SDOT
Seattle Department of Transportation

BURKE-GILMAN TRAIL MISSING LINK PROJECT

Transportation Discipline Report

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Draft Environmental Impact Statement
May 2016

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ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disabilities Act
Ballard Locks	Hiram M. Chittenden Locks
BGT Missing Link	Burke-Gilman Trail Missing Link
BGT	Burke-Gilman Trail
BTR	Ballard Terminal Railroad Co.
City	City of Seattle
CSO	combined sewer overflow
GMA	Growth Management Act
LOS	Level of Service
mph	miles per hour
Parks	Seattle Parks and Recreation
PSRC	Puget Sound Regional Council
RCW	Revised Code of Washington
SDOT	Seattle Department of Transportation
Ship Canal	Lake Washington Ship Canal
Sound Transit	Central Puget Sound Regional Transit Authority
SPU	Seattle Public Utilities
WSDOT	Washington State Department of Transportation
USDOT	United States Department of Transportation

EXECUTIVE SUMMARY

This Transportation Discipline Report describes the existing conditions for all transportation modes and facilities within and near the footprint of the Burke-Gilman Trail Missing Link (BGT Missing Link) and analyzes the potential impacts of project construction and operation on these resources. Existing conditions, impacts, and mitigation for parking are evaluated in a separate Parking Discipline Report.

The study area selected for the BGT Missing Link transportation analysis is the area bounded by 32nd Ave NW to the west, NW 56th St/20th Ave NW/Leary Ave NW to the north, 11th Ave NW to the east, and Shilshole Ave NW/NW 45th St to the south.

The transportation modes that exist within the study area consist of general-purpose vehicles, freight, nonmotorized (pedestrian and bicycle), public transportation, and shortline rail. The facilities within the study area that are associated with these modes are the street network, facilities for nonmotorized users, public transportation facilities, and rail facilities. Transportation safety was also analyzed as part of this report.

Activities during construction of the Build Alternatives could affect transportation in the study area by temporarily increasing congestion and altering local access. It is anticipated that increases in congestion and delay in the study area would be relatively minor because construction would occur in short segments, between three and four street blocks in length, and other local streets would remain open. For all of the Build Alternatives, any street closures along the alignments would likely occur during midday for several hours and would be temporary.

The construction duration of the entire project would be 12 to 18 months. During street closures, traffic would be routed around active construction areas. Pedestrian and bicycle access would be maintained during construction of the Build Alternatives. This would minimize impacts on nonmotorized users. The functionality of the overall street network within the study area would be maintained during construction. Public transportation facilities would be provided on streets within the study area; impacts on public transit would be minimal.

No substantial impacts on rail facilities would occur during construction because rail service would continue. However, the Shilshole South Alternative could require track relocation, which would be coordinated with the rail provider to reduce disruption to track use. All construction activities near the rail line would be coordinated with the rail line operator and the Federal Railroad Administration and would adhere to federal requirements for construction near rail facilities. Various mitigation measures, including construction planning and public information and outreach, would minimize construction impacts on transportation resources.

The Build Alternatives would complete the Burke-Gilman Trail between 11th Ave NW and NW 45th St, and the Hiram M. Chittenden (Ballard) Locks. The project would create a safely designed, direct, and defined multi-use trail for persons of all abilities, and improve predictability for all motorized and nonmotorized users along the project alignment. Under the Shilshole South, Shilshole North, and Ballard Avenue Alternatives, intersection levels of service and delays for vehicle traffic would be similar or better at most intersections compared to the No Build Alternative. Under the Leary Alternative, intersection level of service (LOS) would be reduced to E or F and delay would be increased by five seconds or more at four intersections compared to the No Build Alternative because Leary Ave NW/NW Leary Way and NW Market St each would be reduced by one lane to accommodate the multi-use trail. NW Market St would also be reduced by one lane under the Shilshole North Alternative, but this would not worsen intersection operations on NW Market St.

Under all of the Build Alternatives, some properties adjacent to the City of Seattle right-of-way could experience changes in driveway or loading dock access. Changes could include reorientation of driveways or loading docks. Businesses that are currently using the public right-of-way for loading and unloading activities would no longer be allowed to continue this unpermitted use under the Build Alternatives.

Public transit would not be substantially affected under the Shilshole South, Shilshole North, and Ballard Avenue Alternatives because there would be no additional delay on transit corridors; moreover, transit service would be able to operate similarly to the No Build Alternative. Under the Leary Alternative, increased congestion and delay on Leary Ave NW/NW Leary Way could affect public transportation. Under all of the Build Alternatives, the trail would provide a safer and clearly delineated facility for nonmotorized travel.

CHAPTER 1 INTRODUCTION AND PROJECT HISTORY

1.1 Introduction

The Burke-Gilman Trail (BGT) is a regional trail that runs east from Golden Gardens Park in Seattle and connects to the Sammamish River Trail in Bothell, except for a missing segment through the Ballard neighborhood. Currently, the regional trail ends at 30th Ave NW by the Hiram M. Chittenden (Ballard) Locks on the west, and begins again at the intersection of 11th Ave NW and NW 45th St on the east. The Seattle Department of Transportation (SDOT) proposes to connect these two segments of the BGT with a marked, dedicated route that would serve all users of the multi-use trail. The proposed project to complete the regional facility is referred to as the Missing Link.

Completing this section of the BGT has been discussed since the late 1980s. Refer to Chapter 1 in the Draft Environmental Impact Statement (DEIS) for a detailed summary of the project history. The alternatives evaluated in the DEIS were developed from suggestions received in 2013 during scoping for the DEIS. Suggested routes were evaluated using the following screening criteria: directness of route, number and types of trail crossings (i.e., driveways and intersections), street and arterial classification, adjacent land uses, and right-of-way width.

1.2 No Build Alternative

Under the No Build Alternative, no new multi-use trail would be constructed to connect the existing segments of the regional Burke-Gilman Trail. Trail users would continue to use the existing surface streets and sidewalks to travel between the existing trail segments, a distance of approximately 1.2 miles. Currently, trail users tend to use the most direct route, which is along Shilshole Ave NW. Pedestrians may opt for a street with sidewalks such as Ballard Ave NW or NW Leary Way. The No Build Alternative serves as the baseline condition, against which the Build Alternatives are compared over time to their 2040 design year. Over that time period, population and employment growth is expected to continue in the Ballard neighborhood, leading to an increase in traffic congestion, parking demand, and the number of people walking and biking.

1.3 Build Alternatives

Four Build Alternatives are analyzed in the DEIS: the Shilshole South, Shilshole North, Ballard Avenue, and Leary Alternatives. The alternatives described below are conceptual routes designed to provide distinct alternatives for analysis in the DEIS. The route that is eventually selected as the preferred alternative could be any one of these routes, or a combination of portions of any of them.

1.3.1 Shilshole South Alternative

Under the Shilshole South Alternative, the multi-use trail would be primarily routed along the south side of Shilshole Ave NW (Figure 1-1). There would be changes to parking, lanes, and intersection configurations on both sides of the street along this alternative alignment. The trail would accommodate users on a newly paved surface for most of its length.


30th AVE NW
28th AVE NW
26th AVE NW
24th AVE NW
22nd AVE NW
20th AVE NW
17th AVE NW
15th AVE NW
14th AVE NW
11th AVE NW
NW 58th ST
NW 57th ST
NW 56th ST
NW MARKET ST
NW 54th ST
NW 53rd ST
NW 52nd ST
NW 51st ST
NW 50th ST
NW 49th ST
NW LEARY WAY
NW BALLARD WAY
NW 46th ST
NW 45th ST
NW 54th ST
NW 54TH ST
BALLARD AVE NW
SHILSHOLE AVE NW
LEARY AVE NW
NW DOCK PL
BALLARD BRIDGE
SALMON BAY
Shilshole South Alternative
Shilshole North Alternative
Ballard Avenue Alternative
Leary Alternative
Connector Segment
Existing Trail
Existing Trail End
0
Feet
1000
N

Beginning at the existing western trail end at the Ballard Locks, the trail would continue east along the north side of the unimproved NW 54th St right-of-way until the intersection with Shilshole Ave NW, just east of 24th Ave NW. The trail would then proceed along the south side of Shilshole Ave NW, continuing onto the southern side of NW 45th St to the eastern project end at 11th Ave NW.

From the existing western trail end at the Ballard Locks, the trail would be north of the Ballard Terminal Railroad (BTR) tracks until just before 17th Ave NW, at which point the trail would cross to the south of the tracks. A signal would be installed at the intersection of Shilshole Ave NW and 17th Ave NW for trail users crossing Shilshole Ave NW to access 17th Ave NW**.**

The trail width would vary throughout the corridor due to existing conditions and constraints, but would generally be between 8 and 12 feet wide. Based on the design concepts, the typical right-of-way on Shilshole Ave NW for this alternative would include a buffer zone adjacent to the railroad tracks and vehicle traffic lanes, a multi-use trail, two vehicle travel lanes, and preservation of parking areas where feasible.

1.3.2 **Shilshole North Alternative**

Under the Shilshole North Alternative, the multi-use trail would be primarily routed along the north side of Shilshole Ave NW (Figure 1-1). Beginning at the existing western trail end at the Ballard Locks, the trail would continue east along the south side of NW 54th St until it turns into NW Market St. The trail would continue along the south side of NW Market St, until it crosses 24th Ave NW and turns south on the east side of 24th Ave NW. The trail would then proceed east along the north side of Shilshole Ave NW to the intersection with NW 46th St. A signal would be installed at the intersection of Shilshole Ave NW and 17th Ave NW for trail users crossing 17th Ave NW. It would continue along the north side of NW 46th St underneath the Ballard Bridge to 11th Ave NW. At this point, the trail would turn south along the east side of 11th Ave NW until it connects to the eastern end of the trail at NW 45th St.

There would be changes to parking, vehicle travel lanes, and intersection configurations on both sides of the street in this alternative. The typical right-of-way section on NW Market St would include a sidewalk, the multi-use trail, a buffer zone, two vehicle travel lanes, center turn lane, and parallel parking areas on both sides of the street. The typical right-of-way on Shilshole Ave NW for this alternative would include a buffer zone and informal parking adjacent to the railroad tracks, two vehicle travel lanes, parallel parking area, buffer area, multi-use trail, and sidewalk. The existing gravel shoulder on the south side of Shilshole Ave NW would be maintained. These elements would vary along the trail due to the existing road configuration and structures.

1.3.3 **Ballard Avenue Alternative**

Under the Ballard Avenue Alternative, the multi-use trail would be primarily routed along the south side of Ballard Ave NW (Figure 1-1). Beginning at the existing western trail end at the Ballard Locks, the trail would continue east along the north side of the unimproved NW 54th St right-of-way until 28th Ave NW. At this point the trail would turn north along the east side of 28th Ave NW until it reaches NW 56th St. The trail would then turn east along the south side of NW 56th St to the intersection with 22nd Ave NW. At 24th Ave NW and NW 56th St, a new pedestrian-activated signal would be installed to facilitate the trail crossing of 24th Ave NW. The trail would turn south along the west side of 22nd Ave NW, cross NW Market St, and proceed south to Ballard Ave NW. At this point the trail would turn southeast along the south side of Ballard Ave NW and continue east on the south side of NW Ballard Way to the intersection with 15th Ave NW. The trail would then turn south onto the one-way road on the west side of 15th Ave NW, which could potentially be converted to trail-only use (no motor vehicles). The trail would cross to

the south side of NW 46th St at a newly signalized intersection and proceed east across 11th Ave NW. It would then turn south along the east side of 11th Ave NW to the eastern trail end at NW 45th St.

There would be changes to parking and vehicle travel lane configurations on all streets traversed by this alternative. The typical right-of-way section on Ballard Ave NW would include pedestrian sidewalks on both sides of the street, buffer zone, two vehicle travel lanes, and a parallel parking area on the north side of the street. These elements would vary along the trail due to the existing road configurations and structures.

1.3.4 Leary Alternative

Under the Leary Alternative, the multi-use trail would be primarily routed along the south side of Leary Ave NW (Figure 1-1). Beginning at the existing western trail end at the Ballard Locks, the trail would continue east along the south side of NW 54th St until it turns into NW Market St. The trail would continue east along the south side of NW Market St, crossing 22nd Ave NW. At 22nd Ave NW, the trail would turn southeast on the south side of Leary Ave NW. The trail would continue east along the south side of Leary Ave NW, which becomes NW Leary Way, to 11th Ave NW. At this point, the trail would turn south along the east side of 11th Ave NW to the current trail end at NW 45th St.

There would be changes to parking, vehicle travel lanes, and intersection configurations on both sides of the street along this alternative. The typical right-of-way on Leary Ave NW would include buffer zones on both sides of the street, a multi-use trail, parking areas on both sides of the street, sidewalks on both sides of the street, two vehicle travel lanes, and one two-way center left turn lane. The typical right-of-way on NW Market St would include a sidewalk, the multi-use trail, a buffer zone, two vehicle travel lanes, center turn lane, and parking areas on both sides of the street. These elements would vary along the trail due to the existing road configuration and structures.

1.3.5 Connector Segments

As mentioned previously, there are a number of possibilities to configure the routes, and six segments have been identified as the most likely connectors (Figure 1-1). These segments may be used as connections between portions of the previously identified alternative routes and could be on either side of the road. The connector segments include the following:

- Ballard Avenue NW;
- NW Vernon Place;
- 20th Avenue NW;
- 17th Avenue NW;
- 15th Avenue NW; and
- 14th Avenue NW.

Should NW Vernon Pl be used as a connector segment, a signal at NW Vernon Pl and Shilshole Ave NW may also be warranted, depending on whether the trail would continue on the north or south side of Shilshole Ave NW.

1.4 Features Common to All Build Alternatives

1.4.1 Roadway Design Considerations

Roadway designs would vary for each alternative based on factors such as intersection geometry, vehicle volumes, and types of vehicles. This section describes roadway modifications, intersection treatments, driveway design, and parking lot changes that could be incorporated during the final design phase of the project to address safety, access, non-motorized users, and vehicle types. Similar concepts can be found throughout the city and in design documents such as the Urban Bikeway Design Guide (National Association of City Transportation Officials [NACTO], 2015) and Guide for Development of Bicycle Facilities (American Association of State Highway and Transportation Officials [AASHTO], 2012). These features are common to all Build Alternatives, but the location and other specifics would vary by alternative.

Roadway Design

Adding a trail to the existing street system would require roadway modifications for vehicles to co-exist with non-motorized users. These changes could include geometric changes to create perpendicular intersections, changes to roadway lane configurations, alterations of curb radii, and design details that provide sight lines between vehicles and non-motorized users.

Intersection Design

Intersections would be designed to more clearly identify crossings of the multi-use trail. These improvements could include the following:

- Curb extensions or curb bulbs;
- Pavement markings;
- Raised crosswalks;
- Driveway-style entrances at intersections;
- Signalized intersections;
- Rapid flashing beacons at road crossings of the trail;
- Medians used either to improve the street crossing for pedestrians or to restrict left turns across the trail;
- Barriers, fences, or buffers separating non-motorized trail users from moving vehicular traffic or the railroad; and
- Alternative pavement treatments.

Driveway Design

Driveways that cross or intersect with the multi-use trail would also be evaluated for possible design changes. Design changes could include many of the intersection elements described above, including curb bulbs, and pavement markings and treatments. Driveways and loading docks would be reconfigured so that parked vehicles or trucks would not block the trail. Some driveways may be eliminated, relocated, or consolidated where there are multiple driveways at a single property.

Access Modifications

Some private lots may be affected where vehicle parking currently extends into the public right-of-way, or due to changes to property access from the multi-use trail. For example, striping in parking lots may be modified to prevent vehicles from parking in the right-of-way and blocking the trail, which may reduce the number of parking spaces in some lots.

1.4.2 Construction Activities and Durations

Overall construction of any of the Build Alternatives would last 12 to 18 months. Duration would vary depending on the extent of utility relocations, storm drainage improvements, and existing roadway reconfigurations including bus stop relocations. Construction would likely occur in segments, and one segment would be completed before moving on to the next segment to minimize the construction duration at any given location.

Construction of any of the Build Alternatives would consist of the following general activities:

- Demolition, including removal of pavement, curbs, sidewalks, driveways, trees, signs, bus shelters, fencing, or other features located in the new trail area.
- Construction of new roadway elements, including pavement, curbs and gutters, sidewalks, driveways, trees, bus shelters, fencing, signs, and buffer elements. Buffer elements include such things as paving, landscaping, barriers, fencing, and signage.
- Utility relocations, ranging from moving fire hydrants, stormwater catch basins, and overhead utility and power poles to the installation of new drainage facilities.

1.4.3 Construction Staging

Construction staging and scheduling are typically determined by the contractor; however, the City would specify some mandatory restrictions for the contractor. Demolition would likely be limited to a certain length of the trail; as such, the contractor would not be allowed to demolish the work space along the entire length of the trail. Rather, the project would be constructed in multiple smaller segments.

The project would generally use areas within or near the project footprint for construction staging and storing materials and equipment, including vacant lots, parking lots, and unused rights-of-way. Temporary construction offices (such as trailers) could also use these areas. Alternatively, construction offices may be located in a rented office space. All staging areas would be restored to their pre-construction condition or better.

1.4.4 Construction Traffic and Haul Routes

Construction would generate traffic to transport materials and equipment to the work site and to remove demolition debris and excess soil. The contractor would require access to the site for heavy vehicles such as dump trucks and concrete trucks, light vehicles such as pickup trucks, and heavy equipment such as excavators and compactors. Trucks would transport construction material. The contractor would determine the best construction methods, as permitted by the City and in conformance with the project construction plans and specifications. The exact number of truck trips per day during construction cannot yet be determined because project design is not yet complete. However, preliminary estimates indicate that the highest number would be approximately 20 round-trip truck trips per work day during a paving operation, spread uniformly throughout the day. City streets that could be used as haul routes include Shilshole Ave NW, NW 46th St, NW Leary Way/Leary Ave NW, and 15th Ave NW.

CHAPTER 2 REGULATORY CONTEXT

Transportation facilities and functions are governed by federal, state, regional, and local laws, plans, and policies. These identify goals, infrastructure needs, and performance standards for various transportation modes and systems. This chapter provides a summary of laws, plans, and policies that apply to the BGT Missing Link transportation analysis.

2.1 Federal Laws and Regulations

The United States Department of Transportation (USDOT) signed the Policy Statement on Bicycle and Pedestrian Regulations and Recommendations in March 2010, which reflects the department's "support for the development of fully integrated active transportation networks" (Federal Highway Administration, 2010). The Policy Statement requires that federal-aid projects include walking and bicycling components. The policy also encourages transportation agencies to go beyond the minimum requirements for inclusion of bicycle and pedestrian facilities to reduce the need to retrofit, and to proactively provide convenient, safe, and context-sensitive facilities that encourage increased nonmotorized use by users of all ages and abilities. The minimum requirements for inclusion of bicycle and pedestrian facilities varies by jurisdiction.

2.2 State Laws and Regulations

2.2.1 Washington State Growth Management Act

The Washington State Growth Management Act (GMA) sets goals, compliance deadlines, and direction for state and local governments to manage Washington's growth (Revised Code of Washington [RCW] 36.70A.070). The GMA includes a set of planning goals that local governments use to guide planning efforts, such as comprehensive plans, and local development. The Seattle Comprehensive Plan, including its most recent draft of the Transportation Element (described below), was developed in compliance with the GMA. Development of alternatives for the BGT Missing Link was guided by the multimodal transportation policies included in the GMA and the Seattle Comprehensive Plan.

2.2.2 Washington State Transportation Plan

The Washington State Transportation Plan defines the vision for transportation in Washington State and identifies recommended actions for transportation investment over a 20-year period (WSDOT, 2015). The Washington State Transportation Plan is currently being updated, with the final phase to be completed by December 2017.

The vision of the Washington State Transportation Plan is:

> "By 2035, Washington's transportation system safely connects people and communities, fostering commerce, operating seamlessly across boundaries, and providing travel options to achieve an environmentally and financially sustainable system."

Transportation recommendations included in the plan aim to preserve the state's transportation system, improve safety, encourage economic vitality, improve mobility, and protect the environmental quality and health of transportation facilities. Several recommendations are intended to improve safety, nonmotorized access, public transit, and freight movement in Washington State.

2.2.3 Washington State Bicycle Facilities and Pedestrian Walkways Plan

The Washington State Bicycle Facilities and Pedestrian Walkways Plan establishes Washington's vision for statewide bicycle and pedestrian transportation needs (WSDOT, 2008). The vision included in the plan is to double walking and cycling while decreasing collisions by 5 percent in the next 20 years (SDOT has a plan called Vision Zero to end all collisions within the city of Seattle by 2030; see Section 2.4.10). The Bicycle Facilities and Pedestrian Walkways Plan also establishes objectives and performance measures for each of the state's transportation policy areas. The BGT Missing Link project is included in the plan as a locally identified need.

2.3 Regional Laws and Regulations

The Puget Sound Regional Council (PSRC) adopted Transportation 2040 in May 2010 with amendments adopted in May 2014. Transportation 2040 is an updated regional transportation plan that addresses critical issues such as congestion and mobility, the environment, and transportation finance in the central Puget Sound region (PSRC, 2010). The goals and policies included in Transportation 2040 were used to guide the transportation system elements included in the BGT Missing Link project. This project is included in Transportation 2040 as a Tier 1 bicycling facility. Tier 1 facilities have been identified in the Transportation 2040 plan as the highest priority because they optimally connect regional destinations.

2.4 Local Laws and Regulations

2.4.1 Seattle Comprehensive Plan

The City of Seattle Comprehensive Plan describes the vision for future growth and fundamental policy decisions (City of Seattle Department of Planning and Development, 2005). The Transportation Element was last amended on June 4, 2015. The City of Seattle (City) is currently updating the entire Comprehensive Plan, which is scheduled for adoption in 2016.

The Transportation Element of the Comprehensive Plan highlights the City's goal of promoting safe and convenient access and travel for all users, including pedestrians, bicyclists, transit riders, and people of all abilities, as well as freight and motor vehicle drivers. The Transportation Element also prioritizes commercial/mixed-use industrial areas. Policies are specified in the plan to achieve increased travel choices through efficient use of public right-of-way and transportation demand management strategies. In working toward a multimodal transportation system, the City requires that economic development, the environment, regional connectivity, and efficient operation and maintenance must be considered. The vision outlined in the Transportation Element is implemented through the Seattle Transportation Strategic Plan (described below).

2.4.2 Seattle Transportation Strategic Plan

The Seattle Transportation Strategic Plan (SDOT, 2005) is the implementation document for the transportation goals and policies described in the Comprehensive Plan. Specific programs and projects are included in the plan to bring SDOT closer to its goals. The BGT extension is included in the Seattle Transportation Strategic Plan to achieve SDOT's transportation goals. The Transportation Strategic Plan was released in 2005. The plan is not being updated by SDOT, but the agency released Move Seattle in March 2015 as its 10-year transportation vision (described below). Even though the Seattle Transportation Strategic Plan is not being updated, it still provides direction for implementing the Seattle Comprehensive Plan goals and policies.

2.4.3 Move Seattle

Move Seattle is SDOT's 10-year transportation vision that integrates SDOT's four modal plans: transit, walking, bicycling, and freight (SDOT, 2015f). Move Seattle is intended to help SDOT meet its current and future transportation needs and create a transportation system that contributes to a safe, interconnected, vibrant, affordable, and innovative city. Move Seattle identifies the BGT Missing Link project as a capital investment to be completed by 2024 that will help SDOT achieve its goals to be safe and interconnected. In November 2015, voters passed the 9-year Let's Move Seattle levy to fund projects and improvements included in the Move Seattle plan.

2.4.4 Seattle Freight Master Plan (Draft)

The Seattle Freight Master Plan (draft as of January 2016) is the 20-year blueprint to guide freight mobility investments and improvements, increase safety, and address freight-related issues in Seattle (SDOT, 2016). The plan highlights six main goals for Seattle's freight vision, which include Economy, Safety, Mobility, State of Good Repair, Equity, and Environment. The Freight Master Plan also summarizes existing and future freight conditions in the city, and proposes a number of strategies to achieve the plan's goals.

2.4.5 Seattle Industrial Areas Freight Access Project

The Seattle Industrial Areas Freight Access Project supports and promotes regional and international economic competitiveness and lays out the groundwork for a more comprehensive Seattle Freight Master Plan. The project identifies and initiates solutions to freight mobility, circulation, and access needs to major manufacturing and industrial centers and connecting corridors.

2.4.6 Seattle Transit Master Plan

The Seattle Transit Master Plan identifies the types of transit facilities, services, programs, and system features that will be required to meet Seattle's transit needs through 2030 (SDOT, 2012). The plan highlights six major initiatives for near-term priorities:

- Continue implementation of priority bus corridors;
- Develop center city transit to support downtown growth and vitality;
- Plan, fund, and build priority high-capacity demand transit projects;
- Enhance walk-bike-ride access where needs are greatest;
- Improve transit information and system usability; and
- Pursue funding to enhance transit service and facilities.

The Transit Master Plan includes NW Leary Way/Leary Ave NW, NW Market St, and 24th Ave NW as corridors for full modal evaluation for high-capacity transit service. Potential stations in the study area are at Leary Ave NW or Ballard Ave NW and NW Market St/15th Ave NW. NW Market St and 15th Ave NW have also been identified in the Transit Master Plan as priority bus corridors.

2.4.7 Seattle Bicycle Master Plan

The Seattle Bicycle Master Plan was adopted in April 2014 (SDOT, 2014a). The Bicycle Master Plan provides a framework for SDOT's future actions and investments to improve bicycling throughout the city. The overall vision of the plan is to ensure that "riding a bicycle is a comfortable and integral part of daily life in Seattle for people of all ages and abilities." There are five main goals that support the vision of the Bicycle Master Plan:

- Increase the amount and mode share of bicycle riding in Seattle for all trip purposes;
- Improve safety for bicycle riders;
- Create a bicycle network that connects to places that people want to go and provides for a time-efficient travel option;
- Provide equal cycling access for all through public engagement, program delivery, and capital investment; and
- Build vibrant and healthy communities by creating a welcoming environment for bicycle riding.

The plan aims to upgrade approximately 70 miles of existing bicycle facilities and add approximately 400 miles of new facilities over the next 20 years. In addition to upgrading and adding new facilities, the Bicycle Master Plan contains guidance regarding the provision of end-of-trip elements such as parking, shower facilities, and fix-it stations. The plan also recommends partnering with other agencies to help provide education, enforcement, and encouragement programs.

Several projects in the vicinity of the study area, including the BGT Missing Link, are recommended in the plan. In addition to the BGT Missing Link, recommended projects include bicycle lanes (minor separation) on 24th Ave NW, NW Market St/NW 54th St west of 24th Ave NW, and 20th Ave NW between Leary Ave NW and NW Market St. The Bicycle Master Plan also proposes neighborhood greenways on 20th Ave NW between Shilshole Ave NW and Leary Ave NW, and on 28th Ave NW beginning at NW Market St. Two neighborhood greenways included in the plan are near the study area; the neighborhood greenway on NW 58th St is completed, and the 17th Ave NW neighborhood greenway is currently under construction.

2.4.8 Seattle Pedestrian Master Plan

The Seattle Pedestrian Master Plan, adopted in 2009, provides a framework to allow Seattle to become the most walkable city in the country (SDOT, 2014b). The Master Plan describes four goals for the pedestrian environment: safety, equity, vibrancy, and health. The plan identifies the physical design elements of a walkable street and the types of destinations that create high pedestrian demand. Six objectives are included in the plan:

- Complete and maintain the pedestrian system identified in the Pedestrian Master Plan;
- Improve walkability on all streets;
- Increase pedestrian safety;
- Plan, design, and build complete streets to move more people and goods;
- Create vibrant public spaces that encourage walking; and
- Get more people walking for transportation, recreation, and health.

SDOT has developed a number of strategies to provide possible solutions for various pedestrian issues. The Pedestrian Master Plan does not identify projects for specific locations, but recommends areas of high priority for walking. High-priority areas for walking are locations in Seattle where people need to be able to walk the most. These areas are prioritized for projects and investment. The BGT study area is identified in the plan as a high-priority area.

2.4.9 **Seattle Municipal Code Title 11 Part 58**

Title 11 of the Seattle Municipal Code provides traffic regulations for the City of Seattle. Part 58 describes miscellaneous driving rules on Seattle streets, and includes regulations regarding vehicle operations at alleys, driveways, private properties, and buildings, as stated below:

> "Except as directed otherwise by official traffic-control devices, the driver of a vehicle emerging from any alley, driveway, private property, or building shall stop such vehicle immediately prior to driving onto a sidewalk or onto the sidewalk area extending across any alley or driveway, or onto a public path, and shall yield the right-of-way to any pedestrian or bicyclist as may be necessary to avoid collision, and upon entering the roadway of a street shall yield the right-of-way to all vehicles approaching on the roadway." (SMC 11.58.230).

2.4.10 **Vision Zero Plan**

The Vision Zero Plan outlines how the City intends to end all traffic deaths and serious injuries by 2030. The Vision Zero Plan proposes a combination of street designs, policy, and regulations; education and public engagement; and enforcement to eliminate collisions by 2030. Near-term actions outlined in the plan include the implementation of safety improvements identified in the Pedestrian and Bicycle Master Plans.

CHAPTER 3 METHODOLOGY

3.1 Data Collection

Analysts consulted several sources to collect data regarding existing transportation conditions in the vicinity of the project footprint. The main data categories that were used to define the affected environment are as follows:

- Roadway Characteristics: Lane configuration, intersection control, and industrial and residential driveway information as collected during fieldwork; previous technical analyses in the study area; and data provided by SDOT.
- General-Purpose Traffic: Traffic counts and turning movement data as provided by SDOT and collected in the field.
- Freight Truck: Freight truck volumes, turning movement data, and truck routes as provided by SDOT and collected from field counts and previous technical analyses in the study area.
- Nonmotorized Users: Pedestrian and bicycle volumes and circulation as provided by SDOT and collected in the field within the study area, as well as BGT user volumes in other areas of the city.
- Public Transportation: Public transportation service operating in the study area (King County Metro Routes 15, 17, 18, 29, 40, 44, 994, and RapidRide D Line), and travel routes as provided by King County Metro.
- Freight Rail: Train volumes and routes that traverse the study area, as reported by the Federal Railroad Administration and the Ballard Terminal Railroad.
- Safety: Accident data and incident response data in the project vicinity as provided by SDOT and the Seattle Fire Department.

The quantitative traffic analysis is based on traffic conditions during the PM peak hour—the hour during which traffic volumes are at their highest.

3.2 Selection of Study Area

Analysts defined the study area boundaries to encompass the areas where the function of transportation modes within the project footprint could be affected by project construction or operation. Analysts used estimated traffic volumes and construction phasing to identify potentially affected areas.

3.3 Future Travel Forecasts

This section summarizes how analysts derived future 2040 traffic and trail user volumes used in the transportation analysis. To be consistent with the data gathered for the affected environment and to reflect the travel demand when traffic volumes are greatest, analysts forecasted the travel demand based on the PM peak hour.

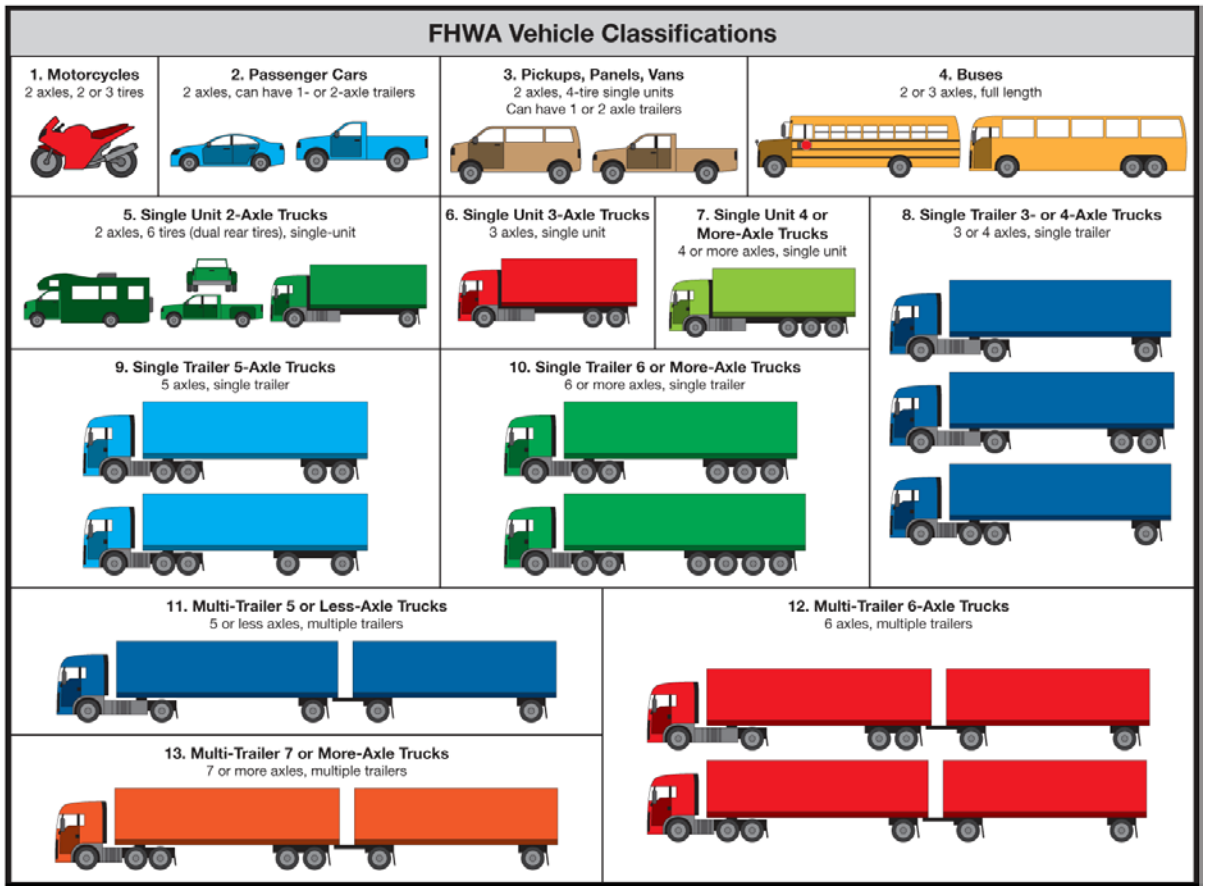
3.3.1 Passenger Vehicle Volumes

Future 2040 passenger vehicle volumes for the study intersections were derived by applying an annual background growth rate of 0.6 percent to existing traffic counts in the study area (IDAX, 2015; SDOT, 2015a; SDOT, 2015b). The 0.6 percent growth rate is consistent with the two previous transportation studies completed in 2008 and 2011 for the BGT Missing Link (Parsons Brinckerhoff, 2008; 2011). This growth rate was also compared to the traffic growth rate included in PSRC's regional travel demand model for the BGT Missing Link study area. Because the growth rate for the BGT study area provided by PSRC was smaller than the 0.6 percent growth rate from the previous studies, analysts used the higher growth rate to ensure the most conservative analysis. The 0.6 percent growth rate captures additional passenger vehicle volumes that would be generated by planned land use development projects in the area.

