

Appendix C

Transportation Technical Report

Transportation Technical Report

Lakewood Station Access Improvements Project AE 0145-17 LSAI 02.02

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Acronyms and Abbreviations

| | |
|-------|---|
| ADA | Americans with Disabilities Act |
| HCM | Highway Capacity Manual |
| ITE | Institute of Transportation Engineers |
| JBLM | Joint Base Lewis-McChord |
| LOS | Level of service |
| MUTCD | Manual on Uniform Traffic Control Devices |
| MPH | Miles per Hour |
| N/A | Not applicable |
| OWSC | One-way stop control |
| PHB | Pedestrian hybrid beacon |
| ROW | Right-of-way |
| RRFB | Rectangular Rapid Flashing Beacon |
| SEPA | State Environmental Policy Act |
| v/c | Volume to capacity |
| WSDOT | Washington State Department of Transportation |

1 INTRODUCTION

This Lakewood Station Access Improvements Project - Transportation Technical Report summarizes the transportation analysis performed to support documentation of the impacts of the Lakewood Station Access Improvements as described in the project's State Environmental Policy Act (SEPA) checklist.

2 PROJECT BACKGROUND

The improvements included in the Build Alternative are a result of the alternative analysis conducted in Phase 1 of the Lakewood Station Access Improvements Project (the project) and are documented in the Phase 1 Lakewood Station Access Improvements Report (Sound Transit, 2021) (Phase 1 Report). The Phase 1 analysis identified two tiers of projects identified as Potential Improvements (herein titled Priority 1) and Possible Alternates (herein titled Priority 2).

The alternatives analysis prioritized projects based on a set of criteria documented in the Phase 1 report. Three key criteria were used to identify Priority 1 and Priority 2 projects. These criteria were:

- Improves connections for underserved communities.
- Addresses a substantial travel barrier.
- Located within proximity of the station.

For the purposes of the environmental analysis, all Priority 1 and Priority 2 projects are included in the Build Alternative.

3 TRANSPORTATION STUDY AREA

This transportation technical report includes a summary of the transportation facilities that serve the Lakewood Station as well as transportation facilities that are in or cross the project vicinity shown in the study area map (Figure 3-1). This includes the area bounded by Gravelly Lake Drive to the west, 47th Avenue SW and Lakeview Avenue SW to the east, McChord Drive SW to the south, and 108th Street SW to the north.

The improvements associated with the project are located throughout the greater Lakewood area, as shown in Figure 3-1 and described in Table 3-1. The study area boundaries incorporate all of the project improvements.

The majority of the improvements included in the project would provide sidewalks and bicycle lanes, and improve access between local destinations (including residences, businesses, and schools), bus stops, or the Lakewood Station. The improvements would not use any water or air transportation services.

A limited number of improvements have the potential to increase traffic volume or travel delay. These projects include:

- Surface parking lot adjacent to the Lakewood Station.
- New pedestrian and bicycle signals at Bridgeport Way SW/115th Street Court SW and Bridgeport Way SW/Seattle Avenue SW.

To address potential changes in traffic volume or travel delay resulting from these improvements, the study intersections shown in Figure 3-2 were analyzed and the impacts documented in this report. These intersections include:

- Bridgeport Way SW/115th Street Court SW.
- Pacific Highway SW/Bridgeport Way SW.
- Pacific Highway SW/47th Avenue SW.
- Bridgeport Way SW/Seattle Avenue SW.
- Pacific Highway SW/Lakewood Station Garage Access.

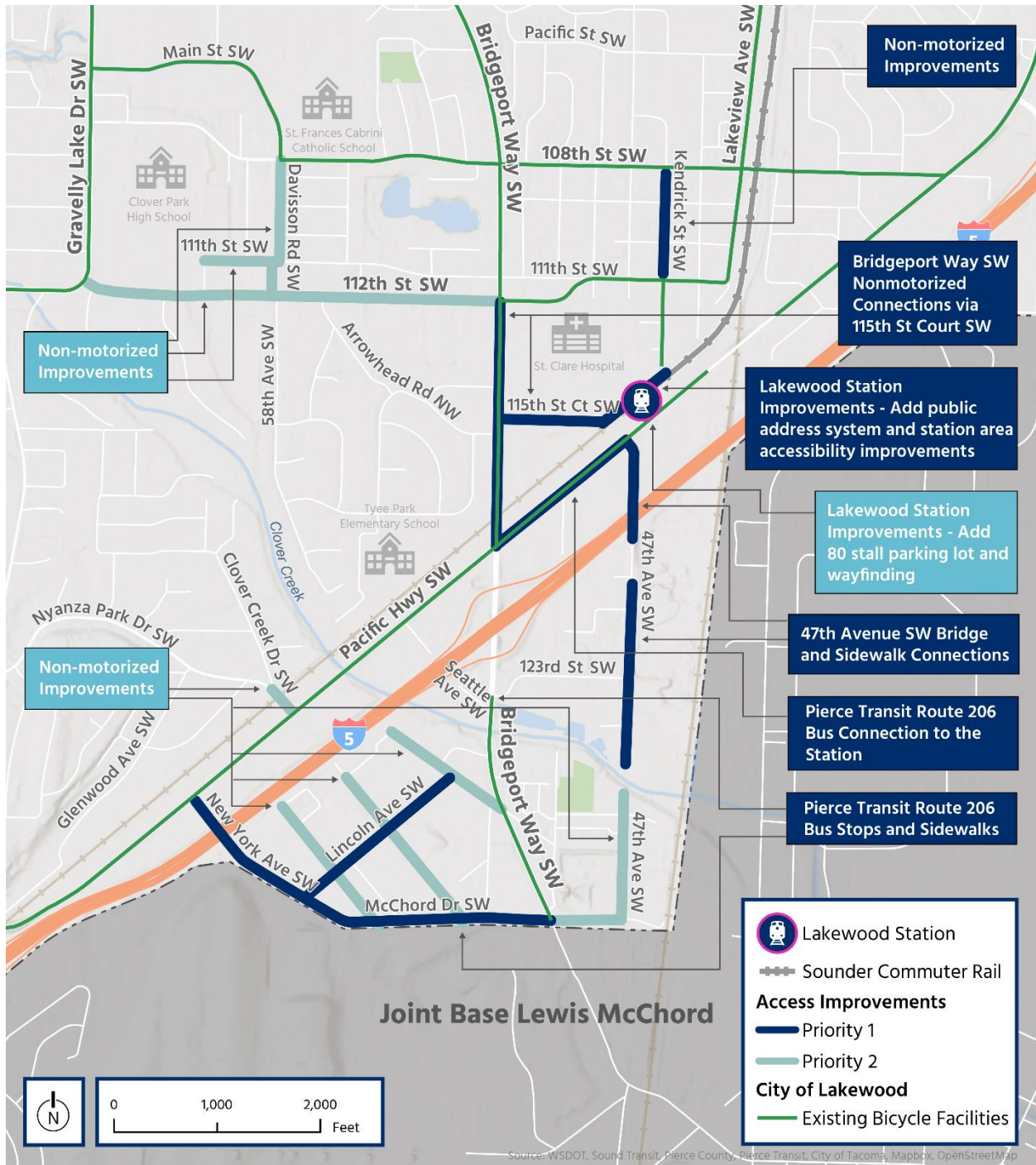


Figure 3-1 Study area

Table 3-1 Build Alternative project improvements

| Description (Project Number per Phase 1 Report) |
|--|
| <p>Bridgeport Way SW Non-Motorized Connections via 115th Street Court SW (Priority 1) Add sharrows,¹ sidewalk (north side) on 115th Street Court SW and add a shared use path to the station (A8, D6) Add pedestrian signal across Bridgeport Way SW and bus stop improvements (A20, B5, B6) Improve station fencing (C1)</p> |
| <p>Pierce Transit Route 206 Bus Stops and Sidewalks (Priority 1) Complete sidewalks and crosswalks on New York Avenue SW/McChord Drive SW and Lincoln Avenue SW to access Route 206 bus stops (A14, A34) Add a pedestrian signal across Bridgeport Way SW at Seattle Avenue SW adjacent to Route 206 bus stops (A23) Improve bus stop amenities (add bench, add shelter in some locations) (B4, B12 – B16, B19, B20)</p> |
| <p>Pierce Transit Route 206 Bus Connection to the Station (Priority 1) Widen the turn radius from southbound Pacific Highway S to northbound Bridgeport Way SW to facilitate Route 206 to access the station (B8)</p> |
| <p>47th Avenue SW Bridge and Sidewalk Connections (Priority 1) South of Interstate 5, provide sidewalks (westside) and sharrows on 47th Avenue SW between Clover Creek and 120th Street SW (A7) Across I-5 on the 47th Avenue SW bridge, provide sidewalk on the westside separated from travel lanes with a barrier and sharrows (A16.D) North of I-5, provide bicycle lane on the west side (southbound) and sharrows on the eastside (northbound) of 47th Avenue SW (A17)</p> |
| <p>Lakewood Station Improvements (Priority 1) Provide station area curb ramp retrofits (A41), shelter retrofits to provide overhead shelter at the mini-high (B17), public address system (E1), retrofit the station stairs (E2), bird deterrent retrofit (E4), and station area accessibility for sight impaired (E5)</p> |
| <p>Kendrick Street SW Improvements (Priority 1) Add sidewalks and bicycle lanes on Kendrick Street SW between 111th Street SW and 108th Street SW (A12)</p> |
| <p>Non-motorized Improvements (Priority 2) Add sidewalks and bike lanes on 112th Street SW (A10) Add sidewalks on 47th Avenue SW/McChord Drive (A18) Add bike lanes on Davisson Road SW (A29) Add sidewalks and bike lanes on 111th Street SW and Davisson Rd SW near Clover Park High School (A30) Add sidewalks on Chicago Avenue SW and Boston Avenue SW (A35, A36) Add sidewalks on San Francisco Avenue SW (A37) Add sidewalks and railroad crossing arms or gates for pedestrians at the Clover Creek Drive SW crossing of the railroad tracks (A39)</p> |
| <p>Lakewood Station Improvements (Priority 2) Add an 80-stall surface parking lot northeast of the current garage (D8.B) Wayfinding to pickup/drop-off areas (E3)</p> |

Notes:

- (1) Sharrows are painted markings on the roadway with two V-shapes and a bicycle. The markings indicate that the roadway is shared by motorists and bicyclists.

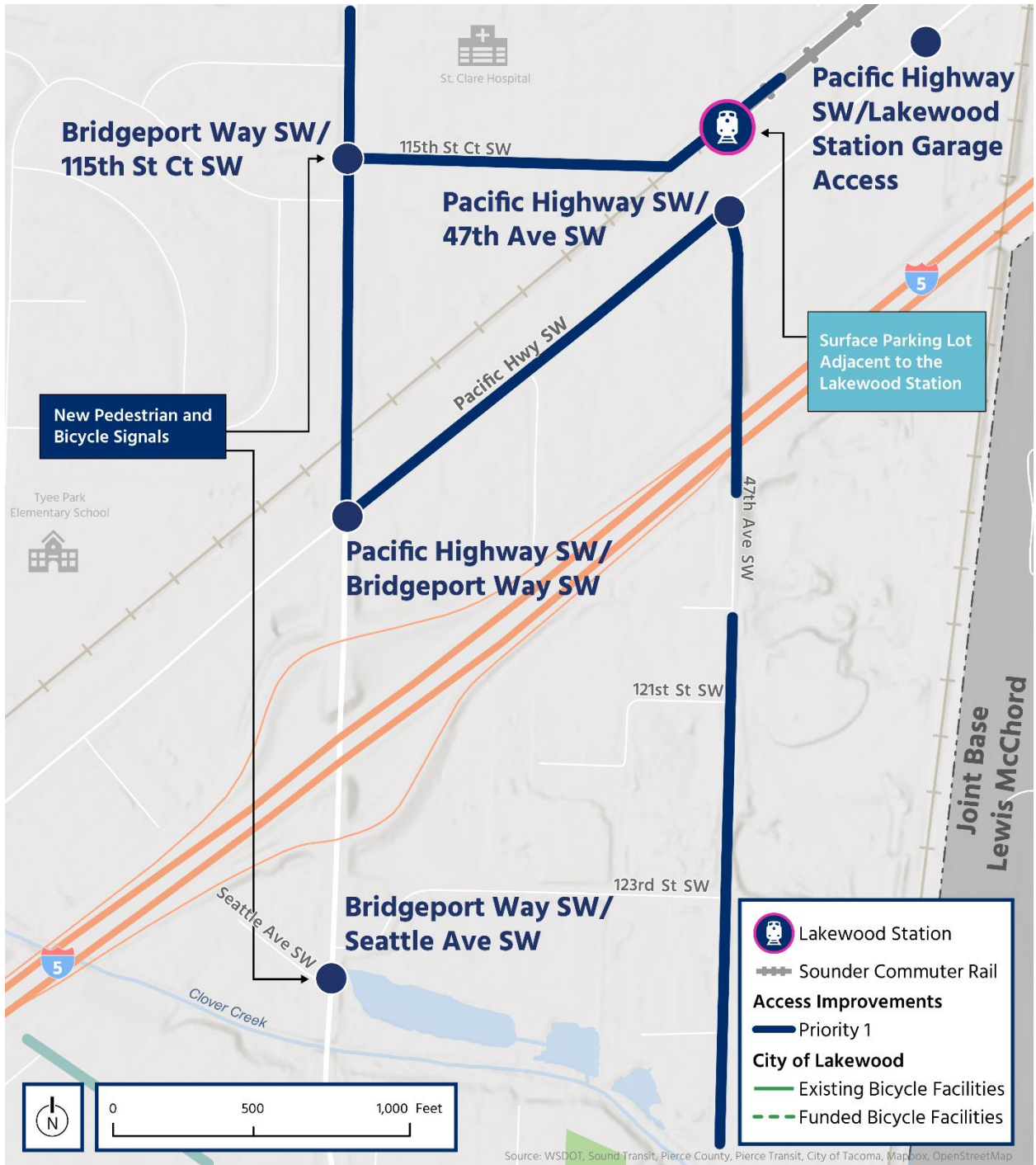


Figure 3-2 Transportation study intersections

4 EXISTING CONDITIONS

This chapter highlights the transportation network serving the Lakewood Station area, including:

- Pedestrian facilities (sidewalks and shared use paths).
- Bicycle facilities (bike lanes, sharrows, and shared use paths).
- Transit services and facilities (bus stops, transit routes, and transit and Lakewood station).
- Roadways/vehicle access.
- Parking.

