DRAFT Transportation Discipline Report

UNIVERSITY OF WASHINGTON 2018 CAMPUS MASTER PLAN

Prepared for
University of Washington

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1 INTRODUCTION

As an incremental step towards implementing the University of Washington's long-term campus vision, this Transportation Discipline Report and related Campus Master Plan EIS evaluate a maximum of 6 million square feet of net new development anticipated to be necessary to accommodate population and University growth over the 10 year, 2018-2028 planning horizon under a range of development options. Future campus development beyond the 6 million square feet of net new development would be addressed via subsequent environmental review(s). Because the effects of transportation relate closely to the behavior of campus population, transportation and growth are analyzed based on forecasts of population (students, faculty, and staff) as noted in the alternatives discussion, and travel modes.

The balance of this Introduction presents information related to the trip and parking caps that the University of Washington has agreed to which has maintained actual traffic impacts below levels reached in 1990. It includes local and national comparisons to neighborhoods and peer institutions, demonstrating the University of Washington's success at limiting vehicle impacts. Finally, it presents a high level preview of the report organization and content to follow.

Vehicle Trip Limits—Trip and Parking Caps. The University of Washington and the City of Seattle entered into an agreement referred to as the City University Agreement (CUA) in 1998. This agreement defines maximum parking and vehicle trip "caps" that the University has agreed not to exceed. The "caps" were developed as part of the Transportation Management Plan (TMP) developed for the University of Washington to meet the goal of ***limiting peak-period, peak direction vehicle trips of students, staff, and faculty to 1990 levels***. To date, the University of Washington has met these aggressive goals through strategies that reduce drive alone behavior. The University has not exceeded these caps even as the population on the campus has grown. The caps are described below:

CUA (City University Agreement) An agreement between the City of Seattle and the University of Washington, that defines maximum parking and peak period trip thresholds or "caps".

Caps: Developed as part of the Transportation Management Plan for the University of Washington to meet the goal of limiting peak-period, peak direction vehicle trips of students, staff, and faculty to 1990 levels.

UNIVERSITY DISTRICT—University of Washington vehicle trips in the University District, including beyond the Major Institution Overlay (MIO) boundary

- AM peak period (7-9 AM) trip cap is **10,100 inbound**
- PM peak period (3-6 PM) trip cap is **10,500 outbound**

UW CAMPUS—University of Washington vehicle trips inside the Major Institution Overlay (MIO) boundary

- AM Peak Period (7-9AM) trip cap is **7,900 inbound**
- AM Peak Period (3-6PM) trip cap is **8,500 outbound**

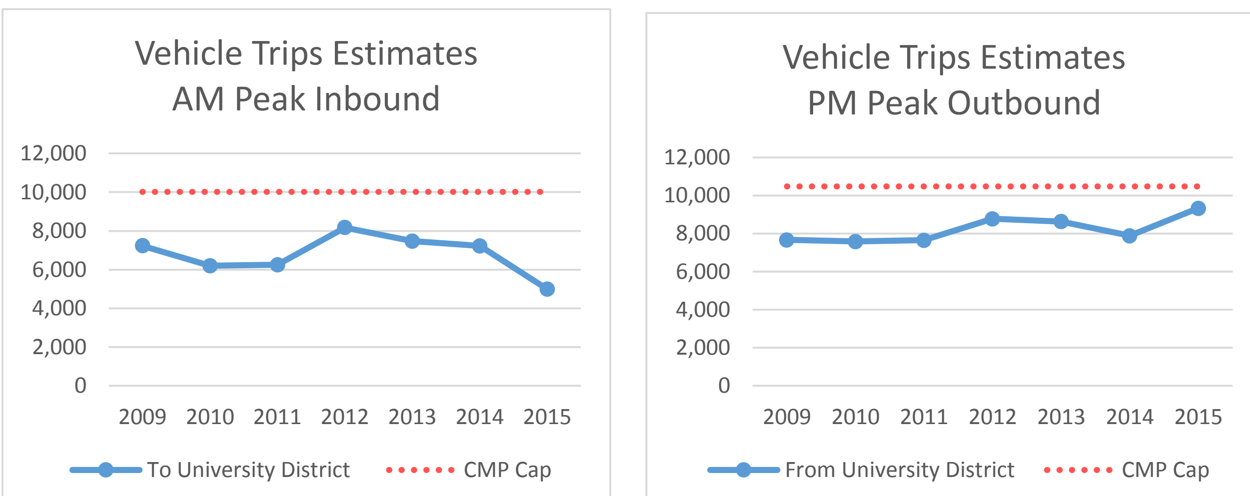
The maximum parking space cap is 12,300 spaces. This parking space cap does not include service and load zones, cycle spaces, accessory off-campus leased spaces, and spaces associated with student housing.

These caps are evaluated in more detail for each alternative in subsequent sections.

Historical Performance. The University's Transportation Management Program (TMP) can be credited for the implementation of the innovative U-PASS program and supporting strategies. Transportation mode choices changed dramatically with the addition of the U-PASS program implemented in 1991. The University of Washington's U-PASS program subsidizes transit use with the addition of a transit pass included with a university member's Husky Card. At inception in 1991, the U-PASS resulted in a substantial decline in vehicle trips to and from the University of Washington, specifically during peak commute periods, in the years following its inception. Figure 1.1 shows the historical performance of the University under the caps.

> **U-PASS**: The University of Washington's U-PASS Program provides students, faculty, and staff with subsidized access to transit. Participating local agencies include King County Metro, Sound Transit, Community Transit, Pierce Transit, Kitsap Transit, and Everett Transit, as well as the King County Water Taxis and Seattle Streetcar. Unlimited rides on these transit agencies are free with the Student U-PASS, and discounts for Zipcar, car2go, and Pronto memberships are also included. The Student U-PASS includes an $84 per student mandatory fee incorporated into quarterly tuition. The University's Employee U-PASS includes the same benefits as the Student U-PASS for $150 per calendar quarter.
>
> Additional terms and descriptions can be found in **Appendix A**.

Figure 1.2 and Figure 1.3 show the effects of the U-PASS program on vehicle trips during the weekday AM and PM peak hours, respectively.



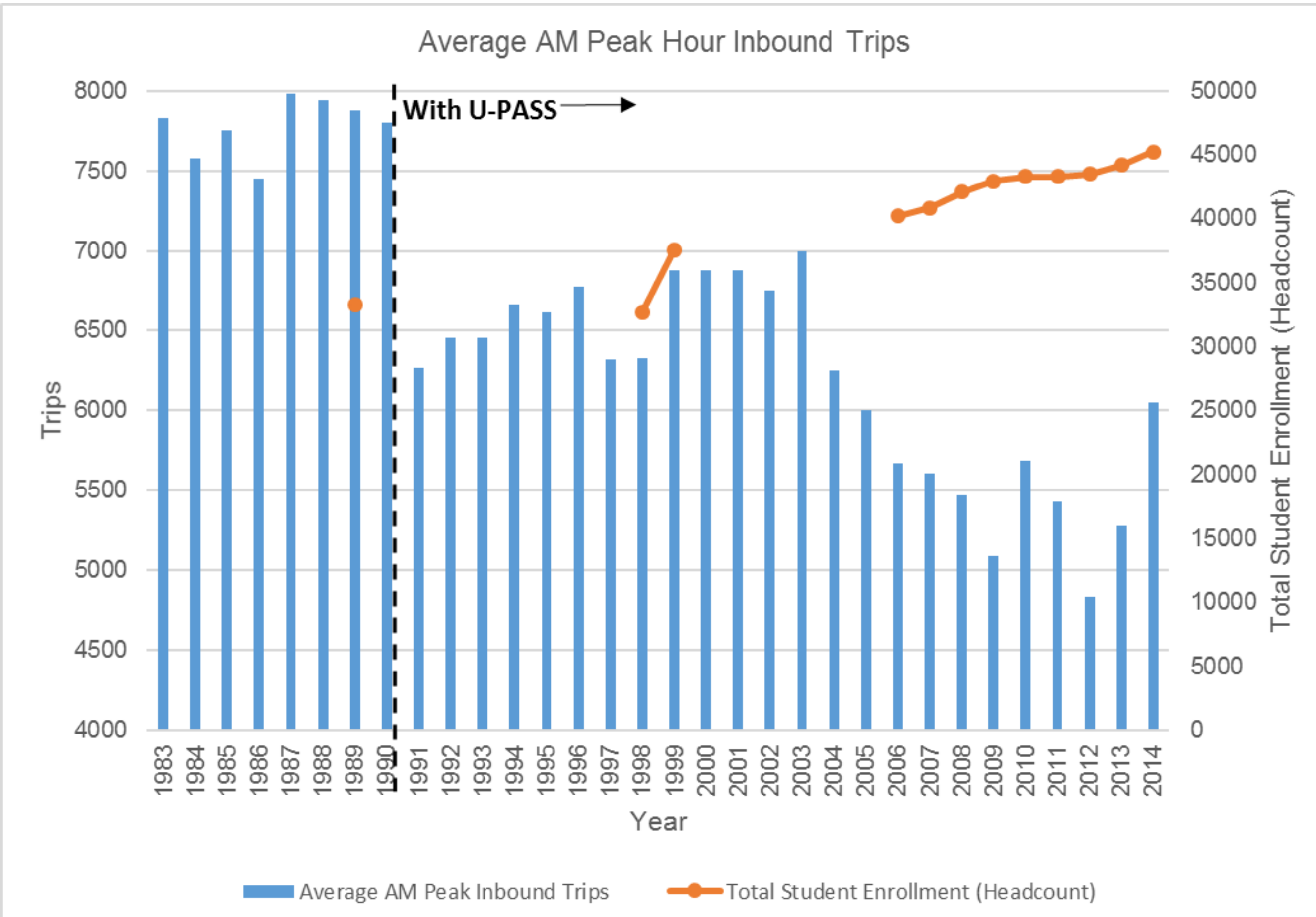
Source: Transpo, 2016

Figure 1.1 Historic Performance of the University under the Caps

In 2003, additional locations from East Campus were added to the annual traffic count monitoring program. Average peak hour trips are graphed in comparison to total student enrollment, including data from 1999 and 2006-2015. Peak hour trips to and from campus have declined since the implementation of the U-PASS program, despite continual increases in student enrollment and faculty and staff employment. Notably, at the same time student enrollment (headcount) increased, vehicle trips to the campus declined.

Figure 1.2 shows the effects of the U-PASS program on vehicle trips during the weekday AM peak hour and contrasts with recent growth in campus population. A comparison to student enrollment is also shown in the graph.

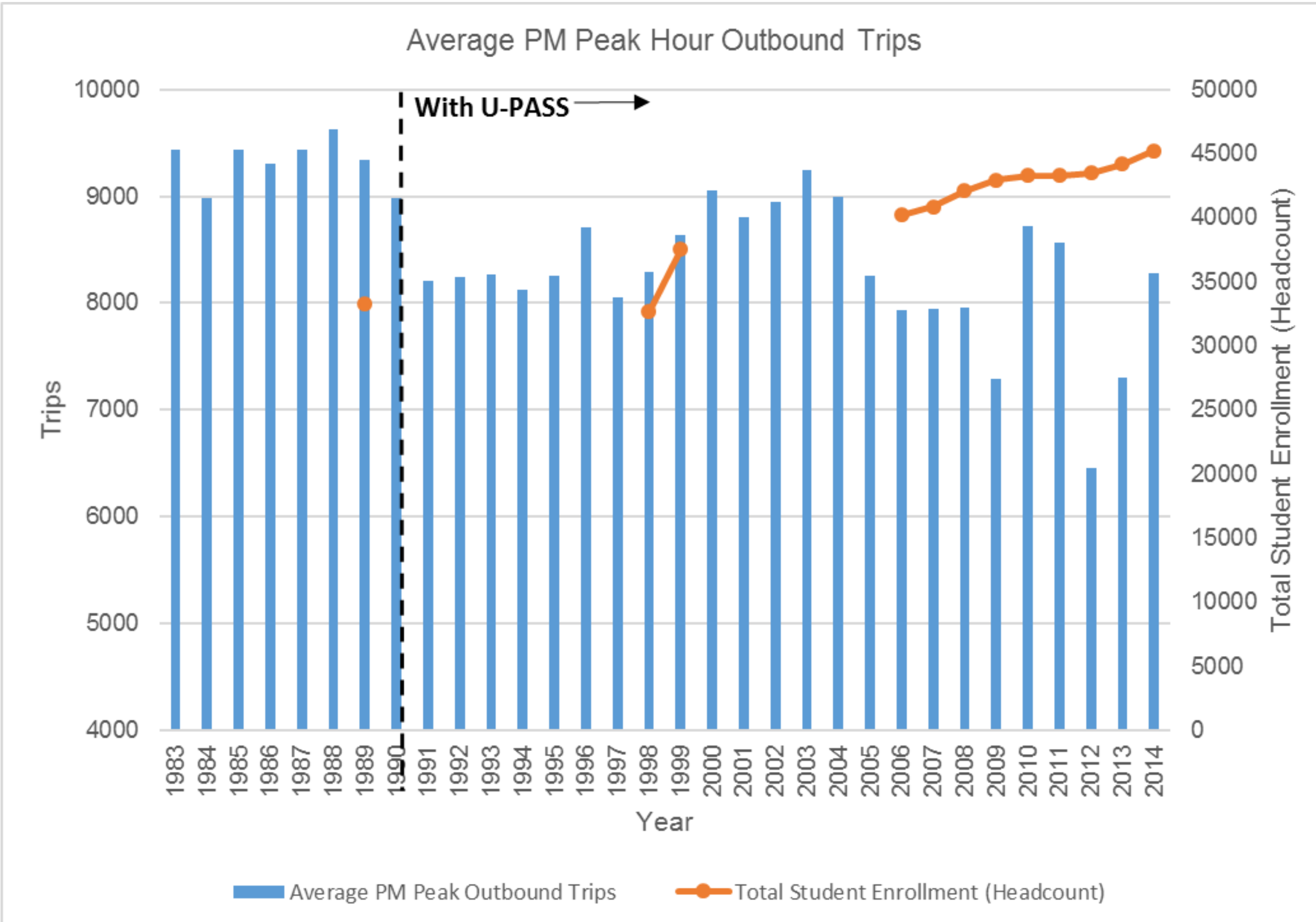
Figure 1.3 illustrates the effects of the U-PASS program on vehicle trips during the weekday PM peak hour and contrasts with recent growth in campus population Like PM peak hour inbound trips, AM peak hour outbound vehicle trips declined while enrollment grew.



Note: Some student enrollment data and 2015 trip data not available

Source: Annual Campus Traffic Count Data Collection Summary, University of Washington Commuter Services

Figure 1.2 Effects of U-PASS Program on Morning Peak Inbound Trips in Comparison to Growth in Student Enrollment

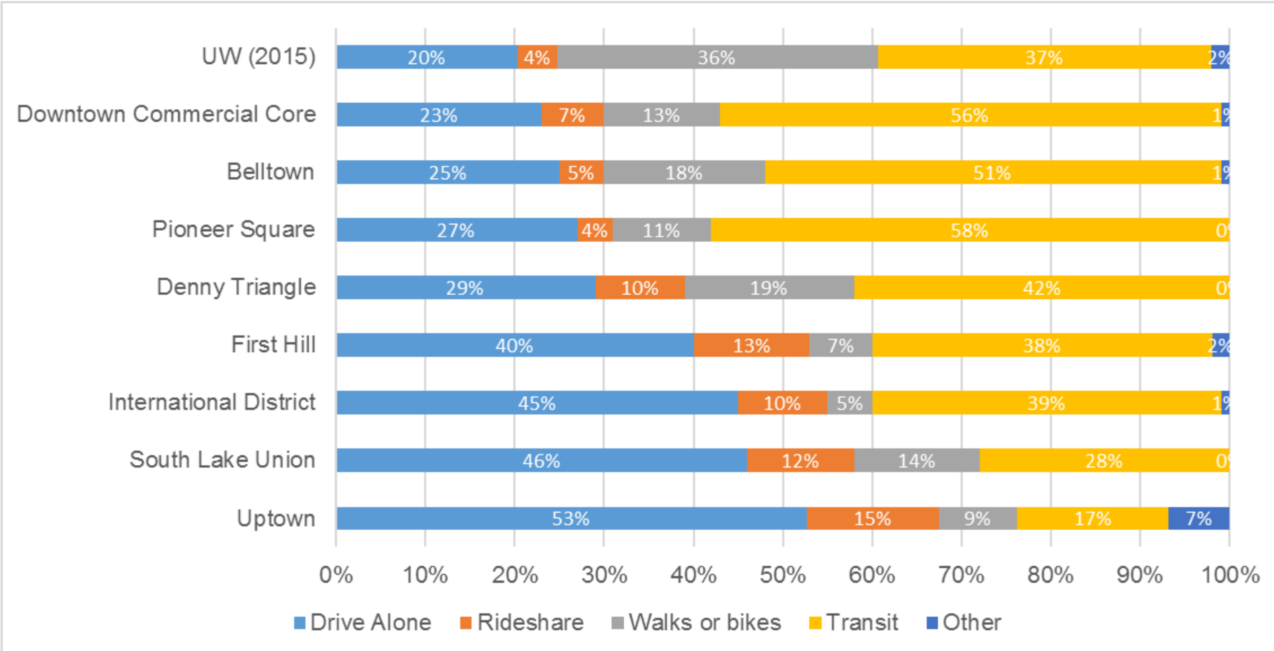


Note: Some student enrollment data and 2015 trip data not available

Source: Annual Campus Traffic Count Data Collection Summary, University of Washington Commuter Services

Figure 1.3 Effects of U-PASS Program on Afternoon Peak Outbound Trips in Comparison to Growth in Student Enrollment

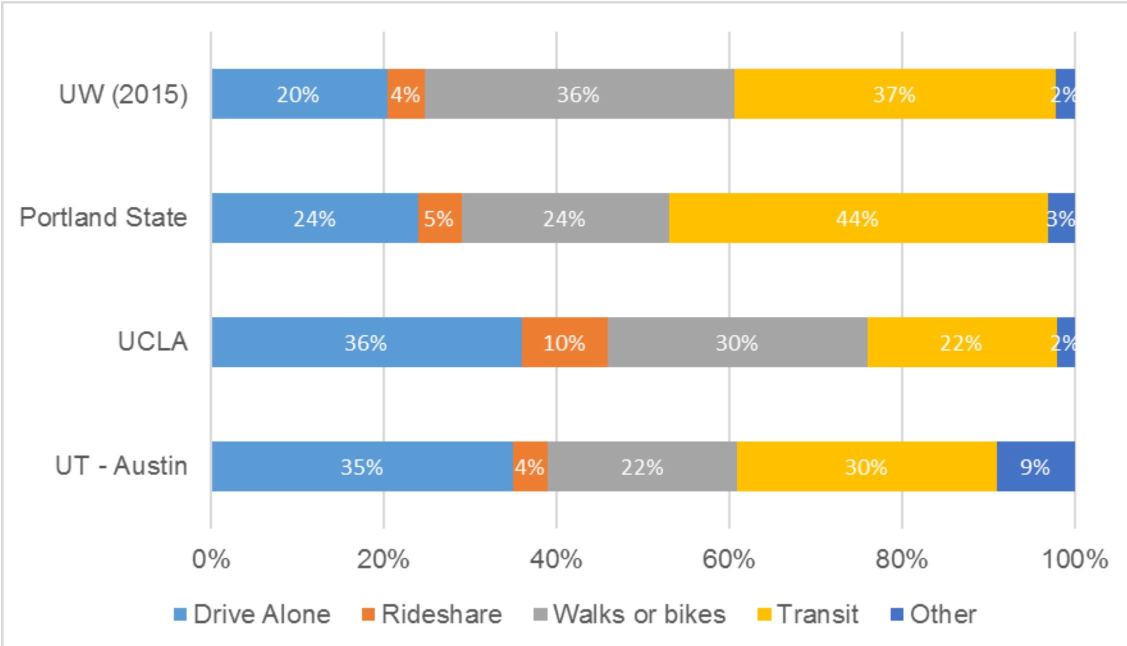
How Does the University of Washington Compare? The University of Washington performs very well locally compared to other urban neighborhoods and to peer institutions. As compared to other City of Seattle neighborhoods, the University of Washington has one of the most successful programs for limiting drive alone vehicular demand. Figure 1.4 provides a comparison of the University of Washington mode splits to other neighborhoods in the City of Seattle. As shown, the campus operates with the lowest drive alone percentage (just 20%) as compared to these neighborhoods.



Source: Commute Seattle Center City Commuter Mode Split Survey, 2014 and University of Washington, 2015

Figure 1.4 Existing Neighborhood Mode Share Comparison

The University of Washington also compares well to large peer universities in urban cities with developing transit systems as shown in Figure 1.5. Compared to nearby Seattle University, another university in an urban neighborhood of Seattle, University of Washington has maintained a much lower drive alone percentage. For example, in 2007, Seattle University reported a 39% drive alone percentage as compared to 23% reported at University of Washington for the same year.



Source: Transpo, 2016; University of Washington, Portland State University, University of California – Los Angeles, and University of Texas – Austin

Figure 1.5 Existing Peer University Comparison

For each of the transportation system elements, the analysis below considers the existing and future facilities and volumes. The impacts of the development alternatives (Alternatives 1-5) are measured based on a comparison of No Action conditions to conditions under the development alternatives. The degree of the impacts as reported inform the nature and level of mitigation that may be necessary to offset significant impacts. Where significant impacts cannot be mitigated, they are identified as significant unavoidable adverse impacts.

Report Organization and Content

This report includes the following main sections:

- **Section 1.0 Introduction** – Provides a description of the alternatives, defines the study area for the analysis, and provides a general framework for the analysis.
- **Section 2.0 Analysis Methodology and Assumptions** – defines the primary analysis assumptions including the study area, horizon years, City investments, and performance measures for each of the travel modes evaluated within this report.
- **Section 3.0 Affected Environment** – Describes the existing conditions in the study area.
- **Section 4.0 Impacts of No Action** – Summarizes the analysis and impacts of the No Action alternative on the transportation system.
- **Section 5.0 Impacts of Alternative 1** – Summarizes the analysis and impacts of Alternative 1 on the transportation system.
- **Section 6.0 Impacts of Alternative 2**– Summarizes the analysis and impacts of Alternative 2 on the transportation system.

- **Section 7.0 Impacts of Alternative 3** – Summarizes the analysis and impacts of Alternative 3 on the transportation system.
- **Section 8.0 Impacts of Alternative 4** – Summarizes the analysis and impacts of Alternative 4 on the transportation system.
- **Section 9.0 Impacts of Alternative 5** – Summarizes the analysis and impacts of Alternative 5, the lack of alley, street and aerial vacations for each growth alternative on the transportation system.
- **Section 10.0 Indirect and Cumulative Impacts** – Identifies impacts associated with additional development not associated with current proposal.
- **Section 11.0 Mitigation –** Summarizes the mitigation identified for each Alternative. This includes physical improvements or elements of the Transportation Management Program (TMP).
- **Section 12.0 Significant Unavoidable Adverse Impacts** – Identifies any significant unavoidable adverse impacts associated with any of the development alternatives
- **Section 13.0 Summary of Impacts** – Summarizes the impacts of each alternative in a comparative format. Outlining the significant impacts identified and recommended mitigation measures.

The evaluation was conducted in accordance with University of Washington and City of Seattle SEPA standards and analyzes impacts on the following transportation elements:

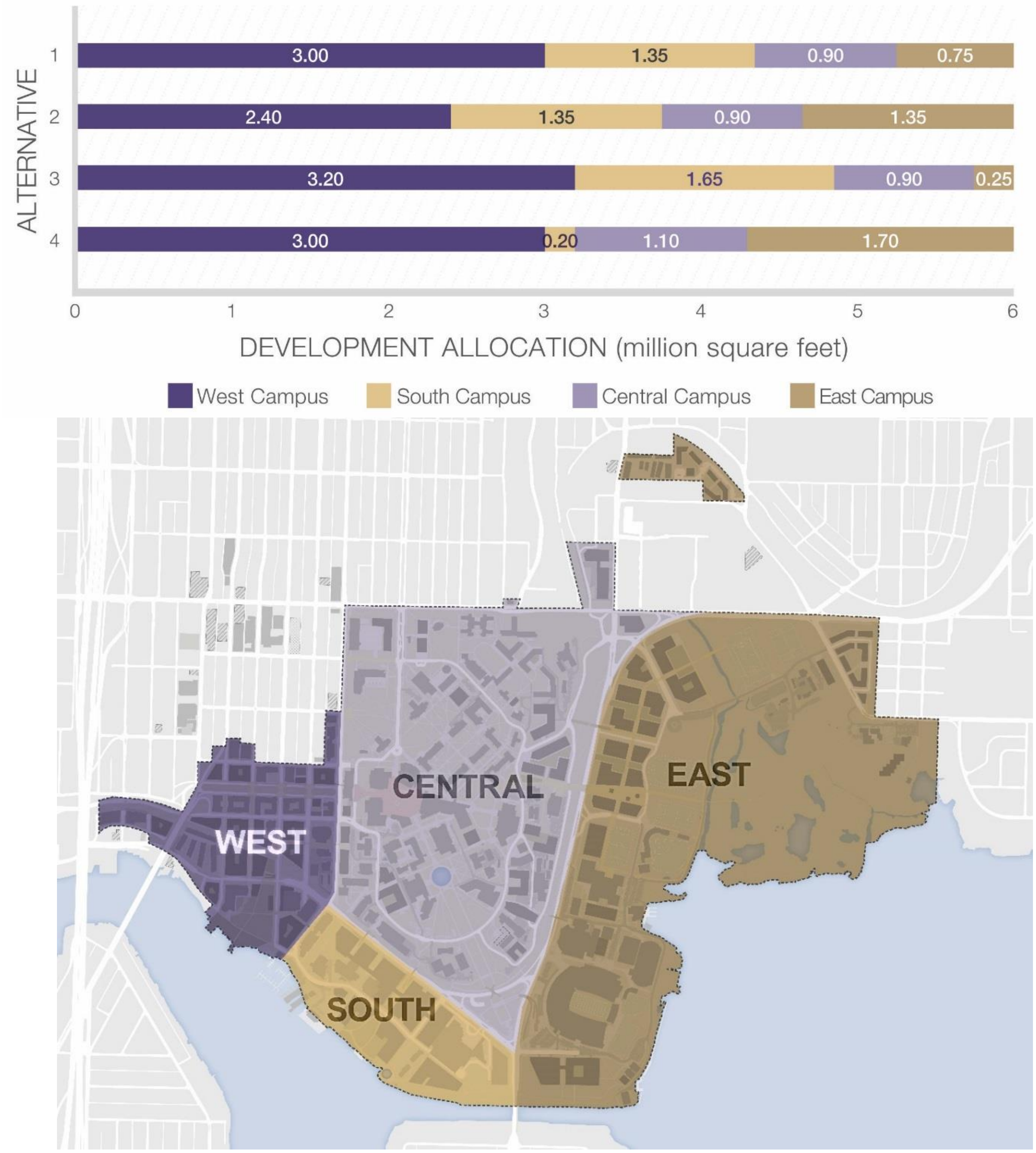
- Pedestrians (safety, connectivity, capacity)
- Bicycles (safety, connectivity, parking)
- Transit (connectivity and capacity)
- Traffic Operations (intersection and corridor operations)
- Traffic Safety (collision history, trends)
- Parking (demand vs. supply)
- Freight/Service (operations, patterns, locations)

Impacts are disclosed both in terms of the comparison to the identified No Action Alternative and also to the trip and parking caps as required by the City-University Agreement.

CUA (City-University Agreement) An agreement between the City of Seattle and the University of Washington, that defines maximum parking and peak period trip thresholds or “caps”.

1.1 DESCRIPTION OF ALTERNATIVES

As noted in the introduction, this Transportation Discipline Report (TDR) evaluates a No Action alternative as compared to four variations of Action Alternatives each with up to 6 million square feet. Each of these Alternatives (1 – 4) apportion this development to campus sectors in different ways. Each assumes vacations of street, alley, or aerial rights of way. A fifth Action Alternative (Alt 5) considers each of these apportioned development alternative assuming no street, alley, or aerial vacations. The following provides a general description of the alternatives. Specific details for each of the alternatives as they relate to the multimodal elements are reflected in the subsections for each alternative. Figure 1.6 shows the campus sectors as referenced in the following description of the alternatives. The campus has four distinct sectors today; West, south, Central, and East. All are described in terms of potential net new increase in development area relative to the No Action conditions. As shown in Figure 1.6, the action alternatives (Alternatives 1, 2, 3, and 4) differ in how the 6 million square feet of proposed development is apportioned to these sectors. Infrastructure investments are developed that accompany this growth. A final alternative, Alternative 5, considers each of these development alternatives without proposed street or aerial vacations.



Source: Transpo 2016

Figure 1.6 Campus Sectors

The development of the 6 million square feet has been identified to reflect a projected growth in head count (or population) anticipated and associated University space needs between 2018 and 2028. The

MIO (Major Institution Overlay): The Major Institution Overlay is a boundary defined by the City of Seattle Land Use and Zoning Code, noting the extents of the University of Washington.

population headcount has been used as a basis for estimating the anticipated increase in campus related trip generation by mode. The population forecasts used in the analysis are summarized below in Table 1.1 where the 2028 population is reflected per the full build out of 6 a net new million gross square feet. As shown, total growth in development for the 10-year planning horizon and related to the 6.0 million square feet of growth, population is expected to increase by approximately 15,676 people over population from 2014. This growth includes remaining gross square footage permitted under the current 2008 Campus Master Plan. That square footage is assumed as the future No Action Alternative.

Table 1.1
EXISTING (2014) AND ESTIMATED FUTURE (2028) UNIVERSITY POPULATION

Population	2014 (Actual)	2028 (Estimated)	Growth (Estimated)
Students	45,213	54,183	8,970
Faculty	7, 951	9,528	1,577
Staff	17,333	22,462	5,129
Total	**70,497**	**86,173**	**15,676**

Source: Sasaki Architects, Inc., 2016.

In general, this transportation analysis evaluates the growth in campus population for Students, Faculty and Staff to fully analyze transportation impacts. This method takes into account that each university population (students, faculty, and staff) have different travel behaviors.

Headcount: A quantifiable count of individuals within the University of Washington population. Headcount differs from a Full Time Equivalent (FTE) count, which converts actual campus enrolled and employed students, faculty, and staff to a full time equivalency based on eight-hour days and 40-hour work week.

No Action Alternative. For the purposes of this analysis the No Action alternative assumes the remaining development under the 2003 CMP, approximately 211,000 gsf of building capacity, would be developed in West Campus**.** It should be noted that this capacity may be constructed in any of the campus sectors but it has been allocated to the West Campus for study purposes.

CMP: Campus Master Plan, or a document guiding development on campus and within the MIO, and determining how the campus can grow in the coming years while minimizing impacts to the community. The most recent University of Washington Campus Master Plan for the Seattle campus was completed in 2003 and is being updated for 2018 to a planning horizon of 2028.

***Alternative 1 2018* CMP with Requested Height Increases**

As shown in Figure 1.7, this alternative has a West and South Campus development focus and includes two roadway vacations and one aerial vacation. This alternative includes increases in height. Under Alternative 1, NE Boat Street would be vacated between the Fishery Science Building driveway. Brooklyn Avenue NE and NE Northlake Place east of 8th Avenue NE would also be vacated. Additionally, the pedestrian bridge over Montlake Boulevard NE near Wahkiakum Road would be vacated under Alternative 1 development. The anticipated campus sector development is as follows:

- West Campus: 3.0 million gsf
- South Campus: 1.35 million gsf
- Central Campus: 0.9 million gsf
- East Campus: 0.75 million gsf

Development on West, South, and Central Campus represents a net increase over the existing developed areas. It is assumed that parking would be developed as part of the building development in each sector.