3.3.2 Freight Truck Volumes

Freight truck volumes were calculated to the future year (2040) using a growth rate of 3.85 percent, which was used in the Seattle Industrial Freight Access Project (SDOT and Port of Seattle, 2015). Freight truck volumes are expected to grow at a faster rate compared to passenger vehicles because of changes in the regional and national economy, activity in Manufacturing Industrial Centers and the Ports, and transit expansion and tolling (SDOT and Port of Seattle, 2015). Medium and heavy trucks were included in the freight truck volume information. Figure 3-1 shows examples of the types of vehicles that are classified as medium and heavy freight trucks.

Figure 3-1. Vehicle Classifications



Source: SDOT and Port of Seattle, 2015

Although freight truck volumes typically peak during the midday (Figure 3-2), the volumes for other transportation modes in the study area, such as nonmotorized users and passenger vehicles, are higher during the PM peak hour. Evaluating the conditions during the PM peak hour results in the worst-case impacts for all modes.

3.3.3 Nonmotorized Volumes

Analysts first estimated trail user volumes that are expected when construction of the BGT Missing Link is complete, and then increased those volumes into the future. BGT Missing Link trail user volumes were calculated by comparing volumes from nearby segments of the BGT (at 9th Ave NW and Seaview Ave NW); it was assumed that volumes on the BGT Missing Link would be similar to those documented in nearby segments. The total number of nonmotorized trail users in the BGT Missing Link study area is estimated to be the same across alternatives, but the exact number of nonmotorized users on the trail may vary slightly depending on the alignment. For example, with the Shilshole South and Shilshole North Alternatives, it is anticipated that there would be some diversion of pedestrians and bicyclists away from NW Leary Way/Leary Ave NW and NW Ballard Way/Ballard Ave NW to the BGT Missing Link. However, because some pedestrians and bicyclists likely would have destinations along NW Leary Way and Ballard Ave NW, these users would be expected to use the trail through the study area for only a short distance, or not at all.

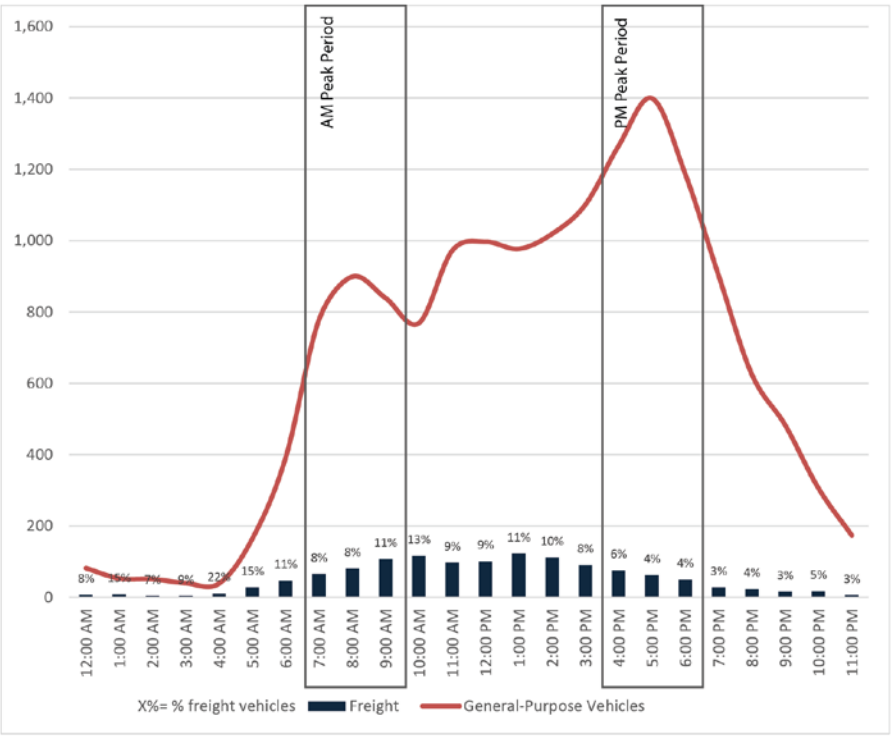
The number of pedestrians and bicyclists in the study area is anticipated to increase in the future with improved nonmotorized facilities and amenities within the study area. However, travel demand models do not forecast nonmotorized transportation modes with a high confidence level. Therefore, future nonmotorized volumes were developed by applying an annual linear background growth rate to the opening day volumes. This growth rate was 1 percent per year for pedestrians and 5 percent per year for bicyclists. These background growth rates were based on historical counts on the BGT, recent studies, expected land use changes and growth in the Ballard area, and input from SDOT.

Analysts reviewed historical bicycle and pedestrian counts between 2013 and 2015 at the Fremont Bridge and the BGT north of 70th St to develop a historical growth rate for pedestrians and bicyclists (SDOT, 2015d; 2015e). These growth rates were compared to growth rates included in local studies and reports in the Seattle area (Sound Transit, 2010; Fehr & Peers and SvR Design Company, 2011).

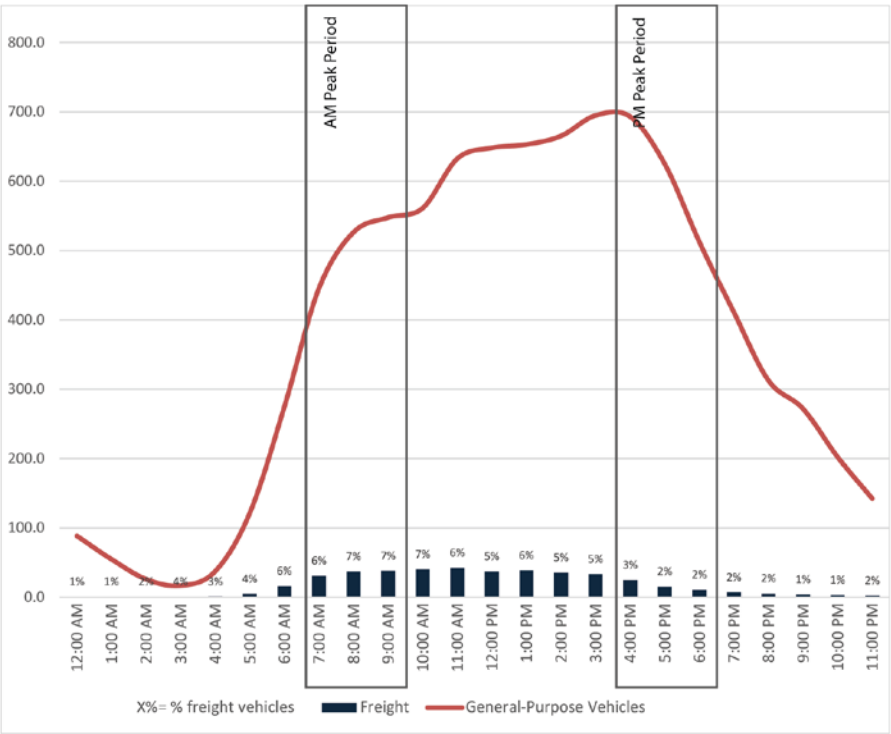
PSRC also provided the nonmotorized growth rate included in the PSRC travel demand model for the BGT study area (PSRC, 2015). The growth rates developed from reviewing historical data were similar to those proposed in local Seattle studies, which were approximately 5 percent for bicyclists and 1 percent for pedestrians. The growth rate provided by PSRC was lower compared to the other sources; therefore, analysts used the higher growth rates to ensure the most conservative estimate of impacts.

3.4 Analysis of Traffic Operations

Analysts used the LOS metric to rate traffic operations in the study area. LOS is measured on a scale ranging from A to F, in which A represents freely flowing traffic and F represents severe congestion. LOS ratings are based on the control delay of the roadway or intersection being studied. Table 3-1 summarizes the criteria used to define LOS. The City does not have an adopted intersection LOS standard.



NW Leary Way east of 14th Ave NW



Shilshole Ave NW northwest of NW 46th St

Figure 3-2. Daily Traffic Patterns for Freight and General-Purpose Traffic

Table 3-1. Intersection Level of Service Criteria

	Control Delay (seconds/vehicle)	
Level of Service	*Signalized Intersection*	*Unsignalized Intersection*
A	<10	<10
B	>10 and <20	>10 and <15
C	>20 and <35	>15 and <25
D	>35 and <55	>25 and <35
E	>55 and <80	>35 and <50
F	>80	>50

Note: The LOS criteria are based on control delay, which includes initial deceleration delay, final deceleration delay, stopped delay, and queue move-up time.
Source: Transportation Research Board, 2000

Analysts used Synchro 9, a macroscopic simulation tool, to determine intersection LOS for isolated intersections, and to develop optimized intersection signal timing plans for the study area. This tool relied on a fixed set of input calculations to develop LOS ratings consistent with the methodology found in the Highway Capacity Manual (Transportation Research Board, 2000). This manual is the standard national traffic engineering guidance for quantifying the level of traffic congestion on streets and intersections.

3.5 Identification of Impacts

3.5.1 Identification of Construction Impacts

Construction impacts were assessed through a qualitative analysis of how construction of the Build Alternatives would affect traffic throughout the study area, as well as other travel modes and facilities including freight, pedestrians, bicyclists, public transportation, and rail. BGT Missing Link construction was anticipated to have an impact on transportation and traffic circulation if construction activities would do any of the following:

- Temporarily disrupt truck travel by prohibiting a facility that currently carries truck traffic from continuing to do so (including a roadway segment, intersection, or driveway);
- Temporarily disrupt nonmotorized access and routing;
- Temporarily disrupt public transportation service;
- Temporarily disrupt business access by blocking driveways, loading zones, or access to parking; or
- Temporarily disrupt rail service by obstructing the rail line or otherwise disrupting service.

3.5.2 Identification of Operational Impacts

3.5.2.1 *Impacts on Traffic*

Analysts used Synchro/SimTraffic software to study traffic impacts at critical intersections and driveway locations where trail activity and/or future traffic volumes could affect PM peak hour vehicle movements.

This traffic analysis software provided analysts with intersection LOS and delay information, which was used to measure the potential for the Build Alternatives to affect traffic at selected intersections.

Traffic impacts were determined at intersections by comparing intersection LOS for the No Build and Build Alternatives during the PM peak hour. Impacts would occur if a Build Alternative would increase traffic demand to a LOS E or F condition when the intersection operates at LOS D or better under the No Build Alternative. Impacts would also occur if a Build Alternative would increase the delay at intersections operating at LOS E or F under the No Build Alternative by 5 seconds or more.

Although it is not feasible to analyze impacts on operations at all driveways along the Build Alternatives, analysts selected a sampling of driveways in the study area that would be representative of all driveways. Analysts evaluated driveways that have a range of traffic volumes and that also represent industrial and commercial driveways in order to provide a range of typical impacts that could be experienced by all driveways in the study area.

There are limitations to how the Synchro/SimTraffic model calculates vehicular LOS and delay associated with intersections and driveways adjacent to trails. Therefore, the following two adjustments to the models were made to evaluate intersection and driveway impacts:

1. Bicyclists were assumed to ride in the traffic lane on Shilshole Ave NW under the No Build Alternative. Because existing bicycle data show that bicyclists primarily use Shilshole Ave NW to travel through the study area, bicycle volumes were added to vehicle volumes to arrive at the total volumes along Shilshole Ave NW. This user volume captures the impacts that would be associated with bicycle traffic in the study area without a trail.

2. Under the Build Alternatives, analysts evaluated delay at driveways as two separate intersections in the Synchro/SimTraffic model. Vehicles approaching an unsignalized trail crossing would stop for trail users before proceeding through the crossing and then stop again at the intersection with the roadway. This provides an estimate of delay at the intersection with the trail and again at the intersection with the roadway. Analysts used the sum of the delay through both intersections to calculate the overall delay of the driveway. At the trail crossing intersection, bicycles were coded as “vehicle volumes” and pedestrian volumes were coded as “conflicting pedestrians” to capture impacts for the delay calculation. At the roadway intersection, the driveway volumes were only affected by the roadway vehicle volumes. Analysts assumed all bicycle traffic would shift to the applicable trail corridor for each Build Alternative. This assumption provides the most conservative estimate of impacts for each of the Build Alternatives.

3.5.2.2 *Impacts on Freight*

Analysts evaluated impacts on freight vehicles by reviewing LOS at intersections and delay at driveways as described in the previous section. Although freight volumes are typically higher during the midday, the analysis was completed for the PM peak hour to reflect the worst-case scenario for all transportation modes. The PM peak hour is the hour of the day when the volumes for other transportation modes in the study area, such as nonmotorized users and general-purpose vehicles, are highest. Evaluating the conditions during the PM peak hour results in worst-case impacts for each of the modes. An auto-turn analysis, a vehicle swept path software that analyzes the ability of large trucks to maneuver driveway and roadway configurations, was also completed to determine if the design of the Build Alternatives would affect freight access to businesses in the study area. The freight impacts analysis considered:

- The potential for trail design to impede freight movement to businesses in the study area; and

- The potential for freight travel delay related to roadway alterations in the study area.

3.5.2.3 *Impacts on Nonmotorized Users*

Analysts qualitatively evaluated the potential for the Build Alternatives to alter operations of nonmotorized circulation and facilities in the study area. Impacts on nonmotorized users considered:

- The potential to alter pedestrian circulation within the study area;
- The potential to alter bicycle circulation within the study area; and
- The type of intersection control provided for nonmotorized users at intersections.

3.5.2.4 *Impacts on Public Transportation*

Analysts qualitatively evaluated impacts on public transportation by reviewing transit service alignments, stop locations, and travel delay in the study area and the potential for the Build Alternatives to alter transit operations. The analysis of transit impacts included:

- The potential for the Build Alternatives to require removal or relocation of transit stops;
- The potential for transit travel delay related to roadway alterations in the study area;
- Removal or relocation of transit layover space in the study area; and
- The potential to preclude a planned future transit improvement.

3.5.2.5 *Impacts on Freight Rail*

Analysts qualitatively evaluated impacts on freight rail movement in the study area by reviewing the potential for the Build Alternatives to change freight rail operations in the study area. The freight rail impacts analysis considered the potential to remove or relocate freight rail facilities in the study area.

3.5.2.6 *Impacts on Safety*

Analysts qualitatively evaluated impacts on safety by reviewing collision and incident response history in the study area and the potential for the Build Alternatives to alter safety. The safety analysis considered:

- The potential for increasing or decreasing the risk of motor vehicle/trail user conflicts;
- The potential for increasing or decreasing the risk of motor vehicle/motor vehicle conflicts; and
- Impacts on sight distances at affected driveways and intersections.

3.6 Identification of Avoidance, Minimization, and Mitigation Measures

Where the potential for construction or operation impacts appears likely, potential measures were identified to avoid, minimize, or mitigate those impacts. Construction measures generally would be designed to improve traffic flow in active construction areas, maintain appropriate wayfinding, and maintain access for all modes of transportation. Operation measures would generally involve adjustments

to roadway and trail design elements or intersection control to maintain satisfactory operation of the transportation environment.

3.7 Cumulative Impacts and Mitigation Measures Analysis

Analysts reviewed potential cumulative effects on transportation resources resulting from other past, present, or reasonably foreseeable future actions that could affect transportation, either directly or indirectly. These actions could include other transportation projects or other planned developments or land use changes occurring in the area.

CHAPTER 4 AFFECTED ENVIRONMENT

This chapter discusses the affected environment for the transportation analysis by defining the study area and describing the 2015 existing transportation conditions. The 2015 existing conditions serve as the basis against which conditions projected for 2040, the project analysis year, are compared.

4.1 Selected Study Area

The study area was defined as the area bounded by 32nd Ave NW to the west, NW 56th St/20th Ave NW/Leary Ave NW to the north, 11th Ave NW to the east, and Shilshole Ave NW/NW 45th St to the south (Figure 4-1).

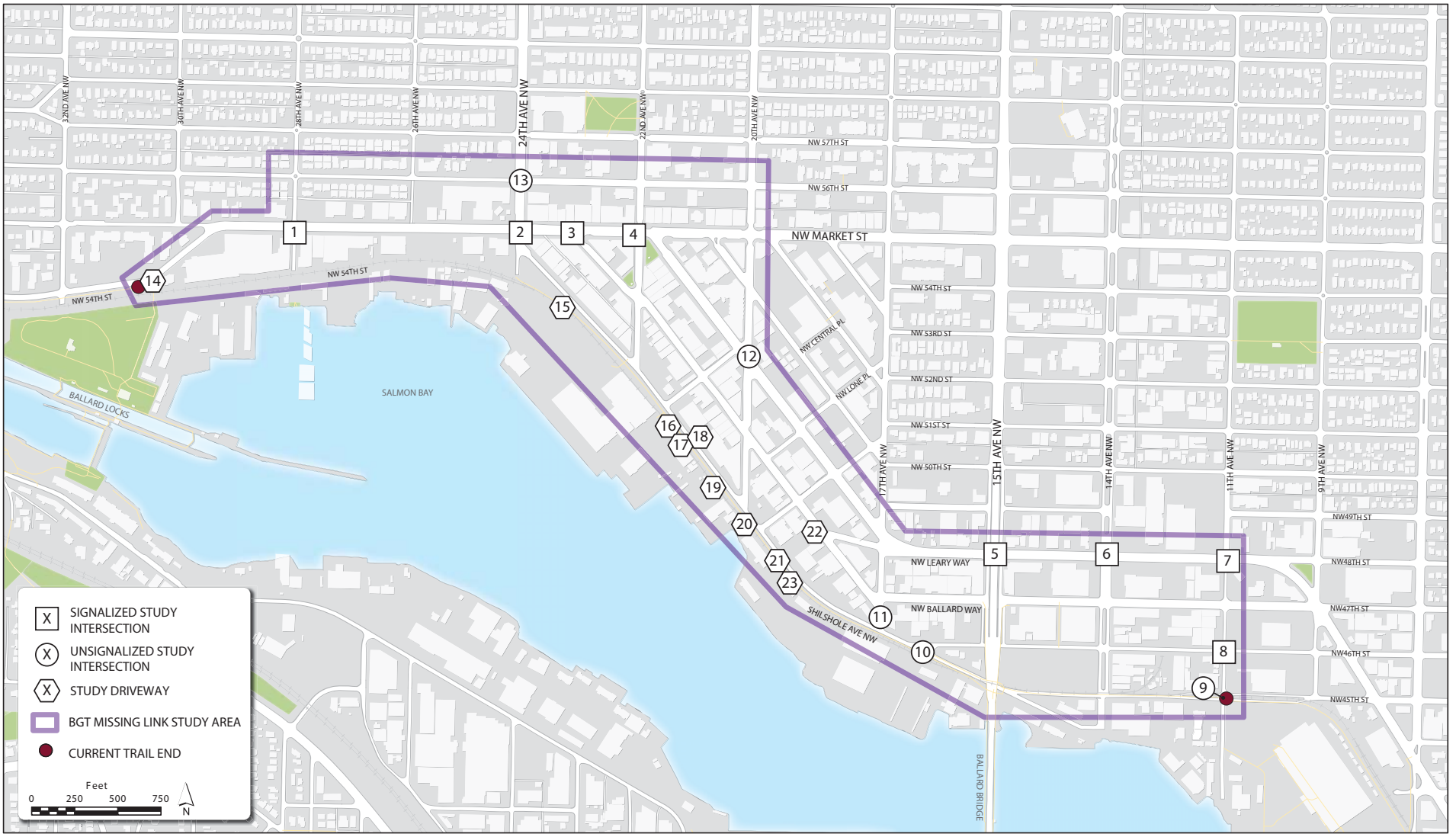
Figure 4-1 also shows the 13 intersections and 10 driveways evaluated as part of the affected environment analysis. Seven of the intersections (intersections 1, 2, and 4 through 8) have full signals and are referred to as signalized intersections. Intersection 3 has a pedestrian-activated signal, which remains green for traffic on the major street until activated by a pedestrian. This intersection is described as having a pedestrian half signal. The remaining intersections (intersections 9 through 13) are controlled by stop signs and are referred to as unsignalized intersections.

Driveways (identified in Figure 4-1 as numbers 14 through 23) provide access to businesses in the study area and are unsignalized. As described in Seattle Municipal Code 11.58.230, vehicles exiting a driveway are required to stop prior to the sidewalk and yield to any pedestrians before continuing to the roadway. The driveways chosen for this analysis are a sampling of representative driveways in the study area. Because it is not feasible to analyze impacts on operations at all driveways along the Build Alternatives, analysts evaluated driveways that have a range of traffic volumes and that also represent industrial and commercial driveways in order to provide a range of typical impacts that could be experienced at all driveways in the study area

4.2 Existing Transportation Conditions

The transportation facilities, service types, and conditions that exist in the study area in 2015 are listed below and discussed in subsequent sections:

- Roadway Network: Roadway types and facilities.
- Traffic Volumes and Operations: Peak hour intersection volumes at all study area intersections and level of service for motor vehicles at intersections.
- Freight: Summary of freight routes and freight vehicle volumes.
- Nonmotorized Users: Bicycle and pedestrian facilities and volumes.
- Public Transportation: Summary of transit routes and stops.
- Freight Rail: Summary of rail facilities.
- Safety: Summary of collision and incident response data.



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-1
Transportation Discipline Study Area and Study Intersections and Driveways

4.2.1 Roadway Network

The roadway network within the study area consists of principal, minor, and collector arterial streets, as well as local access streets (Figure 4-2). Most roads in the study area are classified as local access streets.

Principal arterial roadways are the foundation of the city's transportation network, designated as the major thoroughfares for trucks, motor vehicles, and transit vehicles. In the study area, NW Leary Way and 15th Ave NW are defined as principal arterials, meaning that they serve as primary routes for vehicle trips between urban centers and as connections to the regional transportation network.

Minor arterials distribute traffic from the principal arterials to collector arterials and local access streets and provide connections to community destinations. In the study area, NW 46th St, Shilshole Ave NW, NW Market St, and 24th Ave NW are minor arterials.

Collector arterials collect and distribute traffic from principal and minor arterials to local access streets or directly to local destinations. Collector arterials are typically located within neighborhood boundaries and serve small groups of stores, schools, small apartment complexes, and residential land uses. In the study area, 14th Ave NW and 20th Ave NW are considered collector arterials.

All other streets are local residential or commercial access streets. SDOT does not consider local access streets as part of the arterial network. Local access streets provide direct access from the arterial network to local land uses.

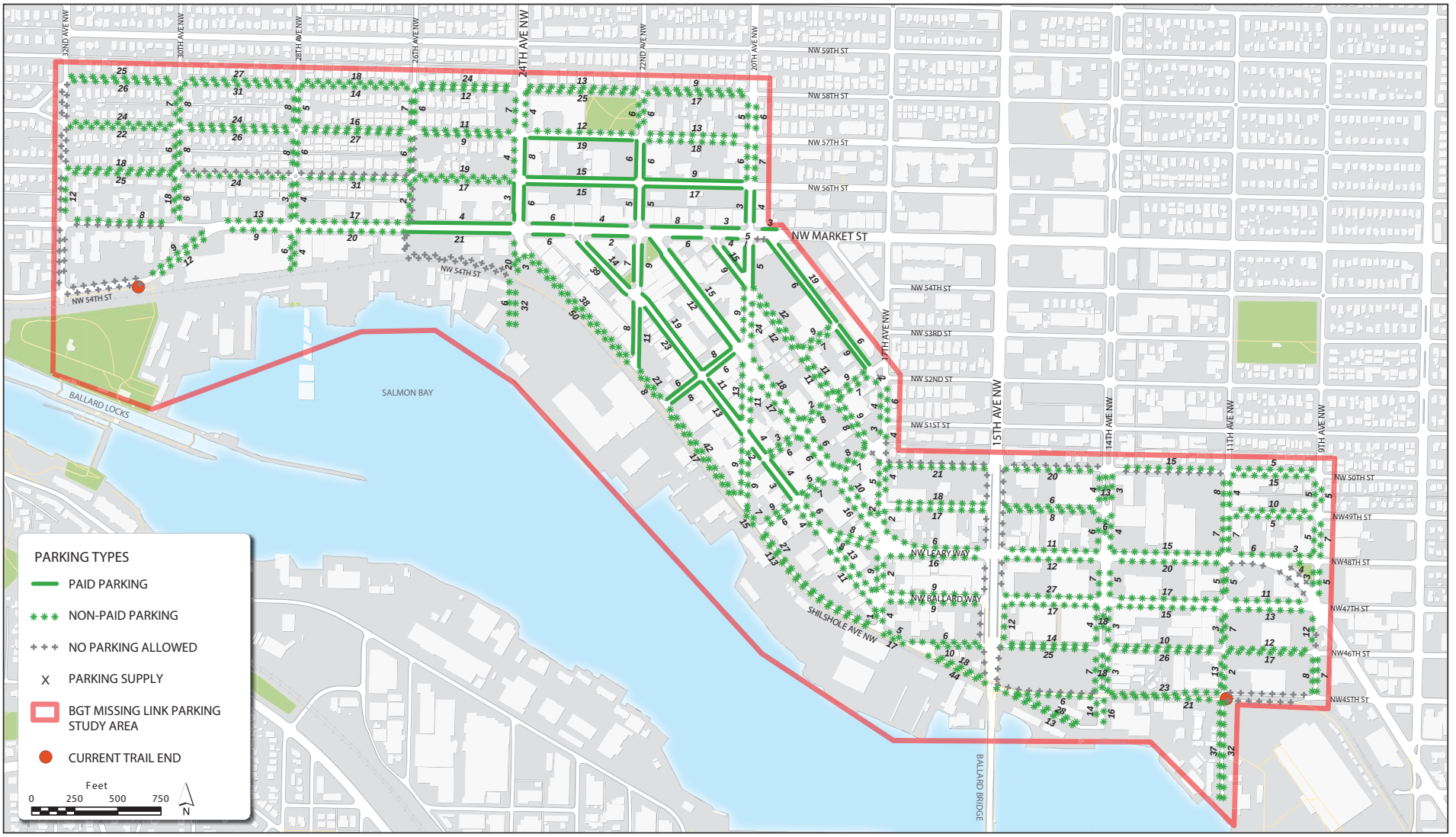
4.2.2 Traffic Volumes and Operations

This section describes the PM peak hour weekday volumes and traffic operations analysis for the 2015 existing conditions in the study area. The PM peak period was analyzed because the evening commute volumes are higher than the morning commute volumes based on the adjacent land uses.

4.2.2.1 *PM Peak Hour Traffic Volumes*

Existing weekday turning movement counts were collected at the 13 study area intersections and 10 driveways in April 2014 and September 2015 between 4 and 6 PM (depending on the intersection) as summarized in Table 4-1 (SDOT, 2015a; IDAX, 2015). The intersection counts included the total number of general-purpose vehicles, medium and heavy freight vehicles, pedestrians, and bicycles. Driveway counts included the total number of vehicles entering and exiting selected study area driveways. The PM peak hour for study area intersections and driveways was the highest 1-hour volume between 4 and 6 PM at each individual intersection or driveway.

Figure 4-3 and Figure 4-4 show PM peak hour turning movements at the study intersections and driveways, respectively. All vehicle counts were rounded to the nearest five vehicles to account for daily fluctuations. For intersections or driveways that had between one and four vehicles recorded, the number was rounded up to provide a conservative estimate of impacts.