4.1 Station area mode of access

Sound Transit’s 2019 System Access Strategic Plan Passenger Access Survey Report and March 2020 Lakewood Station Profile each present figures for how Sounder passengers access Lakewood Station, broken down by mode of transportation. These figures are summarized in Table 4-1 below and demonstrate that the station is primarily accessed by auto. As is described in the subsequent sections, accessing the Lakewood Station via other modes (walk, bicycle, and local transit) is difficult due to barriers or lack of direct travel routes.

Table 4-1 Lakewood Station existing mode of access summary

| Mode of Transportation | 2019 System Access Strategic Plan Passenger Access Survey Report | March 2020 Lakewood Station Profile (pre-Covid) |
|---|--|---|
| Walk/wheelchair | <2% | 8% |
| Bicycle | <2% | <1% |
| Transit transfer | 17% | 4% |
| Auto | 78% | 87% |
| <i>Drop-off</i> | 14% | 8% |
| <i>Parked (Drove alone/carpool/vanpool)</i> | 64% | 79% |
| Other ¹ | <2% | Not measured |

Source(s):

Sound Transit’s 2019 System Access Strategic Plan Passenger Access Survey Report

Sound Transit’s March 2020 Lakewood Station Profile

Note: (1) Other is not defined in source documents

4.2 Non-motorized network

The following describes the pedestrian and bicycle network in the Lakewood Station area.

4.2.1 Pedestrian network

Today, pedestrian access to Lakewood Station occurs on the station’s southeastern frontage along Pacific Highway SW while three signalized intersections along the station frontage (parking garage driveway, north bus terminal driveway, and south bus terminal driveway/47th Avenue SW) provide opportunities for pedestrians to cross Pacific Highway SW. A pedestrian plaza is also located on the northwest side of the Sounder tracks at Kendrick Street SW, linking

to the station platform, bus terminal, and parking garage via a pedestrian bridge. At-grade sidewalk crossings of the Sounder tracks are present at Bridgeport Way SW to the southwest of the station and 108th Street SW to the northeast.

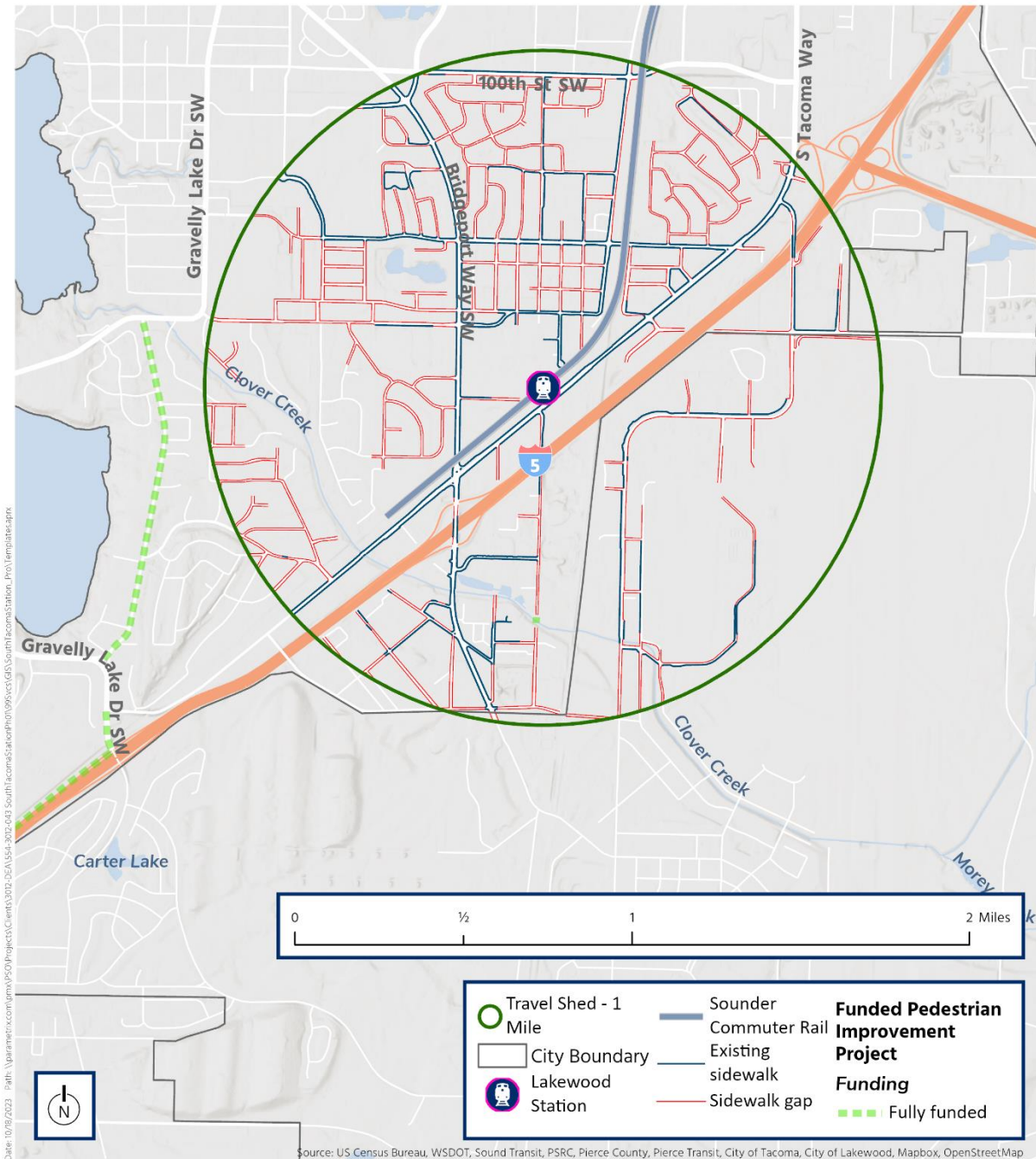


Figure 4-1 Pedestrian facilities

While the Lakewood Station pedestrian bridge provides direct access across the Sounder tracks to the north, pedestrian access is limited to and from locations immediately to the northwest of the station, such as St. Clare Hospital. Currently, accessing such locations would require

pedestrians to either travel southwest along Pacific Highway SW and then north along Bridgeport Way SW, or cross the pedestrian bridge north to Kendrick Street SW, then follow 111th Street SW and 112th Street SW to the west.

Key sidewalk gaps are present on Bridgeport Way SW and 47th Avenue SW as they cross I-5, while sidewalk gaps along 112th Street SW west of Bridgeport Way SW limit pedestrian access to neighborhoods west of the station. As shown in Figure 4-1, sidewalk gaps are present along the majority of non-arterial streets within the 1-mile pedestrian travel shed.

Within the 1-mile Lakewood Station pedestrian travel shed, sidewalks are present along most arterial and collector roadways, with the following exceptions:

- Bridgeport Way SW (both sides between I-5 southbound on/off ramps and I-5 overpass; west side between I-5 overpass and I-5 northbound on/off ramps).
- 47th Avenue SW (west side between Pacific Highway SW and I-5 overpass; both sides south of I-5 overpass).
- South Tacoma Way (west side between Pacific Highway SW and I-5 overpass; west side between I-5 overpass and 112th Street SW).
- 112th Street S (north side east of 34th Avenue S; south side east of South Tacoma Way).
- Wildaire Road SW (both sides west of Main Street SW/Davisson Road SW).
- 112th Street SW (both sides west of 55th Avenue SW; north side between Bridgeport Way SW and 55th Avenue SW; north side between Bridgeport Way SW and Addison Street SW; south side between Addison Street SW and Freiday Street SW).
- 111th Street SW (both sides between Freiday Street SW and Kendrick Street SW.)
- Lakeview Avenue SW (east side north of 108th Street SW).
- 100th Street SW (south side – most of the portion within the 1-mile travel shed).

The condition of curb ramps within the 1-mile pedestrian travel shed varies. Some intersections have curb ramps that are noncompliant with current Americans with Disabilities Act (ADA) standards while other intersections may have missing curb ramps.

4.2.2 Bicycle network

Bike lanes along Pacific Highway SW and South Tacoma Way provide direct access to Lakewood Station and locations to the northeast and southwest between 88th Street S and Gravelly Lake Drive SW, except for a short gap to the northeast of the station as Pacific Highway SW passes below the Burlington Northern Santa Fe Railway, BNSF right-of-way.

Bike lanes on Kendrick Street SW (south of 111th Street SW), 111th Street SW (Kendrick Street SW to Lakeview Avenue SW), and Lakeview Avenue SW (both sides from 111th Street SW to 108th Street SW and west side only between 108th Street SW and Steilacoom Boulevard SW) connect neighborhoods to the north of the station to the northern station entrance and pedestrian bridge. The bike lanes on Lakeview Avenue SW and Pacific Highway SW connect to bike lanes on 108th Street SW, which cross at-grade with the Sounder tracks to the northeast of the station. A project by the City of Lakewood and Sound Transit brought enhanced non-motorized facilities to 111th Street SW and 112th Street SW between Bridgeport Way SW and Kendrick Street SW and were completed in 2021.

Bicycle lanes are provided along Bridgeport Way SW to the west of Lakewood Station between McChord Drive SW and 123rd Street SW and shared lanes are provided between Pacific Highway SW and 75th Street W. The northern end of the shared-lane markings connect to bike lanes on Bridgeport Way SW that continue north into University Place.

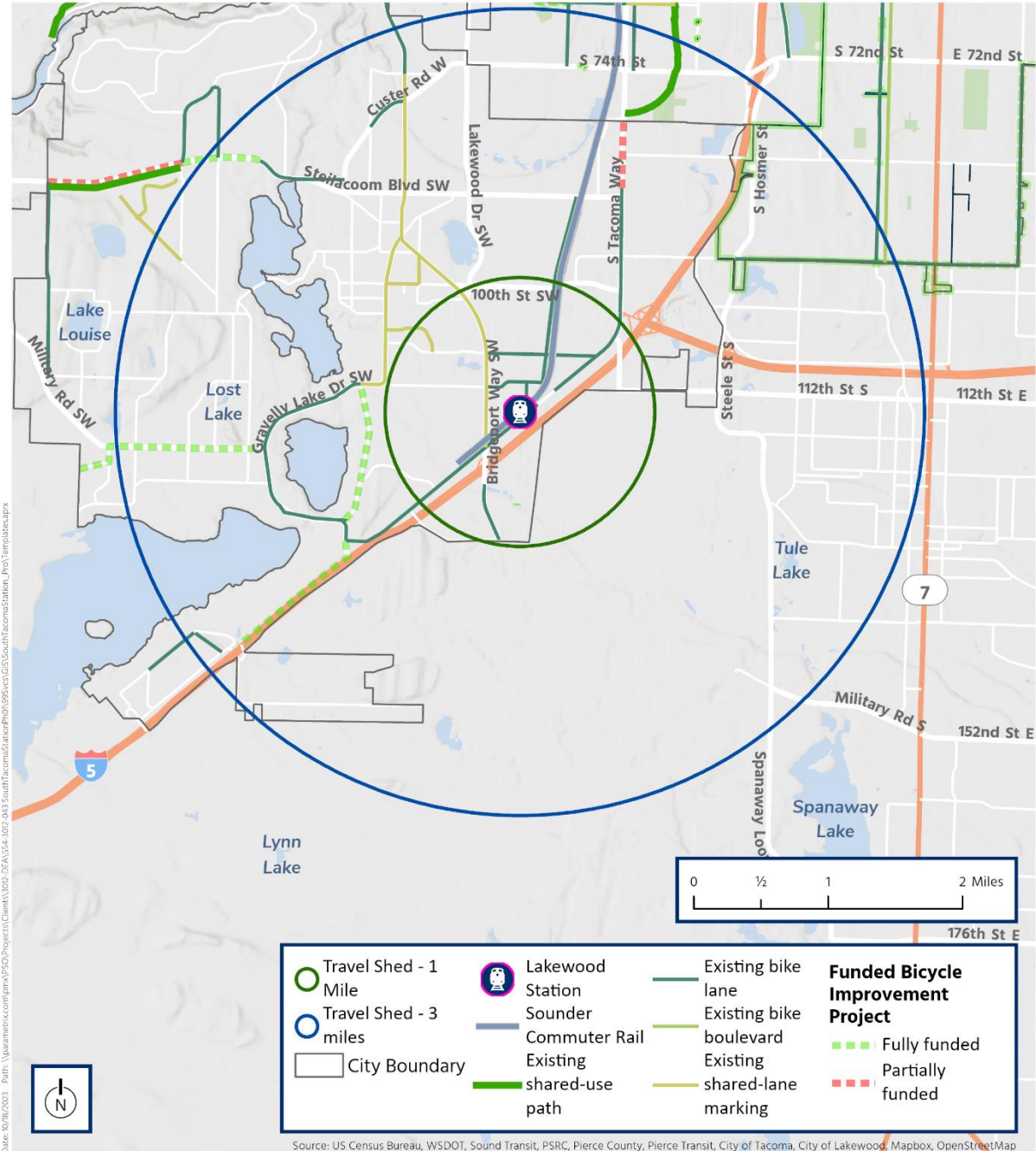


Figure 4-2 Bicycle facilities

As shown in Figure 4-2, few east-west bicycle connections are located within 1 mile of Lakewood Station, and there are few connections to areas to the east and west outside of the immediate station vicinity, as well. I-5 presents a barrier to bicycle access to Lakewood Station from the south and east because there are no crossings with dedicated bicycle facilities within the 3-mile bicycle travel shed. Bicycle access to the station from the east and south is further limited by State Route 512 and Joint Base Lewis McChord (JBLM), particularly from the unincorporated Pierce County community of Parkland.