Source: Sasaki 2016

Figure 1.7 Alternative 1 Potential Development Sites Representing Sector GSF

Alternative 2 2018 CMP with Existing Height Limits

As shown in Figure 1.8, this alternative has a West and East Campus development focus. This alternative would include the same NE Boat Street, NE Northlake Place, and pedestrian bridge vacations as described in Alternative 1. The anticipated campus sector development is as follows:

- West Campus: 2.4 million gsf
- South Campus: 1.35 million gsf
- Central Campus: 0.9 million gsf
- East Campus: 1.35 million gsf

Source: Sasaki 2016

Figure 1.8 Alternative 2 Potential Development Sites Representing Sector GSF

Alternative 3 Campus Development with Increased West & South Campus Development

As shown in Figure 1.9, this alternative has a West and South Campus development focus. This alternative would include pedestrian bridge vacations as described in Alternative 1. The anticipated campus sector development is as follows:

- West Campus: 3.2 million gsf
- South Campus: 1.65 million gsf
- Central Campus: 0.9 million gsf
- East Campus: 0.25 million gsf

Source: Sasaki 2016

Figure 1.9 Alternative 3 Potential Development Sites Representing Sector GSF

Alternative 4 Campus Development with Increased West & East Campus Density

As shown in Figure 1.10, this alternative has a West and East Campus development focus. This alternative would include NE Northlake Place and pedestrian bridge vacations as described in Alternative 1. The anticipated campus sector development is as follows:

- West Campus: 3.0 million gsf
- South Campus: 0.2 million gsf
- Central Campus: 1.1 million gsf
- East Campus: 1.7 million gsf

Source: Sasaki 2016

Figure 1.10 Alternative 4 Potential Development Sites Representing Sector GSF

Alternative 5 includes those development options described in Alternatives 1, 2, 3, and 4, but would not include the NE Boat Street or NW Northlake Place street vacations, or the Montlake aerial vacation associated with the land bridge.

2 ANALYSIS METHODOLOGY & ASSUMPTION

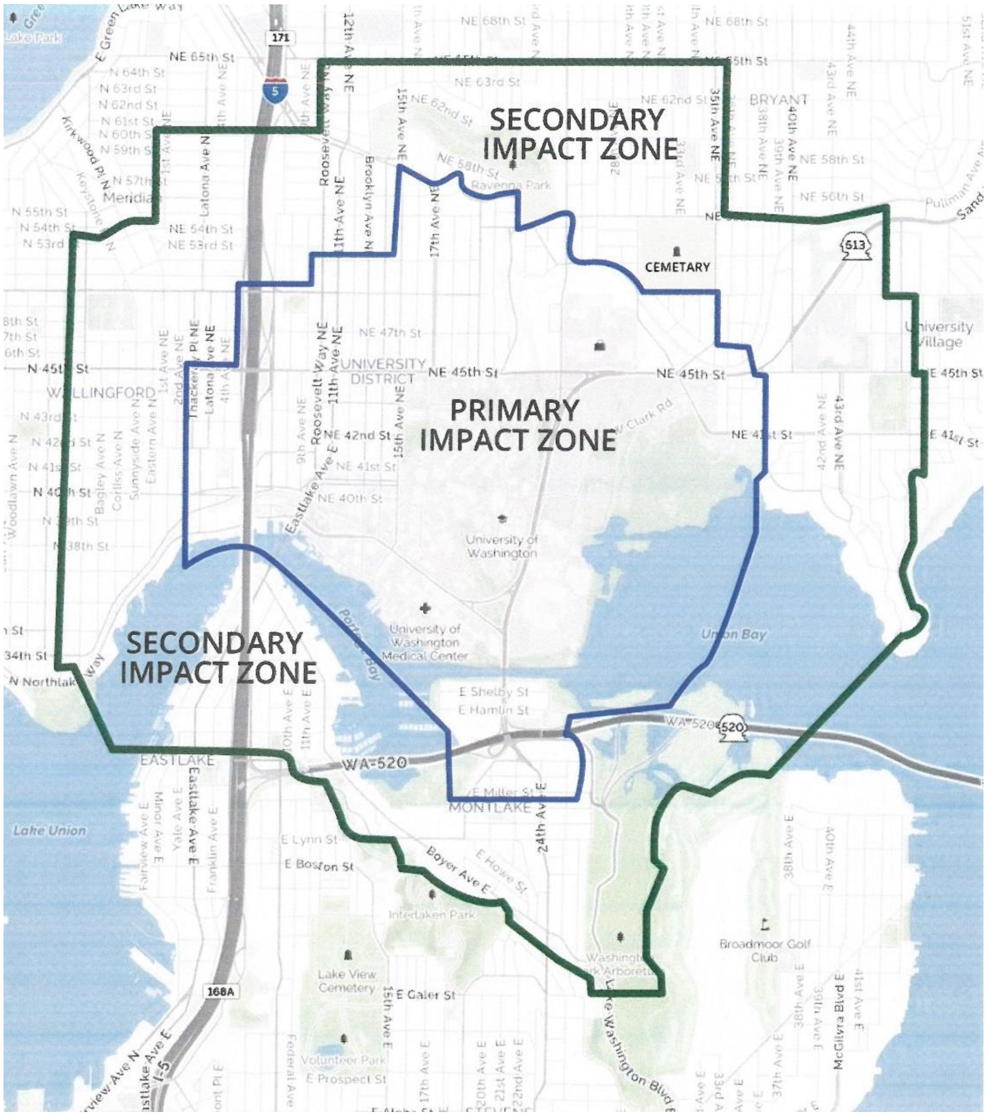
This section describes the methodology for evaluating the proposed alternatives effects on transportation systems. It describes analysis parameters including the study area limits, analysis years, background transportation investments, analysis time periods, performance measures for modes and methods for calculating them, and performance thresholds. Appendix B provides more depth and technical analysis supporting this section.

2.1 STUDY AREA

To evaluate impacts of an updated Campus Master Plan, this analysis explores the potential impacts consistent with the City-University Agreement[1] (CUA), which defines the primary and secondary impact zones. Evaluation and monitoring of the transportation related impacts of the University is conducted within these zones. Thus, the primary and secondary impacts zone boundaries serve as the project study limits. As the names suggest, growth at the University of Washington is expected to have greater impacts in the primary impact zone with lesser impacts in the secondary impact zone. For this reason, the analysis conducted in the primary impact zone is more detailed, while analysis in the secondary impact zone will be less detailed. The boundaries are shown in Figure 2.1.

CUA (City-University Agreement) An agreement between the City of Seattle and the University of Washington, that defines maximum parking and peak period trip thresholds.

[1] 1998, amended November 29, 2004



Source: CUA

Figure 2.1 University of Washington Primary/Secondary Transportation Impact Zones

2.2 HORIZON YEAR/ANALYSIS PERIODS/BACKGROUND IMPROVEMENTS

The Campus Master Plan reflects a 10-year planning horizon with a base year for development to begin in 2018 and extending to 2028. A general list of the City and regional investments anticipated between today (2016) and 2028 are noted below. These investments are considered as part of the background conditions for the different transportation modes.

Table 2.1
BACKGROUND IMPROVEMENTS BY 2028

Type of Improvements	Description
Pedestrians	New multiuse trail across the Montlake Cut connecting the University of Washington with the Washington Park Arboretum as part of the Move Seattle Levy. Continued modifications of the regional Burke Gilman trail through the University of Washington. Green streets are intended to enhance and expand public open space give priority to pedestrian circulation and open space over other transportation uses. Green streets use treatments that may include sidewalk widening, landscaping, traffic calming, and other pedestrian-oriented features. Brooklyn Avenue, NE 43rd Street and NE 42nd Street are designated green streets in the University District.
Bicycles	As part of the Move Seattle Levy, protected bicycle lanes (PBL) on N 50th Street, 35th Avenue NE and bicycle lanes on Brooklyn Ave N are proposed. PBLs have also been identified along 15th Avenue; however, concepts have not been developed, making it unclear how these lanes would be implemented. PBLs have not been identified in the Seattle Bicycle Master Plan 2016-2020 Implementation Plan.
Transit	The Transit Master Plan identifies Multimodal Transit Corridor enhancements along Roosevelt Way NE/11th Avenue NE/Eastlake Avenue NE, 15th Avenue NE/NE Pacific Street/23rd Avenue NE (extension of Montlake) and Market Street/NE 45th Street. Completion of Sound Transit 2 extension of Link Light Rail from the University of Washington Station to Lynnwood including an additional light rail station near campus (University District at Brooklyn Avenue). Expansion of King County Metro Express, Frequent/Rapid Ride and Local service identified in Metro Connects the King County Metro Long Range Plan.
Vehicle	A second Montlake Boulevard Bascule Bridge has been identified as part of the SR 520 Bridge Replacement, which is funded as part of the Connecting Washington Partners Projects and is expected to be completed by 2027.
Freight	The draft Seattle Freight Master Plan includes designation of a network prioritized for use by freight. This plan identifies 45th Street, Pacific Street and Montlake Avenue, and the Roosevelt 11th Avenue couplet as Minor Truck Streets. There are not planned infrastructure investments identifies in the project area.

Source: State Route 520 Bridge Replacement and HOV Project High Capacity Transit Plan (2008), King County Metro Draft Long-Range Plan Summary (2016), Sound Transit 2 (2008), City of Seattle Draft Pedestrian Master Plan (2016), City of Seattle Bicycle Master Plan (2015), City of Seattle Transit Master Plan (2016), and City of Seattle Draft Freight Master Plan, U District Green Streets Concept Plan (2015).

Guiding future City infrastructure investments, the City of Seattle has also developed modal plans (Pedestrian Mobility Plan, Bicycle Mobility Plan, Transit Mobility Plan, and Freight Mobility Plan) that identify projects and corridor needs. These plans support an aspirational, long-range, often 20-year, horizon and may not include implementation timelines or details on how infrastructure could change. Where details are provided on implementation of investments, for example lane designations or modifications, those changes have been reflected as part of the background analysis and carried forward in the analysis of alternatives.

2.3 ANTICIPATED BACKGROUND AND PROPOSED GROWTH

The City has published a draft 2035 Comprehensive Plan (the "City 2035 Plan") as well as a U District Rezone Proposal that identifies increased density and heights in the University District surrounding the University District Station. The City 2035 Plan includes an increase of 120,000 residents and 115,000 jobs, citywide by 2035. The U District Urban Design process suggests a potential increase in building heights over the Seattle 2035 Comprehensive Plan levels, and the increased building heights have been studied in a U District Urban Design EIS.

For this analysis, background growth was interpolated from the 2035 Comprehensive Plan traffic volumes, which were developed using the City developed travel demand model, to reflect the 2028 horizon year. Land use and traffic as part of the U District Rezone Proposal are assumed as part of a cumulative analysis. In addition to vehicle traffic, the City developed travel demand model provides background growth related to transit, pedestrians, and bicycles.

For the purposes of the transportation analysis, campus growth reflective of increased building square footage is translated to trips related to the various campus population groups, specifically students, faculty, and staff. As noted previously, all build alternatives result in expanded development on campus of 6 million net new gross square feet (and remaining square footage in the 2003 Campus Master Plan) by the plan horizon year of 2028. Table 2.2 below provides a summary of the growth in campus population resulting from this level of development.

Alternative Population Assumptions: No Action Alternative assumes a population increase of 1,465 people. All of the Action Alternatives (Alternatives 1-5) assume an additional 6 million net new gsf of development and a population increase of 15,676 people including the 1,465 anticipated with No Action.

A ***cumulative analysis*** is also included that addresses the Action Alternatives with the addition of the proposed U District Rezone.

Table 2.2
UNIVERSITY POPULATION AND FUTURE GROWTH

Population	Existing (2014) Headcount[1]	No Action 2028	Growth over Existing with No Action Alternative	All Action Alternatives 2028[2]	Total Growth over Existing with Action Alternatives[2]
Students	45,213	46,152	939	54,183	8,970
Faculty	7,951	8,117	166	9,528	1,577
Staff	17,333	17,693	360	22,462	5,129
Total Population	70,497	71,962	1,465	86,173	15,676

1. (2014 was the most recent available information)
2. Population numbers include No Action growth (211,000 gross square feet)

An in-depth discussion and details related to the development of background growth, growth related to CMP development alternatives, and parking estimates analysis are provided in Appendix B Methods and Assumptions.

2.3.1 CMP Development Trip Generation

Growth in traffic and visitors related to the proposed Campus Master Plan alternatives, including No Action, were developed based on growth in campus population and reflective of the anticipated development patterns of buildings apportioned by campus sectors of West, South, Central, and East. Recognizing that the campus is fairly fluid with people moving across the campus throughout the day, for the purposes of evaluating trip impacts and growth in different sectors, new trips were assigned to campus sectors based on the proportion of overall development growth in each sector and transportation patterns.

CMP (Campus Master Plan) The University of Washington's Campus Master Plan guides development on campus and within the MIO, determining how the campus can grow in the coming years while minimizing impacts to the community. The most recent University of Washington Campus Master Plan for the Seattle campus was completed in 2003 and is being updated for 2018.

2.3.2 Parking

Development related to the Campus Master Plan alternatives will also require some replacement or expansion of parking. In many cases development could occur where current surface parking sites exist, requiring replacement of parking removed as well as accommodation of parking demands resulting from that increased development. For the purposes of this transportation analysis, parking demand was forecasted based on current parking data including peak demand periods, supply, parking utilization throughout the camps, and visitors. Parking demand resulting from the alternatives was projected for each sector by applying the ratio of the current parking utilization to the current development and applying that factor to future growth by sector to estimate future parking demand. In estimating spaces needed in the future, the demand was grown by a utilization factor of 85 percent that allows for circulation and turnover in lots.

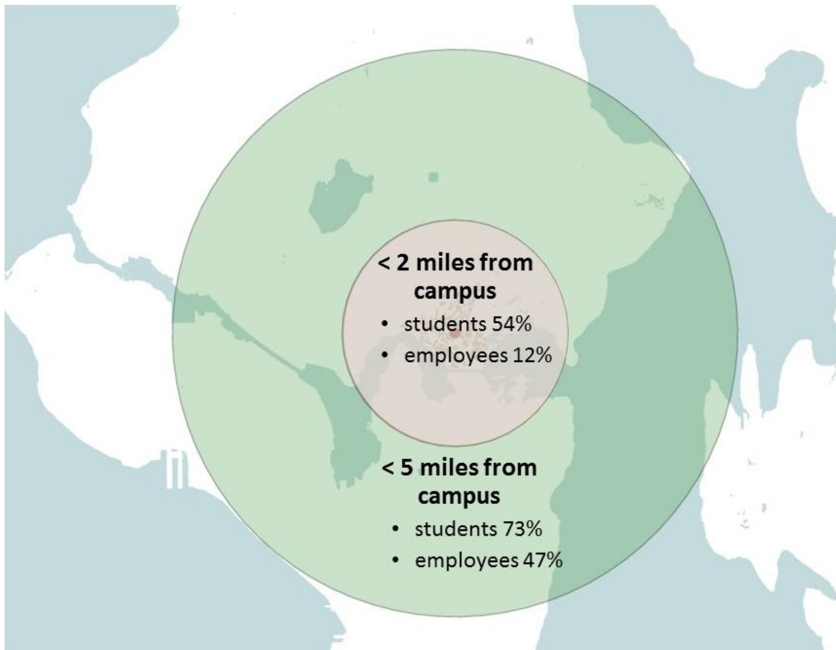
2.3.3 Visitors

With campus growth there is also an anticipated level of growth in visitors related to these new buildings. Based on campus parking data and anecdotal data from other universities, trips from visitors range from 5-10 percent. For the purposes of this work, trips from visitors were assumed to be 10 percent of the total increased trips. Specific details on the methods and assumptions in developing trip and parking generation are provided in Appendix B.

2.3.4 Distribution of Trips

The campus is a unique environment as a large number of students live near and on campus. General distribution patterns for students, faculty, and staff were estimated based on the City Travel Demand Model and campus surveys.

Data from the University of Washington indicates that currently, more than half of the students and over 10% of the employees (faculty and staff) live within 2 miles of the campus, as shown in Figure 1.1. These amounts increase to almost 75% for students and almost half of employees when the distance increased to 5 miles. The 2035 City of Seattle travel demand model provides distribution patterns based on regional growth, changing modes and expansion of transit.



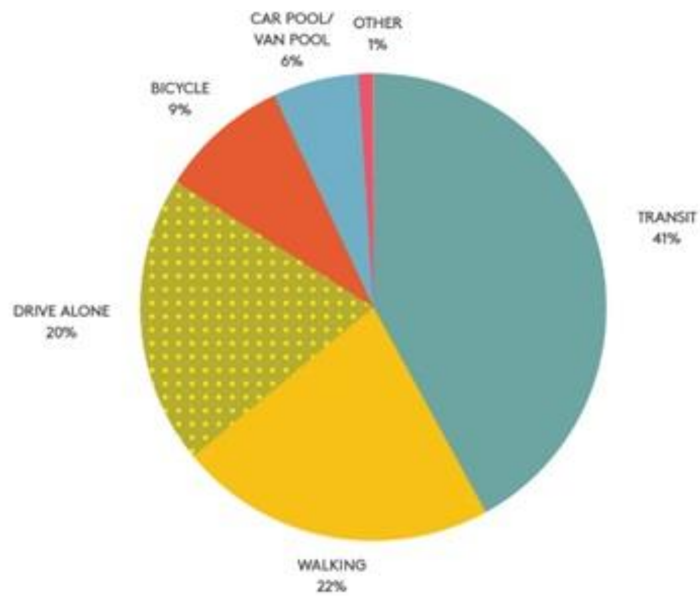
Source: Transpo 2016.

Figure 2.2 Proportion of Students and Employees within 5 Miles of Campus

Other assumptions that support this transportation analysis are also discussed in greater detail in the methods and assumptions and include:

- **Peak Analysis Period** – Data collected from traffic counts at area intersections indicates that the peak period for the study area is during the PM peak (as opposed to the AM peak) for most of the study area. This time coincides with the end of the work day for much of the University as well as people travelling through the area and the end of classes for many. As a result, the PM Peak period will be analyzed for all transportation operations.

- **Mode Split** – The mode split, or proportion of trips using a particular mode, is an important factor in evaluating the effects of growth. It is desirable to have travel made by students, faculty and staff use lower impacting and more sustainable modes such as walking, biking or taking transit. The University of Washington has a strong record of achieving an aggressive mode split with drive alone trips to the campus accounting for just 20 percent of all trips. This is significantly lower than other areas, employers, and communities. The drive alone percentage has stayed near 20 percent for several years. While mode split could fluctuate with the increased access to rail transit or other emerging trends, **for the purposes of the Transportation Discipline Report and this EIS, mode split is assumed to remain a conservative 20 percent single occupant driver through the year 2028 and for all alternatives**.



Source: University of Washington Transportation Services and Sasaki, 2016 CMP

Figure 2.3 Existing Mode Split

- **Emerging Trends: Shared Use and Transportation Network Companies** – Anticipated trends in transportation that could affect the analysis of transportation for the Campus Master Plan include emerging Transportation Network Companies like Lyft, Uber, and shared use transportation providers such as Pronto (bicycle), Car2go, and Zipcar. While use of TNCs for travel is increasing, use and trend data for TNC companies is not broadly available. The Transportation Discipline Report and this EIS includes information related to TNCs and shared use providers to the extent it is available, but assumes it remains a small portion of overall travel.

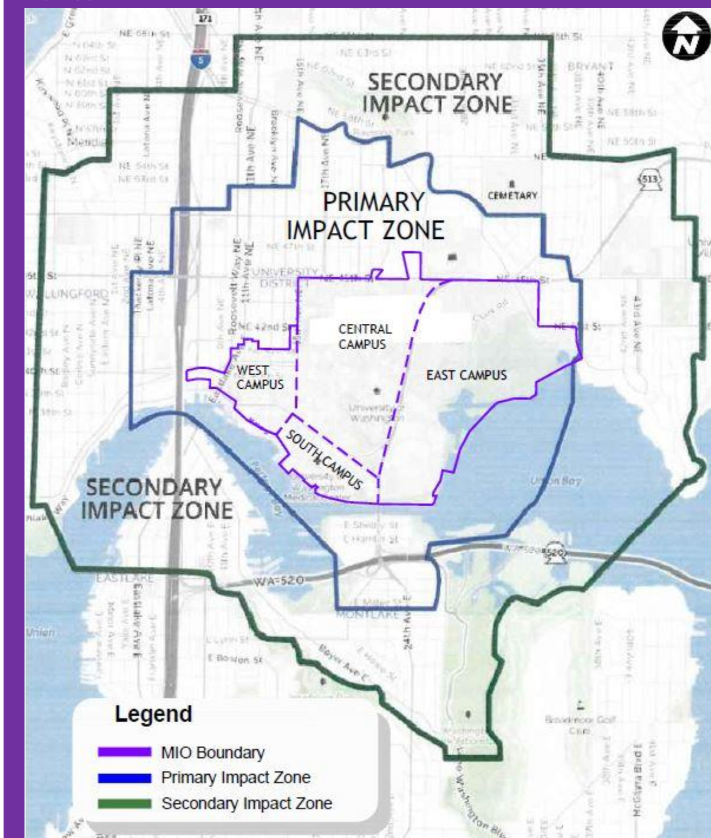
- **Impact Analysis and Performance Measures** – Impact to transportation systems is generally assessed as a comparison between the No Action Alternative with permitted development and background growth) and each action alternative (Alternatives 1-5). As noted in Section 1 Introduction, the CMP action alternatives consist of up to 6.0 million gross square feet of net new development allocated to different sectors of the campus, as shown on Figure 1.6 (Page 1-8). Even though the amount of development is the same between all action alternatives, the impacts may vary for transportation depending on where development occurs on campus (i.e., depending on sector development). The City has a variety of measurements for assessing impact including screenlines as part of concurrency and the comprehensive plan. The performance measures used to evaluate transportation effects and impacts are described in Section 2.4.

2.4 PERFORMANCE MEASURES

A variety of performance measures are used to analyze the effects and impacts of the proposed CMP alternatives. These performance measures are defined for the Primary and Secondary Impact zones, apply to different transportation modes with different potential thresholds, and may measure cumulative impacts.

Primary and Secondary Impact zones – As noted in Section 2.1 Study Area, the CUA identifies a Primary and Secondary Impact Zone to be monitored related to campus growth and development. The Primary Impact zone includes within it an area also defined as the Major Institutions Overlay or MIO. The impact zones suggest that impacts dissipate as you get farther away from the campus. It is expected that there will be greater impacts identified in the Primary Impact zone and thus more fine grained analysis is conducted within this area. In the Secondary Impact zone impacts are expected to dissipate and thus more aggregate analysis is applied.

Major Institution Overlay (MIO): The Major Institution Overlay is a boundary defined by the City of Seattle Land Use and Zoning Code, noting the extents of the University of Washington. It is shown below in reference to the Primary and Secondary Impact Zones



Thresholds – For some performance areas there are defined and established measures of impact or thresholds such as intersection operational analysis and parking utilization. Thresholds specific to the University are described in the CUA and include maximum allowable caps for vehicle trips to the University facilities in the MIO (University Cap), to University area facilities (U District Cap) and University parking facilities in the MIO (Parking Cap). Where this is the case the thresholds are noted.

The measures applied in this Transportation Discipline Report are summarized in Table 2.3 and described in greater detail in Appendix B Methods and Assumptions.

Table 2.3
PERFORMANCE MEASURES

Measure	Mode	Period Evaluated	Description	Impact Zone	Threshold
Proportion of Development within ½ mile of Multifamily Housing	Pedestrian	All Day	Measures amount/proportion of development in a half mile proximity to multifamily housing	MIO/ Primary	Alternative comparison only
Proportion of Development within ½ mile of University of Washington Residence Halls	Pedestrian	All Day	Measures amount/proportion of development in a half mile proximity to University of Washington Residence Halls housing	MIO/ Primary	Alternative comparison only
Quality of Pedestrian Environment	Pedestrian	All Day	Qualitative assessment of the existing walking environment based on the Landscape Framework Plan	Primary/ Secondary	Information only
Burke-Gilman Trail Capacity	Ped and Bicycle	PM Peak Hour	Pedestrian & bicycle level of service analysis based on findings from the Burke-Gilman Trail Corridor Study	MIO/ Primary	Information only
Bicycle Parking & Utilization	Bicycle	Mid-day Peak	Bicycle parking utilization	MIO/ Primary	Information only
Quality of Bicycle Environment	Bicycle	All Day	Qualitative assessment of bicycle environment based on demand, network connectivity, and safety	Primary/ Secondary	Information only
Proportion of Development within ½ mile of Rapid Ride	Transit	All Day	Measures amount/proportion of new development in a half mile proximity to proposed rapid ride	MIO/ Primary	Alternative comparison only
Proportion of Development within ½ mile of Light Rail	Transit	All Day	Measures amount/proportion of new development in a half mile proximity to proposed rapid ride	MIO/ Primary	Alternative comparison only
Transit Service Guidelines	Transit	All Day	Measures amount/proportion of campus meeting proposed Metro Service Guidelines	Primary/ Secondary	Information only
Arterial Operations	All Vehicles[2]	Peak Hour	Measures travel times for various modes along adjacent corridors	Primary/ Secondary	Speed Travel Time

Measure	Mode	Period Evaluated	Description	Impact Zone	Threshold
Intersection Operations	All Vehicles[2]	Peak Hour	Measures delay and operations at intersections	Secondary	Intersection Capacity and LOS
Comp Plan Screenlines	All Vehicles[2]	Peak Hour	Measures aggregate demand crossing a screenline as compared to the capacity	Primary/ Secondary	Comp Plan Screenline Capacity
Cordon Screenlines	All Vehicles[2]	Peak hour	Measures aggregate comparative demand crossing a cordon around the campus for arterials entering/exiting the campus	Primary/ Secondary	
University Trip Cap[1]	All Vehicles[2]	AM Peak and PM Peak	Measures aggregate number of vehicle trips assumed to enter / exit parking areas on campus within the MIO	MIO	Trip Cap[1]
University District Trip Cap[1]	All Vehicles[2]	AM Peak and PM Peak	Measures aggregate number of vehicle trips assumed to enter / exit campus parking areas in the University District	MIO/ Primary	Trip Cap[1]
Parking Supply & Utilization	Vehicle parking spaces	Mid-day	Measures the amount parking supply needs to accommodate alternative development scenarios assuming an 85% parking utilization	MIO	85% Utilization
Parking Cap[1]	Vehicle parking spaces	Mid-day	Maximum number of stalls permitted within the MIO	MIO	Parking Cap[1]

1. Caps as defined by the CUA agreement
2. All vehicles include vehicles, carpools, freight, and transit

CUA (City-University Agreement) An agreement between the City of Seattle and the University of Washington, that defines maximum parking and peak period trip thresholds.

Cordon: A hypothetical boundary where trips are measured crossing in and or out of that boundary is measured and compared.

Screenline: A hypothetical line where the aggregate of trips crossing the line is measured and compared.

3 AFFECTED ENVIRONMENT

This section describes the current transportation system that serves the University of Washington in Seattle. This system extends beyond the Major Institution Overlay (MIO) boundary and connects the students, faculty, staff, and visitors to homes and other destinations. Like most large campuses, the University of Washington has a large resident student population living in residence halls or in nearby housing that can easily walk to campus. As a major institution in a large dense urban city, the University of Washington relies on a well-developed, multi-modal transportation system to support mobility. This well-developed transportation system, described in this section, includes opportunities for students, faculty and staff to have access to a broad range of transportation choices – regional trails, expansive sidewalks, expansive and well connected bicycle facilities, light rail, frequent and regional bus service, a well-developed grid of arterial streets, and close access to interstate and state highways.

Major Institution Overlay (MIO): The Major Institution Overlay is a boundary defined by the City of Seattle Land Use and Zoning Code, noting the extents of the University of Washington.

For its part, the University has encouraged optimization of this transportation system for its student, faculty, and staff population with the implementation of a robust Transportation Management Plan that includes the U-PASS and monitors utilization of the system through regular surveys conducted by the University of Washington Transportation Services (UWTS). Through transportation demand management and operation programs like the U-PASS, the University maintains an exceptionally low drive alone access mode, which results in a more efficient and sustainable use of the transportation system.

This section describes the current transportation system utilized by the University population of students, faculty and staff including vehicle and bicycle parking. Because effects of growth on the transportation system are tied to the modes used, the proportion of students, faculty and staff using specific modes of travel is described in detail. This section is organized by major modes of travel, consistent with the UWTS Mode Hierarchy triangle (right). Based on information found in the 2014 UWTS Climate Action Strategy for Transportation, mode hierarchy is determined from average emissions of travel modes. Travel modes with lower carbon emissions—including walk, bicycle, and telecommute modes—are included at the top of the hierarchy, while higher-carbon travel modes such as driving alone are included at the bottom of the hierarchy.

Figure 3.1 UWTS Mode Hierarchy Triangle, Source: UWTS Climate Action Strategies for Transportation, 2014

For each mode of access, a description of the system and how that system is used today including demand, capacity, safety, and overall operations follows.

3.1 EXISTING CAMPUS CHARACTERISTICS

As an urban campus in a densely populated city, the University of Washington's Seattle Campus has flourished relying on urban amenities including access to high capacity transit, while also maintaining a pedestrian focused setting within its core.

3.1.1 Mode of Access or Mode Split

A key element of the transportation analysis relies on mode of access, or how the students, faculty and staff choose to travel to and within the MIO. The University of Washington supports various transportation choices, allowing students, faculty, and staff opportunities to choose transit, rideshare, and non-vehicle transportation options. Transportation mode choices for commuters traveling to and from campus are traditionally measured through an annual representative survey and using traffic counts conducted by the University of Washington. Current modes for campus populations of students, faculty, and staff include driving alone, carpooling, taking transit, walking, and riding bicycles. Student, faculty, and staff campus populations differ in transportation mode choice; students heavily favor pedestrian and transit modes, while faculty and staff drive alone in addition to utilizing transit. Over time, with the addition of the U-PASS program, non-drive alone travel has increased for all population groups, while driving alone has declined. The mode split for the campus suggests that approximately 20% of the campus population travels by drive alone vehicles (based on 2015 survey data of modes).

Table 3.1 provides a summary of the existing (2014) population in terms of headcount for students, faculty and staff. These headcounts represent the most recently available data.

Table 3.1
EXISTING (2014) UNIVERSITY POPULATION

Population	Headcount
Students	45,213
Faculty	7,951
Staff	17,333
Total Population	**70,497**

Source: Sasaki Architects, Inc., 2016.

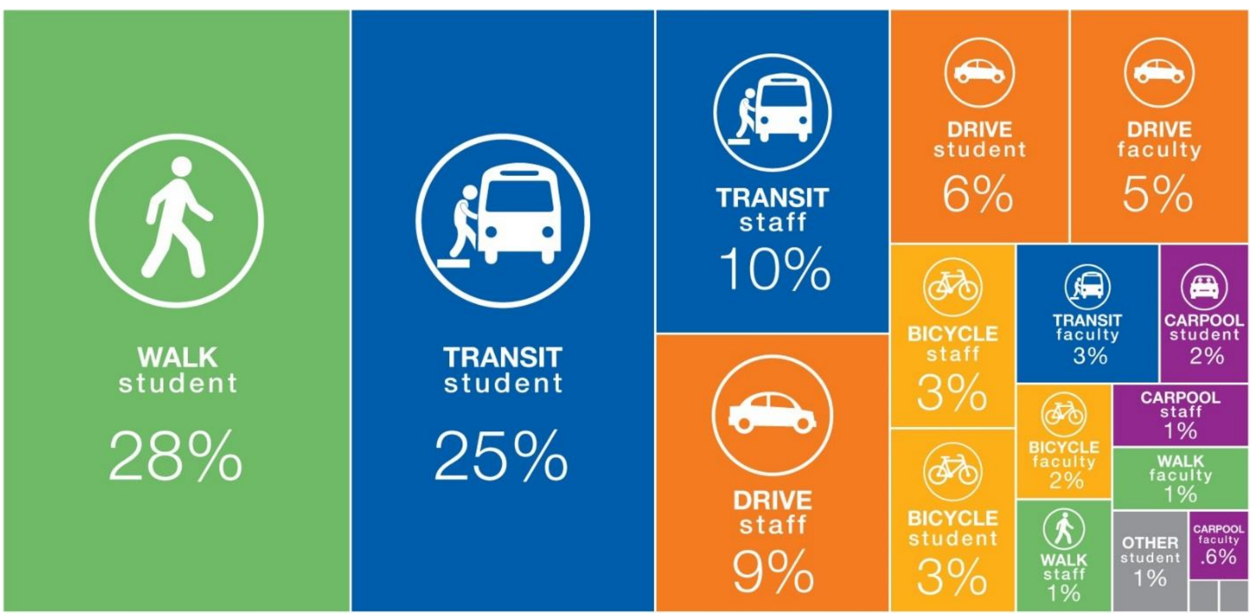
A summary of the existing 2014 headcount population by mode for each campus group (students, faculty and staff) is provided in Table 3.2 below.

Table 3.2
EXISTING (2014) HEADCOUNT BY MODE (POPULATION)

Population	Drive Alone	Carpool	Transit	Walk	Bicycle	Other	TOTAL
Students	3,720	1,887	19,894	16,277	3,165	270	45,213
Faculty	3,539	583	1,988	557	1,113	171	7,951
Staff	5,683	1,966	7,280	693	1,300	411	17,333
Total Population	**12,942**	**4,436**	**29,162**	**17,527**	**5,578**	**852**	**70,497**

Source: Transpo Group, 2015.