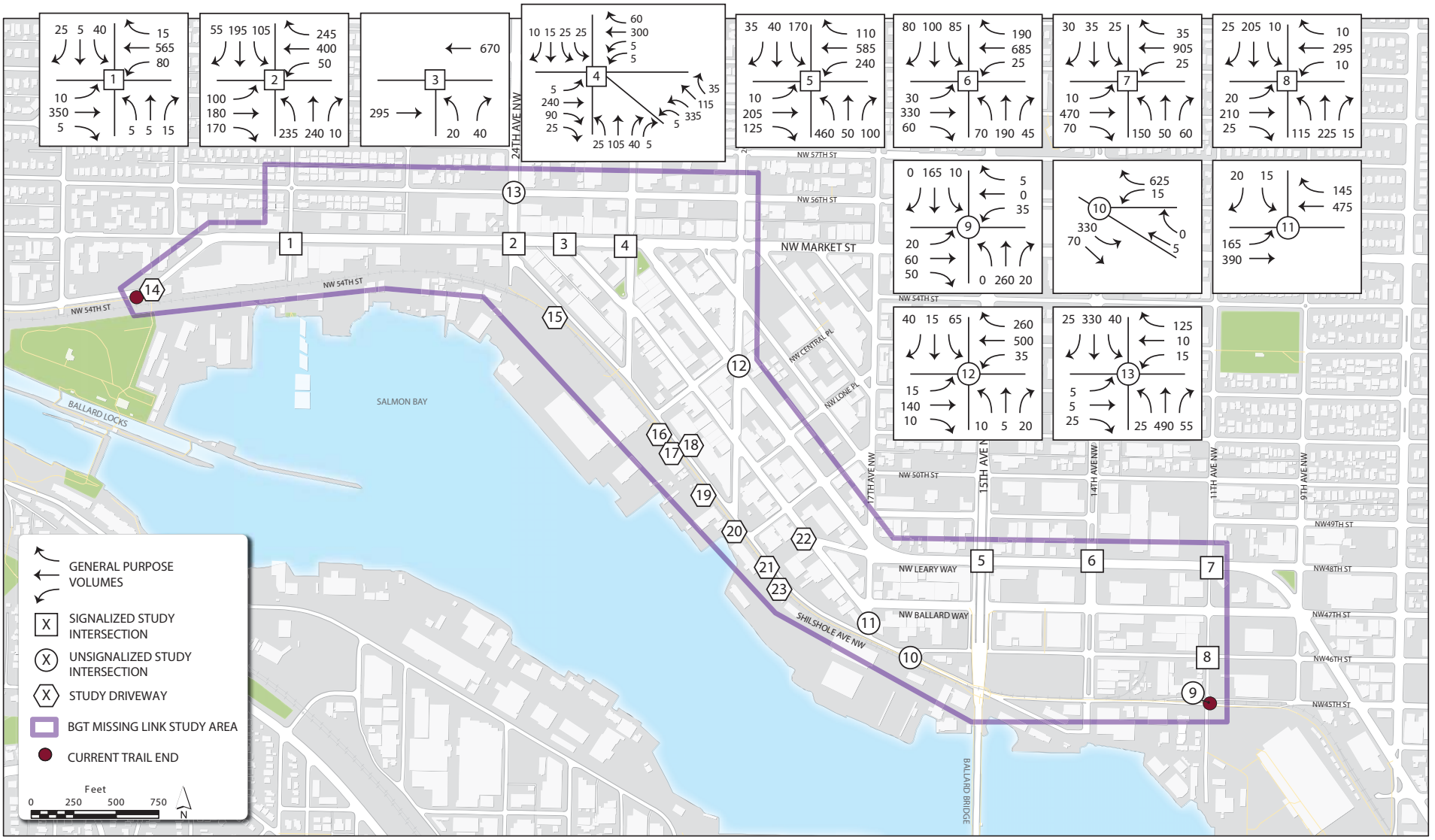
SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-2
Public On-street Parking Supply

Table 4-1. Weekday Turning Movement Counts

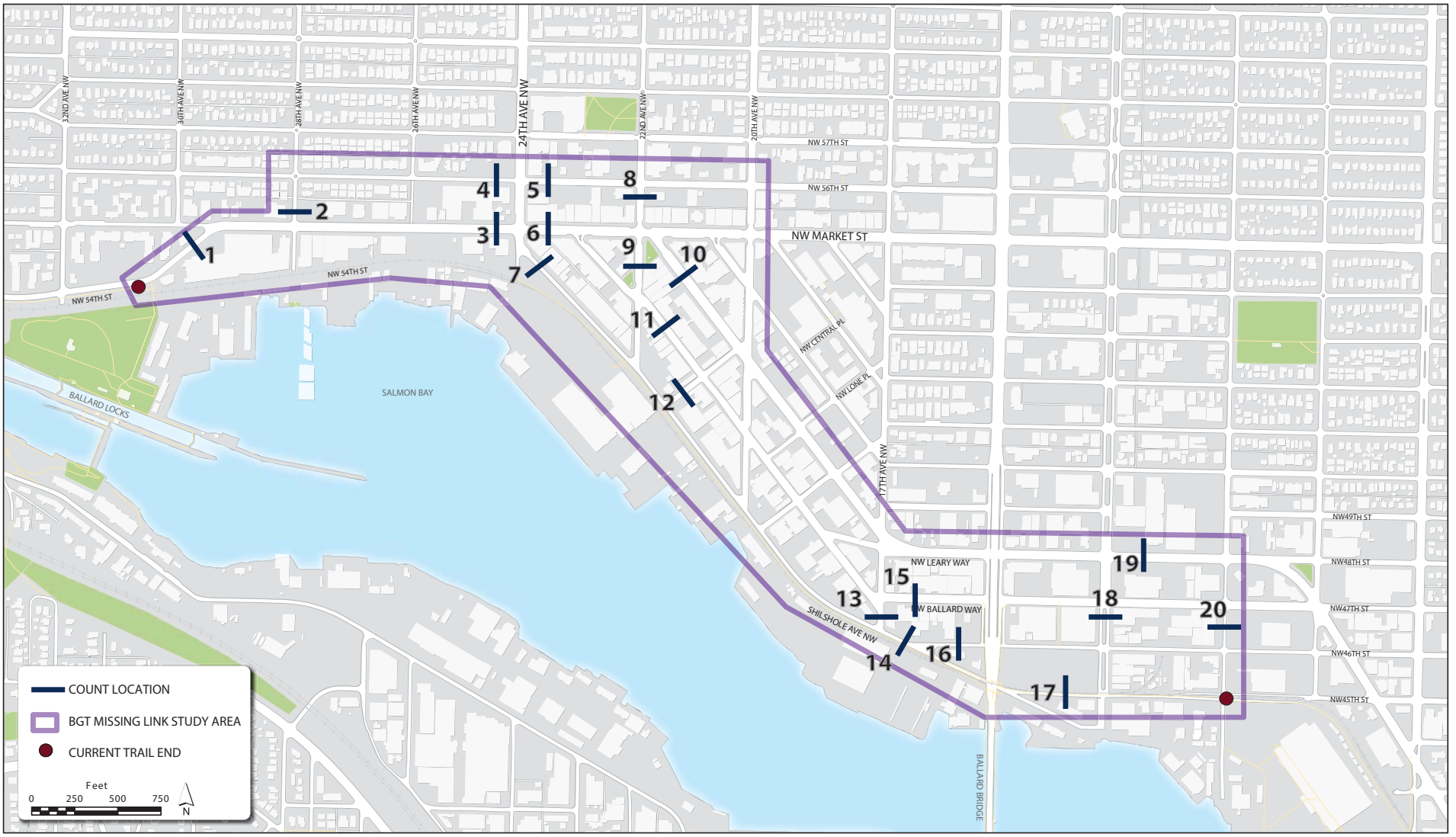
ID	*Count Location*	*Collection Date*	*Day of Week*
1	NW Market St/28th Ave NW	09/22/2015	Tuesday
2	NM Market St/24th Ave NW	09/22/2015	Tuesday
3	NM Market St/Ballard Ave NW	09/22/2015	Tuesday
4	NW Market St/22nd Ave NW/Leary Ave NW	09/22/2015	Tuesday
5a	15th Ave NW/NW Leary Way Southbound Off-Ramp	09/22/2015	Tuesday
5b	15th Ave NW/NW Leary Way Northbound Off-Ramp	09/22/2015	Tuesday
6	NW Leary Way/14th Ave NW	04/15/2014	Tuesday
7	NW Leary Way/11th Ave NW	04/09/2014	Wednesday
8	11th Ave NW/NW 46th St	04/02/2014	Wednesday
9	11th Ave NW/NW 45th St	09/22/2015	Tuesday
10	NW 46th St/Shilshole Ave NW	09/22/2015	Tuesday
11	Shilshole Ave NW/NW 17th St	09/22/2015	Tuesday
12	Leary Ave NW/20th Ave NW	09/22/2015	Tuesday
13	NW 56th St/24th Ave NW	09/22/2015	Tuesday
14	NW 54th St/Ballard Locks	09/22/2015	Tuesday
15	Shilshole Ave NW/Stimson Marina	09/22/2015	Tuesday
16	Shilshole Ave NW/Salmon Bay Center	09/22/2015	Tuesday
17	Shilshole Ave NW/Salmon Bay Sand and Gravel (north side)	09/22/2015	Tuesday
18	Shilshole Ave NW/Salmon Bay Sand and Gravel (south side)	09/22/2015	Tuesday
19	Shilshole Ave NW/Covich-Williams Chevron	09/22/2015	Tuesday
20	Shilshole Ave NW/Salmon Bay Cafe	09/22/2015	Tuesday
21	Shilshole Ave NW/Ballard Industrial	09/22/2015	Tuesday
22	Ballard Ave NW/Ballard Industrial	09/22/2015	Tuesday
23	Shilshole Ave NW/Ballard Mill Marina	09/22/2015	Tuesday



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-3
2015 PM Peak Hour
Intersection Traffic Volumes



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-7
2015 Daily Freight Volume Count Locations

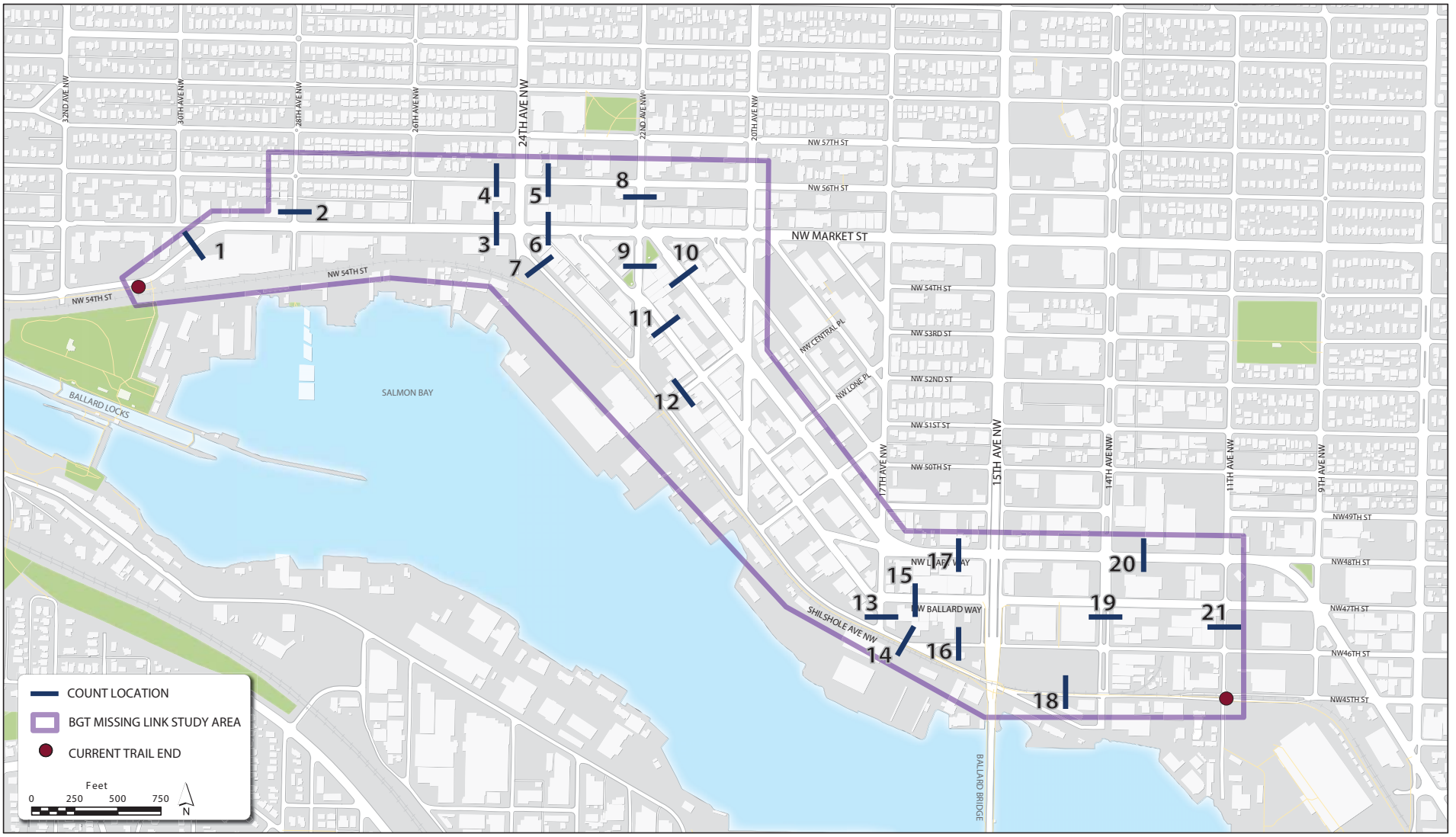
In addition to peak-hour intersection counts, daily volume counts were collected at 21 locations within the study area, as shown on Figure 4-5 (IDAX, 2015; SDOT, 2015b). Table 4-2 summarizes the count location, individual intersection peak hours, PM peak directional volumes, and total daily volumes. All vehicle counts were rounded to the nearest five vehicles to account for daily fluctuations. Based on the daily volume counts, traffic volumes are highest during the PM peak hour on NW Leary Way/Leary Ave NW, NW Market St, NW 46th St, and Shilshole Ave NW.

Table 4-2. Daily Volume Counts (January 2013-September 2015)

ID	*Location*	*Individual PM Peak Hour*	*PM Peak Northbound Volume*	*PM Peak Southbound Volume*	*PM Peak Eastbound Volume*	*PM Peak Westbound Volume*	*Total Volume*
1	NW 54th St west of NW Market St	5:00-6:00 PM	-	-	335	265	7,800
2	28th Ave NW north of NW Market St	5:00-6:00 PM	60	35	-	-	1,200
3	NW Market St west of 24th Ave NW	5:00-6:00 PM	-	-	470	580	12,410
4	NW 56th St west of 24th Ave NW	4:00-5:00 PM	-	-	20	30	730
5	NW 56th St east of 24th Ave NW	5:00-6:00 PM	-	-	120	140	3,025
6	NW Market St east of 24th Ave NW	4:00-5:00 PM	-	-	390	350	10,530
7	Shilshole Ave NW southeast of 24th Ave NW	5:00-6:00 PM	360	235	-	-	7,985
8	22nd Ave NW south of NW 56th St	5:00-6:00 PM	280	100	-	-	3,960
9	22nd Ave NW south of NW Market St	5:00-6:00 PM	165	65	-	-	2,150
10	Leary Ave NW south of NW Market St	5:00-6:00 PM	730	195	-	-	10,830
11	Ballard Ave NW southeast of 22nd Ave NW	5:00-6:00 PM	175	80	-	-	2,945
12	NW Vernon Pl northwest of Shilshole Ave NW	5:00-6:00 PM	-	-	45	40	1,205

ID	*Location*	*Individual PM Peak Hour*	*PM Peak Northbound Volume*	*PM Peak Southbound Volume*	*PM Peak Eastbound Volume*	*PM Peak Westbound Volume*	*Total Volume*
13	17th Ave NW north of Shilshole Ave NW	4:00-5:00 PM	195	30	-	-	3,545
14	Shilshole Ave NW west of NW 46th St	4:00 – 5:00 PM	340	300	-	-	9,595
15	NW Ballard Way east of 17th Ave NW	5:00-6:00 PM	-	-	330	25	4,835
16	NW 46th St west of 15th Ave NW	4:00 – 5:00 PM	-	-	220	420	8,860
17	NW Leary Way west of 15th Ave NW	4:00 – 5:00 PM	-	-	370	690	14,855
18	NW 45th St west of 14th Ave NW	4:00 – 5:00 PM	-	-	100	80	2,750
19	14th Ave NW south of NW Ballard Way	4:00-5:00 PM	130	235	-	-	4,905
20	NW Leary Way east of 14th Ave NW	5:00-6:00 PM	-	-	540	920	16,800
21	11th Ave NW north of NW 46th Ave NW	5:00-6:00 PM	240	105	-	-	4,075

Note: Counts were rounded to the nearest five vehicles to account for daily fluctuations in volumes. For counts that had between one and four vehicles recorded, the number was rounded up to provide a conservative estimate of impacts.



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-5

2015 Daily Traffic Volume Count Locations

In addition to the PM peak hour driveway counts shown in Figure 4-4, PM peak hour (entering and exiting) and daily driveway counts are summarized in Table 4-3 (IDAX, 2015). The driveway counts indicated that the driveways located at the Stimson Marina, Salmon Bay Center, and Ballard Locks have the highest PM peak hour and daily traffic volumes.

Table 4-3. Study Area Daily and PM Peak Hour Driveway Traffic Volumes (September 2015)

Driveway Location	*PM Peak In*	*PM Peak Out*	*Daily Total*
Ballard Locks	40	25	870
Stimson Marina	15	100	975
Salmon Bay Center	15	75	855
Salmon Bay Sand and Gravel, North Side	5	0	130
Salmon Bay Sand and Gravel, South Side	5	5	195
Covich-Williams Chevron	0	5	55
Salmon Bay Café	10	15	270
Ballard Industrial, Shilshole	0	5	180
Ballard Industrial, Ballard Ave	5	0	180
Ballard Mill Marina	15	15	340

Source: IDAX, 2015

Note: Counts were rounded to the nearest five vehicles to account for daily fluctuations. For driveways that had between one and four vehicles recorded, the number was rounded up to provide a conservative estimate of impacts.

4.2.2.2 *Intersection Operations and Driveway Delay*

Intersection operations were measured using the LOS scale ranging from A to F, depending on the delay conditions at the intersection. LOS A represents the best conditions with minimal delay and LOS F represents the worst conditions with severe congestion. LOS ratings are based on the control delay of the intersection or roadway. Table 4-4 lists the intersection LOS delay thresholds for signalized and stop-controlled intersections. There are variations in the ranges of delay associated with the LOS ratings for signalized and unsignalized (stop-controlled) intersections.

Table 4-4. Level of Service Thresholds

Level of Service	*Average Control Delay per Vehicle (seconds)*	
	Signalized Intersections	*Stop-Controlled Intersections*
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Note: The LOS criteria are based on control delay, which includes initial deceleration delay, queue move-up time, stopped delay, and final deceleration delay.

At signalized intersections, LOS is calculated based on the average delay of all vehicles entering the intersection. At two-way stop-controlled intersections, LOS is calculated based on the worst stopped approach. The delay thresholds are also lower for stop-controlled intersections because driver behavior considerations make delays at stop-controlled intersections more onerous. For example, at a signalized intersection, drivers may relax during the red light interval while waiting for the green light interval, but drivers on the stopped approach of a stop-controlled intersection must remain attentive to the task of identifying acceptable gaps in oncoming traffic.

For this analysis, intersections that operate at LOS E or F are considered unacceptable.

Analysts conducted the LOS analysis for the 13 study area intersections and the delay analysis for the 10 driveways using Synchro 9 software. Figure 4-6 and Table 4-5 show the 2015 PM peak hour LOS and delay for each of the study intersections. The average delay for all vehicles is reported for signalized intersections. The delay of the worst stop-controlled approach is reported for unsignalized intersections and driveways.

As shown in Figure 4-6 and Table 4-5, the following four intersections operate at LOS E or F during the PM peak hour:

- Intersection 5b: 15th Ave NW/NW Leary Way Northbound Off-Ramp;
- Intersection 11: Shilshole Ave NW/NW 17th St (southbound approach from NW 17th St);
- Intersection 12: Leary Ave NW/20th Ave NW (southbound approach on 20th Ave NW); and
- Intersection 13: NW 56th St/24th Ave NW (westbound approach on NW 56th St).

All other intersections in the study area currently operate at LOS D or better.

Table 4-5. 2015 PM Peak Hour Study Intersection Level of Service

ID	*Intersection*	*Traffic Control*	*2015 Existing Conditions PM Peak Hour*	
			LOS	*Delay (sec)*
1	NW Market St/28th Ave NW	Signal	A	6
2	NM Market St/24th Ave NW	Signal	D	42
3	NM Market St/Ballard Ave NW	Pedestrian Half Signal	A	8
4	NW Market St/22nd Ave NW/Leary Ave NW	Signal	D	54
5a	15th Ave NW/NW Leary Way Southbound Off-Ramp	Signal	B	15
5b	15th Ave NW/NW Leary Way Northbound Off-Ramp	Signal	E	61
6	NW Leary Way/14th Ave NW	Signal	A	8
7	NW Leary Way/11th Ave NW	Signal	B	14
8	11th Ave NW/NW 46th St	Signal	B	18
9	11th Ave NW/NW 45th St	Unsignalized	A	10

ID	*Intersection*	*Traffic Control*	*2015 Existing Conditions PM Peak Hour*	
			LOS	*Delay (sec)*
10	NW 46th St/Shilshole Ave NW	Unsignalized	A	8
11	Shilshole Ave NW/NW 17th St	Unsignalized	E	42
12	Leary Ave NW/20th Ave NW	Unsignalized	F	269
13	NW 56th St/24th Ave NW	Unsignalized	E	39

The average delay in seconds at driveways during the PM peak hour is shown in Table 4-6. Existing delay at driveways in the study area ranges between approximately 10 and 25 seconds during the PM peak hour.

Table 4-6. 2015 PM Peak Hour Study Driveway Delay

ID	*Driveway*	*2015 Existing Conditions PM Peak Hour Delay (sec)*
14	NW 54th St/Ballard Locks	21
15	Shilshole Ave NW/Stimson Marina	17
16	Shilshole Ave NW/Salmon Bay Center	18
17	Shilshole Ave NW/Salmon Bay Sand and Gravel (north side)	11
18	Shilshole Ave NW/Salmon Bay Sand and Gravel (south side)	22
19	Shilshole Ave NW/Covich-Williams Chevron	15
20	Shilshole Ave NW/Salmon Bay Cafe	15
21	Shilshole Ave NW/Ballard Industrial	20
22	Ballard Ave NW/Ballard Industrial	8
23	Shilshole Ave NW/Ballard Mill Marina	20

SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-6
2015 PM Peak Hour Study Intersection Level of Service

4.2.3 **Freight**

As documented in the Freight Master Plan, SDOT has proposed several streets in the study area as Major and Minor Truck Streets. Major Truck Streets are arterial streets that provide connections between and through industrial land uses (Manufacturing Industrial Centers and intermodal terminals), commercial districts, and urban centers (SDOT, 2016). Minor Truck Streets provide connections to and from urban villages and commercial districts, and secondary connections to major truck streets (SDOT, 2016). Major Truck Streets in the study area include:

- Shilshole Ave NW;
- NW Leary Way;
- 15th Ave NW; and
- NW Market St between 24th Ave NW and the eastern boundary of the study area.

Minor Truck Streets in the study area include 24th Ave NW between Shilshole Ave NW and the northern boundary of the study area.

The Industrial Areas Freight Access Project (SDOT and Port of Seattle, 2015) describes all arterial streets in the city as freight routes, although arterials are not subject to the same criteria for street design, traffic management, and pavement design and repair as Major Truck Streets. As described in Section 4.2.1, Roadway Network, in addition to Shilshole Ave NW, NW Market St, 24th Ave NW, NW Leary Way, and 15th Ave NW, the following streets are considered arterial streets and are expected to accommodate some freight traffic:

- NW 46th St;
- 14th Ave NW; and
- 20th Ave NW.

Daily truck volumes (medium and heavy trucks) are highest on NW Leary Way/Leary Ave NW, NW Market St, NW 54th St, and Ballard Ave NW based on the daily volume counts. During the PM peak hour, freight truck volumes in the study area are also highest on NW Leary Way/Leary Ave NW, Ballard Ave near 22nd Ave NW, and NW Market St.

Table 4-7 summarizes freight truck counts collected in the study area between January 2013 and September 2015 at locations shown on Figure 4-7 (IDAX, 2015; SDOT, 2015b). All freight vehicle counts were rounded to the nearest five vehicles to account for daily fluctuations. Although freight truck volumes are typically highest during the midday, the volumes for other transportation modes in the study area, such as nonmotorized users and general-purpose vehicles, are higher during the PM peak hour. The analysis evaluates the conditions for all modes during the PM peak hour to show the worst-case impacts.

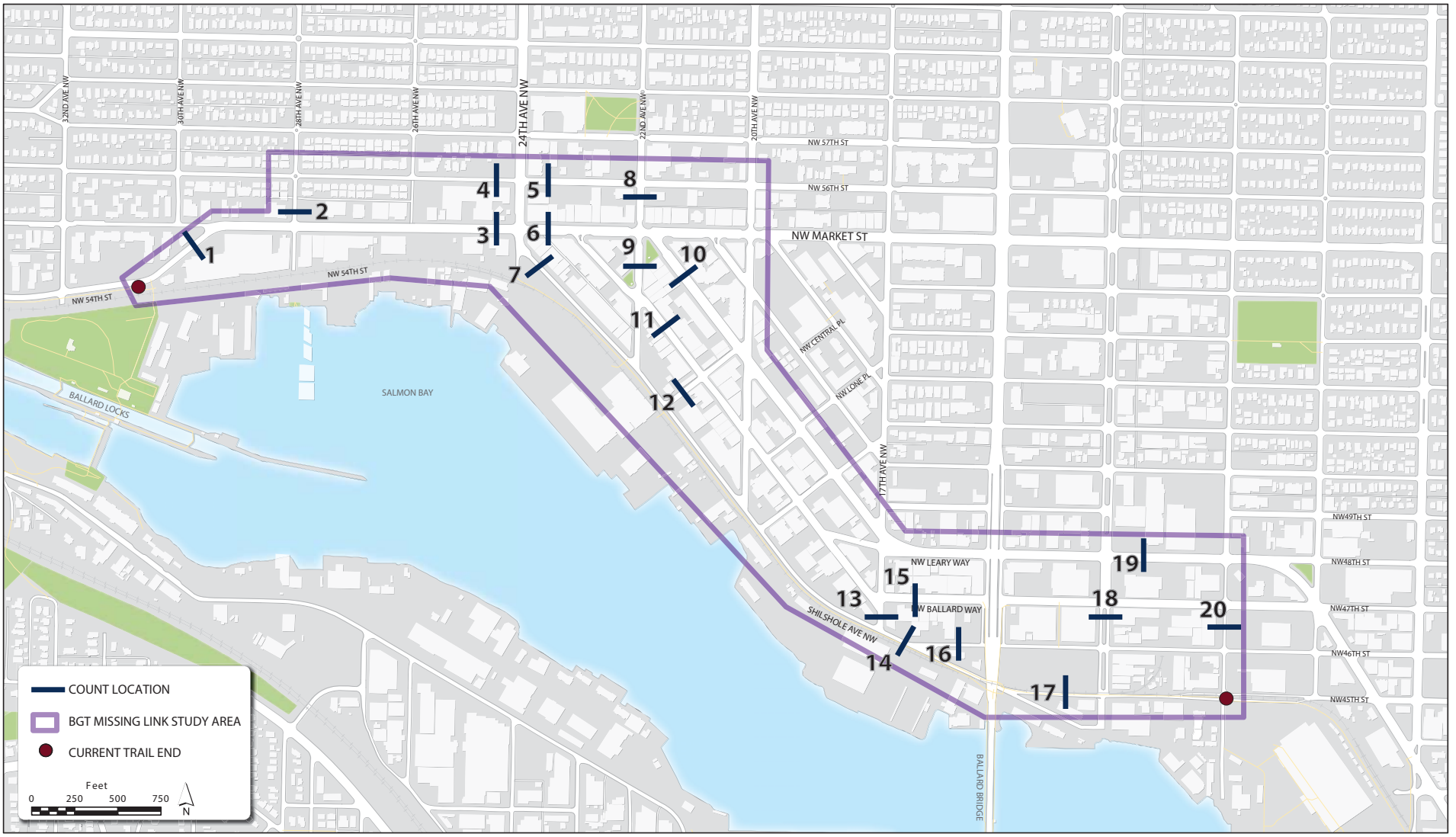
The City is currently updating the Freight Master Plan; a public review draft is scheduled to be available in March 2016. As part of the Freight Master Plan update process, SDOT has identified locations where safety issues and bottlenecks exist for freight transportation. In the study area, 15th Ave NW has been identified as a high bottleneck location, meaning that truck volumes and congestion are expected to be high. The City also identified the intersections of 15th Ave NW/NW Market St and 15th Ave NW/NW Leary Way as locations with safety concerns (SDOT, 2015g).

Table 4-7. 2015 Daily and PM Peak Freight Volumes (January 2013-September 2015)

ID	*Location*	*PM Peak Northbound Volume*	*PM Peak Southbound Volume*	*PM Peak Eastbound Volume*	*PM Peak Westbound Volume*	*Daily Volume*
1	NW 54th St west of NW Market St	-	-	15	20	560
2	28th Ave NW north of NW Market St	5	5	-	-	110
3	NW Market St west of 24th Ave NW	-	-	25	15	640
4	NW 56th St west of 24th Ave NW	-	-	0	0	20
5	NW 56th St east of 24th Ave NW	-	-	5	5	90
6	NW Market St east of 24th Ave NW	-	-	20	15	520
7	Shilshole Ave NW southeast of 24th Ave NW	15	5	-	-	340
8	22nd Ave NW south of NW 56th St	5	5	-	-	145
9	22nd Ave NW south of NW Market St	5	0	-	-	90
10	Leary Ave NW south of NW Market St	40	10	-	-	545
11	Ballard Ave NW southeast of 22nd Ave NW	5	40	-	-	490
12	NW Vernon Pl northwest of Shilshole Ave NW	-	-	5	5	65
13	17th Ave NW north of Shilshole Ave NW	20	5	-	-	410
14	Shilshole Ave NW west of NW 46th St	5	10	-	-	430
15	NW Ballard Way east of 17th Ave NW	-	-	20	5	540

ID	*Location*	*PM Peak Northbound Volume*	*PM Peak Southbound Volume*	*PM Peak Eastbound Volume*	*PM Peak Westbound Volume*	*Daily Volume*
16	NW 46th St west of 15th Ave NW	-	-	5	15	435
17	NW 45th St west of 14th Ave NW	-	-	5	5	115
18	14th Ave NW south of NW Ballard Way	5	10	-	-	345
19	NW Leary Way east of 14th Ave NW	-	-	20	40	1,280
20	11th Ave NW north of NW 46th Ave NW	5	5	-	-	210

Note: Counts were rounded to the nearest five vehicles to account for daily fluctuations. For counts that had between one and four vehicles recorded, the number was rounded up to provide a conservative estimate of impacts.



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-7
2015 Daily Freight Volume Count Locations

4.2.4 Nonmotorized Users

4.2.4.1 *Study Area Facilities*

The existing BGT ends just east and west of the study area. The eastern end of the BGT is at 11th Ave NW and NW 45th St. The western end is located 300 feet east of 32nd Ave NW and NW 54th St.

The BGT is a multi-use trail that provides local and regional access connecting Seattle, Lake Forest Park, and Kenmore. Near the study area, the BGT provides connections to destinations such as Golden Gardens Park and the Ballard Locks to the west, and Gas Works Park and the University of Washington to the east. Near the study area, the trail has a width of between 12 and 15 feet. Currently, the BGT is used by a variety of nonmotorized users, including walkers, runners, cyclists, skaters, and commuters.

In addition to the BGT, other bicycle facilities within and near the study area include the following (Figure 4-8):

- Bicycle lanes on 20th Ave NW between NW Market St and the northern border of the study area;
- Bicycle lanes on 24th Ave NW beginning at the northern border of the study area and traveling north;
- A cycle track on Shilshole Ave NW/NW 45th St between NW 46th St and 11th Ave NW;
- Neighborhood greenway on NW 58th St;
- Bicycle lanes on 8th Ave NW;
- Bicycle lanes on 32nd Ave NW; and
- Path over the Ballard Locks.

A neighborhood greenway is currently under construction on 17th Ave NW between 90th St NW and Ballard Ave NW. A neighborhood greenway is a shared street environment with low speeds and volumes of motorists that is safer and more pleasant for people riding bicycles and walking.

Most streets in the study area have paved sidewalks on both sides of the street with widths varying between 6 and 20 feet (Figure 4-9). For example, 20 foot sidewalks are provided on NW Market St, 12 foot sidewalks are provided on Ballard Ave NW, and 6 foot sidewalks are provided on NW 56th St. Crosswalks are provided at most major intersections. Currently, no sidewalks are provided on NW 45th St and NW 46th St between 14th Ave NW and 11th Ave NW, or on the west side of 11th Ave NW. No sidewalks are provided on the south side of Shilshole Ave NW. Although a sidewalk is provided on the north side of Shilshole Ave NW, there are areas where the sidewalk is partially obstructed by parked vehicles or trash dumpsters. Also, parallel to the Ballard Bridge, there are no sidewalks directly adjacent to the bridge on 15th Ave NW. However, sidewalks are provided on the far east and far west sides of the street. NW Market St and Ballard Ave NW are major pedestrian corridors because of the density of retail and commercial uses.

4.2.4.2 *Pedestrian and Bicycle Volumes*

SDOT provided nonmotorized counts on the BGT at two locations near the study area. Counts were taken on the BGT at 9th Ave NW and on the BGT at Seaview Ave NW in July 2015. Table 4-8 summarizes the daily nonmotorized volumes recorded at these locations. All nonmotorized counts were rounded to the nearest five users to account for daily fluctuations. For counts that were between one and four users, the volume was rounded up to provide a conservative estimate of impacts. Because the counters did not record pedestrian volumes separately, analysts collected pedestrian and bicycle counts at the 9th Ave NW

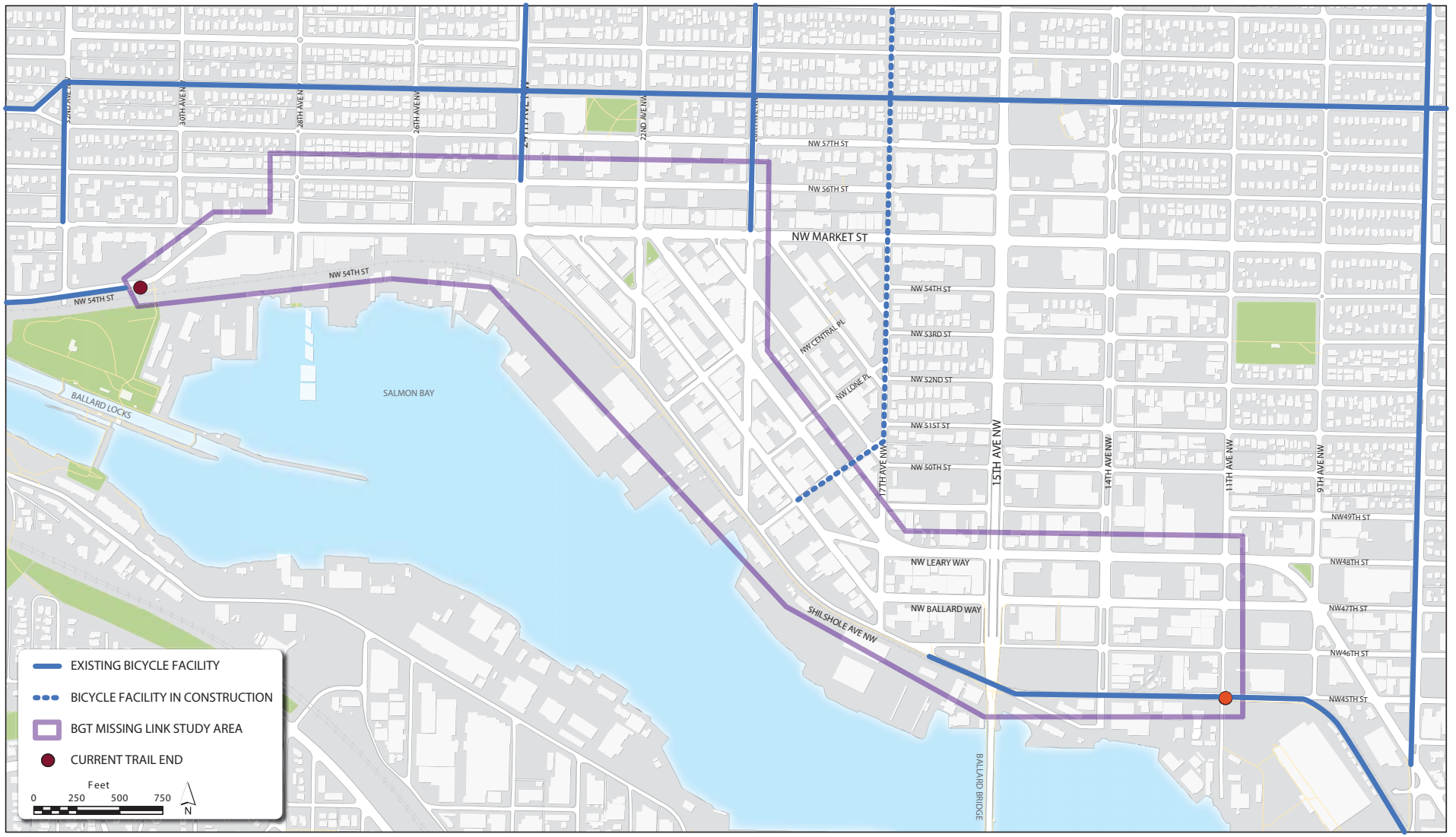
location in September 2015 to develop a ratio of pedestrians to cyclists on the trail. This ratio was applied to the July 2015 bicycle counts to estimate the number of pedestrians during that same period. Analysts used the July counts because overall volumes are higher during the summer compared to the fall. Weather conditions in the fall when counts were taken were cloudy with temperatures in the mid-60s. Weather conditions in the summer when counts were taken were cloudy to sunny with temperatures in the mid-70s to mid-90s.

