections expected to be affected by each Build Alternative in 2042.

The Avalon Station would generate relatively few vehicle trips, so with all Build Alternatives, the intersections near the station would operate similarly to the No Build Alternative, with the exception of Fauntleroy Way Southwest and 35th Avenue Southwest. This intersection would be affected by the project and would degrade from L.O.S. E to L.O.S. F for all Build Alternatives except Alternative WSJ-6 in the p.m. peak hour. Intersection delays would increase the most for Preferred Option WSJ-5b and Alternative WSJ-5a because the project would remove the northbound and southbound free right turns to accommodate bus stops serving the station.

Preferred Option WSJ-5b and Alternative WSJ-5a would construct a new station access driveway on Southwest Avalon Way east of 35th Avenue Southwest. This right-in, right-out driveway would operate at L.O.S. C. All Build Alternatives except Alternative WSJ-6 would include a pick-up/drop-off zone on Southwest Genesee Street, requiring a modification to the northbound approach at Southwest Avalon Way and Southwest Genesee Street from a through-only lane to a shared northbound through/left-turn lane to provide access to the pick-up/drop-off zone. Fewer than 30 northbound left turns are expected, and this intersection would continue operating at L.O.S. F during the p.m. peak hour and L.O.S. C during the a.m. peak hour assuming permitted northbound left turns. The increase in p.m. peak hour delay with Preferred Option WSJ-5b and Alternative WSJ-5a would meet the threshold for an affected intersection.

In the Alaska Junction Station area, all Build Alternatives (including Preferred Option WSJ-5b) would operate at similar conditions to the No Build Alternative except for Alternative WSJ-2, which would affect five intersections. See Section 4.3.2.3 of Appendix N.1 for more details.





Source: City of Seattle, King County (2023).

Preferred Alternative
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Other Alternatives
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station (● *Indicates Preferred Alternative*)
- New

- Segment Line
- Stream
- Piped Stream
- Park
- Affected Study Intersection
- Study Intersection

0 500 1,000 Feet

N

Figure 3-3
2042 Affected Intersections
West Seattle Junction Segment

West Seattle Link Extension

3.5.4 Mitigation for Operation Impacts

Mitigation could be required at intersections where the intersection L.O.S. would not meet project-specific L.O.S. thresholds when compared to the No Build Alternative as agreed to with the City of Seattle, which does not have an official intersection L.O.S. threshold. For the Build Alternatives, affected intersections are identified and defined as locations expected to degrade from L.O.S. D or better in the No Build Alternative to L.O.S. E or F with the project, or if an intersection that already operates at L.O.S. E or F in the No Build Alternative would have noticeably worse vehicle delays in the Build Alternative (10 percent or higher vehicle delay than in the No Build Alternative). Intersections that would be considered for potential mitigation measures would vary depending on the alternative in each segment and are noted in Table 3-7.

In addition to the impacted intersections, the transit treatment measures that could be implemented to mitigate the permanent closure of the SODO Busway with Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b could potentially impact the arterial street system.

Sound Transit will continue to work with the City of Seattle and the FTA as project design progresses to minimize project-related intersection delays. Where additional project-related delays are unavoidable, Sound Transit will work with the City of Seattle to review potential mitigation at intersections identified in Table 3-7 with the intent of either meeting agreed-upon L.O.S. thresholds during the a.m. and p.m. peak hours or attaining a similar vehicle delay as the No Build Alternative.

The intersection mitigation treatments would likely vary depending on the intersection location and cause of the increased vehicular delay. At intersections or movements where the delay would be the result of vehicular operations, such as pick-up/drop-off activity or additional transit buses, mitigation measures could include corridor signal optimization, upgraded signal technologies, implementation of corridor intelligent transportation system strategies, traffic movement and turn restrictions, or added intersection capacity, where feasible. For intersections or movements where increased delay would be due primarily to increased non-motorized activity associated with the station, mitigation could be focused instead on strategies such as signal optimization for pedestrians, intersection crossing enhancements, pedestrian and/or bicycle facility modifications, reducing conflicts between vehicles and non-motorized users, or wayfinding, with the goal of improving safety and providing more efficient movement of pedestrians and bicyclists.

Final mitigation would be determined and agreed upon by Sound Transit and the City of Seattle, in coordination with the FTA and may include Sound Transit contributing a proportionate share of costs to improve intersections based on the project's proportionate ratio of trips at the intersection or another equitable method. The following section describes mitigation measures that are being considered for specific impacted locations, including for the preferred alternative.

3.5.4.1 SODO Segment

The mitigation measures being considered for 4th Avenue South to address the transit travel time impact of closing the SODO Busway could impact arterial operations. This impact could be avoided by implementing transit treatment measures that would not reduce the general purpose traffic capacity of 4th Avenue South, though that could result in trade-offs in the extent to which the transit travel time impact could be mitigated. Specific mitigation for the permanent closure of the SODO Busway would be determined through coordination between Sound Transit, City of Seattle, and Metro.

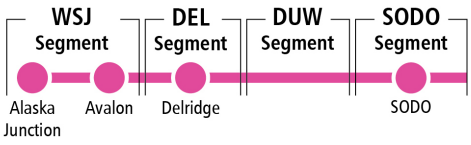
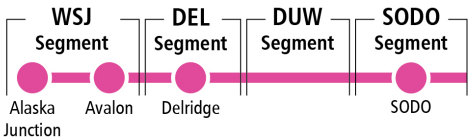


Table 3-7. Potentially Impacted Intersections to be Considered for Mitigation

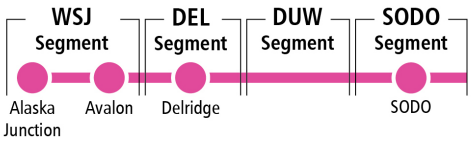
Segment	Intersection	Alternative	Cause(s)	Potential Mitigation
Delridge Segment	23rd Avenue Southwest/Delridge Way Southwest	Full-Build and M.O.S.: Preferred Option DEL-6b and Alternative DEL-7	New signal	See Section 3.5.4.2
	Delridge Way Southwest/Southwest Andover Street	Full-Build and M.O.S.: Alternative DEL-1a, Option DEL-1b, Alternative DEL-2a, Option DEL-2b, Alternative DEL-3, Alternative DEL-4, Alternative DEL-5, and Alternative DEL-6a	Increased pick-up/drop-off activity	See Section 3.5.4.2
	Southwest Dakota Street/Delridge Way Southwest	All Full-Build Alternatives All Alternatives (M.O.S.)	Increased pick-up/drop-off activity	See Section 3.5.4.2
	Southwest Genesee Street/Delridge Way Southwest	Full-Build and M.O.S.: Preferred Option DEL-6b and Alternative DEL-7	Increased pick-up/drop-off activity	See Section 3.5.4.2
West Seattle Junction Segment	Fauntleroy Way Southwest/35th Avenue Southwest	All Build Alternatives except WSJ-6	Increased pick-up/drop-off activity	See Section 3.5.4.3
	Southwest Genesee Street/Southwest Avalon Way	Preferred Option WSJ-5b and Alternative WSJ-5a	Intersection revision to accommodate pick-up/drop-off activity	See Section 3.5.4.3
	Fauntleroy Way Southwest/Southwest Alaska Street, Southwest Alaska Street/38th Avenue Southwest, Fauntleroy Way Southwest/38th Avenue Southwest, Southwest Oregon Street/38th Avenue Southwest, and Fauntleroy Way Southwest/Southwest Oregon Street	Alternative WSJ-2	Increased pick-up/drop-off activity	See Section 3.5.4.3

3.5.4.2 Delridge Segment

This section identifies potential mitigation measures for intersections in the Delridge Segment that are expected to be impacted by the project Build Alternatives (Table 3-7), including Preferred Option DEL-6b. While these measures could reduce the magnitude of the impacts, any modifications would be coordinated with the City of Seattle to determine whether they are consistent with City priorities and preferrable given other trade-offs and modal priorities:



- Delridge Way Southwest and 23rd Avenue Southwest (Preferred Option DEL-6b and Alternative DEL-7)
    - The main cause of the traffic operations impact at this location would be southbound delay during the p.m. peak hour as high volumes of vehicles exit the West Seattle Bridge. With the No Build Alternative, that southbound delay would be associated with the Delridge Way Southwest and Southwest Andover Street signal, as it is the first signalized intersection after exiting the bridge. By implementing a new signal upstream at 23rd Avenue Southwest, the southbound delay assigned to the Southwest Andover Street would only include the stretch of roadway between Southwest Andover Street and 23rd Avenue Southwest and the remaining delay would be shifted to the 23rd Avenue Southwest signal. In other words, while Preferred Option DEL-6b would include a new impact to this location, the broader effect on traffic operations would not differ substantially.
    - Although this intersection would experience increased levels of delay by becoming the new access point for Nucor Steel, the station area, and any associated TOD, it is expected to provide better circulation, safety, and traffic operations than if Preferred Option DEL-6b did not include this new signal and circulation concept. This circulation concept has been developed in coordination with the City of Seattle and Metro, and any modifications could create secondary impacts to other modes or conflict with agency priorities or policies. Sound Transit will continue to refine the station concept through final design in partnership with the City of Seattle and Metro and determine whether further mitigation to reduce vehicle delay will be included in the project.
- Delridge Way Southwest and Southwest Andover Street (Alternative DEL-1a, Option DEL-1b, Alternative DEL-2a, Option DEL-2b, Alternative DEL-3, Alternative DEL-4, Alternative DEL-5, and Alternative DEL-6a)
    - The main cause of the traffic operations impact at this location would be northbound delay during the a.m. peak hour as high volumes of vehicles access the West Seattle Bridge. To mitigate this impact, a second northbound lane south of Southwest Andover Street would be required. However, that may not be consistent with the City of Seattle's priorities nor preferrable given secondary effects to other modes. Sound Transit will continue to work with the City of Seattle and Metro regarding transit treatments and signal operations at this location and determine whether further mitigation to reduce vehicle delay will be included in the project.
- Delridge Way Southwest and Southwest Dakota Street (All Build Alternatives)
    - Vehicles turning from Southwest Dakota Street onto Delridge Way Southwest at this side-street stop-control intersection would experience increased delay as they wait for gaps in traffic on Delridge Way Southwest. This impact could be mitigated by adding a signal at this location. Sound Transit will continue to work with the City of Seattle and Metro regarding transit treatments and signal operations at this location and determine whether further mitigation to reduce vehicle delay will be included in the project.
- Delridge Way Southwest and Southwest Genesee Street (Preferred Option DEL-6b and Alternative DEL-7)
    - Adding an eastbound right-turn pocket on Southwest Genesee Street to allow more vehicles to move through the intersection during the eastbound green time would mitigate this impact.



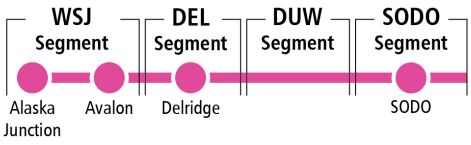
3.5.4.3 West Seattle Junction Segment

This section identifies potential mitigation measures for intersections in the West Seattle Junction Segment that are expected to be impacted by the project Build Alternatives (Table 3-7), including for Preferred Option WSJ-5b. While these measures could reduce the magnitude of the impact, any modifications would be coordinated with the City of Seattle to determine whether they are consistent with the City's priorities and preferrable given other trade-offs and modal priorities:

- Fauntleroy Way Southwest and 35th Avenue Southwest (Preferred Option WSJ-5b and Alternative WSJ-1, Alternative WSJ-2, and Alternative WSJ-3a, Option WSJ-3b, Alternative WSJ-4 and Alternative WSJ-5a)
    - Adding an overlap phase to the northbound right turn during the westbound left phase, modifying the signal cycle length to 120 seconds, and/or maintaining a channelized right turn could potentially mitigate this impact. Sound Transit is coordinating with the City of Seattle and Metro to refine the intersection layout and signal operations to balance the needs of all modes. Effects to adjacent intersections whose signals are coordinated with this location would also need to be considered.
- Southwest Genesee Street and Southwest Avalon Way (Preferred Option WSJ-5b and Alternative WSJ-5a)
    - Revising the intersection to allow northbound left turns into the station area would result in increased delay for vehicles on Southwest Avalon Way. Modifying the signal cycle length to 120 seconds would mitigate the additional delay.

Five other intersections would be impacted only with Alternative WSJ-2. The locations and potential mitigation options are as follows:

- Fauntleroy Way Southwest and Southwest Alaska Street
    - Intersection delays would increase with the additional pick-up/drop-off trips to and from Alaska Junction Station. Increasing the westbound approach capacity from a shared westbound through/left-turn lane to a westbound left and separate westbound through lane would mitigate the additional delay.
- Southwest Alaska Street and 38th Avenue Southwest
    - Increased pick-up/drop-off trips would result in increased delay for vehicles turning from 38th Avenue Southwest onto Southwest Alaska Street. This could be mitigated by converting the intersection from side-street stop controlled to all-way stop controlled.
- Fauntleroy Way Southwest and 38th Avenue Southwest
    - Increased delays would be expected for vehicles turning left from 38th Avenue Southwest onto Fauntleroy Way Southwest. The increased intersection delays could be mitigated by restricting left turns from 38th Avenue Southwest.
- Southwest Oregon Street and 38th Avenue Southwest
    - Increased delays would be experienced by vehicles turning left from 38th Avenue Southwest onto Southwest Oregon Street. Converting the intersection from side-street stop controlled to all-way stop control would mitigate the delay.
- Fauntleroy Southwest and Southwest Oregon Street
    - Increasing the signal cycle length to 120 seconds would mitigate the impact of added delays from additional pick-up/drop-off vehicle trips through the intersection.



3.6 Affected Environment and Impacts during Operation – Parking

This section describes existing on- and off-street parking and curb use conditions along the project corridor and around stations. It describes future changes in parking supply or curb use restrictions with the No Build Alternative and Build Alternatives and also documents the parking supply and occupancy along streets in each station's vicinity to identify unrestricted parking that could be affected by light rail riders who park and ride light rail (also known as hide-and-ride). Section 3.11 discusses, by segment, temporary construction impacts such as loss of on- and off-street parking and construction worker parking. Appendix N.1 provides additional detail on parking impacts.

Two study areas were evaluated to assess parking impacts: a near-project study area and a "hide-and-ride" study area. The near-project study area included streets within one block of the light rail alignment as well as within one block of each station. Potential permanent or temporary changes to curb use functions were assessed for the near-project study area. The hide-and-ride study area included all street segments and publicly available off-street lots (both paid and free parking) within a 0.25-mile walking distance from the Build Alternative stations. Parking data for this analysis were collected in fall 2019, prior to the COVID-19 pandemic. Data collection included a detailed parking inventory (number of spaces by type) and midday occupancy surveys (number of vehicles parked) during the weekday.

3.6.1 Affected Environment

Table 3-8 summarizes the on-street parking within the hide-and-ride study areas for each of the segment alternatives. Special-use curb zones in the near-project study area, including disabled-permit spaces, commercial load zones, and passenger load zones, were also documented and are described in Section 5.2 of Appendix N.1. Parking supply and occupancy counts were performed midday (from 9 a.m. to 3 p.m.) on weekdays between September 2019 and early December 2019.

There are a few publicly owned parking lots near potential stations that serve parks and community centers. Information on these off-street parking facilities is provided in Appendix N.1.

3.6.2 Environmental Impacts of the No Build Alternative

The parking conditions in the study area for the No Build Alternative would not substantially change from the existing conditions.

3.6.3 Environmental Impacts of the Build Alternatives

All of the proposed station locations are currently surrounded by areas of unrestricted parking that could be used by light rail riders to park and commute elsewhere. This hide-and-ride parking could adversely affect local businesses and residents who rely on that parking for other purposes. Consistent with current practice in most of Seattle's existing light rail station areas, Sound Transit expects that the City of Seattle would manage parking within the vicinity of new stations by placing restrictions (including time limits or permit restrictions) where they do not already exist. Operators of off-street parking facilities near stations might choose to change their pricing structures or implement parking management strategies to ensure an adequate supply of parking for their tenants and customers.

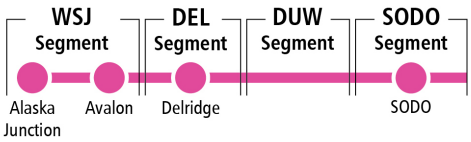
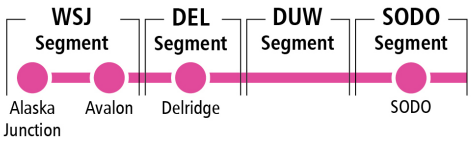


Table 3-8. On-Street Parking in Hide-and-Ride Study Areas

Segment	Alternative	Unrestricted Spaces	Restricted Spaces [a]	Total Spaces	Percent Occupied
SODO	**Preferred At-Grade Lander Access Station Option (SODO-1c)**	**173**	**65**	**238**	**65%**
	At-Grade Alternative (SODO-1a)	173	65	238	65%
	At-Grade South Station Option (SODO-1b)	245	71	316	64%
	Mixed Profile Alternative (SODO-2)	245	71	316	64%
Duwamish	**Preferred South Crossing Alternative (DUW-1a) [b]**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**
	South Crossing South Edge Crossing Alignment Option (DUW-1b) [b]	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	North Crossing Alternative (DUW-2) [b]	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Delridge	**Preferred Andover Street Station Lower Height South Alignment Option (DEL-6b)**	**359**	**33**	**392**	**50%**
	Dakota Street Station Alternative (DEL-1a)	353	73	426	59%
	Dakota Street Station North Alignment Option (DEL-1b)	353	73	426	59%
	Dakota Street Station Lower Height Alternative (DEL-2a)	353	73	426	59%
	Dakota Street Station Lower Height North Alignment Option (DEL-2b)	353	73	426	59%
	Delridge Way Station Alternative (DEL-3)	324	73	397	57%
	Delridge Way Station Lower Height Alternative (DEL-4)	324	73	397	57%
	Andover Street Station Alternative (DEL-5)	359	33	392	50%
	Andover Street Station Lower Height Alternative (DEL-6a)	359	33	392	50%
	Andover Street Station Lower Height No Avalon Station Tunnel Connection Alternative (DEL-7)	359	33	392	50%
West Seattle Junction	**Preferred Medium Tunnel 41st Avenue Station West Entrance Station Option (WSJ-5b): Avalon Station**	**590**	**277**	**867**	**55%**
	Preferred Medium Tunnel 41st Avenue Station West Entrance Station Option (WSJ-5b): Alaska Junction Station	**263**	**756**	**1019**	**64%**
	Elevated 41st/42nd Avenue Station Alternative (WSJ-1): Avalon Station	629	102	731	52%
	Elevated 41st/42nd Avenue Station Alternative (WSJ-1): Alaska Junction Station	242	731	973	62%
	Elevated Fauntleroy Way Station Alternative (WSJ-2): Avalon Station	629	102	731	52%
	Elevated Fauntleroy Way Station Alternative (WSJ-2): Alaska Junction Station	471	507	978	67%
	Tunnel 41st Avenue Station Alternative (WSJ-3a): Avalon Station	590	277	867	55%
	Tunnel 41st Avenue Station Alternative (WSJ-3a): Alaska Junction Station	263	756	1019	64%



Segment	Alternative	Unrestricted Spaces	Restricted Spaces [a]	Total Spaces	Percent Occupied
West Seattle Junction (cont'd)	Tunnel 42nd Avenue Station Option (WSJ-3b): Avalon Station	590	277	867	55%
	Tunnel 42nd Avenue Station Option (WSJ-3b): Alaska Junction Station	132	851	983	61%
	Short Tunnel 41st Avenue Station Alternative (WSJ-4): Avalon Station	629	102	731	52%
	Short Tunnel 41st Avenue Station Alternative (WSJ-4): Alaska Junction Station	263	756	1019	64%
	Medium Tunnel 41st Avenue Station Alternative (WSJ-5a): Avalon Station	590	277	867	55%
	Medium Tunnel 41st Avenue Station Alternative (WSJ-5a): Alaska Junction Station	263	756	1019	64%
	No Avalon Station Tunnel Alternative (WSJ-6): Alaska Junction Station [c]	263	756	1019	64%

[a] Restricted spaces are signed to limit parking duration or type of vehicle.

[b] Parking was not inventoried In in the Duwamish Segment because there are no stations in this segment and none of the alternatives have long-term effects to on-street and public off-street parking.

[c] Parking information for Alternative WSJ-6 is only provided for the Alaska Junction Station because the alternative does not include an Avalon Station.

Sound Transit would not create new parking at any of its stations to accommodate light rail riders. Trip generation and traffic analysis performed for the project assumes no long-term parking by commuters and that curb use management in the vicinity of new light rail stations would discourage such parking. Therefore, long-term parking impacts surrounding the stations could occur if existing unrestricted parking accommodates hide-and-ride parking or if there is permanent removal of parking spaces by the project.

Sound Transit identified potential long-term parking impacts where parking spaces would be permanently removed for project use at the new station locations and along the alignments. These are described further in the following sections.

3.6.3.1 Potential for Hide-and-Ride near Stations

There is unrestricted parking in the vicinity of each station that could be affected by hide-and-ride parking. The existing parking supply within 0.25 mile of each station, including unrestricted spaces, is summarized in Table 3-8.

3.6.3.2 Permanent Removal of Parking

Table 3-9 summarizes the on-street parking that would be removed with each of the alternatives, including both parking that would be permanently removed at the stations or along the alignment and additional parking that would be temporarily removed during construction. The table also notes off-street parking impacts. Temporary parking impacts during construction are discussed by segment in Section 3.11. Appendix N.1 provides details on where parking would be removed for each alternative.

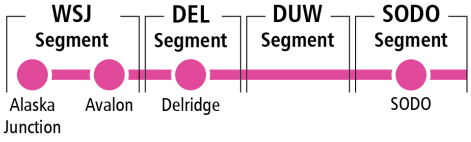
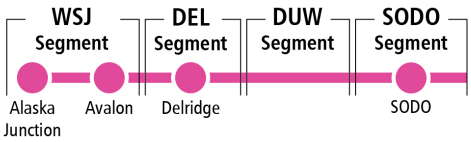


Table 3-9. Displaced On-Street Parking

Segment	Alternative	On-Street Parking Permanently Removed (spaces)	Additional On-Street Parking Temporarily Removed during Construction (spaces)
SODO	**Preferred At-Grade Lander Access Station Option (SODO-1c)**	**80 to 180** [a]	**0 to 105** [b]
	At-Grade Alternative (SODO-1a)	85 to 195 [a]	0 to 105 [b]
	At-Grade South Station Option (SODO-1b)	55 to 155 [a]	15 to 125 [b]
	Mixed Profile Alternative (SODO-2)	25 to 35	25 to 225 [b, c]
Duwamish	**Preferred South Crossing Alternative (DUW-1a)**	**Up to 65** [d]	**40 to 205** [e, f]
	South Crossing South Edge Crossing Alignment Option (DUW-1b)	Up to 65 [d]	40 to 205 [e, f]
	North Crossing Alternative (DUW-2)	5 to 80 [d]	90 to 275 [e, f, g]
Delridge	**Preferred Andover Street Station Lower Height South Alignment Option (DEL-6b)** [h]	**30 to 40**	**15 to 25**
	Dakota Street Station Alternative (DEL-1a)	5 to 15	60 to 85
	Dakota Street Station North Alignment Option (DEL-1b)	5 to 15	115 to 155
	Dakota Street Station Lower Height Alternative (DEL-2a)	15 to 25	30 to 40
	Dakota Street Station Lower Height North Alignment Option (DEL-2b)	20 to 30	30 to 40
	Delridge Way Station Alternative (DEL-3)	5 to 15	75 to 105
	Delridge Way Station Lower Height Alternative (DEL-4)	5 to 15	70 to 90
	Andover Street Station Alternative (DEL-5) [h]	0	55 to 75
	Andover Street Station Lower Height Alternative (DEL-6a) [h]	0	0
	Andover Street Station Lower Height No Avalon Station Tunnel Connection Alternative (DEL-7) [h]	20 to 30	15 to 25
West Seattle Junction	**Preferred Medium Tunnel 41st Avenue Station West Entrance Station Option (WSJ-5b)**	**10 to 20**	**190 to 260**
	Elevated 41st/42nd Avenue Station Alternative (WSJ-1)	10 to 20 [i]	100 to 135
	Elevated Fauntleroy Way Station Alternative (WSJ-2)	10 to 20	70 to 95
	Tunnel 41st Avenue Station Alternative (WSJ-3a)	10 to 20	185 to 245
	Tunnel 42nd Avenue Station Option (WSJ-3b)	15 to 25 [j]	80 to 110
	Short Tunnel 41st Avenue Station Alternative (WSJ-4)	45 to 60	95 to 130
	Medium Tunnel 41st Avenue Station Alternative (WSJ-5a)	Up to 10	190 to 260
	No Avalon Station Tunnel Alternative (WSJ-6)	Up to 10	165 to 225



[a] Includes parking spaces permanently removed on 4th Avenue South between South Holgate Street and South Forest Street due to transit improvements. The various treatments could remove between 25 and 110 spaces in the SODO Segment.