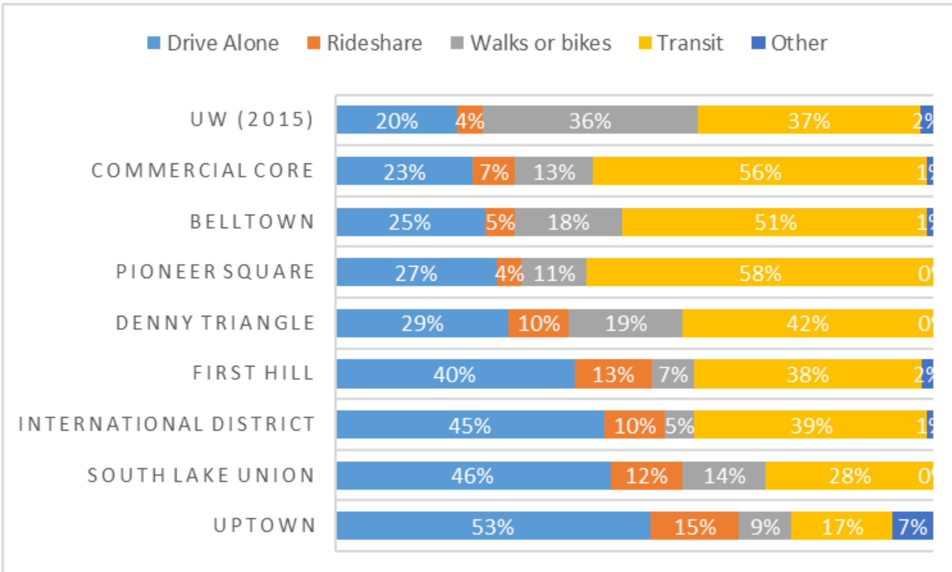
Another illustration of this composition of mode choice is provided as a proportional graph showing the most recent mode split survey from 2015 by population and reflects the high student population (as compared to faculty and staff). As shown, considering all trips, over 50% of the total campus trips are the combined student walk (28% of all trips) and student transit (25% of all trips). This is due in large part to the University of Washington's aggressive and successful actions to promote lower impacting modes of travel.



Source: University of Washington Transportation Services, 2015 Survey, Transpo Group, 2016

Figure 3.2 2015 Total Campus Mode Choice Visual Representation

As compared to other City of Seattle neighborhoods, the University of Washington has one of the most successful programs for promoting modes other than drive alone vehicular demand. Figure 3.3 provides a comparison of the University of Washington mode splits to other urban City Center neighborhoods in the City of Seattle. As shown, the campus operates with the lowest drive alone percentage (20%) as compared to these neighborhoods.



Source: Commute Seattle Center City Commuter Mode Split Survey, 2014 and University of Washington, 2015

Figure 3.3 Existing Neighborhood Mode Share Comparison

This successful demand management can be credited in part to the implementation of the U-PASS. Transportation mode choices changed dramatically with the addition of the U-PASS program implemented in 1991. The University of Washington's U-PASS program subsidizes transit use with the addition of a transit pass included with a university member's Husky Card. At inception in 1991, the U-PASS resulted in a substantial reduction in vehicle trips to and from the University of Washington. The University has seen continued success in managing single occupant vehicle travel to the campus the following years.

3.2 PEDESTRIANS

A total of 17,527 people on campus choose walking as their mode to access the University of Washington campus, as shown in Table 3.2. Of these trips, most (16,277) are students that live on or near campus, over 550 are faculty, and almost 700 are staff. According to the UWTS survey, roughly one-third of trips accessing campus are walking trips.

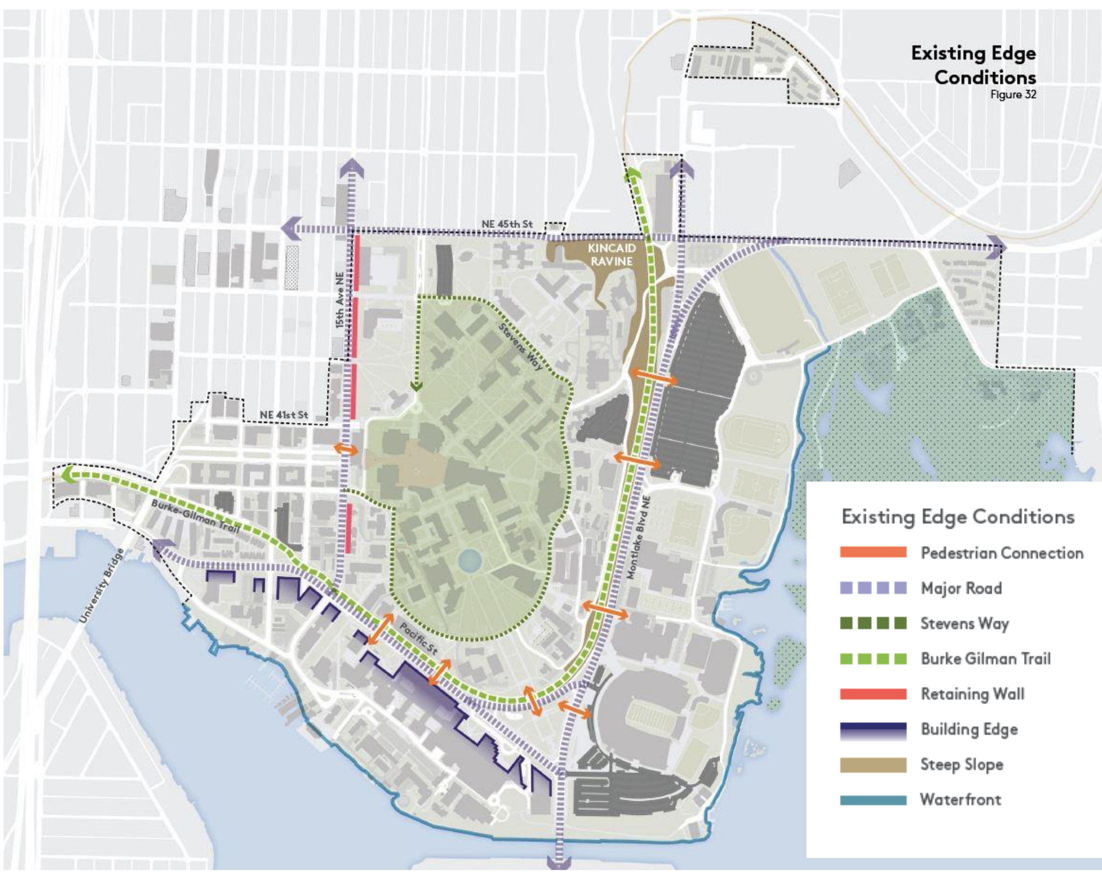
3.2.1 Pedestrian Facilities

The system of pedestrian facilities serving the University of Washington consists of a network of pathways and sidewalks throughout campus. The pathways have been designated as Major or Minor in the Campus Master Plan. Major pathways for pedestrians include the Burke-Gilman Trail, Stevens Way, Memorial Way NE/17th Avenue NE, and NE Campus Parkway, as well as connecting pathways through

Red Square, Rainier Vista, and the Quad, among others. The Burke-Gilman Trail—although under City of Seattle jurisdiction in other neighborhoods—is owned and maintained by the University of Washington within the MIO boundary. Minor pedestrian pathways function as connections between major routes, including pedestrian pathways between the HUB and Drumheller Fountain, and sidewalks along 19th Avenue NE and in the vicinity of Husky Stadium, among others.

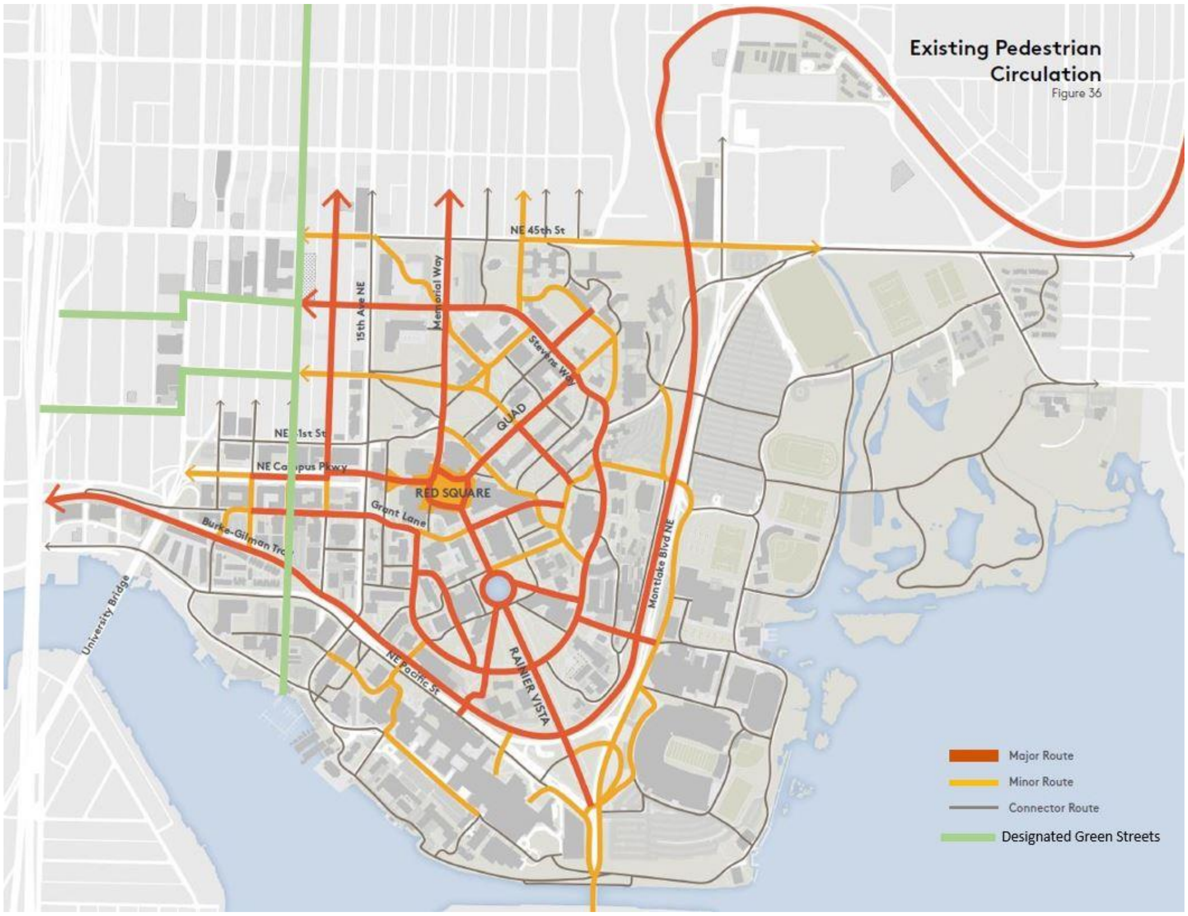
Pedestrian connectors function as sidewalks and pathways less traveled than major and minor routes. For example, sidewalks along 18th Avenue NE and pedestrian pathways along Snohomish Lane and Walla Walla Road are classified as pedestrian connectors. The network of existing pedestrian facilities generally within the campus are shown in Figure 3.5. The pedestrian network outside the campus is also well developed and serves the pedestrians commuting from nearby residential areas, generally north and west. Standard city sidewalks are provided along the major arterials in the area.

Central Campus is separated from other subareas of campus by a series of barriers including arterials 15th Ave NE, NE Pacific St, and Montlake Blvd NE as well as topographical and barriers for universal access. Some of these barriers are noted in Figure 3.4. The City's Draft Pedestrian Master Plan Update identifies locations within the City with missing sidewalks, with widely spaced crosswalks and safety concerns; however, no specific projects have been identified to correct those barriers at this time.



Source: Sasaki, October 2016 CMP

Figure 3.4 Barriers and Existing Edge Conditions



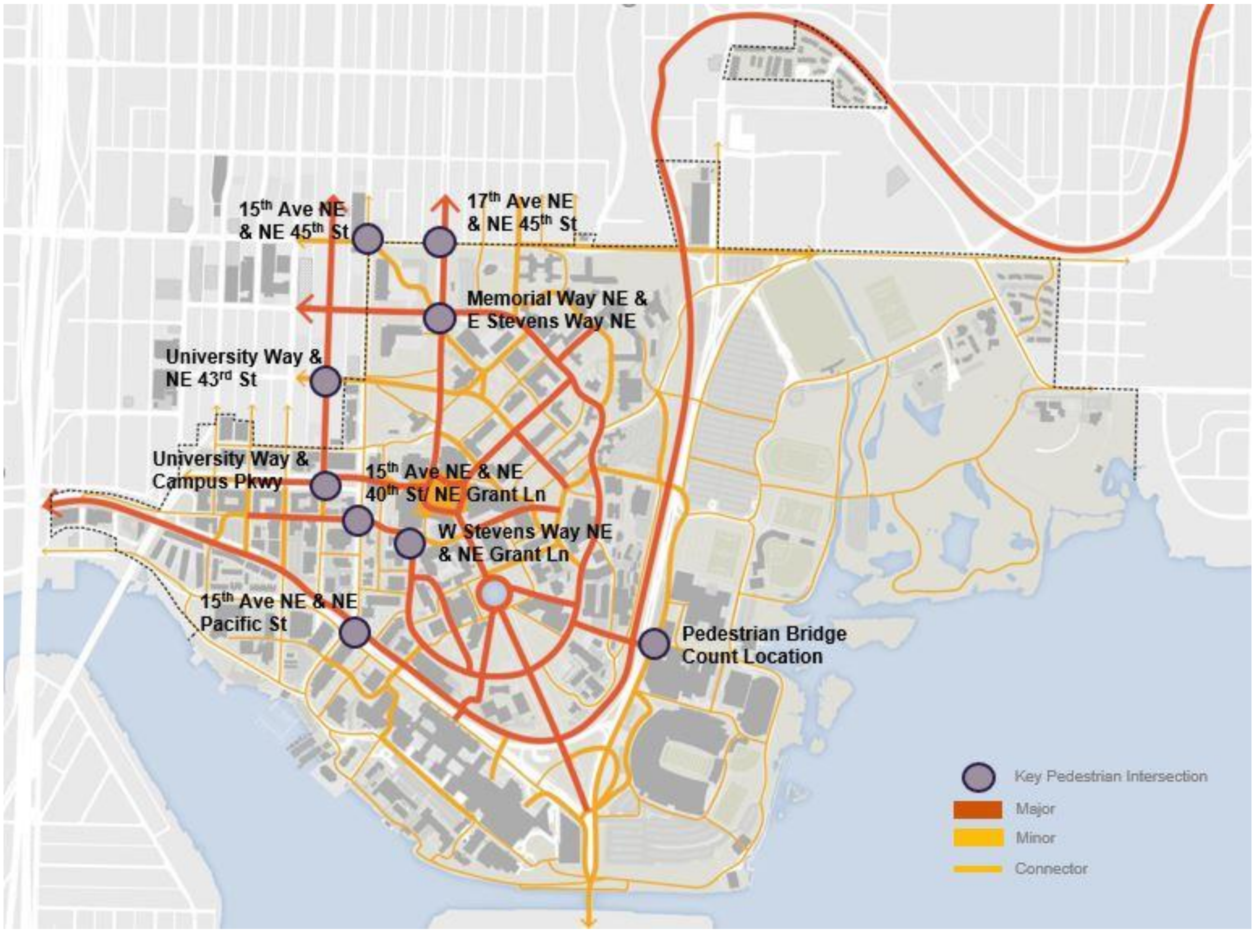
Source: Sasaki, October 2016 CMP

Figure 3.5 Existing Pedestrian Facilities Classifications

Within the 1998 University Community Urban Center Plan the City of Seattle designated NE 42nd St, NE 43rd St and Brooklyn Ave NE as neighborhood green streets to provide attractive and highly landscaped pedestrian routes in the University District. In the Spring of 2015, the City published a Green Streets Concept Plan further defining these concepts. These designated green streets enhance the pedestrian environment and will connect to the University District station that is currently under construction.

3.2.2 Pedestrian Counts

Based on high volume pedestrian counts, several intersections are noted as those with a major pedestrian route along one or both approaches. Figure 3.6 and Table 3.3 summarize pedestrian volumes at these key intersections for the existing (2015) weekday PM peak hour. The tables note the amount of pedestrians crossing each intersection approach. It should be noted that the 15th Avenue NE/ NE 40th Street/ NE Grant Lane intersection includes an all-walk pedestrian phase, with a walk phase for all pedestrian approaches occurring simultaneously. Figure 3.6 includes locations of key pedestrian intersections. This map reflects the extents of the areas of campus related pedestrian trips and the Campus Master Plan designations of major and minor pedestrian facilities.



Source: Transpo Group, 2015

Figure 3.6 Key Pedestrian Intersections

Table 3.3 below summarizes pedestrian crossings by approach for each of the intersections highlighted above.

Table 3.3
EXISTING (2015) WEEKDAY PM PEAK HOUR PEDESTRIAN VOLUMES AT KEY INTERSECTIONS

Intersection	NB Approach Crossings	SB Approach Crossings	EB Approach Crossings	WB Approach Crossings
University Way / NE 43rd Street	240	140	550	470
University Way / Campus Parkway (West)	440	850	650	490
Memorial Way NE / E Stevens Way NE	440	80	300	170
W Stevens Way NE / NE Grant Lane	0	710	0	370
15th Avenue NE / NE 45th Street	270	300	200	160
15th Avenue NE / NE 40th Street / NE Grant Lane	970	490	110	120
15th Avenue NE / NE Pacific Street	260	80	120	160
17th Avenue NE / NE 45th Street	150	170	260	350

NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound
Note: Construction activity closed segments of Stevens Way resulting in 0 pedestrian counts.
Source: Transpo Group, 2015.

With the installation and opening of the University of Washington Light Rail Station in Spring of 2016 near Husky Stadium, a new pedestrian bridge was installed over Montlake Boulevard and a pedestrian/bicycle counter installed on the bridge. Counts were not available for this location at the time of this writing.

Pedestrian Bridges and Connection Points

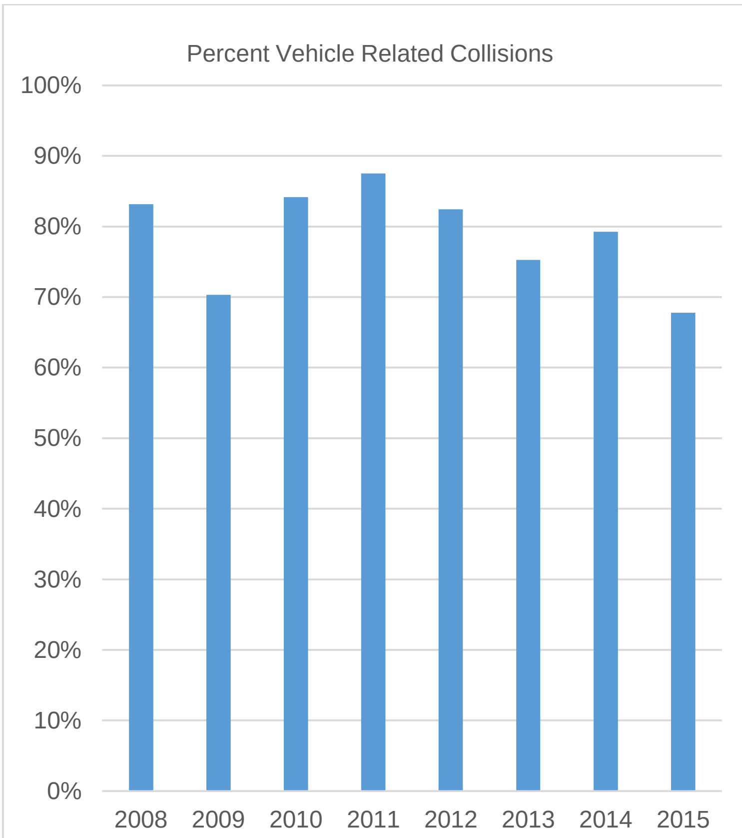
Bridges and pedestrian connection points provide pedestrian access throughout campus. Existing pedestrian bridges provide grade separated access with no vehicle conflicts over the arterials surrounding the campus. Across Montlake Boulevard pedestrian bridges are located at NE Pacific Place, Snohomish Lane N, Wahkiakum Road, and the E1 parking area. These pedestrian bridges provide access to Husky Stadium, Alaska Airlines Arena, and other University of Washington athletic facilities, as well as the University of Washington Link Light Rail Station. Pedestrian routes between campus and University Village, the Center for Urban Horticulture, and neighborhoods east of Montlake Boulevard utilize these pedestrian bridges. Across NE Pacific Street pedestrian bridges at the T-Wing overpass and the Hitchcock overpass connect the campus and Burke Gilman trail with the University of Washington Medical Center. Aside from these connections there is only one signal-controlled midblock at-grade crossing of NE Pacific Street for pedestrians. Across 15th Avenue NE there is one pedestrian bridge at approximately Campus Parkway connecting Red Square and the Henry Art Gallery with Schmitz Hall. Other at-grade crossings of 15th Avenue occur at signal controlled intersections at Pacific/Burke Gilman Trail, mid-block near Guthrie Annex, NE 40th/Stevens Way, NE 42st Street, NE 42nd Street, NE 43rd Street and NE 45th Street.

Pedestrian and bicycle volumes were collected at the pedestrian overpass location above Montlake Boulevard NE connecting the Burke-Gilman Trail with the E1 parking area in the East Campus sector. Data was collected in 15-minute intervals over one day in May 2016, from 7:00 am to 7:00 pm, at the east and west sides of the pedestrian bridge. From this data, a peak hour of 4:30 pm to 5:30 pm was determined for pedestrian volumes across the Montlake Boulevard NE pedestrian bridge overpass, with a maximum of about 220 hourly pedestrian crossings (Transpo, 2016).

3.2.3 Collision History

Pedestrian and Bicycle Collisions

Based data provided by the UWTS, pedestrian and bicycle collisions are largely vehicle-related below shows the percent of vehicle related collisions from all pedestrian and bicycle collisions from 2008 to 2015 in and around Campus. As shown in Figure 3.7, pedestrian and bicycle reported collisions ranged from 82 to 106 between 2008 and 2015. Of these, on average, vehicles were involved in 79% of all reported pedestrian and bicycle collisions.



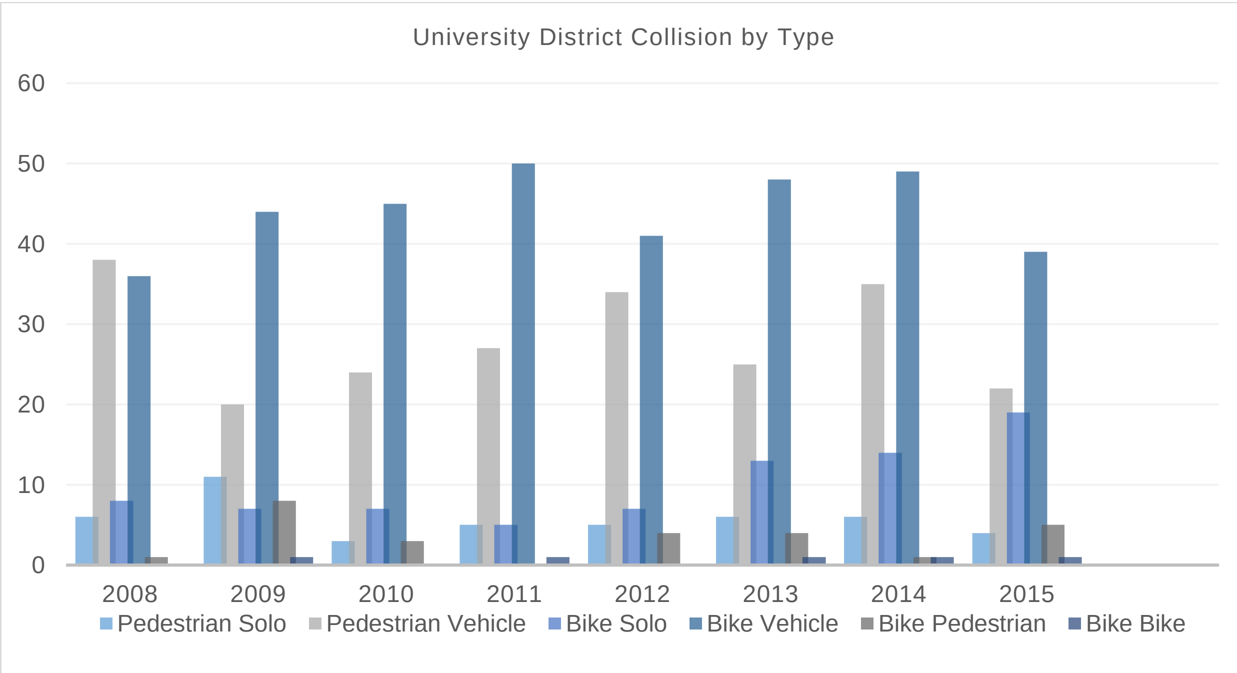
Source: University of Washington Transportation Services

Figure 3.7 Historic Percent Vehicle Related Pedestrian/Bicycle Collisions (Campus)

The same data is shown in more detailed in Figure 3.8. Figure 3.8 groups annual pedestrian and bicycle collisions by type. Between 2008 and 2015, pedestrian-vehicle and bicycle-vehicle collisions combined create the majority of all annual collisions involving pedestrians or cyclists.

The City of Seattle also collects collision data. Through an evaluation of WSDOT and SDOT information, there were 49 collisions that involved pedestrians. This results in an average of 16 per year for this 8-

year period. Of the pedestrian collisions, 4 were reported at the Brooklyn Avenue NE/NE 50th Street, Roosevelt Way NE/NE 45th Street, and 11th Avenue NE/NE 45th Street intersections, and 6 were reported at the Brooklyn Avenue NE/NE 45th Street intersection. Continued focus on pedestrian safety through implementation of the Pedestrian Master Plan and Vision Zero will continue to improve the existing conditions.



Source: University of Washington Transportation Services

Figure 3.8 University District Ped/Bicycle Collisions by Type

3.2.4 Pedestrian Performance Measures

Pedestrian performance measures have been developed to assess and compare alternatives. These performance measures assess impacts to pedestrian travel throughout the study area include the MIO, primary impact zone and secondary impact zone. These measures include a mixture of quantitative as well as qualitative measures and are described in more detail throughout the Affected Environment Section.

- Proportion of Development within 1/2 Mile of Multifamily Housing
- Proportion of Development within 1/2 Mile of University of Washington Residence Halls
- Quality of Pedestrian Environment
- Burke Gilman Trail Capacity (see section 3.3.5)

These measures reflect the effectiveness of the pedestrian network in providing safe, comfortable and easy access to pedestrian destinations, specifically including housing, thereby maintaining a high walk mode choice on campus among students. Each alternative will be assessed based on future conditions of the pedestrian network and effects of growth with each alternative.

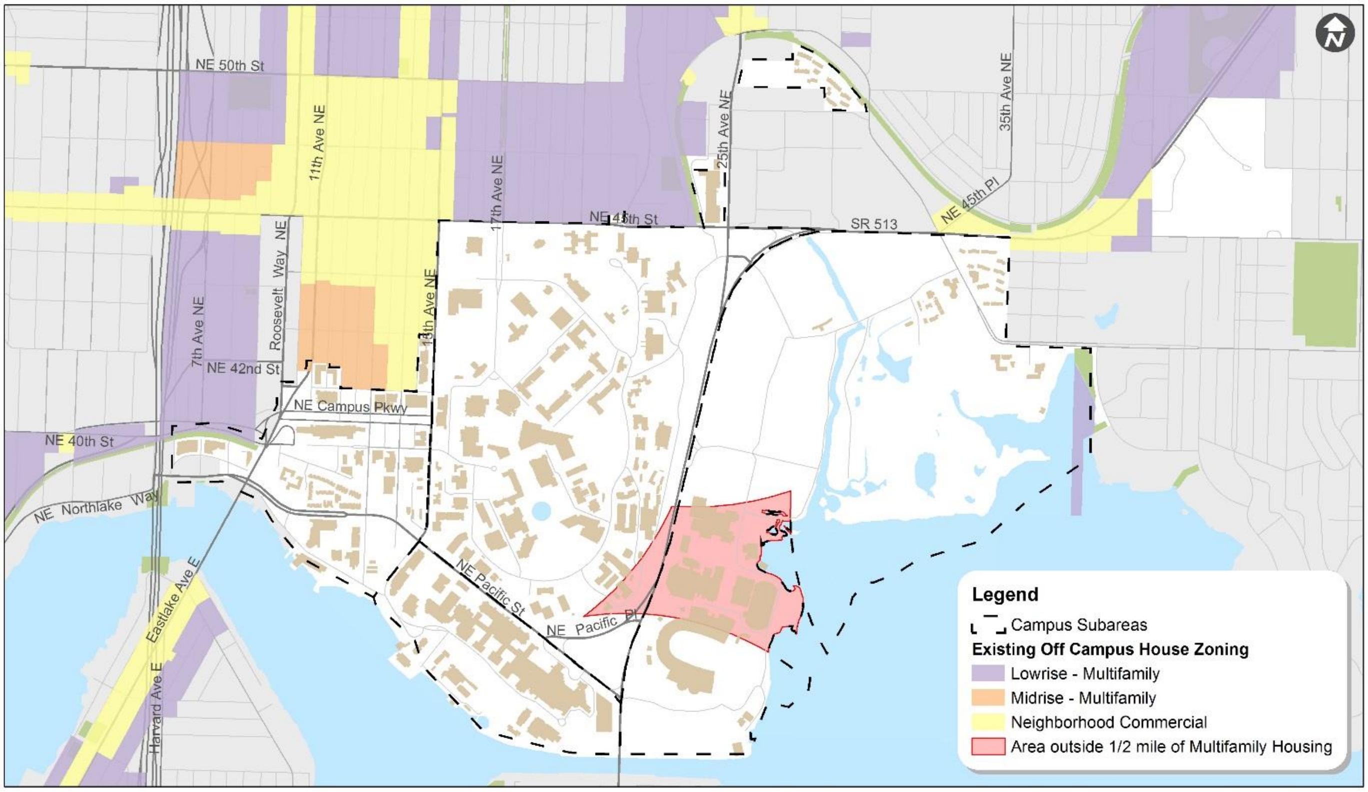
Proportion of development within 1/2 mile of multifamily housing

Walking makes up approximately 30 percent of all existing campus related trips to and from campus. Proximity of campus development to housing is therefore one important measure to assessing the propensity of people to walk. This measure assesses the proximity of the current campus buildings and development to nearby multifamily housing.

This measure was calculated by determining the proportion of each subarea within a 1/2-mile walk of areas currently zoned by the City of Seattle for multifamily housing (including Low Rise, Mid Rise, High Rise, and Neighborhood Commercial). Of the current 16.8 million gross square feet of campus development, roughly 98 percent is within 1/2 mile of multifamily housing. Percentages for each area are shown in Table 3.4 and Figure 3.9.