4.3 Transit services and facilities

Sound Transit operates S Line rail between Lakewood and Seattle, with Lakewood Station serving as the current route’s southern terminus. During the weekday morning period, Seattle-bound northbound trains operate every 20 to 30 minutes between 4:30 a.m. and 7 a.m. One additional northbound trip departs Lakewood around 10 a.m. and one southbound trip from Seattle to Lakewood operates around 8 a.m. During the evening period, Lakewood-bound trains in the southbound direction operate every 20 to 45 minutes, arriving at Lakewood Station between 4:50 p.m. and 7:45 p.m. (Sound Transit 2023). Eight trains operate northbound and southbound each between Lakewood and Seattle each day, for a total of 16 daily trips.¹

In addition to the Sound Transit Sounder S Line rail service between Lakewood and Seattle, bus transit service is provided within 1 mile of the station by Pierce Transit, Intercity Transit, and Sound Transit Express Bus.

Table 4-2 below summarizes the existing bus transit routes and weekday schedule frequency (average headways) serving stops within 1 mile of the station.

Table 4-2 Bus transit routes serving stops within 1 mile of the station (2023)

| Route # and description, <i>Major destination served</i> | Service Span | Headways (weekday) in minutes | | Nearest transfer point to Lakewood Station |
|---|--------------|---|-------------------------|---|
| | | Northbound / Eastbound | Southbound / Westbound | |
| | | a.m. ¹ p.m. ² All Day | a.m. p.m. All Day | |
| Pierce Transit Route 3 - Lakewood – Tacoma: Lakewood Transit Center SR 512 park-and-ride (P&R) Tacoma Mall Transit Center 10th & Commerce Transit Center | 16 hours | 30 30 30-60 | 30 30 30-60 | 108th Street SW and Kendrick Street SW (0.4 mile) |
| Pierce Transit Route 4 - Lakewood – South Hill: Lakewood Transit Center SR 512 P&R South Hill Mall Transit Center Pierce College - Puyallup | 14 hours | 30 30 30 | 30 30 30 | 100th Street SW and 47th Avenue SW (0.9 mile) |
| Pierce Transit Route 202 - 72nd Street: Lakewood Transit Center 72nd Street Transit Center | 15 hours | 30 – 60 30 30-60 | 30 30 30-60 | Lakewood Drive SW and Bridgeport Way SW (1.1 miles) |

¹ Five additional Sounder South trains (10 total daily trips) operate between Seattle and Tacoma Dome Station in the northbound and southbound directions each weekday. For the Sounder trips that do not serve Lakewood station, Sound Transit Express Bus route 594 connects Lakewood and Tacoma Dome Stations (Sound Transit 2023).

Lakewood Station Access Improvements Project Phase 2

| Route # and description, Major destination served | Service Span | Headways (weekday) in minutes | | Nearest transfer point to Lakewood Station |
|---|--------------|---|--|---|
| | | Northbound / Eastbound | Southbound / Westbound | |
| | | a.m. ¹ p.m. ² All Day | a.m. p.m. All Day | |
| Pierce Transit Route 206 - Pacific Highway / Tillicum / Madigan Joint Base Lewis-McChord (JBLM) Madigan Hospital Lakewood Transit Center | 16 hours | 30 30 30-60 | 30 30 30-70 | Bridgeport Way SW and Pacific Highway SW (0.3 mile) |
| Pierce Transit JBLM Runner – Lakewood Transit Center – JBLM Lakewood Transit Center Lakewood Station JBLM | 6 hours | On Demand | On Demand | Lakewood Station |
| Intercity Transit Route 620 – Olympia/512 P&R Express Olympia Transit Center Lacey Transit Center Martin Way Park & Ride Lakewood Station SR 512 Park & Ride | 14 hours | 50-65 60-90 65-85 | 60-65 65-85 50-70 | Lakewood Station |
| Sound Transit Route 574 - Lakewood / Sea-Tac Airport via Federal Way: Lakewood Transit Center SR 512 P&R Tacoma Dome Station Federal Way Transit Center Star Lake Freeway Station Kent/Des Moines Freeway Station Sea-Tac Airport | 20 hours | 30 30 10-60 | 20-30 30 20-60 | SR 512 P&R (0.9 mile) |
| Sound Transit Route 592 - DuPont – Seattle: DuPont Station Lakewood Station SR 512 P&R Downtown Seattle | 4 hours | 15 – 30 (4-7:45 a.m.) N/A N/A | N/A 15 - 30 (4:30-7:45 p.m.) N/A | Lakewood Station |
| Sound Transit Route 594 - Lakewood / Tacoma – Seattle: DuPont Station ³ Lakewood Station SR 512 P&R Tacoma Dome Station Downtown Seattle | 14 hours | 20 (after 8:30 a.m.) N/A 30 | 30 – 45 (after 7 a.m.) 20 – 30 (until 4:30 p.m.) 10 (8-8:15 p.m. only) | Lakewood Station |

Source: Pierce Transit 2023 and Sound Transit 2023.

Notes:

- (1) a.m. period is 6 to 9 a.m.
- (2) p.m. period is 3 to 6 p.m.
- (3) One northbound and 2 southbound trips serve DuPont Station

The Lakewood Transit Center is located just outside of the 1-mile travel shed to the northwest of Lakewood Station and is served by Pierce Transit routes 2, 3, 4, 48, 202, 206, 212 and 214, and JBLM Runner and Sound Transit Express Bus route 574.

Figure 4-3 displays Pierce Transit and Sound Transit Express bus routes and facilities within the 1--mile pedestrian travel shed while Figure 4-4 presents Sound Transit regional connections within the 5--mile transit rider/driver access travel shed.