Table 4-8. 2015 Daily Bicycle Counts and Estimated Pedestrian Volumes on the BGT

Date	*Total Bicycles*	*Westbound Bicycles*	*Eastbound Bicycles*	*Estimated Total Pedestrians*[1]	*Estimated Westbound Pedestrians*[1]	*Estimated Eastbound Pedestrians*[1]
BGT at 9th Ave NW						
Fri 7-17-15	1,080	670	410	360	230	130
Sat 7-18-15	1,530	760	770	505	260	245
Sun 7-19-15	1,420	715	705	470	245	225
Mon 7-20-15	1,665	845	820	545	285	260
Tues 7-21-15	1,640	815	825	540	275	265
Wed 7-22-15	1,720	850	870	565	290	275
BGT at Seaview Ave NW						
Fri 7-17-15	400	180	220	135	60	75
Sat 7-18-15	635	325	310	210	105	105
Sun 7-19-15	200	80	120	65	25	40
Mon 7-20-15	55	45	10	20	15	5
Tues 7-21-15	75	65	10	25	20	5
Wed 7-22-15	130	75	55	45	25	20
Thurs 7-23-15	95	70	25	30	20	10

[1] Pedestrian volumes estimated based on the bicycle-to-pedestrian ratio developed using counts taken in September 2015.

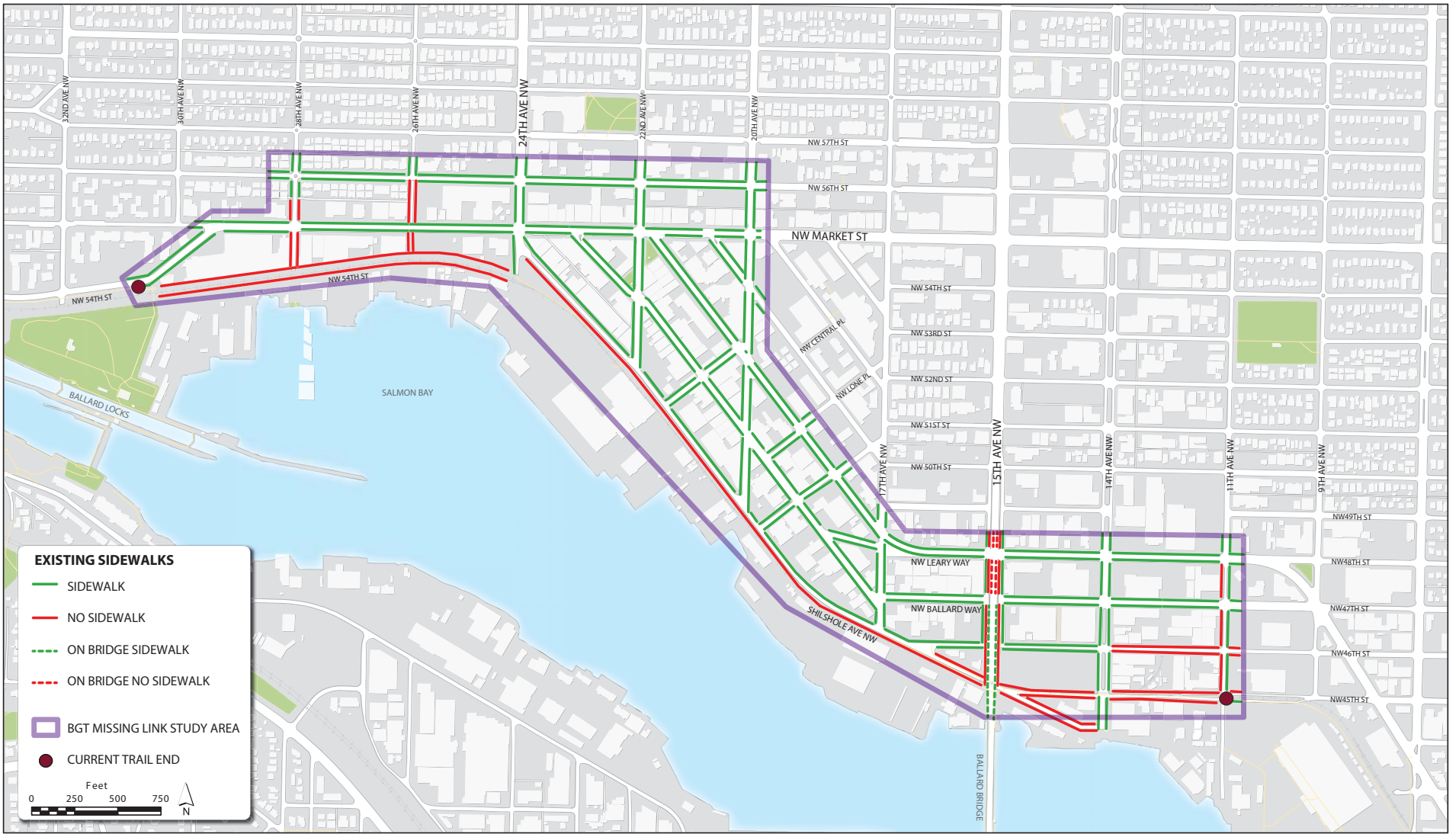
Note: Counts were rounded to the nearest five users to account for daily fluctuations. For counts that were between one and four users, the number was rounded up to provide a conservative estimate of impacts.



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-8
2015 Study Area Bicycle Facilities



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-9
2015 Study Area Sidewalks

Nonmotorized volumes during the PM peak hour on the BGT at 9th Ave NW are summarized in Table 4-9. These counts were collected in September 2015. Nonmotorized volumes on the BGT during the PM peak hour are approximately 10 percent of the daily nonmotorized volume.

Table 4-9. 2015 PM Peak Hour Nonmotorized Counts on the BGT at 9th Ave NW

PM Peak Hour	*Total Bicycles*	*Westbound Bicycles*	*Eastbound Bicycles*	*Total Pedestrians*	*Westbound Pedestrians*	*Eastbound Pedestrians*
5:00-6:00 PM	190	145	45	50	35	15

Note: Counts were rounded to the nearest five users to account for daily fluctuations. For counts that were between one and four users, the number was rounded up to provide a conservative estimate of impacts.

Bicycle volumes are higher than pedestrian volumes on the BGT. The counts recorded on September 26, 2015 indicated that pedestrian volumes are approximately 30 percent of bicycle volumes on the trail. The counts at 9th Ave NW, the closest location to the study area, also indicate that bicycle volumes are typically higher on weekdays than on weekends (see Table 4-8). This is likely because of the high number of commuters who use the BGT compared to recreational users. Nonmotorized volumes on the BGT are substantially higher on the east side of the study area compared to the west side. It is likely that a large number of users are starting and ending their trips in the higher density residential areas north of the study area.

Turning movement counts collected in April 2014 and September 2015 at study area intersections also recorded pedestrian and bicycle movements during the PM peak hour (Figure 4-10). During the PM peak hour, bicycle volumes are highest at:

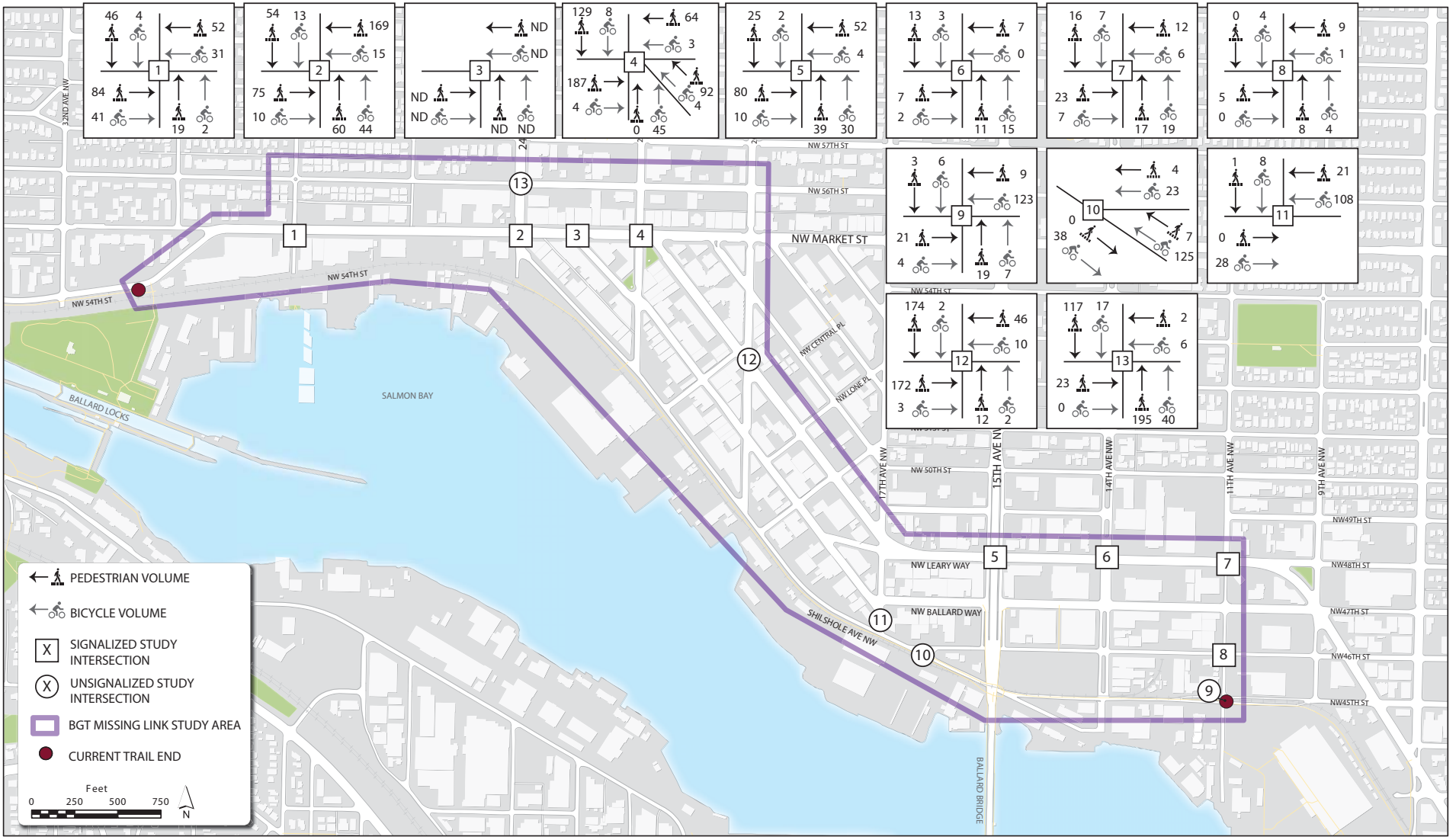
- NW 45th St near the eastern end of the BGT;
- Shilshole Ave NW and NW 46th St;
- 22nd Ave NW and NW Market St;
- NW Market St and NW 24th St; and
- NW Market St and NW 28th St.

The bicycle counts indicate that during the PM peak hour, cyclists are traveling westbound from the eastern end of the BGT along Shilshole Ave NW. Cyclists likely use various northbound streets, such as 22nd Ave NW and 24th Ave NW, to connect to residential areas. This also likely indicates that some of the bicycle trips begin and end in the residential areas north of the study area.

During the PM peak hour, pedestrian volumes are highest at:

- NW Market St;
- Leary Ave NW near 20th Ave NW; and
- NW 56th St near 24th Ave NW.

Pedestrian volumes in these locations are likely highest due to the adjacent land uses and proximity of transit stops. Section 4.2.5, Public Transportation, summarizes existing public transportation facilities in the study area.



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-10
2015 PM Peak Hour
Intersection Nonmotorized Volumes

4.2.5 **Public Transportation**

The following six King County Metro transit routes operate in the study area:

- Route 17, connecting Loyal Heights, Ballard, Queen Anne, and downtown Seattle, with stops on 15th Ave NW and NW Market St in the study area.
- Route 18, connecting North Beach, Ballard, Queen Anne, and downtown Seattle, with stops on 15th Ave NW and NW Market St in the study area.
- Route 29, connecting Ballard, Queen Anne, downtown Seattle, and Pioneer Square, with stops on 15th Ave NW, NW Leary Way, NW Market St, and NW 54th St in the study area.
- Route 40, connecting Northgate, Loyal Heights, Ballard, Fremont, Queen Anne, and downtown Seattle. In the study area, stops are located on NW Leary Way, NW Market St, and 24th Ave NW.
- Route 44, connecting Ballard, Wallingford, and the University of Washington, with stops on NW Market St in the study area.
- RapidRide D Line, connecting Crown Hill, Ballard, Interbay, Uptown, and downtown Seattle. In the study area, stops are located on 15th Ave NW.

Major transit corridors include NW Market St, NW Leary Way, 24th Ave NW, and 15th Ave NW.

Figure 4-11 shows the transit stop locations and transit corridors in the study area. Transit service in the study area is provided 7 days per week. During the weekdays, most transit service is provided between 5:00 and 2:00 AM with additional service during peak commute periods (6:00 to 9:00 AM and 3:00 to 7:00 PM). Routes 17, 18, and 28 only operate during the commute periods on weekdays (no weekend service). The RapidRide D Line provides service 24 hours per day with 15-minute or less headways between 5:00 AM and 11:30 PM during the week.

On weekends, the RapidRide D Line provides service 24 hours per day with 15-minute headways between 5:00 AM and 11:30 PM. Weekend service is also provided on Routes 40 and 44 between 5:00 AM and 2:00 AM. Between 8:00 AM and 6:00 PM on Saturday and Sunday, headways on Routes 40 and 44 are between 15 and 30 minutes.

4.2.6 **Freight Rail**

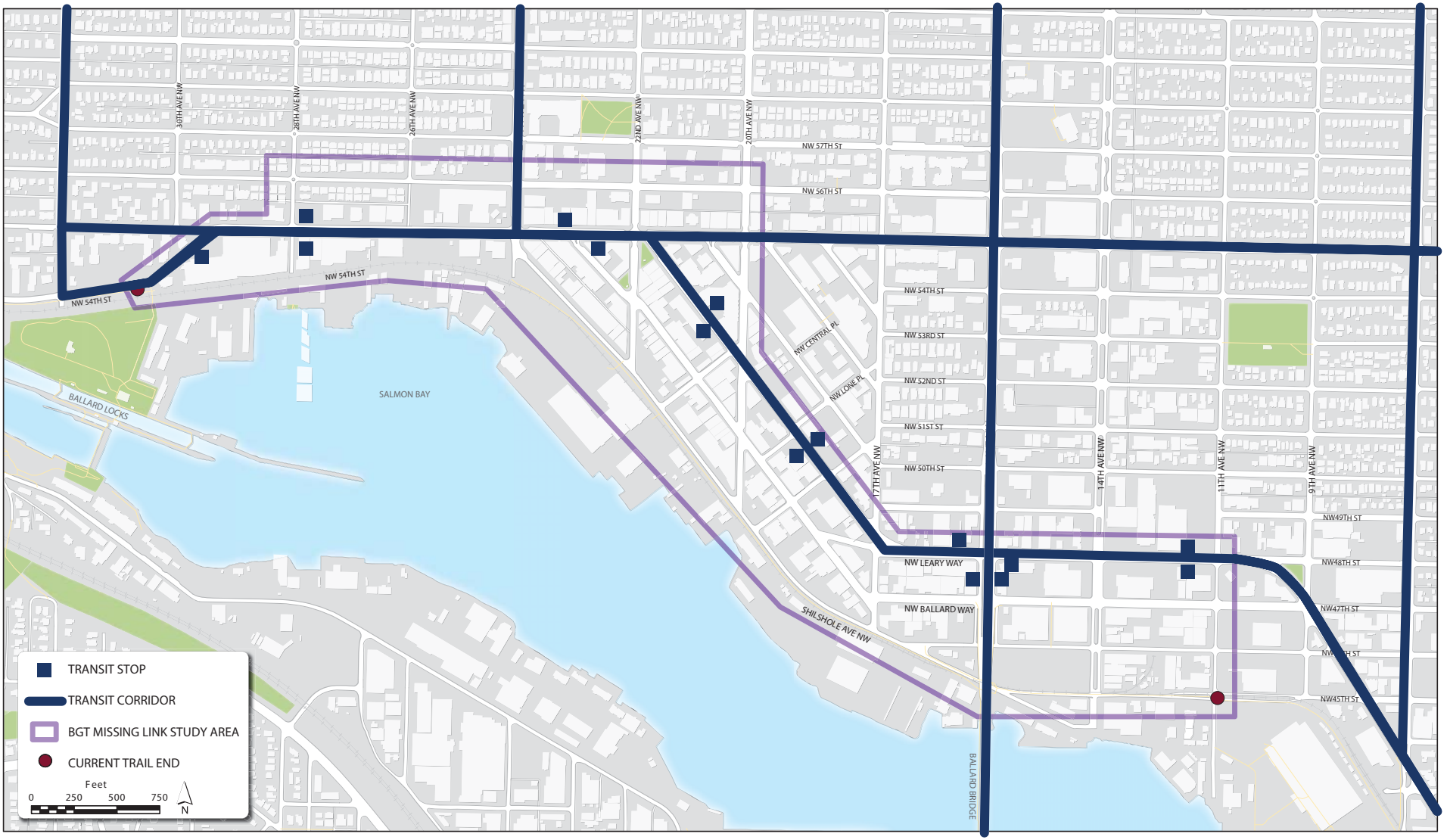
The Ballard Terminal Railroad Co. (BTR) rail line is a shortline railroad that provides freight goods movement in the study area, primarily to the Salmon Bay Sand and Gravel Company. In the study area, the BTR rail line is located on the south side of NW 54th St and Shilshole Ave NW and continues onto the north side of NW 45th St. There is also a rail spur line that travels north from NW 45th St to NW 46th St directly east of 14th Ave NW. There are nine public at-grade crossings in the study area located at:

- 30th Ave NW and NW 54th St;
- 28th Ave NW and NW 54th St;
- 26th Ave NW and NW 54th St;
- 24th Ave NW and NW 54th St;
- Shilshole Ave NW at 15th Ave NW;
- NW 45th St and 11th Ave NW;
- NW 45th St and 14th Ave NW;

- NW 46th St and 14th Ave NW; and
- NW 46th St near 11th Ave NW.

The rail line also crosses several driveways on the south side of Shilshole Ave NW, including the driveways at the Stimson Marina, Salmon Bay Center, Salmon Bay Sand and Gravel, Covich-Williams Chevron, Salmon Bay Café, and Ballard Mill Marina.

Trains do not regularly travel across all of the crossings. Currently, shipments destined for Salmon Bay Sand and Gravel are transferred from BNSF to BTR near the Seaview Boatyard (Cole, 2016). From this location, trains travel south and east along the BTR rail line to deliver shipments to Salmon Bay Sand and Gravel. The shipment is unloaded from the train cars and then empty cars are moved back to the transfer location between BTR and BNSF near the Seaview Boatyard. The train engine used by BTR is stored between NW 45th St and NW 46th St just east of 14th Ave NW. Currently, shipments to Salmon Bay Sand and Gravel occur approximately three times per week (Cole, 2016). Although train movements typically occur when traffic and nonmotorized volumes are lower, such as during the night, BTR can operate trains at any time of the day.



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link
Figure 4-11
2015 Transit Stops and Corridors

Trains typically travel at speeds of 5 to 10 miles per hour (mph) in the study area. Half of the crossings in the study area do not currently have safety enhancements, such as gates, advance warning signs, pavement markings, or crossbucks (signs in a letter "X" formation that indicate grade crossings). At a minimum, federal law requires all public at-grade crossings to have passive warning signs, such as crossbucks (FHWA, 2007). The following five crossings do not provide crossbucks:

- 30th Ave NW and NW 54th St (USDOT Crossing Number 101212H);
- Shilshole Ave NW at 15th Ave NW (USDOT Crossing Number 101226R);
- NW 46th St and 14th Ave NW (USDOT Crossing Number 101246C);
- NW 46th St near 11th Ave NW (USDOT Crossing Number 101258W); and
- NW 45th St and 11th Ave NW (USDOT Crossing Number 101264A).

4.2.7 **Safety**

This section summarizes recent reported collision data in the study area by frequency, type, and severity (including nonmotorized collisions) as well as nonmotorized incident response data (SDOT, 2015c; Seattle Fire Department, 2015). Between January 2012 and December 2014, there were 338 collisions in the study area. Approximately 75 percent of all collisions were property damage-only collisions. None of the collisions were fatal. Table 4-10 summarizes all collisions in the study area, including motor vehicle and nonmotorized collisions, by corridor. Table 4-11 summarizes all collisions in the study area, including motor vehicle and nonmotorized collisions, by intersection.

Table 4-10. Collisions by Corridor 2012-2014

Corridor	*Total Collisions*	*Property Damage Only*	*Injury*	*Fatality*
11th Ave NW between southern dead end and NW Leary Way	2	2	0	0
14th Ave NW between NW 45th St and NW 49th St	9	5	0	0
15th Ave NW (including on-ramp from NW Ballard Way)	6	2	3	0
17th Ave NW between Shilshole Ave NW and NW 49th St	3	1	0	0
20th Ave NW between Shilshole Ave NW and Russell Ave NW	8	6	1	0
22nd Ave NW between Shilshole Ave NW and NW 57th St	12	11	1	0
24th Ave NW between Shilshole Ave NW and NW 57th St	7	6	1	0
28th Ave NW between southern dead end and NW 57th St	5	4	0	0

Corridor	*Total Collisions*	*Property Damage Only*	*Injury*	*Fatality*
30th Ave NW between NW Market St and NW 56th St	1	1	0	0
Ballard Ave NW between NW Market St and NW 48th St, NW Ballard Way between Ballard Ave NW and 11th Ave NW	41	29	1	0
Leary Ave NW/NW Leary Way between NW Market St and NW Ballard Way	38	25	6	0
NW 45th St between 9th and 11th Ave NW, NW 45th St between 14th Ave and 15th Ave NW	3	1	1	0
NW 46th St between 9th Ave NW and 15th Ave NW	6	2	3	0
NW 54th St between 24th Ave NW and NW Market St	4	2	2	0
NW 56th St between 20th Ave NW and 30th Ave NW	9	5	1	0
NW Dock Pl between Shilshole Ave NW and Russell Ave NW	7	6	0	0
NW Ione Pl between Leary Ave NW and Russell Ave NW	2	2	0	0
NW Market St between Leary Ave NW and 32nd Ave NW	38	26	9	0
Shilshole Ave NW between 24th Ave NW and NW 45th St	26	19	5	0
Total	227	155	34	0

Source: SDOT, 2015c
Note: "Not Enough Damage" and "Non-State Matched" collision records are only included in the “Total Collisions” aggregation.

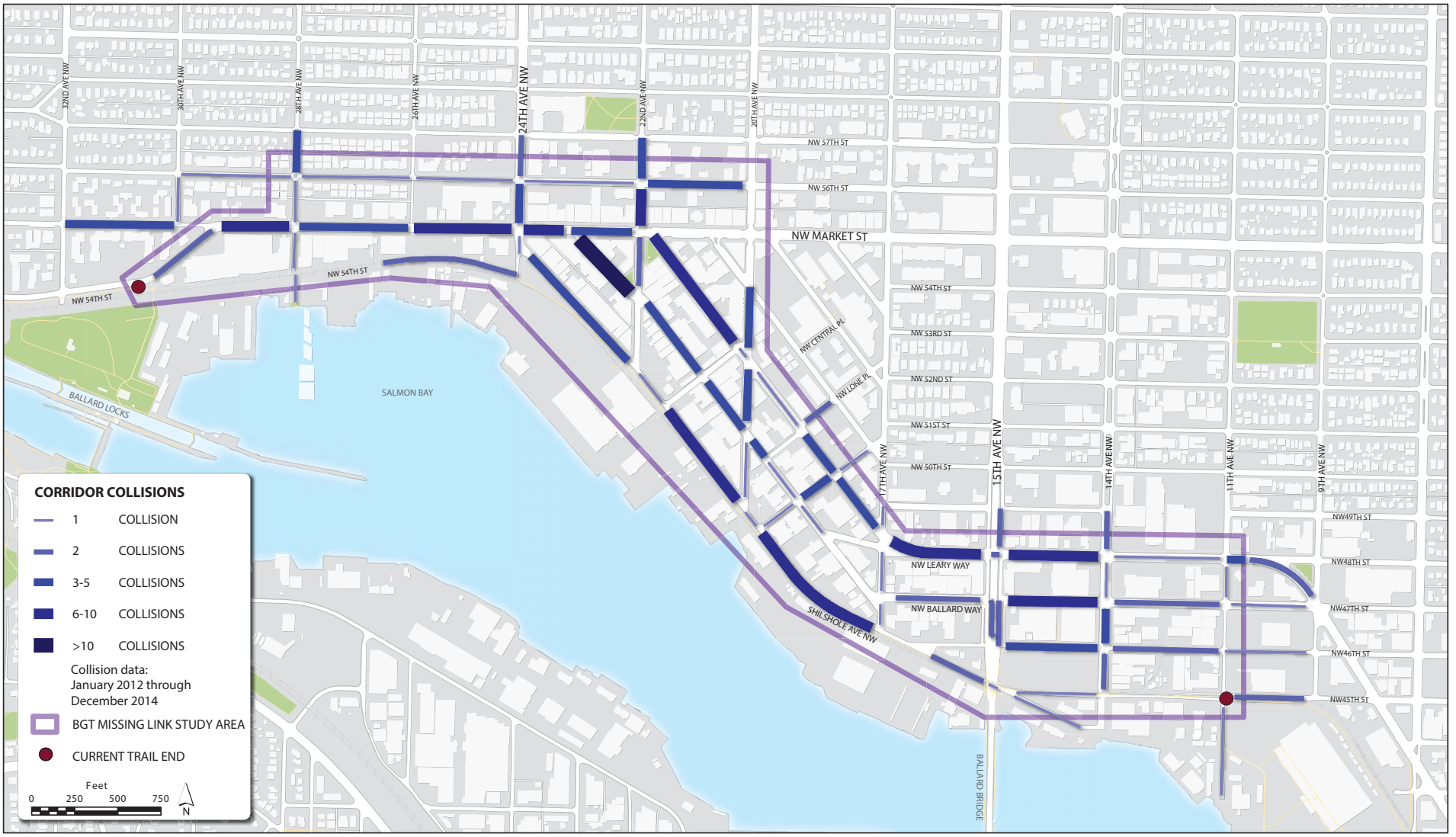
Table 4-11. Collisions by Intersection 2012-2014

Intersection	*Total Collisions*	*Property Damage Only*	*Injury*	*Fatality*
11th Ave NW and NW Ballard Way	2	1	0	0
11th Ave NW and NW Leary Way	6	2	3	0
14th Ave NW and NW 45th St	1	0	1	0
14th Ave NW and NW 46th St	18	13	5	0
14th Ave NW and NW Leary Way	8	4	3	0
15th Ave NW (Northbound) and NW Leary Way	15	12	3	0

Intersection	*Total Collisions*	*Property Damage Only*	*Injury*	*Fatality*
15th Ave NW (Southbound) and NW Leary Way	2	1	1	0
20th Ave NW and Ballard Ave NW	1	0	1	0
20th Ave NW and Leary Ave NW	3	2	0	0
20th Ave NW and Shilshole Ave NW	2	1	0	0
22nd Ave NW and Ballard Ave NW	1	0	1	0
22nd Ave NW and NW 56th St	2	1	1	0
22nd Ave NW and Shilshole Ave NW	3	1	1	0
24th Ave NW and NW Market St	4	3	1	0
24th Ave NW and NW 56th St	2	2	0	0
24th Ave NW and Shilshole Ave NW	2	1	1	0
26th Ave NW and Market St	1	1	0	0
28th Ave NW and NW 56th St	1	0	0	0
28th Ave NW and NW Market St	1	0	1	0
30th Ave NW and NW Market St	2	2	0	0
Ballard Ave NW and NW Ballard Way	2	2	0	0
Ballard Ave NW and NW Dock Pl	3	2	1	0
Ballard Bridge Off-Ramp and NW Ballard Way	3	2	1	0
Ballard Ave NW and NW Market St	2	2	0	0
Leary Ave NW and NW Dock Pl	3	2	1	0
Leary Ave NW and NW Ione Pl	3	2	1	0
Leary Ave NW And NW Leary Way	2	0	1	0
Leary Ave NW and NW Market St	7	4	3	0
Leary Ave NW and NW Vernon Pl	2	1	1	0
NW 54th St and NW Market St	4	3	1	0
Shilshole Ave NW and NW Vernon Pl	1	0	1	0
Shilshole Ave NW and NW 46th St	1	0	1	0
Shilshole Ave NW and NW Dock Pl	1	0	0	0
Total	111	67	35	0

Source: SDOT, 2015c
Note: "Not Enough Damage" and "Non-State Matched" collision records are only included in the “Total Collisions” aggregation

Figure 4-12 summarizes all of the collisions that occurred in the study area, including collisions between motor vehicles, pedestrians, and cyclists, for one-block segments (in Table 4-10, collisions are summarized for multi-block corridors). As shown on Figure 4-12, the single block segment of Ballard Ave NW between NW Market St and 22nd Ave NW had the highest number of collisions compared to other single block segments in the study area with 13 collisions over the 3-year period. The majority of collisions in the study area were property damage-only collisions with parked vehicles.



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-12
Study Area Corridor Collisions

The intersections with the highest concentrations of collisions—five or more collisions over the 3-year period—included (Figure 4-13):

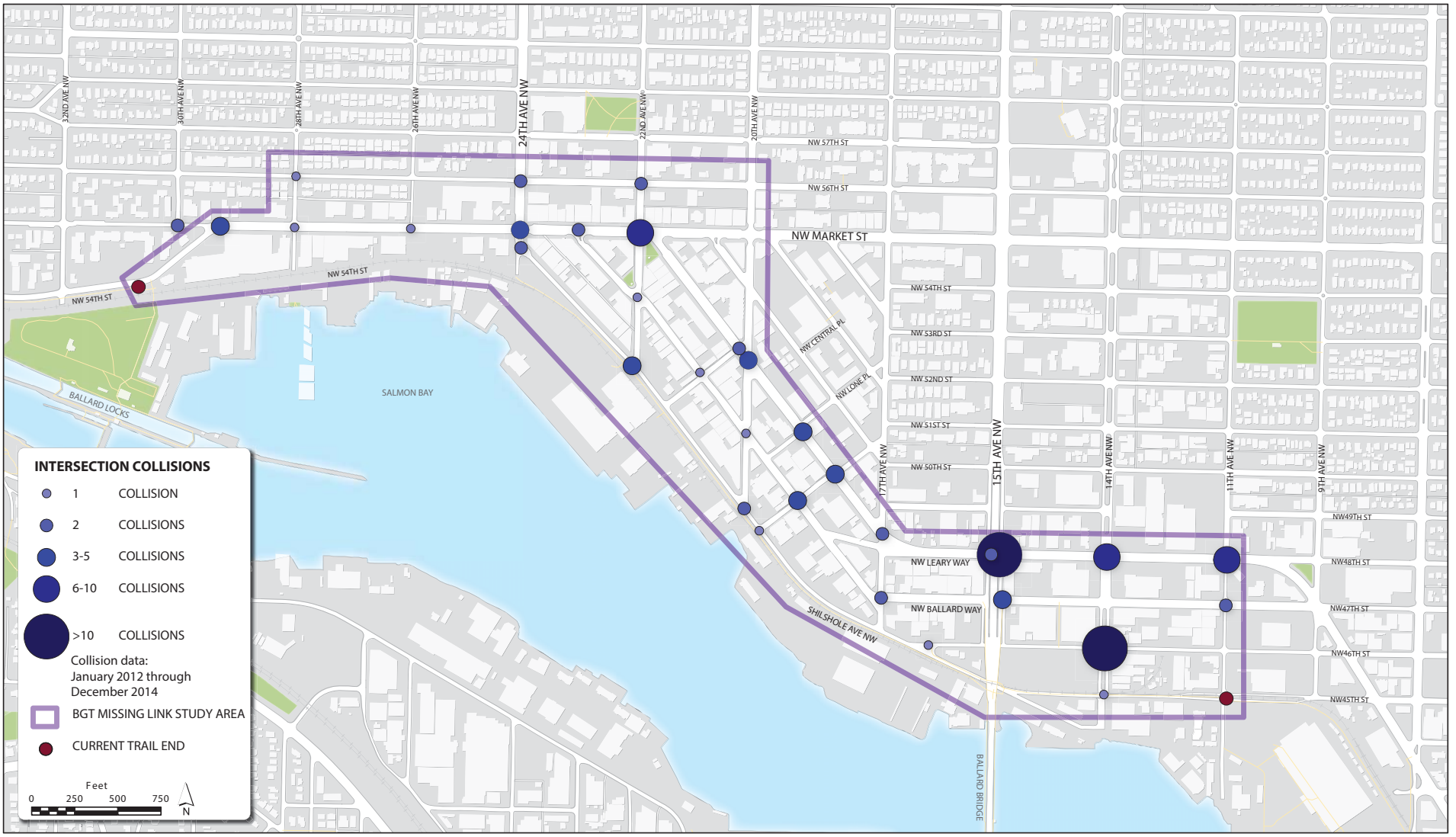
- NW 46th St and 14th Ave NW;
- 15th Ave NW northbound and NW Leary Way;
- NW Market St and Leary Ave NW;
- NW Leary Way and 14th Ave NW; and
- NW Leary Way and 11th Ave NW.

The collision type varied at each of the intersections. Right-angle collisions were the most frequent at NW 46th St and 14th Ave NW. At the intersections of NW Leary Way/15th Ave NW northbound, 14th Ave NW, and 11th Ave NW, the most frequent collision type was left-turn accidents. Rear-end collisions were the most common collisions at NW Market St and Leary Ave NW.