[b] Includes parking spaces temporarily removed on 6th Avenue South for 230-kilovolt relocation for all alternatives. Approximately 280 parking spaces in the SODO Segment could be affected, but only about 100 spaces at a time would be removed.

[c] Includes parking spaces temporarily removed on 4th Avenue South between South Holgate Street and South Forest Street due to transit improvements. The various treatments could remove between 25 and 110 spaces in the SODO Segment.

[d] Includes up to 65 parking spaces permanently removed on 4th Avenue South between South Forest Street and South Spokane Street due to transit improvements if Preferred Option SODO-1c, Alternative SODO-1a, or Option SODO-1b is selected.

[e] Includes parking spaces temporarily removed on 6th Avenue South for 230-kilovolt relocation for all alternatives. About 85 parking spaces in the Duwamish Segment could be affected at one time.

[f] Includes up to 65 parking spaces temporarily removed on 4th Avenue South between South Forest Street and South Spokane Street due to transit improvements if Alternative SODO-2 is selected.

[g] Alternative DUW-2 would temporarily affect the Terminal 25 South truck parking lot, which can accommodate about 140 truck tractors.

[h] Since parking data were collected in 2019, the Seattle Department of Transportation has reconfigured Southwest Andover Street, Southwest Yancy Street, and Southwest Avalon Way. The resulting parking changes along these streets were taken into consideration when determining long-term impacts.

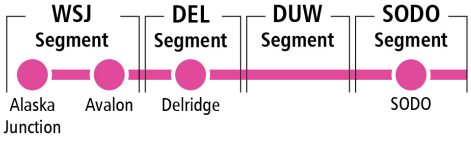
[i] An additional 210 public off-street parking spaces would also be removed with Alternative WSJ-1.

[j] An additional 230 public off-street parking spaces would also be removed with Option WSJ-3b.

Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b would permanently remove parking along 4th Avenue South between South Holgate Street and South Spokane Street in the SODO and Duwamish segments, where new transit improvements would be implemented to accommodate buses diverted off of the SODO Busway. The different types of improvements being considered include queue jump lanes (a bus-only signal and dedicated transit lane that allows buses to proceed through an intersection before general purpose traffic), business access and transit lanes, and freight and transit lanes. The number of parking stalls affected by the transit improvements in the SODO Segment could range from 25 to 110 on-street parking spaces, including up to four General Load Zone spaces, and up to 65 on-street parking spaces in the Duwamish Segment.

3.6.4 Mitigation for Operation Impacts

All of the segments have areas of unrestricted parking that could be affected by light rail riders parking near the station. To mitigate this potential impact, Sound Transit would work with the City of Seattle to consider appropriate on-street parking measures within a 0.25-mile radius of each station to discourage hide-and-ride activity while retaining curb use functions to support area businesses or residents. Sound Transit would inventory on-street parking around each station before and after the start of light rail revenue service, then would work with the City of Seattle to determine where mitigation measures would be needed. Potential parking control measures include parking meters, restricted parking signage, time-limit signs, passenger and truck load zones, and restricted parking zone programs. Sound Transit would be responsible for the cost of installing the signage or other parking controls for 1 year after the light rail extension begins operation. The local jurisdiction would be responsible for monitoring, enforcing, and maintaining the parking controls. In addition, Sound Transit would coordinate with the City of Seattle to relocate affected Americans with Disabilities Act parking spaces.



3.7 Affected Environment and Impacts during Operation – Non-motorized Facilities

This section describes the existing and planned pedestrian and bicycle facilities that could be affected by the project. Pedestrian L.O.S. at sidewalks, crosswalks, and intersection corners within one block of each station entrance were evaluated for the p.m. peak hour. Walksheds and bikesheds were used to show the areas around each station that are accessible to pedestrians and bicyclists, and the condition of the sidewalks and curb ramps was qualitatively assessed within the walkshed of each preferred alternative station. The walksheds, bikesheds, and sidewalk condition are graphically shown and described in more detail in Appendix N.1.

Walksheds and Bikesheds

Walksheds and bikesheds are defined as the distance a person can walk or bicycle in 10 minutes around each station, which translates to roughly a 0.5-mile walk distance and a 1.5-mile bicycle distance. The bikeshed methodology assumes an average speed consistent with traditional bicycles; riders using electric-assist bicycles could travel longer distances.

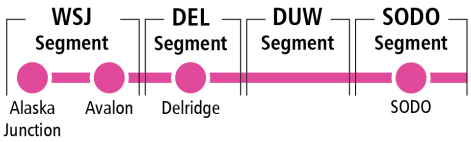
3.7.1 Affected Environment

The SODO and Duwamish segments generally have sidewalks on both sides of the major roadways, but there are gaps in coverage. Many streets have impediments to walking. Impediments include sidewalk obstructions (including parked cars), lack of a curb, long block lengths, high truck volumes, and barriers such as railroad tracks and fencing that limit connectivity and increase walking distances. The current condition of sidewalks and curb ramps around the SODO Station varies; the streets closest to the station are in good condition, but many of the smaller street connections, as well as the south side of South Holgate Street, lack sidewalks. In the West Seattle Junction and Delridge segments, station areas have a predominantly residential and neighborhood commercial character and there are generally sidewalks on both sides of the street near the stations, with a few short gaps in coverage and some intersections missing curb ramps. The majority of the sidewalks around these station locations are in good condition.

Most of the study area lacks designated facilities for bicyclists, as shown on Figure 3-4. Bicycle facilities near stations include bicycle lanes, protected bicycle lanes, neighborhood greenways, and multi-use trails.

3.7.2 Environmental Impacts of the No Build Alternative

With the No Build Alternative, projects included in Seattle's Bicycle Master Plan (City of Seattle 2014), Bicycle Master Plan 2021-2024 Implementation Plan (City of Seattle 2021), and Pedestrian Master Plan (City of Seattle 2017a) are assumed to be built. The Bicycle Master Plan calls for protected bicycle lanes on Airport Way South, Delridge Way Southwest, 35th Avenue Southwest, Fauntleroy Way Southwest, and Southwest Alaska Street and multi-use trails on South Spokane Street and between the SODO Trail and South Spokane Street, among others, as well as a network of greenways as shown in Figure 3-4. Figure 3-4 shows existing and planned bike facilities that are expected to be in place with the No Build and Build Alternatives. Appendix N.1 provides the complete list of projects included in the No Build Alternative. The No Build Alternative assumes all sidewalks, crosswalks, and corners studied would meet L.O.S. standards.



3.7.3 Environmental Impacts of the Build Alternatives

Sound Transit would include pedestrian and bicycle improvements at stations to accommodate the projected increase in pedestrian and bicycle travel with the project. The following sections discuss specific improvements affecting pedestrian circulation, such as new connections or signals, by segment. Sound Transit would work with the City of Seattle to determine the most appropriate pedestrian and bicycle improvements to support station access. New facilities would meet Americans with Disabilities Act requirements as well as local and federal design standards, as appropriate. This section also cites the projected ridership at each station, as forecasted by the Sound Transit Incremental Ridership Model (Sound Transit 2019).

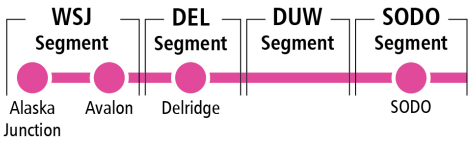
Station Pedestrian and Bicycle Access Opportunities

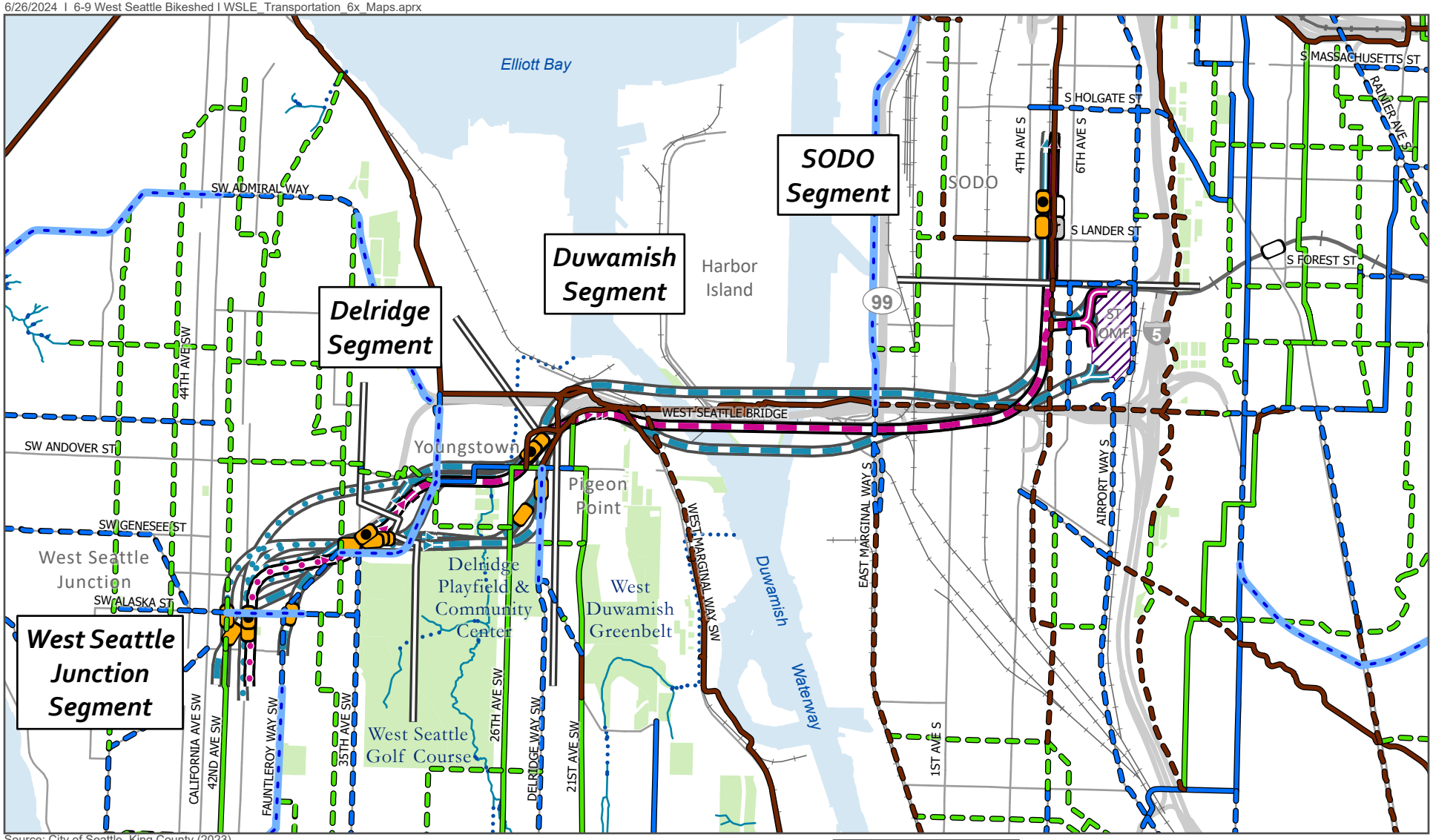
Additional pedestrian and bicycle improvements not included as part of the project could be identified for potential station access enhancement by others. These improvements could be identified through the station planning efforts, included in existing local plans by partner agencies, or potentially funded in partnership with Sound Transit. FTA considers pedestrian and bicycle improvements within ½ mile and 3 miles of station areas, respectively, for grant funding, which could be sought by partner agencies or in conjunction with Sound Transit. In addition, Sound Transit could consider funding access improvements beyond the station footprint as part of the Non-motorized Access Allowance included in the Sound Transit 3 Plan.

3.7.3.1 Impacts Common to All Alternatives

Based on the available information at the time this Final EIS was being prepared, no projects listed in Seattle's Bicycle Master Plan or Bicycle Master Plan 2021–2024 Implementation Plan are expected to be impacted by the Build Alternatives. None of the Build Alternatives would result in long-term adverse impacts to sidewalks, school walk routes, or projects in the Pedestrian Master Plan because any affected pedestrian facility (i.e., proposed guideway columns encroaching on existing sidewalks) would be rebuilt to meet applicable design standards at the time of permitting including Americans with Disabilities Act requirements as well as applicable design standards (such as Seattle Streets Illustrated [City of Seattle 2020], Standard Plans for Municipal Construction [City of Seattle 2023], the Seattle Land Use Code and Light Rail Facility Construction and Construction Impacts sections of the Seattle Municipal Code) or to a standard agreed to by Sound Transit and the City of Seattle. If it is determined that a facility could not be rebuilt in the original location, Sound Transit would coordinate with the City of Seattle to identify an alternate route. No long-term adverse impacts to bicycle parking are expected with any of the Build Alternatives. Sound Transit will continue to coordinate with the City to ensure bike parking facilities are adequately distributed, sized, and configured to meet present and future bike parking demand at the stations.

All sidewalks, crosswalks, and corners within one block of the station entrances have sufficient capacity, in terms of pedestrian L.O.S., to serve projected demand. Sound Transit will coordinate with the City of Seattle on specific sidewalk width requirements through the final design process.





Source: City of Seattle, King County (2023).

Preferred Alternative
- Elevated
- At-Grade
- Tunnel
- Retained Cut

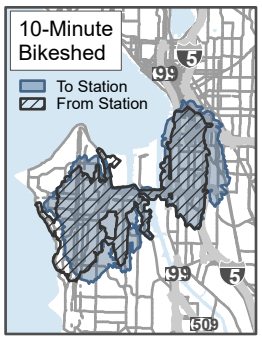
Other Alternatives
- Elevated
- At-Grade
- Tunnel
- Retained Cut

Station (● *Indicates Preferred Alternative*)
- New
- (r) Relocated
- Existing

- Segment Line
- Sound Transit Operations and Maintenance Facility (ST OMF)
- Existing Link Light Rail
- (C) East Link Light Rail (Under Construction)
- Railroad
- Stream
- Piped Stream
- Park

Existing Bicycle Facilities
- Bike Lane (In-Street Separation)
- Multi-Use Trail
- Neighborhood Greenway

Planned Bicycle Facilities
- Bike Lane (In-Street Separation)
- Multi-use Trail
- Neighborhood Greenway
- Planned Improvement of Existing Bike Lane



0 0.5 1 Mile

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FIGURE 3-4
Existing and Planned Bike Facilities

West Seattle Link Extension

3.7.3.2 SODO Segment

The walksheds for the SODO Station with all Build Alternatives are similar in size due to the proposed station locations being near to each other. Preferred Option SODO-1c would include connections from a roadway loop constructed along 5th Place South to the east of the station to serve bus and paratransit loading between the concourse and 6th Avenue South and from the new South Lander Street overpass. The new South Lander Street overpass would include a sidewalk and bicycle lanes or a multi-use path on the north side of the roadway that would separate pedestrians and bicyclists from the current at-grade rail crossing and allow access to the station at the top of the overpass. Preferred Option SODO-1c would incorporate a new traffic signal at South Stacy Street and 6th Avenue South, which would provide a signalized crossing for pedestrians to access the station.

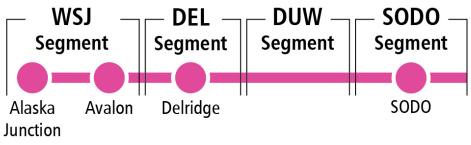
Alternative SODO-1a proposes station access along the South Stacy Street corridor between 4th Avenue South and 6th Avenue South and would include the South Lander Street overpass but would not include direct access from the overpass to the station. Alternative SODO-1a would also add a new signalized crossing at South Stacy Street and 6th Avenue South. Option SODO-1b would include a new roadway loop between 4th Avenue South and the light rail stations and would also include access from the South Lander Street overpass as described for Preferred Option SODO-1c. Alternative SODO-2 would be accessible from the east via the existing South Bayview Street. The pedestrian L.O.S. analysis determined that sidewalks, crosswalks, and intersection corners within one block of the station entrances would have sufficient capacity to serve the pedestrian demand.

With all alternatives in the SODO Segment, cyclists could continue to access the station via the SODO Trail, which could be accessed by planned protected bicycle lanes on South Royal Brougham Way and Airport Way South (with connections at South Holgate Street and South Forest Street). Cyclists could also use a planned trail extension south to South Spokane Street as well as a planned protected bicycle lanes that would connect at the current trail end on South Forest Street and extend south along 6th Avenue South and Airport Way South to South Lucile Street.

While overall boardings and alightings at the SODO Station would increase relative to the No Build Alternative, most of those would be light rail to light rail transfers. Approximately 300 additional non-rail transferring riders (accessing by walk, bike, bus, or drop-off and pick-up) would board at the SODO Station during the p.m. peak hour for all alternatives (relative to the No Build Alternative with only the existing SODO Station).

3.7.3.3 Duwamish Segment

Because the Duwamish Segment would not include any stations, no walkshed, bikeshed, or pedestrian trip generation analysis was conducted. Columns associated with the elevated guideway for Alternative DUW-2 would encroach on the Alki Trail just west of the Chelan Avenue Southwest/West Marginal Way Southwest/Southwest Spokane Street intersection. The trail would be permanently shifted to maintain connectivity between the trail and the crosswalk at that intersection. Columns associated with the elevated guideway tracks connecting all of the alternatives to the Operations and Maintenance Facility Central could encroach on sidewalks on 6th Avenue South north of South Hanford Street. With Preferred Alternative DUW-1a and Alternative DUW-2, guideway columns could also encroach on sidewalks along 4th Avenue South north of Spokane Street. In both locations, Sound Transit would rebuild the affected facilities to the extent feasible.



3.7.3.4 Delridge Segment

The walksheds around each station location in the Delridge Segment mainly consist of residential and commercial uses; Preferred Option DEL-6b, Alternative DEL-5, Alternative DEL-6a, and Alternative DEL-7 include a larger share of industrial uses.

Pedestrian and bicycle access for all Delridge Segment alternatives would be complicated by steep slopes, environmental features, and major infrastructure, particularly to the east and west. Access is hindered by Longfellow Creek Natural Area and large, fenced-off park areas, including the West Seattle Golf Course and Pigeon Point Park, part of the West Duwamish Greenbelt. In addition, the Delridge Way Southwest on- and off-ramps present a barrier for people walking and biking.

With all Build Alternatives in the Delridge Segment, cyclists could access the Delridge Station area via existing and planned neighborhood greenways on 21st Avenue Southwest, 26th Avenue Southwest, and Southwest Andover Street/Southwest Yancy Street; multi-use trails on Delridge Way Southwest north of 23rd Avenue Southwest; the West Seattle Bridge Trail on the Spokane Street Bridge; the Alki Trail; the Duwamish River Trail; the Delridge Connector Trail; and protected bicycle lanes on Delridge Way Southwest and Southwest Avalon Way. All alternatives would have an elevated guideway with columns that would encroach on existing sidewalks through the Delridge Segment. Sound Transit would rebuild the affected sidewalks to the extent feasible.

Preferred Option DEL-6b has a station design featuring a one-way bus loop connecting Southwest Andover Street to Delridge Way Southwest via a realigned Southwest Charlestown Street. Station access would be provided from the bus loop to the west and Delridge Way Southwest from the east, thus allowing riders to transfer between bus and light rail without any street crossings. Preferred Option DEL-6b and Alternative DEL-7 would add a new signal at Delridge Way Southwest and realign Southwest Charlestown Street to provide a new crossing location for pedestrians and cyclists accessing the station.

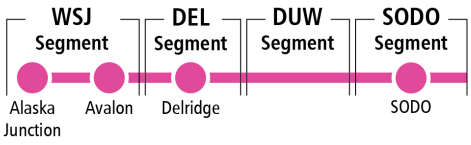
Preferred Option DEL-6b and Option DEL-7 would cross 32nd Avenue Southwest at-grade, resulting in a permanent closure of a portion of 32nd Avenue Southwest, which would create a cul-de-sac on one or both sides of the guideway.

Alternatives DEL-1a and DEL-3 would remove the sidewalk on the south side of Southwest Genesee Street between Southwest Avalon Way and 26th Avenue Southwest; DEL-4 would remove a portion of that sidewalk segment. This sidewalk runs alongside the West Seattle Golf Course fence; pedestrians would instead travel along the sidewalk on the north side of the street. A bus stop would remain on the south side of Southwest Genesee Street with access maintained from the north sidewalk by a pedestrian crossing and treatments to provide safe access.

With Alternative DEL-2a and Option DEL-2b, 25th Avenue Southwest would be closed to through traffic south of Southwest Dakota Street, but pedestrian and bicycle access would be maintained. Option DEL-2b would permanently close 30th Avenue Southwest north of Southwest Genesee Street, thus potentially eliminating pedestrian and bicycle access at that location.

Alternative DEL-7 would have approximately 1,300 riders during the p.m. peak hour, and all the other alternatives would have approximately 1,400 riders during the p.m. peak hour at the Delridge Station, with most riders transferring from buses. The pedestrian L.O.S. analysis determined that sidewalks, crosswalks, and intersection corners within one block of the station entrances would have sufficient capacity.

With the M.O.S., the Delridge Station would be the southern terminus and would therefore have higher ridership than the full-build project. Overall boardings and alightings at the Delridge Station would be approximately 2,100 riders during the p.m. peak hour, with over 90 percent of



riders accessing the light rail station by bus from Alaska Junction, White Center, Burien, and communities to the south. The remaining riders would access the station by walking, biking, or using pick-up and drop-off. All pedestrian sidewalks, crossings, and corners within one block of Delridge Station are expected to have sufficient capacity with the M.O.S. scenario.

3.7.3.5 West Seattle Junction Segment

The alternatives' walksheds are generally comparable in size to one another for both the Avalon Station and Alaska Junction Station, though they cover different areas depending on station location. Because of the proximity between the Alaska Junction and Avalon stations, some areas would fall within the walksheds of both stations.

With all Build Alternatives, cyclists could access the Alaska Junction and Avalon stations via existing or planned neighborhood greenways on Southwest Andover Street, 36th Avenue Southwest, 42nd Avenue Southwest, 45th Avenue Southwest, and 48th Avenue Southwest; planned bicycle lanes on Glenn Way Southwest, Erskine Way Southwest, Southwest Genesee Street, and Southwest Charlestown Street; and existing or planned protected bicycle lanes on Fauntleroy Way Southwest, 35th Avenue Southwest, Southwest Avalon Way, Southwest Admiral Way, and Southwest Alaska Street (however, topography is a limiting factor for bicycle access).

With Preferred Option WSJ-5b, and Alternative WSJ-5a, a short section of Southwest Genesee Street would be permanently closed on the east side of 35th Avenue Southwest. Pedestrians would be detoured along Southwest Genesee Street eastbound to Southwest Avalon Way. Although the station would still be accessible by cyclists and pedestrians, those passing through the station area may have to cross 35th Avenue Southwest and Fauntleroy Way Southwest at Southwest Avalon Way. Guideway columns could encroach on sidewalks along the Fauntleroy Way Southwest corridor with Alternatives WSJ-1 and WSJ-2, but Sound Transit would rebuild the affected facilities to the extent feasible.