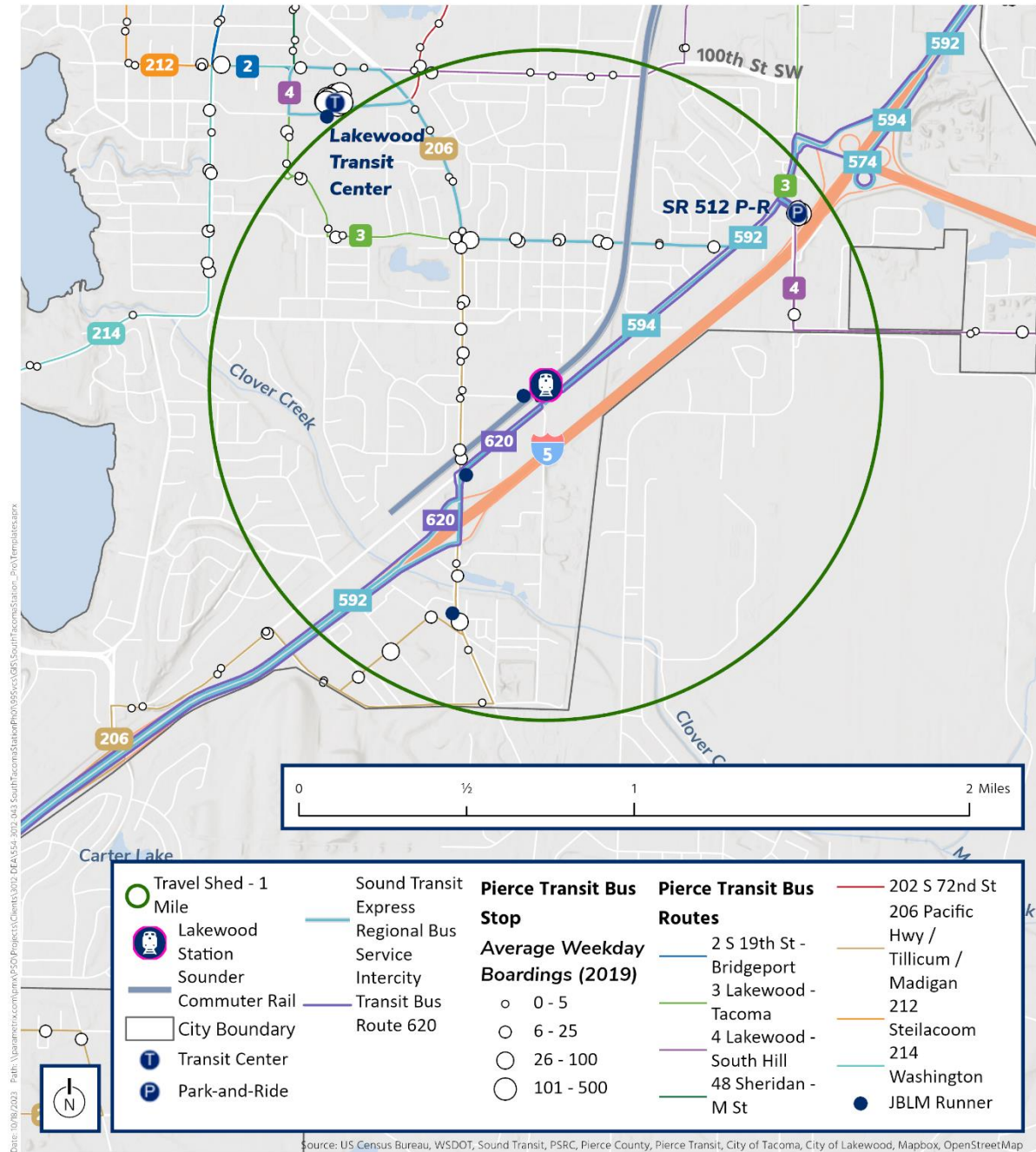


Figure 4-3 Transit routes

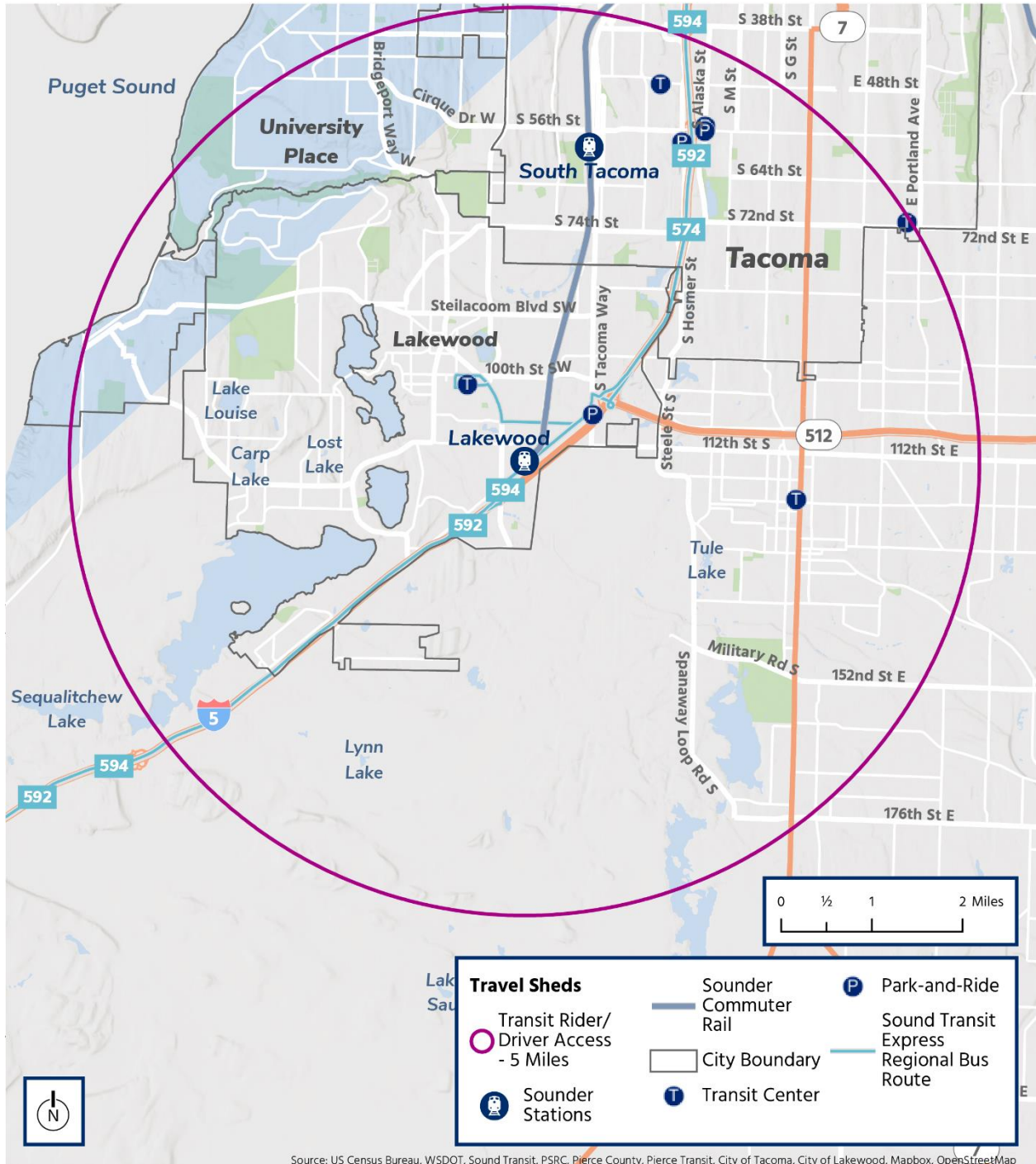


Figure 4-4 Sound Transit regional transit routes

Because no Pierce Transit routes directly serve Lakewood Station, the nearest transfer opportunity from Sounder to a local (non-regional) north-south bus transit route (Route 206) is approximately 0.3 mile from the station while the nearest transfer opportunity to an east-west bus route (route 4) is approximately 0.9 mile away. Pierce Transit Route 206 currently operates along Bridgeport Way SW to the west of Lakewood Station with the nearest stops at the intersection of Pacific Highway SW. Route 4 operates along 100th Street SW to the north of the station, with the nearest stop at the intersection of 47th Avenue SW. Transfer opportunities to Pierce Transit Route 3 are located approximately 0.4 mile from Lakewood Station at the intersection of 108th Street SW and Kendrick Street SW. Other bus routes serve stops approximately 1 mile to the northeast and northwest of the station, requiring riders to walk longer distances for transfer opportunities to bus routes serving destinations other than those along Routes 3, 4, and 206.

Many bus stops located near the station have minimal passenger amenities (shelters, benches, trash cans) and include only flags at the stops. Route 206 stops along Bridgeport Way SW at Seattle Avenue SW and San Francisco Avenue SW and along Lincoln Avenue SW at San Francisco Avenue SW were identified as having potential access issues in the March 2020 Lakewood Station Profile (Sound Transit 2020a). The following factors were considered when identifying transit stops with potential access issues:

- Lack of a complete, accessible paved route to the transit stop or station.
- Lack of a paved, unobstructed landing pad at the stop or station.
- Presence of a shelter with obstructions at the transit stop or station.

4.4 Roadways/vehicle access

Vehicular access to the Lakewood Station parking garage is provided via Pacific Highway SW, through both a signalized intersection on the northeast side of Lakewood Station and at a right-in/right-out point of ingress/egress midway along the garage frontage. From the north, the cul-de-sac southern terminus of Kendrick Street SW provides a pick-up/drop-off location, from which the station platform can be accessed via a pedestrian bridge over the Sounder tracks.

Pacific Highway SW, a primarily north-south minor arterial, connects Lakewood Station to Lakewood's broader roadway network, entering Tacoma to the north and the southern portion of Lakewood to the south. Bridgeport Way SW, a north-south principal arterial, intersects Pacific Highway SW to the southwest of the station and provides connections to University Place in the north as well as I-5 and JBLM to the south. An east-west minor arterial, 112th Street SW, intersects Bridgeport Way SW at a signalized intersection to the northwest of the station and, to the east, connects to Kendrick Street SW and its pickup/drop-off area at the northern edge of the station. Figure 4-5 displays the Lakewood Station vehicle access points.



Figure 4-5 Lakewood Station vehicle access points

Located 0.5 mile southwest of Lakewood Station, the I-5/Bridgeport Way SW interchange provides access to the state highway network, connecting the station area to the regional transportation system. I-5 is the primary north-south limited access corridor for local, regional, interstate, and international travel. I-5 has an interchange with SR 512 approximately 1.5 miles north of the Bridgeport Way SW interchange and enters the Olympia/Lacey area approximately 13.5 miles to the south. Figure 4-6 displays the roadway network within the 5-mile vehicle travel shed and Figure 4-7 shows the roadway network near the station.

Several partially or fully funded roadway projects included in city and county transportation improvement programs are located within the 5-mile vehicle travel shed. These projects are listed in Table 4-3 below.

Table 4-3 Partially or fully-funded roadway improvement projects within the 5-mile travel shed

| Type | Project Name | Source/Agency | Funding |
|----------------------------------|---|--|---------|
| Bike/Ped, Street Repair | Steilacoom Boulevard SW | City of Lakewood Six-Year Comprehensive Transportation Improvement Program 2024-2029 | Full |
| Bike/Ped, Street Repair | South Tacoma Way | City of Lakewood Six-Year Comprehensive Transportation Improvement Program 2024-2029 | Partial |
| Bike/Ped, Street Repair | Washington Boulevard SW/North Gate Road SW/Edgewood Avenue SW | City of Lakewood Six-Year Comprehensive Transportation Improvement Program 2024-2029 | Full |
| Bike/Ped, Street Repair | Steilacoom Boulevard SW/ 88th Street SW | City of Lakewood Six-Year Comprehensive Transportation Improvement Program 2024-2029 | Full |
| Bike/Ped, Street Repair | Mt. Tacoma Drive SW – Interlakken to Whitman Avenue SW | City of Lakewood Six-Year Comprehensive Transportation Improvement Program 2024-2029 | Full |
| Bike/Ped | Gravelly Lake Non-Motorized Trail – Phase 2 | City of Lakewood Six-Year Comprehensive Transportation Improvement Program 2024-2029 | Full |
| Bike/Ped, Street Repair | Military Road SW – Edgewood Drive SW to Farwest Drive | City of Lakewood Six-Year Comprehensive Transportation Improvement Program 2024-2029 | Full |
| Bike/Ped, Street Repair | Custer Road SW – Bridgeport Way to Lakewood Drive | City of Lakewood Six-Year Comprehensive Transportation Improvement Program 2024-2029 | Full |
| Bike/Ped, Street Repair, Signals | E 64th Street Improvements (Phase 2) | City of Tacoma Comprehensive Transportation Improvement Program Amended 2023 and 2024-2029 | Full |
| Bike/Ped, Street Repair, Signals | S Yakima Avenue Sidewalk | City of Tacoma Comprehensive Transportation Improvement Program Amended 2023 and 2024-2029 | Full |

Sources:

City of Lakewood. 2023a. City of Lakewood Amended Six-Year Comprehensive Transportation Improvement Program 2024-2029
 City of Tacoma. 2023. City of Tacoma Comprehensive Transportation Improvement Program Amended 2023 and 2024-2029



Figure 4-6 Regional road network

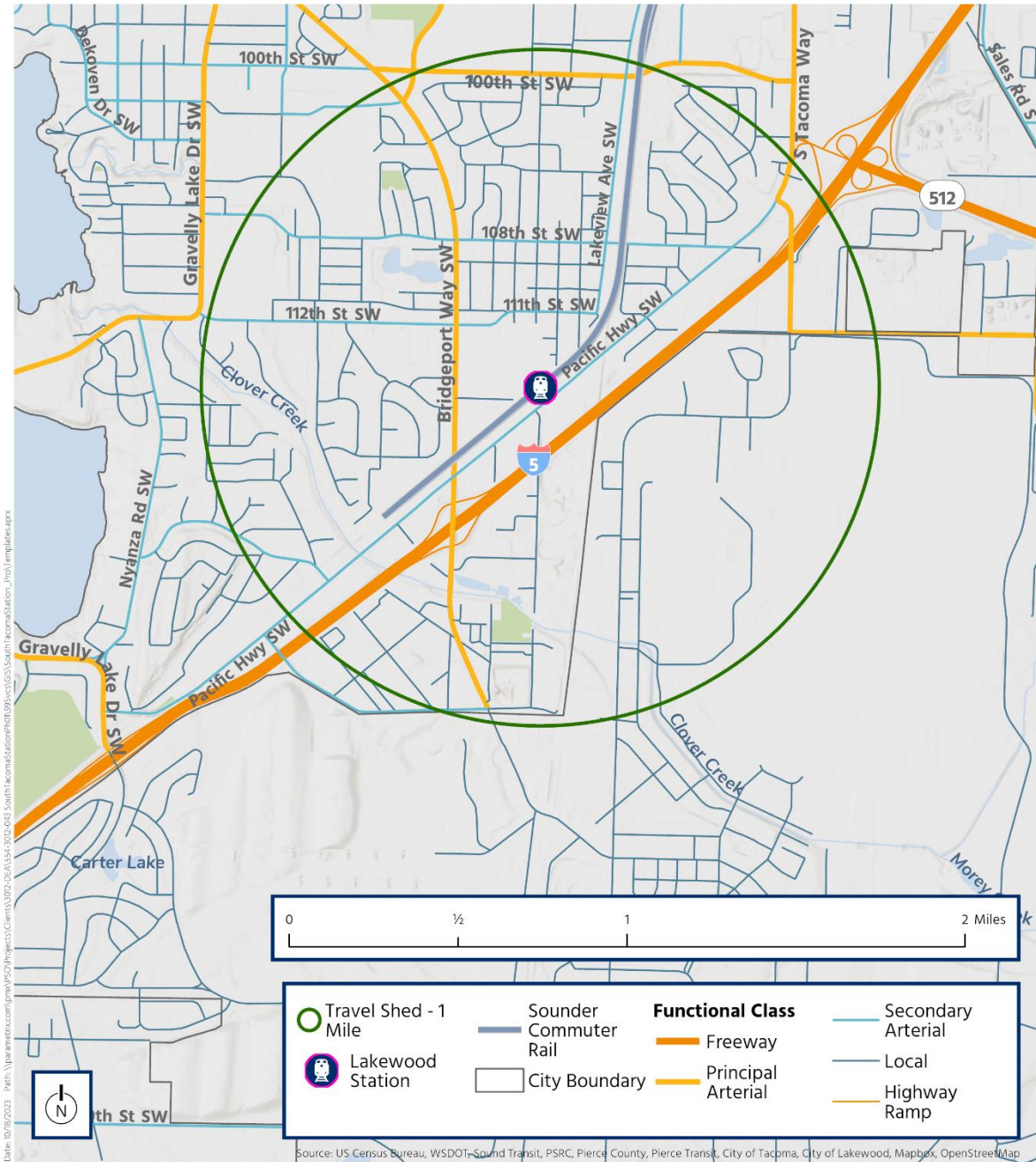


Figure 4-7 Road network

The Lakewood Station is located within the primary arterial network and within a mile of two freeway interchanges. The primary access to the station for transit and users of the garage is located off Pacific Highway (a minor arterial). A second access is provided from Kendrick Street (classified as a local street) for passenger pickup and drop-off.

Bridgeport Way SW is a principal arterial located west of the station and would likely provide access to either the primary access from Pacific Highway SW or the access from Kendrick Street. Other minor arterials that would be used by vehicles travelling to the pick-up/drop-off area north of the Lakewood Station include Lakeview Avenue SW, 111th/112th Street SW, and 108th Street SW.

The City of Lakewood Comprehensive Plan identifies Bridgeport Way SW through the I-5 interchange and to the north as having a level of service (LOS) standard of LOS F and the interchange with I-5 as having a volume-to-capacity ratio of 1.30 or less (City of Lakewood 2020) for a.m. and p.m. peak hour conditions. LOS A represents the best conditions with minimal amount of delay, and LOS F represents the worst conditions with severe congestion and delay. Existing and future conditions arterial LOS was not available in the City's comprehensive plan, however, because Bridgeport Way SW is assigned a LOS threshold of LOS F and a volume-to-capacity ratio of greater than 1.0. This indicates the corridor is congested and is anticipated to continue to be congested.

PM peak hour traffic counts were collected in 2023 to support intersection operations analysis for locations that may be affected by the build alternative. Traffic operations analysis was conducted at five study intersections. Traffic operations analysis utilized the Synchro tool (version 11) to determine the intersection LOS based on the Highway Capacity Manual (HCM) 2000 report and delay (in seconds per vehicle). The Synchro model was developed consistent with the Washington State Department of Transportation (WSDOT 2018) Synchro modeling protocol with the exception of the reporting method. The WSDOT protocol recommends reporting HCM 6th edition. However, the analysis conducted for this study includes pedestrian signals which are not supported by the HCM 6th edition methodology, thus the analysis defaulted to HCM 2000 reports.