Table 4-12 summarizes the number of collisions by collision type for the entire study area. Collisions are classified under only one type, so there is no overlap between collision records. The majority of collisions in the study area were with parked vehicles, followed by right-angle collisions, rear end collisions, and left turn collisions. Head-on and right turn collisions had the lowest collision rates.

Collisions involving nonmotorized users are shown on Figure 4-14. Collisions involving pedestrians or cyclists were distributed throughout the study area with just over half occurring between intersections (on block segments). The majority of the nine collisions with pedestrians occurred when a turning or forward-moving vehicle struck a pedestrian who was crossing the street. The cause of collisions between cyclists and vehicles in the study area varies, although the majority of collisions occurred when both the vehicle and the cyclist were moving. For example, many collisions occurred when a vehicle was traveling in an opposite direction to the cyclist, such as a right-turning vehicle colliding with a forward-moving cyclist or a turning cyclist colliding with a forward-moving vehicle. There were no dedicated bicycle facilities in the locations where a collision between a vehicle and a cyclist occurred, with the exception of one collision that occurred on NW 45th St between 9th Ave NW and 11th Ave NW. In this location, there is a parallel facility, which is the existing BGT.

Nonmotorized safety in the study area is also affected by roadway conditions, including the presence of railroad tracks and other obstacles. Incident response data provided by the Seattle Fire Department indicate locations in the study area where roadway conditions could create unsafe passage for bicyclists and pedestrians (Seattle Fire Department, 2015). Table 4-13 and Figure 4-15 summarize the incident response data in the study area from January 2012 through December 2014. As shown on Figure 4-15, incident responses have been concentrated along NW 45th St and Shilshole Ave NW, and at the intersections of NW 45th St/14th Ave NW and under the Ballard Bridge. The presence of railroad tracks in these locations could influence safety conditions for nonmotorized users, particularly cyclists. Incidents near railroad tracks typically occur when bicycle tires become trapped between the railroad tracks and the street. Between January 2012 and December 2014, there were 45 incidents in the study area. However, it is likely that additional incidents caused by roadway conditions occurred but were not recorded.



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-13
Study Area Intersection Collisions

Table 4-12. Collision Type 2012-2014

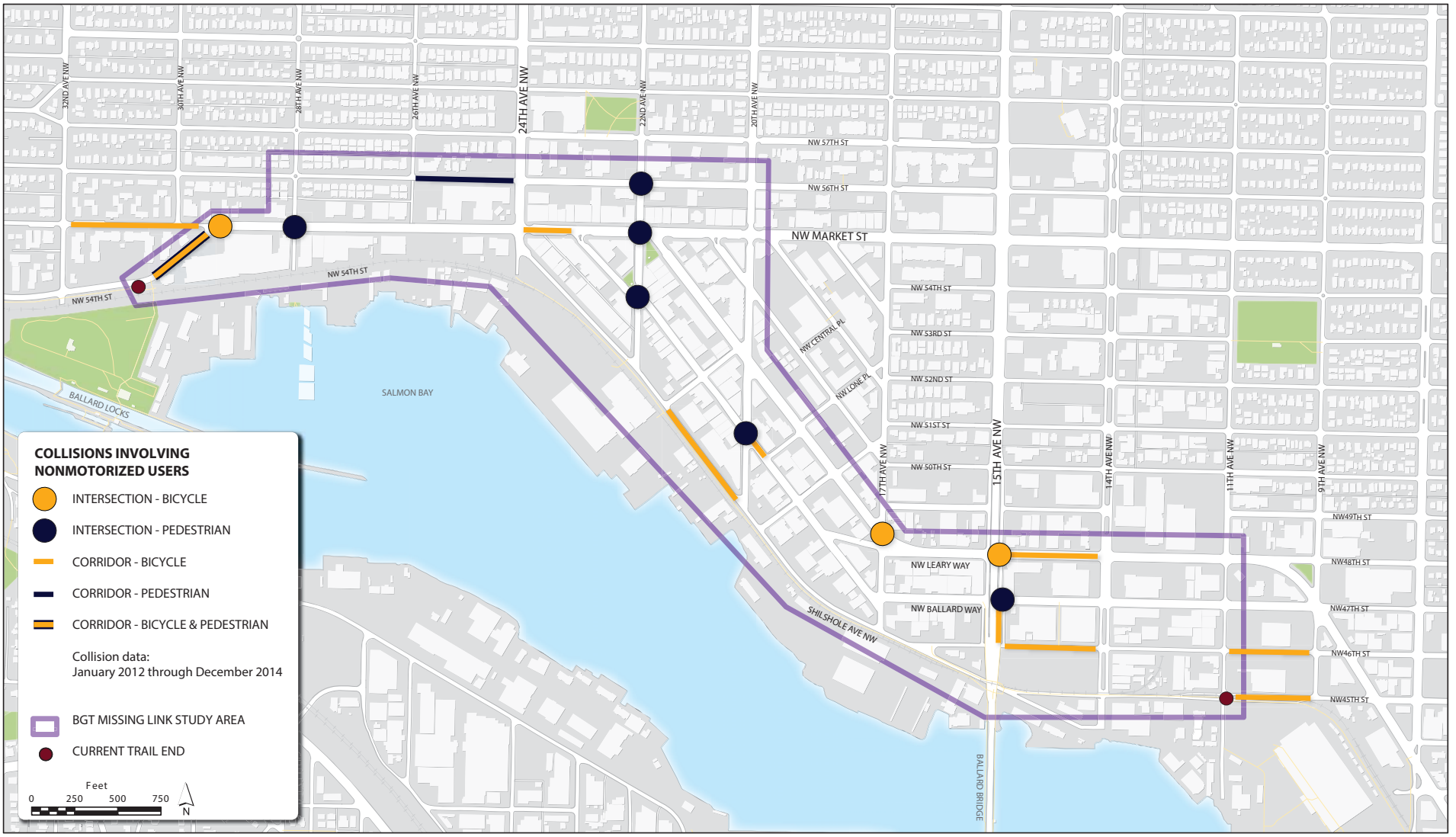
Location	*Parked Car*	*Right angle*	*Right turn*	*Left turn*	*Side swipe*	*Head-on*	*Rear end*	*Other Collision Type*	*Bicycle*	*Pedestrian*
Corridor										
11th Ave NW between southern dead end and NW Leary Way	1	1	0	0	0	0	0	0	0	0
14th Ave NW between NW 45th St and NW 49th St	2	0	0	0	0	0	0	0	0	0
15th Ave NW (including on-ramp from NW Ballard Way)	0	0	0	0	1	0	3	0	1	0
17th Ave NW between Shilshole Ave NW and NW 49th St	1	0	0	0	0	0	0	0	0	0
20th Ave NW between Shilshole Ave NW and Russell Ave NW	4	0	0	0	0	0	2	1	0	0
22nd Ave NW between Shilshole Ave NW and NW 57th St	9	0	0	1	1	0	1	0	0	0
24th Ave NW between Shilshole Ave NW and NW 57th St	2	0	0	0	3	0	1	0	0	0
26th Ave NW and NW Market St	0	0	0	0	0	0	0	0	0	0
28th Ave NW between southern dead end and NW 57th St	3	0	0	0	0	0	0	0	0	0
30th Ave NW between NW Market St and NW 56th St	1	0	0	0	0	0	0	0	0	0
Ballard Ave NW between NW Market St and NW 48th St, NW Ballard Way between Ballard Ave NW and NW Leary Way	23	0	0	0	2	0	1	0	1	0

Location	*Parked Car*	*Right angle*	*Right turn*	*Left turn*	*Side swipe*	*Head-on*	*Rear end*	*Other Collision Type*	*Bicycle*	*Pedestrian*
Leary Ave NW/NW Leary Way between NW Market St and NW Ballard Way	10	4	1	1	3	0	6	5	1	0
NW 45th St between 9th and 11th Ave NW, NW 45th St between 14th Ave and 15th Ave NW	0	0	0	0	0	0	0	1	1	0
NW 46th St between 9th Ave NW and 15th Ave NW	1	0	0	0	0	0	1	0	3	0
NW 54th St between 24th Ave NW and NW Market St	2	0	0	0	0	0	0	0	1	1
NW 56th St between 20th Ave NW and 30th Ave NW	5	0	0	0	0	0	0	0	0	1
NW Dock Pl between Shilshole Ave NW and Russell Ave NW	4	1	0	0	0	0	0	0	0	0
NW Ione Pl between Leary Ave NW and Russell Ave NW	2	0	0	0	0	0	0	0	0	0
NW Market St between Leary Ave NW and NW 54th St	12	1	0	0	5	1	4	4	1	1
Shilshole Ave NW between 24th Ave NW and NW 45th St	12	1	0	2	2	1	1	3	2	0

Location	*Parked Car*	*Right angle*	*Right turn*	*Left turn*	*Side swipe*	*Head-on*	*Rear end*	*Other Collision Type*	*Bicycle*	*Pedestrian*
Intersection										
11th Ave NW and NW Ballard Way	0	0	0	0	0	0	0	0	0	0
11th Ave NW and NW Leary Way	0	1	1	3	0	0	0	0	0	0
14th Ave NW and NW 45th St	0	1	0	0	0	0	0	0	0	0
14th Ave NW and NW 46th St	0	15	0	0	1	0	0	0	0	0
14th Ave NW and NW Leary Way	0	1	0	5	0	0	1	0	0	0
15th Ave NW (Northbound) and NW Leary Way	0	0	0	11	3	0	0	0	1	0
15th Ave NW (southbound) and NW Leary Way	0	0	0	1	0	0	0	1	0	0
20th Ave NW and Ballard Ave NW	0	0	0	0	0	0	0	0	0	1
20th Ave NW and Leary Ave NW	0	1	0	1	0	0	0	0	0	0
20th Ave NW and Shilshole Ave NW	0	0	0	0	0	0	1	0	0	0
22nd Ave NW and Ballard Ave NW	0	0	0	0	0	0	0	0	0	1
22nd Ave NW and NW 56th St	0	0	0	0	0	0	0	0	0	1
22nd Ave NW and Shilshole Ave NW	0	1	0	0	0	0	0	1	0	0
24th Ave NW and NW Market St	0	1	0	0	1	0	2	0	0	0
24th Ave NW and NW 56th St	0	1	0	0	0	0	1	0	0	0
24th Ave NW and Shilshole Ave NW	1	0	0	0	0	0	0	1	0	0
26th Ave NW and Market St	0	1	0	0	0	0	0	0	0	0
28th Ave NW and NW 56th St	0	0	0	0	0	0	0	0	0	0

Location	*Parked Car*	*Right angle*	*Right turn*	*Left turn*	*Side swipe*	*Head-on*	*Rear end*	*Other Collision Type*	*Bicycle*	*Pedestrian*
28th Ave NW and NW Market St	0	0	0	0	0	0	0	0	0	1
30th Ave NW and NW Market St	0	0	0	0	0	0	0	1	0	0
Ballard Ave NW and NW Ballard Way	0	1	0	0	0	0	0	0	0	0
Ballard Ave NW And NW Dock Pl	0	0	0	1	0	0	0	2	0	0
Ballard Bridge Off-Ramp and NW Ballard Way	0	1	0	0	1	0	0	0	0	1
Leary Ave NW and NW Dock Pl	0	1	0	1	0	0	0	1	0	0
Leary Ave NW and NW Ione Pl	0	3	0	0	0	0	0	0	0	0
Leary Ave NW and NW Leary Way	0	0	0	0	0	0	0	0	1	0
Leary Ave NW and NW Market St	1	0	0	1	0	0	4	0	0	1
Leary Ave NW and NW Vernon Pl	0	1	0	1	0	0	0	0	0	0
NW 54th St and NW Market St	0	1	0	2	0	0	0	0	1	0
Shilshole Ave NW and NW Vernon Pl	0	1	0	0	0	0	0	0	0	0
Shilshole Ave NW and NW 46th St	0	1	0	0	0	0	0	0	0	0
Shilshole Ave NW and NW Dock Pl	0	0	0	0	0	0	0	0	0	0
Unclassified Collisions	68									
Total	97	42	2	31	23	2	29	21	14	9

Source: SDOT 2015c



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-14
Study Area Collisions Involving Nonmotorized Users

Table 4-13. Nonmotorized Incident Responses by Corridor and Intersection (2012-2014)

	Number of Incidents
Corridor	
NW Market St between 32nd Ave NW and 30th Ave NW	1
24th Ave NW between NW 54th St and Salmon Bay	1
Shilshole Ave NW between NW 46th St and 15th Ave NW	6
NW 45th St between 14th Ave NW and 11th Ave NW	7
NW 54th St between the Ballard Locks Driveway and 32nd Ave NW	1
15th Ave NW between NW 46th St and Shilshole Ave NW	1
Shilshole Ave NW between NW Vernon Pl and 20th Ave NW	1
NW Ballard Way between 15th Ave NW and 14th Ave NW	1
NW 46th St between 15th Ave NW and 14th Ave NW	1
Intersection	
NW 45th St and 14th Ave NW	4
Shilshole Ave NW and NW 45th St	3
Shilshole Ave NW and 20th Ave NW	2
Shilshole Ave NW and 22nd Ave NW	2
NW Market St and 24th Ave NW	2
Shilshole Ave NW and NW 46th St	2
NW Leary Way and 15th Ave NW	2
NW 46th St and 11th Ave NW	2
NW 46th St and 14th Ave NW	1
NW Market St and 28th Ave NW	1
NW Market St and 32nd Ave NW	1
Shilshole Ave NW and NW Vernon Pl	1
NW 46th St and 15th Ave NW	1
NW 45th Ave and 15th Ave NW	1
Total	45

Source: Seattle Fire Department , 2015

SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 4-15
Study Area Nonmotorized Incident Responses

CHAPTER 5 POTENTIAL IMPACTS

5.1 No Build Alternative

5.1.1 Construction

No construction activities would occur under the No Build Alternative for the BGT Missing Link project; therefore, there would be no construction impacts associated with the No Build Alternative.

5.1.2 Operation

5.1.2.1 *Roadway Network*

The roadway configuration and the 23 study area intersections and driveways for the No Build Alternative would be the same as the 2015 existing conditions described in Section 4.2, Existing Transportation Conditions.

5.1.2.2 *Traffic Volumes and Operations*

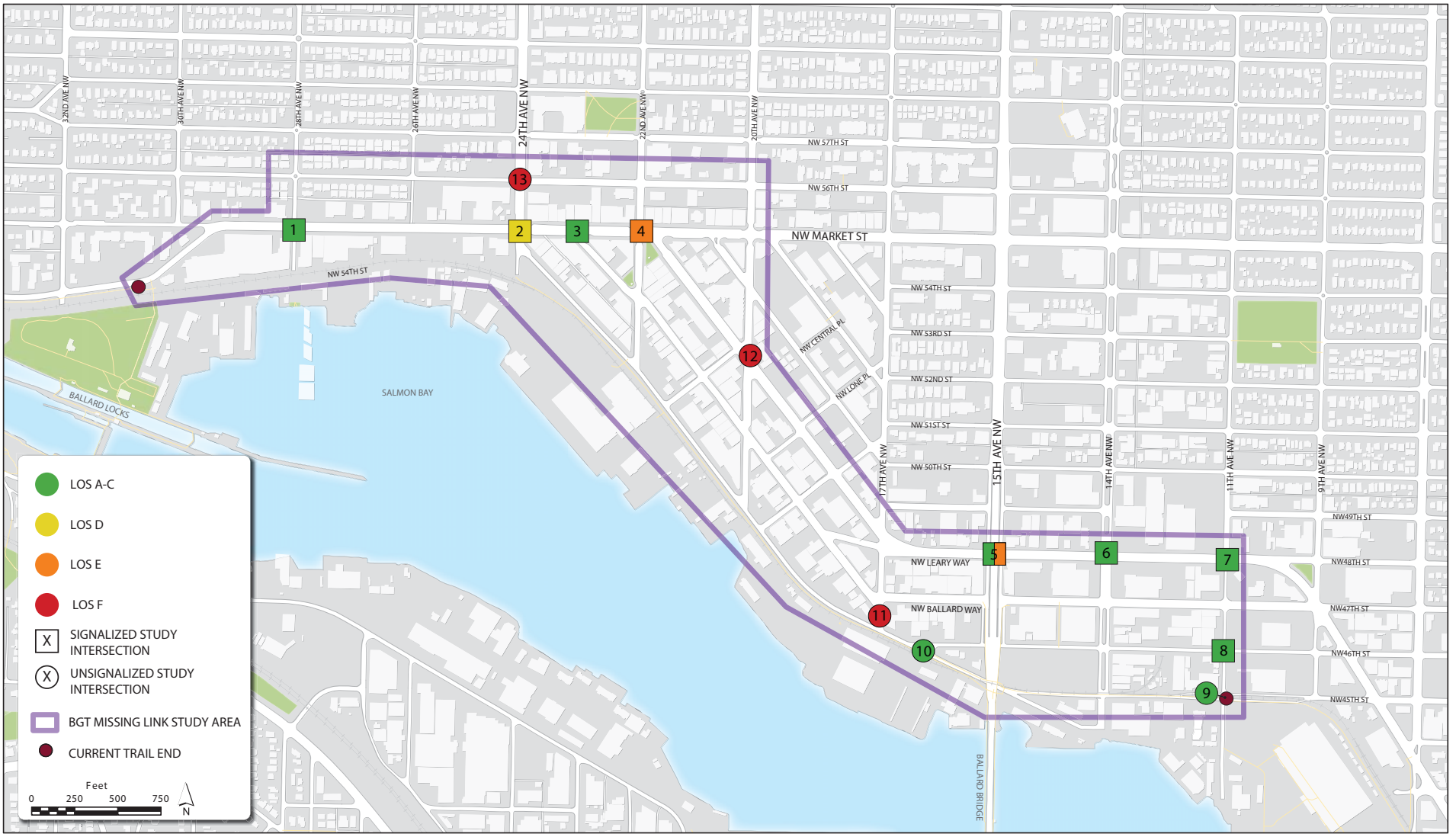
This section describes the PM peak hour traffic volumes and operations expected to exist in the 2040 No Build Alternative. Traffic volumes are expected to increase by 0.6 percent each year between 2015 and 2040 due to regional population and employment growth (Parsons Brinckerhoff, 2008, 2011). The roadway configuration is expected to be the same as the 2015 existing conditions.

The results of the analysis for the PM peak hour intersection operations for the 2040 No Build Alternative are summarized in Figure 5-1. Table 5-1 summarizes and compares the intersection operations results for the PM peak hour for both the 2015 existing conditions and the 2040 No Build Alternative. The average delay for all vehicles is reported for signalized intersections. For unsignalized intersections, delay is reported for the worst-operating stopped approach.

There would be more congestion and delay under the No Build Alternative compared to the 2015 existing conditions due to population and employment growth. The following intersections are expected to operate at LOS E or F or would have increased delay in 2040 under the No Build Alternative:

- Intersection 4: NW Market St/22nd Ave NW/Leary Ave NW;
- Intersection 5b: 15th Ave NW/NW Leary Way Southbound Off-Ramp;
- Intersection 11: Shilshole Ave NW/NW 17th St (southbound approach);
- Intersection 12: Leary Ave NW/20th Ave NW (southbound approach on 20th Ave NW); and
- Intersection 13: NW 56th St/24th Ave NW (westbound approach).

All other intersections in the study area would operate at LOS D or better.



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 5-1
2040 No Build Alternative PM Peak Hour Study Intersection Level of Service

Table 5-1. Comparison of PM Peak Hour Study Intersection Levels of Service, 2015 Existing Conditions and 2040 No Build Alternative

ID	*Intersection*	*Traffic Control*	*2015 Existing Conditions PM Peak Hour*		*2040 No Build PM Peak Hour*	
			LOS	*Delay (sec)*	*LOS*	*Delay (sec)*
1	NW Market St/28th Ave NW	Signal	A	6	A	7
2	NW Market St/24th Ave NW	Signal	D	42	D	46
3	NW Market St/Ballard Ave NW	Pedestrian Half Signal	A	8	A	8
4	NW Market St/22nd Ave NW/Leary Ave NW	Signal	D	54	F	81
5a	15th Ave NW/NW Leary Way Southbound Off-Ramp	Signal	B	15	C	20
5b	15th Ave NW/NW Leary Way Northbound Off-Ramp	Signal	E	61	E	68
6	NW Leary Way/14th Ave NW	Signal	A	8	A	10
7	NW Leary Way/11th Ave NW	Signal	B	14	B	18
8	11th Ave NW/NW 46th St	Signal	B	18	C	21
9	11th Ave NW/NW 45th St	Unsignalized – All-way Stop	A	10	B	11
10	NW 46th St/Shilshole Ave NW	Unsignalized – Two-way Stop	A	8	A	9
11	Shilshole Ave NW/NW 17th St	Unsignalized – Two-Way Stop	E	42	F	247
12	Leary Ave NW/20th Ave NW	Unsignalized – All-way Stop	F	269	F	>300
13	NW 56th St/24th Ave NW	Unsignalized – Two-Way Stop	E	39	F	153

Table 5-2 summarizes and compares the average delay at study area driveways during the PM peak hour for both the 2015 existing conditions and the 2040 No Build Alternative. During the PM peak hour, delay at study area driveways could increase by up to 12 seconds compared to existing conditions.

Table 5-2. Comparison of PM Peak Hour Study Driveway Delay, 2015 Existing Conditions and 2040 No Build Alternative

ID	*Driveway*	*2015 Existing Conditions PM Peak Hour Delay (sec)*	*2040 No Build PM Peak Hour Delay (sec)*
14	NW 54th St/Ballard Locks	21	33
15	Shilshole Ave NW/Stimson Marina	17	23
16	Shilshole Ave NW/Salmon Bay Center	18	24
17	Shilshole Ave NW/Salmon Bay Sand and Gravel (north side)	11	11
18	Shilshole Ave NW/Salmon Bay Sand and Gravel (south side)	22	30
19	Shilshole Ave NW/Covich-Williams Chevron	15	17
20	Shilshole Ave NW/Salmon Bay Cafe	15	18
21	Shilshole Ave NW/Ballard Industrial	20	29
22	Ballard Ave NW/Ballard Industrial	8	8
23	Shilshole Ave NW/Ballard Mill Marina	20	27

Note: The driveway analysis evaluates changes to delay at a sample of typical driveways to characterize the range of impacts that could occur under the Build Alternatives. Under the existing conditions and No Build Alternative evaluation, bicyclists were added to motor vehicle volumes to arrive at the total volumes along Shilshole Ave NW. This addition captures the impacts that would be associated with bicycle traffic in the study area without a trail.

5.1.2.3 *Freight*

The primary freight corridors are expected to be the same under the No Build Alternative compared to the 2015 existing conditions. Freight would continue to be accommodated on the following roadways in the study area:

- Shilshole Ave NW;
- NW Market St between 24th Ave NW and the eastern boundary of the study area;
- NW Leary Way;
- 15th Ave NW; and
- 24th Ave NW.

However, increased traffic congestion from background population and employment growth would likely adversely affect freight movement in the study area. Freight vehicles would experience the same delay at

study area intersections as general-purpose vehicles. Intersection 11 (Shilshole Ave NW/NW 17th St) would operate at LOS F in 2040 and is located on a primary freight corridor as designated by SDOT.

5.1.2.4 *Nonmotorized Users*

5.1.2.4.1 Study Area Facilities

Pedestrian and bicycle facilities in and near the study area under the No Build Alternative would be the same as under the 2015 existing conditions. Bicycle facilities that would be provided in and near the study area under the No Build Alternative are shown on Figure 4-8. Most study area streets would have sidewalks and crosswalks provided at signalized intersections, as shown on Figure 4-9.

There would continue to be a gap in the BGT in the study area between 11th Ave NW and NW 45th St and approximately 300 feet east of 32nd Ave NW and NW 54th St.

5.1.2.4.2 Pedestrian and Bicycle Volumes

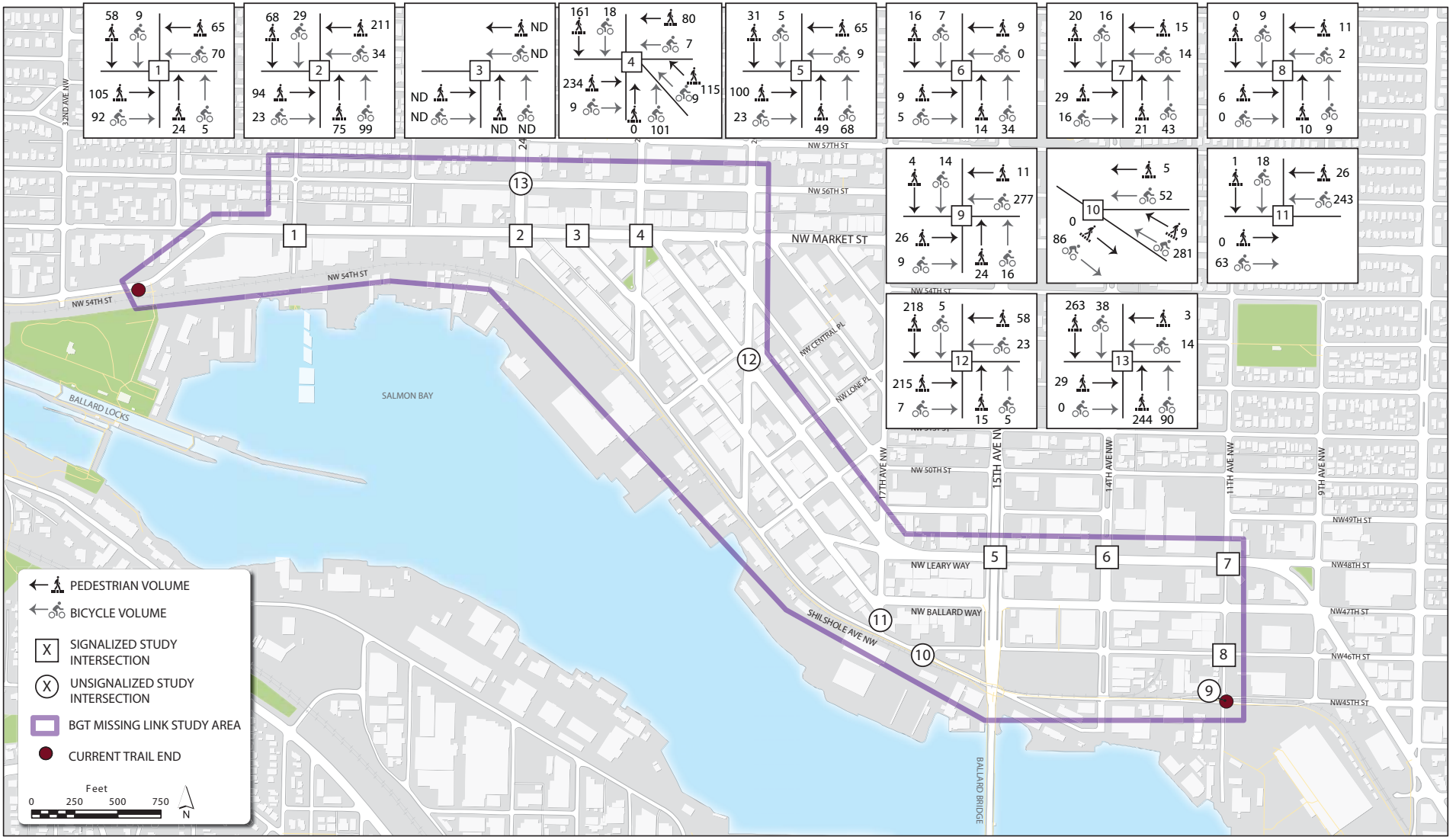
Bicycle volumes in the study area are projected to increase by 5 percent each year between 2015 and 2040 based on recent studies and counts on the BGT, expected land use changes and growth in the Ballard area, and input from SDOT (SDOT, 2015d, 2015e; Fehr & Peers and SvR Design Company, 2011; PSRC, 2015). Pedestrian volumes are projected to increase by 1 percent each year between 2015 and 2040 (Sound Transit, 2010; Fehr & Peers and SvR Design Company, 2011; PSRC, 2015).

Figure 5-2 summarizes the future bicycle and pedestrian volumes during the PM peak hour at study area intersections in 2040. Peak hour nonmotorized volumes on the BGT at 9th Ave NW in 2040 are summarized in Table 5-3. All nonmotorized counts were rounded to the nearest five users to account for daily fluctuations. For locations where the recorded volumes were between one and four, the count was rounded up to provide a conservative estimate of impacts. Similar to existing conditions, bicyclists are anticipated to primarily use Shilshole Ave NW to travel through the study area.

Table 5-3. 2040 PM Peak Hour Nonmotorized Volumes on the BGT at 9th Ave NW

PM Peak Hour	*Total Bicycles*	*Westbound Bicycles*	*Eastbound Bicycles*	*Total Pedestrians*	*Westbound Pedestrians*	*Eastbound Pedestrians*
5:00-6:00 PM	430	325	105	65	45	20

Under the No Build Alternative, increased pedestrian and bicycle volumes in the study area could result in increased conflicts between nonmotorized users and vehicular traffic, particularly for cyclists. Cyclists currently travel on study area roadways without designated bicycle facilities, particularly on Shilshole Ave NW. When there are more bicyclists on study area streets in the future, the lack of dedicated facilities could result in a greater likelihood of collisions between motor vehicles and cyclists due to increased exposure.



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 5-2
2040 No Build PM Peak Hour
Intersection Nonmotorized Volumes

5.1.2.5 *Public Transportation*

Public transportation services under the No Build Alternative would be similar to the 2015 existing conditions. With increased population and employment growth, it is anticipated that demand for public transit would increase, which could result in the need for service expansion in the study area.

No intersections along transit corridors are expected to operate at LOS F under the No Build Alternative. The intersection at NW 56th St and 24th Ave NW would operate at LOS F under the No Build Alternative, but this would not affect transit because the delay would only be experienced by vehicles at the westbound approach.

5.1.2.6 *Freight Rail*

Rail operations in the study area under the No Build Alternative are expected to be similar to the 2015 existing conditions. No impacts are anticipated under the No Build Alternative.

5.1.2.7 *Safety*

Traffic and nonmotorized volumes in the study area are expected to increase between 2015 and 2040. This could increase collision frequencies for both motor vehicle and nonmotorized users in the study area. Bicycle volumes are expected to grow at a higher rate than vehicles and pedestrians; therefore, the frequency of motor vehicle-bicycle collisions could increase at a greater rate under the No Build Alternative. No new dedicated bicycle facilities would be provided under the No Build Alternative, which could result in a greater likelihood of collisions between motor vehicles and cyclists due to increased exposure. As discussed in Section 4.2.7, the majority of collisions between cyclists and motor vehicles to date have occurred when both the cyclist and the motor vehicle were in movement in areas where there were no dedicated bicycle facilities. If this condition persists, there could be an increased likelihood for collisions between motor vehicles and cyclists because of increased volumes.

As mentioned in Section 5.1.2.1, the roadway network is expected to be the same under the No Build Alternative as under the 2015 existing conditions; as a result, collision types and severity for motor vehicles and nonmotorized users are expected to be similar.

Other roadway conditions that influence nonmotorized safety would also remain the same under the No Build Alternative, such as the presence of railroad tracks and other obstacles. If dedicated bicycle facilities are not provided to allow cyclists to avoid or safely traverse areas with obstacles such as railroad tracks, the number of nonmotorized incidents is expected to increase as nonmotorized volumes increase in the study area.

5.2 Impacts Common to all Build Alternatives

This section describes construction impacts common to all Build Alternatives. Impacts that are unique to a particular Build Alternative are described in the following sections.

5.2.1 Construction

5.2.1.1 *Traffic Volumes and Operations*

Construction activities could affect traffic operations in the vicinity of each alternative during the 12- to 18-month construction duration. Construction would occur in small segments that could range between three and four street blocks; therefore, isolated portions of the roadway would be affected.

During construction, traffic delay and congestion impacts are anticipated, particularly in areas where the roadway is reduced to one lane. There could also be traffic diversions to other study area streets during construction, which could increase delay and congestion on other roadways. However, traffic delay from diversions is expected to be minimal because it is likely that vehicles would be distributed along multiple adjacent roadways under each alternative.

Additional sources of potential traffic delay during construction could include:

- Visual distraction from construction activities; and
- Construction trucks entering and exiting the work zone and staging areas.

In general, delays resulting from these sources are likely to be minor.

It is expected that driveway access to properties would be maintained during construction. It is possible that driveways could be narrowed during construction, or could be temporarily surfaced with ADA-compliant materials in place of asphalt or concrete. If properties have more than one access point, it is also possible that one driveway could be closed while the other remains open during periods of construction. Impacts are expected to be minor for driveway access and for traffic accessing individual properties.

5.2.1.2 *Freight*

Impacts on freight traffic would be similar to those described for general-purpose traffic in Section 5.2.1.1. There could be some impacts from delay and congestion, but these are expected to be temporary and minor. Access to businesses in the study area would be maintained throughout construction of the project. Because freight traffic peaks during the midday, roadway closures during the day could cause additional delay for freight vehicles. However, this impact is not anticipated to be significant because closures would only occur for several hours.

5.2.1.3 *Nonmotorized Users*

Pedestrian and cyclist access would be maintained within the construction areas in accordance with City policies for construction. Commercial businesses would remain open, and residential and industrial properties would remain accessible. Sidewalks could be temporarily replaced by temporary facilities that would be ADA compliant within the construction area and for accessing other properties. Temporary pedestrian facilities could include asphalt sidewalks, steel plates over unfinished areas, wood sidewalks with railings, or cordoned off areas of parking lanes. When necessary during construction, nonmotorized users could be rerouted around active construction zones, which could lengthen nonmotorized trips and travel times. However, the impact would be minor in any one location because construction is expected to occur in segments of three to four street blocks.