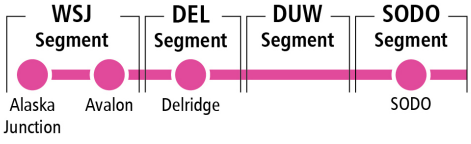
With Alternative WSJ-4, 37th Avenue Southwest north of Fauntleroy Way Southwest and 38th Avenue Southwest north of Southwest Oregon Street would be permanently closed at the guideway, potentially eliminating non-motorized access. Pedestrians and bicycles could reroute to the adjacent parallel roadways, which have relatively short block spacing such that out-of-direction travel would be minimal.

The Avalon and Alaska Junction stations in the West Seattle Junction Segment would have approximately 1,700 riders during the p.m. peak hour for all Build Alternatives except for Alternative WSJ-2, which would have 1,900 riders, with most occurring at the Alaska Junction Station. Most riders would arrive on foot or transfer from local buses. The pedestrian L.O.S. analysis determined that sidewalks, crosswalks, and intersection corners within one block of the station entrances would have sufficient capacity.

3.7.4 Mitigation for Operation Impacts

The project is not expected to permanently impact existing designated bicycle facilities or routes. If impacts are identified as the project advances, Sound Transit will work with the City of Seattle to rebuild the affected facilities or develop alternate facilities or routes that achieve, to the extent feasible, a similar level of protection and comfort afforded by the facility being impacted. These replacements would be funded by Sound Transit, and may include, for example, protected or standard bicycle lanes, trails, and neighborhood greenway treatments, along with associated design elements such as pavement markings and bike signals, where needed.

No pedestrian facilities would have an L.O.S. impact with either the full-build project or M.O.S.



The project may also have direct physical impacts to existing sidewalks and trails due to placement of guideway columns in the Duwamish and Delridge segments, and several streets in the Delridge and West Seattle Junction segments would be permanently closed potentially eliminating pedestrian and bicycle access at those locations. As the project design is refined and potential column locations are identified with greater precision, additional pedestrian and bicycle visibility issues may emerge. These visibility issues could be mitigated with measures such as protected vehicle turns or restricting vehicle movements.

Sound Transit will rebuild affected non-motorized facilities to meet Americans with Disabilities Act requirements as well as applicable local design standards at the time of permitting (such as Seattle Streets Illustrated [City of Seattle 2020] and the Seattle Land Use Code and Light Rail Facility Construction and Construction Impacts sections of the Seattle Municipal Code) or to a standard agreed to by Sound Transit and the City of Seattle.

As the project design advances, if it is determined that a facility could not be rebuilt to applicable design standards and an alternate design cannot be agreed upon in the original location, Sound Transit would work with the City of Seattle to develop mitigation, such as an alternate route.

3.8 Affected Environment and Impacts during Operation – Safety

This section summarizes the existing study area safety and collision data for arterials and local streets within approximately one block of the project alignment. Also described are the potential future vehicle and non-motorized safety impacts (increases or decreases in collisions) for the Build Alternatives compared to the No Build Alternative.

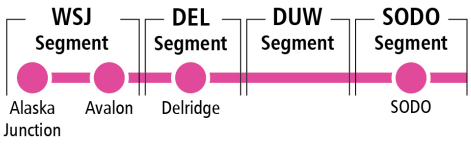
The City of Seattle's safety initiative, Vision Zero, aims to eliminate all traffic deaths by 2030. This section considers the high injury corridors included in the Vision Zero corridor prioritization that are within the study area. Vision Zero high injury corridors represent the top 100 arterial corridor segments where collisions occur most frequently, while also accounting for roadway characteristics and traffic volumes.

3.8.1 Affected Environment

Several roadways along the project corridor are identified as high injury corridors in Seattle Department of Transportation's *2019 Vision Zero Update Report* (City of Seattle 2019).

Southwest Oregon Street was identified as a priority location, along with Southwest Avalon Way, 4th Avenue South, 6th Avenue South, the Spokane Street Viaduct, and South Lander Street. There are currently no planned, committed safety improvement projects at these locations within the study area. However, recent improvements along Southwest Avalon Way included adding protected bike lanes and removing some parking spaces, which may reduce collision severity and frequency.

The roadway segments and intersections adjacent to the project alternatives that historically experience the highest crash frequencies are summarized in Appendix N.1.



3.8.2 Environmental Impacts of the No Build Alternative

The transportation safety performance with the No Build Alternative is expected to be similar or better than the existing conditions as the City of Seattle completes transportation (including Vision Zero) projects within the corridor, along with modest background traffic volume growth expected by year 2042.

Transportation projects in the study area assumed to be completed include the Fauntleroy Way Southwest Boulevard Project, 35th Avenue Southwest/Southwest Avalon Way Repaving Project (completed in 2020), RapidRide H Line Project (completed in 2023), Delridge Multimodal Corridor Project, West Marginal Way Southwest Safety Corridor Project (completed in 2023), East Marginal Way Corridor Improvement Project, Lander Street Bridge Project (completed in 2020), as well as planned bicycle and greenway improvements throughout the corridor. The City of Seattle routinely prepares Vision Zero progress reports to assess previous projects and identify prioritized locations for future projects. Therefore, it is expected that beyond the specific projects identified above, the City of Seattle would implement additional projects in the future to improve the safety of the transportation system in the study area prior to the project being built.

3.8.3 Environmental Impacts of the Build Alternatives

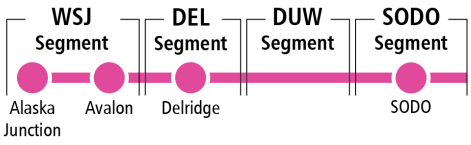
3.8.3.1 Impacts Common to All Alternatives

While most of the project alignment would be adjacent to or along City of Seattle-designated high injury corridors, the safety of the transportation system is expected to be minimally affected by the project or improve because of the following:

- All Build Alternatives would be grade-separated and operate in exclusive rights-of-way, with no new direct conflicts with vehicles, pedestrians, or bicyclists.
- Light rail design would adhere to both light rail and roadway standards to minimize impacts on transportation safety.
- People would shift from driving to riding transit, a safer travel mode.
- Station access improvements (such as proposed signaled crossings) would be implemented.

Overall, the project would shift some trips from driving or taking another non-transit mode to using transit. This shift would result in a reduction of approximately 17,000 daily vehicle miles traveled in the region. This has an inherent safety benefit because a person riding transit faces a far lower risk of injury or death than they do in a car, on a per-mile basis (American Public Transportation Association 2018).

All of the stations are expected to experience only small increases in daily vehicle traffic around the station under typical conditions, suggesting that the impact to vehicle safety would be negligible around stations. The light rail design would adhere to both light rail and roadway standards to minimize impacts on transportation safety. Pedestrian and bicyclist activity is expected to increase (between 450 to 2,500 daily trips) around each station. While this increase in activity would create the potential for more conflicts near stations, Sound Transit is proposing pedestrian and bicycle improvements adjacent to the stations to ensure access is at signalized or controlled locations and, in some instances, grade-separated crossings. Beyond the station improvements, increased non-motorized activity can also improve driver expectations (i.e., drivers expecting pedestrians and bicyclists to be present) and reduce collision severity because of reduced speeds. All stations would be designed to include appropriate non-motorized facilities to accommodate this expected level of activity and would be coordinated with the City of Seattle.



3.8.3.2 SODO Segment

With Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b, the new guideway would be within the SODO Busway right-of-way and separated from general purpose traffic. Buses would no longer use the SODO Busway, which would become a rail-only facility with this alternative. As part of the project's transit integration plan, five of the seven bus routes currently using the SODO Busway would be truncated or eliminated, and the other two would shift to 4th Avenue South. Therefore, the additional bus traffic on nearby streets with the SODO Busway transition to a rail-only facility is not expected to be substantial. Some shifts to pedestrians' exposure to traffic may occur as a result of bus stops shifting to 4th Avenue South, with some riders having an additional crossing of 4th Avenue South and others one fewer. Therefore, the net change to rider safety is expected to be minimal.

The proposed South Lander Street overcrossing would separate the proposed West Seattle Link Extension and the existing 1 Line light rail tracks from traffic along South Lander Street with Preferred Option SODO-1c, Alternative SODO-1a and Option SODO-1b, avoiding future conflicts at that intersection and removing the rail conflicts with crossing vehicles, pedestrians, and bicyclists that currently exist.

With Alternative SODO-2, the project's elevated guideway would be grade-separated from the roadway. No portion of the guideway would be within the roadway and it would not impact vehicle safety. This alternative would be elevated over South Lander Street and would not create any additional at-grade rail crossings. However, the existing 1 Line at-grade rail signalized crossing at South Lander Street would continue to occur.

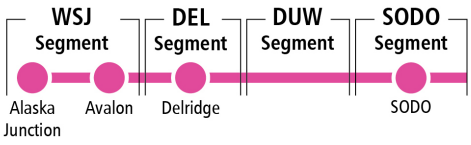
3.8.3.3 Duwamish Segment

None of the alternatives would affect vehicular or non-motorized safety in the Duwamish Segment, as the guideway would be elevated, grade-separated, and outside of the roadway for the entirety of the segment. The project would ensure adequate lateral clearance from the guideway columns to any travel lanes.

3.8.3.4 Delridge Segment

The Delridge Station would generate approximately 500 new daily pedestrian and bicycle trips, thus creating the potential for increased conflicts near the station. However, the station would be designed to accommodate this level of activity, and station access would be at signalized and/or controlled locations.

Preferred Option DEL-6b would add a traffic signal at the intersection of Delridge Way Southwest and 23rd Avenue Southwest to facilitate vehicle access and pedestrian crossings into the station area and Nucor Steel. Bus stops would be located along the station frontage, which would allow riders to transfer between bus and rail without needing to cross a street. The addition of the new signal to the current free-flow traffic on Delridge Way Southwest could result in an increase in rear-end crashes. However, it would potentially improve the severity of crashes for all modes at this location, and a new signal particularly has the potential to reduce vehicle versus vehicle angle collisions (the collision type most associated with injuries and fatalities) and vehicle versus pedestrian crashes. Pedestrian safety would improve because the new signal would provide a protected crossing. The need for a traffic signal and pedestrian crossing at the Delridge Way Southwest and 23rd Avenue Southwest intersection is eliminated with Alternatives DEL-5 and DEL-6a; however, those two alternatives along with Alternative DEL-7 would have similar overall safety impacts as Preferred Option DEL-6b in the Delridge Segment.



Preferred Option DEL-6b would also require the permanent closure of 32nd Avenue Southwest. Sound Transit is considering options to provide a pedestrian connection from Southwest Andover Street to 32nd Avenue Southwest south of the cul-de-sac; however, it is unknown if a connection would be feasible until final design. If a pedestrian connection cannot be maintained, then non-motorized users would likely divert to Southwest Avalon Way, where there are higher numbers of vehicle-pedestrian conflicts.

With Alternative DEL-1a, Option DEL-1b, Alternative DEL-2a, Option DEL-2b, Alternative DEL-3, and Alternative DEL-4, the elevated guideway would be outside of or adjacent to the roadway in this segment except for a few locations where it crosses from one side to the other. This would place a guideway column in the median of Southwest Genesee Street. The project would ensure adequate sightlines and lateral clearance to any travel lanes, including to and from the Nucor Steel property, to minimize impacts. Safety impacts from the guideway columns outside of the roadway would be minimal to none.

With Alternative DEL-2a and Option DEL-2b, 25th Avenue Southwest south of Southwest Dakota Street would be permanently closed, and 30th Avenue Southwest north of Southwest Genesee Street would be permanently closed with Option DEL-2b. There would be little anticipated impact on safety with these closures because of limited volumes and the proximity of alternative routes to similar or better facilities.

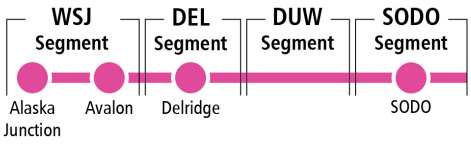
3.8.3.5 West Seattle Junction Segment

With Preferred Option WSJ-5b, Avalon Station would experience a small increase in daily vehicle traffic around the station location; however, the impact to vehicle safety is expected to be negligible. Pedestrian and bicyclist daily volumes are expected to increase from approximately 900 daily trips in the no build condition to approximately 1,800 daily trips. This doubling of trips is expected to have a negligible impact on safety around the station area because there is not a history of pedestrian and bicycle crashes in this location, the project would be built to design standards, and the predicted pedestrian level of service would be at acceptable levels.

At the Alaska Junction Station for Preferred Option WSJ-5b, there would be an increase in pedestrian and bicycle volumes on the surrounding transportation system from approximately 1,300 daily trips in the no build condition to approximately 3,800 daily trips. However, the Alaska Junction Station area would be designed to accommodate this level of activity, and station access would be at signalized or controlled locations, including a new signal at Southwest Alaska Street and 41st Avenue Southwest. There would also be entrances on both sides of Southwest Alaska Street to avoid the need for riders to cross this street. Although pedestrian and bicyclist volumes are expected to increase at this station location, the increase in conflicts would be relatively small compared to the number of conflicts already experienced in this urban environment.

Alternatives WSJ-1 and WSJ-2 would require the placement of guideway columns to support portions of the elevated guideway. These guideway columns would adhere to design standards and be outside of the vehicle travel lanes, and thus would not be expected to introduce a safety hazard.

All other alternatives (Alternative WSJ-3a, Option WSJ-3b, Alternative WSJ-4, Alternative WSJ-5a, and Alternative WSJ-6) would have similar transportation safety conditions to Preferred Option WSJ-5b near the stations. However, these tunnel alternatives would not have any guideway columns or other physical roadway impacts.



3.8.4 Mitigation for Operation Impacts

The project includes roadway, transit, and pedestrian and bicyclist improvements and associated potential mitigation around the stations, including some grade-separated facilities to reduce conflicts, increase visibility between modes, and reduce congestion for the impacted modes; these project elements and potential mitigation are described in the sections for transit (Sections 3.4.3 and 3.4.4), arterials and local streets (Sections 3.5.3 and 3.5.4), and non-motorized facilities (Sections 3.7.3 and 3.7.4). Beyond these improvements, the project would operate in exclusive right-of-way, separated from other modes of travel, and would be built to applicable design standards, such as those that determine the placement of guideway columns; therefore, no further mitigation specific to safety-related impacts is proposed.

3.9 Affected Environment and Impacts during Operation – Navigation

This section discusses how the project would affect navigation on navigable waterways in the project study area.

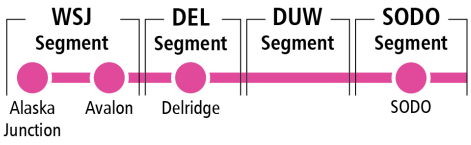
Navigable Waterways

The term navigable waterways generally refers to waterbodies that are subject to tidal influence, waterways with a history of substantial commercial navigation, waterways that presently have commercial navigation, or waterways susceptible to commercial development.

The United States Coast Guard has primary permitting authority related to navigation. The Coast Guard approves the locations and clearances of bridges through the issuance of bridge permits under the authority of Section 9 of the Rivers and Harbors Act, the General Bridge Act of 1946, and other statutes. A bridge permit is required for new construction, reconstruction, or modification of a bridge or causeway over navigable waters of the United States. The Coast Guard issues bridge permits after confirming that the other federal approvals described below have been issued.

The United States Army Corps of Engineers also has regulatory authority under Section 10 and Section 14 of the Rivers and Harbors Act of 1899. Section 10, codified in 33 United States Code Section 403, allows the Army Corps of Engineers to require a permit for any construction, not just bridges, that would affect navigable waters. Section 14, codified in 33 United States Code Section 408 and referred to herein as Section 408, requires the Army Corps of Engineers to review and approve proposed modifications to federally authorized Public Works projects to ensure that such proposed activities would not be injurious to the public interest or impair the usefulness of a federally authorized project. Federally authorized Public Works can include navigation projects to improve the nation's waterways. Together, both agencies provide safe, reliable, and efficient waterborne transportation systems (e.g., channels, harbors, and waterways) for movement of commerce, national security needs, and recreation.

In addition to this Final EIS, Sound Transit prepared a navigation impact report for the Duwamish Waterway to support the United States Coast Guard bridge permitting process. Based on the findings in the navigation impact report, the United States Coast Guard issued a preliminary navigation clearance determination for any bridge Sound Transit would construct over the West Waterway as part of the project. The preliminary navigation clearance determination concluded that the vertical clearance must be a minimum of 140 feet and the horizontal clearance must be a minimum of 250 feet. The preliminary navigation clearance determination also requires that, for any bridge that needs in-water piers, those piers must line up with the current West Seattle Bridge piers to maintain the existing horizontal clearance of 250 feet through both the West Seattle Bridge and the project's bridge over the West Waterway (United States Coast Guard 2022).



3.9.1 Affected Environment

The study area for navigation analysis includes navigable waterways within 3 miles of the bridges across the Duwamish Waterway (also known as the Duwamish River) associated with the project Build Alternatives. The Duwamish Waterway is the only navigable waterway that would be crossed by the West Seattle Link Extension. The industrialized portion of the Duwamish Waterway extends about 6 miles upstream from Elliott Bay and encompasses three segments: the West and East waterways on either side of Harbor Island and the Lower Duwamish Waterway upstream/south of Harbor Island. The waterways are shown on Figure 3-5.

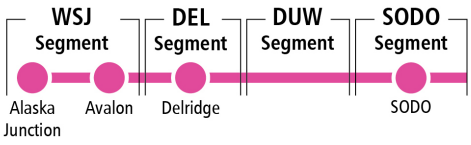
3.9.1.1 Waterway Users

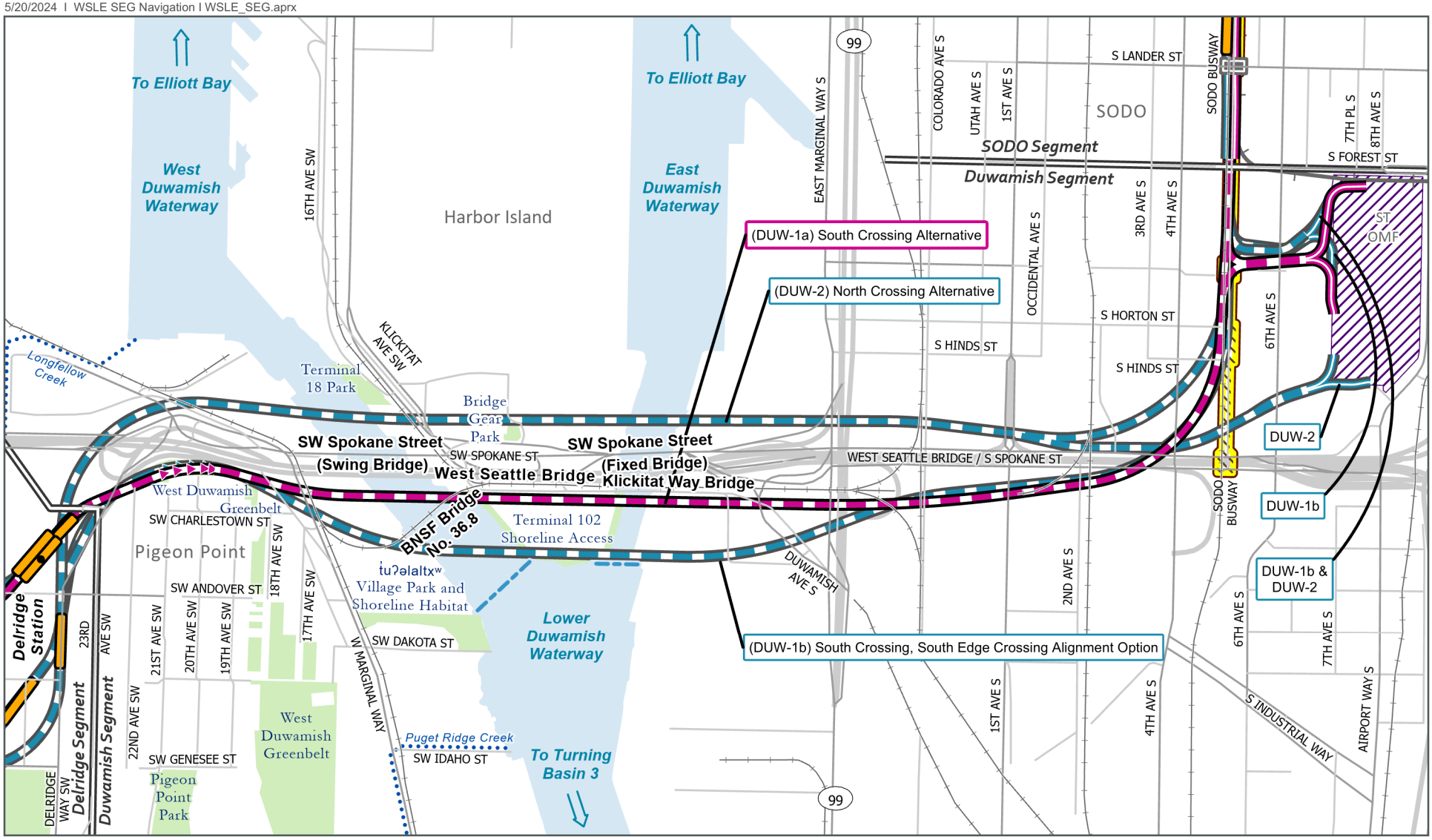
Because the Duwamish Waterway has a primarily industrial and commercial shoreline, tugboats, barges, and cargo boats make up a large portion of the vessels that use it. Recreational pleasure boat traffic on the Duwamish Waterway occurs year-round, but typically peaks in the summer months. Most recreational traffic occurs as vessels make their way to and from their berths on the Duwamish Waterway.

The Muckleshoot Indian Tribe is signatory to both the Treaty of Point Elliott and the Treaty of Medicine Creek. The Muckleshoot Indian Tribe has treaty-protected fishing rights and Usual and Accustomed Areas in the Puget Sound region, which includes the Duwamish Waterway. The Suquamish Tribe of the Port Madison Reservation (Suquamish Tribe) is signatory to the Treaty of Point Elliott and has treaty-protected fishing rights and Usual and Accustomed Areas in the Puget Sound region, which includes the Duwamish Waterway. Tribal fishing boats operate on the waterway, and the Tribal fishermen place fishing gear in traditional fishing locations. Tribal treaty-protected fishing peaks in mid- to late summer through late fall during annually established salmon and steelhead fishing seasons. The Muckleshoot Indian Tribe Fisheries Division enforcement vessels dock in the study area at Harbor Island Marina.

The Army Corps of Engineers uses vessels such as a workboat with a crane or a standard clamshell dredge to maintain navigation channels by clearing debris and dredging. Barges may also be used to remove dredged material from the waterway, and other Army Corps of Engineers vessels are used for hydrographic surveys to map the navigation channels.

The Seattle Police Harbor Patrol is located on the north shore of Lake Union. While the headquarters and boat docks are outside the study area, the Seattle Police Harbor Patrol operates on waterways within the study area, including Elliott Bay and the Duwamish Waterway. They provide marine law enforcement, rescue, fire response, and assistance.





Source: City of Seattle, King County (2023).

Preferred Alternative
- Elevated
- Retained Cut
- At-Grade

Other Alternatives
- Elevated
- Retained Cut
- At-Grade

Station (● *Indicates Preferred Alternative*)
- New

- Segment Line
- Existing Link Light Rail
- Railroad
- SODO Busway
- Proposed Overpass
- Sound Transit Operations and Maintenance Facility (ST OMF)
- Piped Stream
- Park
- Duwamish Waterway Break

0 500 1,000 Feet

N

FIGURE 3-5
Key Restrictions to Navigation, Duwamish Waterway
Duwamish Segment

West Seattle Link Extension

3.9.1.2 Existing Vertical Clearances, Horizontal Clearances, and Hazards

Navigation Channel

A navigation channel is a deeper channel cut into a river bed to enable larger vessels to pass through to a port.

The Duwamish Waterway includes two navigation channels maintained by the Army Corps of Engineers: one consists of the West Waterway and the Lower Duwamish Waterway and the other consists of the East Waterway between Elliott Bay and the Spokane Street (fixed) Bridge. Because these navigation channels are maintained by the Army Corps of Engineers, they are considered federal navigation projects subject to Section 408 requirements. Areas outside of the navigation channels are also used by vessels to access local facilities and maneuver, hold, or avoid other vessels.