While the corridors per the City's comprehensive plan operate with v/c ratios above 1.0 at I-5, the study intersections operate with v/c ratios well under the City's threshold of 0.90, and grades within the City's threshold of LOS D or better (see Table 4-4).

Table 4-4 Existing conditions intersection operations analysis

| Intersection | Intersection Control Type | Approach | Existing p.m. Peak Hour LOS, Delay ¹ , V/C ² |
|--|---------------------------|------------|--|
| Bridgeport Way SW/115th Street Ct SW | OWSC ³ | Northbound | N/A ⁴ |
| | | Southbound | N/A |
| | | Westbound | B, 12, 0.40 |
| Pacific Highway SW/Bridgeport Way SW | Signal | Overall | C, 31, 0.48 |
| Bridgeport Way SW/Seattle Avenue SW | OWSC | Northbound | N/A |
| | | Southbound | N/A |
| | | Eastbound | B, 13, 0.31 |
| Pacific Highway SW/47th Avenue SW | Signal | Overall | C, 16, 0.22 |
| Pacific Highway SW/Lakewood Station Garage Access | Signal | Overall | B, 16, 0.24 |
| Do all the study intersections operate within the City's threshold (LOS D and v/c ratio of 0.90 or better)? | | | Yes |

- (1) Delay is reported in seconds per vehicle.
- (2) V/C – volume to capacity ratio.
- (3) OWSC – one-way stop control.
- (4) N/A – Movement is free-flow as movement is not stop controlled.

4.5 Parking

Parking at Lakewood Station is provided in a 601-stall parking garage located directly adjacent to the Sounder tracks to the northeast of the platform. On Pacific Highway SW, vehicular access to the garage is located at a signalized intersection to the northeast and at a right-in/right-out driveway midway along the garage frontage. Passenger ingress and egress from the parking garage is located at-grade near the northeastern portion of the station platform. Bicycle parking is provided at Lakewood Station in the form of 18 covered bicycle parking spaces while no additional public bicycle parking locations are available within two blocks of the station. The March 2020 Lakewood Station Profile reports that bicycle parking utilization at the station was 36% for the period 2018-2019.

The Sound Transit Parking Utilization Report (2019d) describes that the parking garage at Lakewood Station was between 93% and 96% occupied during a Tuesday through Thursday data collection period in January 2019. In May 2023, utilization during a Tuesday through Thursday data collection period ranged from 20% to 31%. A license plate survey conducted for Lakewood Station in 2016 reported that of the parked vehicles observed to be registered in Washington, 67% were registered in a jurisdiction within the Sound Transit District, 43% were registered within a jurisdiction within 5 miles of the station, and 24% were registered within the City of Lakewood (Sound Transit 2016a). Parking management policies, such as permit parking, are in use at Lakewood Station but have been paused due to the COVID-19 pandemic. Additional parking management policies would have an effect on parking utilization at the station.

In addition to the 601-stall parking garage at Lakewood Station, the SR 512 Park-and-Ride operated by Pierce Transit provides 493 parking stalls at the intersection of South Tacoma Way and Pacific Highway SW within the 1-mile travel shed. The SR 512 Park-and-Ride is served by Pierce Transit Routes 3, 4, and Runner, Sound Transit Express Bus Routes 574, 592, and 594, and Intercity Transit Route 620.

As discussed above, the vehicle parking at Lakewood Station is not fully utilized. Additionally, there is currently no indication that Sounder riders are overflow parking along City of Lakewood streets in neighborhoods adjacent to the Lakewood Station. Bicycle parking at the station is also underutilized. There are no identified parking access gaps.

5 YEAR 2030 CONDITIONS

5.1 No-Build Alternative

Conditions within the study area between now and horizon year 2030 are not anticipated to be substantially different in terms of the roadway, bicycle, and pedestrian networks or transit route service in the vicinity of the project improvements. However, sidewalk improvements on 47th Avenue SW in the vicinity of 121st Street SW were assumed to be constructed by the City or private development before 2030 and were assumed as part of the No-Build Alternative.

Traffic volumes are anticipated to increase by year 2030. To estimate traffic for the future year 2030 No-Build Alternative, existing traffic volumes were grown by a two percent annual growth rate. This growth rate was provided by the City of Lakewood and aligns with the City's forecasts for population growth as described in the City of Lakewood Housing Needs Assessment (City of Lakewood 2023b).

Traffic operations analysis was conducted at the five study intersections to establish baseline conditions from which to quantitatively assess changes between the No-Build and Build Alternatives. As described in the existing conditions analysis, the Synchro model was used to determine intersection LOS, delay, and v/c ratios. Similar to the existing conditions, in the year 2030, the study intersections are anticipated to operate within the City’s LOS D and 0.90 v/c ratio thresholds (see Table 5-1).

Table 5-1 Year 2030 No-Build Alternative intersection operations analysis

| Intersection | Intersection Control Type | Approach | 2030 p.m. Peak Hour LOS, Delay ¹ , V/C |
|---|---------------------------|------------|---|
| Bridgeport Way SW/115th Street Ct SW | OWSC | Northbound | N/A ² |
| | | Southbound | N/A |
| | | Westbound | B, 12, 0.45 |
| Pacific Highway SW/Bridgeport Way SW | Signal | Overall | C, 33, 0.55 |
| Bridgeport Way SW/Seattle Avenue SW | OWSC | Northbound | N/A |
| | | Southbound | N/A |
| | | Eastbound | B, 13, 0.33 |
| Pacific Highway SW/47th Avenue SW | Signal | Overall | C, 32, 0.26 |
| Pacific Highway SW/Lakewood Station Garage Access | Signal | Overall | B, 16, 0.28 |

Notes:

- (1) Delay is reported in seconds per vehicle.
- (2) N/A – Movement is free-flow as movement is not stop controlled.

5.2 Build Alternative

The Build Alternative includes all Priority 1 and 2 project improvements. The analysis in this section describes the anticipated changes to the transportation network, by mode, and the forecast impacts of the project. Table 5-2 identifies the type of analysis that was performed for each transportation mode.

Table 5-2 Scope of transportation analysis

| Element | Type of Analysis for Build Alternative |
|--|--|
| Non-motorized network | Qualitative description of newly created connections and removed barriers, including connectivity to existing network, funded City projects and transit. |
| Transit stops and routes | Qualitative description of the changes to stop locations and transit routes. Quantified changes in bus travel time for Route 206 to access the station. |
| Vehicle access/traffic operations | Quantified changes in traffic volumes and intersection delay that would occur by adding parking capacity at the Sounder station. Quantified changes in vehicle delay at intersections where a pedestrian signal would be constructed. |
| Parking impacts | Quantified changes in parking capacity within the City right-of-way (ROW). Quantified increase in parking capacity for project which adds a surface lot at the station. |

Figure 3-1 and Table 5-3 list the projects included within the Build Alternative, including their classification as Priority 1 or Priority 2. Table 5-3 also identifies which modes or facilities would be affected by the projects in the Build Alternative. The following sections further describe how the projects modify and impact the non-motorized network, transit facilities and access, vehicle access/traffic operations, and parking capacity.

Table 5-3 Build Alternative project improvements

| Description (Project Number as shown in the Phase 2 Report) | Mode or facility potentially impacted by improvement | | | |
|--|--|--------------------------------|------------------------|-------------------------------|
| | Non-motorized access | Transit services or facilities | Vehicle access/traffic | Parking (including shoulders) |
| <p>Bridgeport Way SW Non-motorized Connections via 115th Street Court SW (Priority 1)</p> <p>Add sharrows¹, sidewalk (north side) on 115th Street Court SW and add a shared use path to the station (A8, D6)</p> <p>Add pedestrian signal across Bridgeport Way SW and bus stop improvements (A20, B5, B6)</p> <p>Improve station fencing (C1)</p> | Yes | No | No | No |
| | Yes | Yes | Yes | No |
| | No | Yes | No | No |
| <p>Pierce Transit Route 206 Bus Stops and Sidewalks (Priority 1)</p> <p>Complete sidewalks and crosswalks on New York Avenue SW/McChord Drive SW and Lincoln Avenue SW to access Route 206 bus stops (A14, A34)</p> <p>Add a pedestrian signal across Bridgeport Way SW at Seattle Avenue SW adjacent to Route 206 bus stops (A23)</p> <p>Improve bus stop amenities (add bench, add shelter in some locations) (B4, B12 – B16, B19, B20)</p> | Yes | No | No | No |
| | Yes | No | Yes | No |
| | No | Yes | No | No |
| <p>Pierce Transit Route 206 Bus Connection to the Station (Priority 1)</p> <p>Widen the turn radius from southbound Pacific Highway S to northbound Bridgeport Way SW to facilitate Route 206 to access the station (B8)</p> | No | Yes | No | No |
| <p>47th Avenue SW Bridge and Sidewalk Connections (Priority 1)</p> <p>South of I-5, provide sidewalks (westside) and sharrows on 47th Avenue SW between Clover Creek and 120th Street SW (A7)</p> <p>Across I-5 on the 47th Avenue SW bridge, provide sidewalk on the westside separated from travel lanes with a barrier and sharrows (A16.D)</p> <p>North of I-5, provide bike lane on the west side (southbound) and sharrows on the eastside (northbound) of 47th Avenue SW (A17)</p> | Yes | No | No | Yes |

| Description (Project Number as shown in the Phase 2 Report) | Mode or facility potentially impacted by improvement | | | |
|---|--|--------------------------------|------------------------|-------------------------------|
| | Non-motorized access | Transit services or facilities | Vehicle access/traffic | Parking (including shoulders) |
| Lakewood Station Improvements (Priority 1) Provide station area curb ramp retrofits (A41), shelter retrofits to provide overhead shelter at the mini-high (B17), public address system (E1), retrofit the station stairs (E2), bird deterrent retrofit (E4), and station area accessibility for sight impaired (E5) | No | Yes | No | No |
| Non-motorized Improvements (Priority 2) | | | | |
| Add sidewalks and bike lanes on 112th Street SW (A10) | Yes | No | No | Yes |
| Add sidewalks and bike lanes on Kendrick Street SW (A12) | Yes | No | No | Yes |
| Add sidewalks on 47th Avenue SW/McChord Drive (A18) | Yes | No | No | Yes |
| Add bike lanes on Davisson Road SW (A29) | Yes | No | No | Yes |
| Add sidewalks and bike lanes on 111th Street SW and Davisson Rd SW near Clover Park High School (A30) | Yes | No | No | Yes |
| Add sidewalks on Chicago Avenue SW and Boston Avenue SW (A35, A36) | Yes | No | No | Yes |
| Add sidewalks on San Francisco Avenue SW (A37) | Yes | No | No | Yes |
| Add sidewalks and railroad crossing arms or gates for pedestrians Clover Creek Drive SW crossing of the railroad tracks (A39) | Yes | No | No | Yes |
| Lakewood Station Improvements (Priority 2) | | | | |
| Add an 80-stall surface parking lot northeast of the current garage (D8.B) | No | No | Yes | Yes |
| Wayfinding to pickup/drop-off areas (E3) | No | No | No | No |

Notes:

- (1) Sharrows are painted markings on the roadway with two V-shapes and a bicycle. The markings indicate that the roadway is shared by motorists and bicyclists.

5.3 Changes to the non-motorized network

The improvement projects associated with the Build Alternative would complete portions of the City’s planned bicycle and pedestrian network and improve access directly to the station or to Pierce Transit Route 206, which serves the station.

5.3.1 Bridgeport Way SW non-motorized connections via 115th Street Court SW (Priority 1)

The improvements proposed at 115th Street Court SW would facilitate non-motorized connections between the Bridgeport Way SW bus stop and the 115th Street Court SW cul-de-sac to the Lakewood Station. They would allow for drop-off and pickup of passengers at the

street end and access to the station via a trail along the north side of the tracks to the north station entrance.

- Sharrows would be added to 115th Street Court SW from Bridgeport Way SW to the end of the cul-de-sac. An approximately 1,620-foot-long by 10-foot-wide asphalt path would be constructed from the end of the cul-de-sac along the north side of the rail ROW to just past the pedestrian overpass allowing passengers to access the overpass bridge to the station. The path would be bordered on both sides with a chain link fence for security and be extended beyond the overcrossing to reduce ground level crossing of the tracks.
- At the Bridgeport Way SW/115th Street Court SW intersection, a pedestrian signal would be added, as well as improved lighting and crosswalks to improve access to the bus stops. Additional information is available in Section 5.5 Changes to Vehicle Access/Traffic Operations regarding the impact (change in delay) for vehicles with the new pedestrian signal.
- On Bridgeport Way SW, four driveways would be improved including adding new ADA curb ramps over a distance of approximately 2,350 feet. These are located between just south of 115th Street SW and 112th Street SW and include driveways to the Pet Doctor business and Watson Signature Event Center.

5.3.2 Route 206 bus stops and sidewalks (Priority 1)

Pierce Transit Route 206 runs along Bridgeport Way SW from the Lakewood Towne Center and extends south through the study area. The improvements in this area would connect residential developments in the area to Route 206 bus stops by completing the sidewalk system, including meeting ADA standards at intersections and bus stops.

