

# 1. INTRODUCTION AND PROJECT DESCRIPTION

## 1.1 Project Background

The City of Seattle (City) proposes to build a bridge on S Lander St between 1st Ave S and 4th Ave S to provide a grade-separated crossing over the BNSF Railway's railroad tracks that will improve local traffic circulation and safety in the City's SODO neighborhood. S Lander St is an essential east-west corridor that is heavily used by freight and commuter traffic as well as pedestrians, bicycles, and transit. It serves one of the largest manufacturing and industrial centers in the state, including the Port of Seattle's seaport terminals. The street currently intersects with four BNSF tracks at an at-grade crossing located between Occidental Ave S and 3rd Ave S. Available data indicate that more than half of the BNSF rail cars that move through Washington go through the S Lander St crossing, contributing to vehicular delays averaging over 4 ½ hours each day. These delays affect freight, commuters, local businesses, and the public. An overcrossing at this location would eliminate delays caused by train crossings, benefiting mobility and safety in the area.

The City envisioned the S Lander St Grade Separation Project nearly 20 years ago. It was one of the original Freight Action Strategy (FAST) Corridor projects (Texas Transportation Institute 1997), intended to improve railroad crossings along the BNSF Everett-Seattle-Tacoma rail corridor. There are currently two existing grade-separated crossings in the north end of SODO at S Royal Brougham Way and Edgar Martinez Dr S (SR 519); to the south, the Spokane St Viaduct provides a route that passes above this set of railroad tracks. Between those two locations, S Lander St is the most viable of the remaining grade separation options because of its wide right-of-way, the distance between railroad tracks and adjacent streets, and the relatively small railroad crossing width. These factors allow for a shorter crossing that has sufficient space to reach the necessary clearance requirements over the tracks. The grade separation would be designed to provide the necessary vertical clearance over the railroad tracks while maintaining access to local businesses.

The S Lander St Grade Separation Project is a high-priority project in the Seattle Freight Master Plan and in the 2015 Plan to Move Seattle, the 10-year City strategic plan for increasing safety, reducing congestion, and balancing modal needs. It also supports the Industrial Areas component of the Seattle Comprehensive Plan and was identified as a Tier 1 project by the Seattle Industrial Areas Freight Access Project. These plans have elevated the project as a City priority not only because of its safety, congestion, and multimodal access benefits, but also because of its important role in the regional freight network.

## 1.2 Project Location

The project area is shown in Figure 1-1. The project area extends along S Lander St from 1st Ave S on the west to 4th Ave S on the east. Improvements would generally be made within the existing 100-foot wide City right-of-way.



Figure 1-1. Project Area

## 1.3 Purpose and Need for the Project

The primary purpose of the project is to provide a grade separation between the roadway and the BNSF tracks to reduce delays and improve safety for all users. The City’s goals and objectives for the S Lander St corridor have been documented in the Access Duwamish Report in 2000 (City of Seattle and Port of Seattle 2000) as well as the bridge type, size, and location (TS&L) study in 2016 (COWI 2016).

## 1.4 Project Description

The project would extend from 1st Ave S on the west to 4th Ave S on the east. Both of these roadways serve as major north-south arterials in the existing surface street network. The grade-separated structure would have a four-lane cross section, which would accommodate forecast traffic volumes through the year 2040.

Table 1-1 summarizes the main project design features related to the bridge alignment, local access, and nonmotorized facilities. Each of these elements is described in more detail in the following subsections.

**Table 1-1. Summary of Project Design Features**

Project Element	Description
Bridge alignment	Bridge centerline offset 6 feet north of existing S Lander St centerline.
Bridge profile	To meet the railroad track-clearance requirement of 23.5 feet and a desired maximum grade of 7%, the bridge would be 7 to 8 feet above Occidental Ave S, eliminating its existing intersection with S Lander St.
Cross section	68 feet in total width including exterior barriers. Includes two 12-foot lanes two 11-foot lanes, a 14-foot-wide multi-use path, and a barrier between motorized and nonmotorized vehicles.
Nonmotorized facilities	14-foot-wide two-way shared use path on north side of the bridge.
Local access west of railroad tracks	Dead-end Occidental Ave S on each side of bridge.
Local access east of railroad tracks	Two-Way Connection—two-way surface street along south side of bridge, crossing under bridge to Seattle Public Schools John Stanford Center for Educational Excellence site.
S Lander St intersections at 1st Ave S and 4th Ave S	Westbound S Lander St approaching 1st Ave S—one left-turn lane, one through lane, and one right-turn lane. Eastbound S Lander St approaching 4th Ave S—one left-turn lane, one through lane, and one through right-turn lane.