5.2.1.4 *Public Transportation*

Similar to impacts discussed in Section 5.2.1.1, traffic diversion to other study area streets could increase delay and congestion for transit in the study area. However, this impact is not expected to be significant because it is likely that diverted vehicles would be distributed along multiple adjacent roadways under each of the alternatives.

Specific construction impacts on public transportation that would only occur for the Ballard Avenue Alternative and Leary Alternative are described in Section 5.5 and Section 5.6, respectively.

5.2.1.5 *Freight Rail*

Construction impacts on rail service would only occur on the Shilshole South Alternative (Section 5.3). Construction activities for all other Build Alternatives are not expected to affect rail operations in the study area.

5.2.1.6 *Safety*

Construction activities for the Build Alternatives could temporarily affect safety in the study area. Temporary changes in roadside characteristics and surfacing could impact accident frequencies in isolated locations in the study area during construction. Changes in roadside characteristics could include the presence of construction equipment and activities or loss of shoulders, among other alterations, which have the potential to create distractions for drivers. Changes in roadway surfacing could affect traffic speeds and braking.

5.2.2 Operation

5.2.2.1 *Roadway Network*

All alternatives would provide a dedicated nonmotorized facility for the entire length of the study area. This facility would be 8 to 12 feet wide with varying buffers on the side of the trail between the adjacent roadways and properties.

5.2.2.2 *Traffic Volumes and Operations*

The same projected increases in traffic, bicycle, and pedestrian volumes for the year 2040 used in the No Build Alternative analysis were also applied to each Build Alternative described below.

5.2.2.3 *Freight*

All alternatives would cross driveways used for freight movement. Freight vehicles would be required to stop before the trail to check for pedestrians and bicyclists before advancing to the roadway. For driveways that were studied, this could result in zero to 25 seconds of additional delay, on average, above the No Build Alternative during the PM peak hour. Similar delays are expected for other driveways in the study area. With the anticipated volume of trail users, and because trail users would be spread out, this delay would occur sporadically during the PM peak hour and all day.

Some businesses that currently use the City right-of-way to access parking or loading docks on their properties might need to relocate their access points to driveways or possibly to the ends of the blocks. The change in access would potentially change how private property owners use the space between their

buildings and the City's right-of-way. Some businesses may not be able to access their businesses as they currently do and may have to reorient their business operations to accommodate freight by relocating loading docks or driveways.

5.2.2.4 *Nonmotorized Users*

The project would provide a dedicated 8- to 12-foot multi-use trail for nonmotorized users for the entire length of the study area. Additional nonmotorized improvements could include curb treatments, pavement markings and treatments, signage, wayfinding, and lighting. The trail would cross driveways and loading docks. These crossings would be clearly delineated, which would improve comfort and safety for nonmotorized users in the study area compared to the No Build Alternative by organizing and creating predictability of potential conflict points between vehicles and nonmotorized users. Vehicles would be required to stop for trail users at all driveway/trail intersections.

5.2.2.5 *Safety*

The Missing Link would improve safety for nonmotorized users and motor vehicles in the study area. A dedicated bicycle facility would improve the predictability of conflict points between motor vehicles and cyclists and reduce the likelihood of collisions because potential conflict points would be clearly identifiable by both motor vehicle drivers and trail users. Potential conflict points would be clearly organized and delineated, which would allow motor vehicle drivers and trail users to be aware of where to travel cautiously. A dedicated facility would also reduce the likelihood of nonmotorized injury incidents by providing a facility that safely traverses or avoids obstacles in the study area such as the railroad tracks. The Missing Link would be designed to clearly delineate trail user space from the roadway, and would include safety features such as buffers, pavement markings, raised crosswalks, curb treatments, signage, and lighting.

5.3 Shilshole South Alternative

5.3.1 Construction

Under the Shilshole South Alternative, there could be additional traffic and freight delays on Shilshole Ave NW during construction. If construction activities require the closure of one lane of the roadway, a flagger could be required to direct travel to other routes within the construction zone. It is anticipated that this impact would occur for several hours during the midday but only for short segments of roadway (between three and four street blocks).

Under the Shilshole South Alternative, pavement would be added to portions of the BTR rail line to decrease gaps between the tracks and the roadway to improve safety at driveways in the study area. These construction activities would be coordinated with BTR operations and would occur during times when BTR trains are not operating; construction equipment would be cleared from the tracks each day. Because construction activities near the rail line would be coordinated with BTR train movements, construction activities are not expected to affect rail operations. Any construction activities near the BTR rail line would be coordinated with the BTR and would adhere to Federal Railroad Administration requirements for construction near rail facilities.

5.3.2 Operation

5.3.2.1 *Roadway Network*

The Shilshole South Alternative would alter the roadway network on NW 45th St, Shilshole Ave NW, and NW 54th St. As described in Chapter 1, Introduction and Project History, the Shilshole South Alternative would construct a multi-use trail on the south side of NW 45th St and Shilshole Ave NW, and on the north side of NW 54th St between 11th Ave NW and the driveway at the Ballard Locks, where the BGT currently terminates. Under the Shilshole South Alternative, driveways would cross the trail, which would not occur under the No Build Alternative.

The Shilshole South Alternative would provide a dedicated nonmotorized facility for the entire length of the study area. This facility would be 8 to 12 feet wide with a 1- to 6-foot buffer on both sides of the trail between the roadway and adjacent properties.

Under the Shilshole South Alternative, NW 54th St between the Ballard Locks driveway and Shilshole Ave NW would have one lane of travel in each direction. In various locations, driveways would cross the trail to allow access to businesses. The roadway channelization on Shilshole Ave NW would be similar to the No Build Alternative, with one travel lane in each direction for vehicles. There are approximately 41 driveways and loading docks along the alignment. To the extent necessary, driveway access to all businesses would be reconstructed and provided in the same location as the No Build Alternative, but some properties with multiple accesses could have their driveways consolidated into a single access point in coordination with SDOT and property owners. On Shilshole Ave NW at 17th Ave NW, a left-turn pocket and new signal would be provided in the eastbound direction.

One travel lane in each direction would be provided on NW 45th St between Shilshole Ave NW and 11th Ave NW under the Shilshole South Alternative. At the intersection of 14th Ave NW and NW 45th St, a left-turn pocket would be provided in both the eastbound and westbound directions. At the intersection of 11th Ave NW and NW 45th St, a left-turn pocket would be provided in the eastbound direction. A 5- to 17-foot median clear zone would be provided between the Ballard Bridge overpass and 11th Ave NW on NW 45th St. The 17-foot-wide clear zone would be centered on the railroad tracks for clearance and safety.

All other roadways in the study area would be the same as the No Build Alternative.

5.3.2.2 *Traffic Volumes and Operations*

Traffic volume growth would be similar to the No Build Alternative on most study area streets. Traffic volumes are expected to increase by 0.6 percent per year between 2015 and 2040 due to background population and employment growth.

Under the Shilshole South Alternative, traffic operations at most study area intersections would be similar to the No Build Alternative, as summarized in Table 5-4 and Figure 5-3. The average delay for all vehicles is reported for signalized intersections. For unsignalized intersections, delay is reported for the worst-operating stopped approach.

Table 5-4. Comparison of PM Peak Hour Study Intersection Levels of Service, 2040 No Build Alternative and Shilshole South Alternative

ID	*Intersection*	*Traffic Control*	*2040 No Build Alternative PM Peak Hour*		*2040 Shilshole South Alternative PM Peak Hour*	
			LOS	*Delay (sec)*	*LOS*	*Delay (sec)*
1	NW Market St/28th Ave NW	Signal	A	7	A	7
2	NM Market St/24th Ave NW	Signal	D	46	D	46
3	NM Market St/Ballard Ave NW	Pedestrian Half Signal	A	8	A	8
4	NW Market St/22nd Ave NW/Leary Ave NW	Signal	F	81	E	80
5a	15th Ave NW/NW Leary Way Southbound Off-Ramp	Signal	C	20	C	20
5b	15th Ave NW/NW Leary Way Northbound Off-Ramp	Signal	E	68	E	68
6	NW Leary Way/14th Ave NW	Signal	A	10	A	10
7	NW Leary Way/11th Ave NW	Signal	B	18	B	18
8	11th Ave NW/NW 46th St	Signal	C	21	B	16
9	11th Ave NW/NW 45th St	Unsignalized – All-way Stop	B	11	B	11
10	NW 46th St/Shilshole Ave NW	Unsignalized – Two-way Stop	A	9	D	28
11	Shilshole Ave NW/NW 17th St*	Unsignalized – Two-way Stop	F	247	A	8
12	Leary Ave NW/20th Ave NW	Unsignalized – All-way Stop	F	>300	F	>300
13	NW 56th St/24th Ave NW	Unsignalized – Two-way Stop	F	153	F	114

* Intersection at NW 17th Street and Shilshole Ave NW becomes signalized under the Shilshole South Alternative

The Shilshole South Alternative would not cause any intersections to operate at LOS E or F that would otherwise operate at LOS D or better under the No Build Alternative. However, five intersections would operate at a different LOS or have a change in delay when compared to the No Build Alternative:

- Intersection 4: NW Market St/22nd Ave NW/Leary Ave NW;
- Intersection 8: 11th Ave NW/NW 46th St;
- Intersection 10: NW 46th St/Shilshole Ave NW (northbound approach);
- Intersection 11: Shilshole Ave NW/17th Ave NW (southbound approach); and
- Intersection 13: NW 56th St/24th Ave NW.

The intersection at NW Market St/22nd Ave NW/Leary Ave NW (Intersection 4) would have approximately 1 second less delay because some nonmotorized users in the study area would likely shift to the trail. This would reduce the amount of conflicting nonmotorized and vehicle movements at the intersection, which would improve overall intersection delay.

The intersection at 11th Ave NW and NW 46th St (Intersection 8) would operate at LOS B compared to LOS C because traffic would shift from NW 46th St to NW 45th St as NW 45th St is restored to a two-way street. Under the No Build Alternative, NW 45th St remains an eastbound one-way street for vehicles. However, this would also result in the intersection at NW 46th St and Shilshole Ave NW (Intersection 10) operating at LOS D under the Shilshole South Alternative compared to LOS A under the No Build Alternative. This intersection is a two-way stop control and the delay reported above is for the worst-operating approach. Although the LOS decreases under the Shilshole South Alternative, this delay would only be experienced by vehicles at the northbound approach. This volume is much smaller compared to east-west traffic at this intersection. This is not anticipated to have a substantial adverse impact on traffic operations because only a small number of vehicles would experience additional delay and the intersection would still operate at LOS E or better.

The intersection at Shilshole Ave NW and 17th Ave NW (Intersection 11) would be signalized under the Shilshole South Alternative. This would result in improved intersection operations (LOS A compared to LOS F under the No Build Alternative).

The intersection at NW 56th St and 24th Ave NW (Intersection 13) would have approximately 40 seconds less delay when compared to the No Build Alternative because some nonmotorized users in the study area would shift to the trail. This would reduce the amount of conflicting nonmotorized and vehicle movements at the intersection, which would improve overall delay.

SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 5-3
Shilshole South Alternative PM Peak Hour Study Intersection Level of Service

The driveways shown in Table 5-5 are a sample of typical driveways that analysts evaluated to characterize the range of impacts that could occur under the Shilshole South Alternative. Under this alternative, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall delay at each driveway. Depending on the traffic volume at a particular driveway, vehicles exiting could experience up to 11 seconds of increased delay compared to the No Build Alternative.

Table 5-5. Comparison of PM Peak Hour Study Driveway Delay, 2040 No Build Alternative and Shilshole South Alternative

ID	*Driveway*	*2040 No Build Alternative PM Peak Hour (sec)*	*2040 Shilshole South Alternative PM Peak Hour (sec)*
14	NW 54th St/Ballard Locks	33	36
15	Shilshole Ave NW/Stimson Marina	23	30
16	Shilshole Ave NW/Salmon Bay Center	24	30
17	Shilshole Ave NW/Salmon Bay Sand and Gravel (north side)	11	11
18	Shilshole Ave NW/Salmon Bay Sand and Gravel (south side)	30	36
19	Shilshole Ave NW/Covich-Williams Chevron	17	28
20	Shilshole Ave NW/Salmon Bay Cafe	18	26
21	Shilshole Ave NW/Ballard Industrial	29	21
22	Ballard Ave NW/Ballard Industrial	8	8
23	Shilshole Ave NW/Ballard Mill Marina	27	31

Note: The driveway analysis evaluates changes to delay at a sample of typical driveways to characterize the range of impacts that could occur under the Build Alternatives. Under the No Build Alternative evaluation, bicyclists were added to motor vehicle volumes to arrive at the total volumes along Shilshole Ave NW. Under the Build Alternatives, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall driveway delay.

5.3.2.3 *Freight*

The primary freight corridors are expected to be the same under the Shilshole South Alternative compared to the No Build Alternative. Freight would continue to be accommodated on the following roadways in the study area:

- Shilshole Ave NW;
- NW Market St between 24th Ave NW and the eastern boundary of the study area;
- NW Leary Way;

- 15th Ave NW; and
- 24th Ave NW.

Operations at most study area intersections are expected to have similar impacts on freight mobility under the Shilshole South Alternative compared to the No Build Alternative. Freight mobility at the intersections of 11th Ave NW and NW 46th St would be improved under the Shilshole South Alternative compared to the No Build Alternative. This is because NW 45th St would be restored to a two-way roadway, which would redistribute traffic in this part of the study area. Freight mobility at the intersection of Shilshole Ave NW and 17th Ave NW would also be improved under the Shilshole South Alternative because a signal would be provided, improving intersection operations from LOS F to LOS A compared to the No Build Alternative.

There are approximately 41 driveways and loading docks located along the alignment of the Shilshole South Alternative. Freight vehicles would be required to stop before the trail to check for pedestrians and cyclists before advancing to the roadway, which could result in a delay of up to 11 seconds on average during the PM peak hour. With the anticipated volume of trail users and because trail users would be spread out, this delay would occur sporadically during the PM peak hour and all day. Although some driveways could experience additional delay compared to the No Build Alternative, this delay would not be considered a significant impact.

Up to 10 freight access points (driveways and loading docks) to private properties could change because the BGT Missing Link would be constructed within the City's right-of-way along the north side of NW 54th St and the south side of Shilshole Ave NW. Some businesses that currently use the City right-of-way to access parking or loading docks on their properties might need to relocate their access points to driveways or possibly to the ends of the blocks. The change in access would potentially change how private property owners use the space between their buildings and the City's right-of-way. Some businesses may not be able to access their businesses as they currently do and may have to reorient their business operations to accommodate freight by relocating loading docks or driveways. Businesses that are currently using the public right-of-way for loading and unloading activities would no longer be allowed to continue this unpermitted use under the Shilshole South Alternative. Properties with multiple driveways or access points may need to consolidate accesses where possible to improve safety and operations. All other loading docks and driveways along the Shilshole South Alternative would remain the same as the No Build Alternative.

5.3.2.4 ***Nonmotorized Users***

5.3.2.4.1 Study Area Facilities

Under the Shilshole South Alternative, pedestrian and bicycle facilities in the study area would be similar to the No Build Alternative, with the exception of the completion of the BGT Missing Link. As described in Chapter 1, Introduction and Project History, the project would provide a dedicated 8- to 12-foot multi-use trail for nonmotorized users for the entire length of the study area. Additional nonmotorized improvements under the Shilshole South Alternative could include curb treatments, pavement markings and treatments, signage, wayfinding, and lighting.

Curb bulbs would be provided at the following intersections:

- Shilshole Ave NW and NW Vernon Pl;
- Shilshole Ave NW and 20th Ave NW;

- Shilshole Ave NW and NW Dock Pl;
- NW 45th St and 14th Ave NW; and
- NW 45th St and 11th Ave NW.

The trail would cross approximately 41 driveways and loading docks under the Shilshole South Alternative. Trail crossings with driveways and intersections would be clearly delineated, which would improve comfort and safety for nonmotorized users in the study area compared to the No Build Alternative by organizing and creating predictability of potential conflict points between vehicles and nonmotorized users. Vehicles would be required to stop for trail users at all driveway/trail intersections. However, after stopping before the trail, vehicles would continue forward over the trail and stop at the roadway. It is possible that vehicles blocking the trail would occasionally delay trail users during the day. On average, trail users could have to wait between 15 to 25 seconds for a vehicle to clear the trail. (See Section 3.5.2.1 for additional information on how this was calculated.)

5.3.2.4.2 Pedestrian and Bicycle Volumes

Between 2015 and 2040, bicycle volumes are anticipated to grow by 5 percent annually and pedestrian volumes are expected to grow by 1 percent annually in the study area. As described in Section 3.3.3, these growth rates are based on recent studies and counts on the BGT, expected land use changes and growth in the Ballard area, and input from SDOT (SDOT, 2015d; 2015e; Sound Transit, 2010; Fehr & Peers and SvR Design Company, 2011; PSRC, 2015). Anticipated nonmotorized volumes on the BGT Missing Link in 2040 are summarized in Table 5-6. All nonmotorized counts were rounded to the nearest five users to account for daily fluctuations. For locations where the recorded volumes were between one and four, the count was rounded up to provide a conservative estimate of impacts. As described in Section 3.5.2.1, analysts assumed that bicycle traffic would shift to the trail corridor proposed under each Build Alternative. This assumption provides the most conservative estimate of impacts for each of the Build Alternatives. Pedestrians and bicyclists who have destinations in other parts of the study area may use the trail on Shilshole Ave NW through the study area for only a short distance. This would result in nonmotorized users continuing to use other roadways in the study area as well, but the majority of users would shift to the trail.

Table 5-6. 2040 PM Peak Hour Nonmotorized Volumes on the BGT

PM Peak Hour	*Total Bicycles*	*Westbound Bicycles*	*Eastbound Bicycles*	*Total Pedestrians*	*Westbound Pedestrians*	*Eastbound Pedestrians*
BGT at the eastern end						
5:00-6:00 PM	430	325	105	65	45	20
BGT at the western end						
5:00-6:00 PM	160	90	70	125	85	40

The BGT Missing Link project would be designed to accommodate a high volume of nonmotorized users; therefore, BGT Missing Link users are not expected to be affected by diversion. Signal timing for both vehicles and nonmotorized users would be included in the design at study area intersections; as a result,

no impacts on delay would occur from the addition of nonmotorized movements through intersections under the Shilshole South Alternative. Signal timing would be optimized for all movements, so delay would not be increased to unacceptable levels for nonmotorized users and vehicles.

5.3.2.5 *Public Transportation*

No impacts on transit under the Shilshole South Alternative are anticipated because transit service is not available on streets along this alignment.

5.3.2.6 *Freight Rail*

Under the Shilshole South Alternative, the BTR tracks could be relocated in various isolated locations along NW 54th St, Shilshole Ave NW, and NW 45th St. This could include removing pieces of passing rail that are no longer used or relocating track to allow additional right-of-way space for the trail. All track relocation would be coordinated with BTR so that rail operations would not be adversely affected.

The Shilshole South Alternative would provide improved separation between nonmotorized users and the rail line, which would improve safety. The BGT Missing Link would cross the rail line near the Ballard Mill Marina. Signage and other design elements would be provided to warn nonmotorized users of train activity.

5.3.2.7 *Safety*

The Shilshole South Alternative would improve safety for nonmotorized users and motor vehicles in the study area. Under this alternative, a dedicated bicycle facility would improve predictability of conflict points between motor vehicles and cyclists and reduce the likelihood of collisions because potential conflict points would be clearly identifiable by both motor vehicle drivers and trail users. Potential conflict points would be clearly organized and delineated, which would allow motor vehicle drivers and trail users to be aware of where to travel cautiously. A dedicated facility would also reduce the likelihood of nonmotorized injury incidents by providing a facility that safely traverses or avoids obstacles in the study area such as the railroad tracks. The BGT Missing Link would be designed to clearly delineate trail user space from the roadway and would include safety features such as buffers, pavement markings, raised crosswalks, curb treatments, signage, and lighting.

Under the Shilshole South Alternative, there would be sight distance concerns for exiting vehicles at up to eight driveways on the south side of Shilshole Ave NW between 20th Ave NW and 11th Ave NW where buildings are constructed up to the property lines. Buildings and structures adjacent to the trail could reduce visibility for both vehicles and trail users. However, as discussed in Section 1.3, Project Description, the final design of the trail would include safety features to reduce conflicts between trail users and vehicles. The placement of the trail could also be moved to locations further from the property lines, but this would require additional relocation of the BTR tracks. The final placement of the trail would be decided during final design. Wherever possible, signage, pavement markings, and advanced warning systems, among other safety enhancements, would be used to notify trail users and vehicle drivers that there is a trail crossing. Although a buffer would not be provided between the property line and the trail, these driveways would still operate safely under Seattle Municipal Code 11.58.230, which states:

> "Except as directed otherwise by official traffic-control devices, the driver of a vehicle emerging from any alley, driveway, private property, or building shall stop such vehicle immediately prior to driving onto a sidewalk or onto the sidewalk area extending across any alley or driveway, or onto a public path, and shall yield the right-of-way to any pedestrian or bicyclist as may be necessary to avoid collision, and upon entering the roadway of a street shall yield the right-of-way to all vehicles approaching on the roadway."

Drivers would be required to stop before crossing the trail, which would allow drivers to look for trail users before continuing to the roadway. There would be no sight distance concerns for vehicles entering driveways because trail crossings would be clearly marked with signage, pavement markings, and other safety enhancements, and buildings would not block views of the trail. Driveway widths would be wide enough to safely accommodate industrial and commercial traffic.

5.4 Shilshole North Alternative

5.4.1 Construction

Under the Shilshole North Alternative, there could be additional traffic and freight delay during construction on Shilshole Ave NW because the roadway is a two-lane street (one lane of traffic in each direction). If construction activities would require the closure of one lane of the roadway, traffic on Shilshole Ave NW would have to be controlled by a flagger to direct travel through the construction zone. It is anticipated that traffic would be affected for several hours during midday.

Under the Shilshole North Alternative, construction would occur on NW Market St, a transit corridor, which could have temporary impacts on public transportation. These impacts would be similar to those described for general-purpose traffic. It is possible that delay and congestion could increase as a result of traffic diversion and road closures during construction. However, these impacts are expected to be minimal because construction would occur in segments of three or four street blocks. Construction activities could also require temporary relocations of bus stops in the study area. Any construction activities that could affect public transportation on NW Market St would be coordinated with the transit agency.

5.4.2 Operation

5.4.2.1 *Roadway Network*

Under the Shilshole North Alternative, the roadway network on NW 54th St, NW Market St, Shilshole Ave NW, and NW 46th St would be altered. As described in Chapter 1, Introduction and Project History, the Shilshole North Alternative would construct a multi-use trail on the south side of NW 54th St and NW Market St and on the north side of Shilshole Ave NW and NW 46th St between the Ballard Locks driveway and 11th Ave NW. The multi-use trail would continue south on the east side of 11th Ave NW one block to the existing end of the BGT at 11th Ave NW and NW 45th St.

The Shilshole North Alternative would provide a dedicated nonmotorized facility for the entire length of the study area. This facility would be 12 feet wide with a 3- to 11-foot buffer between the roadway and the trail. A sidewalk between 5 and 12 feet wide would be provided between the trail and adjacent properties. There are approximately 58 driveways and loading docks along the alignment. To the extent necessary, driveway access to all businesses would be reconstructed and provided in the same location as the No Build Alternative. However, some properties with multiple accesses could have their driveways consolidated into a single access point in coordination with SDOT and property owners.

Under this alternative, NW 54th St between NW Market St and 32nd Ave NW would be a two-lane roadway with one lane in each direction. A left-turn pocket would be provided at 32nd Ave NW in the westbound direction. NW Market St between 30th Ave NW and 24th Ave NW would be a three-lane roadway with one travel lane in each direction and a two-way center-turn lane. At the intersection of NW Market St and 24th Ave NW, right- and left-turn pockets would be provided in the eastbound direction. On Shilshole Ave NW and NW 46th St, one travel lane in each direction would be provided. A signal at 17th Ave NW and Shilshole Ave NW would be provided.

All other roadways in the study area would be the same as the No Build Alternative.

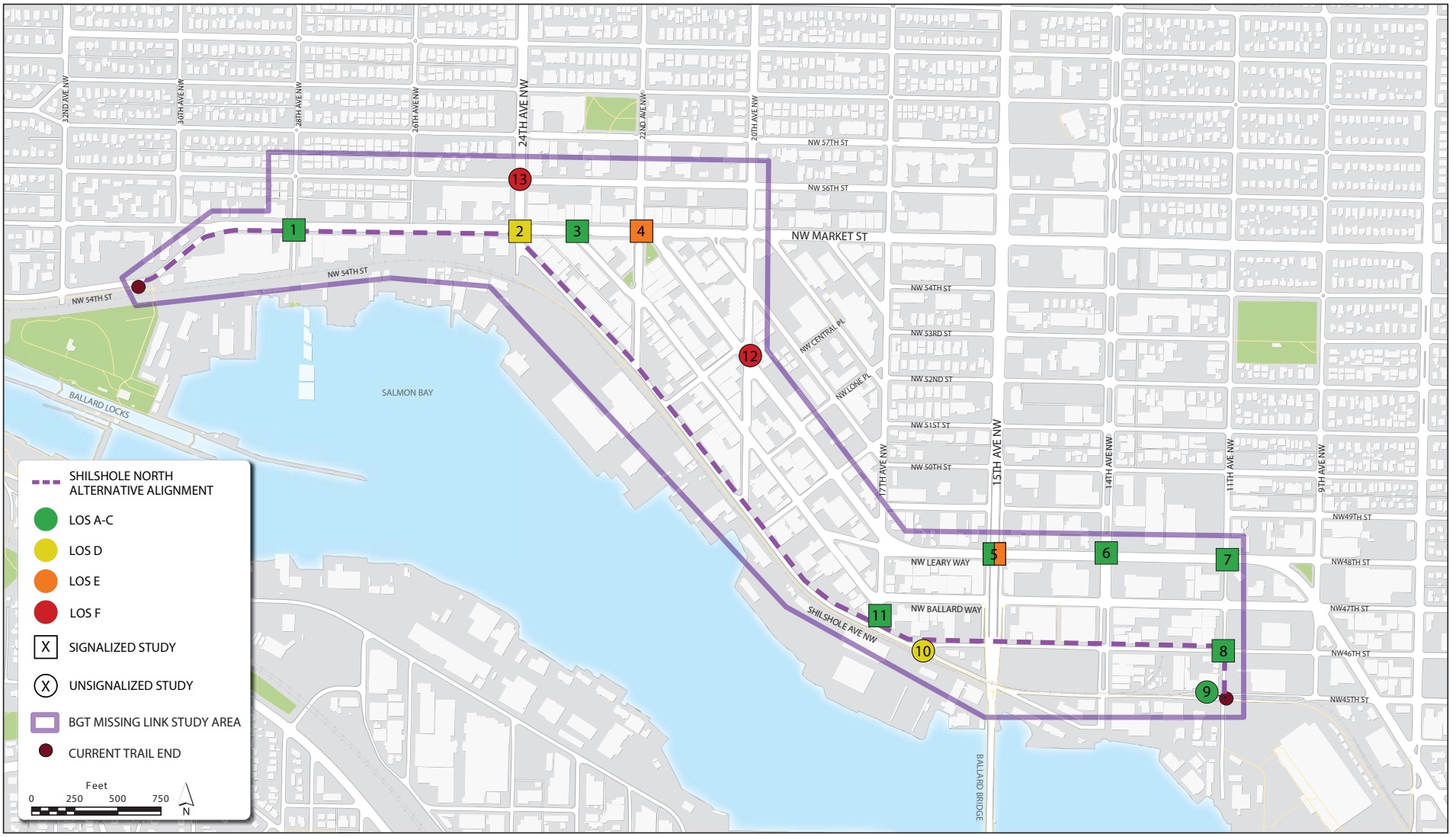
5.4.2.2 *Traffic Volumes and Operations*

Under the Shilshole North Alternative, traffic volume growth would be similar to the No Build Alternative on most study area streets. Traffic volumes are expected to increase by 0.6 percent per year between 2015 and 2040 due to background population and employment growth. Traffic operations at most study area intersections would be similar to the No Build Alternative, as summarized in Table 5-7 and Figure 5-4. The average delay for all vehicles is reported for signalized intersections. For unsignalized intersections, delay is reported for the worst-operating stopped approach.

Table 5-7. Comparison of PM Peak Hour Study Intersection Level of Service, 2040 No Build Alternative and Shilshole North Alternative

ID	*Intersection*	*Traffic Control*	*2040 No Build Alternative PM Peak Hour*		*2040 Shilshole North Alternative PM Peak Hour*	
			LOS	*Delay (sec)*	*LOS*	*Delay (sec)*
1	NW Market St/28th Ave NW	Signal	A	7	C	23
2	NM Market St/24th Ave NW	Signal	D	46	D	48
3	NM Market St/Ballard Ave NW	Pedestrian Half Signal	A	8	A	8
4	NW Market St/22nd Ave NW/Leary Ave NW	Signal	F	81	E	80
5a	15th Ave NW/NW Leary Way Southbound Off-Ramp	Signal	C	20	C	20
5b	15th Ave NW/NW Leary Way Northbound Off-Ramp	Signal	E	68	E	68
6	NW Leary Way/14th Ave NW	Signal	A	10	A	10
7	NW Leary Way/11th Ave NW	Signal	B	18	B	18
8	11th Ave NW/NW 46th St	Signal	C	21	B	16
9	11th Ave NW/NW 45th St	Unsignalized – All-way Stop	B	11	B	11
10	NW 46th St/Shilshole Ave NW	Unsignalized – Two-way Stop	A	9	D	28
11	Shilshole Ave NW/NW 17th St*	Unsignalized – Two-way Stop	F	247	B	11
12	Leary Ave NW/20th Ave NW	Unsignalized – All-way Stop	F	>300	F	>300
13	NW 56th St/24th Ave NW	Unsignalized – Two-way Stop	F	153	F	114

* Intersection at NW 17th Street and Shilshole Ave NW becomes signalized under the Shilshole North Alternative



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 5-4
Shilshole North Alternative PM Peak Hour Study Intersection Level of Service

The Shilshole North Alternative would not cause any intersections to operate at LOS E or F that would otherwise operate at LOS D or better under the No Build Alternative. However, seven intersections would operate at a different LOS or have changes in delay when compared to the No Build Alternative:

- Intersection 1: NW Market St/28th Ave NW;
- Intersection 2: NW Market St/24th Ave NW;
- Intersection 4: NW Market St/22nd Ave NW/Leary Ave NW;
- Intersection 8: 11th Ave NW/NW 46th St;
- Intersection 10: NW 46th St/Shilshole Ave NW (northbound approach);
- Intersection 11: Shilshole Ave NW/17th Ave NW (southbound approach); and
- Intersection 13: NW 56th St/24th Ave NW.

The intersection at NW Market St and 28th Ave NW (Intersection 1) would operate at LOS C under the Shilshole North Alternative compared to LOS A under the No Build Alternative. Under the Shilshole North Alternative, NW Market St would be reduced from four lanes to three lanes, which would increase delay during the PM peak hour. However, this intersection would still operate at LOS E or better.

The intersection at NW Market St and 24th Ave NW (Intersection 2) would have approximately 2 additional seconds of delay because the trail would cross the south leg of the intersection before it continues onto the north side of Shilshole Ave NW. This would create additional minor delay at the intersection but would not reduce overall LOS.

The intersection at NW Market St/22nd Ave NW/Leary Ave NW (Intersection 4) would have approximately 1 second less delay because some nonmotorized users in the study area would likely shift to the trail. This would reduce the amount of conflicting nonmotorized and vehicle movements at the intersection, which would improve overall delay.

The intersection at 11th Ave NW and NW 46th St (Intersection 8) would operate better under the Shilshole North Alternative (LOS B) compared to the No Build Alternative (LOS C). This is because traffic would shift from NW 46th St to NW 45th St because NW 45th St would be restored to a two-way street. Under the No Build Alternative, NW 45th St would remain an eastbound one-way street for vehicles. However, this would also result in the intersection at NW 46th St and Shilshole Ave NW (Intersection 10) operating at LOS D under the Shilshole North Alternative compared to LOS A under the No Build Alternative. This intersection is a two-way stop control and the delay reported above is for the worst-operating approach. Although the LOS decreases under the Shilshole North Alternative, this delay would only be experienced by vehicles at the northbound approach. This volume is much smaller compared to east-west traffic at this intersection. This delay is not anticipated to have an adverse impact on traffic operations because only a small number of vehicles would experience additional delay and the intersection would still operate at LOS E or better.

The intersection at Shilshole Ave NW and 17th Ave NW (Intersection 11) would be signalized under the Shilshole North Alternative. This would result in improved intersection operations (LOS B compared to LOS F under the No Build Alternative).

The intersection at NW 56th St and 24th Ave NW (Intersection 13) would have approximately 40 seconds less delay when compared to the No Build Alternative because some nonmotorized users in the study area would likely shift to the trail. This would reduce the amount of conflicting nonmotorized and vehicle movements at the intersection, which would improve overall delay.

The driveways shown in Table 5-8 are a sample of typical driveways that analysts evaluated to characterize the range of impacts that could occur under the Shilshole North Alternative. Under this alternative, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall delay at each driveway. Depending on the traffic volume at a particular driveway, vehicles exiting could experience up to 25 seconds of additional delay compared to the No Build Alternative.