- A 6-foot-wide sidewalk would be constructed on the north side of New York Avenue SW and McChord Drive SW between Bridgeport Way SW and Pacific Highway SW over a distance of approximately 3,880 feet. New crosswalk striping would be added at Lincoln Avenue SW to access the southbound bus stop on McChord Drive SW.
- At the New York Avenue SW crossing of I-5, the sidewalks on the north and south sides would be removed. A new sidewalk would be constructed on the north side, which would be slightly over 6 feet wide. On the north side a concrete barrier and pedestrian railing would be installed between the street and the sidewalk and a new railing at the bridge edge.
- Sidewalks would be constructed on Lincoln Avenue SW between McChord Drive SW and San Francisco Avenue SW for a distance of approximately 1,900 feet. Sidewalks would be added to both sides of Lincoln Avenue SW between McChord Drive SW and Chicago Avenue SW. From Chicago Avenue SW to San Francisco Avenue SW sidewalks would only be added to the north side of Lincoln Avenue SW.

5.3.3 47th Avenue SW bridge and sidewalk connections (Priority 1)

This project would allow bicycles and pedestrians to travel between the residential developments along 47th Avenue SW and the Lakewood Sounder Station to the north on designated sidewalks and bicycle facilities. Sidewalks and sharrows would be constructed along both sides of 47th Avenue SW from Clover Creek to 120th Street SW. From 127th Street SW, sidewalks would only be added to the west side of 47th Avenue SW extending across I-5 to Pacific Highway SW. A bike lane would be included on one side of the road. North of the I-5 crossing, the sidewalk on the east side would be removed to allow improvements to continue on the west side of the roadway. Sharrows would be included across the bridge over I-5.

5.3.4 Non-motorized improvements (Priority 2)

Various other station access improvements would enhance non-motorized travel in the project area. These project improvements include:

- 112th Street SW – Add sidewalks and bicycle lanes on 112th Street SW for a length of approximately 4,030 feet, providing an east-west connection between the City’s existing non-motorized facilities along Gravelly Lake Drive, schools, and major origins and destinations in the study area.
- Kendrick Street SW – Construct sidewalks, bicycles lanes and lighting along approximately 1,080 feet of Kendrick Street SW to support access to and from the Sounder station to the north.
- Clover Creek Drive SW – Provide sidewalks on Clover Creek Drive SW between Hillcrest Drive SW and Pacific Highway SW, signage, and crossing arms to improve accessibility and safety at the at-grade rail crossing.
- Wayfinding to pickup/drop-off locations serving the station – Install wayfinding signage at several locations including near the intersections of Bridgeport Way SW and Pacific Highway SW, Bridgeport Way SW and 112th Street SW, and Kendrick Street SW and 111th Street SW. Station access signage would be added to Pacific Highway SW near the station.
- Clover Park High School connection – Adds bike lanes and sidewalks on 111th Street SW between 60th Avenue SW and Davisson Road SW.
- Davisson Road SW - Construct bike lanes and sidewalks on Davisson Road SW between 108th Street SW and 111th Street SW and on Highland Street SW between 111th Street SW and 112th Street SW.
- Springbrook Area connections - Provide sidewalks and sharrows on 47th Avenue SW and McChord Drive SW for a distance of approximately 1,890 feet. Construct sidewalks and install street lighting on Chicago Avenue SW between McChord Drive SW and Springbrook Lane SW and Boston Avenue SW between McChord Drive SW and 57th Avenue Ct SW for a distance of approximately 1,970 feet. Construct sidewalks and install street lighting on San Francisco Avenue SW between Springbrook Lane SW and Bridgeport Way SW for a distance of approximately 1,300 feet.

5.4 Changes to transit services and facilities

The improvements associated with the project include localized changes in bus stop locations and amenities, and an opportunity to modify Pierce Transit’s Route 206 to serve the Lakewood Station directly.

5.4.1 Bridgeport Way SW non-motorized connections via 115th Street Court SW (Priority 1)

This project would change the Route 206 southbound bus stop location on Bridgeport Way SW at 115th Street SW and would also change access to the station and improve security along the railroad tracks.

To allow for a pedestrian signal to be construction at Bridgeport Way SW/115th Street Court SW, the southbound Route 206 bus stop would be moved to a location south of 115th Street Court SW. In its current location, it conflicts with the pedestrian signal and would create sight distance issues between travelling vehicles, the bus, and crossing pedestrians.

Based on field studies, it appears that people breach the railroad ROW in the vicinity of 115th Street SW by travelling through gaps or holes in the fencing, rather than use the grade separated crossing that is provided at the station. This may occur as there is no designated or direct path for bicyclists and pedestrians between Bridgeport Way SW and the station without travelling to the north to 111th/112th Street SW.

To improve access to the station from Bridgeport Way SW or other areas west of the station and reduce security risks, the project would repair or replace the fencing to prohibit access to the railroad crossing, and would also encourage the use of the designated elevated crossing at the Station by completing the shared use path between Bridgeport Way SW and the station.

5.4.2 Route 206 bus stops and sidewalks (Priority 1)

In conjunction with the sidewalk improvements to provide better access to and from the Route 206 bus stops (described in Section 5.3 above), the project would add bus stop benches consistent with Pierce Transit standards. Benches are a basic amenity and are constructed at all stops. For bus stops that have 10 riders or more a day, shelters are also provided. The following locations do not currently have a shelter and meet the 10 daily rider threshold:

- Eastbound stop at Lincoln Avenue SW/Boston Avenue SW.
- Southbound stop at Bridgeport Way SW/115th Street court SW (currently has a shelter, but stop would be relocated further south with a shelter).
- Northbound stop at Bridgeport Way SW/San Francisco Avenue.

5.4.3 Route 206 bus connection to the station (Priority 1)

Today, the Route 206 travels north and southbound along Bridgeport Way SW but does not directly access the station to the east on Pacific Highway S due to the tight turn radius (does not meet transit turning radius needs) from Pacific Highway S to Bridgeport Way SW. The project includes reconstructing the southbound right turn lane from Pacific Highway SW to northbound Bridgeport Way SW to increase the turn radius so that transit turning movements could be accommodated. This would include reducing the existing island in the northeast quadrant and shifting the northbound lanes on Bridgeport Way SW to the west.

Rerouting Route 206 to serve the station directly would increase the total travel time by five to six minutes, of which three to four minutes are attributed to signal delay (per the Synchro analysis conducted for this study) and increased travel distance (see Table 5-4). The change in travel time is calculated from the Bridgeport Way SW/Pacific Highway SW intersection to and from the Lakewood Station. The calculations assumed a 30 second dwell time at the station which would be dependent on the ridership and if the station is used as a new time check location. Under existing conditions, the total travel time for a bus rider exiting the bus at Bridgeport Way SW and walking to the station (or the reverse) would be 10 to 15 minutes. The direct transfer would provide a net 5-to-10-minute total travel time savings for those riders.

With this study, Sound Transit has identified potential improvements to aide in revising the Route 206 travel path, however it is up to Pierce Transit to determine if the change in route would be a net benefit to their system.

Table 5-4 Potential change in travel time for Route 206 (Year 2030)

| Northbound Comparison from Bridgeport Way SW/Pacific Highway S to serve Lakewood Station) | | | |
|--|---|---|---|
| Current Route 206 Travel Path | | Route 206 Travel Path with Build Alternative Projects | |
| 25 sec | Bridgeport Way SW/Pacific Highway SW – northbound through | 22 sec | Bridgeport Way SW/Pacific Highway SW – northbound right |
| | | +34 sec | Travel time 1,500 feet at average 30 mph |
| | | +45 sec | Left turn from Pacific Highway SW to station |
| | | +120 sec | Dwell at station |
| | | +33 sec | Right turn from station onto Pacific Highway |
| | | +34 sec | Travel time 1,500 feet at average 30 mph |
| | | +41 sec | Bridgeport Way SW/Pacific Highway SW – westbound right |
| =0.4 min | Total Route Travel Time | =5.5 min | Total Route Travel Time |
| Southbound Comparison from Bridgeport Way SW/Pacific Highway S to serve Lakewood Station) | | | |
| Current Route 206 Travel Path | | Route 206 Travel Path with Build Alternative Projects | |
| 20 sec | Bridgeport Way SW/Pacific Highway SW – southbound through | 56 sec | Bridgeport Way SW/Pacific Highway SW – southbound left |
| | | +34 sec | Travel time 1,500 feet at average 30 mph |
| | | +45 sec | Left turn from Pacific Highway SW to station |
| | | +30 sec | Dwell at station |
| | | +33 sec | Right turn from station onto Pacific Highway |
| | | +34 sec | Travel time 1,500 feet at average 30 mph |
| | | +58 sec | Bridgeport Way SW/Pacific Highway SW – westbound left |
| =0.3 min | Total Route Travel Time | =4.8 min | Total Route Travel Time |

5.4.4 Lakewood Station improvements (Priority 1)

Lakewood Station projects would improve access conditions for sight impaired, non-English speaking, and disabled persons, as well support non-motorized access. These include the following upgrades to the station:

- Add bird deterrent system.
- Provide a mini-high shelter.
- Retrofit stairs and other station components where trash accumulates.
- Install a public address system.
- Provide accessible wayfinding for sight impaired persons.
 - Braille for ticketing.
 - Tactile strips between platform and drop-off areas.
- Provide signage for non-English-speaking persons.

In addition, ADA compliant curb ramps would be retrofitted at 35 sidewalk locations within ½ mile of the station.

5.5 Changes to vehicle access/traffic operations

A traffic operations analysis was performed to assess the impacts of a subset of improvements on vehicular traffic volumes, travel patterns, or operations. The improvements identified to generate trips, affect travel patterns, or modify stop control include:

- Pedestrian signal at Bridgeport Way SW/115th Street Court SW.
- Pedestrian signal at Bridgeport Way SW/Seattle Avenue SW.
- Surface parking lot at the Lakewood Station.

The project improvements would not interfere with, affect, or be affected by the movement of agricultural and forest products on roads and streets in the area.

5.5.1 Bridgeport Way SW/115th Street Court SW pedestrian signal

The project would include adding a signalized pedestrian crossing on Bridgeport Way SW at 115th Street Court SW. Guidance from the Manual of Uniform Traffic Control Devices (MUTCD 2009) was used to conduct a pedestrian signal warrant. Three types of traffic controls were considered:

- A Rectangular Rapid Flashing Beacon (RRFB).
- A Pedestrian Hybrid Beacon (PHB).
- A full pedestrian signal.

Of the traffic control considered, an RRFB is the lowest level of treatment which is activated to alert vehicles that the crosswalk is in use. A PHB provides a greater level of traffic control by requiring all vehicles to stop (then proceed if the crosswalk is clear), when a pedestrian or bicycle is in the vicinity of the crosswalk. A full pedestrian signal provides the greatest level of traffic control of the three options by stopping the vehicles for the duration of time a pedestrian or bicycle is approaching the crosswalk until they clear the roadway completely. The following describes the operations of the three traffic control devices.

When a pedestrian or bicyclist is present, an RRFB flashes yellow lights and is a warning for vehicles alerting about the presence of pedestrians or bicyclists in the crosswalk. The signal is activated by bicyclists or pedestrians with a push button. When pedestrians or bicyclists are present in the crosswalk, motorists must stop and yield. When no pedestrians are present, the lights are not activated or lit and appear black to vehicles.

A PHB operates with a yellow-red-flashing red sequence. The signal is activated by bicyclists or pedestrians with a push button. A yellow light is then activated to alert vehicles that there is a bicycle or pedestrian approaching the roadway. The next signal phase is a solid red which requires all vehicles to stop. After a period of solid red, the light switches to a flashing red. At that point, vehicles must stop, check for pedestrians or bicycles in the travel way, and can continue. When no pedestrians are present, the signal is not lit and appears black to vehicles. A PHB can be coordinated with adjacent signals including the signal at Pacific Highway S or the rail crossing.

Based on the MUTCD, a PHB should be considered when traffic volumes and pedestrian volumes exceed the thresholds identified in Figure 5-1.