When traveling from Elliott Bay, vessels can enter either the East or West waterways. In the East Waterway in the vicinity of the Spokane Street (fixed) Bridge, obstructions limit navigation under the bridge to vessels that can pass beneath a vertical clearance of 5 feet (National Oceanic and Atmospheric Administration 2019). In the West Waterway, vessels are restricted by the 140-foot vertical and 150-foot horizontal clearances of the West Seattle Bridge.

The Duwamish Waterway is tidally influenced. Some vessels must wait for certain tides to travel under the West Seattle Bridge, either sailing on a lower tide to meet the vertical clearance or sailing on a higher tide to have enough draft within the navigation channel. Other existing hazards to navigation include shoaling (sediment accumulation that creates shallow areas) at the edge of the navigation channels, submerged obstructions, and minimal room outside of the navigation channels to maneuver, hold, or avoid other vessels.

Climate change projections suggest that sea level rise is very likely to affect the water level of the Duwamish Waterway. Under a high emissions scenario (Representative Concentration Pathway 8.5, the highest emissions scenario adopted by the Intergovernmental Panel on Climate Change), there is a 17 percent probability that sea level rise will exceed 3 feet and a 1 percent probability that it will exceed 5 feet by the year 2100 (Miller et al. 2018). An increase in water levels would correspondingly result in a reduction of vertical clearances under all bridges, which may limit the vessels that can travel through this area.

Guide Clearances

Guide clearances are defined as the navigational clearances established by the United States Coast Guard for a particular navigable water of the United States that will ordinarily receive favorable consideration under the bridge permitting process as providing for the reasonable needs of navigation.

There are existing structures on the Duwamish Waterway that create horizontal or vertical restrictions to navigation. Key existing restrictions to navigation are listed in Table 3-10. Additional restrictions on the Duwamish Waterway are provided in Appendix N.1.

The United States Coast Guard has established guide clearances for the West Waterway of a vertical clearance of 140 feet for fixed bridges and a horizontal clearance of 250 feet for all types of bridges, which were matched in the preliminary navigation clearance determination, but has not established guide clearances for the East Waterway.

3.9.2 Environmental Impacts of the No Build Alternative

Under the No Build Alternative, light rail would not be extended to West Seattle and the potential impacts on navigation identified for the Build Alternatives would be avoided. Navigation on the Duwamish Waterway would continue as it does today.

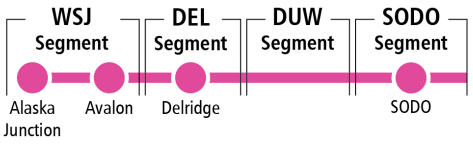


Table 3-10. Key Existing Restrictions to Navigation on the Duwamish Waterway

Structure	Approximate Rivermile	Type/Use	Vertical Clearance Closed/Open (feet) [a]	Horizontal Clearance Closed/Open (feet) [b]	Channel Depth (feet)	Waterway Width (feet) [c]
West Waterway: West Seattle Bridge	1.36	Fixed/road	140	150	42	450
West Waterway: Spokane Street (swing) Bridge	1.33	Moveable (swing)/road	44/unrestricted	250	42	450
West Waterway: BNSF Railway Bridge (Bridge No. 36.8)	1.45	Moveable (single-leaf bascule)/rail	7/unrestricted	150	43	400
East Waterway: Spokane Street (fixed) Bridge	1.31	Fixed/road	5	90	Unknown	390
East Waterway: Klickitat Way Bridge [d]	1.38	Fixed/road and rail	7	48	11	390

Sources: National Oceanic and Atmospheric Administration 2019, United States Army Corps of Engineers 2020a, 2020b, and 2020c.

[a] Vertical clearance in feet above mean high water; refers to the lowest clearance of the cable or bridge.

[b] Horizontal clearance refers to the width between bridge fenders or bridge protection on either side of a bridge opening.

[c] Width based on approximate measurements using Google Earth imagery.

[d] The Klickitat Way Bridge across the East Waterway includes two structures for the railroad tracks and one for the two-lane roadway. However, this report considers the structures to be one bridge because they are intricately connected by metal grating and have the same vertical and horizontal clearances.

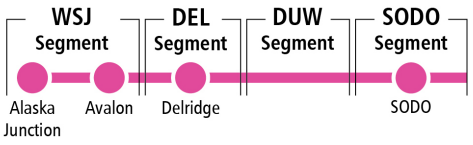
3.9.3 Environmental Impacts of the Build Alternatives

3.9.3.1 Impacts Common to All Alternatives

Sound Transit evaluated impacts to navigation on the Duwamish Waterway. This includes the Army Corps of Engineers-maintained navigation channels and areas outside of the navigation channels that vessels use to access local docks. Impacts to moorage are also identified. Displacement of water-dependent businesses and related economic impacts and mitigation are described in Section 4.3, Economics.

All alternatives would cross the East and West waterways near existing restrictions. For the West Waterway, all alternatives would meet or exceed the 140-foot vertical clearance and 250-foot horizontal clearance required by the 2022 United States Coast Guard preliminary navigation clearance determination. All vessels that currently travel under the West Seattle Bridge and through the area could continue to do so.

Outside of the Army Corps of Engineer-maintained navigation channels and adjacent areas subject to the preliminary navigation clearance determination, the alternatives would create a new vertical clearance immediately under the guideway. Depending on the alternative, the new vertical clearance in these areas would range from approximately 100 over the East Waterway to 140 feet over the West Waterway. The projected 3- to 5-foot increase in the Duwamish Waterway water levels related to climate change would correspondingly reduce vertical clearances under the existing structures and the proposed alternatives.



Sound Transit is evaluating the feasibility of several high-level fixed bridge types to cross the Duwamish Waterway, as described in Chapter 2. All Build Alternatives would have a balanced cantilever segmental box girder bridge over the East Waterway. Preferred Alternative DUW-1a would be either cable-stayed or truss over the West Waterway and would avoid placing guideway columns in the water. All bridge types for Option DUW-1b would require a guideway column in the West Waterway. Depending on the bridge type selected for Alternative DUW-2, the waterway crossing could require guideway columns in the West Waterway. Any column in the West Waterway would be outside of the Army Corps of Engineers-maintained navigation channel, but could still affect vessel movements. In the West Waterway, a new light rail bridge would be a fourth bridge in a relatively short stretch of water. A bridge type with in-water guideway columns would require vessels to set up to travel through the bridges earlier and to hold their course longer in a relatively narrow channel. Along the West Waterway, the areas available for holding or maneuvering outside of the navigation channel are already relatively narrow. An additional in-water guideway column and pier protection would further constrain these areas. Increased interaction with Puget Sound Vessel Traffic Services may be needed during times with heavier vessel traffic (typically Wednesdays and Fridays and daily around 7 a.m. and 5 p.m.). Vessel congestion could potentially extend north into the West Waterway and south into the open area upstream of the Harbor Island Marina.

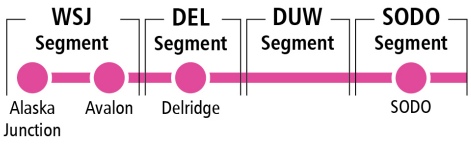
Bridge types with guideway columns and associated pier protection in the water, and to a lesser degree bridge types with guideway columns on shore, could affect Muckleshoot Indian Tribe treaty-protected fishing rights and access to the Tribe's Usual and Accustomed Areas. Bridge types with guideway columns and associated pier protection in the water could also affect Suquamish Tribe treaty-protected fishing rights and access to the Tribe's Usual and Accustomed Areas. See Section 4.3, Economics, for additional information regarding impacts to Tribal treaty-protected fishing.

Depending on bridge type, occasional maintenance about every 2 years would also temporarily reduce portions of the planned vertical clearance over the East and West waterways up to about 15 feet. The maintenance durations would range from 2 weeks to 3 weeks for a structural inspection to 2 years to repaint a truss bridge. Truss bridge repainting would occur approximately every 20 years. Based on vessel heights reported during surveys and coordination Sound Transit conducted with Duwamish Waterway users, these temporary vertical clearance reductions could affect some of the boats that currently access maritime facilities on the Duwamish Waterway, such as shipping terminals and facilities for marine construction and building boats.

3.9.3.2 Preferred South Crossing Alternative (DUW-1a)

Preferred Alternative DUW-1a would cross over a portion of the East Waterway that does not include an Army Corps of Engineers-maintained navigation channel and is in close proximity (about 40 feet) to the Spokane Street (fixed) Bridge, which has a vertical clearance of 5 feet and blocks the majority of vessels from navigating under the bridge.

The portion of the East Waterway where Preferred Alternative DUW-1a would cross is primarily used by vessels to access the Harbor Island Marina commercial dock. The horizontal clearance under the guideway would not change, and the vertical clearance under the guideway would be approximately 104 feet. This is not anticipated to affect the vessels that use the dock because they are primarily tugs and work boats that require less than 104 feet of vertical clearance.



3.9.3.3 South Crossing South Edge Crossing Alignment Option (DUW-1b)

Option DUW-1b would have similar impacts to the East Waterway as Preferred Alternative DUW-1a. However, the vertical clearance under the guideway would be higher, at approximately 125 feet.

Option DUW-1b would permanently reduce moorage in the Duwamish Waterway by removing recreational marinas and docks. The amount of recreational moorage that would be removed from the Duwamish Waterway represents about 20 percent of what is currently available. Due to the percentage of moorage being displaced, many recreational boaters are unlikely to find replacement moorage nearby on the Duwamish Waterway or in Elliott Bay.

3.9.3.4 North Crossing Alternative (DUW-2)

Alternative DUW-2 is over an Army Corps of Engineers-maintained navigation channel (a Public Work subject to Section 408 review and approval process) that spans the entire width of the East Waterway. The vertical clearance under the guideway would be about 100 feet over the navigation channel. The horizontal clearance under the guideway would be about 315 feet wide, approximately 75 feet less than the current horizontal clearance. Alternative DUW-2 would be approximately 150 feet north of the Spokane Street (fixed) Bridge, which has a vertical clearance of 5 feet and blocks the majority of vessels from navigating under the bridge. Sound Transit would coordinate with the Army Corps of Engineers regarding the East Waterway federal navigation projects as part of the permission process pursuant to Section 408.

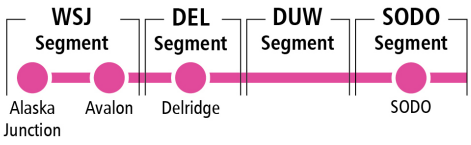
This area is primarily used by vessels to access maritime businesses and includes a dock. Vessels that currently use this area typically require about 75 feet of vertical clearance; therefore, the vertical clearance of DUW-2 is not anticipated to affect current uses. However, the change in horizontal clearance could affect vessel movements by reducing the area available for navigation and maneuvering in this section of the waterway.

3.9.4 Mitigation for Operation Impacts

During final design and the bridge permitting process, Sound Transit would determine mitigation actions in coordination with the Muckleshoot Indian Tribe, the Suquamish Tribe, the United States Coast Guard, and the United States Army Corps of Engineers. This would include identifying specific aids to navigation, such as signage and lighting. Proposed aids to navigation would be approved by the Coast Guard prior to installation.

3.10 Affected Environment and Impacts during Operation – Freight Mobility and Access

This section describes the freight transportation system within 0.5 mile of the light rail alternatives, including the facilities and operations for truck and rail and how the Build Alternatives could affect this system during project operation. Section 9, Freight Mobility and Access, in Appendix N.1 provides additional details regarding the elements described in this section. The marine freight network and permanent long-term operation impacts are described in Section 3.9, Affected Environment and Impacts during Operation – Navigation, and temporary construction impacts are described in Section 3.11.1.6. The assessment of freight mobility and access in this section addresses direct impacts from the project.



The City of Seattle's designated truck network (City of Seattle 2016) identifies many streets and arterials based on their function for freight. The City also has two regulatory networks related to heavy and over-dimensioned freight: the Heavy Haul Network, which allows heavy freight to use some streets in the vicinity of the Port's container terminals, and the Over-Legal Network (City of Seattle 2016), which accommodates loads up to 20 feet high and 20 feet wide. The City has also identified access routes to major Port of Seattle cargo terminals as Seaport Highway Connectors and Seaport Intermodal Connectors.

3.10.1 Affected Environment

Streets that are part of the designated truck network are most concentrated in the SODO and Duwamish segments, which are within the Duwamish Manufacturing/Industrial Center. The Port of Seattle's Terminal 5 and Terminal 18 are located in the Duwamish Segment and are served by truck and rail. These two strategic container terminals are operated by the Northwest Seaport Alliance as part of the Puget Sound Gateway.

On-street truck-only load zones, commercial vehicle load zones, and general load zones serve local business deliveries. Truck-only load zones are the most restrictive and allow only vehicles that are licensed as trucks. Commercial vehicle load zones allow a broader range of vehicles but still require specific licensing or commercial permits. They are most commonly located in Seattle's business districts. Some areas also have general load zones that allow any type of vehicle. Load zones are located in all of the segments within the study area. Long-term and overnight truck parking is allowed in Seattle Industrial Zones (Seattle Municipal Code 11.72.070), which include areas in the SODO, Duwamish, and Delridge segments. There is also an overnight truck parking lot at Terminal 25 that is discussed in Section 3.11.3.3, Parking, for the Duwamish Segment.

Seattle is served by two Class I railroads: BNSF Railway and Union Pacific Railroad. The BNSF Railway mainline passes through the Duwamish and SODO segments and continues north. The Union Pacific mainline is located south of South Spokane Street. Both railroads have major intermodal transfer hubs in the Duwamish Segment. There are local rail spurs throughout the Duwamish Segment, including lead tracks located just south of South Spokane Street that serve industries and on-dock rail yards on Harbor Island and in West Seattle and spur tracks along the SODO Busway that serve local businesses.

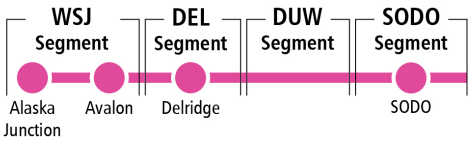
3.10.2 Environmental Impacts of the No Build Alternative

The truck and rail system in the study area for the No Build Alternative would not substantially change from the existing conditions.

3.10.3 Environmental Impacts of the Build Alternatives

3.10.3.1 Impacts Common to All Alternatives

All of the Build Alternatives would be designed to retain clearance envelopes for truck streets, including those designated for over-legal loads. They would also retain horizontal and vertical clearance requirements for railroad tracks. None of the alternatives would permanently remove truck-only load zones, commercial vehicle load zones, or general load zones because they would be relocated as necessary.



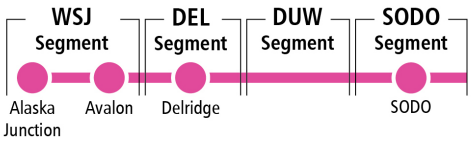
All of the Build Alternatives could affect 4th Avenue South, which is designated by the City of Seattle as a Major Truck Street, a street classification for arterials that accommodate substantial amounts of freight movement. On 4th Avenue South between South Massachusetts Street and South Spokane Street, transit improvements would be constructed to accommodate buses diverted from the SODO Busway. The 4th Avenue South transit improvements would be permanent for Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b because the new light rail guideway would permanently close the SODO Busway to buses. For Alternative SODO-2, the transit accommodations on 4th Avenue South would be a long-term, construction-related change for the duration of construction on the SODO Busway. The closure period would be 5 years for construction of the project, during which time buses would not be allowed in the SODO Busway. Sound Transit is also planning the Ballard Link Extension, which is a light rail extension from SODO Station to Ballard that would also require closure of the SODO Busway during construction. The mitigation options being considered to address the impact to transit could affect freight traffic. Potential improvement options for the busway closure include modifying 4th Avenue South with bus queue jumps at key intersections, business access and transit lanes, and/or a freight and bus lane that could be shared by buses and trucks. The first two transit improvement options could increase delays to truck traffic on 4th Avenue South, and the third option could reduce delays for truck traffic. Section 3.5.4, Mitigation for Operation Impacts – Arterial and Local Street Operations, provides further information about the traffic operations effects of the potential transit improvements on 4th Avenue South.

3.10.3.2 SODO Segment

Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b would build a new vehicle overpass over the existing and future light rail tracks at South Lander Street, which is a Major Truck Street. The vehicle overpass would be designed to accommodate trucks with a maximum slope of 7 percent, and would eliminate truck delays caused by the existing light rail crossing. Alternative access to the existing United States Postal Service Carrier Annex/Terminal Post Office garage would be provided by connecting the southern access driveway to 4th Avenue South via a new access road under the new South Lander Street overpass. Sound Transit is working with the United States Postal Service and the City of Seattle to ensure trucks and other vehicles are able to access the parking garage facility. The clearance above the new roadway would accommodate truck access to this facility. Alternative SODO-2 would not have an overpass at South Lander Street, and the new light rail track would be elevated above South Lander Street. However, the existing 1 Line light rail track would remain at-grade, and trucks would continue to experience short-duration delays when light rail trains cross South Lander Street on the 1 Line.

Preferred Option SODO-1c would permanently eliminate about 14 load zone spaces along 5th Place South, South Bayview Street, and South Lander Street to accommodate the new station and vehicle overpass. Option SODO-2 would eliminate three load zones. The other alternatives would not affect commercial load zones.

Spur tracks along the SODO Busway north of South Lander Street would be removed for all alternatives. The BNSF Railway storage tracks on the west side of the SODO Busway between the vicinity of South Hinds Street and South Lander Street would also be eliminated. Loading and lead tracks on the east side of the SODO Busway south of South Lander Street, including those that serve Franz Bakery and the 7th Avenue South lead tracks, would be retained.



3.10.3.3 Duwamish Segment

None of the Duwamish Segment alternatives would have structures within the public street system or Port of Seattle terminals that would affect traffic or truck operations, including over-legal trucks. All alternatives would cross several major rail facilities but would have no long-term effects on rail operations. The alternatives would retain the existing local rail spur on the east side of the SODO Busway south of South Forest Street. The BNSF Railway storage tracks on the west side of the SODO Busway in the vicinity of South Hinds Street would be eliminated. No commercial load zones in this segment would be eliminated with any alternative.

3.10.3.4 Delridge Segment

Preferred Option DEL-6b would create a new signalized intersection at Delridge Way Southwest and Southwest Charlestown Street/23rd Avenue Southwest that would provide truck and passenger vehicle access to Nucor Steel. Alternative DEL-7 would be similar to Preferred Option DEL-6b. None of the other Delridge Segment alternatives would affect the truck or rail system. No commercial load zones would be affected by any of the alternatives.

3.10.3.5 West Seattle Junction Segment

None of the West Seattle Junction Segment alternatives would permanently affect the truck or rail system. No commercial load zones would be affected.

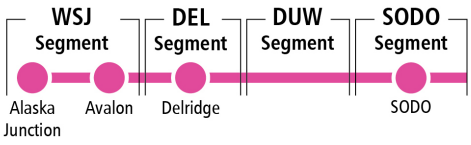
3.10.4 Mitigation for Operation Impacts

Freight traffic could be affected by the mitigation options being considered on 4th Avenue South to address the impact to transit of the SODO Busway closure. Potential improvement options for the busway closure include modifying 4th Avenue South with bus queue jumps at key intersections, business access and transit lanes, and/or a freight and bus lane that could be shared by buses and trucks. The first two transit improvement options could increase delays to truck traffic on 4th Avenue South, and the third option could reduce delays for truck traffic on 4th Avenue South. Therefore, Sound Transit and the City of Seattle may choose to mitigate the effect to freight travel times by selecting freight and bus lanes as the improvement on 4th Avenue South.

As part of the parking mitigation (see Section 3.6.4), Sound Transit would coordinate with the City of Seattle to manage curb use in the station vicinities. This would include locating commercial vehicle and truck-only load zones to service business needs.

3.11 Construction Impacts

This section describes the construction-period transportation impacts for the project. This section is organized into impacts on the project as a whole and on its individual segments, with a discussion of each transportation element within each segment. See Sections 3.4 through 3.10 for information on the long-term transportation impacts during operation of the Build Alternatives. An overview of the methodology and assumptions used to analyze the construction-period transportation impacts of the project is included in Section 3.2, Introduction and Methodology and Assumptions, and described in further detail in Attachment N.1A, Transportation Technical Analysis Methodology, in Appendix N.1. Except where noted, the sequencing of construction activities was not assessed for this Final EIS, and some of the



impacts described in this section may occur simultaneously. More detailed construction planning including sequencing will be provided in later project phases once the design is advanced. See Tables 3-11 through 3-14 for key roadway construction closures by segment. Attachment N.1D, Permanent and Temporary Transportation Facility Closures, in Appendix N.1 provides a list of key roadway and non-motorized facility construction closures, including extents and durations.

3.11.1 Impacts Common to All Alternatives

3.11.1.1 Arterial and Local Street Operations

For arterial and local street operations, the construction impacts describe the truck traffic and haul routes associated with the project's construction, property access impacts, roadway closures and, where appropriate, traffic modeling of certain construction impacts.

3.11.1.1.1 Haul Routes and Construction Traffic

To construct the project, Sound Transit would primarily use the City of Seattle's Major Truck Streets (see Section 9.2 in Appendix N.1 for the City's Major Truck Streets) and the Washington State Department of Transportation's (WSDOT's) Interstate and State Route facilities, including Interstates 5, 90, and 405 and State Routes 99, 509, 519, 599, and 520. These routes would be used for construction vehicle access to and from the alignments. Some oversize construction vehicles may need to use designated alternative routes.

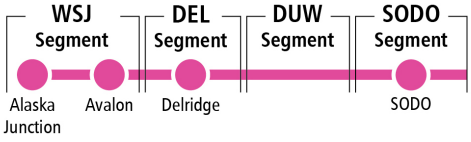
Certain construction areas are not served by these state and city major truck routes, so other existing streets would be used to access construction areas. These streets would be limited to arterials or larger whenever possible but would sometimes need to include local streets to access construction areas not on the arterial street system. Construction areas where local streets would be necessary for access include the vicinity of Pigeon Point, at elevated and tunnel stations, and at the tunnel portals in Delridge and West Seattle Junction.

Consistent with City of Seattle regulations, construction and construction traffic management plans (including haul routes) would be prepared in consultation with the City of Seattle during final design and construction.

Over the duration of the construction period, the major construction activities would be associated with the station construction, tunneling, and constructing the elevated guideway or bridges. These activities would require between 10 and 35 trucks per hour, with bridge construction and tunnel excavation generating the highest truck activity (20 to 35 trucks per hour) within that range.

3.11.1.1.2 Property Access, Roadway Impacts, and Detour Routes

Construction for each alternative would require road and lane closures that could also affect transit, freight, and non-motorized travel, as addressed later in this section. In general, detour routes would be along arterials, where feasible, to discourage traffic on local and collector streets through neighborhoods. Detour routes would be determined during the final design phase and in coordination with the City of Seattle and contractor. Project-related roadway closures could increase traffic congestion on detour routes or other roadways where volumes are increased as a result of the closures.



This section identifies major roadway and lane closures, generally defined as a full or partial closure of roadways for at least 1 year that would affect vehicle, people, and property access on these roadways. Some shorter-term (less than 1 year) closures are also described, as appropriate, to explain the breadth of the construction activities within a segment. Construction flaggers may also occasionally halt vehicle and non-motorized traffic on roadways adjacent to active construction for very short periods. See Attachment N.1D in Appendix N.1 for a more complete list of the roadway construction closures expected for each alternative.

For extended (over 1 year on key arterial streets) closures, an assessment of the traffic impacts was performed. Traffic diverting to adjacent roadways is likely with many of these closures. In these situations, the assessment identifies streets where there could be additional congestion as a result of the construction activities. In the SODO Segment, the SODO Busway would be permanently closed or fully closed for more than 1 year for all alternatives. Other segments would experience varied construction closures and diverted traffic that depend on the specific alternative and are discussed in Sections 3.11.2 through 3.11.5. Further information on this is provided in Section 4.3.3 in Appendix N.1.