Table 5-8. Comparison of PM Peak Hour Study Driveway Delay, 2040 No Build Alternative and Shilshole North Alternative

ID	*Driveway*	*2040 No Build Alternative PM Peak Hour (sec)*	*2040 Shilshole North Alternative PM Peak Hour (sec)*
14	NW 54th St/Ballard Locks	33	34
15	Shilshole Ave NW/Stimson Marina	23	19
16	Shilshole Ave NW/Salmon Bay Center	24	19
17	Shilshole Ave NW/Salmon Bay Sand and Gravel (north side)	11	36
18	Shilshole Ave NW/Salmon Bay Sand and Gravel (south side)	30	11
19	Shilshole Ave NW/Covich-Williams Chevron	17	16
20	Shilshole Ave NW/Salmon Bay Cafe	18	15
21	Shilshole Ave NW/Ballard Industrial	29	21
22	Ballard Ave NW/Ballard Industrial	8	8
23	Shilshole Ave NW/Ballard Mill Marina	27	20

Note: The driveway analysis evaluates changes to delay at a sample of typical driveways to characterize the range of impacts that could occur under the Build Alternatives. Under the No Build Alternative evaluation, bicyclists were added to motor vehicle volumes to arrive at the total volumes along Shilshole Ave NW. Under the Build Alternatives, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall driveway delay.

5.4.2.3 *Freight*

The primary freight corridors are expected to be the same under the Shilshole North Alternative compared to the No Build Alternative. Freight would likely continue to be accommodated on the following roadways in the study area:

- Shilshole Ave NW;
- NW Market St between 24th Ave NW and the eastern boundary of the study area;
- NW Leary Way;
- 15th Ave NW; and
- 24th Ave NW.

Operations at most study area intersections are expected to have similar impacts on freight mobility under the Shilshole North Alternative compared to the No Build Alternative.

Freight mobility at the intersections of 11th Ave NW and NW 46th St would be improved under the Shilshole North Alternative compared to the No Build Alternative. This is because NW 45th St would be restored to a two-way roadway, which would redistribute traffic in this part of the study area. Freight mobility at the intersection of Shilshole Ave NW and 17th Ave NW would also be improved under the Shilshole North Alternative because a signal would be provided, improving intersection operations from LOS F to LOS B compared to the No Build Alternative.

There are approximately 58 driveways and loading docks located along the alignment of the Shilshole North Alternative. Freight vehicles would be required to stop before the trail to check for pedestrians and cyclists before advancing to the roadway, which could result in a delay of up to 25 seconds on average during the PM peak hour. With the anticipated volume of trail users and because trail users would be spread throughout the day, this delay would occur sporadically during the PM peak hour. Although some driveways could experience additional delay compared to the No Build Alternative, this would not be considered as an impact.

Up to six freight access points (driveways and loading docks) to private properties could change because the BGT Missing Link would be constructed within the City's right-of-way along the south side of NW 54th St/Market St NW, the north side of Shilshole Ave NW, and the north side of NW 46th St. Some businesses that currently use the City right-of-way to access parking or loading docks on their properties would need to relocate their access points to driveways or possibly to the ends of the blocks. Approximately four loading docks could be affected between 24th Ave NW and 17th Ave NW on Shilshole Ave NW, and two driveways on NW Market St between NW 54th St and 26th Ave NW.

The change in access could potentially change how private property owners use the space between their buildings and the City's right-of-way by preventing some businesses from accessing their properties as they currently do. This may require some property owners to reorient their business operations to accommodate freight by moving driveways or loading docks. Businesses that are currently using the public right-of-way for loading and unloading activities would no longer be allowed to continue this unpermitted use under the Shilshole North Alternative. Properties with multiple driveways or access points, such as properties along NW Market St with two access points to a single parking lot, may need to consolidate accesses where possible to improve safety and operations. This would reduce the number of conflict points with the trail while maintaining adequate access to properties. All other loading docks and driveways along the Shilshole North Alternative would remain the same as the No Build Alternative.

5.4.2.4 ***Nonmotorized Users***

5.4.2.4.1 Study Area Facilities

Under the Shilshole North Alternative, pedestrian and bicycle facilities in the study area would be similar to the No Build Alternative, with the exception of the completion of the BGT Missing Link. As described in Chapter 1, Introduction and Project History, the project would provide a dedicated 12-foot multi-use trail for nonmotorized users for the entire study area. A 3- to 11-foot buffer would be provided between the roadway and the trail. A sidewalk between 5 and 12 feet wide would also be provided between the trail and properties along NW 54th St, NW Market St, Shilshole Ave NW, and NW 46th St. Additional nonmotorized improvements under the Shilshole North Alternative could include curb treatments, pavement markings and treatments, signage and wayfinding, and lighting.

Curb bulbs would be provided at the following intersections:

- NW Market St and 28th Ave NW;
- NW Market St and 24th Ave NW;
- Shilshole Ave NW and 22nd Ave NW;
- Shilshole Ave NW and 20th Ave NW;
- Shilshole Ave NW and 17th Ave NW;
- NW 46th St and 14th Ave NW;
- NW 46th St and 11th Ave NW; and
- 11th Ave NW and NW 45th St.

The trail would cross approximately 58 driveways and loading docks under the Shilshole North Alternative. Trail crossings with driveways and intersections would be clearly delineated, which would improve comfort and safety for nonmotorized users in the study area by organizing and creating predictability of potential conflict points between vehicles and nonmotorized users. Vehicles would be required to stop for trail users at all driveway/trail intersections. However, after stopping before the trail, vehicles would continue forward over the trail and stop at the roadway. It is possible that vehicles blocking the trail would occasionally delay trail users during the day. On average, trail users could have to wait between 15 to25 seconds for a vehicle to clear the trail.

5.4.2.4.2 Pedestrian and Bicycle Volumes

Pedestrian and bicycle volumes would be similar to those described under the Shilshole South Alternative, Section 5.3.2.4.2, Pedestrian and Bicycle Volumes.

5.4.2.5 *Public Transportation*

There would be minimal impacts from the Shilshole North Alternative on transit. At the intersection of NW Market St and 28th Ave NW, which is located along a transit corridor, there could be additional delay compared to the No Build Alternative. As shown in Table 5-7, this intersection would operate at LOS C under the Shilshole North Alternative compared to LOS A under the No Build Alternative. This could affect transit delay and speeds near this intersection. However, this intersection would operate above LOS E and mitigation would not be required.

5.4.2.6 *Freight Rail*

No impacts on rail from the Shilshole North Alternative are anticipated because rail facilities and operations would not be altered.

5.4.2.7 *Safety*

Under the Shilshole North Alternative, safety would be improved for nonmotorized users and motor vehicles in the study area. Traffic and nonmotorized volumes in the study area are expected to increase between 2015 and 2040. Bicycle volumes are expected to grow at a higher rate than vehicles and pedestrians. Under the Shilshole North Alternative, a dedicated bicycle facility would provide a safer nonmotorized environment in the study area compared to the No Build Alternative. A dedicated facility would improve predictability of conflict points between motor vehicles and cyclists and reduce the likelihood of collisions because potential conflict points would be clearly identifiable by both motor

vehicle drivers and trail users. Potential conflict points would be clearly organized and delineated, allowing motor vehicle drivers and trail users to be aware of where to travel cautiously. A dedicated facility would also reduce the likelihood of nonmotorized injury incidents by providing a facility that safely traverses or avoids obstacles in the study area such as railroad tracks. The BGT Missing Link would be designed to clearly delineate trail user space from the roadway and would include safety features such as buffers, pavement markings, raised crosswalks, curb treatments, signage, and lighting.

Under the Shilshole North Alternative, there would be sight distance concerns for exiting vehicles at approximately 8 driveways on NW Market St, approximately 16 driveways on Shilshole Ave NW, and approximately 4 driveways on NW 46th St where buildings are constructed up to the property lines. Under the Shilshole North Alternative, sidewalks would be provided between the properties and the trail, which would improve safety. Trail users would have a buffer of 5 to 12 feet from the property frontage. As discussed in Section 1.3, Project Description, the final design of the trail would reduce conflicts between trail users and vehicles. Wherever possible, signage, pavement markings, and advanced warning systems, among other safety enhancements, would be used to notify sidewalk and trail users and vehicle drivers that there is a trail crossing. Under Seattle Municipal Code 11.58.230 (summarized in Section 5.3.2.7), driveways along the Shilshole North Alternative would operate safely. Drivers would be required to stop before crossing the trail, which would allow drivers to look for trail users before continuing to the roadway.

There would be no sight distance concerns for vehicles entering driveways because the trail crossings would be clearly marked with signage, pavement markings, and other safety enhancements, and buildings would not block views of the trail. Driveway widths would be wide enough to safely accommodate industrial and commercial traffic.

5.5 Ballard Avenue Alternative

5.5.1 Construction

Under the Ballard Avenue Alternative, there could be additional traffic and freight delay during construction on 28th Ave NW, NW 56th St, 22nd Ave NW, and Ballard Ave NW because these streets are two-lane streets (one lane of traffic in each direction). If construction activities would require the closure of one lane of the roadway, a flagger could be required to direct travel via alternative routes within the construction zone, which could be three to four street blocks in length. It is anticipated that this impact would be minimal because roadway closures would occur temporarily during the midday for several hours.

5.5.2 Operation

5.5.2.1 *Roadway Network*

The Ballard Avenue Alternative would alter the roadway network on NW 54th St, 28th Ave NW, NW 56th St, 22nd Ave NW, Ballard Ave NW, 15th Ave NW, NW 46th St, and 11th Ave NW. As described in Chapter 1, Introduction and Project History, the Ballard Avenue Alternative would construct a multi-use trail with the following alignment:

- North side of NW 54th St;
- East side of 28th Ave NW;
- South side of NW 56th St;

- West side of 22nd Ave NW;
- Southwest side of Ballard Ave NW;
- South side of NW Ballard Way;
- West side of southbound one-way portion of 15th Ave NW (entire right-of-way would be trail use);
- South side of NW 46th St; and
- East side of 11th Ave NW.

The Ballard Avenue Alternative would provide a dedicated nonmotorized facility for the entire length of the study area. This facility would be between 12 and 20 feet wide with a 4- to 5-foot buffer between the roadway and the trail. A sidewalk 6 to 10 feet wide would be provided between the trail and adjacent properties.

Under the Ballard Avenue Alternative, all streets along the trail alignment would have one lane in each direction (two-lane roadway), with the exception of the western right-of-way adjacent to 15th Ave NW, which would be converted to only trail use. There are approximately 42 driveways and loading docks along the alignment. To the extent necessary, driveway access to all businesses would be reconstructed and provided in the same location as the No Build Alternative, but some properties with multiple accesses could have their driveways consolidated into a single access point in coordination with the City and property owners.

All other roadways in the study area would be the same as the No Build Alternative.

5.5.2.2 *Traffic Volumes and Operations*

Traffic volume growth would be similar to the No Build Alternative on most study area streets. Traffic volumes are expected to increase by 0.6 percent per year between 2015 and 2040 due to background population and employment growth.

Under the Ballard Avenue Alternative, traffic operations at most study area intersections would be similar to the No Build Alternative, as summarized in Table 5-9 and Figure 5-5. The average delay for all vehicles is reported for signalized intersections. For unsignalized intersections, delay is reported for the worst-operating stop approach.

Table 5-9. Comparison of PM Peak Hour Study Intersection Levels of Service, 2040 No Build Alternative and Ballard Avenue Alternative

ID	*Intersection*	*Traffic Control*	*2040 No Build Alternative PM Peak Hour*		*2040 Ballard Avenue Alternative PM Peak Hour*	
			LOS	*Delay (sec)*	*LOS*	*Delay (sec)*
1	NW Market St/28th Ave NW	Signal	A	7	A	9
2	NM Market St/24th Ave NW	Signal	D	46	D	50
3	NM Market St/Ballard Ave NW	Pedestrian Half Signal	A	8	A	8
4	NW Market St/22nd Ave NW/Leary Ave NW	Signal	F	81	E	80
5a	15th Ave NW/NW Leary Way Southbound Off-Ramp	Signal	C	20	C	20
5b	15th Ave NW/NW Leary Way Northbound Off-Ramp	Signal	E	68	E	68
6	NW Leary Way/14th Ave NW	Signal	A	10	A	10
7	NW Leary Way/11th Ave NW	Signal	B	18	B	18
8	11th Ave NW/NW 46th St	Signal	C	21	B	17
9	11th Ave NW/NW 45th St	Unsignalized –All-way Stop	B	11	B	11
10	NW 46th St/Shilshole Ave NW	Unsignalized – Two-way Stop	A	9	D	29
11	Shilshole Ave NW/NW 17th St	Unsignalized – Two-way Stop	F	247	E	43
12	Leary Ave NW/20th Ave NW	Unsignalized – All-way Stop	F	>300	F	>300
13	NW 56th St/24th Ave NW*	Unsignalized – Two-way Stop	F	153	B	14

* Intersection at NW 56th Street and 24th Ave NW (Intersection 13) becomes signalized under the Ballard Avenue Alternative

The Ballard Avenue Alternative would not cause any intersection to operate at LOS E or worse that would otherwise operate at LOS D or better under the No Build Alternative. However, seven intersections would operate at a different LOS or change in delay when compared to the No Build Alternative:

- Intersection 1: NW Market St/28th Ave NW;
- Intersection 2: NW Market St/24th Ave NW;
- Intersection 4: NW Market St/22nd Ave NW/Leary Ave NW;
- Intersection 8: 11th Ave NW/NW 46th St;
- Intersection 10: NW 46th St/Shilshole Ave NW (northbound approach);
- Intersection 11: Shilshole Ave NW/17th Ave NW (southbound approach); and
- Intersection 13: NW 56th St/24th Ave NW.

The intersection at NW Market St and 28th Ave NW (Intersection 1) would have approximately 2 additional seconds of delay under the Ballard Avenue Alternative when compared to the No Build Alternative. This is because the trail would cross the east leg of the intersection, which would result in a minor increase in overall intersection delay.

There would be approximately 4 additional seconds of delay at the intersection of NW Market St and 24th Ave NW (Intersection 2). This is because a signal would be installed at the nearby intersection of NW 56th St and 24th Ave NW (Intersection 13), which would alter traffic flow and coordination between the two intersections. Although there could be 4 additional seconds of delay, the intersection would operate at the same LOS under both the No Build Alternative and Ballard Avenue Alternative.

The intersection at NW Market St/22nd Ave NW/Leary Ave NW (Intersection 4) would have approximately 1 second less delay because some nonmotorized users in the study area would likely shift to the trail. This would reduce the amount of conflicting nonmotorized and vehicle movements at the intersection, which would improve overall delay.

The intersection at 11th Ave NW and NW 46th St (Intersection 8) would operate at LOS B compared to LOS C under the No Build Alternative. Traffic would shift from NW 46th St to NW 45th St because NW 45th St would be restored to a two-way street. Under the No Build Alternative, NW 45th St would remain an eastbound one-way street for vehicles. However, this would also result in the intersection at NW 46th St and Shilshole Ave NW (Intersection 10) operating at LOS D under the Ballard Avenue Alternative compared to LOS A under the No Build Alternative. This intersection is a two-way stop control and the delay reported above is for the worst-operating approach. Although the LOS would decrease under the Ballard Avenue Alternative, this delay would only be experienced by vehicles at the northbound approach. This volume is much smaller compared to east-west traffic at this intersection. This is not anticipated to have an adverse impact on traffic operations.

The intersection at Shilshole Ave NW and 17th Ave NW (Intersection 11) would operate at LOS E under the Ballard Avenue Alternative compared to LOS F under the No Build Alternative. Trail users would shift to the trail on NW Ballard Ave/Ballard Ave NW rather than ride in a lane with traffic on Shilshole Ave NW.

The intersection at NW 56th St and 24th Ave NW (Intersection 13) would operate at LOS B under the Ballard Avenue Alternative compared to LOS F under the No Build Alternative. Under the Ballard Avenue Alternative, this intersection would be signalized to improve safety for nonmotorized users, which would also improve operations for vehicles compared to the No Build Alternative.

SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 5-5
Ballard Avenue Alternative PM Peak Hour Study Intersection Level of Service

The driveways shown in Table 5-10 are a sample of typical driveways that analysts evaluated to characterize the range of impacts that could occur under the Ballard Avenue Alternative. Under this alternative, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall delay at each driveway. Depending on the traffic volume at a particular driveway, vehicles exiting could experience up to 3 seconds of additional delay compared to the No Build Alternative.

Table 5-10. Comparison of PM Peak Hour Study Driveway Delay, 2040 No Build Alternative and Ballard Avenue Alternative

ID	*Driveway*	*2040 No Build Alternative PM Peak Hour (sec)*	*2040 Ballard Avenue Alternative PM Peak Hour (sec)*
14	NW 54th St/Ballard Locks	33	36
15	Shilshole Ave NW/Stimson Marina	23	19
16	Shilshole Ave NW/Salmon Bay Center	24	19
17	Shilshole Ave NW/Salmon Bay Sand and Gravel (north side)	11	11
18	Shilshole Ave NW/Salmon Bay Sand and Gravel (south side)	30	24
19	Shilshole Ave NW/Covich-Williams Chevron	17	16
20	Shilshole Ave NW/Salmon Bay Cafe	18	15
21	Shilshole Ave NW/Ballard Industrial	29	21
22	Ballard Ave NW/Ballard Industrial	8	8
23	Shilshole Ave NW/Ballard Mill Marina	27	20

Note: The driveway analysis evaluates changes to delay at a sample of typical driveways to characterize the range of impacts that could occur under the Build Alternatives. Under the No Build Alternative evaluation, bicyclists were added to motor vehicle volumes to arrive at the total volumes along Shilshole Ave NW. Under the Build Alternatives, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall driveway delay.

5.5.2.3 ***Freight***

The primary freight corridors are expected to be the same under the Ballard Avenue Alternative compared to the No Build Alternative. Freight would likely continue to be accommodated on the following roadways in the study area:

- Shilshole Ave NW;
- NW Market St between 24th Ave NW and the eastern boundary of the study area;
- NW Leary Way;

- 15th Ave NW; and
- 24th Ave NW.

Operations at most study area intersections are expected to have similar impacts on freight mobility under the Ballard Avenue Alternative compared to the No Build Alternative.

Freight mobility at the intersections of 11th Ave NW and NW 46th St would be improved under the Ballard Avenue Alternative compared to the No Build Alternative. This is because NW 45th St would be restored to a two-way roadway, which would redistribute traffic in this part of the study area.

There are approximately 42 driveways and loading docks located along the alignment of the Ballard Avenue Alternative. Freight vehicles would be required to stop before the trail to check for pedestrians and cyclists before advancing to the roadway, which could result in a delay of up to 3 seconds on average during the PM peak hour. With the anticipated volume of trail users and because trail users would be spread throughout the day, this delay would occur sporadically during the PM peak hour.

Under the Ballard Avenue Alternative, up to eight freight access points (driveways and loading docks) to private properties could change because the BGT Missing Link would be constructed within the City's right-of-way along the north side of NW 54th St, the east side of 28th Ave NW, the south side of NW 56th St, the west side of 22nd Ave NW, the southwest side of Ballard Ave NW/NW Ballard Way, the south side of NW 46th St, and the east side of 11th Ave NW. Some businesses that currently use the City right-of-way to access parking or loading docks on their properties would need to relocate their access points to driveways or possibly to the ends of the blocks. Up to three loading docks could be affected between NW 54th St and NW Market St on 28th Ave NW.

The change in access could potentially alter how private property owners use the space between their buildings and the City's right-of-way. Some businesses may not be able to access their properties as they currently do and may have to reorient their business operations to accommodate freight by moving driveways or loading docks. Businesses that are currently using the public right-of-way for loading and unloading activities would no longer be allowed to continue this unpermitted use under the Ballard Avenue Alternative. Properties with multiple driveways or access points, such as properties along NW 56th St with two access points to a single parking lot, may need to consolidate access points where possible to improve safety and operations. This would reduce the number of conflict points with the trail while maintaining adequate access to properties. All other loading docks and driveways along the Ballard Avenue Alternative would remain the same as the No Build Alternative.

5.5.2.4 *Nonmotorized Users*

5.5.2.4.1 Study Area Facilities

Under the Ballard Avenue Alternative, pedestrian and bicycle facilities in the study area would be similar to the No Build Alternative, with the exception of the completion of the BGT. As described in Chapter 1, Introduction and Project History, the project would provide a dedicated, 12- to 20-foot multi-use trail for nonmotorized users for the entire study area. A 4- to 5-foot buffer would be provided between the roadway and the trail. A sidewalk 6 to 10 feet wide would also be provided between the trail and properties along NW 54th St, NW Market St, Shilshole Ave NW, and NW 46th St. Additional nonmotorized improvements under the Ballard Avenue Alternative could include curb treatments, pavement markings and treatments, signage, wayfinding, and lighting. Curb bulbs would be provided at most intersections along the alignment.

The trail would cross approximately 42 driveways and loading docks under the Ballard Avenue Alternative. Trail crossings with driveways and intersections would be clearly delineated, which would improve comfort and safety for nonmotorized users in the study area by organizing and creating predictability of potential conflict points between vehicles and nonmotorized users. Vehicles would be required to stop for trail users at all driveway/trail intersections. However, after stopping before the trail, vehicles would continue forward over the trail and stop at the roadway. It is possible that vehicles blocking the trail would occasionally delay trail users during the day. On average, trail users could have to wait between 15 to 25 seconds for a vehicle to clear the trail.

5.5.2.4.2 Pedestrian and Bicycle Volumes

Pedestrian and bicycle volumes would be similar to those described under the Shilshole South Alternative, Section 5.3.2.4.2, Pedestrian and Bicycle Volumes.

5.5.2.5 *Public Transportation*

No impacts on transit under the Ballard Avenue Alternative are anticipated because there would be no additional delay on transit corridors compared to the No Build Alternative.

5.5.2.6 *Freight Rail*

No impacts on rail from the Ballard Avenue Alternative are anticipated because rail operations and facilities would not be altered.

5.5.2.7 *Safety*

Under the Ballard Avenue Alternative, safety would be improved for nonmotorized users and motor vehicles in the study area. Traffic and nonmotorized volumes in the study area are expected to increase between 2015 and 2040. Bicycle volumes are expected to grow at a higher rate than vehicles and pedestrians. Under the Ballard Avenue Alternative, a dedicated bicycle facility would provide a safer nonmotorized environment in the study area compared to the No Build Alternative. A dedicated facility would improve predictability of conflict points between motor vehicles and cyclists and reduce the likelihood of collisions because potential conflict points would be clearly identifiable by both motor vehicle drivers and trail users. Potential conflict points would be clearly organized and delineated, which would allow motor vehicle drivers and trail users to be aware of where to travel cautiously. A dedicated facility would also reduce the likelihood of nonmotorized injury incidents by providing a facility that safely traverses or avoids obstacles in the study area such as railroad tracks. The BGT Missing Link would be designed to clearly delineate trail user space from the roadway and would include safety features such as buffers, pavement markings, raised crosswalks, curb treatments, signage, and lighting.

Under the Ballard Avenue Alternative, there could be sight distance concerns for exiting vehicles at up to 16 driveways on the southwest/south side of Ballard Ave NW/NW Ballard Way and up to two driveways on the south side of NW 46th St where buildings are constructed up to the property lines. Under the Ballard Avenue Alternative, sidewalks would be provided between the properties and the trail, which would improve safety. Trail users would have a buffer of 7 to 10 feet from the property frontage. As discussed in Section 1.3, Project Description, the final design of the trail would include safety features to reduce conflicts between trail users and vehicles. Wherever possible, signage, pavement markings, and advanced warning systems, among other safety enhancements, would be used to notify sidewalk and trail users and vehicles that there is a trail crossing. Under Seattle Municipal Code 11.58.230 (summarized in Section 5.3.2.7), driveways along the Ballard Avenue Alternative would operate safely. Drivers would be

required to stop before crossing the trail, which would allow drivers to look for trail users before continuing to the roadway.

There would be no sight distance concerns for vehicles entering driveways because trail crossings would be clearly marked with signage, pavement markings, and other safety enhancements, and buildings would not block views of the trail. Driveway widths would be wide enough to safely accommodate commercial traffic.

There could also be potential safety impacts associated with the Ballard Sunday Farmers Market (the Market) under the Ballard Avenue Alternative. The market occurs every Sunday, year-round, and is located on Ballard Ave NW between Vernon Pl and 22nd Ave NW. When the market is open, Ballard Ave NW between Vernon Pl and 22nd Ave NW is closed to vehicle traffic to accommodate market stalls, which are set up in the right-of-way. The market attracts a large number of pedestrians to the area when open, which could conflict with trail use. The potential for collisions between trail users and visitors to the market could be a safety concern under the Ballard Avenue Alternative. Trail users could be required to dismount or the trail could be closed during market hours to reduce safety impacts.

5.6 Leary Alternative

5.6.1 Construction

Under the Leary Alternative, there could be additional traffic and freight delay during construction on 11th Ave NW because 11th Ave NW is a two-lane street (one lane of traffic in each direction). If construction activities would require the closure of one lane of the roadway, a flagger could be required to direct travel to alternative routes through the construction zone. It is anticipated that this impact would be temporary.

Under the Leary Alternative, construction would occur on a transit corridor, which could have temporary impacts on public transportation similar to those described for general-purpose traffic. Increases in delay and congestion from traffic diversion and road closures could be possible during construction. However, these impacts are expected to be minimal because construction would occur in segments of three to four street blocks. Construction activities could also require temporary relocations of bus stops in the study area. Any construction activities that could affect public transportation would be coordinated with the transit provider.

5.6.2 Operation

5.6.2.1 *Roadway Network*

The Leary Alternative would alter the roadway network on NW 54th St, NW Market St, Leary Ave NW, and 11th Ave NW. As described in Chapter 1, Introduction and Project History, the Leary Alternative would construct a multi-use trail along the south side of NW 54th St and NW Market St, the southwest side of NW Leary Way, and the east side of 11th Ave NW.

The Leary Alternative would provide a dedicated nonmotorized facility for the entire length of the study area. This facility would be 12 feet wide with a 3- to 13-foot buffer between the roadway and the trail. A sidewalk 6 to 10 feet wide would be provided between the trail and adjacent properties.

Under the Leary Alternative, NW Market St and Leary Ave NW/NW Leary Way would no longer be two lanes in each direction (four-lane roadway) along the trail alignment; these streets would have one travel lane in each direction and a center two-way left-turn lane (three-lane roadway). NW 54th St would have

one travel lane in each direction (two-lane roadway), similar to existing conditions. There are approximately 33 driveways and loading docks along the alignment. To the extent necessary, driveway access to all businesses would be reconstructed and provided in the same location as the No Build Alternative. However, some properties with multiple access points could have their driveways consolidated into a single access point in coordination with the City and property owners.

At the intersection of NW Market St and 24th Ave NW, right- and left-turn lanes would be provided in the eastbound and westbound directions. At the NW Leary Way and 15th Ave NW intersection, left-turn lanes would be provided in the eastbound and westbound directions.

All other roadways in the study area would be the same as the No Build Alternative.

5.6.2.2 *Traffic Volumes and Operations*

Traffic volume growth would be similar to the No Build Alternative on most study area streets. Traffic volumes are expected to increase by 0.6 percent per year between 2015 and 2040 due to background population and employment growth.

Under the Leary Alternative, traffic operations at most study area intersections would be similar to the No Build Alternative, as summarized in Table 5-11 and Figure 5-6. The average delay for all vehicles is reported for signalized intersections. For unsignalized intersections, delay is reported for the worst-operating stop approach.

Table 5-11. Comparison of PM Peak Hour Study Intersection Level of Service, 2040 No Build Alternative and Leary Alternative

ID	*Intersection*	*Traffic Control*	*2040 No Build Alternative PM Peak Hour*		*2040 Leary Alternative PM Peak Hour*	
			LOS	*Delay (sec)*	*LOS*	*Delay (sec)*
1	NW Market St/28th Ave NW	Signal	A	7	C	23
2	NW Market St/24th Ave NW	Signal	D	46	D	48
3	NW Market St/Ballard Ave NW	Pedestrian Half Signal	A	8	A	8
4	NW Market St/22nd Ave NW/Leary Ave NW	Signal	F	81	F	97
5a	15th Ave NW/NW Leary Way Southbound Off-Ramp	Signal	C	20	E	57
5b	15th Ave NW/NW Leary Way Northbound Off-Ramp	Signal	E	68	F	81
6	NW Leary Way/14th Ave NW	Signal	A	10	C	29
7	NW Leary Way/11th Ave NW	Signal	B	18	E	74
8	11th Ave NW/NW 46th St	Signal	C	21	B	16

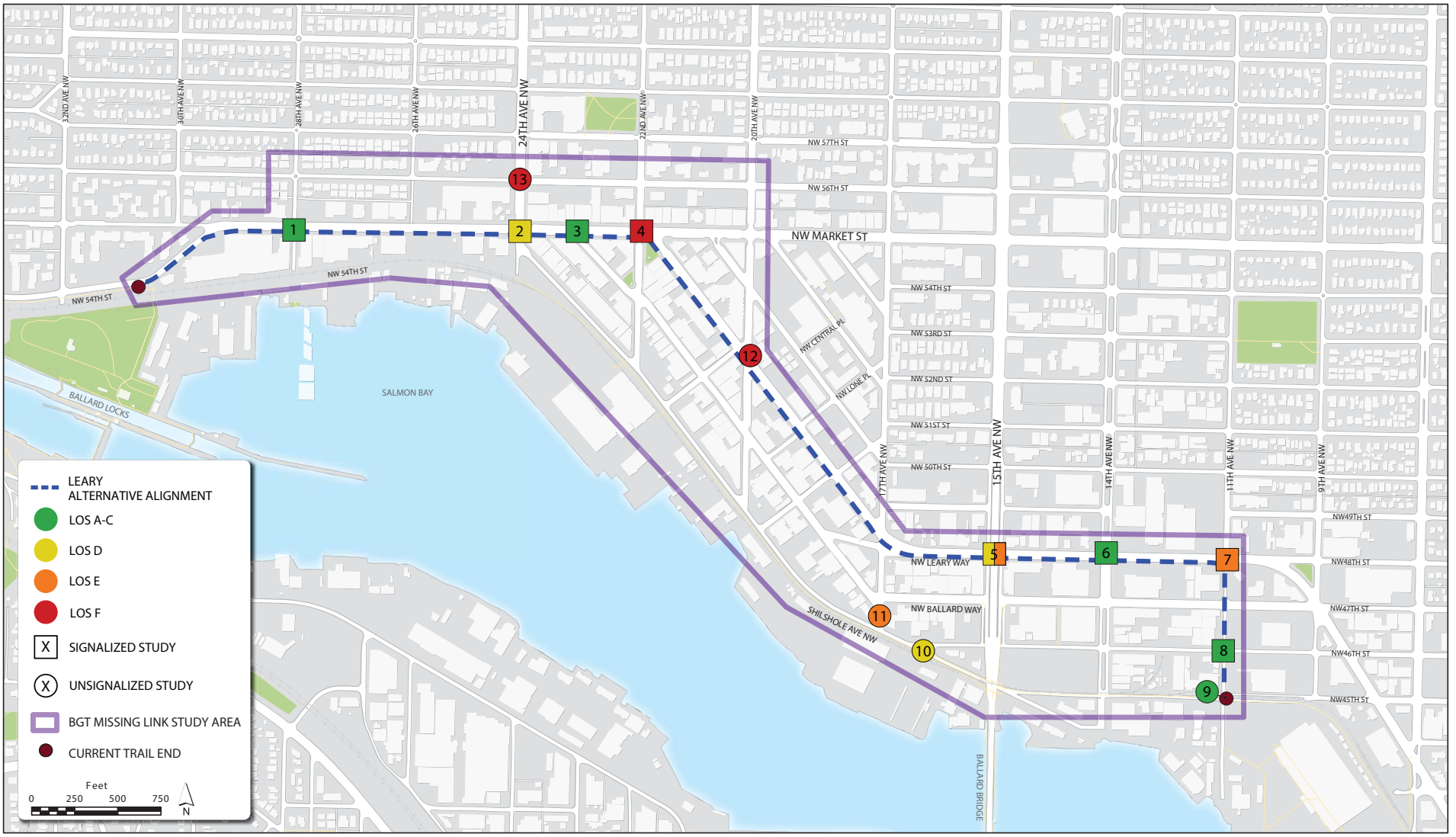
ID	*Intersection*	*Traffic Control*	*2040 No Build Alternative PM Peak Hour*		*2040 Leary Alternative PM Peak Hour*	
			LOS	*Delay (sec)*	*LOS*	*Delay (sec)*
9	11th Ave NW/NW 45th St	Unsignalized – All-way Stop	B	11	B	11
10	NW 46th St/Shilshole Ave NW	Unsignalized – Two-way Stop	A	9	D	29
11	Shilshole Ave NW/NW 17th St	Unsignalized – Two-way Stop	F	247	E	43
12	Leary Ave NW/20th Ave NW	Unsignalized – All-way Stop	F	>300	F	>300
13	NW 56th St/24th Ave NW	Unsignalized – Two-way Stop	F	153	F	114

The Leary Alternative would cause two intersections to operate at LOS E or worse that would otherwise operate at LOS D or better under the No Build Alternative. In addition, this alternative would cause delay to increase by 5 seconds or more at two intersections that operate at LOS E or worse under both alternatives. This includes the following intersections:

- Intersection 4: NW Market St/22nd Ave NW/Leary Ave NW;
- Intersection 5a: 15th Ave NW/NW Leary Way southbound off-ramp;
- Intersection 5b: 15th Ave NW/NW Leary Way northbound off-ramp; and
- Intersection 7: NW Leary Way/11th Ave NW.