Figure 4F-1. Guidelines for the Installation of Pedestrian Hybrid Beacons on Low-Speed Roadways

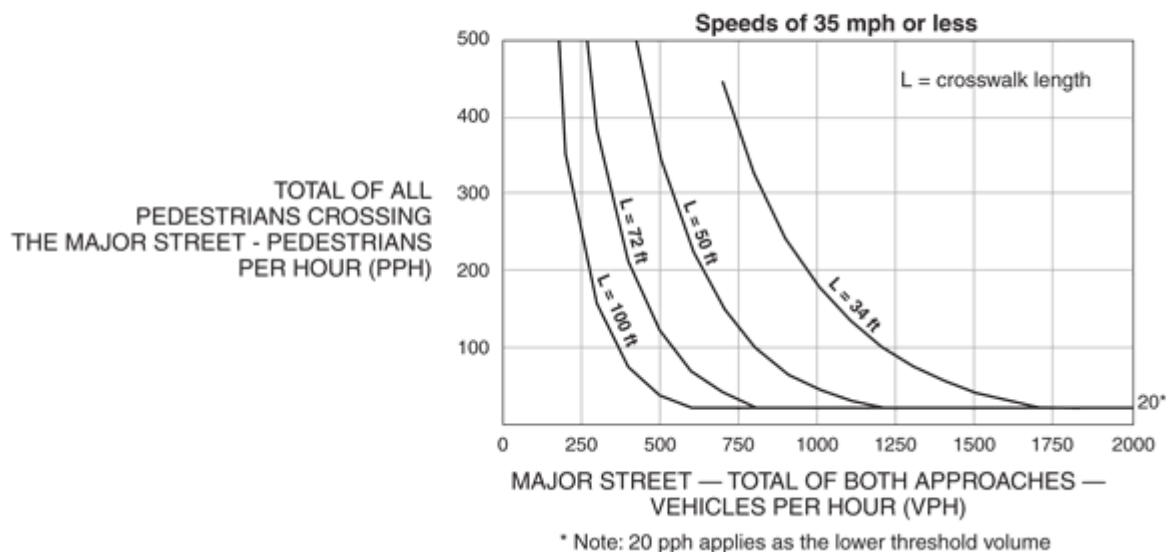


Figure 5-1 MUTCD Figure 4F-1 – Pedestrian hybrid beacon thresholds

A full pedestrian signal fully stops all the vehicles while the pedestrians or bicycles are in the crosswalk. Like the other signals, a full pedestrian signal is activated with a push button by the pedestrians or bicyclists. A full pedestrian signal can be coordinated with adjacent signals. This differs from a fully signalized intersection, which responds to vehicle activity as well as pedestrian activation.

Of the three signal options, the full pedestrian signal results in the most delay for vehicles but also removes the decision making that occurs with the other two traffic control devices (RRFB or PHB). With a full pedestrian signal, drivers are forced to stop with the red light; with a RRFB or PHB, the driver can proceed if the driver determines the travel way is clear.

Based on the MUTCD, a full pedestrian signal should be considered when traffic volumes and pedestrian volumes exceed the thresholds identified in Figure 5-2.

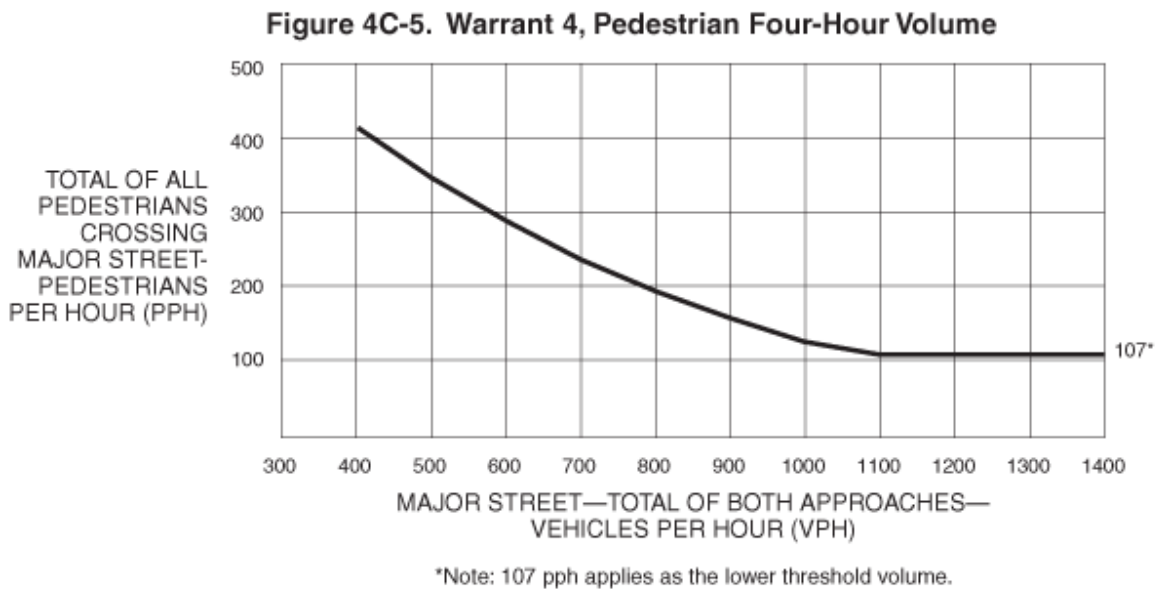


Figure 5-2 MUTCD Figure 4C-5 – Pedestrian signal warrant

At the Bridgeport Way SW/115th Street Court SW intersection, conditions meet the minimum thresholds to install a PHB. These MUTCD thresholds include: traffic volumes exceed 2,000 peak hour trips, roadway speed is 35 miles per hour (mph), and a crossing width of approximately 60 feet, and likely 20 pedestrians or bicyclists per day.

While the pedestrian volumes are lower than the thresholds shown in Figure 5-2, a full pedestrian signal should be considered given the geometric complexities of the corridor with the 115th Street Court SW intersecting Bridgeport Way SW. All turn movements are allowed at 115th Street Court SW, thus managing conflicts would be safer with a full pedestrian signal.

Traffic analyses were conducted for both a PHB and full pedestrian signal. The forecast difference in delay incurred on vehicular traffic is similar, with both scenarios operating within the City of Lakewood’s LOS and v/c ratio standards (Table 5-5). The queues from either a PHB or full pedestrian signal are not anticipated to extend back to the rail crossing.

Table 5-5 Year 2030 No-Build and Build Alternative intersection operations, Bridgeport Way SW/115th Street Court SW

| Scenario | Intersection Control Type | Approach | 2030 p.m. Peak Hour LOS, Delay ¹ , V/C | 2030 Northbound Queue (800 feet storage between 115th and tracks) |
|--|---------------------------|--|--|---|
| No-Build Alternative | OWSC | Northbound Southbound Westbound | N/A ² N/A B, 12, 0.45 | N/A |
| Build Alternative | PHB | Overall Northbound Southbound Westbound | A, 7, 0.45 A, 6, 0.54 A, 7, 0.50 C, 33, 0.29 | 95th percentile queue 230 feet. Queue contained in available storage and not forecasted to spill over onto tracks. |
| | Full pedestrian signal | Overall Northbound Southbound Westbound | B, 11, 0.46 B, 11, 0.67 B, 10, 0.60 C, 29, 0.24 | 95th percentile queue 410 feet. Queue contained in available storage and not forecasted to spill over onto tracks. |
| Do all the study intersections operate within the City's threshold (LOS D and v/c ratio of 0.90 or better)? | | | | Yes |

Notes:

- (1) Delay is reported in seconds per vehicle.
- (2) N/A – Movement is free-flow as movement is not stop controlled.

5.5.2 Bridgeport Way SW/Seattle Avenue SW pedestrian signal

Similar to the analysis described above for the Bridgeport Way SW/115th Street Court SW intersection, analysis was conducted at Bridgeport Way SW/Seattle Avenue SW to determine the appropriate level of intersection control to implement at the pedestrian crossing.

Traffic volumes on Bridgeport Way SW at Seattle Avenue SW are approximately 1,800 vehicles per hour during the p.m. peak hour. The existing and future pedestrian/bicycle activity at this intersection is less than 10 per hour. This level of pedestrian and bicycle activity is not expected to increase substantially in the future as Seattle Avenue SW is a dead end/cul-de-sac, and 123rd Street SW east of Bridgeport Way SW is built out with apartments.

A PHB is recommended when the pedestrian/bicycle volume exceeds 20 per hour (see Figure 5-1 above). While the pedestrian/bicyclist volume at this crossing is lower than this threshold a PHB is an appropriate level of traffic control due to the traffic volumes, speeds, and geometric conditions. Bridgeport Way SW has a posted speed of 35 mph, the roadway is five lanes through this section and carries up to 1,800 vehicles per hour. Pedestrian volumes likely would not increase to a level necessary to install a full pedestrian signal (over 107 bicyclist/pedestrians per hour).

Traffic analysis was conducted for both a PHB and full pedestrian signal, and both conditions operate within the City's LOS and v/c standards.

Table 5-6 Year 2030 No-Build and Build Alternative intersection operations, Bridgeport Way SW/Seattle Avenue SW

| Intersection | Intersection Control Type | Approach | 2030 p.m. Peak Hour LOS, Delay ¹ , V/C |
|--|---------------------------|--|---|
| No-Build Alternative | OWSC | Northbound Southbound Eastbound | N/A ² N/AB, 13, 0.33 |
| Build Alternatives | Pedestrian hybrid beacon | Overall Northbound Southbound Eastbound | A, 7, 0.41 A, 7, 0.51 A, 6, 0.37 D, 36, 0.25 |
| | Full pedestrian signal | Overall Northbound Southbound Eastbound | A, 8, 0.41 A, 9, 0.55 A, 7, 0.39 D, 37, 0.27 |
| Do all the study intersections operate within the City's threshold (LOS D and v/c ratio of 0.90 or better)? | | | Yes |

Notes:

- (1) Delay is reported in seconds per vehicle
- (2) N/A – Movement is free-flow as movement is not stop controlled

5.5.3 Surface lot at Lakewood Station

The Build Alternative improvements include a new surface parking lot with up to 80 stalls located northeast of the existing Lakewood Station parking garage. Parking demand and the associated project trips for the surface parking lot were estimated using methodologies established in the Institute of Transportation Engineers (ITE 2019) Parking Generation Manual, 5th edition. The ITE Parking Generation Manual also provides guidance on the time-of-day distribution for parking demand. Based on the additional 80 parking stalls and the ITE land use code #090 (Park-and-Ride Lot with Bus or Light Rail), it is estimated that 50 stalls would be occupied daily with about 14 trips, or 28%, of the parking trips leaving the surface parking lot during the p.m. peak hour. However, for a conservative analysis, it was assumed that all 80 parking stalls would be occupied with about 22 trips, or 28%, of parking trips leaving the surface parking lot during the p.m. peak hour. This increase in trips is within the daily variation and are considered nominal. Figure 5-3 displays the location of the proposed surface parking lot.



Figure 5-3 Proposed Lakewood Station surface lot

For the Build Alternative analysis, the 22 generated p.m. peak hour trips were distributed through the study intersections based on the intersection turning movement counts. Table 5-7 compares the study intersection LOS, delay, and v/c ratio for the No-Build and Build Alternative.

Based on the forecasted trips generated, it is expected that the study intersections would operate similar to the No-Build Alternative and all study intersections would meet the City of Lakewood’s traffic operations standards.

Table 5-7 Year 2030 intersection operations with surface lot at Lakewood Station

| Intersection | Intersection Control Type | Approach | 2030 p.m. Peak Hour LOS, Delay, V/C | | Added trips with Build Alternative |
|--|---------------------------|----------|-------------------------------------|-------------------|---|
| | | | No-Build Alternative | Build Alternative | |
| Bridgeport Way SW/Pacific Highway SW | Signal | Overall | C, 33, 0.55 | C, 33, 0.55 | + <15 vehicles per hour, or <1% of entering vehicles |
| 47th Avenue SW/Pacific Highway SW | Signal | Overall | C, 32, 0.26 | C, 32, 0.26 | + <15 vehicles per hour, or about 1% of entering vehicles |
| Lakewood Station Garage Access/Pacific Highway SW | Signal | Overall | B, 16, 0.28 | B, 16, 0.28 | + 22 vehicles per hour, or 2% of entering vehicles |
| Do all the study intersections operate within the City's threshold (LOS D and v/c ratio of 0.90 or better)? | | | Yes | Yes | |

5.6 Changes to parking

The following describes the addition of parking at the Lakewood Station and changes in on- and off-street parking to accommodate bicycle or pedestrian improvements.

5.6.1 Lakewood Station improvements – surface lot

This project would provide additional parking with an up to 80-stall surface lot at the Lakewood Station, located northeast of the existing garage. Table 5-8 lists the existing capacity of the Lakewood Station garage, utilization in 2019 (pre-covid) and 2023, and the future capacity with an additional surface lot. The existing vehicle parking at Lakewood Station is not fully utilized. Additionally, there is currently no indication that Sound Transit riders are overflow parking along City of Lakewood streets in neighborhoods adjacent to the Lakewood Station.

Table 5-8 Existing and Build Alternative parking capacity changes at the Lakewood Station

| Project | Capacity | Utilization |
|----------------------------------|-----------------|----------------------------------|
| Existing Lakewood Station Garage | 601 stalls | 93-96% in 2019 20-31% in 2023 |
| Build Alternative surface lot | Up to 80 stalls | N/A |

Sources:

Sound Transit Parking Utilization Report (2019d).

Sound Transit Parking Utilization count data (2023).

5.6.2 Changes to parking – on-street and private property

To accommodate the sidewalk and bike lane improvements associated with the Build Alternative, driveways along Kendrick Street SW and 47th Avenue SW would be upgraded to meet City of Lakewood roadway design requirements in accordance with the Engineering Standards Manual. The City of Lakewood roadway design requires that driveways and driveway approaches shall be combined whenever possible to create the fewest number of accesses onto a street.

In some areas, the proposed changes will mean reclaiming space in the City's ROW currently being used for private use, such as informal on-street parking, business parking, or landscaping. During the next stage of design, the City will work with individual property owners to work out ROW conflicts before construction.