### 1.4.1. Bridge Alignment and Cross Section

The proposed bridge alignment is offset 6 feet northward of the existing centerline of S Lander St as shown in Figure 1-2.

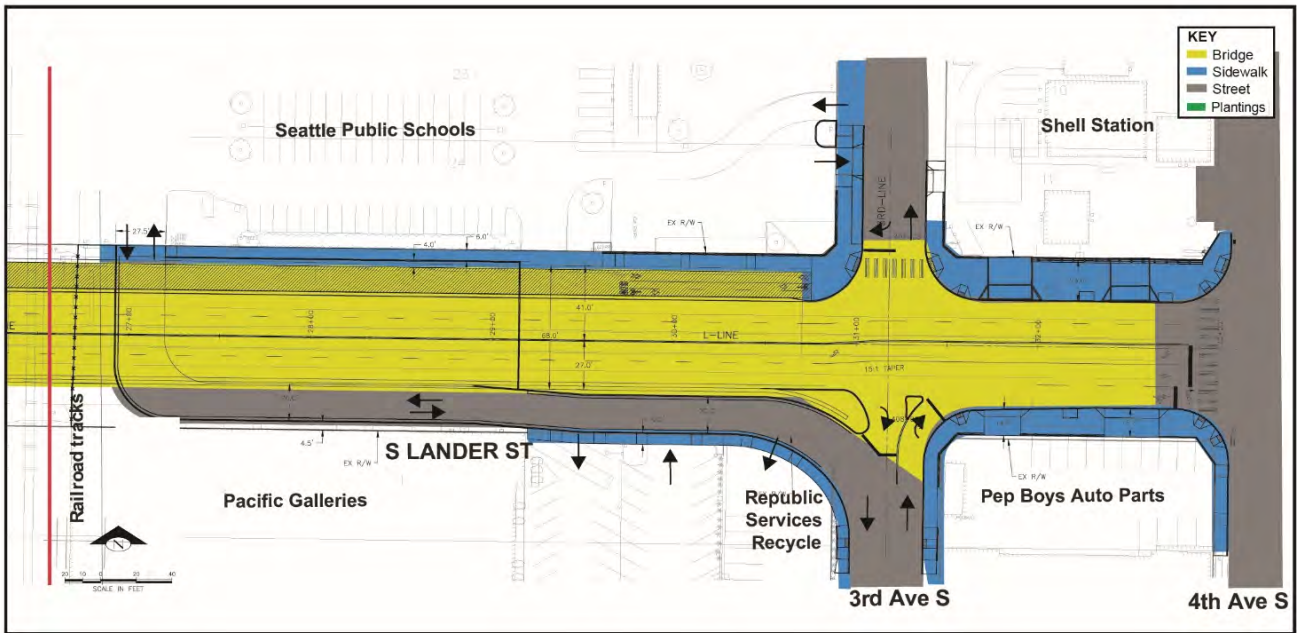
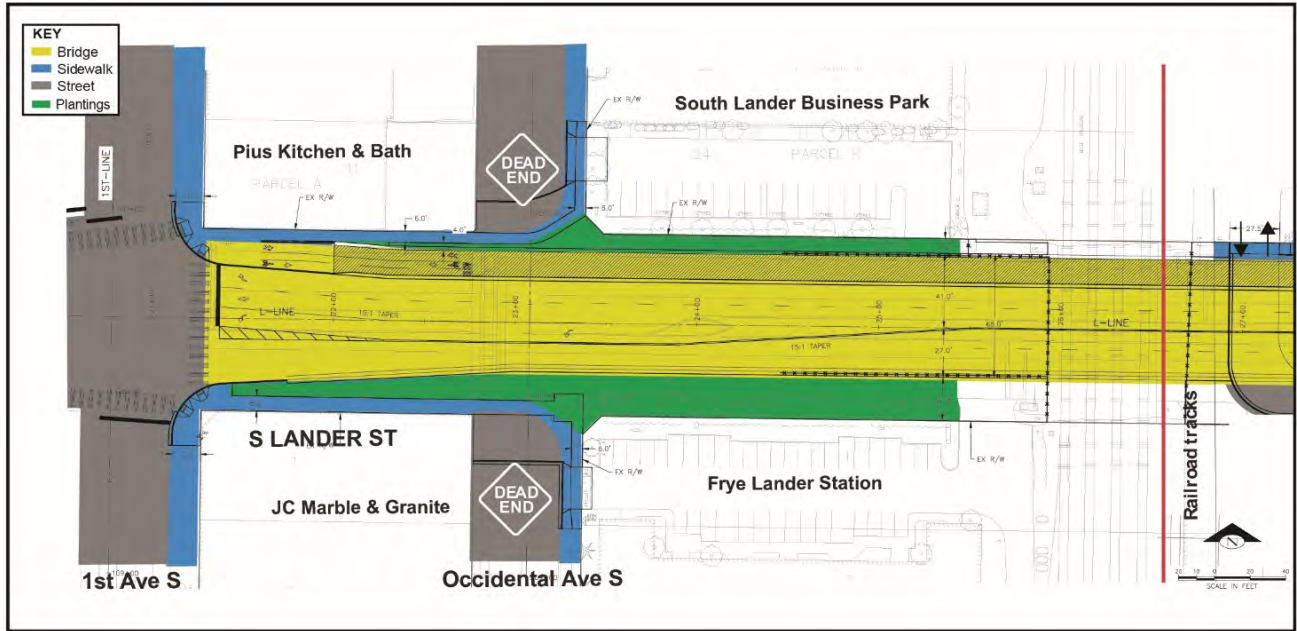
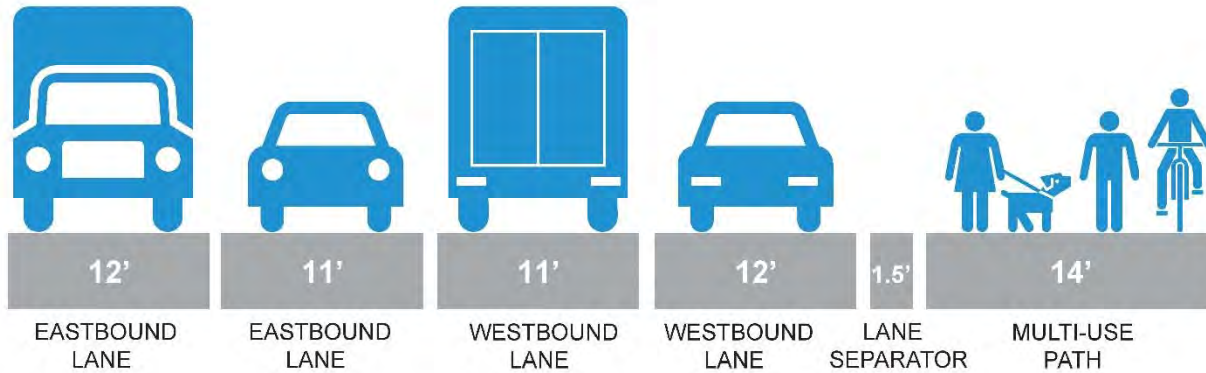