If property access is restricted, temporary alternate access, if feasible, 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.

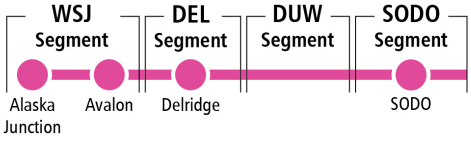
In the SODO and Duwamish segments, all project alternatives would require relocation of 26-kilovolt and 230-kilovolt utilities along the SODO Busway and 6th Avenue South. Construction activity would progress in stages along the corridors such that closures would be localized rather than closing the entire corridor at once. South Holgate Street and South Lander Street would each have partial closures at the SODO Busway for up to one month at a time. One to two lanes of 6th Avenue South would be closed at a time, with each closure lasting up to 4 months. Full closures of 6th Avenue South would also occur between South Massachusetts Street and South Spokane Street and between Diagonal Avenue and South Hinds Street. Intersection closures could also occur during overnight hours. Because these are short-term closures (less than 1 year), they are not quantitatively analyzed in further detail. Additional road or lane closures may be needed for utility relocation, which will be determined during final design in coordination with the utility owner.

3.11.1.2 Transit

Construction activities for the project could affect transit by impacting transit infrastructure and facilities and the access to those facilities; and by affecting transit service and routing due to roadway closures.

3.11.1.2.1 Transit Infrastructure and Facilities Impacts

Road, lane, and sidewalk closures would require bus stop and layover, and comfort station relocations; bus service detours; or both during construction. Sidewalk and bicycle lane closures would also affect pedestrians and cyclists accessing transit. Specific transit facilities that are expected to be affected by construction for at least 1 year are described in the segment-specific sections that follow.



For all alternatives, there would be potential construction-related impacts to 1 Line operations and access. Details of construction phasing would not be finalized until final design, but a long-term (greater than 1 year) closure of the existing SODO Station may be needed while the 1 Line operates on a temporary track around the construction area. Closure of the SODO Station would reduce light rail access to the SODO area. There could also be short-term service interruptions for 1 Line service to relocate overhead catenary system wires and adjust the track and other related roadway and station construction. These short-term service interruptions could result in longer headways during single-track operations or complete service interruptions during nights and weekends.

3.11.1.2.2 Roadway Closures

During construction, current bus routes would be affected at some locations along the corridor. Bus reliability could potentially degrade along streets with project construction activities due to lane closures and other construction-related activity. For areas with construction within the roadway right of-way, streets may operate with fewer lanes or be completely closed, affecting roadway operations including bus service along those streets.

In locations where roadways experience full closure, bus routes may need to use alternate pathways and temporary bus facilities may need to be installed. Depending on the condition of the alternate pathways, pavement damage could occur as a result of the longer-term transit reroutes. In general, project alternatives constructed outside the roadway right-of-way would have minimal impacts on bus routes, although some pedestrian and bicycle access to transit routes may be temporarily affected.

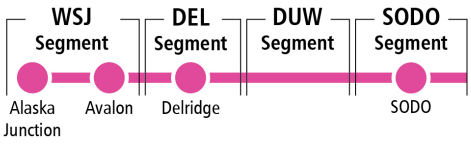
Detailed descriptions of the roadway closures affecting transit during construction are provided in each of the Arterial and Local Street Operations sections of Section 3.11. See Attachment N.1D in Appendix N.1 for a more detailed list of the roadway construction closures expected for each alternative.

3.11.1.3 Parking

Potential temporary parking impacts during construction are described by segment in Sections 3.11.2.3, 3.11.3.3, 3.11.4.3, and 3.11.5.3. The temporary parking impacts are in addition to parking that is permanently removed as described in Section 3.6.3 or lost through property acquisition. Table 3-9 in Section 3.6.3.2 presents the potential parking temporarily removed during construction of the guideway and stations. The number of spaces listed is the total amount that could be removed during construction, even if those removals do not occur simultaneously. Additional short-term removal of parking during night or weekend construction could be needed beyond those areas, depending on the construction activities. The known temporary parking removals are described further in the segment sections. With these temporary impacts, parking would be restored after construction is complete. Appendix N.1 details where parking would be removed for each alternative.

Sound Transit expects that construction employee vehicles could park within the construction staging areas. Construction workers could also park on local streets and arterials where parking is unrestricted.

All alternatives would temporarily remove on-street parking spaces along 6th Avenue South between South Massachusetts Street and South Spokane Street during relocation of the 230-kilovolt power lines. Each affected street segment could have up to 100 stalls that are removed simultaneously. Parking would be restored after construction is complete.



3.11.1.4 Non-motorized Facilities

Specific non-motorized facilities that are expected to be affected by construction for at least one year are described in the following segment-specific discussions (consistent with the definition of long-term closures in Attachment N.1A). See Attachment N.1D, Permanent and Temporary Transportation Facility Closures, in Appendix N.1 for a complete list of the roadway construction closures expected for each alternative.

Project construction would impact non-motorized travel modes; see Chapter 4, Arterial and Local Street Operations of Appendix N.1 for discussion of specific roadways, including extents and durations of key closures. Construction could temporarily close some sidewalks, reduce sidewalk widths, or close crosswalks, though Americans with Disabilities Act-compliant access would be maintained or detours would be provided to the extent feasible. Construction flaggers may also occasionally halt non-motorized travel adjacent to active construction for very short periods. In accordance with Seattle Department of Transportation Director's Rule 10-2015, sidewalks and pedestrian paths would be maintained to the maximum extent feasible; adjacent lanes could be repurposed to create non-motorized pathways through or around construction zones.

Although sidewalks or pedestrian paths that students use to reach schools may be affected during construction, no designated school crossings are expected to be affected. Some Americans with Disabilities Act-accessible curb ramps may be temporarily removed. There could also be bicycle facility closures and reduced bicycle lane widths within or adjacent to construction areas. Some roadways may have full closures such that the roadway connection is eliminated; in those cases, pedestrians and bicycles would be rerouted to the next adjacent street, where feasible, to minimize out-of-direction travel.

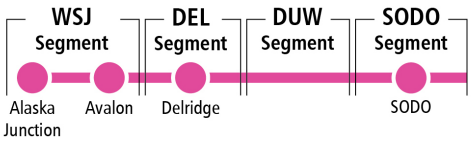
The conditions described above could affect areas throughout the project corridor for a range of durations. Trails, bicycle lanes, greenways, signed bicycle routes, non-street pedestrian throughways, and stairways affected by construction or full roadway closures causing substantial barriers or out-of-direction travel for at least 1 year are described in the segment-specific Non-motorized Facilities sections of Section 3.11.2 through Section 3.11.5.

3.11.1.5 Safety

The potential roadway closures and traffic diversions during construction may increase traffic volumes and the potential for conflicts and collisions on adjacent streets and alternate routes. However, the overall number of collisions in the area is not expected to substantially change as the total traffic volumes in the area would be similar.

In locations where there would be no physical change to the roadway (i.e., volume changes only), the types of collisions would likely remain similar to existing conditions. Currently, the majority of collisions in the study area are property damage only (see Table 7-1 in Section 7 of Appendix N.1) (WSDOT 2023). Signing and advanced communication of any changes to travel patterns and detours would minimize the potential safety impacts and would be addressed in the Maintenance of Traffic Plan. The Maintenance of Traffic Plan will be developed based on the Federal Highway Administration's *Manual on Uniform Traffic Control Devices* (2009) and Seattle Department of Transportation's *Traffic Control Manual* (2012).

Access modifications (such as right-in, right-out) and left-turn restrictions at intersections, such as along Delridge Way Southwest and Fauntleroy Way Southwest, would occur in the project construction areas. This would reduce some vehicle conflicts along these roadways.



Some sidewalks, crosswalks, and bicycle facilities may be closed temporarily during construction. Detours would be provided where feasible and appropriately designed and marked to encourage compliance. This could temporarily modify trips to these other routes. Some closures may divert bicyclists away from dedicated facilities to shared facilities, and Sound Transit would coordinate with the City of Seattle to identify appropriate alternate facilities.

3.11.1.6 Navigation

Navigation is only applicable to the Duwamish Segment because there are no navigable waterways in the SODO, Delridge, and West Seattle Junction segments. See Section 3.11.3.6 for details.

3.11.1.7 Freight Mobility and Access

Construction activities for all Build Alternatives are expected to eliminate on-street load zones used by trucks and for business deliveries within the construction areas, particularly near stations. For many of those locations, adjacent businesses would also be acquired, which could limit the demand for the affected load zone. Temporary removal of parking during construction could affect freight trucks, which are allowed to legally park long-term and overnight on streets in industrial areas.

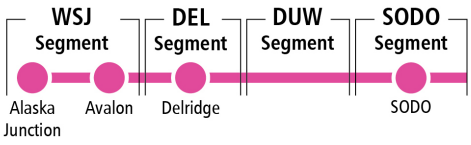
Freight facilities expected to be affected by construction or full roadway closures causing substantial barriers or out-of-direction travel are described in the following sections by segment. In addition, many streets could be fully closed for a short duration (less than 48 hours) when structures are constructed overhead. Construction flaggers may also occasionally halt vehicle traffic on roadways adjacent to active construction for very short periods; this would affect key freight routes that pass through the construction area.

All alternatives would temporarily close sections of 6th Avenue South between South Massachusetts Street and South Spokane Street during relocation of the 230-kilovolt power lines from the SODO Busway. This Major Truck Street is located in the SODO and Duwamish segments of the project. Sections of 6th Avenue South could be fully closed temporarily while a crane is used to erect power poles. Access to truck parking or loading zones along each segment would also be eliminated during these closures. Major Truck Streets that cross 6th Avenue South could also require temporary closures during these construction activities.

3.11.2 SODO Segment

3.11.2.1 Arterial and Local Street Operations

As summarized in Table 3-11, Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b would close South Lander Street for construction of a new overpass of the existing and proposed light rail tracks. Closing South Lander Street would require detouring a substantial number of peak hour vehicle trips to other routes such as South Holgate Street and South Spokane Street, along with portions of 4th Avenue South, 6th Avenue South, and Airport Way South. Based on the preferred alternative construction analysis, the intersections of 4th Avenue South and South Holgate Street and 6th Avenue South and South Spokane Street would be affected by the South Lander Street closure. Traffic operations findings for Alternative SODO-1a and Option SODO-1b would likely be similar to Preferred Option SODO-1c.



The SODO Busway closure during construction of Alternative SODO-2 would likely displace 60 to 80 buses total in the peak hour to either 4th Avenue South or 6th Avenue South, but would not substantially affect general traffic conditions along these streets as these volumes are small relative to the peak hour general purpose traffic volumes. The permanent closure of the SODO Busway with Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b would occur at the beginning of construction and would have similar impacts during construction to those described with Alternative SODO-2. More detailed traffic operations analysis was completed for potential concurrent roadway closures for Preferred Option SODO-1c.

Table 3-11. Key Construction Roadway Closures – SODO Segment

Affected Street	Extents [a]	Preferred Option (SODO-1c)	At-Grade Alternative (SODO-1a)	At-Grade South Station Option (SODO-1b)	Mixed Profile Alternative (SODO-2)
SODO Busway [b]	South Massachusetts Street to South Spokane Street	**Permanently closed**	Permanently closed	Permanently closed	Full closure, 5 years
South Lander Street	4th Avenue South to 6th Avenue South	**Full closure, 3 years [c]**	Full closure, 3 years [c]	Full closure, 3 years [c]	Full closure, nights/weekends

Note: The physical limits of street closures as well as durations are approximate and subject to change based on final design and construction planning. Roadways listed typically include designated arterials with closures of 1 year or longer for at least one alternative. For the complete list, see Attachment N.1D, Permanent and Temporary Transportation Facility Closures.

[a] Extents listed do not include intersections unless specifically stated.
[b] While the full length of the SODO Busway extends beyond the SODO Segment, the SODO Busway closure is described in the SODO Segment.
[c] Includes short-term partial closures of intersections with 4th Avenue South and 6th Avenue South.

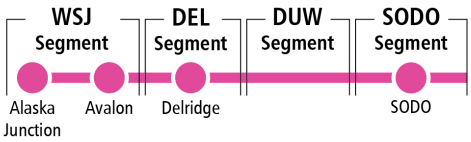
The analysis includes closures in both the SODO and Duwamish segments due to the proximity of the closures; see the Preferred Alternative Construction Analysis in Section 3.11.3.1.1.

The permanent impacts of the SODO Busway closure are described in Section 3.5.3.3.2. Further information on the transit changes associated with the SODO Busway closure during construction is provided in Section 3.11.2.2.

3.11.2.2 Transit

See Table 3-11 for details on key construction-related roadway closures in the SODO Segment. With Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b, the closure of South Lander Street between 4th Avenue South and 6th Avenue South would affect bus routes along South Lander Street. The SODO Busway would also be permanently closed to buses with these alternatives, with the closure occurring at the beginning of construction. With Alternative SODO-2, South Lander Street would remain open, while the SODO Busway would be closed for the duration of construction (5 years).

Impacts on transit with the SODO Busway closed during construction would affect 60 to 80 peak hour Metro buses, including both revenue and non-revenue trips. The buses would likely shift to either 4th Avenue South or 6th Avenue South and would create additional travel time for buses in this segment. Approximately 1,700 feet of layover space and one comfort station would also be affected by the SODO Busway closure. Section 3.4.3.1.2 describes the permanent effect of this closure on bus service.



3.11.2.3 Parking

All Build Alternatives would temporarily remove parking along 6th Avenue South during relocation of the 230-kilovolt power lines; this could include up to 100 spaces at a time in the SODO Segment and up to 85 spaces at a time in the Duwamish Segment. In addition, Preferred Option SODO-1c would remove five on-street parking spaces near the SODO Station. Alternative SODO-1a would have similar parking removals as Preferred Option SODO-1c, and Option SODO-1b would remove slightly more parking during construction.

Potential mitigation for Alternative SODO-2 would implement temporary transit improvements on 4th Avenue South to accommodate buses diverted from the SODO Busway for the duration of construction. These transit improvements could remove 25 to 110 on-street parking spaces on 4th Avenue South between South Holgate Street and South Forest Street, depending on the type of improvement. The closure period for Alternative SODO-2 would be 5 years for construction of the project. Note that the same effects would also apply to the other SODO Segment alternatives discussed in Section 3.6.3.2, but would be permanent in nature under those alternatives. Sound Transit is also planning the Ballard Link Extension, which is a light rail extension from SODO Station to Ballard that would also require a closure of the SODO Busway during construction. See Chapter 5, Cumulative Impacts, for further discussion. In addition to parking removals described for Preferred Option SODO-1c, Alternative SODO-2 would temporarily remove up to 10 on-street parking spaces.

3.11.2.4 Non-motorized Facilities

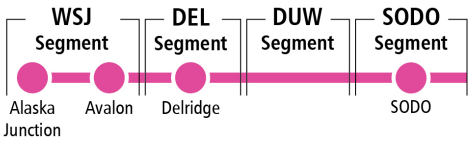
All Build Alternatives in the SODO Segment would require relocation of 26-kilovolt and 230-kilovolt utilities along the SODO Busway and 6th Avenue South, which would require short-term closures of sections of the SODO Trail, South Holgate Street, South Lander Street, and 6th Avenue South during different stages of construction. In addition to the utility relocation closures, for each alternative, the SODO Trail would be closed for the duration of light rail construction between South Stacy Street and South Forest Street (approximately 4 years). Pedestrians and bicycles would be detoured to 6th Avenue South, with east-west access maintained at adjacent street crossings.

With Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b, the sidewalks on both sides of South Lander Street between 4th Avenue South and 6th Avenue South would be closed for approximately 3 years during construction of the South Lander Street overpass. During this time, pedestrians would be detoured to a temporary connection south of South Lander Street to connect between 4th Avenue South and 6th Avenue South.

3.11.2.5 Safety

See Table 3-11 for details on key construction-related roadway closures in the SODO Segment. With Preferred Option SODO-1c, the South Lander Street closure would redistribute traffic to adjacent streets, thus increasing volumes on some roadways and decreasing volume on other roadways. This would likely have a mixed impact on traffic safety as collisions are related to traffic volumes. While specific streets may see a change in safety benefits or impacts (i.e., increase or decrease), it is likely that there would be negligible overall traffic safety impacts within the segment as the total volume in the area is not expected to substantially change.

During construction, pedestrians would be detoured to a temporary connection south of South Lander Street to connect between 4th Avenue South and 6th Avenue South. The connection would be parallel to South Lander Street along a nearby east-west path where practical. However, the SODO Trail would be temporarily closed (see Section 3.11.2.4), requiring pedestrians and bicyclists to detour to 6th Avenue South, which could increase the potential for conflicts with vehicles.



3.11.2.6 Freight Mobility and Access

See Table 3-11 for details on key construction-related roadway closures in the SODO Segment. Preferred Option SODO-1c, Alternative SODO-1a, and Option SODO-1b would require the temporary closure of South Lander Street during the construction of the new South Lander Street overpass. South Holgate Street would remain open and would likely be the primary diversion route for trucks. Alternative SODO-2 would not require long-term closure of South Lander Street.

Preferred Option SODO-1c and Alternative SODO-1a would not affect additional load zones beyond the permanent removals. Option SODO-1b and SODO-2 would affect seven load zones during construction, which include four general load zones and three truck-only load zones on 5th Place South.

3.11.3 Duwamish Segment

3.11.3.1 Arterial and Local Street Operations

Table 3-12 summarizes the major construction road closures in the Duwamish Segment. Road closures in the Duwamish Segment would include partial and full roadway closures for the guideway crossings over several city streets and State Route 99; see Attachment N.1D in Appendix N.1 for a complete list. Crossing over the West Seattle Bridge would also require night and weekend partial closures for each alternative. Some local street construction access would also be required in the Pigeon Point area, namely the full closure of Southwest Marginal Place for over 4 years. However, the location is a dead-end street and no substantive traffic effects are expected.

Table 3-12. Key Construction Roadway Closures for All Alternatives – Duwamish Segment

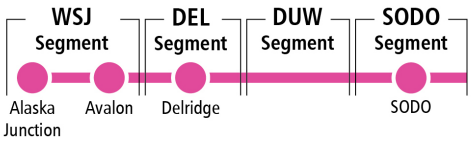
Affected Street	Extents [a]	Preferred Alternative DUW-1a	Option DUW-1b	Alternative DUW-2
4th Avenue South [b]	4th Avenue South just north of South Spokane Street [c]	**Partial closure (3 lanes) 1.5 years**	Not applicable	Not applicable
Southwest Marginal Place	Southwest Marginal Place south of West Seattle Bridge	**Full closure 4.5 years**	Full closure 4.5 years	Not applicable
Delridge Way Southwest	Delridge Way Southwest south of West Seattle Bridge	**Full closure, nights/weekends when connecting to Alternative DEL-5, Alternative DEL-6a, Preferred Option DEL-6b, and Alternative DEL-7**	Partial closure, 9 months and nights/weekends	Not applicable

Note: The physical limits of street closures, as well as durations, are approximate and subject to change based on final design and construction planning. Roadways listed typically include designated arterials with closures of 1 year or longer for at least one alternative. For the complete list, see Attachment N.1D in Appendix N.1.

[a] Extents listed do not include intersections unless specifically stated.

[b] While this closure is in the Duwamish Segment, the traffic operations were evaluated concurrently with other SODO roadway closures in the SODO Segment.

[c] Although the construction closure would affect the area just north of South Spokane Street, traffic would be diverted to the east side of the street starting in the vicinity of South Hinds Street.



3.11.3.1.1 Preferred Alternative Construction Analysis (SODO and Duwamish Segments)

Detailed traffic operations analysis was completed for potential concurrent roadway closures for Preferred Option SODO-1c in the SODO Segment and Preferred Alternative DUW-1a in the Duwamish Segment. An intersection is considered affected by construction if the intersection L.O.S. worsens to L.O.S. E or F, or if the intersection already operates at L.O.S. E or F under 2032 no build conditions and delay increases more than 10 percent. More detailed information on the concurrent closures evaluated and assumed traffic operations and geometry changes are in Section 4.3.3.3 of Appendix N.1.

Construction Scenario 1

Under Construction Scenario 1, the SODO Busway would be fully closed and South Lander Street would be fully closed between 4th Avenue South and 6th Avenue South. With No Build, about 1,000 vehicles would use South Lander Street between 4th Avenue South and 6th Avenue South during the a.m. and p.m. peak hours. Based on travel demand modeling completed for this scenario, 300 to 400 vehicles would be diverted to South Holgate Street, and 100 to 200 vehicles would be diverted to South Spokane Street to travel between 4th Avenue South and 6th Avenue South during both the a.m. and p.m. peak hours. Vehicle traffic also would increase northbound and southbound on 1st Avenue South, 6th Avenue South, and Airport Way South because of the diversion to turn onto South Holgate Street and South Spokane Street. The remaining diverted vehicles were assumed to travel northbound and southbound on 1st Avenue South, 4th Avenue South, and 6th Avenue South, and turn east or west outside of the study area.

The following intersections would be affected in Construction Scenario 1:

- 6th Avenue South and South Spokane Street (both peak hours)
- 4th Avenue South and South Holgate Street (p.m. peak hour)

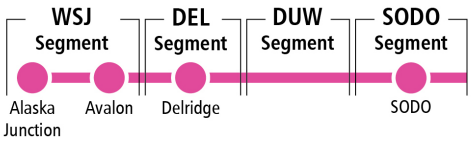
Construction Scenario 2

Under Construction Scenario 2, all southbound lanes of 4th Avenue South would be closed between 175 feet south of South Hinds Street and South Spokane Street. Northbound traffic would use the two eastern lanes, and southbound traffic would use the two western lanes on the east side of 4th Avenue South. The existing northbound bus stop just north of South Spokane Street was assumed to shift to a near-side stop in the northbound right-turn lane approaching the intersection, with a transit queue jump so that buses would not have to merge back into the northbound through lanes. While this roadway portion is in the Duwamish Segment, this scenario considers concurrent closure of the SODO Busway, which spans the SODO and Duwamish segments.

This closure would result in a one lane reduction for both northbound and southbound traffic on 4th Avenue South between South Spokane Street and South Hinds Street. Based on travel demand modeling completed for this scenario, about 100 northbound and 200 southbound vehicles would be diverted from this segment of 4th Avenue South to use 1st Avenue South or 6th Avenue South during the peak hours.

The following intersections would be affected in Construction Scenario 2:

- 4th Avenue South and South Spokane Street (both peak hours)
- 6th Avenue South and South Spokane Street (p.m. peak hour)



3.11.3.2 Transit

Preferred Alternative DUW-1a would have partial closures of 4th Avenue South just north of South Spokane Street, which would affect approximately 60 to 80 peak hour buses (including the buses that are required to shift from the SODO Busway) that would travel on 4th Avenue South. If connected to Preferred Option DEL-6b and Alternatives DEL-5, DEL-6a, and DEL-7, Preferred Alternative DUW-1a would result in night and weekend full closures of Delridge Way Southwest in the vicinity of the West Seattle Bridge ramps, which could affect Metro Routes 50 and 125 and the RapidRide H Line. Due to the geography of the area, full closures during nights and weekends would require a relatively long-distance reroute to minimize service disruptions.

3.11.3.3 Parking

All Build Alternatives would temporarily remove parking along 6th Avenue South during relocation of the 230-kilovolt power lines. In addition, Preferred Alternative DUW-1a would temporarily remove 40 to 55 on-street parking spaces along 6th Avenue South between South Forest Street and South Horton Street during construction of the light rail tracks. There would be no additional removals of special-use spaces during construction.

Alternative SODO-2 would implement temporary transit improvements on 4th Avenue South to accommodate buses diverted from the SODO Busway for the duration of construction. Within the Duwamish Segment, these transit improvements could remove up to 65 parking spaces on 4th Avenue South between South Forest Street and South Spokane Street. Alternative DUW-2 would also temporarily remove 50 to 70 on-street parking spaces located under State Route 99 north of South Spokane Street during construction and would also temporarily displace the Terminal 25 South truck parking lot, which can accommodate about 140 truck tractors. There would be no additional removals of special-use spaces during construction.