Table 3.4
PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF MULTIFAMILY HOUSING

Sector	Existing
West	100%
South	100%
Central	97%
East	87%
Average	**98%**



Source: Transpo 2016

Figure 3.9 Proportion of Development within ½ Mile of Multifamily Housing

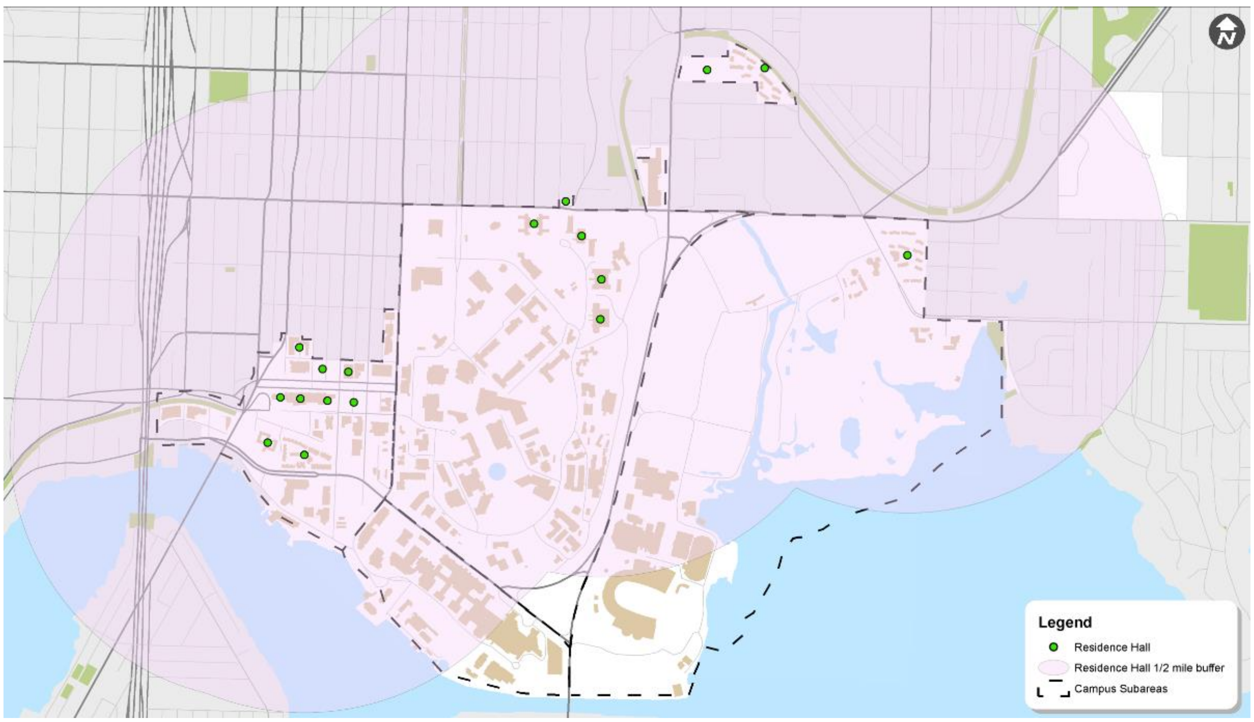
Proportion of development within 1/2 mile of University of Washington residence halls

Similar to the previous measure, this performance measure assesses the proportion of campus development within walking distance of residence halls. University of Washington residence halls were identified and then buffered by a 1/2-mile, as shown in Figure 3.10. The percentage of each sector covered by this buffer was then used to scale an "average" percentage of development that might be expected to be within the 1/2-mile buffer. Notably areas outside this buffer area are athletic facilities and the UW Medical Center.

Of the current 16.8 million gross square feet of campus development, roughly 88 percent is within 1/2 mile of residence halls. Percentages for each sector are shown in the Table 3.5 below.

Table 3.5
PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF RESIDENCE HALLS

Sector	Existing
West	100%
South	68%
Central	97%
East	80%
Average	**88%**



Source: Transpo 2016

Figure 3.10 Proportion of Development within ½ Mile of Residence Halls

Quality of Pedestrian Environment

This measure provides a qualitative assessment of the pedestrian environment within the Primary and Secondary Impact zones. This assessment draws from the Draft Pedestrian Master Plan as well as other plans such as the University District Green Streets Plan and SR 520 HOV and Bridge Replacement Project when specific projects have been identified. While other measures focus on pedestrian volumes in locations where capacity limitations may exist, this measure will more generally address where pedestrian travel might be expected to change.

Currently, the quality of the pedestrian environment varies throughout the Impact zones. Within the MIO, and particularly on Central Campus, pedestrian travel is well accommodated with a connected and generally high-quality pedestrian network. Pedestrian barriers surrounding Central Campus such as

Montlake Avenue NE and NE Pacific Street are addressed using a number of pedestrian bridges. Along 15th Avenue NE and NE 45th Street at-grade crossings as well as one pedestrian bridge provide access to campus. Travel for people with limited mobility is more disconnected due to grade changes and is addressed through a holistic approach to mobility including a Dial-A-Ride shuttle system.

Within the University District pedestrians travel along a dense, regular street grid providing good connectivity with sidewalks provided on both sides of nearly all streets. Sidewalk facilities in the University District are generally older and reflect this age both with respect to condition and design. Pedestrian demand is higher along University Way, NE 45th Street, Campus Parkway and a number of other streets with dense housing or other destinations along them. Pedestrian improvements along Roosevelt, NE 42st Street and NE 43nd Street have been identified.

A new pedestrian and bicycle bridge near the UW Station improves connectivity from campus to Link as well as the Montlake Bridge and areas to the south. Improvements to pedestrian facilities across major barriers such as I-5 and Montlake Cut have been identified. See Section 3.2.3 for information on collisions.

3.3 BICYCLES

Of the campus community approximately 5,600 chose to bicycle to access the University of Washington campus based on mode share data shown in Table 3.2. Most (over 3,100) are students. Faculty and staff combined that choose to bicycle equal around 1,000.

3.3.1 Bicycle Facilities

The existing University of Washington bicycle system includes designated streets and pathways as well as end-of-trip facilities such as short-term bicycle parking, secured and covered bicycle parking and shower/changing facilities.

Figure 3.11 shows the existing bicycle network, including protected and unprotected bicycle lanes, shared lanes, and greenways and trails. NE Campus Parkway, NE 40th Street, and Roosevelt Way NE include protected bicycle lanes, while 11th Avenue NE, parts of Brooklyn Avenue NE, and parts of University Way NE include unprotected bicycle lanes. Stevens Way NE, Pend Oreille Road NE, and NE 45th Street have shared marked lanes for bicyclists, and the Burke-Gilman Trail provides a paved, flat route for bicyclists to travel throughout campus.

Protected Bicycle Lane (PBL): A protected bicycle lane separates bicycles from pedestrians and vehicles on a roadway, creating safe and inviting facilities for cyclists of all ages and abilities.

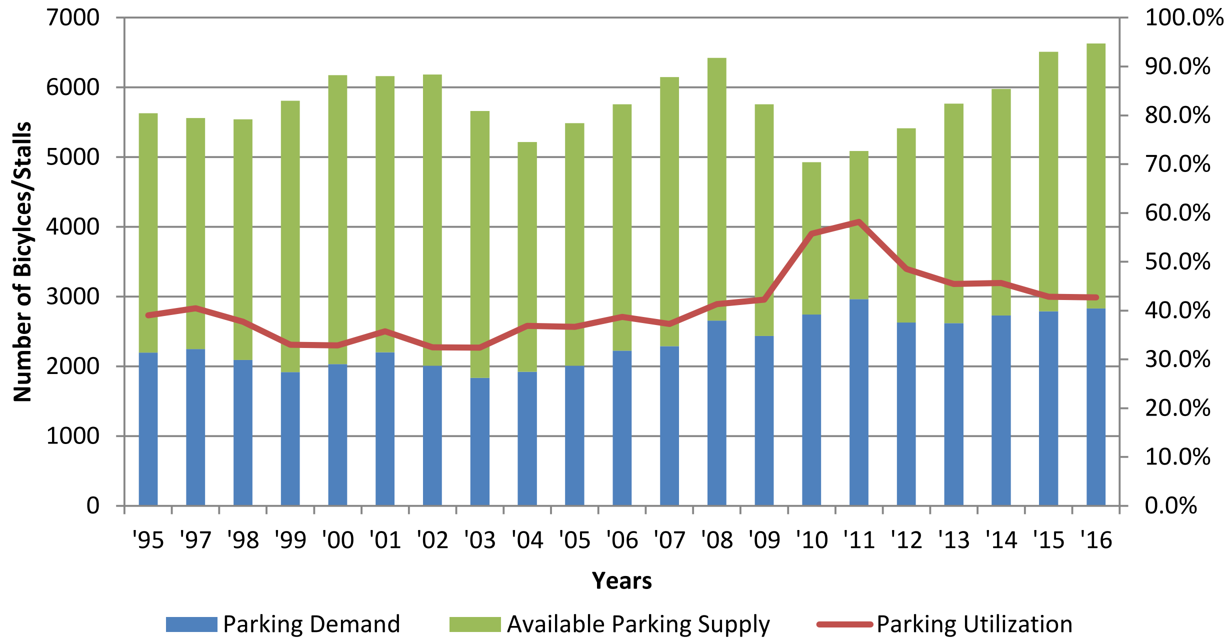
Source: Sasaki, October 2016 CMP

Figure 3.11 Existing (2015) Bicycle Facilities

Figure 3.11 shows current bike facilities near or serving the campus. Bicycle facilities on campus are a priority. Stevens Way connects the protected bicycle lanes of NE Campus Parkway with the Burke-Gilman Trail, and provides a key opportunity for improving campus bicycle connectivity. Separating bicycle riders from other travel modes, as is done with protected bicycle lanes, can reduce vehicle- and pedestrian-involved collisions.

3.3.2 Bicycle Parking and Bicycle Share Facilities

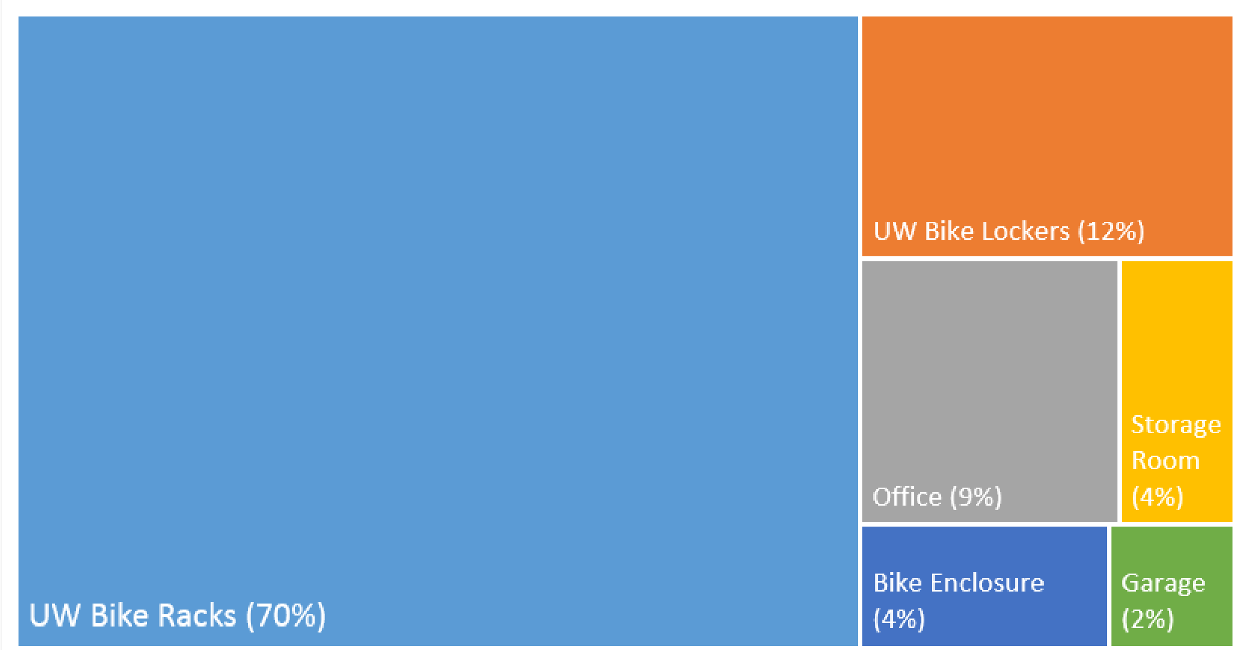
Bicycle parking supply and accessibility provides an additional opportunity for improvement throughout the campus network. Figure 3.12 shows bicycle parking utilization trends from 1995 to 2016. The increase in parking utilization between 2009 and 2011 is a reflection of adjustments for real-world bicycle parking capacity rather than theoretical bicycle parking capacity. Since then, bicycle capacity has increased by roughly 1,500 spaces and utilization dropped by nearly 20% from its peak. These figures show that the UW closely manages bicycle parking, ensuring there is sufficient capacity to meet demand.



Source: University of Washington Transportation Services

Figure 3.12 Bicycle Parking Utilization Trends

Data shown in Figure 3.13, which is derived from the biennium transportation telephone survey of students, faculty and staff, indicates that a number of people, most likely faculty and staff don't use UW provided racks. An estimated 82 percent of campus bicycle riders use University of Washington provided bicycle storage facilities, with 70 percent utilizing bicycle racks throughout campus and 12 percent utilizing bicycle lockers. While not directly indicated here, this data in combination of with other survey data indicates an ongoing need and demand for secure bicycle storage on campus which the University is working to address, especially in new construction.

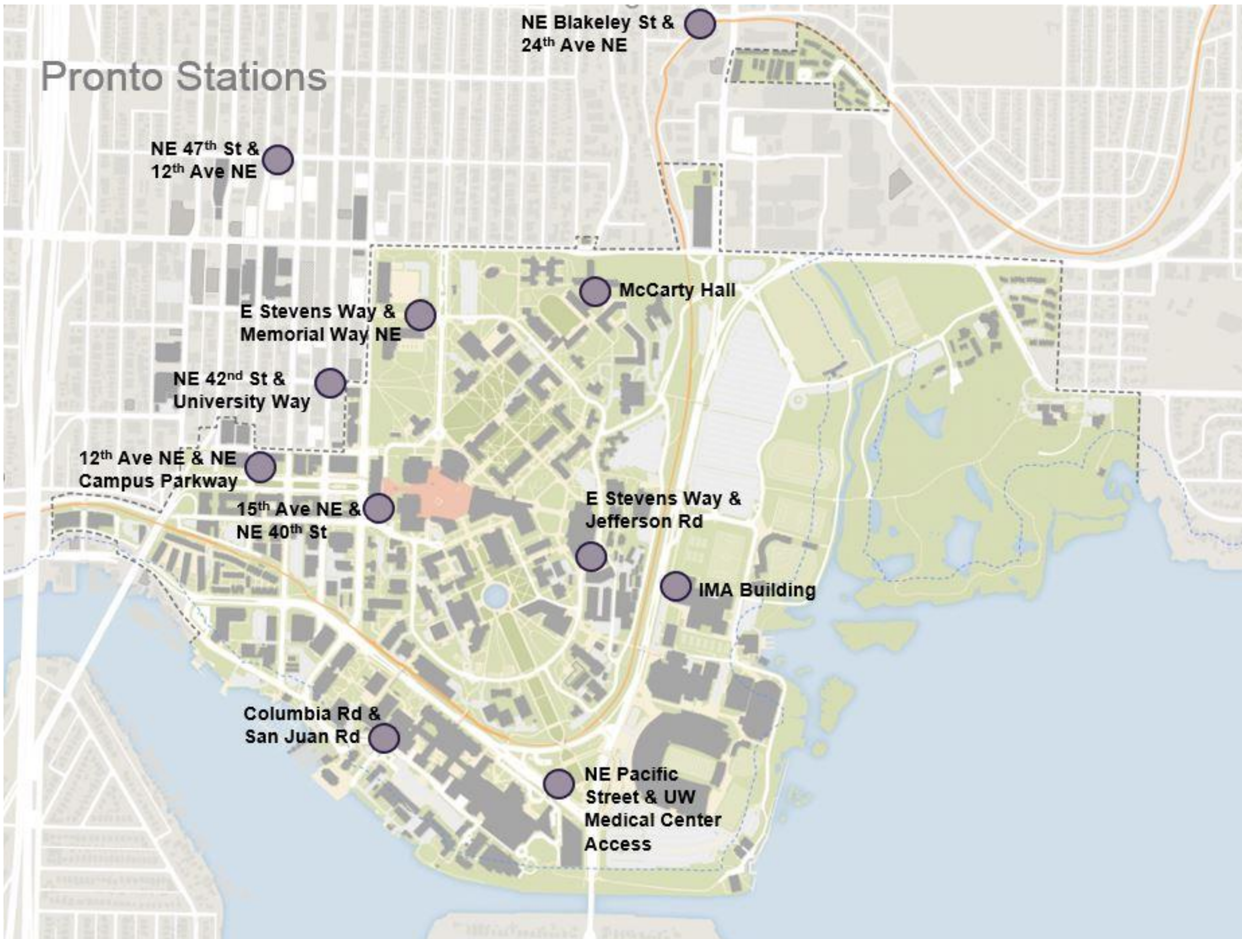


Source: University of Washington Transportation Services

Figure 3.13 Bicycle Parking Locations

Bicycle-share Program

Pronto is a bicycle share program currently managed by the City of Seattle to promote biking and reduce dependence on automobiles. Eleven Pronto bicycle-share stations are positioned within the Primary and Secondary Impact Zones. Pronto stations in the University District are shown in Figure 3.14.



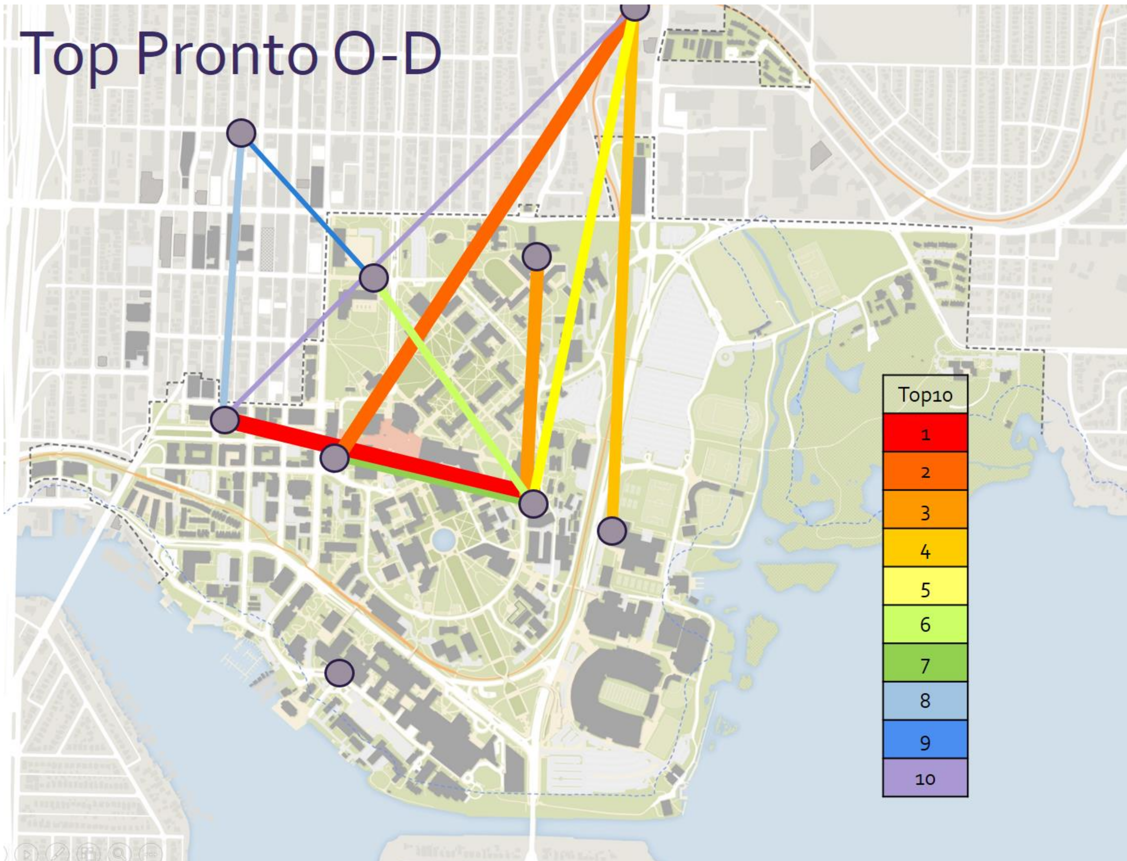
Source: Transpo Group, 2015

Figure 3.14 Pronto Bicycle Stations

The performance of the Pronto Bicycle-share program on the University of Washington campus is low in comparison to the use at other Pronto stations. Based on 2015 Pronto station ridership data, all University of Washington stations average four Pronto trips per station per day or fewer. All University of Washington Pronto stations rank in the bottom 30 percent in average trips per day. The most frequently used Pronto station is located at the 12th Avenue NE/NE Campus Parkway intersection, with 4.14 trips per day. The fewest Pronto trips per day are from the McCarty Hall/Whitman Court station with 1.22 trips.

In comparison, the maximum Pronto trips per day are from the 3rd Avenue/Broad Street station in Downtown Seattle, with over 15 trips per day. The most common trip to and from University District Pronto stations include between the 12th Avenue/NE Campus Parkway station and the E Stevens Way NE/Jefferson Road station. With the opening of the University of Washington Station, Pronto use near this currently end-of-line station is expected to increase.

The top 10 origin-destination pairs for Pronto use in the University District area are shown in Figure 3.15. The map indicates that travel to/from the HUB is popular for short trips between areas of campus. The data also shows that three of the top five origin-destinations involved the station near 25th Ave NE and Ravenna Pl NE near Nordheim Court, which is a flat and comfortable ride for residency hall student to campus via the Burke-Gilman trail.



Source: Transpo Group, 2015

Figure 3.15 Top Pronto Origin-Destination Pairs

3.3.3 Bicycle Counts

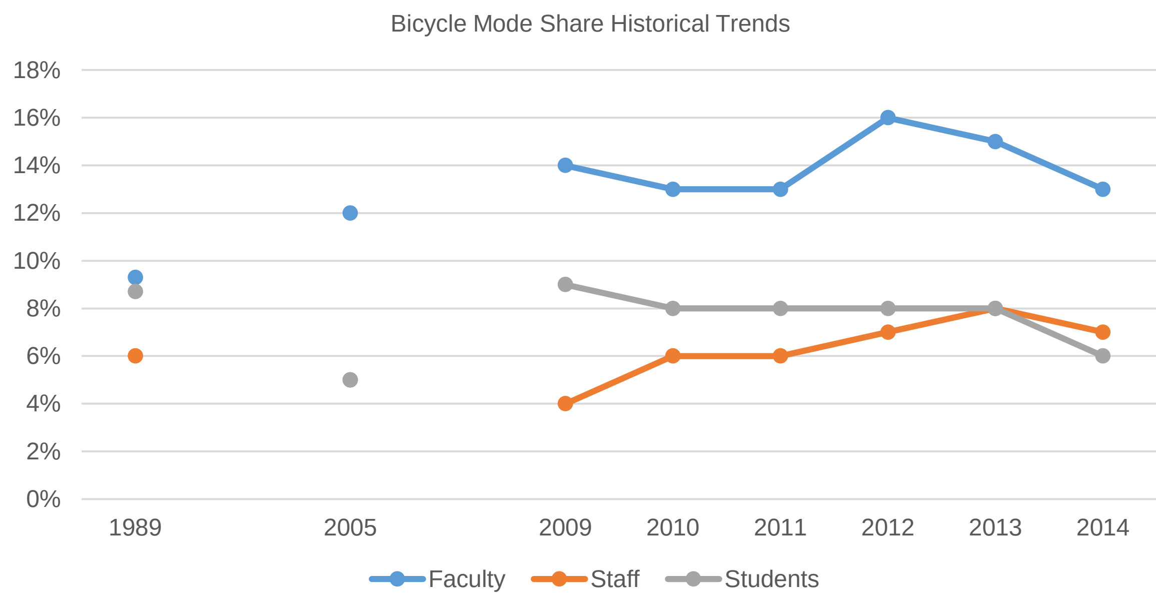
Bicycle ridership data from the Seattle Department of Transportation (SDOT) includes 2011 and 2012 bicycle counts at intersections throughout Seattle, including three University District locations. Table 3.6 summarizes bicycle counts and indicates that for these locations in the University District, bicycle travel is increasing.

Table 3.6
ANNUAL BICYCLE VOLUMES AT UNIVERSITY DISTRICT LOCATIONS

Location	2012 Total	2011 Total	Percent Change	Absolute Change
NE 45th Street/Brooklyn Avenue NE	765	579	32%	186
Montlake Boulevard NE/NE Pacific Street	2,188	1,817	20%	371
University Bridge	2,768	1,815	53%	953

Source: Seattle Department of Transportation, 2012.

Additional bicycle volumes along the Burke-Gilman Trail are shown in Figure 3.17. As shown in Figure 3.16, bicycle mode share growth trends for students and staff have not shown distinct positive growth from 2009-2014. Promoting bicycle use can reduce drive mode share percentages and encourage alternate forms of transportation.



Source: University of Washington Transportation Services

Figure 3.16 Bicycle Mode Share Trends

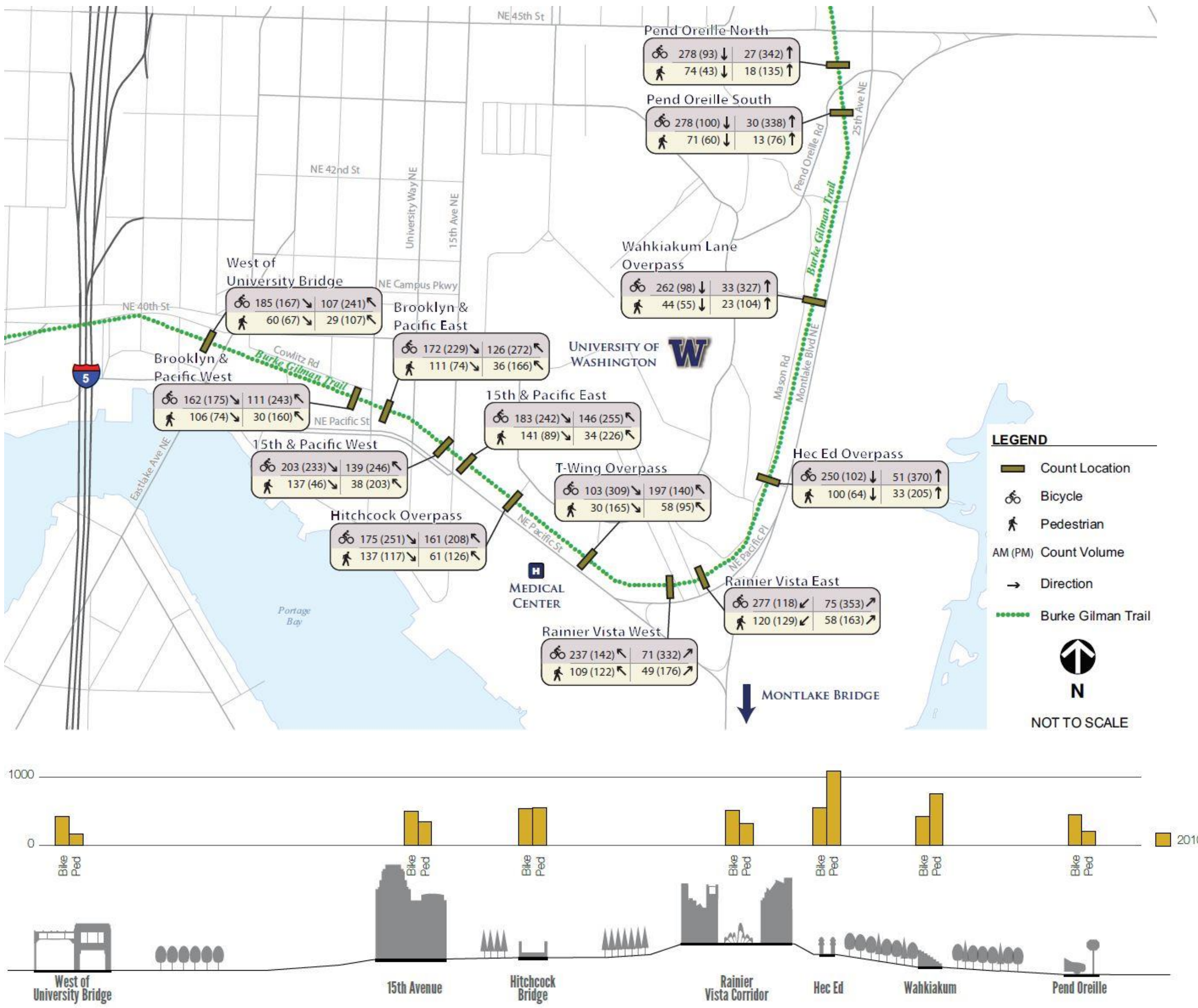
3.3.4 Collision Data

Collision data for bicycles was also evaluated for the years 2008-2015 by UWTS and are reported with pedestrian related collisions in Figure 3.8. Based on this data provided by UWTS, bicycle vehicle collisions are the highest reported type of collision with roughly 40 collisions per year. A review of the data provided by SDOT for the larger study area also addresses bicycle collisions and these are addressed in section 3.5.4. A total of 40 bicycle related collisions occurred, equivalent to 13 per year.

3.3.5 Bicycle System Performance

Burke-Gilman Trail Capacity

The University of Washington owns the Burke-Gilman Trail throughout the MIO. The University has conducted two detailed studies in 2011 and 2012 to identify how best to improve the capacity and aesthetics of the corridor. Counts from 2010 of pedestrians and bikes along the corridor are shown in Figure 3.17 from this report.



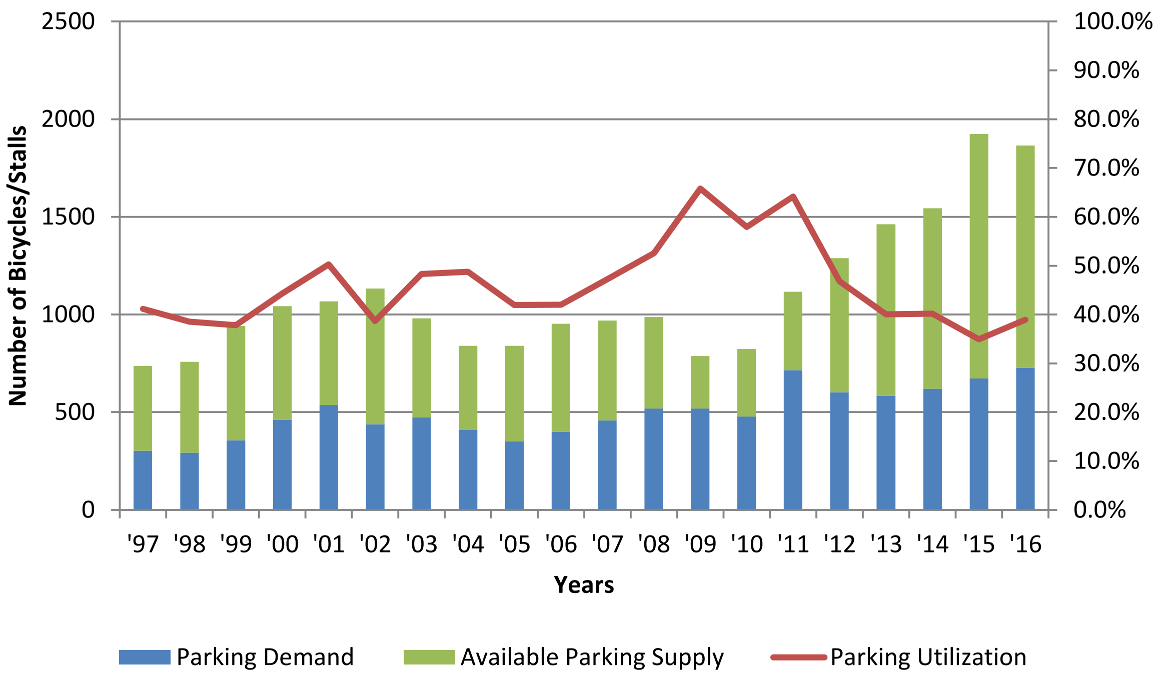
Source: University of Washington Burke-Gilman Trail Corridor Study, July 2011

Figure 3.17 Pedestrian and Bicycle Counts along Burke-Gilman Trail Corridor

Combined these studies provide a long term implementation plan for the trail including capital investments that are on-going. Recent upgrades have been completed along the trail between 15th Avenue NE and Rainier Vista, along parts of West Campus, and at the bridge connection to the Link Light Rail Husky Stadium Station. The previous trail design mixes pedestrian and bicycle uses, while the new design separates pedestrian and bicycle modes. Improvements to the Burke-Gilman Trail address pedestrian-bicycle conflict points through grade separation and bicycle speed control tactics.

Bicycle Parking and Utilization

As discussed in Section 3.3.2 the University has a long track record of managing bicycle parking supply, ensuring that it can meet demand from students, faculty and staff. Bicycling is an important travel mode for the University because it helps to reduce drive-alone trips to campus, bicycle travel is relatively inexpensive for the University to encourage (compared to transit) and is very environmentally beneficial. Additionally, the UW currently provide roughly twice the number of bicycle parking spaces as required by the City of Seattle (SMCU 23.54.015.K.1). Despite this fact, the University continues to add parking, especially parking that is covered and includes security features. Figure 3.18 shows bicycle parking supply, demand and utilization from 1997 through 2016 in West Campus, which has seen redevelopment of numerous University own properties over the last 5 years. This figure shows that not only has the University nearly doubled bicycle parking supply in this growing area, it has reduced bicycle parking utilization. University wide data is discussed in Section 3.3.2 and shows a similar reduction of bicycle parking utilization from a high in 2010/2011.



Source: UWTS, 2016.