An additional seven intersections would operate at a different LOS or experience a change in delay when compared to the No Build Alternative:

- Intersection 1: NW Market St/28th Ave NW;
- Intersection 2: NW Market St/24th Ave NW;
- Intersection 6: NW Leary Way/14th Ave NW;
- Intersection 8: 11th Ave NW/NW 46th St;
- Intersection 10: NW 46th St/Shilshole Ave NW (northbound approach);
- Intersection 11: Shilshole Ave NW/17th Ave NW (southbound approach); and
- Intersection 13: NW 56th St/24th Ave NW.



SOURCE:
IDAX 2015; ESA 2015; City of Seattle 2015
Service Layer Credits: Esri, USDA

Burke-Gilman Trail Missing Link

Figure 5-6
Leary Alternative PM Peak Hour
Study Intersection Level of Service

The intersection at NW Market St and 28th Ave NW (Intersection 1) would operate at LOS C under the Leary Alternative compared to LOS A under the No Build Alternative. Under the Leary Alternative, NW Market St would be reduced from four lanes to three lanes, which would increase delay during the PM peak hour. However, this intersection would still operate at LOS D or better.

The intersection at NW Market St and 24th Ave NW (Intersection 2) would have approximately 2 additional seconds of delay because the trail would cross the south leg of the intersection. This would create additional but minor delay at the intersection, but would not reduce the overall LOS.

The intersection of NW Market St, 22nd Ave NW, and Leary Ave NW (Intersection 4) would have approximately 16 seconds of additional delay under the Leary Alternative compared to the No Build Alternative because the trail would travel through the intersection. This would create additional delay for vehicles because drivers would be required to stop for trail users.

The intersection at 11th Ave NW and NW 46th St (Intersection 8) would operate at LOS B compared to LOS C under the No Build Alternative. Traffic would shift from NW 46th St to NW 45th St because NW 45th St would be restored to a two-way street. Under the No Build Alternative, NW 45th St would remain an eastbound one-way street for vehicles. However, this would also result in the intersection at NW 46th St and Shilshole Ave NW (Intersection 10) operating at LOS D under the Leary Alternative compared to LOS A under the No Build Alternative. This intersection is a two-way stop control and the delay reported above is for the worst-operating approach. Although the LOS decreases under the Leary Alternative, this delay would only be experienced by vehicles at the northbound approach. This volume is much smaller compared to east-west traffic at this intersection. This is not anticipated to have an adverse impact on traffic operations.

The intersection at Shilshole Ave NW and 17th Ave NW (Intersection 11) would operate at LOS E under the Leary Alternative compared to LOS F under the No Build Alternative because trail users would shift to the trail on NW Leary Way/Leary Ave NW rather than ride in a lane with traffic on Shilshole Ave NW.

The study intersections on NW Leary Way/Leary Ave NW (Intersections 5a, 5b, 6, and 7) would operate at a worse LOS under the Leary Alternative compared to the No Build Alternative because NW Leary Way/Leary Ave NW would be reduced from four lanes to three lanes to accommodate the trail. Intersection 6 would be reduced to LOS C from LOS A under the Leary Alternative. Intersections 5a and 7 on NW Leary Way/Leary Ave NW would operate at LOS D or better under the No Build Alternative and LOS E or F under the Leary Alternative. The delay at Intersection 5b would increase by an estimated 13 seconds under the Leary Alternative compared to the No Build Alternative even though the intersection would operate at LOS E or F under both alternatives.

The intersection at NW 56th St and 24th Ave NW (Intersection 13) would have approximately 40 seconds less delay when compared to the No Build Alternative because some nonmotorized users in the study area would likely shift to the trail. This would reduce the amount of conflicting nonmotorized and vehicle movements at the intersection, which would improve overall delay.

The driveways shown in Table 5-12 are a sample of typical driveways that analysts evaluated to characterize the range of impacts that could occur under the Leary Alternative at driveways. Under this alternative, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall delay at each driveway. Depending on the traffic volume at a particular driveway, vehicles exiting could experience up to 1 second of additional delay compared to the No Build Alternative.

Table 5-12. Comparison of PM Peak Hour Study Driveway Delay, 2040 No Build Alternative and Leary Alternative

ID	*Driveway*	*2040 No Build Alternative PM Peak Hour (sec)*	*2040 Leary Alternative PM Peak Hour (sec)*
14	NW 54th St/Ballard Locks	33	34
15	Shilshole Ave NW/Stimson Marina	23	19
16	Shilshole Ave NW/Salmon Bay Center	24	19
17	Shilshole Ave NW/Salmon Bay Sand and Gravel (north side)	11	11
18	Shilshole Ave NW/Salmon Bay Sand and Gravel (south side)	30	24
19	Shilshole Ave NW/Covich-Williams Chevron	17	16
20	Shilshole Ave NW/Salmon Bay Cafe	18	15
21	Shilshole Ave NW/Ballard Industrial	29	21
22	Ballard Ave NW/Ballard Industrial	8	8
23	Shilshole Ave NW/Ballard Mill Marina	27	20

Note: The driveway analysis evaluates changes to delay at a sample of typical driveways to characterize the range of impacts that could occur under the Build Alternatives. Under the No Build Alternative evaluation, bicyclists were added to motor vehicle volumes to arrive at the total volumes along Shilshole Ave NW. Under the Build Alternatives, driveways were evaluated as two separate intersections to measure the amount of delay associated with the intersection with the trail and the intersection with the roadway. Analysts summed the delay of both intersections to calculate the overall driveway delay.

5.6.2.3 ***Freight***

The primary freight corridors are expected to be the same under the Leary Alternative compared to the No Build Alternative. Freight will continue to be accommodated on the following roadways in the study area:

- Shilshole Ave NW;
- NW Market St between 24th Ave NW and the eastern boundary of the study area;
- NW Leary Way;
- 15th Ave NW; and
- 24th Ave NW.

Operations at study area intersections are expected to have similar impacts or to perform better for freight mobility under the Leary Alternative compared to the No Build Alternative. As described in Section 5.6.2.2, intersection operations at the following intersections would be similar to or improve under the Leary Alternative when compared to the No Build Alternative:

- Intersection 2: NW Market St/24th Ave NW;
- Intersection 3: NW Market St/Ballard Ave NW;

- Intersection 8: 11th Ave NW/NW 46th St;
- Intersection 9: 11th Ave NW/NW 45th St;
- Intersection 11: Shilshole Ave NW/NW 17th St;
- Intersection 12: Leary Ave NW/20th Ave NW; and
- Intersection 13: NW 56th St/24th Ave NW.

Freight mobility at Intersections 8 and 11 would improve under the Leary Alternative. At the intersection of 11th Ave NW and NW 46th St (Intersection 8), freight mobility would be improved because NW 45th St would be restored to a two-way roadway, which would redistribute traffic in this part of the study area. At the intersection of Shilshole Ave NW and NW 17th St, freight mobility would be improved because trail users would shift to the trail on NW Leary Way/Leary Ave NW rather than ride in a lane with traffic on Shilshole Ave NW.

The following four intersections would operate at a lower LOS under the Leary Alternative when compared to the No Build Alternative:

- Intersection 1: NW Market St/28th Ave NW;
- Intersection 6: NW Leary Way/14th Ave NW; and
- Intersection 10: NW 46th St/Shilshole Ave NW.

However, this would not be considered an impact because the intersections would still operate at LOS D or better.

Freight would be delayed at the following four intersections under the Leary Alternative when compared to the No Build Alternative:

- Intersection 4: NW Market St/22nd Ave NW/Leary Ave NW;
- Intersection 5a: 15th Ave NW/NW Leary Way southbound off-ramp;
- Intersection 5b: 15th Ave NW/NW Leary Way northbound off-ramp; and
- Intersection 7: NW Leary Way/11th Ave NW.

Freight mobility could be affected on NW Leary Way between 15th Ave NW and the eastern edge of the study area because NW Leary Way would be reduced by one lane in each direction. The decline in LOS experienced on these corridors is described in the previous section.

There are approximately 33 driveways and loading docks along the alignment of the Leary Alternative. Delay at driveways along the Leary Alternative is expected to be similar to those indicated in Table 5-12. Freight vehicles would be required to stop before the trail to check for pedestrians and cyclists before advancing to the roadway, which could result in up to 1 additional second of delay on average during the PM peak hour. With the anticipated volume of trail users and because trail users would be spread throughout the day, this delay would occur sporadically during the PM peak hour.

Up to three freight access points (driveways and loading docks) to private properties could change because the BGT Missing Link would be constructed within the City's right-of-way along the south side of NW 54th Street/NW Market St, the southwest side of Leary Ave NW/NW Leary Way, and the east side of 11th Ave NW. Some businesses that currently use the City right-of-way to access parking or loading docks on their properties might need to relocate their access points to driveways or possibly to the ends of

the blocks because this is an unpermitted use of public right-of-way. Two driveways on NW Market St and one driveway on NW Leary Way/Leary Ave NW might need to be moved. The change in access could potentially change how private property owners use the space between their buildings and the City's right-of-way. Some businesses may not be able to access their properties as they currently do and may have to reorient their business operations to accommodate freight by relocating access. Properties with multiple driveways or access points, such as properties along NW 56th St with two access points to a single parking lot, may need to consolidate access points where possible to improve safety and operations. This would reduce the number of conflict points with the trail while maintaining adequate access to properties. All other loading docks and driveways along the Leary Alternative would remain the same as the No Build Alternative.

5.6.2.4 *Nonmotorized Users*

5.6.2.4.1 Study Area Facilities

Under the Leary Alternative, pedestrian and bicycle facilities in the study area would be similar to the No Build Alternative, with the exception of the completion of the BGT. As described in Chapter 1, Introduction and Project History, the project would provide a dedicated 12-foot multi-use trail for nonmotorized users for the entire study area. A 3- to 13-foot buffer would be provided between the roadway and the trail. A sidewalk 6 to 10 feet wide would also be provided between the trail and adjacent properties. Curb bulbs would be provided at most study area intersections.

The trail would cross approximately 33 driveways and loading docks under the Leary Alternative. Trail crossings with driveways and intersections would be clearly delineated, which would improve comfort and safety for nonmotorized users in the study area. Vehicles would be required to stop for trail users at all driveway/trail intersections. However, after stopping before the trail, vehicles would continue forward over the trail and stop at the roadway. It is possible that vehicles blocking the trail would occasionally delay trail users during the day. On average, trail users could have to wait between 15 and 25 seconds for a vehicle to clear the trail.

Additional nonmotorized improvements under the Leary Alternative could include curb treatments, pavement markings and treatments, signage and wayfinding, and lighting.

5.6.2.4.2 Pedestrian and Bicycle Volumes

Pedestrian and bicycle volumes would be similar to those described under the Shilshole South Alternative, Section 5.3.2.4.2, Pedestrian and Bicycle Volumes.

5.6.2.5 *Public Transportation*

Under the Leary Alternative, impacts on public transportation would be similar to those described for general-purpose traffic on NW Leary Way/Leary Ave NW and NW Market St, which are both transit corridors. Additional congestion and delay at intersections on these streets could affect public transportation service on King County Metro Routes 17, 18, 29, 40, 44, and RapidRide D.

5.6.2.6 *Freight Rail*

No impacts on rail from the Leary Alternative are anticipated because rail operations and facilities would not be altered.

5.6.2.7 *Safety*

Under the Leary Alternative, safety would be improved for nonmotorized users and motor vehicles in the study area. Traffic and nonmotorized volumes in the study area are expected to increase between 2015 and 2040. Bicycle volumes are expected to grow at a higher rate than vehicles and pedestrians. Under the Leary Alternative, a dedicated bicycle facility would provide a safer nonmotorized environment in the study area compared to the No Build Alternative. A dedicated facility would improve predictability of conflict points between motor vehicles and cyclists and reduce the likelihood of collisions because potential conflict points would be clearly identifiable by both motor vehicle drivers and trail users. Potential conflict points would be clearly organized and delineated, which would allow motor vehicle drivers and trail users to be aware of where to travel cautiously. A dedicated facility would also reduce the likelihood of nonmotorized injury incidents by providing a facility that safely traverses or avoids obstacles in the study area such as railroad tracks. The BGT Missing Link would be designed to clearly delineate trail user space from the roadway and would include safety features such as buffers, pavement markings, raised crosswalks, curb treatments, signage, and lighting.

Under the Leary Alternative, there could be sight distance concerns for exiting vehicles at up to nine driveways on the southwest/south side of Leary Ave NW/NW Leary Way and up to eight driveways on the south side of NW Market St where buildings are constructed up to the property lines. Under the Leary Alternative, sidewalks would be provided between the properties and the trail, which would improve safety. Trail users would have a buffer of 8 to 10 feet from the property frontage. As discussed in Section 1.3, Project Description, the final design of the trail would include safety features to reduce conflicts between trail users and vehicles. Wherever possible, signage, pavement markings, and advanced warning systems, among other safety enhancements, would be used to notify sidewalk and trail users and vehicles that there is a trail crossing. Under Seattle Municipal Code 11.58.230 (summarized in Section 5.3.2.7), driveways along the Leary Alternative would operate safely. There would be no sight distance concerns for vehicles entering driveways because trail crossings would be clearly marked with signage, pavement markings, and other safety enhancements, and buildings would not block views of the trail. Driveway widths would be wide enough to safely accommodate industrial and commercial traffic.

The Leary Alternative would reduce the existing sidewalk on NW Market St between 24th Ave NW and 22nd Ave NW by up to 12 feet to accommodate the BGT Missing Link. This location is a heavy-use pedestrian corridor, and the potential for conflicts between pedestrians and trail users could increase if the sidewalk was narrowed to accommodate the trail. Safety improvements, such as pavement variations and signage, could be used to slow trail user traffic through this portion of the Leary Alternative.

5.7 Connector Segments

5.7.1 Construction

Construction impacts on traffic volumes and operations, freight, nonmotorized users, public transportation, rail, and safety would be similar among all of the connector segments to those described for the Build Alternatives.

5.7.2 Operation

The specific design and impacts of the Connector Segments would depend on which alignments were being connected. Potential impacts associated with any Connector Segment could include the following:

- Increased intersection LOS and delay for general-purpose vehicles, freight, and public transportation;
- Altered loading dock and driveway access for businesses;
- Pedestrian congestion if sidewalks are reduced; and
- Potential sight distance concerns at driveways.

However, improvements on any of the Connector Segments would include improved safety and comfort for nonmotorized users and vehicles.

CHAPTER 6 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

6.1 Measures Common to All Build Alternatives

6.1.1 Construction

To mitigate impacts from construction, SDOT would require the contractor to develop a Traffic Control Plan to reduce impacts on traffic operations and to protect and control motor vehicle, pedestrian, and bicycle traffic during all phases of construction. The plan would be developed in accordance with City construction specifications and would be updated as appropriate for each construction phase. The plan would outline specific impact-reducing measures, including the following:

- Clearly marked detours for motor vehicles, developed in coordination with other agencies and adjacent construction projects, to provide alternative routes for access through the study area and to avoid active construction areas;
- Accommodations for vehicles that require loading zone access to properties for services such as business deliveries, taxi and bus service, and garbage pickup;
- Use of flaggers, uniformed police officers, barricades, signing, or other traffic control devices;
- Designated construction haul routes to minimize construction traffic impacts on other roadways;
- Accommodations for oversized freight vehicles to travel through construction zones, if necessary, during road closures;
- Clearly marked pedestrian and bicycle access routes as well as proposed locations of detour signage and other wayfinding elements; accessible routes to be within a reasonable distance of temporarily closed trails and other pathways;
- Transit stop closures, alternative transit stop locations, and interim transit routes developed and publicized in coordination with King County Metro;
- Arrangements for emergency access to and travel through construction areas to minimize impacts on emergency response times, developed in coordination with emergency response providers; and
- Maintenance of rail facilities and operations to minimize impacts on freight rail service, developed in coordination with BTR in accordance with Federal Railroad Administration specifications.

The City would maintain access to private property to the maximum extent feasible, and would notify property owners in advance of activities that might temporarily limit access. In addition, SDOT would coordinate with businesses affected by construction to provide wayfinding information for customers and support other outreach activities to minimize the potential adverse impacts of construction.

6.1.2 Operation

Traffic impacts were determined at intersections by comparing intersection LOS for the No Build and Build Alternatives during the PM peak hour. Impacts would occur if a Build Alternative would increase traffic demand to LOS E or LOS F, but the intersection operates at LOS D or better under the No Build

Alternative. Impacts would also occur if a Build Alternative would increase the delay at intersections operating at LOS E or F under the No Build Alternative by 5 seconds or more.

Avoidance, minimization, and mitigation measures for potential impacts on operations under each alternative are discussed below.

6.2 Shilshole South Alternative

6.2.1 Traffic Operations

No additional intersections are anticipated to operate at LOS E or worse under the Shilshole South Alternative when they operate at LOS D or better under the No Build Alternative. No traffic improvement measures would be required.

6.2.2 Freight

Mitigation measures for freight would not be required because the Shilshole South Alternative would not reduce operations to LOS E or worse at study area intersections that operate at LOS D or better under the No Build Alternative. However, SDOT could implement some improvements, such as signalization at intersections on key freight corridors, to improve LOS.

Up to 10 access points to businesses along NW 54th St, Shilshole Ave NW, and NW 45th St could be reoriented to improve safety and operations along the BGT Missing Link. To mitigate this impact, SDOT could coordinate with affected businesses to reorient their access points to access driveways or possibly to the ends of the blocks. This would result in different access locations but overall access to properties would be maintained. If access to businesses could not be relocated, SDOT could provide relocation assistance and benefits to affected property owners.

6.2.3 Nonmotorized Users

Under the Shilshole South Alternative, nonmotorized facilities and comfort in the study area would be improved compared to the No Build Alternative. Therefore, no mitigation measures would be required. Nonmotorized traffic is also not expected to reduce intersection operations in the study area to LOS E or F when an intersection operates at LOS D or better under the No Build Alternative. However, SDOT could implement some improvements, such as signalization at key intersections, to improve LOS.

6.2.4 Public Transportation

The Shilshole South Alternative is not expected to adversely affect public transportation compared to the No Build Alternative. Therefore, no mitigation measures would be necessary.

6.2.5 Freight Rail

The Shilshole South Alternative could require relocation of the BTR tracks in various isolated locations along NW 54th St, Shilshole Ave NW, and NW 45th St. All track relocation would be coordinated with BTR so that rail operations would not be adversely affected. BTR would complete removal and reconstruction of any track segments prior to construction of the BGT Missing Link.

6.2.6 Safety

The Shilshole South Alternative would improve safety in the study area compared to the No Build Alternative by providing a dedicated facility for nonmotorized users. The final design would also include safety considerations to ensure that the trail operates safely. Therefore, no mitigation would be required.

In locations with sight distance concerns, design elements such as pavement markings, signage, or bubble mirrors would be used to further improve safety. Variations in the use of asphalt and concrete, different paint or thermoplastic striping and symbols, and elevations at driveway entrances could be used to clearly identify where the trail intersects with driveways. Driveway notification signage could be used to maintain trail usage at safe speeds and to notify trail users and vehicles that a trail intersection exists.

Other improvements, such as intersection signalization or advanced warning systems with vehicle detection that activates elevated flashing beacons, could also be used to improve safety at key intersections or driveways. In coordination with businesses, driveways could also be combined into fewer access points to reduce the number of conflict locations. In areas of highest concern, SDOT could also choose to yield the trail to driveways. However, as discussed in Section 1.3, Project Description, the final design of the trail would include safety features to reduce conflicts between trail users and vehicles.

6.3 Shilshole North Alternative

6.3.1 Traffic Operations

No additional intersections are anticipated to operate at a LOS E or worse under the Shilshole North Alternative when they operate at LOS D or better under the No Build Alternative. No traffic improvement measures would be required.

6.3.2 Freight

Mitigation measures for freight would not be required because the Shilshole North Alternative would not reduce operations to LOS E or worse at study area intersections when they operate at LOS D or better under the No Build Alternative. However, SDOT could implement some improvements, such as signalization at intersections on key freight corridors, to improve LOS.

Up to six access points to businesses along NW 54th St/Market St NW, Shilshole Ave NW, and NW 46th St could be reoriented to improve safety and operations along the BGT Missing Link. To mitigate this impact, SDOT would coordinate with affected businesses to reorient their access points to the access driveways or possibly to the ends of the blocks. This would result in different access locations but overall access to properties would continue to be provided. If access to businesses could not be relocated, SDOT could provide relocation assistance and benefits to affected property owners.

6.3.3 Nonmotorized Users

Under the Shilshole North Alternative, nonmotorized facilities and comfort in the study area would be improved compared to the No Build Alternative. Nonmotorized traffic is also not expected to affect intersection LOS or driveway delay in the study area. Therefore, no mitigation measures would be required. However, SDOT could implement some improvements, such as signalization at key intersections, to improve LOS.

6.3.4 Public Transportation

The Shilshole North Alternative is not expected to adversely affect public transportation compared to the No Build Alternative. Therefore, no mitigation measures would be necessary.

6.3.5 Freight Rail

The Shilshole North Alternative is not expected to adversely affect rail compared to the No Build Alternative. Therefore, no mitigation measures would be necessary.

6.3.6 Safety

The Shilshole North Alternative would improve safety in the study area compared to the No Build Alternative by providing a dedicated facility for nonmotorized users. The final design would also include safety considerations to ensure that the trail operates safely. Therefore, no mitigation would be required. Measures discussed in Section 6.2.6 could be implemented to address sight distance concerns and improve safety at key intersections or driveways.

6.4 Ballard Avenue Alternative

6.4.1 Traffic Operations

No additional intersections are anticipated to operate at LOS E or F under the Ballard Avenue Alternative when they operate at LOS D or better under the No Build Alternative. No traffic improvement measures would be required.

6.4.2 Freight

Mitigation measures for freight would not be required because the Ballard Avenue Alternative would not worsen operations to LOS E or F at study area intersections when they operate at LOS D or better under the No Build Alternative. However, SDOT could implement some improvements, such as signalization at intersections on key freight corridors, to improve LOS.

Up to eight access points to businesses along NW 54th St, 28th Ave NW, NW 56th St, 22nd Ave NW, Ballard Ave NW/NW Ballard Way, NW 46th St, and 11th Ave NW could be reoriented to improve safety and operations along the BGT Missing Link. To mitigate this impact, SDOT would coordinate with affected businesses to reorient their access points to access driveways or possibly to the ends of the blocks. This would result in different access locations but overall access to properties would continue to be provided. If access to businesses could not be relocated, SDOT could provide relocation assistance and benefits to affected property owners.

6.4.3 Nonmotorized Users

Under the Ballard Avenue Alternative, nonmotorized facilities and comfort in the study area would be improved compared to the No Build Alternative. Nonmotorized traffic is also not expected to affect intersection LOS or driveway delay in the study area. Therefore, no mitigation measures would be required. However, SDOT could implement some improvements, such as signalization at key intersections, to improve LOS.

There could be some impacts on nonmotorized users and mobility near the Ballard Farmers Market during operating hours. Potential mitigation measures could include:

- Nonmotorized users on the trail could be required to walk through the market area during operating hours.
- The trail could be closed near the market during operating hours.

6.4.4 Public Transportation

The Ballard Avenue Alternative is not expected to adversely affect public transportation compared to the No Build Alternative. Therefore, no mitigation measures would be necessary.

6.4.5 Freight Rail

The Ballard Avenue Alternative is not expected to adversely affect rail compared to the No Build Alternative. Therefore, no mitigation measures would be necessary.

6.4.6 Safety

The Ballard Avenue Alternative would improve safety in the study area compared to the No Build Alternative by providing a dedicated facility for nonmotorized users. No mitigation would be required. However, measures discussed in Section 6.2.6 could be implemented to address sight distance concerns and improve safety at key intersections or driveways.

Pedestrian safety near the Ballard Farmers Market during operating hours could be affected by the BGT Missing Link project under the Ballard Avenue Alternative. To mitigate this impact, SDOT could require trail users to walk through the market area during operating hours, or the BGT Missing Link in the market area could be closed during operating hours.

6.5 Leary Alternative

6.5.1 Traffic Operations

The Leary Alternative would cause two intersections to operate at LOS E or worse that would otherwise operate at LOS D or better under the No Build Alternative. This alternative would cause delay to increase by 5 seconds or more at two intersections that operate at LOS E or worse under both alternatives. This includes the following intersections:

- Intersection 4: NW Market St/22nd Ave NW/Leary Ave NW;
- Intersection 5a: 15th Ave NW/NW Leary Way southbound off-ramp;
- Intersection 5b: 15th Ave NW/NW Leary Way northbound off-ramp; and
- Intersection 7: NW Leary Way/11th Ave NW.

The Leary Alternative would increase delay by more than 5 seconds at the intersection of NW Market St/22nd Ave NW/Leary Ave NW (Intersection 4). Under the No Build Alternative, this intersection would operate at LOS E but would have less delay when compared to the Leary Alternative.

Because the right-of-way at on NW Market St and Leary Ave NW/Leary Way NW is constrained, additional right-of-way would be required if SDOT were to mitigate additional delay at Intersections 4, 5a, 5b, and 7. It is likely that this would result in additional impacts on properties and businesses near the intersections. The additional delay that would be experienced at Intersections 4, 5a, 5b, and 7 would likely occur only during the PM peak hour when traffic volumes are highest.

6.5.2 Freight

Mitigation measures for freight would be similar to those mentioned above for general-purpose vehicles. SDOT could implement some improvements, such as signalization at intersections on key freight corridors, to improve LOS.

Up to three access points to businesses along NW 54th St/NW Market St, Leary Ave NW/NW Leary Way, and 11th Ave NW could be reoriented to improve safety and operations along the BGT Missing Link. To mitigate this impact, SDOT would coordinate with affected businesses to reorient their access points to the access driveways or possibly to the ends of the blocks. This would result in different access locations but overall access to properties would continue to be provided. If access to businesses could not be relocated, SDOT could provide relocation assistance and benefits to affected property owners.

6.5.3 Nonmotorized Users

Under the Leary Alternative, the sidewalk on NW Market St between 24th Ave NW and 22nd Ave NW would be reduced to accommodate the BGT Missing Link. This could create some pedestrian congestion. Design elements such as landscaping, pavement variations and markings, and signage could be used to mitigate impacts. Elsewhere in the study area, nonmotorized facilities and comfort would be improved compared to the No Build Alternative.

6.5.4 Public Transportation

The Leary Alternative could affect public transportation on Leary Ave NW/NW Leary Way similarly to impacts discussed in Section 6.5.1, Traffic Operations. SDOT could evaluate mitigation measures such as queue jumps to mitigate transit impacts under the Leary Alternative. Queue jumps are additional travel lanes provided for transit vehicles only that give transit priority over general-purpose vehicles at intersections. Queue jumps are often accompanied by a signal that provides an early green light for transit vehicles only.

6.5.5 Freight Rail

The Leary Alternative is not expected to adversely affect rail compared to the No Build Alternative. Therefore, no mitigation measures would be necessary.

6.5.6 Safety

The Leary Alternative could affect pedestrian safety on NW Market St between 24th Ave NW and 22nd Ave NW where the sidewalk would be reduced by up to 12 feet to accommodate the BGT Missing Link. Design elements such as landscaping, pavement variations and markings, and signage could be used to mitigate impacts. Elsewhere in the study area, the Leary Alternative would improve safety compared to the No Build Alternative by providing a dedicated facility for nonmotorized users. The final design would also include safety considerations to ensure that the trail operates safely. Therefore, no mitigation would be required. However, measures discussed in Section 6.2.6 could be implemented to address sight distance concerns and improve safety at key intersections or driveways.

CHAPTER 7 CUMULATIVE IMPACTS

Cumulative impacts are the accumulation of impacts from past, present, and reasonably foreseeable actions. These impacts are analyzed so that decision-makers can consider how impacts from actions over time "add up" to affect a resource. Analysts reviewed potential cumulative effects on transportation resources resulting from other past, present, or reasonably foreseeable future actions that could affect transportation, either directly or indirectly.

The Ballard area has experienced significant development and re-development in the past several years, and this trend is anticipated to continue as long as favorable economic conditions persist. This growth has resulted in construction of numerous apartments and condominiums throughout the area, and above-average construction activity. Several larger construction and development projects are summarized below that are known and are reasonably expected to occur in the near future in the project vicinity.

7.1 Proposed Development Projects

7.1.1 Ship Canal Water Quality Project

Seattle Public Utilities (SPU) is proposing a large project to reduce Combined Sewer Overflow (CSOs) that would occur in the vicinity of the proposed BGT Missing Link project. The project will be under construction over an approximate 6-year period, beginning in approximately 2018. Over the course of construction, active construction would occur in phases at different locations, but would be heavily involved in the Ballard area over much of the construction period.

If construction of this project occurs simultaneously with construction of the BGT Missing Link project, more impacts on traffic and other transportation resources could be expected. Construction activities related to the Ship Canal Water Quality Project could also interfere with roadway or trail operations. SDOT and SPU should coordinate construction staging to minimize any potential short-term impacts on transportation resources.

7.1.2 C.D. Stimson Development

Developer C.D. Stimson Co. plans to build a 500,000-square-foot office complex consisting of five, five-story buildings at 5423 Shilshole Ave NW. The project will start with one 105,000-square-foot building, with the remaining added in the following years. Construction of the first building is anticipated to take two years beginning in 2016 or 2017.

The C.D. Stimson Development project could increase all modes of travel in the study area. An increase in nonmotorized trips is not expected to have a substantial impact because the nonmotorized facilities in the study area, including the BGT Missing Link project, would be able to accommodate additional users. Additional traffic related to the C.D. Stimson Development project could create more congestion and delays in the study area. However, the developer of the site would be expected to mitigate any impacts on transportation resources as part of the project.

Transportation resources could be temporarily affected if construction of the C.D. Stimson Development project occurred simultaneously with construction of the BGT Missing Link project. Construction activities related to this project could be coordinated with SDOT to minimize impacts during construction.

7.1.3 Sound Transit 3 Draft Priority Projects List

Sound Transit has developed a draft priority projects list as part of their planning process to expand the regional mass transit system to meet anticipated population growth expected by 2040. Sound Transit is currently conducting further analysis and a final list will be included in a ballot measure that could go to voters as early as November 2016. The schedule for these potential projects is not yet known. The projects on the draft project list in the study area are:

C-02 Ballad to University District. This project would build light rail in a tunnel from Ballard's Market Street area to the vicinity of the U District light rail station now under construction.

Light Rail Downtown Seattle to Ballard (Market Street Vicinity). There are several alternative projects that would build light rail from downtown Seattle to Ballard's Market Street area.

All of Sound Transit's proposed priority projects would likely decrease personal vehicle use in the study area, which could reduce congestion and delay for motor vehicles in this area. Nonmotorized facilities would be complementary to increased transit service.

7.1.4 SDOT Move Seattle Transportation Strategy

There are two projects in Move Seattle that overlap in the study area: the Ballard to Downtown Enhanced Transit Corridor, and Market/45th Transit Improvement Project. Both projects are proposed to be implemented by 2024.

Ballard to Downtown Enhanced Transit Corridor. In preparation for a potential Ballard light rail line in the future via a Sound Transit 3 ballot measure, the Ballard to Downtown Enhanced Transit Corridor project improves the corridor's existing transit operations and adds interim safety improvements for people who cycle and walk across the Ship Canal.

Market/45th Transit Improvement Project. The Market/45th transit project enhances transit speed and reliability on one of the city's primary east-west corridors and most chronically congested routes.

Both of the Move Seattle projects could decrease personal vehicle use in the study area. This could improve congestion and delays for motor vehicles in the study area. Improved transit corridors would also be complementary to nonmotorized facilities in the study area. Safety improvements on these corridors would also improve safety for nonmotorized users in the study area.

7.1.5 Seattle Bicycle Master Plan Projects

The Bicycle Master Plan proposes a number of bicycle improvements in and near the BGT Missing Link project study area. These projects include constructing neighborhood greenways on NW 50th St, 11th Ave NW, 28th Ave NW, and NW 64th St. Bicycle lanes with minor separation are proposed for NW Market St between 24th Ave NW and 32nd Ave NW, and on 14th Ave NW. The completion of projects in the Seattle Bicycle Master Plan could decrease personal vehicle use in the study area and increase bicycle use. This could improve congestion and reduce delay for motor vehicles in the study area.

7.1.6 Other Private Development

The Ballard neighborhood has been experiencing growth in the last few years and it is anticipated that this growth will continue (City of Seattle 2015). The types of development expected are commercial

buildings, as well as residential medium-density and high-density housing, including multi-family complexes with commercial development on the ground floor.

Private development could increase all modes of travel in the study area. An increase in nonmotorized trips is not expected to have a substantial impact because the nonmotorized facilities in the study area, including the BGT Missing Link project, would be able to accommodate additional users. Additional traffic related to private development could create more congestion and delays in the study area. However, private developers would be expected to mitigate any impacts on transportation resources as part of their project.

Transportation resources could be temporarily affected if construction of other private development projects occurred simultaneously with construction of the BGT Missing Link project. Construction activities related to private development in the study area could be coordinated with SDOT to minimize impacts during construction.

7.2 Mitigation Measures for Cumulative Impacts

The BGT Missing Link and a number of reasonably foreseeable actions could create additional delay and congestion for vehicles in the study area. This impact would be mitigated in conjunction with the environmental process for specific projects. SDOT and other project proponents could implement measures similar to those presented in Section 6.1.1, Construction, to minimize the effect of construction-related cumulative impacts on transportation resources. Such measures could maintain mobility and safety to the extent feasible during construction and facilitate the efficient use of the transportation system.

To mitigate for operational cumulative impacts on transportation resources, SDOT and other project proponents could implement measures similar to those presented in Chapter 6, Avoidance, Minimization, and Mitigation Measures. Such measures could maintain LOS, mobility, and safety for transportation resources.

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