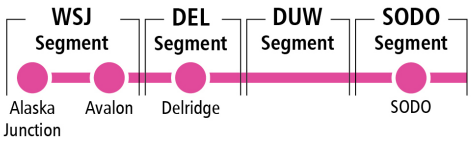
3.11.3.4 Non-motorized Facilities

All Build Alternatives in the Duwamish Segment would require relocation of 26-kilovolt and 230-kilovolt utilities along the SODO Busway and 6th Avenue South, which would require closures of sections of 6th Avenue South, including its pedestrian facilities, during different stages of construction.

Preferred Alternative DUW-1a would require partial closures of 4th Avenue South north of South Spokane Street, during which the sidewalk on one side of the street would be closed.

Preferred Alternative DUW-1a and Option DUW-1b would require a detour of the Delridge Connector Trail to the West Seattle Bridge Trail during construction. Rather than running along the east side of Delridge Way Southwest, the trail would be detoured along the 23rd Avenue Southwest pathway on the west side of Delridge Way Southwest (starting at roughly Southwest Charlestown Street), connecting to the trail on the north side of the West Seattle Bridge. The 22nd Avenue Southwest connection to the Delridge Connector Trail and the stairway between 22nd Avenue Southwest and Delridge Way Southwest would also be temporarily closed during construction. Bicyclists would be detoured via Southwest Andover Street and 23rd Avenue Southwest, where they could use the new signal at Delridge Way Southwest and 23rd Avenue Southwest to access the Delridge Connector Trail detour route.

The staircase through the West Duwamish Greenbelt between Southwest Charlestown Street and Southwest Marginal Place would also be closed during construction of Preferred Alternative DUW-1a and Option DUW-1b, as would the Southwest Marginal Place connector trail to the West Seattle Bridge Trail. Pedestrians who must detour during the staircase closure would have to



travel a longer distance and encounter more vehicle conflicts on facilities along the roadway. The Southwest Marginal Place connector trail would be kept open for some periods of construction, depending on the construction activity. During some periods, non-motorized users could be detoured to the sidewalks on the west side of West Marginal Way Southwest or the planned pedestrian path of the east side of West Marginal Way Southwest (scheduled to be constructed in 2024) to connect to the West Seattle Bridge Trail at the intersection with Chelan Avenue Southwest. However, the west side facility is a relatively narrow sidewalk with no barrier to adjacent traffic. Moreover, there may be periods of construction when the sidewalk on the west side of West Marginal Way Southwest and the planned pedestrian path of the east side of West Marginal Way Southwest are closed concurrent with the Southwest Marginal Place closure. Due to the limited street network and topographical constraints, pedestrian and bicycle travel on existing facilities may not be possible during those times. Sound Transit would continue to consider alternative means to transport pedestrians and bicycles through the corridor.

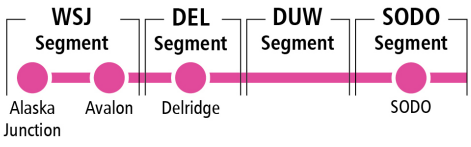
With Alternative DUW-2, construction of the light rail guideway would close the portion of the Alki Trail west of the Chelan Avenue Southwest/West Marginal Way Southwest/Southwest Spokane Street intersection. Although the current access to the crosswalk would be unavailable, travelers may use existing crosswalks farther to the west to connect to the West Seattle Bridge Trail and the Duwamish Trail. The partial closure of 4th Avenue South as described for Preferred Alternative DUW-1a would also apply for Alternative DUW-2.

3.11.3.5 Safety

At the Spokane Street Viaduct, 4th Avenue South would be partially closed for multiple years, which would result in vehicles being diverted during the peak hour to 6th Avenue South and 1st Avenue South. These vehicular diversions are not anticipated to substantially affect safety conditions due to multiple potential diversion routes and similar roadway attributes among 1st, 4th, and 6th Avenues South. Pedestrians would be required to navigate sidewalk closures, necessitating additional roadway crossings. These additional crossings would add two potential conflict locations with vehicles during construction. Vehicles would be detoured to one side of the roadway to allow a partial closure of the other side using temporary barriers, signage, and signals as appropriate for construction zones.

All lanes of Southwest Marginal Place would be closed for multiple years for construction of the guideway, where the new light rail bridge would cross the roadway. No detours are assumed and the street closure is not expected to substantially affect safety, as this is a dead-end street, and no additional conflicts would be introduced.

The staircase through the West Duwamish Greenbelt between Southwest Charlestown Street and Southwest Marginal Place, the sidewalk on the west side of West Marginal Way Southwest, the planned pedestrian path on the east side of West Marginal Way Southwest, and the Southwest Marginal Place connector trail to the West Seattle Bridge Trail would also be closed during some periods of construction. Pedestrians who must detour during the staircase closure would have to travel a longer distance and encounter more vehicle conflicts on facilities along the roadway. Non-motorized users of the Southwest Marginal Place connector trail could be detoured to the facilities on West Marginal Way Southwest during some periods of construction. This does not offer the same level of safety as the affected facilities, and there may be periods of construction when these facilities are closed as well. Due to the limited street network and topographical constraints, pedestrian and bicycle travel on existing facilities may not be possible during those times. Sound Transit would continue to consider alternative means to transport pedestrians and bicycles through the corridor.



With Preferred Alternative DUW-1a, the Delridge Connector Trail from Delridge Way Southwest to the West Seattle Bridge Trail would be rerouted during construction. Pedestrians and bicycles would detour via the 23rd Avenue Southwest pathway on the west side of Delridge Way Southwest to connect to the trail on the north side of the West Seattle Bridge via a series of improvements Sound Transit is designing in coordination with the City of Seattle. The 22nd Avenue Southwest connection to the Delridge Connector Trail would also be temporarily closed. Bicyclists would be detoured, which would require associated treatments to provide safe crossings for users, which are being designed in coordination with City of Seattle. Both of these detour routes would require non-motorized users to cross multiple roadways during construction, which would introduce new conflict locations with vehicles.

Navigation-related safety concerns are discussed in Section 3.11.3.6, Navigation.

3.11.3.6 Navigation

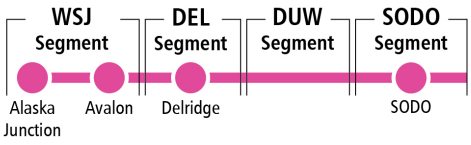
3.11.3.6.1 Impacts Common to All Bridge Alternatives

Barges would be required for material supply and would be moored outside of the navigation channels when possible. However, given the size of the barges, they are likely to encroach on the navigation channels, which are Section 408 resources.

All alternatives would result in the short-term closure of the East and West waterways for approximately 4 hours twice a week during bridge construction. The waterways would be closed because larger vessels and those constrained to the deep-draft channel may not have adequate horizontal clearance or water depth to pass the construction barges. In addition, all alternatives could result in two 12-hour closures of the East and West waterways to complete the center of each overwater bridge span, but the truss bridge type would result in a full 3-day closure when the center span is placed. Closures of the West and East waterways could affect access to the navigation channels in those waterways. Sound Transit would coordinate with the Army Corps of Engineers regarding potential impacts to the Duwamish Waterway and East Waterway federal navigation projects as part of the permission process pursuant to Section 408 of the Rivers and Harbors Act. All waterway closures would be coordinated through and approved by the United States Coast Guard. Economic impacts related to temporary closures and restrictions and mitigation are described in Section 4.3, Economics.

Seattle Police Harbor Patrol response times to the Duwamish Waterway could be affected by temporary closures of the navigation channel and by increased waterway congestion during construction. Sound Transit would coordinate with the Seattle Police Harbor Patrol prior to and throughout construction at key milestones or phases where navigation conditions could change.

Construction on the shoreline for all alternatives and in the water for some bridge types, including placement of temporary cofferdams, work barges, and work trestles (for Option DUW-1b and Alternative DUW-2 only), may affect Muckleshoot Indian Tribe treaty-protected fishing rights and access to the Tribe's Usual and Accustomed Areas for the duration of construction when Tribal treaty-protected fishing is occurring. These construction activities may also affect Suquamish Tribe treaty-protected fishing rights and access to the Tribe's Usual and Accustomed Areas for the duration of construction when Tribal treaty-protected fishing is occurring. Construction activities may also change vessel traffic patterns, which could interfere with upstream and downstream Tribal treaty-protected fishing rights and access.



3.11.3.6.2 Preferred South Crossing Alternative (DUW-1a)

East Waterway

The northern gangway from Harbor Island to the Harbor Island Marina commercial dock on the East Waterway would be temporarily closed during construction. Mariners could use the existing southern access point; however, the northern gangway is the only vehicle access point for loading and unloading heavy gear. In addition, the northern 125 feet of the dock would be closed during construction. Closure of the northern portion of the dock would reduce commercial moorage and may temporarily displace some commercial vessels. If the Muckleshoot Indian Tribe Fisheries Division vessels moor at the commercial dock, these vessels may also be temporarily displaced. Temporarily displaced commercial vessels and Tribal patrol boats could have difficulty finding replacement moorage on the Duwamish Waterway. Sound Transit would coordinate with the Port of Seattle to minimize disruptions to land and water access from the closure of the northern gangway and northern portion of the Harbor Island Marina commercial dock and use would be restored following construction. Sound Transit would coordinate with the Port of Seattle to ensure access is maintained throughout construction to the Harbor Island Marina.

Neither of the bridge types for Preferred Alternative DUW-1a would require temporary work trestles to be installed in the East Waterway. For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the vertical clearance over the waterway by up to 15 feet from approximately 104 feet to approximately 89 feet for about 3 months. Because vessels that use this area are primarily tugs and work boats that typically require less than 89 feet of vertical clearance, the vertical clearance is not anticipated to prevent current uses. Sound Transit's *Duwamish Waterway Navigation Impact Report* has more information on the vertical clearance requirements of the vessels that use the Harbor Island Marina commercial dock (Sound Transit 2021).

West Waterway

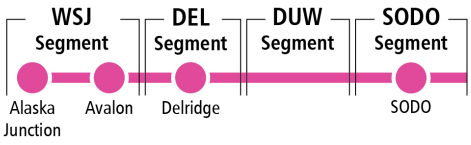
The gangway from Harbor Island to the Jim Clark Marina on the West Waterway would be temporarily relocated. Sound Transit would coordinate with the Port of Seattle and tenants to provide alternate access to the marina from the western edge of the Port-owned Harbor Marina Corporate Center parking lot. Sound Transit would coordinate with the Port of Seattle to ensure access is maintained throughout construction to the Jim Clark Marina.

Neither of the bridge types for Preferred Alternative DUW-1a would require a permanent bridge protection system or temporary work trestles to be installed in the West Waterway. For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the vertical clearance over the waterway by up to 15 feet from approximately 140 feet to approximately 125 feet for about 2 months. Based on vessel heights reported during surveys and coordination Sound Transit conducted with Duwamish Waterway users, these temporary vertical clearance reductions could affect some of the boats that currently access maritime facilities on the Lower Duwamish Waterway, such as shipping terminals and facilities for marine construction and building boats.

3.11.3.6.3 South Crossing South Edge Crossing Alignment Option (DUW-1b)

East Waterway

The southern gangway from Harbor Island to the Harbor Island Marina commercial dock on the East Waterway would be closed intermittently during construction, but mariners could use the existing northern access point. In addition, the southern 300 feet of the dock would be restricted



during overhead bridge construction, which would temporarily displace commercial vessels. Temporarily displaced commercial vessels could have difficulty finding replacement moorage on the Duwamish Waterway. Sound Transit would coordinate with the Port of Seattle to minimize disruptions to land and water access from the intermittent closures of the southern gangway and southern portion of the Harbor Island Marina commercial dock. Use of the southern access point and southern portion of the dock would be restored following construction.

Temporary work trestles may be installed in the East Waterway to support the operation of heavy equipment. The trestles would be placed outside of the navigation channel. For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the vertical clearance over the waterway by up to 15 feet (from approximately 125 feet to approximately 110 feet) for about 3 months. Because vessels that use this area are primarily tugs and work boats that typically require less than 100 feet of vertical clearance (Sound Transit 2021), the vertical clearance of the bridge during construction is not anticipated to prevent current uses.

West Waterway

The Harbor Island Marina recreational docks would be closed for approximately 3 to 4 years during construction, which would temporarily remove about 18 percent of recreational moorage and 100 percent of linear dockage for recreational boats on the Duwamish Waterway. If the Muckleshoot Indian Tribe Fisheries Division patrol boats moor at a recreational dock, these vessels may also be temporarily displaced. Temporarily displaced recreational vessels and Tribal patrol boats could have difficulty finding replacement moorage nearby. Sound Transit would coordinate with Port of Seattle to retain the Harbor Island Marina recreational docks and associated marina infrastructure so that marina operations could resume after construction.

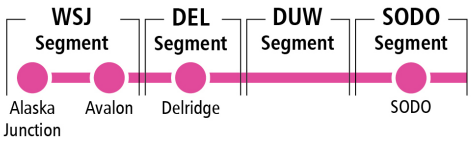
Temporary work trestles may be installed in the West Waterway to support the operation of heavy equipment. The trestles would be placed outside of the navigation channel. For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the vertical clearance over the waterway by up to 15 feet (from approximately 140 feet to approximately 125 feet) for about 5 months. Based on vessel heights reported during surveys and coordination Sound Transit conducted with Duwamish Waterway users, these temporary vertical clearance reductions could affect some of the boats that currently access maritime facilities on the Lower Duwamish Waterway such as shipping terminals and facilities for marine construction and building boats.

West Waterway navigation channel closures would occur during installation of the bridge protection system for all bridge types, when part of the navigation channel would be closed intermittently for up to approximately 4 weeks.

3.11.3.6.4 North Crossing Alternative (DUW-2)

East Waterway

Temporary work trestles may be installed in the East Waterway to support the operation of heavy equipment. The trestles would be placed outside of the navigation channel. For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the vertical clearance over the waterway by up to 15 feet (from approximately 100 feet to approximately 85 feet) for about 6 months. Because vessels that use this area typically require about 75 feet of vertical clearance or less, the vertical clearance of the bridge during construction is not anticipated to prevent current uses. East Waterway navigation channel closures would also occur during installation of the bridge protection system for all bridge types, when part of the navigation channel would be closed intermittently for up to approximately 4 weeks.



West Waterway

Temporary work trestles may be installed in the West Waterway to support the operation of heavy equipment. The trestles would be placed outside of the navigation channel. For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the vertical clearance over the waterway by up to 15 feet (from approximately 140 feet to approximately 125 feet) for about 1 month. Based on vessel heights reported during surveys and coordination Sound Transit conducted with Duwamish Waterway users, these temporary vertical clearance reductions could affect some of the boats that currently access maritime facilities on the Lower Duwamish Waterway, such as shipping terminals and facilities for marine construction and building boats.

West Waterway navigation channel closures would occur during installation of the bridge protection system for all bridge types, when part of the navigation channel would be closed intermittently for up to approximately 4 weeks.

3.11.3.7 Freight Mobility and Access

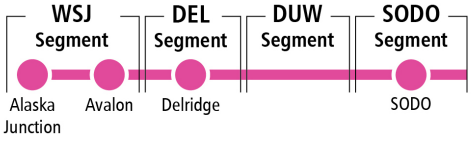
All alternatives would require closures of key streets in the truck network (e.g., South Spokane Street, State Route 99, and East Marginal Way South, and West Marginal Way Southwest) on nights and weekends when the guideway is built over those streets (see Attachment N.1D in Appendix N.1). Construction of the guideway and guideway columns could also temporarily affect the local business rail spurs on each side of the SODO Busway.

Preferred Alternative DUW-1a would partially close 4th Avenue South for up to 18 months and South Spokane Street for up to 6 months. Option DUW-1b would have similar street network impacts as Preferred Alternative DUW-1a, except that the partial closure of 4th Avenue South would be less than a year.

Preferred Alternative DUW-1a and Option DUW-1b could require temporary closures of the BNSF Railway tracks east of East Marginal Way South due to ground improvements associated with a guideway column. Preferred Alternative DUW-1a would also have a bridge column and foundation just east of the West Waterway that is close to the BNSF Railway West Seattle lead tracks. Option DUW-1b would have similar rail impacts as Preferred Alternative DUW-1a, except that the pier for the Duwamish River Bridge crossing would not be located near the West Seattle lead track.

Alternative DUW-2 would have a guideway column requiring lane closures on Chelan Avenue Southwest west of the West Marginal Way Southwest/Southwest Spokane Street intersection. During construction, increased traffic congestion is expected at this intersection, with short-term lane closures on Chelan Avenue Southwest; however, one lane in each direction would be maintained. This alternative also has a column in the Terminal 18 employee parking lot just west of the Terminal 18 truck gate queue area, but would not affect truck operations at the terminal. Construction access to the column and construction of the guideway could encroach into the gate area but is not expected to affect queue capacity or circulation within the terminal.

Construction staging areas for all alternatives could affect between 40 and 55 on-street parking spaces. Temporary removal of parking during construction could affect trucks, which are allowed to legally park long-term and overnight on streets in designated industrial areas. All of the alternatives would affect two general load zones on 6th Avenue South. Alternative DUW-2 would temporarily displace the Terminal 25 South truck parking lot.



3.11.4 Delridge Segment

3.11.4.1 Arterial and Local Street Operations

Table 3-13 summarizes the major construction closures in the Delridge Segment. Preferred Option DEL-6b and Alternative DEL-7 would not have any long-term roadway closures during construction; however, 26th Avenue Southwest south of Southwest Andover Street would be fully closed during nights and weekends. Alternative DEL-7 would also include a key short-term closure (3 months to 6 months) that would partially close the West Seattle Bridge at the guideway crossing (just south of the Southwest Andover Street pedestrian bridge).

Alternative DEL-1a would cross over Delridge Way Southwest as an elevated guideway. Portions of Delridge Way Southwest would likely have short-term closures for the construction of this guideway. The construction of the Delridge Station would require a long-term closure of 25th Avenue Southwest and short-term closures on 26th Avenue Southwest and Southwest Dakota Street. The construction of the guideway would require the full closure of Southwest Genesee Street. While the volumes on Southwest Genesee Street are moderate, this street is one of the few east-west routes through the Delridge neighborhood. Traffic would likely be diverted to other arterial and local streets within the Youngstown neighborhood. Southwest Genesee Street would also be fully closed from Southwest Avalon Way to 32nd Avenue Southwest. This street segment is not designated as an arterial and has low traffic volumes, as it provides residential access to the neighborhood. Traffic would be diverted to either 35th Avenue Southwest to the south or Southwest Andover Street to the north.

Alternative DEL-2a would construct the guideway over both Delridge Way Southwest and Southwest Genesee Street, likely requiring their closure on nights and weekends.

Options DEL-1b and Option DEL-2b would have impacts similar to Alternative DEL-1a along Delridge Way Southwest and in the vicinity of the Delridge Station. Option DEL-1b would close Southwest Genesee Street, with impacts similar to Alternative DEL-1a, while Southwest Genesee Street could remain open except for short-term closures with Option DEL-2b.

Alternative DEL-3 would require the closure of one to three lanes on Delridge Way Southwest. These lane closures would likely divert substantial amounts to 35th Avenue Southwest, Southwest Avalon Way, the West Seattle Bridge, and 26th Avenue Southwest. This alternative would also require closure of Southwest Genesee Street, with impacts similar to those identified for Alternative DEL-1a. Construction of the Delridge Station would close Southwest Dakota Street adjacent to the station.

Alternative DEL-4 would have impacts similar to Alternative DEL-3 along Delridge Way Southwest. Southwest Genesee could remain open except for short-term closures.

Alternative DEL-5 construction would require a closure of Southwest Andover Street and Southwest Avalon Way, likely during overlapping periods. This would result in a substantial diversion of vehicle trips to Delridge Way Southwest, Southwest Genesee Street, and West Seattle Bridge/Fauntleroy Way Southwest. With these closures, Southwest Yancy Street and Delridge Way Southwest would also be fully closed during nights and weekends, although access to the Nucor Steel property would be maintained.

Alternative DEL-6a would also require the closure of Southwest Andover Street, although closures on Southwest Avalon Way and Southwest Yancy Streets would be limited to nights and weekends. Delridge Way Southwest would also be partially closed for short periods. The traffic volumes on Southwest Andover Street would likely be diverted to Delridge Way Southwest, Southwest Genesee Street, and Southwest Avalon Way along these streets. Access to the Nucor Steel property would be maintained.

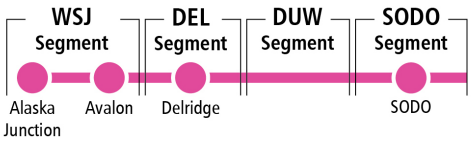
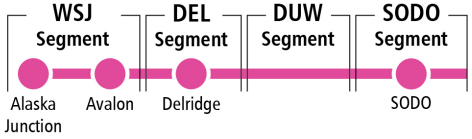
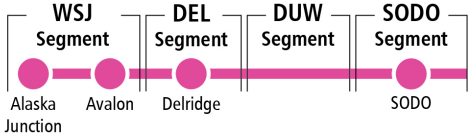


Table 3-13. Key Construction Roadway Closures – Delridge Segment

Affected Street	Extents [a]	Preferred Andover Street Station Lower Height South Alignment Option (DEL-6b)	Dakota Street Station Alternative (DEL-1a)	Dakota Street Station, North Alignment Option (DEL-1b)	Dakota Street Station (Lower Height) Alternative (DEL-2a)	Dakota Street Station (Lower Height), North Alignment Option (DEL-2b)	Delridge Way Station Alternative (DEL-3)	Delridge Way Station (Lower Height) Alternative (DEL-4)	Andover Street Station Alternative (DEL-5)	Andover Street Station (Lower Height) Alternative (DEL-6a)	Andover Street Station Lower Height No Avalon Station Tunnel Connection (DEL-7)
25th Avenue Southwest	Southwest Dakota Street to Southwest Genesee Street	**Not applicable**	Full closure, 4 years	Full closure, 4 years	Permanently closed	Permanently closed	Full closure, nights/ weekends	Full closure, nights/ weekends	Not applicable	Not applicable	Not applicable
Delridge Way Southwest (see Table 3-12 for closures of Delridge Way Southwest north of 23rd Avenue Southwest)	23rd Avenue Southwest to Southwest Dakota Street	**Not applicable**	Partial closure, 9 months Full closure, nights/ weekends	Partial closure, 9 months Full closures, nights/ weekends	Partial closure, 9 months Full closure, nights/ weekends	Partial closure, 9 months Full closure, nights/ weekends	Partial closure, 3 years Full closure, nights/ weekends (extends south of Southwest Dakota Street)	Partial closure, 3 years Full closure, nights/ weekends (extends south of Southwest Dakota Street)	Not applicable	Not applicable	Not applicable
Southwest Andover Street	26th Avenue Southwest to 28th Avenue Southwest	**Not applicable**	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Full closure, 2 years	Full closure, 2 years	Not applicable



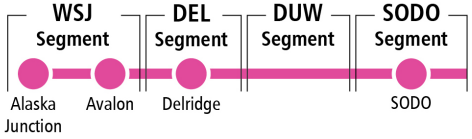
Affected Street	Extents [a]	Preferred Andover Street Station Lower Height South Alignment Option (DEL-6b)	Dakota Street Station Alternative (DEL-1a)	Dakota Street Station, North Alignment Option (DEL-1b)	Dakota Street Station (Lower Height) Alternative (DEL-2a)	Dakota Street Station (Lower Height), North Alignment Option (DEL-2b)	Delridge Way Station Alternative (DEL-3)	Delridge Way Station (Lower Height) Alternative (DEL-4)	Andover Street Station Alternative (DEL-5)	Andover Street Station (Lower Height) Alternative (DEL-6a)	Andover Street Station Lower Height No Avalon Station Tunnel Connection (DEL-7)
Southwest Avalon Way	Southwest Yancy Street to Southwest Genesee Street	**Full closure, nights/ weekends (north of Southwest Yancy Street/ Southwest Andover Street)**	Full closure, nights/weekends (Southwest Avalon Way at Southwest Genesee Street intersection)	Partial closure, 9 months (Southwest Avalon Way north of Southwest Genesee Street)	Not applicable	Not applicable	Full closure, nights/weekends (Southwest Avalon Way at Southwest Genesee Street intersection)	Not applicable	Full closure, 1 year	Full closure, nights/weekends (north of Southwest Yancy Street/ Southwest Andover Street)	Full closure, nights/ weekends (north of Southwest Yancy Street/ Southwest Andover Street)
Southwest Dakota Street	25th Avenue Southwest to Delridge Way Southwest	**Not applicable**	Full closure, nights/ weekends	Full closure, nights/ weekends	Full closure, nights/ weekends	Full closure, nights/ weekends	Full closure, 3 years	Full closure, 3 years	Not applicable	Not applicable	Not applicable
Southwest Genesee Street	26th Avenue Southwest to Southwest Avalon Way	**Not applicable**	Full closure, 2 years	Full closure, 2 years	Full closure, nights/ weekends (only extends from 26th Avenue Southwest to 28th Avenue Southwest)	Partial closure, 9 months Full closure, nights/ weekends (only extends from 26th Avenue Southwest to 30th Avenue Southwest)	Full closure, 2 years	Partial closure, 9 months Full closure, nights/ weekends (only extends from 26th Avenue Southwest to 28th Avenue Southwest)	Not applicable	Not applicable	Not applicable



Affected Street	Extents [a]	Preferred Andover Street Station Lower Height South Alignment Option (DEL-6b)	Dakota Street Station Alternative (DEL-1a)	Dakota Street Station, North Alignment Option (DEL-1b)	Dakota Street Station (Lower Height) Alternative (DEL-2a)	Dakota Street Station (Lower Height), North Alignment Option (DEL-2b)	Delridge Way Station Alternative (DEL-3)	Delridge Way Station (Lower Height) Alternative (DEL-4)	Andover Street Station Alternative (DEL-5)	Andover Street Station (Lower Height) Alternative (DEL-6a)	Andover Street Station Lower Height No Avalon Station Tunnel Connection (DEL-7)
Southwest Genesee Street	Southwest Avalon Way to 32nd Avenue Southwest	**Not applicable**	Full closure, 3 years	Full closure, 3 years	Not applicable	Not applicable	Full closure, 3 years	Not applicable	Not applicable	Not applicable	Not applicable

Note: The physical limits of street closures as well as durations are approximate and subject to change based on final design and construction planning. Roadways listed typically include designated arterials with closures of 1 year or longer for at least one alternative. For the complete list, see Attachment N.1D in Appendix N.1.