Figure 3.18 Bicycle Parking in West Campus

These facts show that the University has a long track record of managing bicycle parking demand and as new buildings are constructed; more than sufficient parking supply is built. For these reasons additional bicycle parking analysis for the Alternatives was not completed.

Quality of Bicycle Environment

Bicycle travel in the Primary and Secondary Impact zone has seen recent improvements; however, some long-standing connectivity gaps remain. This measure will provide a qualitative assessment of the bicycle environment, providing comparisons between Alternatives where discernible. In general, bicycle travel does not face capacity limitations, so this assessment will primarily focus on improvements to the bicycle network and general changes to travel patterns and demand. Projects by SDOT, WSDOT or the University will be assessed here. Bicycle travel on the Burke-Gilman trail, which can see capacity issues, is analyzed more qualitatively above.

The Burke-Gilman trail currently provides a strong bicycle backbone through much of the Primary and Secondary Impact zone, with connections to it throughout the area. On Central Campus, Grant Lane and Memorial Way provide access to the Campus core with circulation around campus primary occurring along Stevens Way, however none of these roads include dedicated bicycle facilities. Cyclists use paths to travel through campus but during passing periods bicycling travel in the Central Campus is restricted both by University policy and capacity limitations of paths.

The bicycle network in West Campus is more developed and higher quality with a number of protected bicycle lanes, bicycle lanes and other facilities present. A number of additions to this area are fairly new, however some gaps exist. South and East Campus have a limited bicycle networks, with access to/from the Burke Gilman Trail representing their primary bicycle connection.

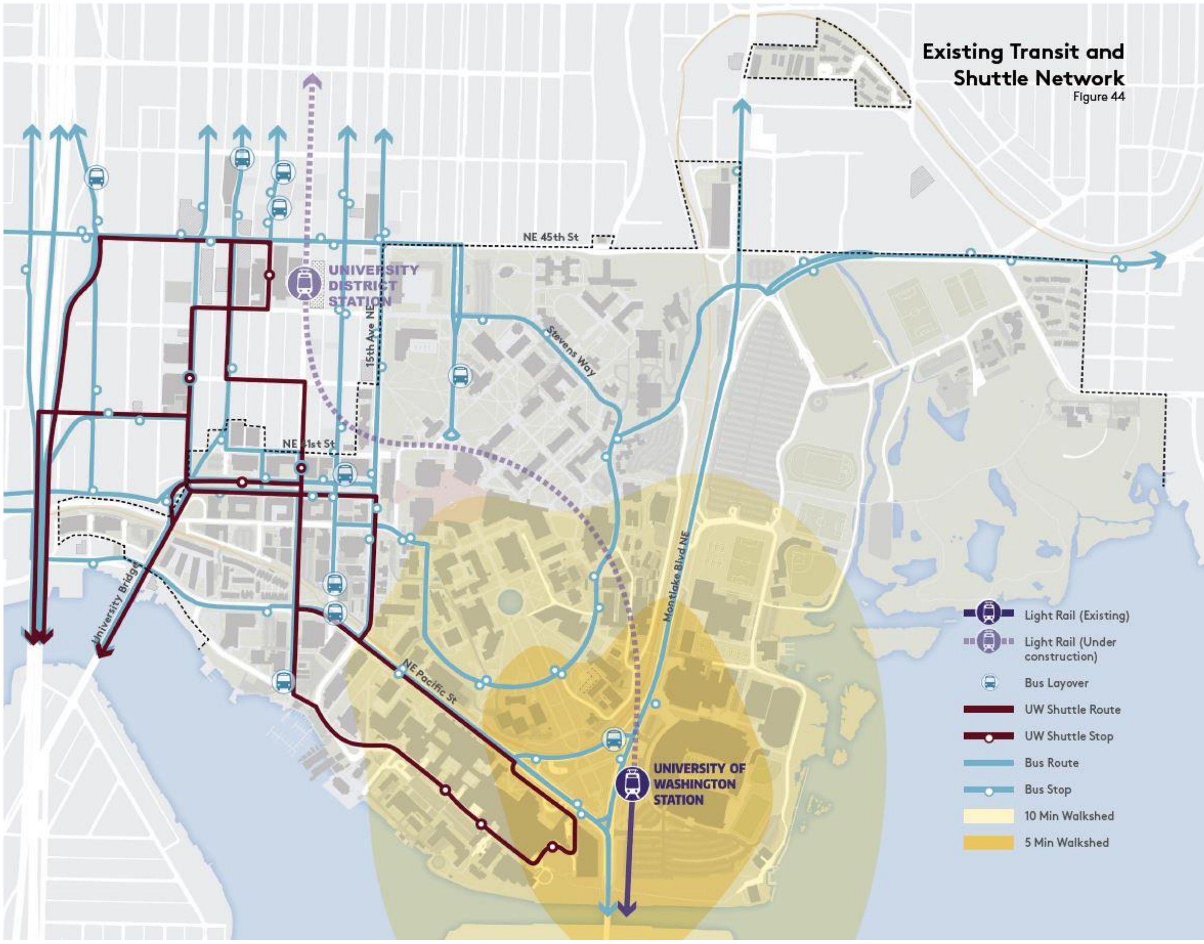
The new pedestrian and bicycle bridge to the UW Station improve travel between the Burke-Gilman Trail and the Montlake area however the Montlake Bridge and I-5 represent long-standing barriers to bicycle travel.

3.4 TRANSIT

Of the campus community approximately 29,000 access the University of Washington using transit, based on mode share data shown in Table 3.2. Of these trips, almost 19,900 are students, 1,988 are faculty, and 7,280 are staff.

3.4.1 Transit Stops and Facilities

The transit network throughout the University of Washington campus and surrounding University District incorporates King County Metro, Sound Transit, Community Transit, and the recent University of Washington Link Light Rail station at Husky Stadium. Figure 3.19and Figure 3.20 show existing transit facilities throughout the University of Washington campus, including University of Washington shuttles and public transit. Figure 3.19 includes walksheds from the existing University of Washington Link Light Rail station at Husky Stadium. Currently, the University of Washington Station operates as an end-of-line station and requires integration with all modes of travel to campus and surrounding neighborhoods.

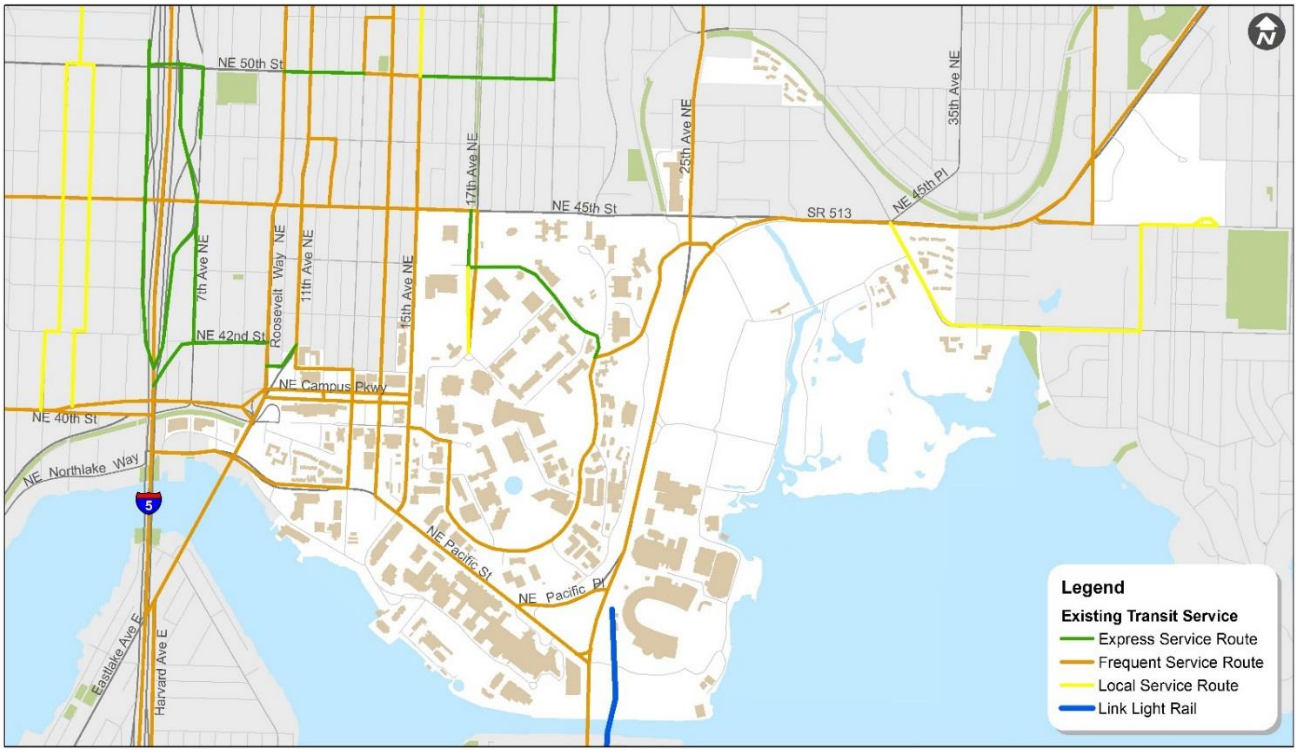


Source: Campus Master Plan, 2016

Figure 3.19 Existing Transit Network and Light Rail Walkshed

3.4.2 Existing Routes/Layover Areas

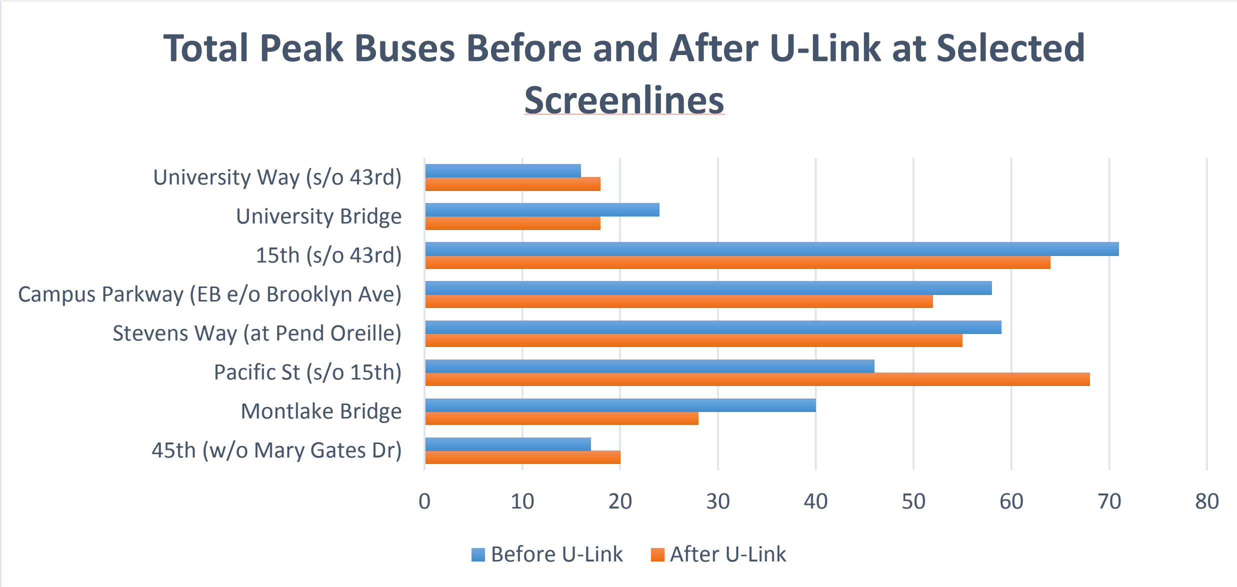
Figure 3.19 includes King County Metro transit lines after the March 2016 service changes. Routes were restructured to provide better connection to the existing and upcoming Link Light Rail stations. Figure 3.19also indicates current layover areas along Memorial Drive, University Way, Brooklyn Avenue, 12th Avenue and Memorial Drive. Layover locations were negotiated in an agreement between Metro, and the City of Seattle in 1999.



Source: Transpo Group, 2016

Figure 3.20 Existing Transit Service Types (Source: King County Metro Vision)

Figure 3.20 shows peak hour bus volumes grouped by screenline location, for pre- and post- U Link opening. Transit volumes have decreased at the University Bridge, 15th Avenue NE, Campus Parkway, Stevens Way, and Montlake Bridge screenlines due to service changes that orient to the University of Washington Light Rail Station. In contrast, peak hour bus volumes at the University Way, Pacific Street, and NE 45th Street screenlines increase after U Link opened. These revisions reflect a service concept integrated with the light rail station.



Source: UWTS, 2016.

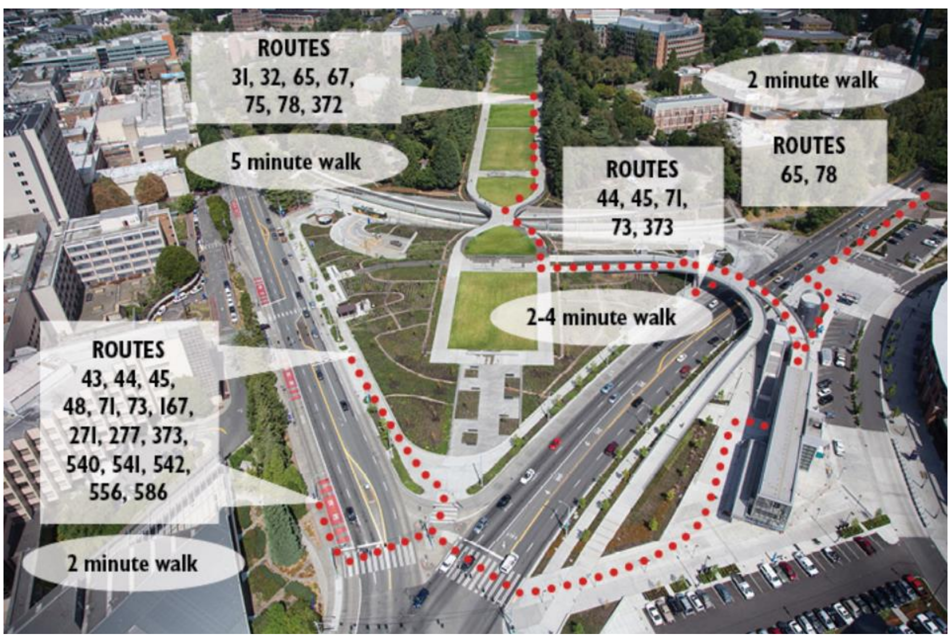
Figure 3.21 Peak Buses Per Hour by Screenline Location Before and After Opening of U Link

Figure 3.21 includes King County Metro transit connections accessible from the Husky Stadium Link Light Rail station. Routes 31, 32, 65, 67, 75, 78, and 372 are accessible via an estimated five-minute walk to Stevens Way NE. Routes 65 and 78 are accessible with an estimated two-minute walk north on Montlake Boulevard NE. Routes 43, 44, 45, 48, 71, 73, 167, 271, 277, 373, 540, 541, 542, 556, and 586 are accessible via an estimated two-minute walk to connection points at NE Pacific Street adjacent to the University of Washington Medical Center. Initial ridership results of Link Light Rail ridership after the station opening in March 2016 is shown in Table 3.7 indicating an overall increase in ridership of 13%.

Table 3.7
U-PASS SUMMARY – COMPARISON OF MAY 2015 TO MAY 2016 (AFTER OPENING OF U LINK LIGHT RAIL)

Services	2015	2016	Changes	Ratio
By Provider				
Community Transit	28,468	28,834	366	1%
Everett Transit	227	216	-11	-5%
King County Metro	61,4834	58,2836	-31,998	-5%
Kitsap Transit	610	958	348	57%
Pierce Transit	1,147	1,056	-91	-8%
Sound Transit	65,378	189,827	124,449	190%
By Mode				
Bus	46,671	51,189	4,518	10%
Demand Response	2	81	79	3,950%
Commuter Rail	4,697	5,682	985	21%
Light Rail	14,008	132,875	118,867	849%
Total	**710,664**	**803,727**	**93,063**	**13%**

Source: UWTS, 2016



Source: Transpo Group, 2015

Figure 3.22 Available Transit Connections from U-Link Husky Stadium Station

3.4.3 Transit Walk Shed and Connectivity

Providing walkable access to transit ensures transit remains a viable transportation choice. As shown in Figure 3.22, with existing transit walksheds the recently opened University of Washington light rail station is within a ten-minute walkshed of approximately half the campus. With the anticipated opening of the University District station, most of the campus would be within a ten-minute walkshed of light rail, as shown in Figure 3.23.

3.4.4 Transit Performance

Transit is critical for the mobility of the University, transportation roughly 4 in 10 of students, faculty and staff to campus every day.

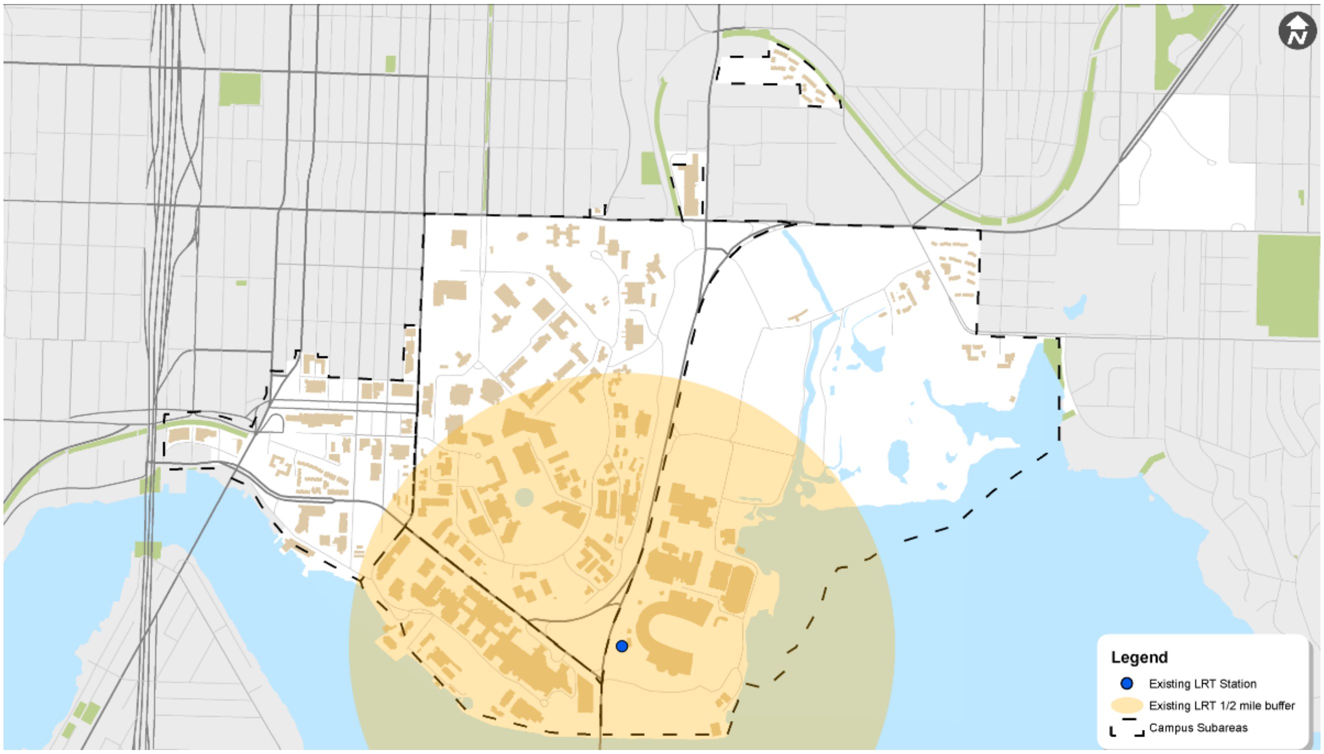
- ***Proportion of Development within 1/2 Mile of RapidRide***
- ***Proportion of Development within 1/2 Mile of Light Rail***
- ***Metro Service Guidelines***

Each are described herein:

Proportion of Development within 1/2 Mile of RapidRide
This measure, as well as the next measure, assesses proximity of campus development to high capacity transit service including RapidRide and Link Light Rail. Proximity to transit is an important factor in transit ridership and since currently 40% of trips to and from the University of Washington are on transit; this measure will help inform how different alternatives perform with relation to transit accessibility.

This measure was calculated by determining the ratio of each sector within a 1/2-mile walk of a RapidRide stop. For future years the 2025 Draft King County Long Range Plan service network[2] was used to determine the location of RapidRide routes and stop locations were inferred based on existing high-ridership stops, Link station locations and desired stop spacing. Because the CMP does not identify which development sites will be used within a sector, the ratio of the sector within 1/2-mile of RapidRide stops were used to scale an "average" percentage of development that might be expected to be within the 1/2-mile buffer. Currently no RapidRide routes pass through the University District.

Proportion of Development within 1/2 Mile of Light Rail
This measure is identical to the measure above, but proximity is measured to the University of Washington Light Rail Link Station. In future alternatives proximity to Light Rail will include the future University District Station assumed to be completed in 2021. The current 1/2 Mile proximity to the University of Washington Station is shown in Figure 3.23.



Source: Transpo Group, 2016.

Figure 3.23 Proportion of Development within ½ Mile of Light Rail

Table 3.8 below shows that a little more than half of the campus area is within a ½ mile proximity to Light Rail.

Table 3.8
PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF LIGHT RAIL

Sector	Existing
West	6%
South	100%
Central	49%
East	42%
Total	**54%**

Transit Service Guidelines

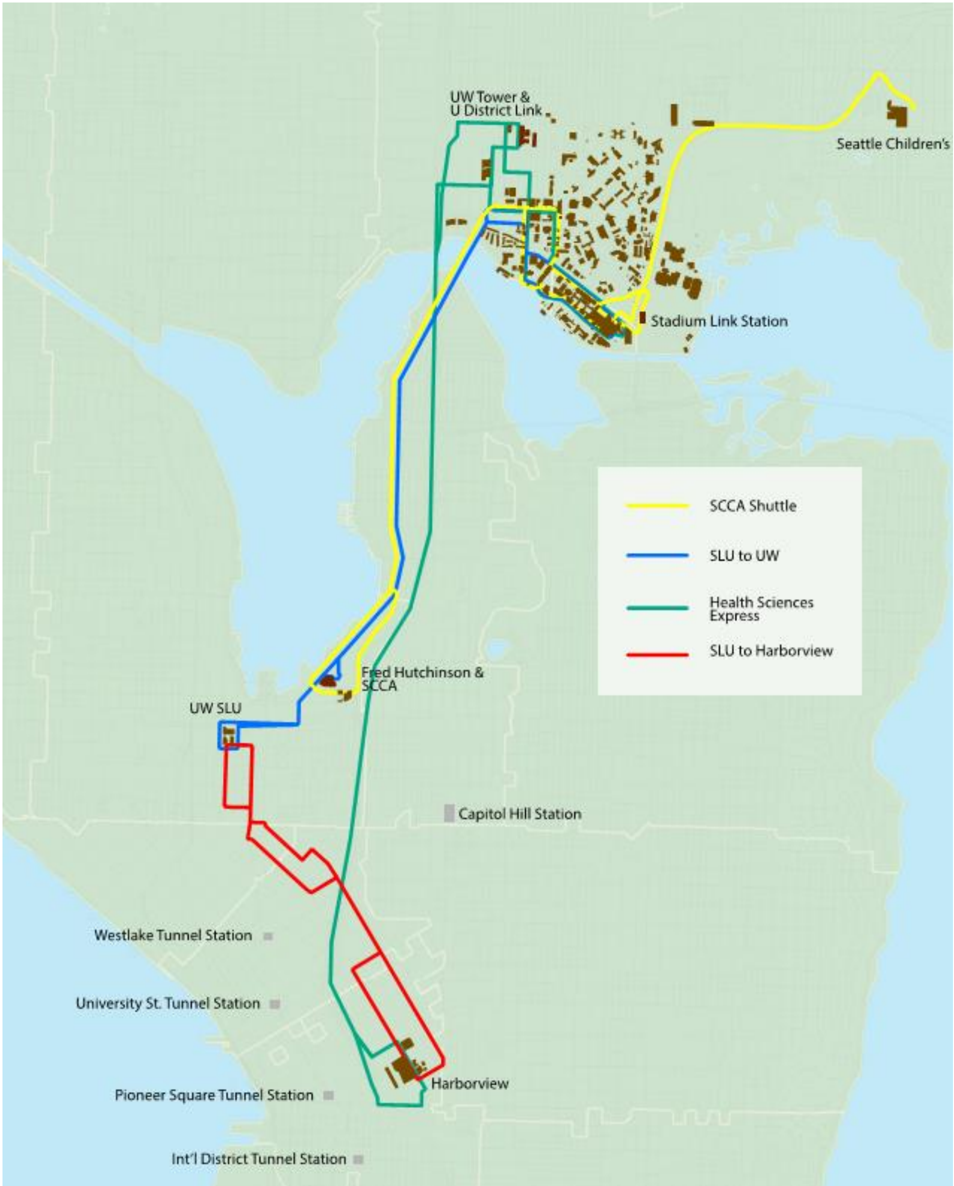
King County Metro identifies typical service guidelines in their 2015 Update of the Service Guidelines. These guidelines recommend thresholds for service including spacing for stops for RapidRide (1/2 Mile) and all other service ¼ mile, amenities based on boardings inside and outside Seattle, and service levels. While the study area currently does not have a RapidRide line serving it, the amenities and stops around the campus exceed the service guidelines and stops with shelters are frequent and exist at large transit stops along Pacific Street and 15th Avenue.

3.4.5 Shuttles Shared Use, and Transportation Network Companies

Shuttles serve as auxiliary transit, providing direct connections between University properties. The University of Washington shuttle system extends throughout the Seattle campus, providing access to University of Washington Medical Center facilities on campus and in South Lake Union. Shuttles also travel between the University District and Seattle Children's Hospital as well as Harborview Medical Center. The University of Washington Shuttle system is fare free, with multiple funding partners. Routes are extensive, as shown in Figure 3.24.

Shuttle routes include the Health Sciences Express, reaching between the north and west areas of campus to south campus and the University of Washington Medical Center, and continuing to the University of Washington Link Light Rail Station, University of Washington South Lake Union research facilities, and Harborview Medical Center. University of Washington shuttle services also include NightRide and Dial-a-Ride vehicles.

An additional shuttle route sponsored by Seattle Children's Hospital travels from Children's Hospital to the Husky Stadium Link Light Rail station and on to the South Lake Union research facilities. Although fare free, primary customers for the University of Washington shuttles can include patients or others conducting business between facilities. Passenger volumes are modest in comparison to the university population. Although shuttles are far reaching to Seattle Children's Hospital, South Lake Union, and Harborview Medical Center, routes are indirect, infrequent, and do not serve all areas of the University District. The shuttle systems serving the campus are shown in Figure 3.24.

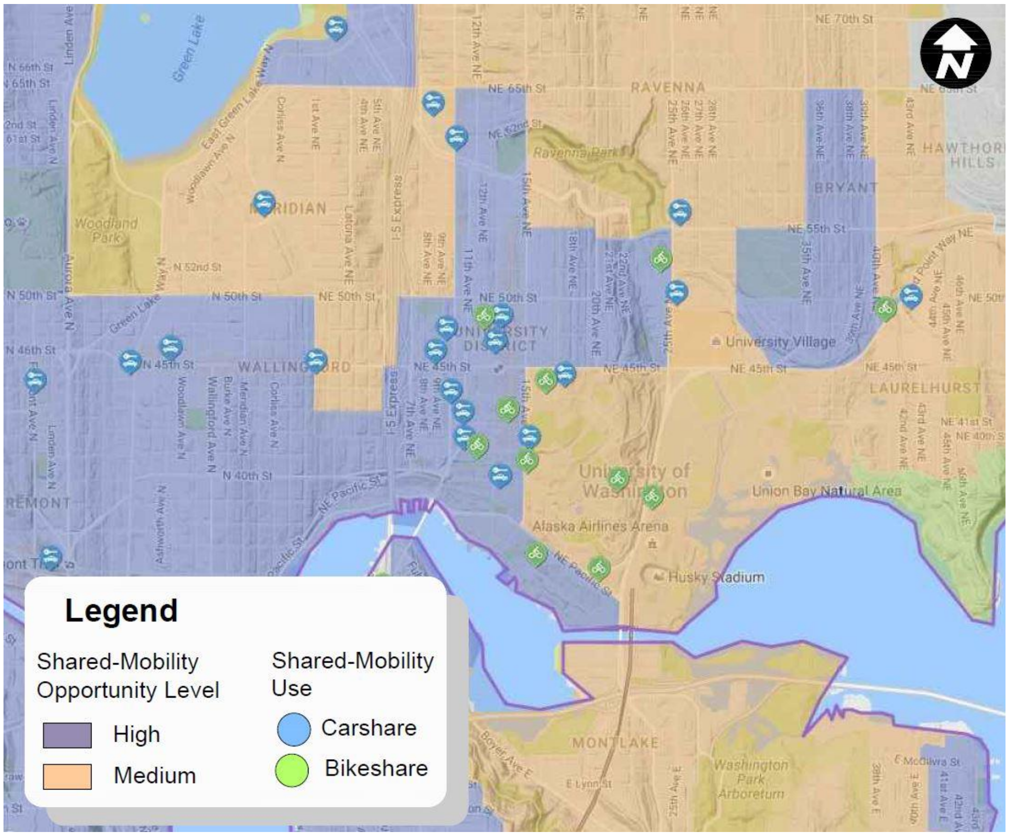


Source: University of Washington Transportation Services, 2016

Figure 3.24 Existing University of Washington Shuttle Routes

Shared use private car sharing services, such as Car2Go and Zipcar, and Transportation Network Companies (TNCs) including Uber and Lyft, operate in the study area, providing an alternative to private auto use and parking for campus communities. In the future, these car sharing and livery services can provide options that lessen reliance on cars and provide options for first and last mile access to transit. The Shared Use Mobility Center provides data and mapping of shared use opportunities (http://maps.sharedusemobilitycenter.org/sumc/).

This tool also suggests that areas around the campus have relatively high shared use mobility opportunities. It should be noted that data from TNCs is not available. In the future maintaining passenger loading areas throughout the campus can help foster use of TNCs for users.



Source: Shared Use Mobility Center, Transpo, 2016 (http://maps.sharedusemobilitycenter.org/sumc/)

Figure 3.25 Shared Use Mobility in the Area and Shared Mobility Opportunity Level

3.5 VEHICLE

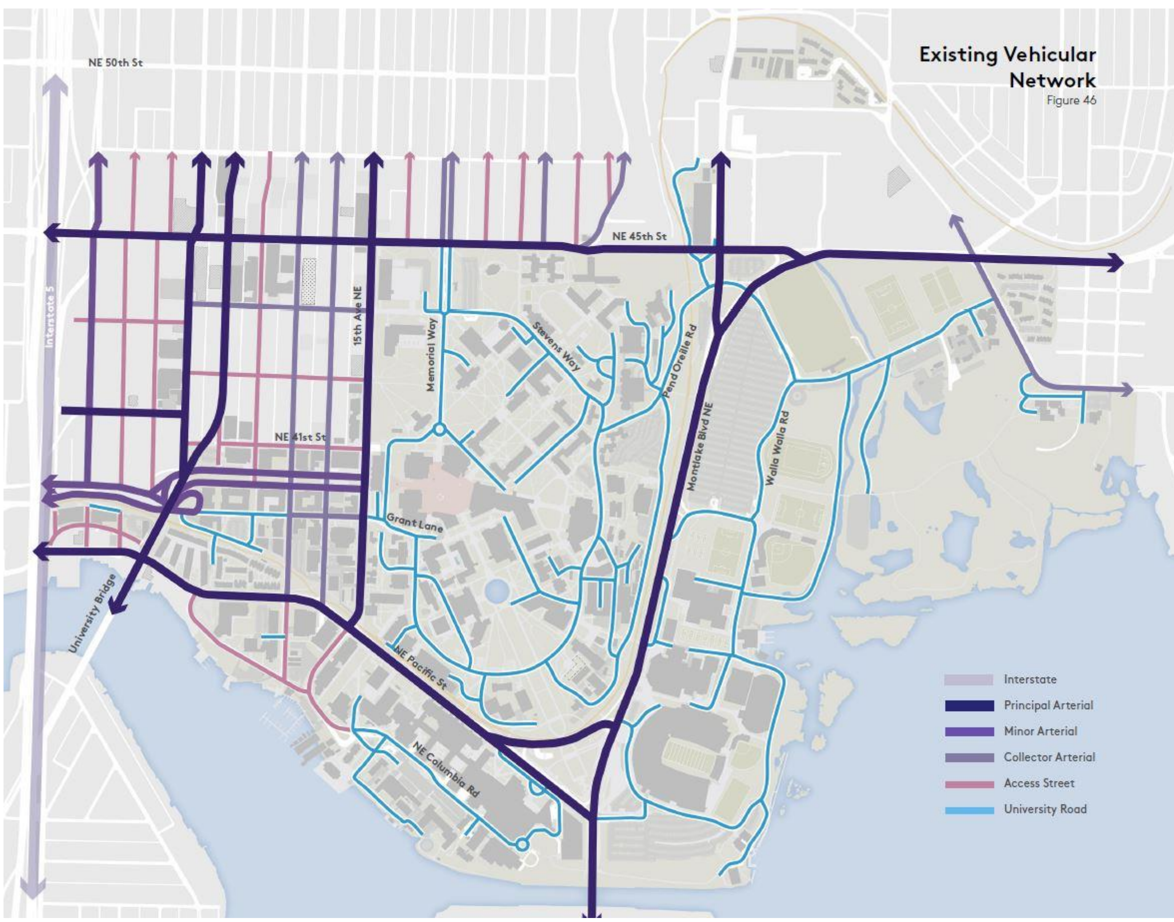
As shown in Table 3.2, of the campus community approximately 13,000 people access the campus using single occupancy vehicles (SOV). Of these trips, 3,720 are students, 3,539 are faculty, and 5,683 are staff. Additionally, there are over 4,000 people who access the campus using carpools.