Figure 1-2. Proposed Alignment

A four-lane bridge is proposed for this project. The total width of the bridge would be 68 feet, with a cross section that would include a 14-foot-wide multi-use path for nonmotorized traffic (described below), one 12-foot lane (curbside) and one 11-foot lane in each direction, plus a 2-foot shoulder adjacent to the eastbound barrier and a 1.5-foot lane separator between the nonmotorized facilities and vehicle lanes. Figure 1-3 depicts the proposed bridge cross section.



**Figure 1-3. Proposed Bridge Cross Section**

The bridge would be a 4-span structure, with drilled shaft foundations up to 200 feet in depth. Geofoam approaches, up to 20 feet in height, would be used to reduce the loading on the underlying utilities between exterior bridge barriers (not shown).

The proposed bridge must clear all BNSF railroad tracks by 23.5 feet and a future Amtrak rail line by 22.5 feet; the desired maximum grade for the roadway is 7 percent. Given those design parameters, the bridge approaches would meet Occidental Ave S about 7 to 8 feet above the existing street grade, which would eliminate the existing intersection. There would be more horizontal distance between the railroad tracks and 3rd Ave S to the east, and the intersection at S Lander St/3rd Ave S would be retained by raising 3rd Ave S by 2 to 3 feet.

### 1.4.2. Nonmotorized Facilities

The project would create a 14-foot-wide, two-way multi-use path on the north side of the bridge, separated from the vehicle lanes by a 1.5-foot lane separator (Figure 1-3). This configuration would accommodate the large majority of pedestrians in the corridor who walk along the north side, which is along the direct walking route between the Starbucks Center, the Seattle Public Schools John Stanford Center for Educational Excellence (district headquarters building), and the SODO Link light rail station. The 14-foot width is comparable to other multi-use trails such as the Elliott Bay Trail, the West Seattle Trail across the Spokane St swing bridge, and the SR 520 regional shared-use path across the new floating bridge. The multi-use path on S Lander St would provide capacity for shared use by both pedestrians and bicyclists, space for passing, and separation between vehicular and nonmotorized traffic. On the west, the path would continue to 1st Ave S. On the east, the dedicated path would end at 3rd Ave S; however, a wider sidewalk would be included between 3rd and 4th Aves S to accommodate the potential increase in bicycle activity.

In addition to the multi-use path on the bridge, sidewalks with a minimum width of 6 feet would be provided at street level adjacent to the Seattle Public School District headquarters, the access road to 3rd Ave S, and on each side of the roadway between 1st Ave S and Occidental Ave S (see Figure 1-2).

### **1.4.3. Local Access West of Railroad Tracks**

The bridge approaches would be elevated above Occidental Ave S west of the railroad tracks, which would eliminate the ability to connect the street north and south of S Lander St. As a result, Occidental Ave S would be dead-ended north and south of the bridge. Figure 1-2 shows the proposed configuration.

Between 1st Ave S and the railroad tracks, the new structure would eliminate access to businesses from S Lander St because the roadway would be elevated above these sites. The driveways for the South Lander Business Park and Frye Lander Station would need to be moved to Occidental Ave S, with access to the arterial network provided via the S Forest St/1st Ave S intersection to the south and the S Stacy St/1st Ave S intersection to the north. Both of those intersections are signalized and provide access from all directions.

### **1.4.4. Local Access East of Railroad Tracks**

Local access to the Seattle Public Schools John Stanford Center for Educational Excellence, Pacific Galleries, and Republic Services properties located east of the railroad tracks would be provided via a two-way local roadway along the south side of S Lander St at the 3rd Ave S intersection, as shown in Figure 1-2.

### **1.4.5. Intersections at 1st Ave S and 4th Ave S**

The intersection at S Lander St and 1st Ave S would be designed to accommodate three westbound lanes: a left-turn lane, a through lane, and a right-turn lane. The left-turn lane would allow the intersection to operate with protected or protected-permissive left-turn phasing, consistent with current operations. Only one through lane in each direction is necessary for the expected demand. A right-turn-only lane would allow the pedestrian crossing of the intersection's north leg to be separated from right-turn traffic, if necessary. One eastbound departure lane (leaving 1st Ave S) would be wide enough (or would have buffer space) to allow for large truck-turning movements.

The intersection at S Lander St and 4th Ave S would also be designed to accommodate three westbound lanes: a left-turn lane, a through lane, and a through/right-turn lane. The inside eastbound lane on the bridge would transition to the left-turn lane at this intersection, and signage would be provided to alert motorists that they are approaching a turn lane.

## **References:**

City of Seattle and Port of Seattle. 2000. Access Duwamish: A Freight Mobility and Economic Strategy for the Duwamish Area. Project Summary Report. June 2000.

COWI (COWI North America, Inc.). 2016. South Lander Street Grade Separation: Bridge and Structures Type, Size, and Location Report. Prepared for Seattle Department of Transportation. Seattle, Washington. July 29, 2016.

Texas Transportation Institute. 1997. FAST Project Report. March 1997.