Constructing sidewalk and bike lane improvements in accordance with these standards would change the number of driveways for some private properties and would remove areas currently used for parking when sidewalks are constructed.

- The multifamily apartment building at 10817 Kendrick Street SW has parking perpendicular to the building and street. This parking area is contained entirely on private property and has no formalized driveway access point to Kendrick Street SW. The project would construct sidewalks in front of the apartment and formalize driveway access consistent with City of Lakewood design standards creating a one-way drive aisle with an inbound driveway and an outbound driveway. The establishment of the driveway access points would likely require the property owners to reconfigure the parking from perpendicular to parallel thus reducing the overall capacity.
- Along the west side of 47th Avenue SW between Pacific Highway S and the I-5 bridge, vehicles park outside the fence between the auto dealership and 47th Avenue SW. The fence is located within the private property line thus the parking that occurs between the fence and 47th Avenue SW is partially on private property and partially within City ROW. This area is not signed/designated by the City of Lakewood for on-street parking; however, it is also not prohibited. To construct the proposed sidewalk improvements, the City ROW would need to be utilized, thus removing these parking spaces. There is no impact to private property as all improvements would occur within the ROW and they would not preclude the owner of the auto dealership from reconfiguring the use of the property.
- Several apartment buildings are located along the east side of 47th Avenue SW and do not have formalized driveways or driveway approaches today. At 12701, 12721, 12805 to 12809, and 12915 47th Avenue SW, the improvements would result in the construction of sidewalks and driveway approaches consistent with the City of Lakewood design standards. This would include one ingress and one egress access point at each apartment building, thus requiring reconfiguration of parking within the private property.

Figures 5-4 through 5-7 display where construction of curb, gutter, and sidewalks within the City ROW may change how parking on private property will be accessed. The construction of curb, gutter, and sidewalks also require the driveway access points to be formalized to meet City requirements. These changes are consistent with the City of Lakewood design standards and property development, thus are not impacts requiring further mitigation.

Existing Conditions



Build Alternative

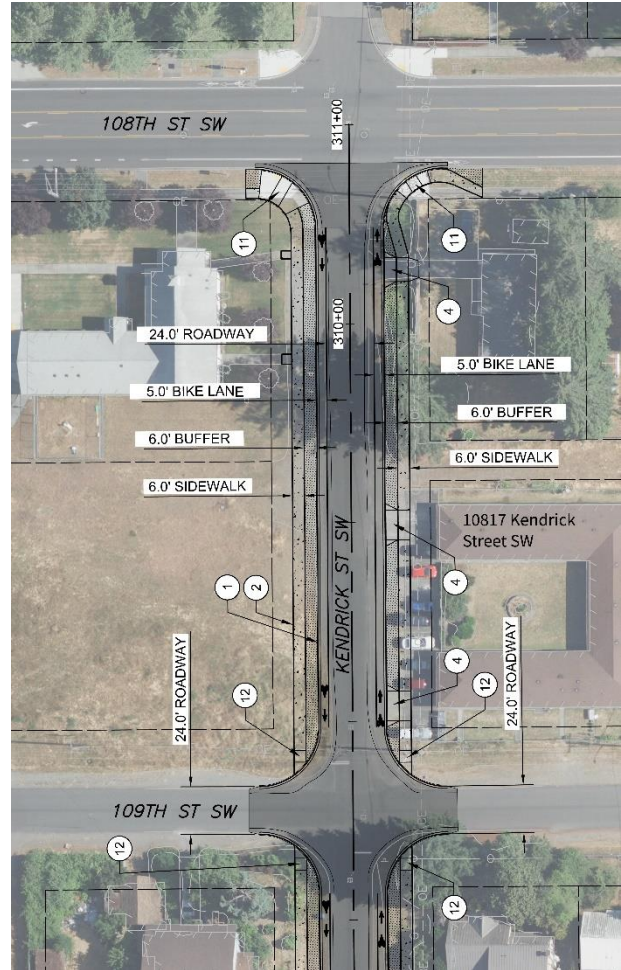
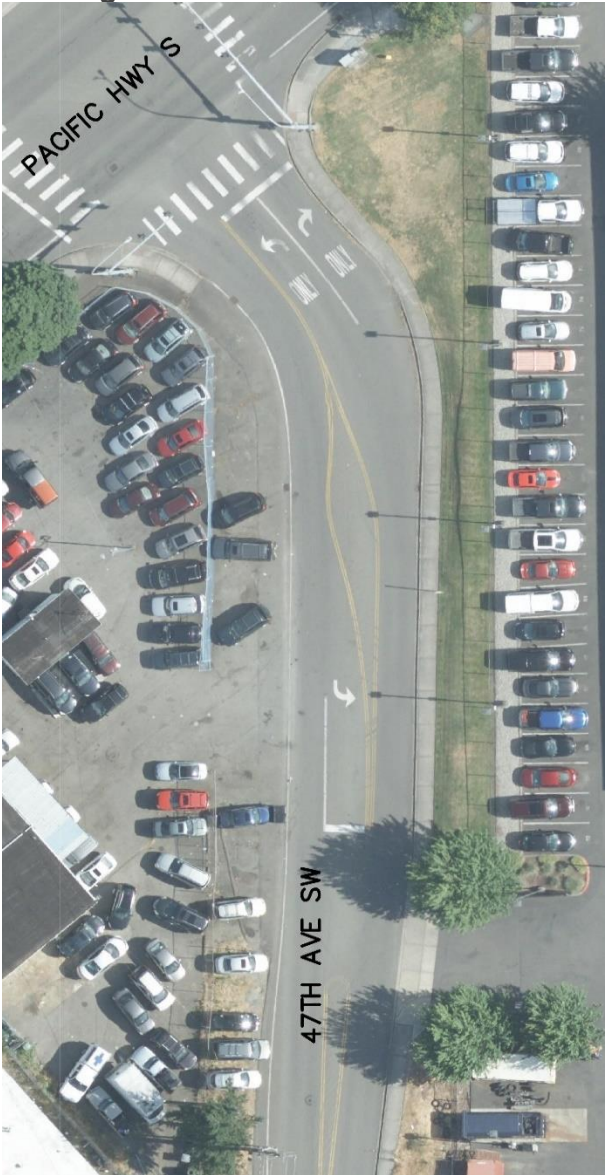


Figure 5-4 Parking 10817 Kendrick Street SW

Existing Conditions



Build Alternative

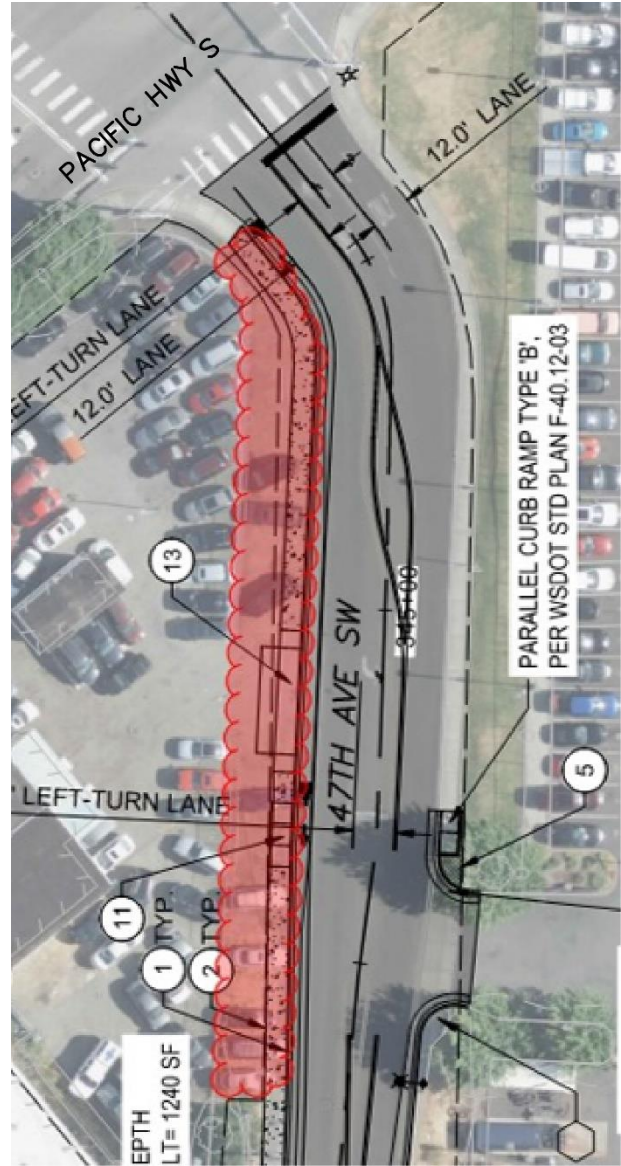


Figure 5-5 Parking – 47th Avenue SW between Pacific Highway S and I-5 Bridge

Existing Conditions



Build Alternative

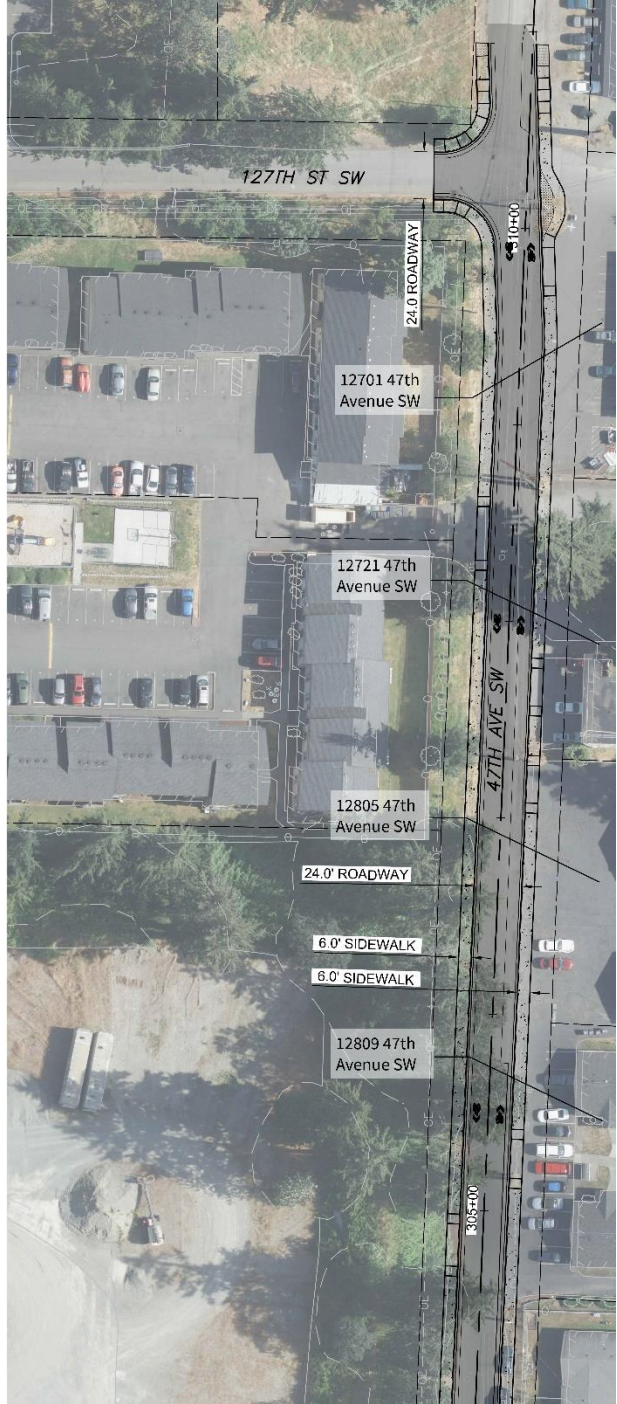


Figure 5-6 Parking – 12701, 12721 and 12805 to 12809 47th Ave SW

Existing Conditions



Build Alternative

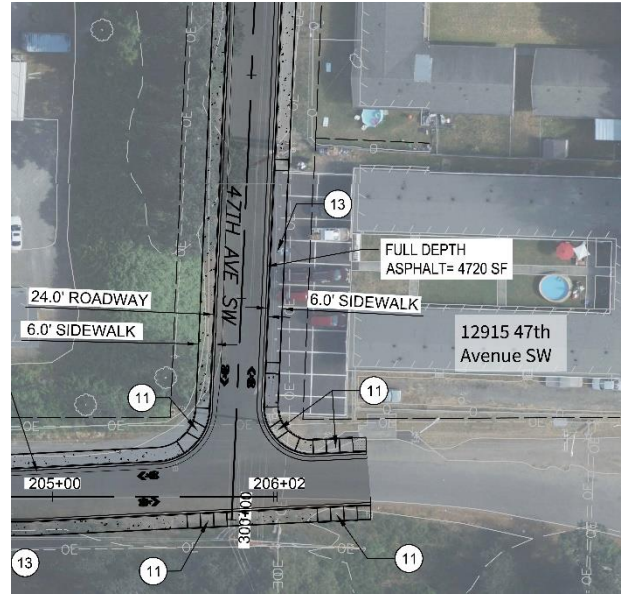


Figure 5-7 Parking - 12915 47th Avenue SE

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