3.5.1 Street System

The street system in the vicinity of the University of Washington campus is comprised of different classes of roadways serving multiple functions. City of Seattle roadways are classified as principal arterials, minor arterials, collector arterials, and local access streets. University of Washington-owned roadways do not have separate functional classifications, but are generally similar in nature to local access streets. Broader regional access to the University of Washington campus is provided via Interstate 5 (I-5) to the west and State Route 520 (SR 520) to the south with connections between the campus and these regional facilities generally provided via principal arterials.

Figure 3.26 shows the City's street classification in the study area and also identifies University owned roads. Table 3.9 summarizes the characteristics of major corridors within the study area (principal and minor arterials) including each roadway's functional classification, speed limit, number of lanes, parking, and general characteristics of non-motorized facilities. The City also designates streets with freight, pedestrian, and transit classifications. To improve safety, the City recently adopted lower speeds. The current classifications for the streets included in the project study area are also noted in Table 3.9.

In addition to functional classification, the City also classifies roadways as major truck streets and Green Streets. Major truck streets typically serve freight movement through the City between major freight traffic generators and the regional freeway network. Green Streets are roadways where pedestrian circulation and open space are prioritized over other transportation uses through design and operational features. Within the study area, NE Pacific Street and Montlake Boulevard south of NE Pacific Street are designated as major truck routes. Several Neighborhood Green Streets are located within the study area and include Brooklyn Avenue NE, NE 43rd Street, and NE 42nd Street. Routes designated for trucks in the Freight Master Plan are shown in Figure 3.34.



Source: Campus Master Plan, 2016

Figure 3.26 Arterial Classification in the Study Area

Table 3.9
STUDY AREA EXISTING ROADWAY NETWORK SUMMARY

Street	Classification	Posted Speed Limit	Number of Travel Lanes	Parking	Sidewalks and Bicycle Facilities
NE 50th St	Principal Arterial[1] Minor Transit	30 mph	2 travel lanes in each direction	No	Sidewalks on both sides
NE 45th St	Principal Arterial Major/Minor Transit	30 mph	1-3 EB travel lanes; 2-3 WB travel lanes	No	Sidewalks on both sides Sharrows
NE 42nd St	Principal Arterial/Access Street Major Transit	30 mph	1 travel lane in each direction	Intermittent both sides; peak hour restrictions	Sidewalks on both sides
NE Northlake Way	Collector Arterial	30 mph	1-2 travel lanes in each direction	Intermittent both sides; peak hour restrictions	Sidewalks mostly on both sides but intermittent
NE Pacific St	Principal Arterial Principal/Minor Transit	30 mph	1-2 travel lanes in each direction; EB bus only near Montlake Blvd NE	No	Sidewalks on both sides west of 15th Ave NE; south side only east of 15th Ave NE
Roosevelt Way NE	Principal Arterial Major Transit	30 mph	2 one-way southbound travel lanes	Intermittent paid	Sidewalks on both sides; cycle track
11th Ave	Principal Arterial Major Transit	30 mph	2-3 one-way northbound travel lanes	Intermittent paid & time limited	Sidewalks on both sides
Eastlake Ave NE	Principal Arterial Major Transit	30 mph	2 travel lanes in each direction	No	Sidewalks & bicycle lanes on both sides
15th Ave NE	Principal Arterial Principal Transit	30 mph	2 travel lanes in each direction	Intermittent paid	Sidewalks on both sides
Montlake Blvd NE	Principal Arterial Principal/Major Transit	30-35 mph	2-3 travel lanes in each direction	No	Sidewalks on both sides south of NE Pacific Pl; east side only north of NE Pacific Pl
25th Ave NE	Principal Arterial Minor Transit	30 mph	2 travel lanes in each direction	No	Sidewalks on both sides
NE 40th St	Minor Arterial/Collector Minor/Local Transit	25-30 mph	1 travel lane in each direction	Intermittent paid	Sidewalks on both sides
NE Campus Way	Minor Arterial Major Transit	30 mph	2 travel lanes in each direction	Intermittent paid	Sidewalks on both sides

Source: Transpo Group, 2016

NOTE: The City recently adopted lowering of arterial and local speed limits by 2 miles an hour. These posted speeds do not reflect what the speed limits would be when this takes affect.

EB = Eastbound, NEB = Northeast-bound, NWB = Northwest-bound, SWB = Southwest bound, WB = Westbound

1. NE 50th Street is a collector arterial east of 15th Avenue.

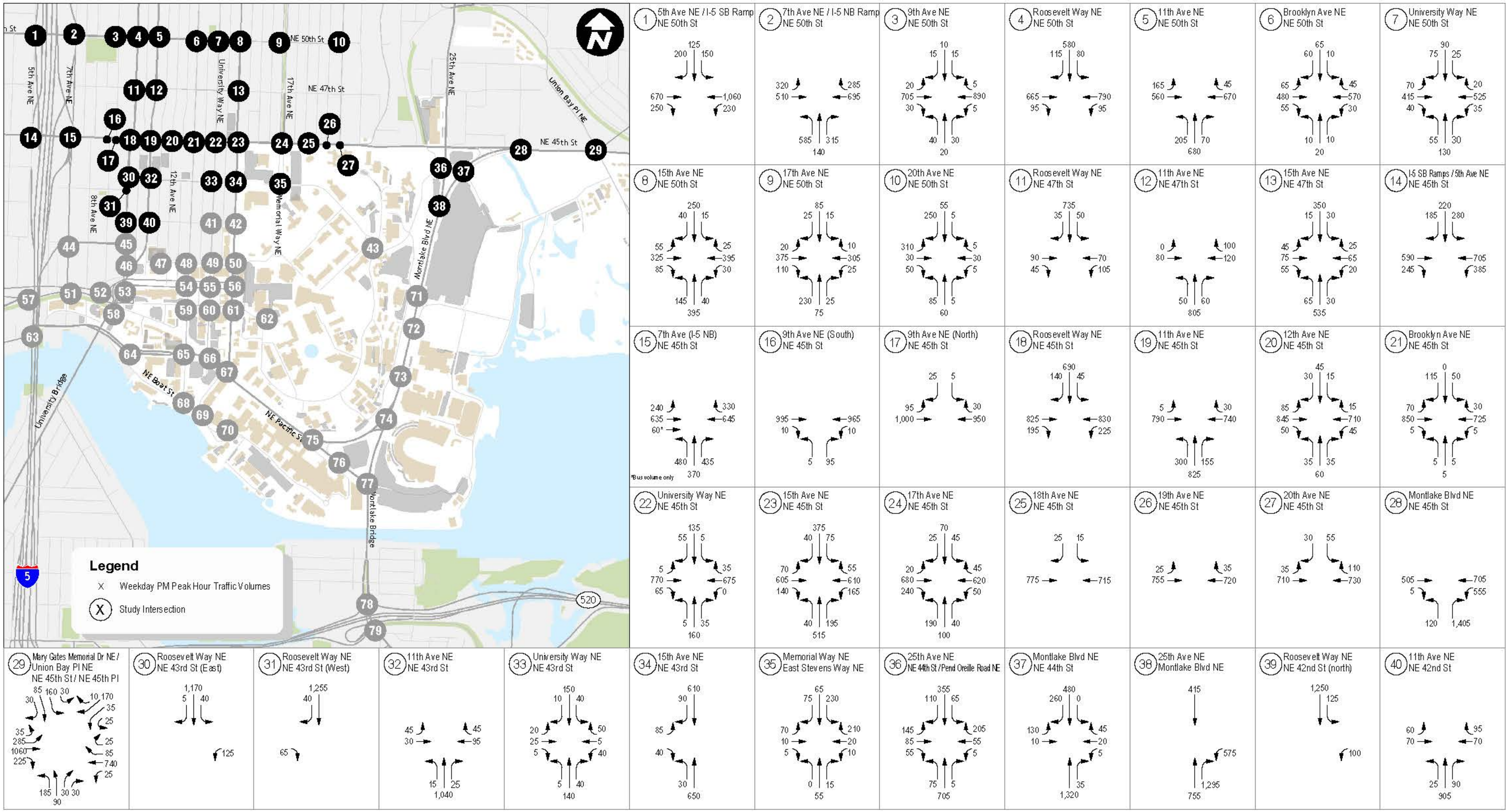
3.5.2 Traffic Volumes

Traffic data was obtained for all study area intersections from counts commissioned by Transpo Group and performed by Quality Counts between October and November 2015. The existing weekday PM peak hour traffic volumes are shown in Figure 3.27 and Figure 3.28. Weekday PM peak hour turning movement volumes at the study intersection are provided in Appendix C.

In the vicinity of the University of Washington campus and as typical of their functional classification, the greatest vehicular traffic volumes are greatest along the principal arterial roadways. West of the campus, the highest volume roadway is the Roosevelt Way NE-11th Avenue NE couplet which currently serves a combined 1,700 to 2,700 vehicles during the weekday PM peak hour. The remaining principal arterials serve the following vehicular volumes during the weekday PM peak commute period:

- NE 45th Street - between 1,500 to 2,000 vehicles per hour
- NE 50th Street - approximately 1,500 vehicles per hour
- 15th Avenue NE - approximately 1,100 to 1,400 vehicles per hour

The remaining principal arterials in the vicinity of the University of Washington campus include NE Pacific Street and Montlake Boulevard NE. NE Pacific Street serves approximately 1,400 to 1,800 vehicles during the weekday PM peak hour, and Montlake Boulevard serves approximately 3,000 vehicles per hour north of NE Pacific Street and 4,000 to 4,500 vehicles per hour in the vicinity of the SR 520 interchange.



Existing (2015) (Intersections 1-40) Weekday PM Peak Hour Traffic Volumes

FIGURE 3.27

University of Washington 2018 Campus Master Plan

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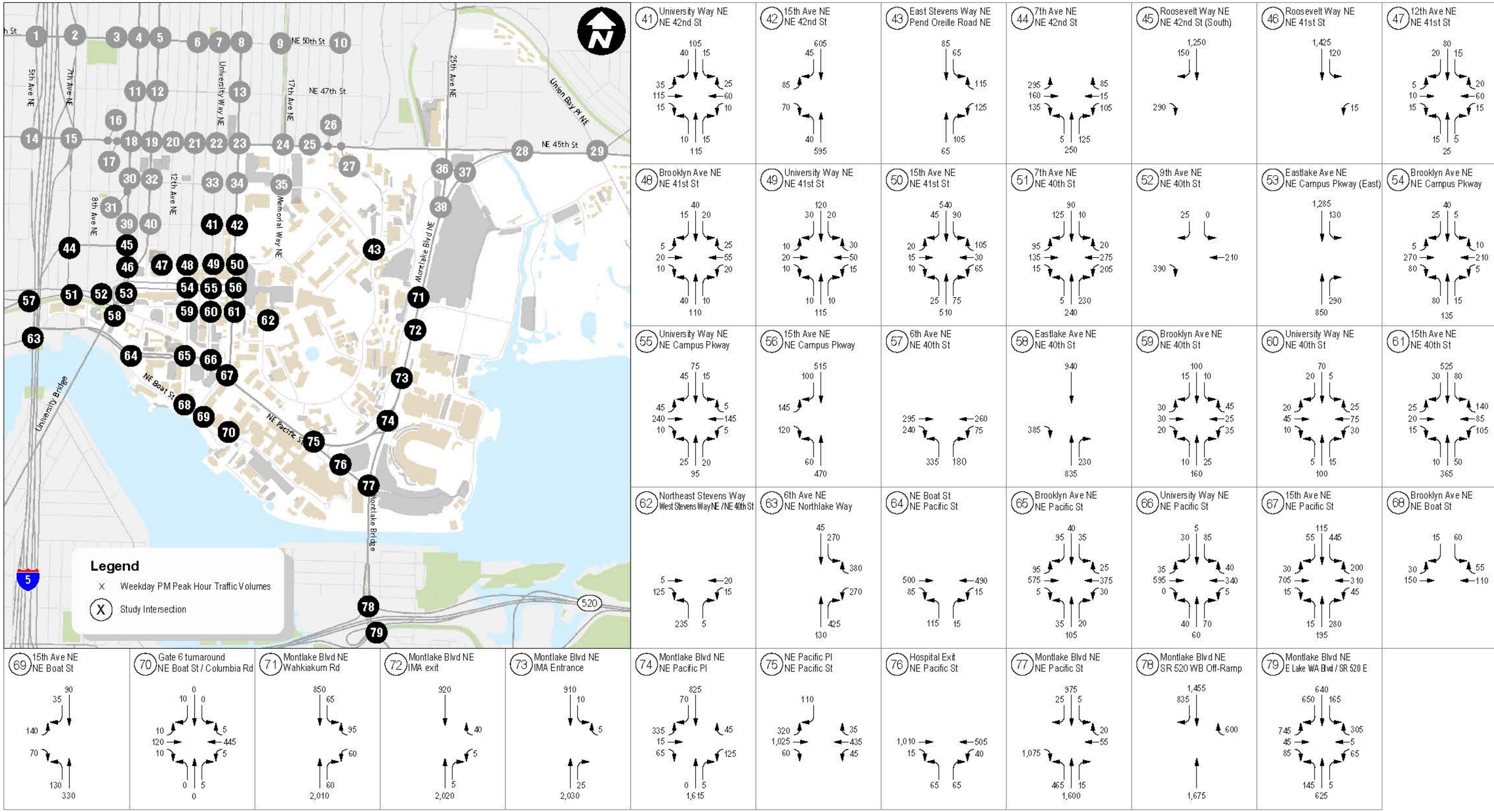

Existing (2015) (Intersections 41-79) Weekday PM Peak Hour Traffic Volumes

University of Washington 2018 Campus Master Plan

FIGURE
3.28

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WHAT TRANSPORTATION CAN BE.

3.5.3 Traffic Operations Performance

Detailed methods for evaluation of traffic operations are described in Appendix B. Arterial LOS was evaluated along six corridors within the primary study area. This includes:

- NE 45th Street, Eastbound/Westbound (5th Avenue NE to Union Bay Place NE)
- NE Pacific Street (NE Northlake Way), Eastbound/Westbound (6th Avenue NE to Montlake Boulevard E)
- 11th Avenue NE, Northbound (NE Campus Parkway to NE 50th Street)
- Roosevelt Way NE, Southbound (NE Campus Parkway to NE 50th Street)
- 15th Avenue NE, Northbound/Southbound (NE Boat Street to NE 50th Street)
- Montlake Boulevard E, Northbound/Southbound (E Lake Washington Boulevard to NE 45th Street)

Arterial performance is based on the average vehicle speed and the arterial class of the corridor. The average speed along the corridor includes vehicle travel time as well as delay from traffic signals. Signal delay for arterial LOS is based on Synchro 9 methodology and the arterial class is determined by Synchro 9 based on the speed limit and intersection spacing of the corridor.

Intersection Operations

As part of the intersection operations analysis, signal timing and phasing information was obtained from the SDOT. Lane geometrics and traffic control were confirmed through a review of aerial images from 2015 and field visits. Note that due to peak period on-street parking restrictions, the functional lane geometry changes at some of the study area intersections between the weekday AM and PM peak periods. At intersections with transit lanes (for example Pacific Avenue), modifications were made to the Synchro 9 model to account for the bus lanes. The intersection levels of service also consider pedestrian volumes, bicycle volumes, heavy vehicle volumes, and intersection peaking characteristics from the traffic volume counts. Note that operations at the intersections of Brooklyn Avenue NE/NE Campus Parkway and University Way NE/NE Campus Parkway were reviewed as either separate or combined intersections, considering the overall weighted average delay. This analysis is due to the current configuration of the intersections. Additional discussion surrounding these intersections is included in Appendix B.

Intersection levels of service are shown for all study area intersections on Figure 3.30 for the weekday PM peak hour. Intersection summary tables for LOS results are included in Appendix C. Detailed level of service worksheets are in Appendix C. The number of intersections within the study area that are operating at LOS C or better, LOS D, LOS E, or LOS F is also summarized in Figure 3.29.

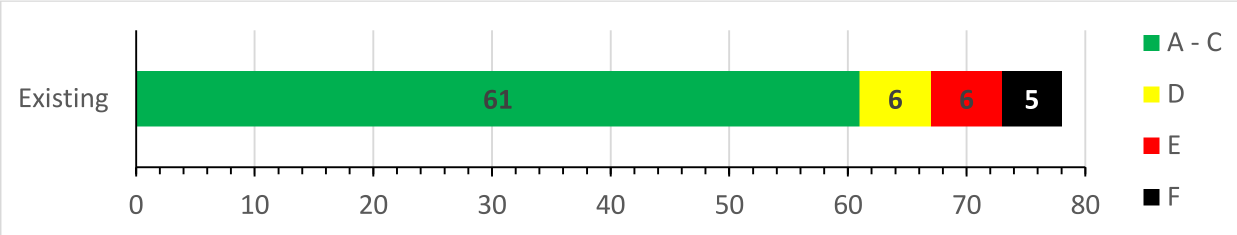
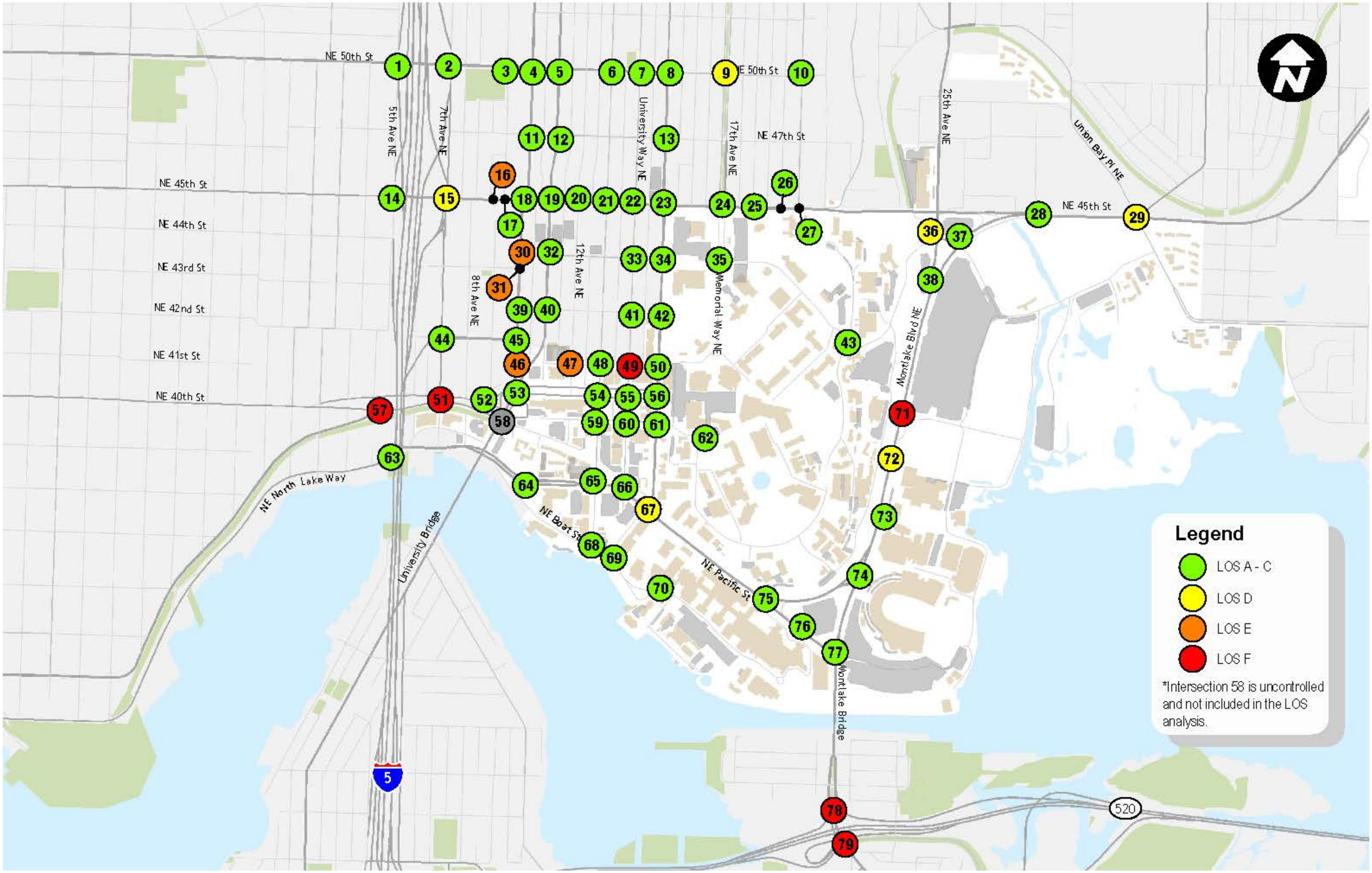


Figure 3.29 Existing (2016) Weekday PM Peak Intersection Level of Service Summary

As illustrated by Figure 3.29, all study area intersections currently operate at LOS D or better, with the exception of the following 11 intersections that operate at LOS E or F:

16. 9th Avenue NE (South)/NE 45th Street
30. Roosevelt Way NE/NE 43rd Street (East)
31. Roosevelt Way NE/NE 43rd Street (West)
46. Roosevelt Way NE/NE 41st Street
47. 12th Avenue NE/NE 41st Street
49. University Way NE/NE 41st Street
51. 7th Avenue NE/NE 40th Street
57. 6th Avenue NE/NE 40th Street
71. Montlake Boulevard NE/Wahkiakum Road
78. Montlake Boulevard NE/SR 520 WB Off-Ramp
79. Montlake Boulevard NE/E Lake Washington Boulevard/SR 520 EB Ramps



Existing (2015) Weekday PM Peak Hour Traffic Operations

University of Washington 2018 Campus Master Plan

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WHAT TRANSPORTATION CAN BE.

FIGURE
3.30

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Arterial Operations

Route performance along key corridors was evaluated within the study area to provide an additional level of analysis regarding the overall operations of the roadway network. Methods for calculating arterial operations is described in the Appendix B Methods and Assumptions. Table 3.10 provides a summary of the existing calibrated travel times and average speeds. Detailed data including travel times measured in the field, existing uncalibrated travel times from the Synchro model, and the resulting adjustment factor can be found in Appendix C.

Table 3.10
EXISTING FACTORED WEEKDAY PM PEAK HOUR ARTERIAL TRAVEL TIMES AND SPEEDS

Corridor	Existing Factored Model Output[1]	
	Travel Time (m:ss)[2]	Average Speed (mph)
NE 45th Street—5th Avenue NE to Union Bay Place NE		
Eastbound	8:25	11.7
Westbound	7:51	12.0
NE Northlake Way/NE Pacific Street—6th Avenue NE to Montlake Boulevard E		
Eastbound	4:32	15.9
Westbound	3:30	20.6
Roosevelt Way NE—NE Campus Parkway to NE 50th Street		
Southbound	5:21	14.4
11th Avenue NE—NE Campus Parkway to NE 50th Street		
Northbound	4:19	8.5
Montlake Boulevard E—E Lake Washington Boulevard to NE 45th Street		
Southbound	11:01	8.0
Northbound	5:32	14.0

1. Existing factored model output is Synchro output data that has been adjusted to account for existing field measurements and takes in to account operational impacts such as midblock crosswalks and parking maneuvers.
2. m:ss = minutes and seconds

As shown, the weekday PM peak travel speeds take into account free-flow travel times and intersection related delay. Overall the travel times and speeds indicate existing congestion in both directions along Montlake Boulevard E, but particularly so in the southbound direction. With the addition of further traffic growth, all directional travel times would increase and travel speeds would decrease.

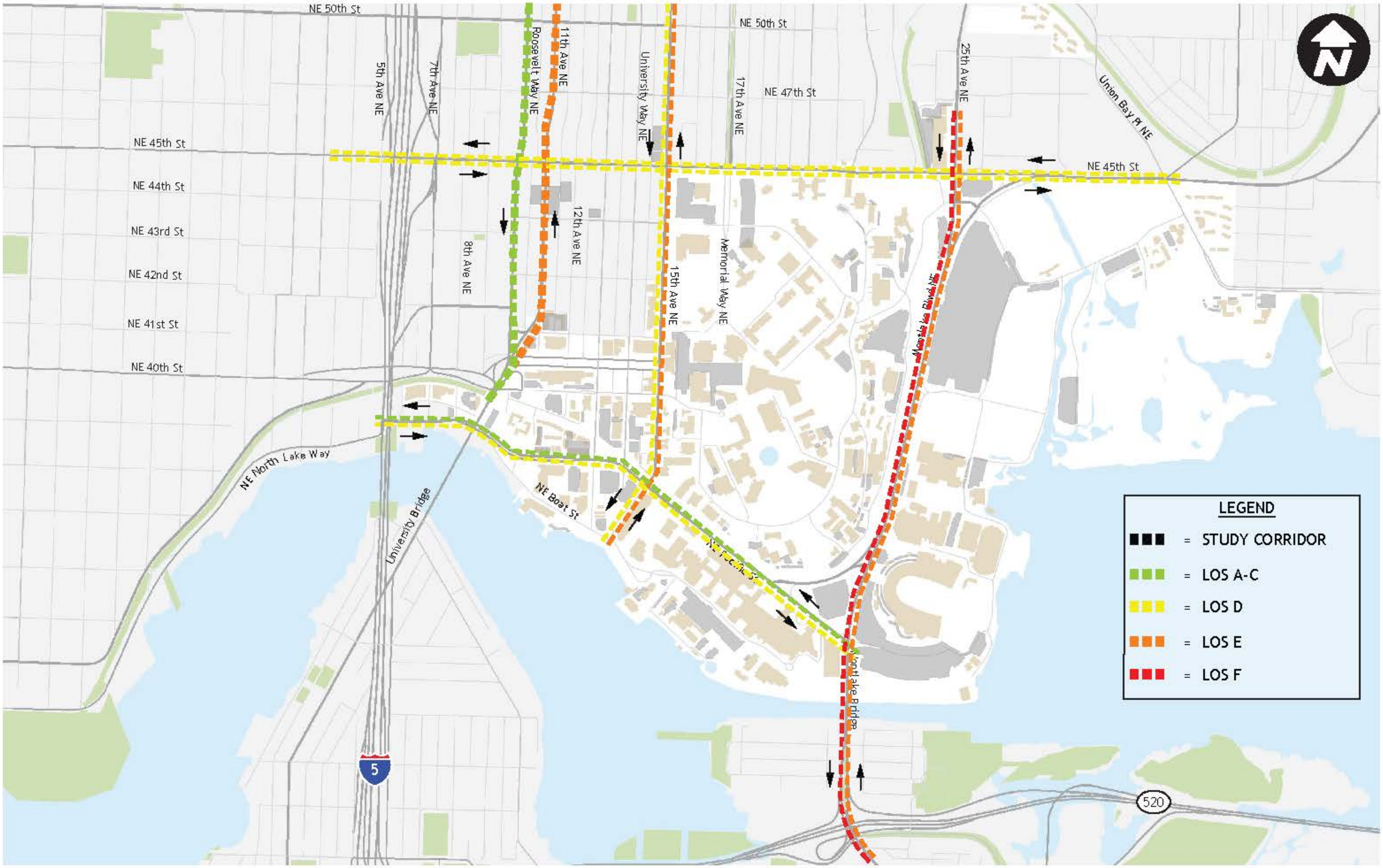
The arterial analysis was performed using the Synchro 9 software and determines arterial LOS based on travel speed between points. The results are summarized in Table 3.11**.** Detailed arterial LOS calculations are included in Appendix C. Traffic conditions can be worse when extreme congestion on I-5 and SR 520 constrains access onto the freeway.

Table 3.11
EXISTING PM PEAK ARTERIAL LEVEL OF SERVICE SUMMARY

Corridor	Existing PM Peak Hour	
	LOS[1]	Speed[2]
NE 45th Street, Eastbound (5th Avenue NE to Union Bay Place NE)	D	11.7
NE 45th Street, Westbound (5th Avenue NE to Union Bay Place NE)	D	12.0
NE Pacific Street (NE Northlake Way), Eastbound (6th Avenue NE to Montlake Boulevard E)	D	15.9
NE Pacific Street (NE Northlake Way), Westbound (6th Avenue NE to Montlake Boulevard E)	C	20.6
11th Avenue NE, Northbound (NE Campus Parkway to NE 50th Street)	E	8.5
Roosevelt Way NE, Southbound (NE Campus Parkway to NE 50th Street)	C	14.4
15th Avenue NE, Northbound (NE Boat Street to NE 50th Street)	E	8.2
15th Avenue NE, Southbound (NE Boat Street to NE 50th Street)	D	9.4
Montlake Boulevard NE, Northbound (E Lake Washington Boulevard to NE 45th Street)	E	14.0
Montlake Boulevard NE, Southbound (E Lake Washington Boulevard to NE 45th Street)	F	8.0

Source: Transpo Group, 2016
1. Level of service.
2. Average speed in miles per hour

As shown in Figure 3.31, all six arterials analyzed currently operate at either LOS D or better during the weekday PM peak hour conditions with the exception of the following: 11th Avenue NE in the northbound direction, 15th Avenue NE northbound, and Montlake Boulevard NE northbound which currently operate at LOS E and Montlake Boulevard NE southbound which currently operates at LOS F. These arterials serve as the main routes to/from I-5 and the University of Washington Campus and experience congestion during the peak periods resulting from heavy commuting traffic volumes.



Existing (2015) Weekday PM Peak Hour Corridor Traffic Operations

University of Washington 2018 Campus Master Plan

FIGURE
3.31

transpogroup WHAT TRANSPORTATION CAN BE.

Aug 26, 2016 - 1:44pm francescal \\srv-dfs-wa\MM_Projects\Projects\14\14284.03 - UW Master Plan EIS\Graphics\Draft EIS Graphics_Existing.dwg Layout: Corridor_Ex

Screenline Analysis: Primary Impact Zone

Screenline: An imaginary line across which the number of passing vehicles is counted.

The following section describes the screenline analysis completed for two designated screenlines within the study area, consistent with the City of Seattle's Transportation Concurrency system. . In this study, screenlines were selected to count vehicle traffic entering and exiting the University of Washington primary and secondary impact zones. As part of the Mayor's Seattle 2035 Comprehensive Plan (City of Seattle, 2016), two screenlines are identified within the vicinity of the University of Washington, as shown in Figure 3.32. Screenline 5.16 is an east-west screenline, measuring north-south travel, and extending along the ship canal to include the University and Montlake Bridges. Screenline 13.13 is a north-south screenline, measuring east-west travel, and extending east of I-5 between NE Pacific Street and NE Ravenna Boulevard.