[a] Extents listed do not include intersections unless specifically stated.



3.11.4.2 Transit

See Table 3-13 for details on key construction-related roadway closures in the Delridge Segment. Preferred Option DEL-6b, Alternative DEL-6a, and Alternative DEL-7 would not have any long-term roadway closures during construction that would affect transit service.

With Alternative DEL-1a, Option DEL-1b, and Alternative DEL-3, Metro Route 50 on Southwest Genesee Street would be rerouted for the duration of construction. Given the limited number of east-west streets between the Delridge and Avalon station areas, Route 50 may need to be rerouted on other streets in the neighborhood, which could affect pavement quality. Route 50 could also be routed along other existing transit pathways, but this would reduce transit coverage in the area.

Alternatives DEL-3 and DEL-4 would have the longest construction effects on Delridge Way Southwest, which could affect 16 to 20 peak hour bus trips, including Metro Routes 50 and 125 and the RapidRide H Line. The partial closures of Delridge Way Southwest would affect speed and reliability of these routes.

With Alternative DEL-5, a full closure of Southwest Avalon Way for 1 year would require the temporary rerouting of multiple Metro routes, including the RapidRide C Line, affecting 40 to 60 peak hour bus trips. While the West Seattle Bridge provides a potential reroute alternative for Southwest Avalon Way, some stops on Southwest Avalon Way would not be served.

3.11.4.3 Parking

In addition to the parking spaces that would be permanently removed, Preferred Option DEL-6b would temporarily remove 15 to 25 on-street parking spaces on Southwest Andover Street between 32nd Avenue Southwest and Southwest Avalon Way during construction. There would be no additional removals of special-use spaces during construction.

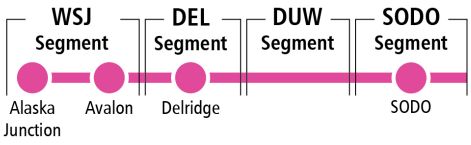
Alternative DEL-1a could temporarily remove up to 85 on-street parking spaces during construction, and Option DEL-1b could remove up to 155 on-street parking spaces. Alternative DEL-2a and Option DEL-2b could temporarily remove up to 40 on-street parking spaces during construction.

Alternative DEL-3 could temporarily remove up to 105 on-street parking spaces during construction, and Alternative DEL-4 could remove up to 90 spaces. Alternative DEL-5 could remove up to 75 on-street parking spaces during construction. Alternative DEL-6a would not remove additional on-street parking, and Alternative DEL-7 could remove up to 25 spaces.

All alternatives other than Preferred Option DEL-6b would temporarily remove up to one Disabled Parking Space, one General Load Zone space, and one Passenger Load Zone space during construction. None of these alternatives are expected to affect public off-street parking during construction.

3.11.4.4 Non-motorized Facilities

During construction of Preferred Option DEL-6b and Alternative DEL-7, 26th Avenue Southwest south of Southwest Andover Street would be closed on nights and weekends. This would include closure of the sidewalks on both sides of 26th Avenue Southwest. This roadway is a neighborhood greenway so bicyclists would need to use an alternate route such as 28th Avenue Southwest. No additional non-motorized effects beyond the general roadway impacts described in the Construction Impacts Common to All Alternatives section are expected for Preferred Option DEL-6b.



With Alternative DEL-1a, Option DEL-1b, and Alternative DEL-3, the closure of Southwest Genesee Street would temporarily preclude its use by pedestrians and cyclists as well as motorized vehicles. With Alternative DEL-4, portions of Southwest Genesee Street would be partially closed. The irregular street grid in that area would require some out-of-direction travel. Traffic diversion from Southwest Genesee Street would likely also cause an increase in vehicle traffic on 26th Avenue Southwest, which is a neighborhood greenway.

No specific non-motorized effects are expected with Alternative DEL-2a or Option DEL-2b.

With Alternatives DEL-3 and DEL-4, the partial closure of Delridge Way Southwest would affect the sidewalk on one side of the street.

With Alternatives DEL-5 and DEL-6a, Southwest Andover Street, a signed bicycle route, would be temporarily closed to pedestrian and bicyclists. Pedestrians and bicycles could use Southwest Genesee Street as an alternate route. Alternative DEL-5 would also close Southwest Avalon Way, including the protected bike lanes along that street. Pedestrians and bicycles could use 32nd Avenue Southwest as an alternate route. Traffic diversion from Southwest Andover Street and Southwest Avalon Way could also cause an increase in vehicle traffic on 26th Avenue Southwest, which is a neighborhood greenway.

3.11.4.5 Safety

Roadway closures for Preferred Option DEL-6b would be short in duration and/or limited to nights and weekends with safety impacts expected to be negligible.

Alternative DEL-1a, Option DEL-1b, Alternative DEL-2a, Option DEL-2b, and Alternatives DEL 3, DEL-4, DEL-5, DEL-6a, and DEL-7 would require multi-year, full or partial closures of roadways in the station area, including differing closure combinations of 25th Avenue Southwest, Southwest Genesee Street, Delridge Way Southwest, Southwest Andover Street, and Southwest Avalon Street. In general, these closures could increase traffic volumes on detour routes and potentially increase conflicts on those routes. See Appendix N.1, Section 7.3.2.2, for more details.

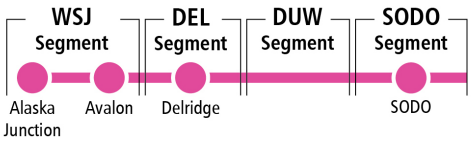
3.11.4.6 Freight Mobility and Access

See Table 3-13 for details on key construction-related facility closures in the Delridge Segment.

Preferred Option DEL-6b would require the full closure of Southwest Avalon Way during nights and weekends. This road is part of the City of Seattle's designated Over-Legal Network and a Minor Truck Street. These nights and weekend closures would also occur with Alternative DEL-1a, Option DEL-1b, Alternative DEL-3, Alternative DEL-6a, and Alternative DEL-7. Option DEL-1b would also partially close Southwest Avalon Way for nine months. Alternative DEL-5 would require full closure of Southwest Avalon Way for about 1 year. Other truck streets could be closed on nights and weekends during construction.

Nucor Steel is adjacent to two alternatives that would be constructed along Southwest Andover Street. Alternative DEL-5 and Alternative DEL-6a would require a full closure of Southwest Andover Street during construction, but access to Nucor Steel by vehicle and rail would be maintained. Nucor Steel access could also be affected by Alternative DEL-3 and Alternative DEL-4, which would require a partial closure of Delridge Way Southwest for multiple years.

None of the alignments would affect the rail network in this segment. Preferred Option DEL-6b Alternative DEL-5, Alternative DEL-6a, and Alternative DEL-7 would affect one General Load Zone on Southwest Yancy Street; the other Build Alternatives would not have additional load zone impacts during construction beyond those described as long-term impacts.



3.11.5 West Seattle Junction Segment

3.11.5.1 Arterial and Local Street Operations

Table 3-14 summarizes the major construction roadway closures in the West Seattle Junction Segment.

3.11.5.1.1 Preferred Option WSJ-5b Construction Analysis

Detailed traffic operations analysis was completed for potential concurrent roadway closures for Preferred Option WSJ-5b. Two scenarios were evaluated in the West Seattle Junction Segment. A SimTraffic simulation model was created to analyze traffic operations that allow for detailed representation of intersection delays and queuing along corridors when vehicles would be diverted during roadway closures. A number of intersection and roadway changes were assumed in the analysis to accommodate diverted vehicle traffic during the construction closures, including signal timing changes (phasing, cycle lengths, and cycle offsets) along key arterial corridors and lane re-assignments to better serve diverted vehicle demand. Seventeen signalized or all-way stop intersections were evaluated within the study area. See Section 4.3.3.5 of Appendix N.1 for more detailed information on the modeling assumptions and results.

Construction Scenario 3

Under Construction Scenario 3, the following concurrent construction-related closures are assumed:

- Partial closure of Southwest Alaska Street between 42nd Avenue Southwest and 40th Avenue Southwest to remove one bus-only travel lane in each direction
- Full closure of 41st Avenue Southwest from north of Southwest Alaska Street to south of Southwest Hudson Street, while allowing east-west through traffic on Southwest Alaska Street and Southwest Edmunds Street
- Full closure of 35th Avenue Southwest between Southwest Avalon Way and Fauntleroy Way Southwest

The route diversions for these closures were conservative and assumed drivers would not divert outside of the study area nor shift to other travel modes or times of day. Depending on the closure, drivers are assumed to divert to California Avenue Southwest, Fauntleroy Way Southwest, 35th Avenue Southwest, or Southwest Avalon Way, based on their ultimate destination.

The simulation model results showed three intersections affected in the a.m. peak hour and five intersections affected in the p.m. peak hour for Construction Scenario 3. In the a.m. peak hour, diverted vehicle trips to Fauntleroy Way Southwest would result in longer northbound queues at Southwest Alaska Street, extending beyond Southwest Edmunds Street. Longer queues and more congestion are expected on Southwest Avalon Way, another key diversion route. Operations on the 35th Avenue Southwest corridor would improve with the roadway closure and shifted vehicle trips to other corridors.

In the p.m. peak hour, the increased demand on the West Seattle Bridge and Southwest Avalon Way would increase the congestion and queuing on these roadways. On Southwest Avalon Way, the southbound queue from Southwest Genesee Street could at times extend back to Southwest Spokane Street. At 35th Avenue Southwest and Fauntleroy Way Southwest, the southbound queue could extend beyond Southwest Manning Street. On the West Seattle Bridge, the westbound queue would extend more than a half mile from the intersection at 35th Avenue Southwest. The intersections of Southwest Alaska Street with 42nd Avenue Southwest and California Avenue Southwest would also be affected.

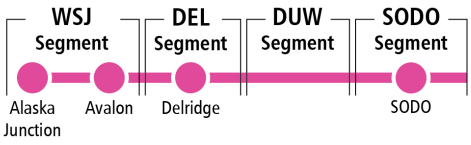
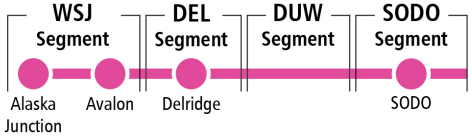


Table 3-14. Key Construction Roadway Closures – West Seattle Junction Segment

Affected Street	Extents [a]	Preferred Medium Tunnel 41st Avenue Station West Entrance Station Option (WSJ-5b)	Elevated 41st/42nd Avenue Alternative (WSJ-1)	Elevated Fauntleroy Way Alternative (WSJ-2)	Tunnel 41st Avenue Station Alternative (WSJ-3a)	Tunnel 42nd Avenue Station Option (WSJ-3b)	Short Tunnel 41st Avenue Station Alternative (WSJ-4)	Medium Tunnel 41st Avenue Station Alternative (WSJ-5a)	No Avalon Station Tunnel Alternative (WSJ-6)
35th Avenue Southwest	West Seattle Bridge/ Fauntleroy Way Southwest to Southwest Avalon Way	**Full closure, 1 year** [b]	Full closure, nights/weekends	Full closure, nights/weekends	Full closure, 3 years	Full closure, 3 years	Full closure, nights/ weekends	Full closure, 1 year	Not applicable
36th Avenue Southwest	Southwest Genesee Street to Fauntleroy Way Southwest	**Not applicable**	Full closure, 1.5 years	Full closure, 3 years	Full closure, 3 years	Full closure, 3 years	Full closure, 9 months	Not applicable	Not applicable
41st Avenue Southwest	North of Southwest Alaska Street to Southwest Hudson Street	**Full closure, 4 years**	Not applicable	Not applicable	Full closure, 4 years	Not applicable	Full closure, 4 years [c]	Full closure, 4 years	Full closure, 4 years
42nd Avenue Southwest	North of Southwest Alaska Street to Southwest Hudson Street	**Not applicable**	Partial closure, 9 months Full closure, nights/weekends (extent limited to block north of Southwest Edmunds Street)	Not applicable	Not applicable	Full closure, 4 years (includes 4-year partial closure of Southwest Hudson Street at 42nd Avenue Southwest)	Not applicable	Not applicable	Not applicable



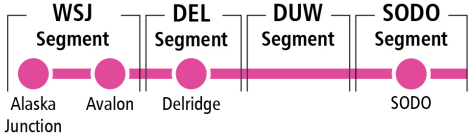
Affected Street	Extents [a]	Preferred Medium Tunnel 41st Avenue Station West Entrance Station Option (WSJ-5b)	Elevated 41st/42nd Avenue Alternative (WSJ-1)	Elevated Fauntleroy Way Alternative (WSJ-2)	Tunnel 41st Avenue Station Alternative (WSJ-3a)	Tunnel 42nd Avenue Station Option (WSJ-3b)	Short Tunnel 41st Avenue Station Alternative (WSJ-4)	Medium Tunnel 41st Avenue Station Alternative (WSJ-5a)	No Avalon Station Tunnel Alternative (WSJ-6)
Fauntleroy Way Southwest	West Seattle Bridge/ 35th Avenue Southwest to Southwest Avalon Way	**Partial closure, 1.5 years (at Southwest Avalon Way)**	Full closure, nights/weekends (extends from West Seattle Bridge/35th Avenue Southwest to Southwest Oregon Street)	Full closure, nights/weekends	Partial closure, 1.5 years	Partial closure, 1.5 years	Partial closure, 9 months Full closure, nights/ weekends	Partial closure, 1.5 years (at Southwest Avalon Way)	Not applicable
Southwest Alaska Street	38th Avenue Southwest to Fauntleroy Way Southwest	**Not applicable**	Not applicable	Full closure, 3 years	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Southwest Edmunds Street	At 41st Avenue Southwest	**Full closure, 6 months**	Not applicable	Not applicable	Full closure, 4 years	Not applicable	Full closure, 4 years	Full closure, 4 years	Full closure, 4 years
Southwest Edmunds Street	At 42nd Avenue Southwest	**Not applicable**	Full closure, nights/weekends (west of 42nd Avenue Southwest)	Not applicable	Not applicable	Full closure, 4 years	Not applicable	Not applicable	Not applicable

Note: The physical limits of street closures as well as durations are approximate and subject to change based on final design and construction planning. Roadways listed typically include designated arterials with closures of 1 year or longer for at least one alternative. For the complete list, see Attachment N.1D in Appendix N.1.

[a] Extents listed do not include intersections unless specifically stated.

[b] The 35th Avenue Southwest full closure would be coordinated to not overlap with the partial Fauntleroy Way Southwest closure.

[c] The closure extends to south of Southwest Hudson Street; includes 1-year partial closure of Southwest Alaska Street east of 41st Avenue Southwest.



The simulation model suggests that several hundred vehicles would likely switch travel modes, change travel times, or divert out of the study area to avoid congestion related to the closure. The potential diversion routes include Southwest Admiral Way, Delridge Way Southwest, West Marginal Way Southwest, Highland Park Way Southwest, and the 1st Avenue South bridge.

Construction Scenario 4

Under Construction Scenario 4, the following concurrent construction-related closures are assumed:

- Partial closure of Southwest Alaska Street between 42nd Avenue Southwest and 40th Avenue Southwest to remove one bus-only travel lane in each direction.
- Full closure of 41st Avenue Southwest from north of Southwest Alaska Street to south of Southwest Hudson Street, while allowing east-west through traffic on Southwest Alaska Street and Southwest Edmunds Street.
- Partial closure of the intersection at Fauntleroy Way Southwest and Southwest Avalon Way. One approach lane and one departure lane were assumed at each leg of the intersection. (Construction activities would close one quadrant of the intersection at a time; this analysis assumes that a consistent amount of vehicular capacity would be maintained during each quadrant closure).

Depending on the closure, drivers are assumed to divert to California Avenue Southwest, 35th Avenue Southwest, or Southwest Avalon Way, based on their ultimate destination.

Seven intersections would be affected in the a.m. peak hour. Due to the routing changes, 650 additional vehicles would be routed onto 35th Avenue Southwest between Southwest Alaska Street and Southwest Avalon Way. Even with these shifts, Fauntleroy Way Southwest and 35th Avenue Southwest would be over capacity and queuing and congestion would spill back throughout the study network. Long queues are expected at:

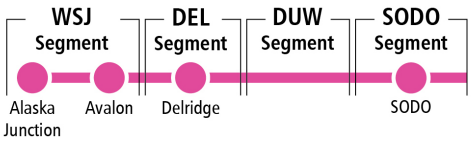
- Northbound on Fauntleroy Way Southwest at Southwest Edmunds Street
- Northbound on 35th Avenue Southwest at Southwest Alaska Street
- Westbound on Southwest Avalon Way at 35th Avenue Southwest
- Southbound on 35th Avenue Southwest at Fauntleroy Way Southwest

Nine intersections would be affected during the p.m. peak hour. Due to the routing changes, there would be additional congestion and queuing westbound on the West Seattle Bridge. During the construction closure, the average delay for drivers would be over 4 minutes, with extensive queuing onto the West Seattle Bridge from the intersection at 35th Avenue Southwest.

The simulation model suggests up to 500 vehicles during each peak hour would likely switch travel modes, change travel times, or divert out of the study area to avoid congestion related to the closure. The potential diversion routes include Southwest Admiral Way, Delridge Way Southwest, West Marginal Way Southwest, Highland Park Way Southwest, and the 1st Avenue South bridge.

3.11.5.1.2 Other Build Alternatives

With Alternative WSJ-1, a short section of 36th Avenue Southwest would be fully closed during construction. Traffic could be diverted to 37th Avenue Southwest, the adjacent street, for access to southbound Fauntleroy Way Southwest.



Sections of Fauntleroy Way Southwest would be closed on nights and weekends for guideway construction. Traffic effects would likely be minimal during these low-volume times, although West Seattle Bridge access would be restricted, likely diverting trips to 35th Avenue Southwest to access the bridge. Short sections of Southwest Oregon Street, 39th Avenue Southwest, 40th Avenue Southwest, and 42nd Avenue Southwest would also have short-term closures with minimal effect on traffic.

Construction of Alternative WSJ-2 would have similar construction effects as Alternative WSJ-1 except at the Alaska Junction Station area. A relatively low traffic volume section of Southwest Alaska Street would be closed, with a majority of the traffic likely to use Fauntleroy Way Southwest, resulting in higher congestion levels between 38th Avenue Southwest and Southwest Avalon Way. This closure of Southwest Alaska Street would affect seven Metro bus routes, including RapidRide C.

With Alternative WSJ-3a, 35th Avenue Southwest would be closed, diverting a high number of vehicles to Fauntleroy Way Southwest, Southwest Alaska Street, Southwest Avalon Way, and California Avenue Southwest, as well as to connecting local streets. For a portion of this time, Fauntleroy Way Southwest would be partially closed, diverting a substantial number of vehicles to surrounding streets such as 35th Avenue Southwest (if open) and Southwest Alaska Street. Simultaneous closures of 35th Avenue Southwest and Fauntleroy Way Southwest would be minimized, where feasible. If Alternative WSJ-3a connects to Option DEL-2b, there would be a multi-year full closure of Southwest Genesee Street between Fauntleroy Way Southwest and 37th Avenue Southwest.

The closures of the non-arterial roadways (36th Avenue Southwest, 41st Avenue Southwest, and Southwest Edmunds Street) would create localized traffic diversions that could be adequately accommodated within the adjacent street system. Fauntleroy Way Southwest would also have a short-term partial closure at the Avalon Station adding to localized peak hour congestion at this location. The construction effects of Option WSJ-3b would be similar those described for Alternative WSJ-3a, except that the closures of non-arterial roadways would be along 42nd Avenue Southwest instead of along 41st Avenue Southwest.

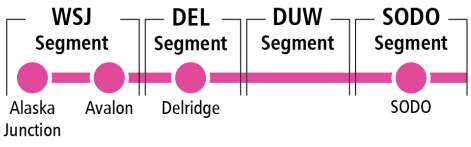
The construction closures described for Alternative WSJ-4 would be similar Alternative WSJ-3a; however, the partial closure of Fauntleroy Way Southwest would be short term, the 35th Avenue Southwest full closure would be nights and weekends only, and the local 36th Avenue Southwest full closure would be short term. Alternative WSJ-5a would have similar construction effects as Preferred Option WSJ-5b.

With Alternative WSJ-6, there would be a full closure of 41st Avenue Southwest, which would create localized traffic diversions that could be adequately handled within the adjacent street system. Southwest Alaska Street at 41st Avenue Southwest would be partially closed for several months during the construction of the cut-and-cover Alaska Junction Station, although traffic along Southwest Alaska Street could be maintained.

3.11.5.2 Transit

See Table 3-14 for details on key construction roadway facility closures in the West Seattle Junction Segment.

Construction of Preferred Option WSJ-5b, Alternative WSJ-3a, Option WSJ-3b, and Alternative WSJ-5a would affect Route 21X that would need to divert around the closure of 35th Avenue Southwest between Fauntleroy Way Southwest and Southwest Avalon Way. Traffic congestion caused by this closure could also affect speed and reliability of routes on 35th Avenue Southwest south of Southwest Avalon Way and routes on Southwest Avalon Way, affecting 20 to 25 peak hour bus trips.



WSJ-1 would not require any long-term or major short-term closures of streets that have transit routes and so would have minimal effects on transit operations. With Alternative WSJ-2, Southwest Alaska Street between 38th Avenue Southwest and Fauntleroy Way Southwest would be closed for 3 years. This would require rerouting several Metro routes, including the RapidRide C Line, to bypass this closure, which would affect 35 to 40 peak hour bus trips. These routes could be rerouted to Fauntleroy Way Southwest, but this would reduce overall service levels on 35th Avenue Southwest.