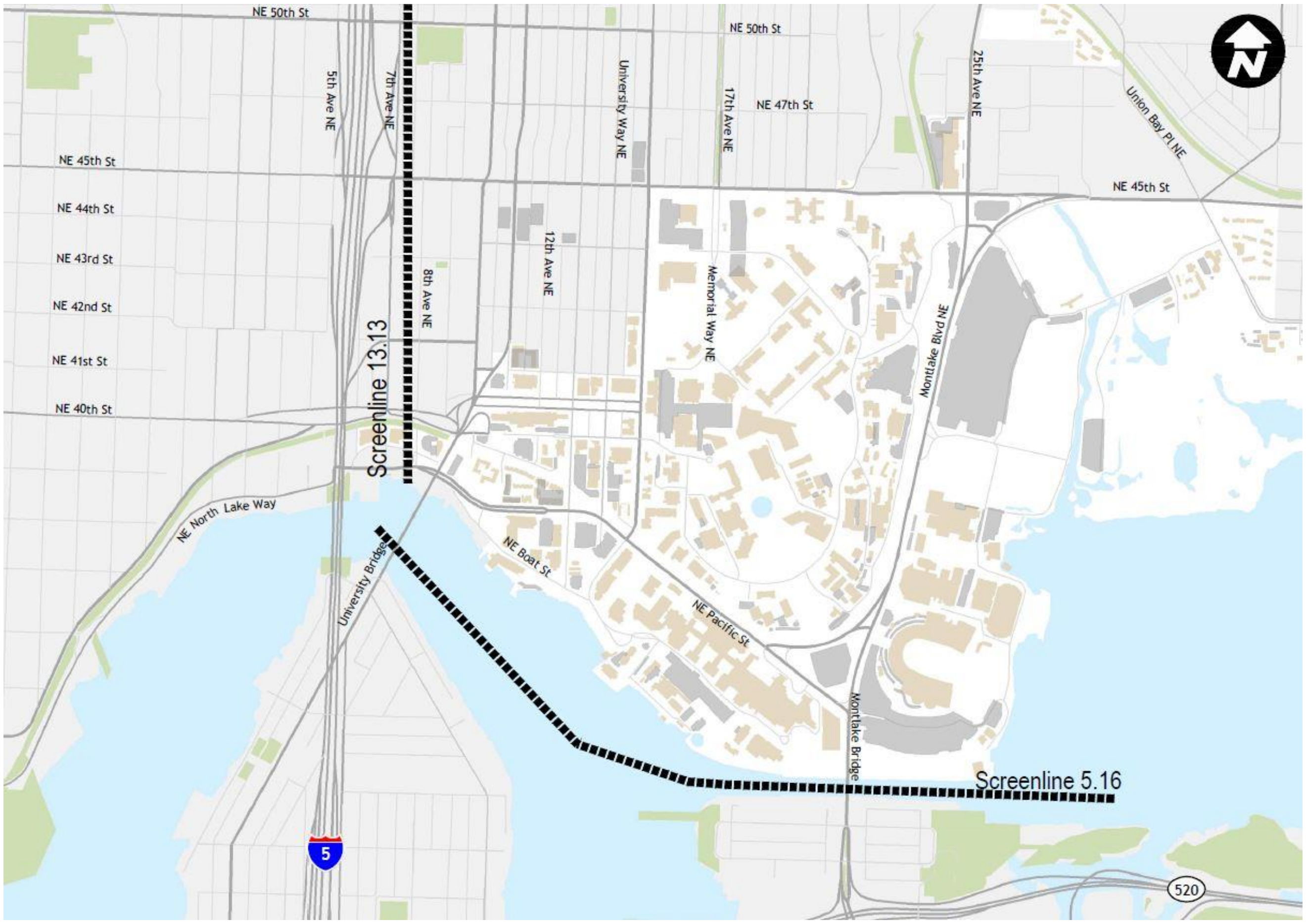


Figure 3.32 Study Area Screenlines

The screenline analysis includes volume to capacity (V/C) calculations for the vehicles traversing the screenlines using existing (2015) traffic volumes and roadway capacity estimates. Existing roadway capacity estimates are shown in Table 3.12 below.

Table 3.12
ROADWAY CAPACITY ASSUMPTIONS

Roadway Description	Capacity (per direction, per hour)
Two-lane street	800
Four-lane street	1,600
Six-lane street	2,400
Two-lane street with frequent buses	750
Four-lane street with frequent buses	1,450
Six-lane street with frequent buses	2,150

Source: NACTO and Transpo Group, 2016

Level of service standards for the screenline analysis are based on the volume to capacity ratio of a screenline. As described in the Seattle Comprehensive Plan Update EIS, the LOS standard volume to capacity ratio for Screenline 5.16 and Screenline 13.13 are 1.20 and 1.00, respectively. The existing conditions screenline analysis is included in Table 3.13. Detailed screenline volumes and volume to capacity calculations are included in Appendix C.

Table 3.13
EXISTING SCREENLINE ANALYSIS

Screenline	Screenline Volume	Capacity	V/C	LOS Standard V/C
5.16 – Ship Canal, University and Montlake Bridges				
Northbound	3,340	3,850	0.87	1.20
Southbound	3,615	3,850	0.94	1.20
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard				
Eastbound	3,245	6,100	0.53	1.00
Westbound	3,620	6,100	0.59	1.00

Source: NACTO, Seattle Comprehensive Plan Update EIS, and Transpo Group, 2016

As shown in Table 3.13, all existing screenline volume to capacity ratios meet the acceptable LOS standard.

3.5.4 Collision History

Recent collision records were reviewed within the study area to identify existing traffic safety issues at the study intersections. The most recent three-year summary of accident data from the Seattle Department of Transportation (SDOT) and Washington Department of Transportation (WSDOT) is for the period between January 1, 2012 and December 31, 2014. Collisions were summarized at study locations for vehicle, bicycle, and pedestrian modes. Locations with an average of 3 or more collisions per year and total 3-year bicycle and pedestrian collision are summarized in Table 3.14.

SDOT annually reviews the previous year's collisions within the City and creates a list of "high collision locations" (HCL) that are monitored or reviewed in the next year. The review screens the previous year collisions for signalized intersections with 10 or more collisions in a year, unsignalized intersections with 5 or more collisions, and locations with 5 or more pedestrian or bicycle collisions in the previous 3 years. SDOT's *Draft Candidate Locations for 2015 HCL Reviews* shows the following locations in the study area:

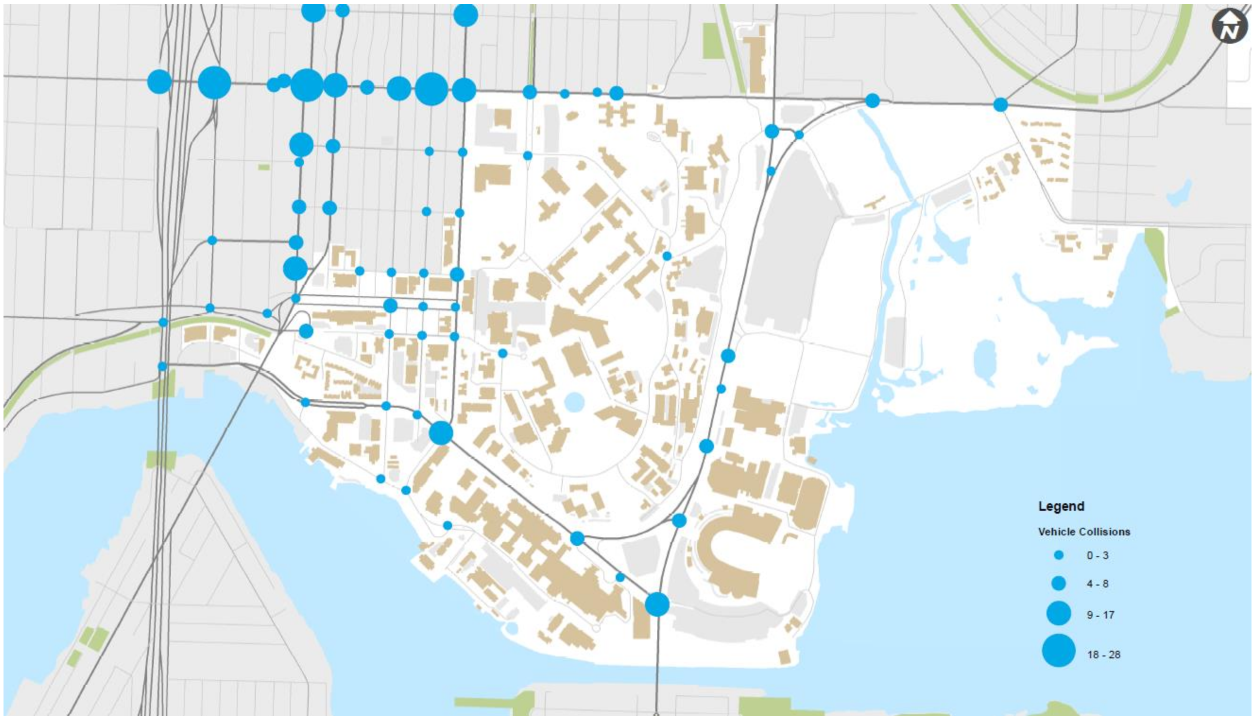
- **Roosevelt Way NE & NE 45th ST**: This intersection had 9 collisions in 2014. Additionally, this location had 4 pedestrian collisions during the 3-year period. A repaving project in 2015 included improvements for pedestrians.
- **Brooklyn Ave NE / NE 45th ST:** This location had 7 pedestrian collisions during the 3-year period. The City monitored this location in 2013.
- **Brooklyn Ave NE / NE 50th ST:** This location had 4 pedestrian collisions during the 3-year period.

Table 3.14
3-YEAR COLLISION SUMMARY

Location	3-Year Total (1/2012-12/2014)			
	Ped/Bicycle	Total Fatalities	Total Vehicle Collisions	Annual Average Vehicle Collisions
7th Ave (I-5 NB) / NE 45th St	3	0	18	6
Roosevelt Way NE / NE 45th St	5	0	18	6
Brooklyn Ave NE / NE 50th St	4	0	17	5.7
11th Ave NE / NE 50th St	5	0	15	5
Roosevelt Way NE / NE 50th St	3	0	14	4.7
15th Ave NE / NE 50th St	1	0	14	4.7
University Way NE / NE 45th St	2	0	14	4.7
University Way NE / NE 50th St	5	0	13	4.3
Brooklyn Ave NE / NE 45th St	6	0	12	4
9th Ave NE / NE 50th St	1	0	10	3.3
Roosevelt Way NE / NE 41st St	2	0	10	3.3
Montlake Blvd NE / E Lake WA Blvd / SR 520 E	2	0	10	3.3
7th Ave NE / I-5 NB Ramp / NE 50th St	2	0	9	3
Montlake Blvd NE / NE Pacific St	1	0	9	3

Source: SDOT and WSDOT

A hotspot analysis showing the number of collisions within the study area is shown in Figure 3.33.



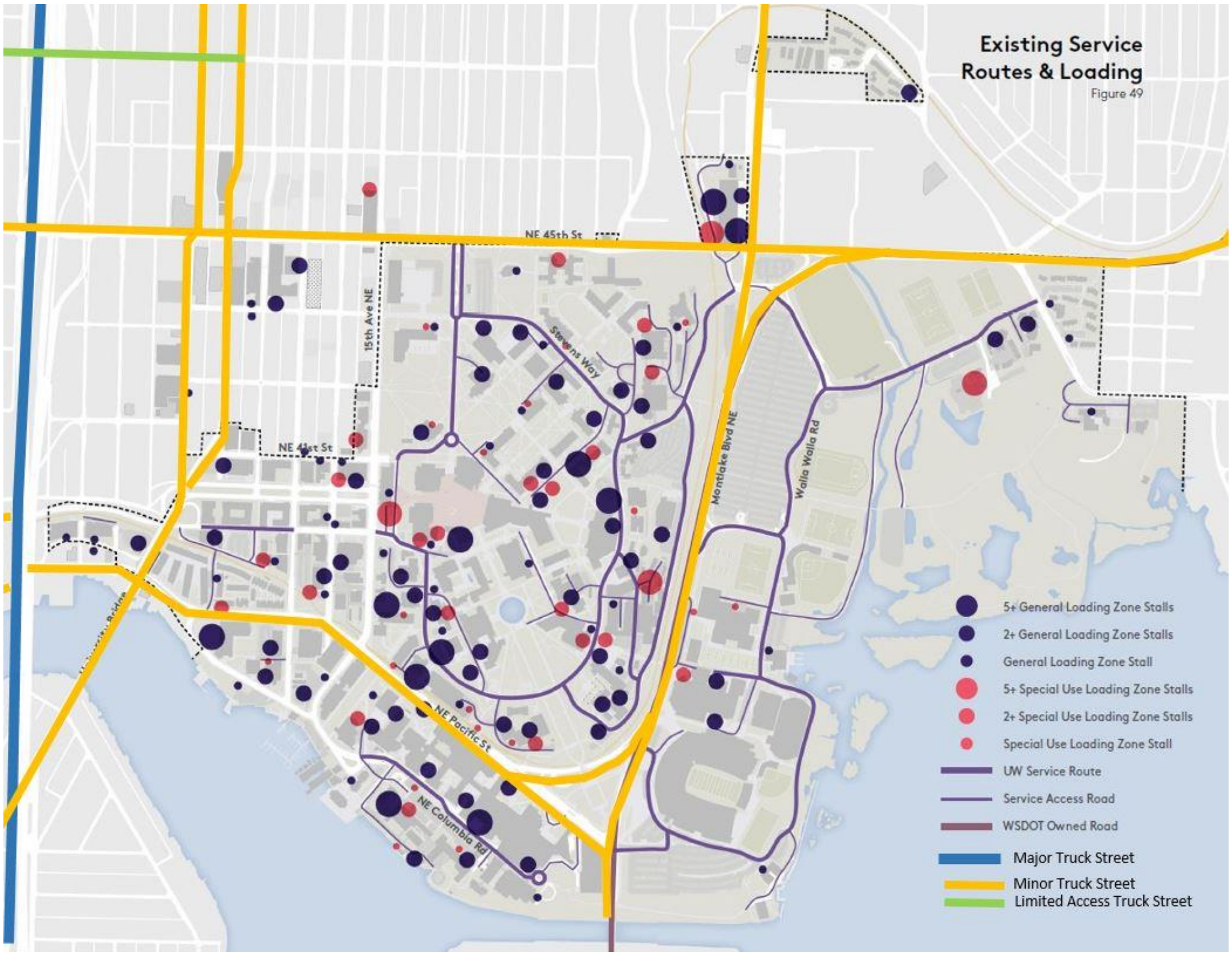
Source: Transpo 2016

Figure 3.33 Intersection Vehicle Collision Summary

3.5.5 Service/Freight Routes

Freight deliveries occur throughout campus directly from the shippers to the individual buildings as well as interdepartmental deliveries. Figure 3.34 highlights the existing loading zones, service access roads, and University of Washington service routes. These loading zones include on-street loading zones as well as dedicated off-street zones. Depending on the nature of the deliveries, they may access the site using one of the many arterials such as NE 45th Street, Montlake Blvd NE, or any of the local streets depending on the nature of the delivery. Figure 3.34 also shows designated major and minor truck streets as designated in the City of Seattle Freight Master Plan.

Freight Master Plan: The City of Seattle has published their first Freight Master Plan in 2016. The Freight Master Plan includes a network of designated Major and Minor Truck Streets, Limited Access facilities and First/Last Mile Connectors that are planned and designed to accommodate truck movements.



Source: Sasaki, October 2016 CMP, Transpo

Figure 3.34 Existing Service Rotes and Loading

3.5.6 Parking

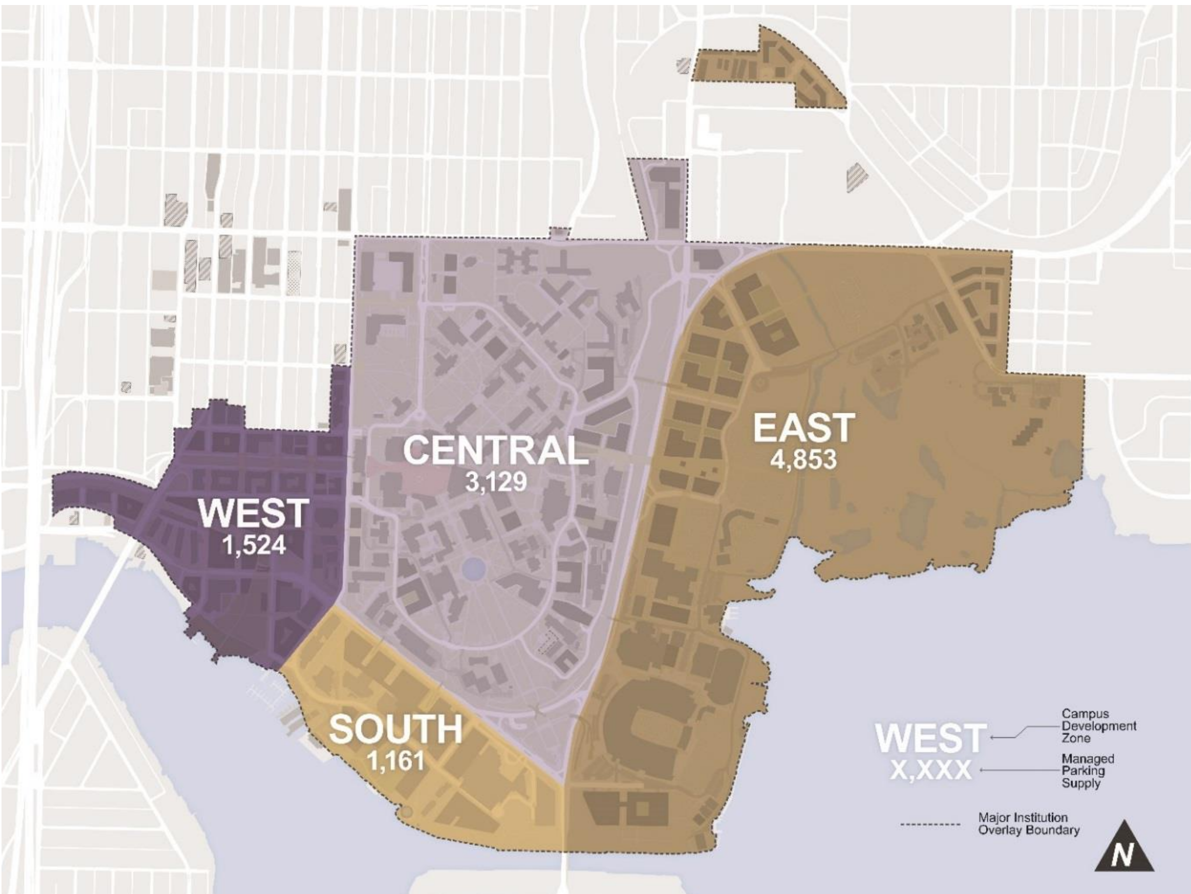
The University of Washington parking is managed by University of Washington Transportation Services (UWTS). Parking on campus consists largely of paid permit parking on weekdays between 6 a.m. and 9 p.m. and Saturday from 7 a.m. to noon. Students, faculty and staff generally have pre-assigned parking areas; visitors are allocated to open spaces on a day-by-day basis, depending on demand characteristics. Complimentary parking is available on weekdays after 9 p.m. until 6 a.m., Saturdays from noon until 6 a.m., Sundays and holidays. The methodology for evaluating parking demands and supply of existing as well as future conditions is described in the Methods and Assumptions Appendix B. The parking supply and demand are described below for existing University of Washington conditions.

Supply

> **Cap Parking Supply:** The University of Washington has an obligation as part of the City-University Agreement (CUA) with the City of Seattle to meet parking caps. The current on-campus parking limit is 12,300 spaces.

The existing Campus Master Plan (CMP) limits on-campus parking to a maximum of 12,300 spaces. This parking space cap does not include service and load zones, cycle spaces, accessory off-campus leased spaces, and spaces associated with student housing. Of the 12,545 spaces on campus, UW currently reports 10,667 spaces included in the most recent parking cap calculation for City-University Agreement (CUA) compliance, which is well below the allowed cap of 12,300 spaces the University could supply.

This parking analysis focuses on the current supply of parking under the University's parking cap, as this captures the supply available to accommodate campus growth.



Source: University of Washington Transportation Services.

Figure 3.35 Existing Campus Cap Parking Supply by Sector

Demand

University of Washington parking peaks midday between 11 a.m. and 2 p.m. consistent with class and work schedules as well as visitors coming to/from campus. Table 3.15 summarizes the existing 2015 peak parking demand counts for the campus. This parking demand is reflective of spaces used within the cap parking supply for the University of Washington as well as consideration other parking demand that may utilize cap supply in the future such as parking currently occurring on-street or within other areas of campus not subject to the parking cap. Visitor parking demand is also included as part of the analysis.

Table 3.15
EXISTING PEAK PARKING DEMAND BY POPULATION

	Vehicles Parked[1]			
	Students[2]	Faculty[2]	Staff[2]	Total
On-Campus[2]	1,844	1,090	3,786	6,720
On-Street[2]	134	49	93	276
Total	**1,978**	**1,139**	**3,879**	**6,996**

Source: Transpo Group, 2016

1. Based on University of Washington 2015 parking counts, which includes visitor parking. Peak parking demand occurs during the weekday midday period.
2. Demand by population and parking destinations based on a 3-year average of the University of Washington Transportation Surveys (2012, 2013 and 2014).

As shown in the table, the peak on-campus parking demand is approximately 6,700 vehicles resulting in approximately 63 percent of the cap parking supply being utilized. In addition, there is parking that occurs on-street within the MIO and surrounding areas. There are some on-street parking restrictions such as time limits and restricted parking zones. It is estimated, based on commute trip survey responses, that during the weekday peak period, approximately 275 vehicles associated with the University of Washington are parked on-street. Field observations indicated that on-street parking is generally full in the vicinity of the University of Washington.

The on-campus parking demand and utilization was also reviewed by sector to provide context on where parking is occurring (see Table 3.16). Allocation of existing parking demand by sector was based on the University of Washington parking counts that indicate where vehicles are parked on-campus.

Table 3.16
EXISTING SUPPLY AND WEEKDAY PEAK PARKING DEMAND BY SECTOR

	Campus Parking Supply		Existing Parking Demand[1]	
Sector	**No. Lots**	**Cap Supply**	**Demand (vehicles)**	**% Utilization**
West	26	1,524	1,428	94%
South	12	1,161	1,139	98%
Central	42	3,129	2,689	86%
East	21	4,853	1,464	30%
Total	**101**	**10,667**	**6,720**	**63%**

Source: Transpo Group, 2016

1. Based on 2015 parking counts conducted by University of Washington Transportation Services, which includes visitor parking. Peak parking demand occurs during the weekday midday period.

As shown in the table, parking in the South and Central Sectors are the most highly utilized for the campus. This is reflective of the majority of activity occurring at the University of Washington Medical Center and student and staff parking permits being allocated to the South and Central Sectors. The East Sector is further from most of the academic building so parking is less utilized during the peak midday period. The South and West Sectors experience the highest level of peak utilization at 93 to 98 percent, which is effectively at or near capacity when searching for parking is considered. In fact, some of the reported demand in the West Sector is likely parking that would prefer to be parking in the South Sector, but is redirected to available parking in West Campus garages and lots.

Secondary Parking Impacts

Given the cost of parking and the U-PASS program that provides transit passes, there is likely some parking that occurs outside the primary impact zone surrounding the campus. This would include vehicles parking within transit served areas with unrestricted parking and then using transit to travel to campus. It is difficult to quantify to what degree parking in neighborhood areas adjacent to the campus is occurring given that the City of Seattle and surrounding areas are well served by transit.

3.5.7 City University Agreement – Trip and Parking Caps

CUA (City-University Agreement) An agreement between the City of Seattle and the University of Washington, that defines maximum parking and peak period trip.

Transportation Management Program (TMP): A transportation management program provides strategies for limiting traffic impacts and promoting active communities by managing vehicle trips and parking, as well as accommodating transit and non-motorized travel modes.

The University of Washington has a continuing obligation as part of the City-University Agreement with the City of Seattle (CUA) to meet vehicle trip and parking caps consistent with traffic levels reached in 1990. With the introduction of the U-PASS program in 1991, and continuing attention to U-PASS and other measures identified in the existing Transportation Management Program (TMP), the University of Washington has maintained compliance with these goals every year since 1990, despite growing 35 percent in campus population.

Vehicle Trips. The University has a program of monitoring, evaluating, and reporting transportation conditions through data collection and survey. Through an annual telephone survey, students, faculty and staff provide a basis for annual calculations of vehicle trips subject to limits (caps), and reported in the Annual CMP Monitoring Report. Table 3.17 illustrates the 2015 campus surveys of students, faculty and staff results for peak period travel compared to the trip caps which reflect 1990 impact levels.

Table 3.17 TRIP CAP SUMMARY – 2015

Location/Peak Period	Trip Cap (vph)	2015
UW Campus		
AM Peak Period Inbound (7:00-9:00)	*7,900*	*3,997*
PM Peak Period Outbound (3:00-6:00)	*8,500*	*7,562*
University District		
AM Peak Period Inbound (7:00-9:00)	*10,100*	*4,988*
PM Peak Period Outbound (3:00-6:00)	*10,500*	*9,329*

Note: 2016 Annual Report for 2015, UWTS.

Figure 3.36 illustrates the historical compliance with the University District trip caps dating back to 2009.

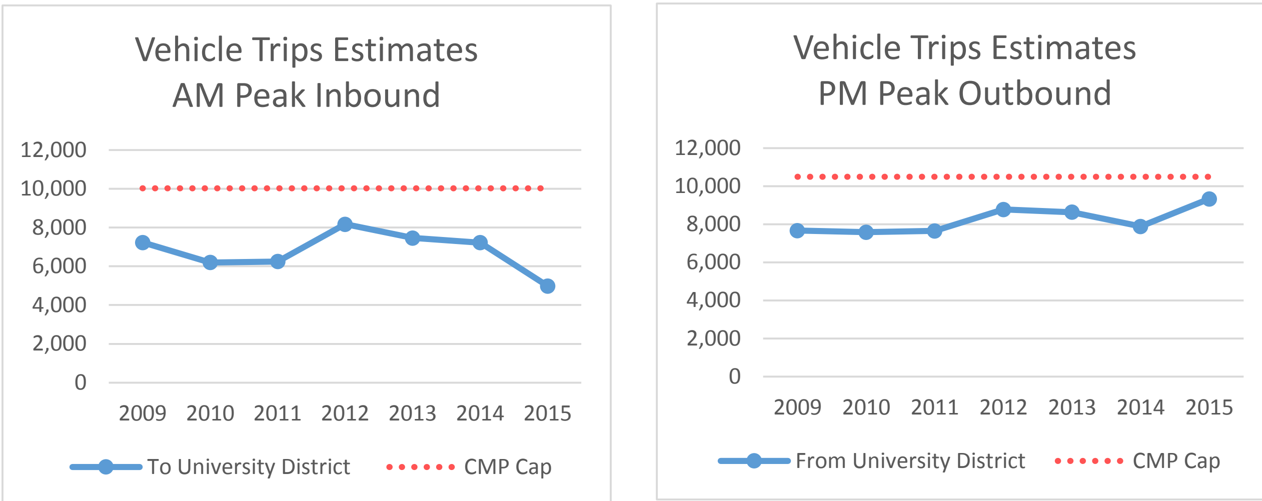


Figure 3.36 Historic AM and PM Trip Cap Summary

Parking Caps. In addition to the trip cap, which is monitored annually, the University has maintained a cap on total parking supply of 12,300 spaces for student, faculty and staff commuter parking. This parking space cap does not include handicapped or visitor spaces, service and load zones, cycle spaces, accessory off-campus leased spaces, and spaces associated with student housing. UW currently has 10,667 spaces included in the most recent parking cap calculation for CUA compliance.

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4 NO ACTION ALTERNATIVE

This section describes the effects on the transportation system for the No Action alternative that assumes buildout of the current 2003 Campus Master Plan. This analysis reflects the impacts associated with approximately 211,000 gross square feet (gsf) of development occurring in the West Campus area. This analysis evaluates all modes of travel and compares current transportation system operations noted in Section 3 (Affected Environment) to operations for a horizon year of 2028 with 211,000 gsf of new development.

4.1 FUTURE CAMPUS CHARACTERISTICS

4.1.1 Future Trip Generation by Mode

The following provides a summary of the methodology used to estimate the pedestrian, bicycle, transit, and vehicle trip generation volumes for all alternatives presented herein. Trip generation for the University of Washington is divided among four categories; students, faculty, staff, and visitors, but the same methodology was utilized to forecast each category of the trip generation, with the exception of campus visitors. The technical analysis presented in the following section is based on population projections as enabled by the 211,000 gross square feet of development.

Trip Generation Methodology

The methodology used to forecast the trip generation for the various modes is based on mode split data for each population group. The basis for the mode split assumptions is a 3-year average of the transportation survey conducted by the UWTS. The University utilizes a survey to evaluate the effectiveness of the U-PASS program among students, faculty, and staff. The information is also used to help meet Washington State Commute Trip Reduction (CTR) Law requirements.

The most recent available information is from the 2012, 2013, 2014, and 2015 surveys.[2] The surveys typically capture information from approximately 1,500 students, faculty, and staff. The survey collects information from students, faculty, and staff about how many days per week they come to campus, how they get to campus, if they commute how many people are in the vehicle, how far they live from campus, and the type of parking utilized. Based on the surveys the following existing characteristics are identified and summarized in Table 4.1. Where available, more data were used, specifically for the time of day and direction of trip (inbound/outbound). Additionally, the survey asks the typical time of arrival and departure, this helps determine if the trip is inside the typical AM (7 to 9 a.m.) and PM (3 to 6 p.m.) commute periods.

[2] *University of Washington 2012, 2013, 2014, and 2015 Transportation Survey Final Report,* March 2016, Northwest Research Group

Table 4.1
THREE-YEAR AVERAGE CAMPUS COMMUTE PROFILE[1]

Mode	Students	Faculty	Staff
Transit	44%	25%	42%
Walk	36%	7%	4%
Bicycle	7%	14%	8%
Other	1%	2%	2%
Sub Total Non-Vehicular	88%	48%	56%
Vehicle			
Single Occupant Vehicle (SOV)	8%	45%	33%
Carpool	4%	7%	11%
Carpool Vehicle Occupancy			
Average Vehicle Occupancy (AVO)	2.22	2.12	2.15

Source: University of Washington Transit Services surveys.
1. Based on an average of the most recent 3-years (2012, 2013, and 2014) of transportation survey results.

As shown in Table 4.1, a majority (88 percent) of students utilized non-SOV or carpool modes of transportation to commute to campus. Additionally, approximately 48 percent of faculty and 56 percent of staff utilize non-SOV or carpool modes.

The daily, AM, and PM peak hour trip generation was developed for existing and future conditions. Existing trip generation was estimated in order to develop the net new trips anticipated to the University assuming average mode splits. Future trip generation was developed first by determining the forecasted student enrollment, faculty, and staff headcount. The No Action trip generation was based on approximately 211,000 gsf of building capacity remaining under the 2003 Campus Master Plan (CMP). A conservative 20 percent cumulative SOV rate, consistent with the 2015 survey mode split, was utilized for future trip generation.

The vehicle trip generation accounts for single occupant vehicles (SOV) and carpools. Carpools account for the average vehicle occupancy as noted above and collected as part of the survey. The resulting vehicle trip generation is summarized in Table 4.2. The daily trip generation by mode is summarized in Table 4.3.

In addition to faculty, students, and staff trip generation additional activity from visitors to campus also impact the overall traffic levels. Visitor traffic was assumed to equal 10 percent of the net new trip generation associated with any of the EIS Alternatives.

Table 4.2
ESTIMATED NET NEW NO ACTION VEHICLE TRIPS

Trip Type	Daily Trips	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
No Action Trips	***150***	***35***	***15***	***45***	***20***	***30***	***50***
Visitors (10%)	*15*	*5*	*0*	*5*	*0*	*5*	5
Total UW *Trips*	***165***	***40***	***15***	***50***	***20***	***35***	***55***

Source: Transpo Group, 2016

As shown in Table 4.2, the trip generation associated with the remaining 211,000 gsf under the CMP is approximately 165 daily trips with approximately 50 occurring during the AM peak hour and 55 during the PM peak hour and includes visitors. Notably, the PM peak hour is slightly higher aligning with the analysis to address PM peak operations.