3.11.5.3 Parking

In addition to the parking spaces that would be permanently removed, Preferred Option WSJ-5b would temporarily remove an additional 190 to 260 on-street parking spaces, including 165 to 225 spaces along 41st Avenue Southwest and 25 to 35 spaces along 37th Avenue Southwest. Construction activities would not remove public off-street parking. During construction, up to two Disabled Parking Spaces, one General Load Zone space, and two Passenger Load Zone spaces would be temporarily removed.

Alternative WSJ-1 could temporarily remove up to 135 on-street parking spaces during construction. Alternative WSJ-2 could temporarily remove up to 95 on-street space and Alternative WSJ-3a could remove up to 245 parking spaces during construction. Option WSJ-3b could remove up to 110 parking spaces during construction. Alternative WSJ-4 could remove up to 130 spaces during construction. Alternative WSJ-5a could remove up to 260 spaces, and Alternative WSJ-6 could remove up to 225 spaces. Construction activities would not remove public off-street parking with any of these alternatives. During construction, these alternatives would remove between 2 and 11 special-use spaces.

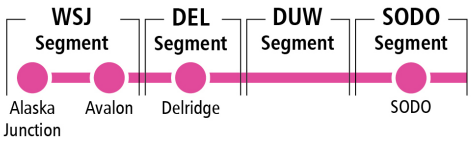
3.11.5.4 Non-motorized Facilities

See Table 3-14 for details on key construction roadway facility closures in the West Seattle Junction Segment.

Preferred Option WSJ-5b would close 35th Avenue Southwest between Fauntleroy Way Southwest and Southwest Avalon Way for 1 year during construction, during which time pedestrians could detour to Fauntleroy Way Southwest. Construction would be phased such that the 35th Avenue Southwest closure would not coincide with closures at the Fauntleroy Way Southwest and Southwest Avalon Way intersection, and partial closures of the intersection pedestrian crossings would be phased.

From north of Southwest Alaska Street to Southwest Hudson Street, 41st Avenue Southwest would also be closed during construction of Preferred Option WSJ-5b. Pedestrians would detour to either 40th Avenue Southwest or 42nd Avenue Southwest. The staircases along Southwest Hudson Street on either side of 41st Avenue Southwest would be closed during construction. Pedestrians could detour to Southwest Dawson Street to the south.

Alternative WSJ-1, Alternative WSJ-2, Alternative WSJ-3a, and Option WSJ-3b would close 36th Avenue Southwest from Fauntleroy Way Southwest to Southwest Genesee Street. Pedestrians would detour approximately 130 feet to the northeast, where Southwest Genesee Street and Fauntleroy Way Southwest meet. Alternative WSJ-2 would close portions of Southwest Alaska Street and 39th Avenue Southwest, which would temporarily close pedestrian and bicycle access along the roadway, including a westbound bike lane. Pedestrians and bicyclists would likely not be allowed on Southwest Alaska Street for several months due to the type of construction activities. For the remaining construction period, the sidewalk could be maintained on at least one side of the street. During the periods when pedestrians are not allowed on Southwest Alaska Street, the nearest alternate route would be 38th Avenue Southwest and Fauntleroy Way Southwest.



Alternative WSJ-3a, Option WSJ-3b, and Alternative WSJ-5a would close portions of 35th Avenue Southwest for varying durations. Because there are no parallel routes to the east, pedestrians and bicycles could use either 36th Avenue Southwest (with Alternative WSJ-5a) or 37th Avenue Southwest (with Alternative WSJ-3a and Option WSJ-3b) as an alternate route.

Alternatives WSJ-3a, WSJ-4, WSJ-5a, and WSJ-6 would close the staircases along Southwest Hudson Street on either side of 41st Avenue Southwest during construction. With Option WSJ-3b, Southwest Hudson Street would be closed to pedestrians and bicycles at 42nd Avenue Southwest.

3.11.5.5 Safety

Preferred Option WSJ-5b would require the full closure of 35th Avenue Southwest. This would divert traffic to Southwest Alaska Street and Southwest Avalon Way, which would substantially increase the number of left turns. It would also cause the 35th Avenue South and Southwest Avalon Way intersection to become a three-leg intersection during construction. The impact to safety is expected to be minimal due to sufficient pedestrian facility and roadway capacity. The intersection of Fauntleroy Way Southwest and Southwest Avalon Way would experience partial closures that would be phased to avoid coinciding with the closure of 35th Avenue Southwest. With appropriate signing, destination guidance, and detour communications, the detour is not expected to substantially impact safety. Multi-year full closures would occur on 41st Avenue Southwest and the staircases along Southwest Hudson Street on either side of 41st Avenue Southwest. Pedestrians would detour to similar sidewalk facilities. These detours would be likely to have minimal impacts on vehicular and non-motorized safety.

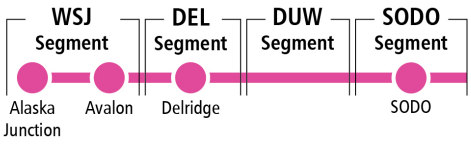
Alternatives WSJ-1, WSJ-2, and WSJ-3a; Option WSJ-3b; and Alternatives WSJ-4, WSJ-5a, and WSJ-6 would require multi-year, full, or partial closures of roadways in the station area, including differing closure combinations of 35th Avenue Southwest, 36th Avenue Southwest, 41st Avenue Southwest, 42nd Avenue Southwest, Fauntleroy Way Southwest, Southwest Alaska Street, and Southwest Genesee Street. In most cases, impacts to safety are expected to be minimal because alternative routes with similar safety profiles would be provided. Some rerouted traffic may experience an increase in potential conflicts. See Appendix N.1, Section 7.3.2.2, for more details.

3.11.5.6 Freight Mobility and Access

See Table 3-14 for details on key construction roadway facility closures in the West Seattle Junction Segment. Preferred Option WSJ-5b would require a partial closure of the intersection at Fauntleroy Way Southwest and Southwest Avalon Way. Both of these streets are part of the City of Seattle's Over-Legal Network; Fauntleroy Way Southwest is a Major Truck Street and Southwest Avalon Way is a Minor Truck Street.

Alternatives WSJ-1, WSJ-2, and WSJ-4 would require a full closure on Fauntleroy Way Southwest on nights and weekends. Alternative WSJ-3a and Option WSJ-3b would require a partial closure of Fauntleroy Way Southwest for over a year. Alternative WSJ-6 would not affect any truck streets.

Preferred Option WSJ-5b would affect one General Load Zone on 41st Avenue Southwest. The other Build Alternatives would affect between one and three load zones.



3.11.6 Mitigation for Construction Impacts

The following sections describe mitigation measures specific to each transportation element that could be affected by construction. Across all modes of travel and with any Build Alternative, Sound Transit would coordinate with the City of Seattle, Metro, the Port of Seattle, Northwest Seaport Alliance, and WSDOT on the construction schedule and sequencing to minimize major construction work on overlapping corridors at the same time.

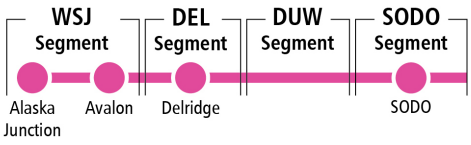
3.11.6.1 Arterial and Local Street Operations

3.11.6.1.1 Mitigation for All Build Alternatives

Sound Transit would develop a Construction Access and Traffic Management Plan for the project for whichever Build Alternative is selected. The plan would be developed as the project advances and include the overarching goals and objectives for the project's construction and the approach to partner agency coordination. It would include applicable mitigation commitments to be built by Sound Transit, finalized as part of the environmental documentation, as well as additional detail reflecting continued design for the project after this Final EIS. Components likely to be addressed in detail include maintaining business access; minimizing construction disruption during large events; providing alternate routes for freight, general traffic, and non-motorized access; parking management; pavement restoration as appropriate; and maintaining transit operations (bus and light rail).

Potential construction mitigation measures would be consistent with the applicable City requirements and would be finalized during permitting. Sound Transit would prepare traffic control plans and acquire the necessary permits during subsequent design phases to coordinate on how all modes of transportation would be maintained and address pedestrian and bicycle access and safety. Mitigation measures would follow the *Manual on Uniform Traffic Control Devices for Streets and Highways* (Federal Highway Administration 2009) and the City of Seattle *Traffic Control Manual* (City of Seattle 2012) for maintenance of traffic plans. Potential measures to minimize construction traffic impacts could include the following practices and would apply to all Build Alternatives:

- Install advance warning signs and highly-visible construction barriers and use flaggers where needed.
- Consider a variety of traffic and travel demand management strategies, such as supporting employer incentives or programs to use transit.
- Clearly sign and provide detour routes when streets are fully or partially closed. The contractor would be required to keep nearby parallel facilities open to facilitate access and mobility.
- For extended closures requiring substantial traffic detours, Sound Transit would coordinate with the City of Seattle to consider temporary physical treatments such as roadway rechannelization, traffic signals, and transit priority treatments.
- 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.



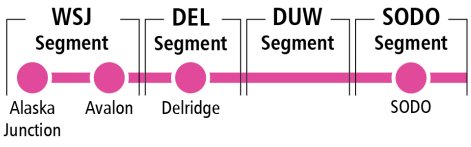
- Coordinate access closures with affected businesses and residents. If access closures are required, property access to residences and businesses would be maintained to the extent possible. If access to the property cannot be maintained, the specific construction activity would be reviewed to determine if it could occur during non-business hours, or if the parking and users of this access (e.g., deliveries) could be accommodated 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 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. In addition, closures of parallel arterials or access points would be coordinated with the goal of avoiding simultaneous closures.
- Cover potholes and open trenches, where possible, and use protective barriers to protect drivers from open trenches.
- To minimize potential freight impacts, coordinate with affected businesses throughout the construction period to notify them of lane and access closures and maintain business access as much as possible.
- Provide construction information to WSDOT for use in the state's freight notification system when construction activities could affect state facilities, such as State Route 99. Sound Transit would provide information in the format required by WSDOT.
- Coordinate with the City of Seattle and other relevant agencies to disseminate construction closure information to the public.

The above mitigation measures could decrease vehicle demand, particularly peak hour demand, through the project construction areas. The travel demand management strategies would help to mitigate the traffic operations impacts expected during construction. In addition to the measures described above that apply to all Build Alternatives, the following section describes mitigation measures that are being considered for specific locations expected to be impacted by the preferred alternative. Although the discussion here reflects the construction closures expected with the preferred alternative, the types of measures would also apply to other alternatives, for example, signal timing revisions, lane reconfigurations, and transit treatments such as queue jumps.

3.11.6.1.2 Mitigation for the Preferred Alternative

SODO and Duwamish Segments

For Construction Scenario 1, a potential measure to minimize construction traffic impacts for buses could include constructing a northbound transit queue jump at 4th Avenue South/South Holgate Street and a southbound transit queue jump at 4th Avenue South/South Lander Street. The transit queue jumps could reduce transit travel time by about 30 seconds, and result in up to 30 seconds of delay for vehicle and freight travel times along 4th Avenue South. The impact to 6th Avenue South/South Spokane Street could be mitigated with signal timing revisions.



For Construction Scenario 2, the existing northbound bus stop just north of South Spokane Street was assumed to shift to a near-side stop in the northbound right-turn lane approaching the intersection, with a transit queue jump so that buses would not have to merge back into the through lanes. With this transit treatment in place, travel times along 4th Avenue South for vehicles, freight, and transit would be similar to no build conditions, and no additional mitigation would be required.

Delridge Segment

No location-specific construction impacts are expected with Preferred Option DEL-6b; therefore, no mitigation measures are identified.

West Seattle Junction Segment

The construction analysis described in Section 3.11.5.1 incorporates a variety of lane configuration and signal timing measures to improve traffic flow and minimize delay during the roadway closures required for Preferred Option WSJ-5b (refer to Section 4.3.3.5 of Appendix N.1 for more information). As the project advances, Sound Transit will continue to refine its construction approach and seek ways to limit impacts on traffic operations. There are no additional location-specific mitigation measures identified at this time beyond those already included in the analysis.

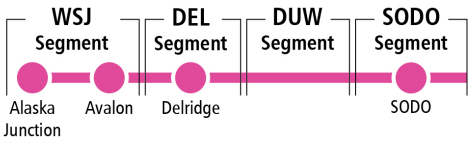
3.11.6.2 Transit

Sound Transit would coordinate with Metro, City of Seattle, and FTA, where appropriate, to identify and agree to bus service and associated infrastructure modifications and transit facility improvements that maintain transit service and access through construction areas. This would include continuing to coordinate on construction-related impacts to Metro's transit operations to determine the potential mitigation required, as many of the alternatives would close roadways served by transit and restrict access to transit facilities for varying durations. Sound Transit would implement agreed-upon improvements that mitigate impacts directly associated with the project.

Sound Transit would maintain access to existing bus stops, layover areas, and comfort stations to the extent feasible and coordinate with Metro and the City of Seattle to minimize impacts and disruptions. Where needed, this coordination would include other transit operators. Where bus stops, layover, and comfort stations could not be maintained in existing locations, Sound Transit would provide temporary facilities to maintain service and access. Information would be communicated to riders in advance of construction at these locations.

Sound Transit would maintain non-motorized access to transit, where feasible, through construction areas, such as providing dedicated walkways or alternative bike facilities around the construction area. Where non-motorized access could not be maintained through construction areas, Sound Transit would provide temporary non-motorized facilities to maintain access to transit. Sound Transit would also notify the public of any closures. Refer to Section 3.11.6.1 for more information on measures to minimize impacts related to road closures and detours that would also reduce bus service disruptions.

Construction-related transit service impacts, such as the SODO Busway closure (whether permanent or temporary) with all SODO Segment alternatives, as well as other transit pathway closures identified in this Final EIS, would be coordinated with Metro, the City of Seattle, and other relevant service providers. Sound Transit would coordinate with the City of Seattle, Metro, and other agencies as necessary to develop a transit operations plan for construction-related closures to transit pathways. These transit operations plans would identify bus detour routes and minimize impacts and disruptions to bus facilities and service performance and hours



during project construction. This would include identifying associated improvements needed to implement these service and facility modifications, such as speed and reliability treatments (for example, new transit lanes and transit signal priority). Sound Transit would continue to coordinate with the City of Seattle and Metro during final design to finalize a construction transit operations plan that would define specific transit reroutes and identify agreed-upon speed and reliability improvements, bus stop modifications, temporary layover and comfort stations, and pavement management plans.

Sound Transit is committed to maintaining the regional transit access provided by the SODO Station. Mitigation measures to maintain this access are still being identified by Sound Transit and agency partners, but could include the following:

- Study the feasibility of building an interim station/platforms in the vicinity of the existing SODO Station with connections to transit routes on 4th Avenue South and South Lander Street. Key factors that require further study are whether there are adequate access routes to an interim station given the construction in the area and the operations/regulatory considerations to build and operate an interim station.
- Implement a transit shuttle between the SODO Station area and Stadium Station.
- Work with Metro to adjust routing of buses near the SODO Station to provide a convenient connection from the SODO Station area to an adjacent Link 1 Line station (Stadium and/or Beacon Hill stations).

3.11.6.3 Parking

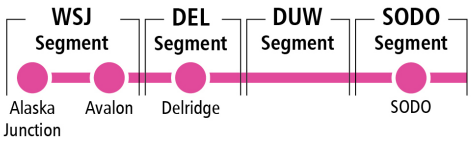
Through the permit process, Sound Transit would coordinate with the City of Seattle on measures to address temporary curbside management and project parking impacts during construction, in conjunction with the other infrastructure and development projects in the study area. This would include temporarily relocating affected Americans with Disabilities Act stalls or load zones that would continue to serve adjacent land uses. Increased bus service (such as bus bridges) implemented as mitigation for interruptions to transit service during construction could affect parking supply and would be coordinated with the City of Seattle and other relevant parties.

Sound Transit would work with owners and operators of garages where parking could be removed or where ingress or egress could be blocked during construction.

Sound Transit would prohibit construction worker parking on city streets outside of the staging areas and require the contractor to develop a Parking Plan describing where construction worker parking would be allowed.

3.11.6.4 Non-motorized Facilities

When non-motorized facilities such as sidewalks and bicycle lanes must be temporarily closed for construction, Sound Transit would provide marked detours, such as dedicated walkways and alternate bicycle routes that may include treatments such as pedestrian and bicycle signals, signal optimization including leading pedestrian intervals, crosswalks, curb bulbs, rectangular rapid flashing beacons, pavement markings, and temporary signals. Where possible, temporary facilities would be designed to applicable design standards such as Seattle Streets Illustrated (City of Seattle 2020), Standard Plans for Municipal Construction (City of Seattle 2023), or as agreed to by the City of Seattle; at minimum, they would comply with Americans with Disabilities Act requirements. If maintaining a facility is not feasible, Sound Transit would work with the City of Seattle to develop and implement a construction management plan to provide alternate facilities that, to the extent feasible, offer a similar level of protection and comfort. As design progresses, these detours will be refined in coordination with the City of Seattle.



3.11.6.5 Safety

During construction, Sound Transit would develop a Maintenance of Traffic Plan to adhere to federal and local agency guidelines. The Maintenance of Traffic Plan would be created to minimize safety concerns on the transportation system during construction. The mitigation proposed in Section 3.11.6.2 for transit and Section 3.11.6.4 for non-motorized facilities would also be implemented to maximize safety. Therefore, no additional safety-related mitigation measures for the construction period are anticipated to be necessary.

3.11.6.6 Navigation

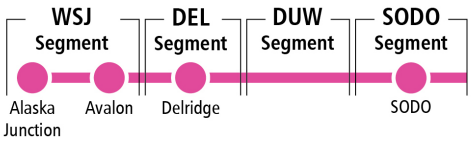
The FTA, in coordination with Sound Transit, will continue government-to-government consultation with the Muckleshoot Indian Tribe and the Suquamish Tribe to avoid or minimize impacts to Tribal treaty-protected fishing rights and access to Usual and Accustomed Areas during construction.

Sound Transit would develop a construction navigation management plan in consultation with the United States Coast Guard, United States Army Corps of Engineers, and Port of Seattle to mitigate impacts to navigation during construction. Measures in the plan could include the following:

- Create a marine safety zone (to be approved by the United States Coast Guard and Army Corps of Engineers) to help motorized and non-motorized waterway users pass through the Harbor Island Reach and East Waterway construction zones.
- Provide a safe and easily recognizable path for non-motorized waterway users through the marine safety zone.
- Set up the marine safety zone so all construction features or potential obstacles can be seen during inclement weather.
- Coordinate with maritime stakeholders and emergency service providers and conduct construction outreach prior to and throughout construction at key milestones or phases where navigation conditions could change.
- Schedule navigation channel restrictions during a time of day or a day of the week with less vessel traffic.
- Coordinate all maritime operations with the United States Coast Guard, Army Corps of Engineers, Puget Sound Vessel Traffic Services, Puget Sound Harbor Safety Committee, and local mariners and advertise all changes to maritime operations in the Local Notice to Mariners publication.

3.11.6.7 Freight Mobility and Access

Prior to construction activities that fully or partially close a Major or Minor Truck Street, Sound Transit would work with the City of Seattle to accommodate truck turning maneuvers or identify detour routes suitable for trucks. Construction activities that would affect the City of Seattle's Over-Legal Network, including Southwest Avalon Way and Fauntleroy Way Southwest, would be coordinated with the City of Seattle to identify construction management measures that would maintain an envelope to accommodate oversized trucks during construction or to identify suitable alternative routes that would be defined prior to freight movements as part of the City's over-legal permit process.



Sound Transit would coordinate with the BNSF Railway and Union Pacific Railroad prior to construction over rail tracks or ground improvements for guideway columns close to the rail tracks. To the extent feasible, construction activities would adhere to schedule and minimum clearance requirements as agreed to by Sound Transit and BNSF Railway.

Sound Transit would work with the Port of Seattle and Northwest Seaport Alliance to identify construction management measures to maintain adequate port terminal access and operations along its primary drayage routes between the marine and rail terminals. For Preferred Alternative DUW-1a and Option DUW-1b, this could include identifying alternative routes for trucks if construction closures affect access or drayage routes along South Spokane Street. In addition, for Alternative DUW-2, measures could include ensuring adequate terminal driveway widths and restricting some construction activities to times of day when the terminals have low or no gate activity. At a broader level, Sound Transit would coordinate with the Port of Seattle and Northwest Seaport Alliance on the construction schedule and sequencing to minimize major construction work on key freight corridors at the same time.

For locations where truck-only load zones, commercial load zones, or general load zones would be eliminated but businesses that rely on them remain, Sound Transit would coordinate with the City of Seattle to relocate these commercial load zones. For Alternative DUW-2, Sound Transit would work with the Port of Seattle to provide temporary truck parking to replace parking affected by construction activities on Terminal 25.

3.12 Indirect Impacts

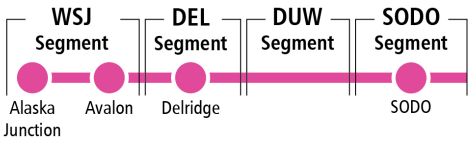
This section presents the project's indirect and secondary transportation impacts beyond those described in previous sections. See Section 4.3, Economics, for discussion of indirect effects to maritime businesses.

3.12.1 Regional Travel

The completion of the West Seattle Link Extension would provide reliable light rail service between West Seattle and the region's major urban centers, including Downtown Seattle. Light rail service could help facilitate further increases in residential and employment uses around the stations beyond what is assumed for the Final EIS. This could lead to changes in regional and local travel patterns as trips to and from these areas increase for all travel modes, affecting transit, local and regional traffic volumes, parking demand, and non-motorized users.

3.12.2 Transit Service and Operations

Beyond the future conceptual bus service plan assumed for each Build Alternative, other changes in transit service within the project corridor that are not yet planned or anticipated in response to the project could also result in shifts in ridership. For instance, Metro could redeploy or reinvest in bus service that would be replaced by light rail service above what has been assumed in this Final EIS.



Investments in high-capacity transit service can attract higher density residential and commercial land uses around stations; this is known as TOD. The population and employment projections used in Sound Transit's ridership forecasting model (Puget Sound Regional Council's 2014 Land Use Targets) forecast substantial population and employment growth around project stations. Because the ridership model already accounts for this potential TOD, ridership is not expected to exceed the forecasts presented in this Final EIS. Passenger load forecasts (see Section 3.4.3) indicate sufficient capacity on the project and other routes in the corridor, so overcrowding is unlikely.

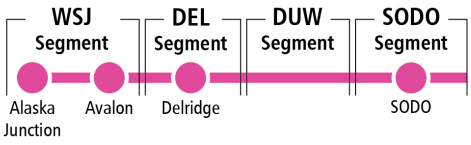
3.12.3 Arterial and Local Street Operations, Freight, Parking, Non-motorized Facilities, and Safety

TOD around project stations has the potential to increase automobile and parking demand as well as non-motorized trips to and from the station areas. An increase in volumes would have the potential to cause additional impacts on the transportation network, such as increased hide-and-ride parking activity, sidewalk crowding, and intersection delay. Since this growth was incorporated into the ridership modeling performed for this Final EIS, any associated impacts are already reflected in the applicable modal analysis. The non-motorized analysis (see Section 3.7) indicates that all adjacent sidewalks, crosswalks, and corners have ample capacity under future conditions, and potential long-term impacts to intersection L.O.S. are disclosed in Section 3.5. Hide-and-ride impacts are not anticipated in station areas, as Sound Transit would work with the City of Seattle to implement curb use management where it does not already exist, but the demand for parking more than 0.25 mile from the stations could increase because riders could park along feeder bus routes and travel to the station by bus. With respect to 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).

3.12.4 Mitigation for Indirect Impacts

No mitigation for indirect impacts is proposed. The potential direct impacts identified in the previous sections are consistent with City of Seattle and regional comprehensive planning, which promotes higher density, mixed-use development around transit services. Development around project stations would encourage the use of non-single-occupancy vehicle modes (transit, walking, and bicycling), which could reduce traffic volumes and air pollution, improve access and mobility, and create health benefits.

Some transit riders could be affected if local transit agencies make additional changes to the bus system beyond the previously identified bus integration plans, or if ridership were to surpass expectations. The project would provide a substantial increase in transit service to the area, which would create the opportunity to reinvest duplicative bus service hours to accommodate this demand.



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