Table 4.3
ESTIMATED NET NEW NO ACTION DAILY NON-VEHICLE TRIPS

Trip Type	Transit	Walk	Bicycle	Other
Student	220	290	55	5
Faculty	20	10	20	0
Staff	250	15	20	5
Total Trips	490	315	95	10

Source: Transpo Group, 2016

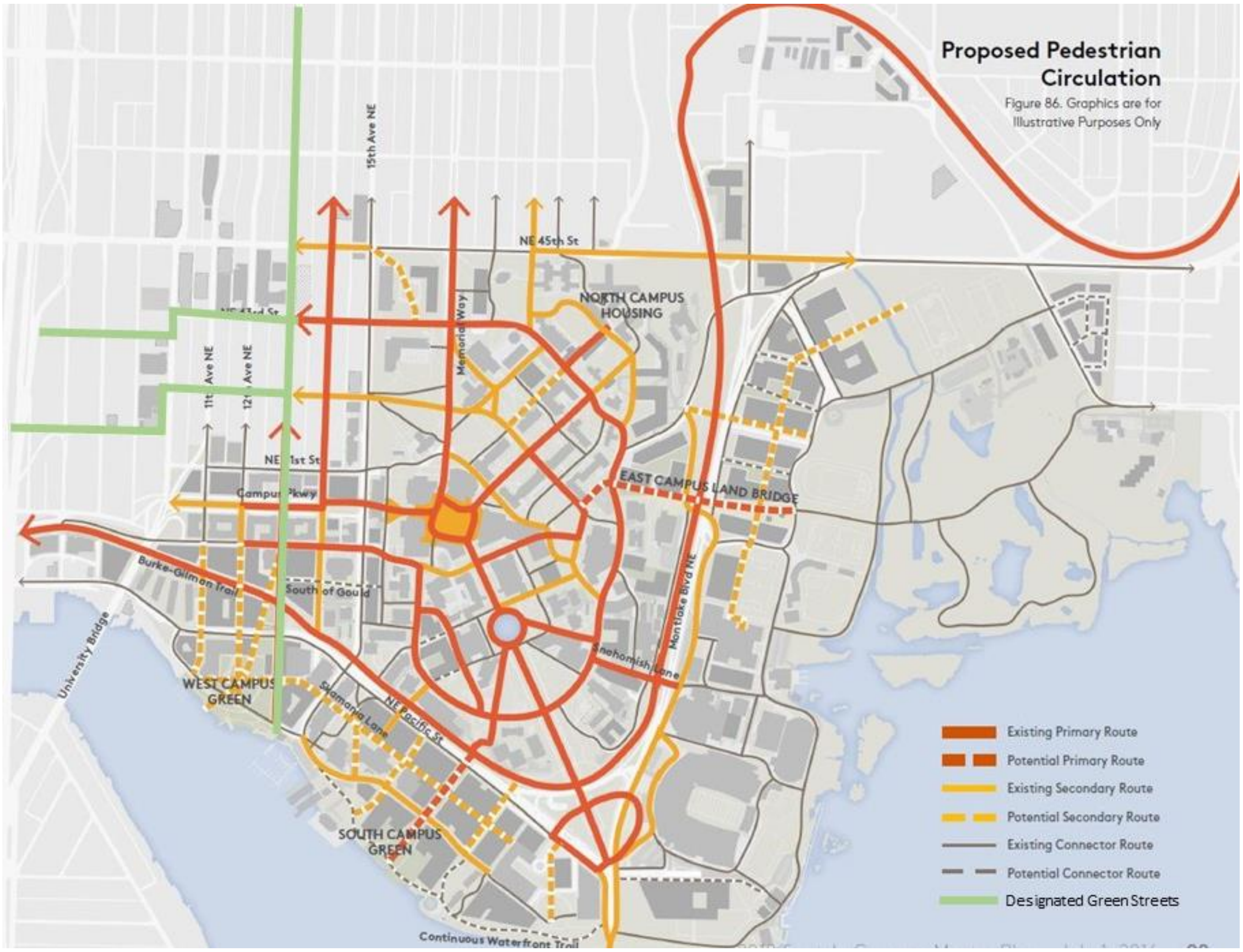
Table 4.3 reflects net new No Action trips based on current mode splits for each campus population group. As shown in Table 4.3, under No Action conditions, campus development is anticipated to generate approximately 490 daily transit trips, 315 walk trips, 95 bicycle trips, and 10 other trips.

4.2 PEDESTRIANS

4.2.1 Planned Improvements

Planned pedestrian improvements in the University District work in conjunction with transit additions to the area, including increased King County Metro services and the development of the Sound Transit Link Light Rail Extensions. Green Streets proposed by the City of Seattle to promote a pedestrian environment are identified on 43rd Street, 42nd Street and Brooklyn Avenue. A proposed future pedestrian network is shown in Figure 4.1.

Pedestrian Master Plan (PMP): A Pedestrian Master Plan identifies priorities for investments to make improvements within the pedestrian realm. A draft update to the City of Seattle's Pedestrian Master Plan was recently released.



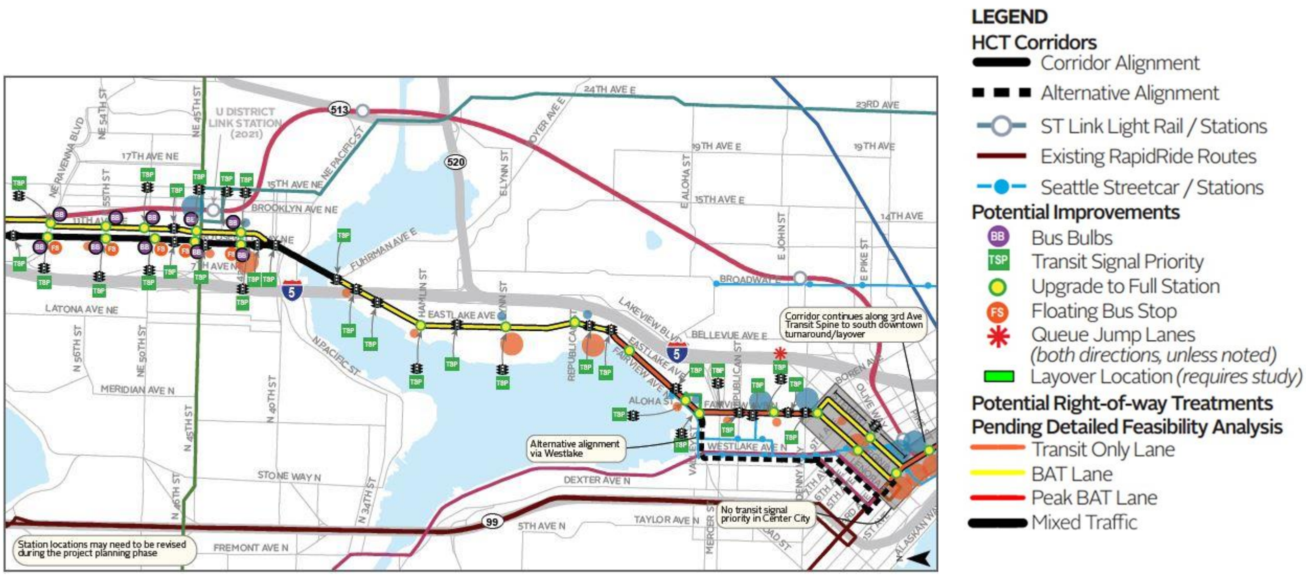
Source: Sasaki, October 2016 CMP

Figure 4.1 Future Pedestrian Circulation

> **Green Streets:** A Green Street is a street right of way that, through a variety of design and operational treatments, gives priority to pedestrian circulation and open space over other transportation uses. Treatments may include sidewalk widening, landscaping, traffic calming and other pedestrian oriented features. In 2015, the City of Seattle finalized the U District Green Streets Concept Plan.

The University District is included along a corridor evaluated for High Capacity Transit (HCT) with the SDOT 2016 Transit Master Plan. The 6.1-mile corridor connects the Roosevelt, University District, South Lake Union, Downtown, and Eastlake areas throughout Seattle. Improved pedestrian facilities for transit riders along this corridor are included in the planned HCT corridor. These facilities would improve pedestrian access along Brooklyn Avenue NE, the Roosevelt Way NE / 11th Avenue NE couplet, and the University Bridge connection to Eastlake Avenue E. Improvements include pedestrian shelters at transit stops and safe walking routes to the planned light rail stations at Brooklyn Avenue NE and Roosevelt Way NE. Based on SDOT's 2015 Move Seattle Transportation Strategy, pedestrian improvements are planned for the Roosevelt to Downtown Complete Street, improving pedestrian facilities in conjunction with added bus rapid transit. The Move

Seattle Strategy shows the Roosevelt to Downtown Complete Street project is planned to be implemented by 2024. Figure 4.2below shows an overview of the section of the proposed corridor in the study area.



Source: SDOT 2016 Transit Master Plan

Figure 4.2 Roosevelt to Downtown Complete Street Corridor

Additional planned improvements proposed by Move Seattle include those identified as part of multimodal corridors like Roosevelt to Eastlake, 23rd Avenue Corridor and Market to 45th Improvements. These changes include improved sidewalks along a corridor connecting to the University of Washington network via Montlake Boulevard E. Phase 4 of the 23rd Avenue Corridor Improvements reaches the transportation network just south of the Montlake Cut.

Move Seattle: A citywide strategic vision and 9-year levy for transportation investments in the City of Seattle

The SR-520 Bridge Replacement and HOV Program will improve pedestrian connections across the SR-520 corridor along Montlake Boulevard. This program is fully funded through the Connecting Washington Partners package and will continue to add pedestrian facilities and connections to the Montlake area and existing University of Washington pedestrian network. This includes pedestrian paths and sidewalks connecting to the Burke-Gilman Trail north of the Montlake Cut, as well as connecting to the Washington Park Arboretum Waterfront Trail south of the Montlake Cut. In addition to providing safe walking routes, these pedestrian facility additions will connect to existing and planned transit hubs in the University District.

4.2.2 Performance Measures

As noted in Section 3 under Affected Environment, three pedestrian related performance measures have been identified to assess and compare alternatives.

- Proportion of Development within1/2 mile of Multifamily Housing
- Proportion of Development within 1/2 mile of University of Washington Residence Halls
- Quality of Pedestrian Environments

These measures reflect the effectiveness of the pedestrian network in providing safe and easy access to pedestrian destinations, specifically housing, and thereby maintaining a high walk mode choice on campus. Comparisons of future No Action conditions to existing conditions is provided for each measure below:

Proportion of development within 1/2 mile of multifamily housing
Walking makes up nearly 1/3rd of all existing campus related trips to and from campus. Proximity of campus development to housing is therefore one important measure to assessing the propensity of people to walk. This measure assesses the proximity of the current campus buildings and development to nearby multifamily housing. Similar to Existing conditions, with all development occurring in the West area, 100% of the growth is within 1/2-mile proximity to multifamily housing.

Proportion of development within 1/2mile of University of Washington residence halls
Similar to the previous measure, this performance measure assesses the proximity of campus development within walking distance of residence halls. Residence halls were identified and then buffered by a 1/2-mile. Similar to Existing Conditions, with all development occurring in the West area, 100% of the growth is within 1/2-mile proximity to University of Washington residence halls.

Quality of Pedestrian Environment (Primary & Secondary Impact Zone)
The quality of pedestrian travel will largely remain unchanged under this alternative. Increased pedestrian travel to/from and around the University District Station would be expected to increase. Sound Transit plans to improve pedestrian capacity immediately adjacent to the station along Brooklyn Ave NE and NE 43rd Street. Improvements to pedestrian travel to/from and across SR 520 will also be improved with completion of the bridge replacement project.

4.3 BICYCLES

4.3.1 Planned Improvements

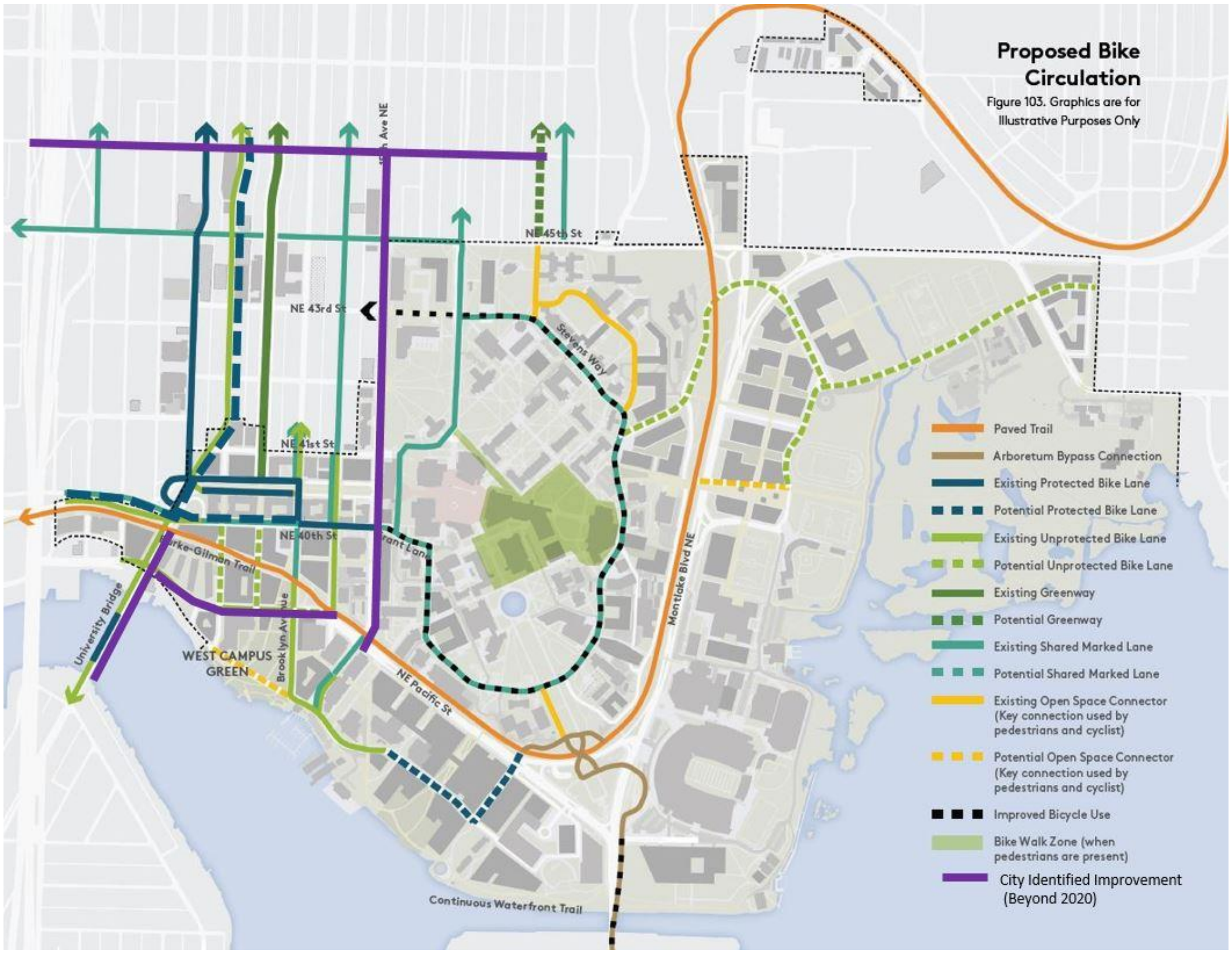
Based on the Seattle Department of Transportation's (SDOT) 2015-2019 Bicycle Master Plan Implementation Plan, additional protected bicycle lanes and neighborhood greenways are planned for implementation between 2015 and 2019. In 2015, planned construction began for protected bicycle lanes along Roosevelt Way NE and NE Campus Parkway throughout the University District. Additional construction is planned in 2018 for protected bicycle lanes along Ravenna Place NE, connecting to the existing University District bicycle network. These improvements incorporate a block of Brooklyn Avenue NE between NE Campus Parkway and NE 40th Street to integrate with existing campus bicycle network and Burke-Gilman Trail access. A summary of planned protected bicycle lane improvements in the University District area is included in Table 4.4.

Table 4.4
PLANNED BICYCLE NETWORK IMPROVEMENTS – PROTECTED BICYCLE LANES, 2015-2019

Primary Street	Project Extents	Total Project Length (miles)	Planned Construction Year
Roosevelt Way NE	NE 40th Street to NE 45th Street	0.30	2015
Roosevelt Way NE	NE 42nd Street	0.05	2015-2016
Roosevelt Way NE	NE 45th Street to NE 65th Street	1.00	2015
NE Campus Parkway	University Way NE to Eastlake Avenue NE	0.34	2015
University Bridge	NE Campus Parkway to Fuhrman Avenue E	0.35	2015
Ravenna Place NE	NE 55th Street to Burke-Gilman Trail	0.17	2018

Source: Seattle Department of Transportation (SDOT).

Protected bicycle lanes have also been identified on 15th Avenue adjacent to the campus, however, concept plans have not been developed indicating how those lanes would be implemented in the right-of-way. As such they have not been reflected in the analysis. Additional bicycle network improvements in the University of Washington vicinity include the construction of a neighborhood greenway along NE 66th Street/NE 68th Street between 8th Avenue NE and 50th Avenue NE. Construction of this 2.20-mile project is planned for 2019. In addition, the University Bridge improvements are included as a catalyst project. A proposed future bicycle network is shown in Figure 4.3.



Source: Sasaki, October 2016 CMP

Figure 4.3 Future Bicycle Network

4.3.2 Bicycle Parking/Bicycle Share Facilities

A bicycle parking utilization study completed by University of Washington Transportation Services in 2012 shows recent trends of increased bicycle parking utilization on campus. Based on the results of this survey, UWTS is working with University of Washington Capital Planning and Development Projects and the University of Washington Office of Planning and Budgeting to install additional indoor and outdoor bicycle storage facilities on campus. In addition, University of Washington Transportation Services continues an improved bicycle parking inventory system implemented in 2013.

4.3.3 Bicycle Performance Measures

Burke-Gilman Trail Capacity

Bicycle traffic along the Burke-Gilman Trail is anticipated to increase with the No Action Alternative, due to citywide growth and growth in travel to and from the Link Light Rail University of Washington station as ridership of the system increases. Local pedestrian traffic along and across the Burke-Gilman Trail is also anticipated to increase but by a lesser amount. As shown in Table 4.5 below, bicycle and pedestrian volumes are projected to increase, between 1 and 6 percent per year, along the various segments due to overall area growth in the area, and changing mode choices as new transit investments are implemented including new light rail stations (University of Washington and U District).

Table 4.5
BURKE-GILMAN TRAIL FORECASTED GROWTH 2010 TO 2030

Trail Location	2010 Bicycle Counts	2010 Pedestrian Counts	2030 Bicycle	2030 Pedestrian Counts	Bicycle % Annual Change	Pedestrian % Annual Change
West of University Bridge	408	174	1,321	260	6%	2%
West of 15th Avenue NE	479	249	1,548	351	6%	2%
Hitchcock Bridge	459	243	1,568	677	6%	5%
T-Wing Overpass	449	260	1,571	841	6%	6%
Rainier Vista West	474	298	1,520	364	6%	1%
Hec Edmundson Bridge	472	269	1,537	424	6%	2%
Wahkiakum Lane	425	159	1,386	290	6%	3%
South of Pend Oreille Road	438	136	1,429	261	6%	3%
North of Pend Oreille Road	435	178	1,419	312	6%	3%

Source: University of Washington Burke-Gilman Trail Corridor Study, SvR 2011

As pedestrian and bicycle volumes increase, the operations along the trail are expected to become more congested along segments which have not been upgraded to separate pedestrian and bicycle travel. According to analysis from the Burke-Gilman Trail Corridor Study, without separating pedestrians and bicyclist, level of service for both pedestrians and bicyclists will operate poorly (LOS F) regardless of the width of the joint use trail. The study recommends separation of the trail into pedestrian and bicycle only facilities. A 2012 study (Burke Gilman Trail Concept Design, Alta 2012) provided design options and recommendations for the trail. The University of Washington has completed expansion of two segments: a portion of the Neighborhood Reach from the University Street Bridge to Nordheim Court and the Campus Reach from 15th Avenue to Rainier Vista, which was completed in summer 2016. The University is continuing to expand the trail to meet future campus and other regional growth within their 1.7-mile ownership of the trail.

Burke Gilman Trail Concept: The University of Washington has developed conceptual plans to expand the Burke Gilman Trail, creating separated facilities along their 1.7-mile ownership. The Burke Gilman Concept Design Plan, ALTA 2012 creates segments or reaches of the Burke Gilman Trail and defines design concepts. Some of these segments including portions of the Neighborhood Reach and the Campus Reach have been completed.

Quality of Bicycle Environment (Primary & Secondary Impact Zones)

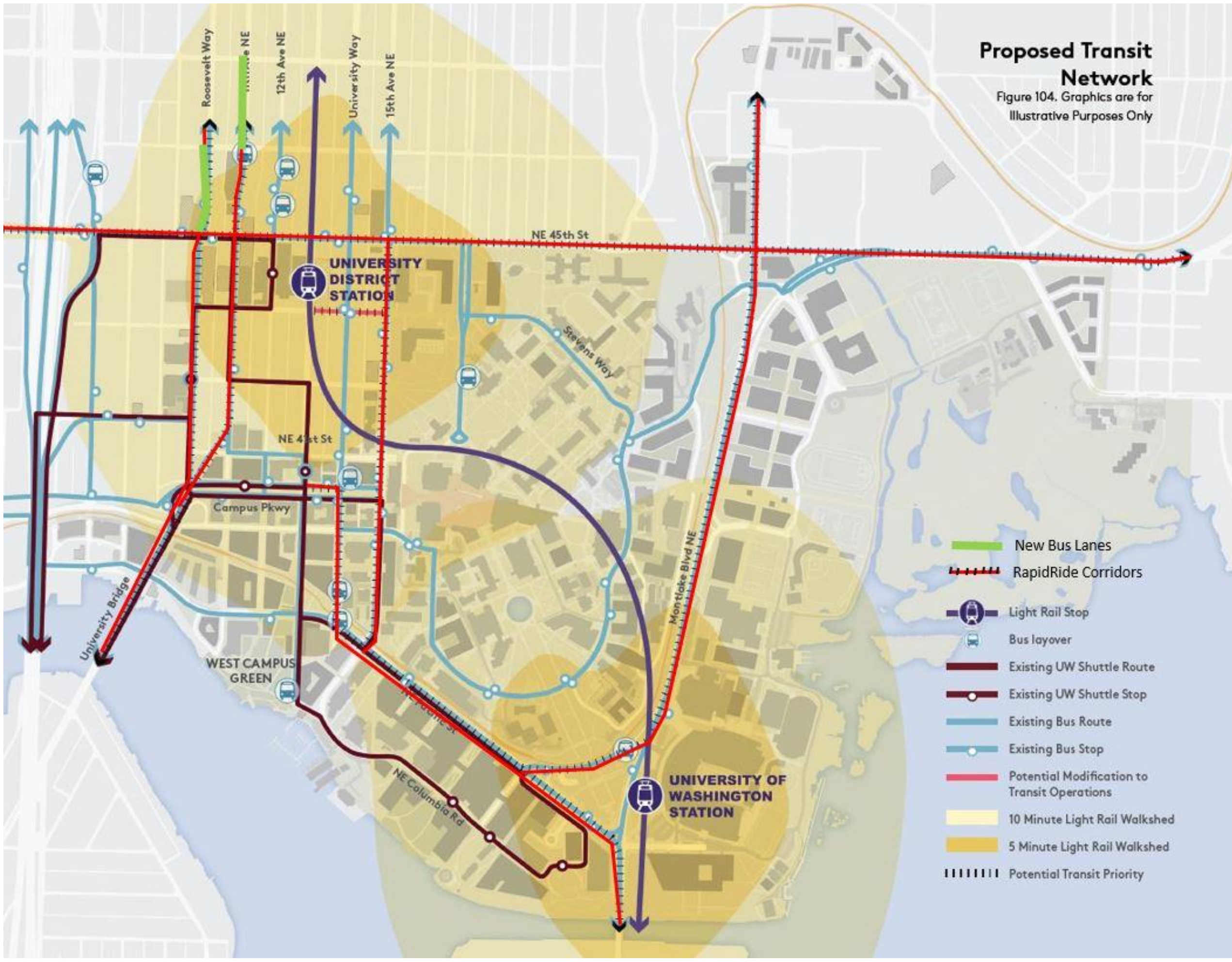
Under the No Action Alternative improvements to the bicycle environment associated with City and WSDOT investments are expected as well as a growth in bicycle travel demand associated with expanded Link access and citywide growth. Improvements to bicycle travel including upgrades to bicycle facilities along NE 40th Street and 11th Ave NE will be completed by SDOT before 2020, with additional investments possible after that date. These investments will expand connectivity of facilities for all ages and abilities, especially in West Campus. Completion of the SR 520 HOV and Bridge Replacement Project will also improve regional bicycle travel to the Eastside, improve bicycle travel in the Montlake neighborhood and provide new connectivity between the UW, Capitol Hill and Eastlake neighborhoods.

4.4 TRANSIT

4.4.1 Planned Improvements

Sound Transit

Planned transit improvements in the coming years will alter the transit system framework in the University District. Completed in 2016, the Sound Transit University Link Extension connects Link Light Rail as far north as Husky Stadium. Current funding supports the Sound Transit North Link Extension, including the Northgate Link Extension, scheduled to be completed in 2021, and the Lynnwood Link Extension, scheduled to be completed in 2023. The North Link Extension will construct a 4.3-mile light rail extension connecting the University of Washington station with a planned Northgate station, including stops at University District (Brooklyn) and Roosevelt stations. Figure 4.4 includes the planned transit network and walksheds from the University District station, as well as from the existing Husky Stadium station.



Source: Sasaki, October 2016 CMP

Figure 4.4 Planned Transit Network and Walkshed

The Sound Transit North Link Light Rail Extensions are funded and included in the ST2 System Plan Project Phasing. Other planned Sound Transit improvements are included in the ST3 System Plan without current funding. These include Light Rail extensions and additional Sound Transit Express, Bus Rapid Transit, and Sounder Commuter Rail service hours.

The City of Seattle Transit Master Plan, updated in 2016, identifies a set of RapidRide Transit Priority Corridors that include enhancements to support transit including amenities at stops such as shelters, real time information, transit signal priority and off board fare payment. Three of these are funded as part of the Move Seattle Levy. These include RapidRide Corridors 4 (U District to Rainier Valley), 5 Ballard to U District) and 7 (Northgate to Downtown by way of the U District).

4.4.2 Route Modifications

The King County Metro Future RapidRide Expansion includes proposed candidate routes for implementation in 2025 and 2040. A total of 12 new RapidRide routes are proposed for implementation in 2025, with 4 servicing the University of Washington Campus or the University District neighborhood. The following tables summarizes King County Metro's proposed RapidRide expansion routes in the University of Washington vicinity. Table 4.6 includes proposed RapidRide routes by 2025.

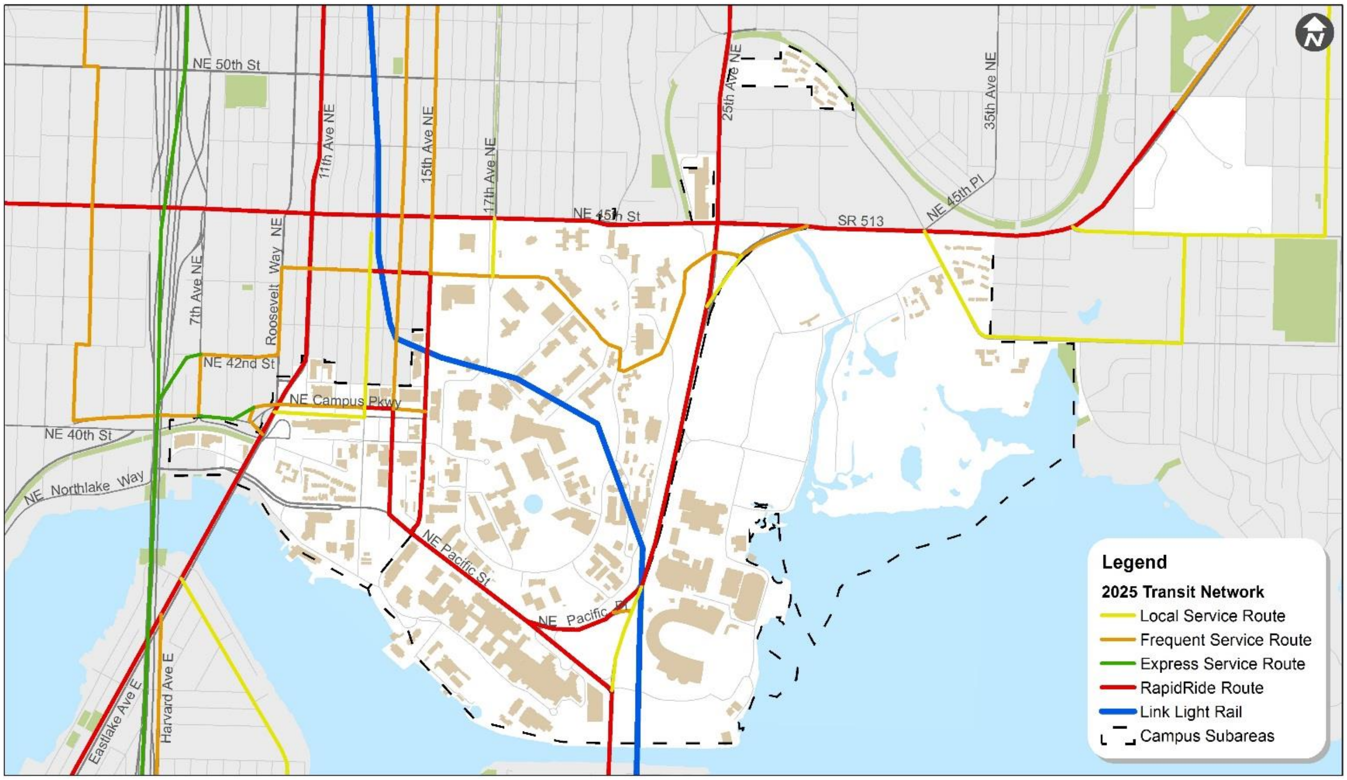
Table 4.6
KING COUNTY METRO PROPOSED RAPIDRIDE ROUTES, 2025

Primary Current Route(s)	Routing	Route Miles
372	Bothell – UW – Lake City	13.3
44	Ballard – Children's Hospital – Wallingford	5.9
7s, 48s	University District – Rainier Beach – Mount Baker	10.7
7n, 70	University District – Mount Baker – Seattle CBD	7.7

Source: King County Metro Future RapidRide Expansion, 2016.

Based on the King County Metro Long Range Transit Plan Spring 2016 Draft, King County Metro plans to expand frequent, express, and local services throughout Seattle, planning to reach 6 million service hours from the existing 3.5 million hours. Frequent service includes arrivals every 5 to 15 minutes or better throughout weekdays, with arrivals every 15 minutes on weekends. Frequent service also includes RapidRide routes. King County Metro plans to add bus lanes, transit signal priority, and transit queue jumps to allow for additional frequent and RapidRide service. Express service includes arrivals of every 15 to 30 minutes during the day, serving areas of large populations along main travel corridors. Local service includes arrivals every 30 to 60 minutes throughout the day, with increased frequency during the peak periods. Stops along local service routes are typically 0.25 to 0.5 miles apart, and service is geared towards lower-density areas with less access to transit.

Figure 4.5 illustrates the overall 2025 service network including King County Metro's planned improvements.



Source: King County Metro Draft Long-Range Plan Online Service Network Map, Spring 2016

Figure 4.5 King County Metro 2025 Service Network

As shown in Figure 4.5, King County Metro's planned 2025 service network includes frequent, express, and local routes with access to the University of Washington campus and University District.

4.4.3 Transit Performance

Proportion of Development within 1/2 mile of RapidRide

This measure, as well as the next measure, assesses proximity of campus development to high capacity transit service including RapidRide and Link Light Rail. This measure was calculated by determining the ratio of each sector within a 1/2-mile walk of a RapidRide stop. For future years the 2025 Draft King County Long Range Plan service network was used to determine the location of RapidRide routes and stop locations were inferred based on existing high-ridership stops, Link station locations and desired stop spacing. Because the CMP does not identify which development sites will be used within a sector, the ratio of the sector within 1/2-mile of RapidRide stops were used to scale an "average" percentage of development that might be expected to be within the 1/2-mile buffer. With the advent of RapidRide in the future, generally all of the proposed development in No Action will have access to RapidRide within a 1/2-mile buffer area.

Table 4.7
PROPORTION OF DEVELOPMENT WITHIN 1/2 MILE OF RAPIDRIDE

Sector	No Action
West	211,000 gsf
South	NA
Central	NA
East	NA
Total	**211,000 gsf**

Proportion of Development within1/2 mile of Link
This measure is identical to the measure above, but proximity is measured to the University of Washington Light Rail Link Station. In future alternatives proximity to Light Rail will include the future University District Station assumed to be completed in 2021. The current 1/2 Mile proximity to the University of Washington Station is shown in Figure 4.4

Table 4.8
PROPORTION OF DEVELOPMENT WITHIN 1/2 MILE OF LIGHT RAIL

Sector	No Action
West	181,460 gsf
South	NA
Central	NA
East	NA
Total	**181,460 gsf**

4.5 VEHICLE

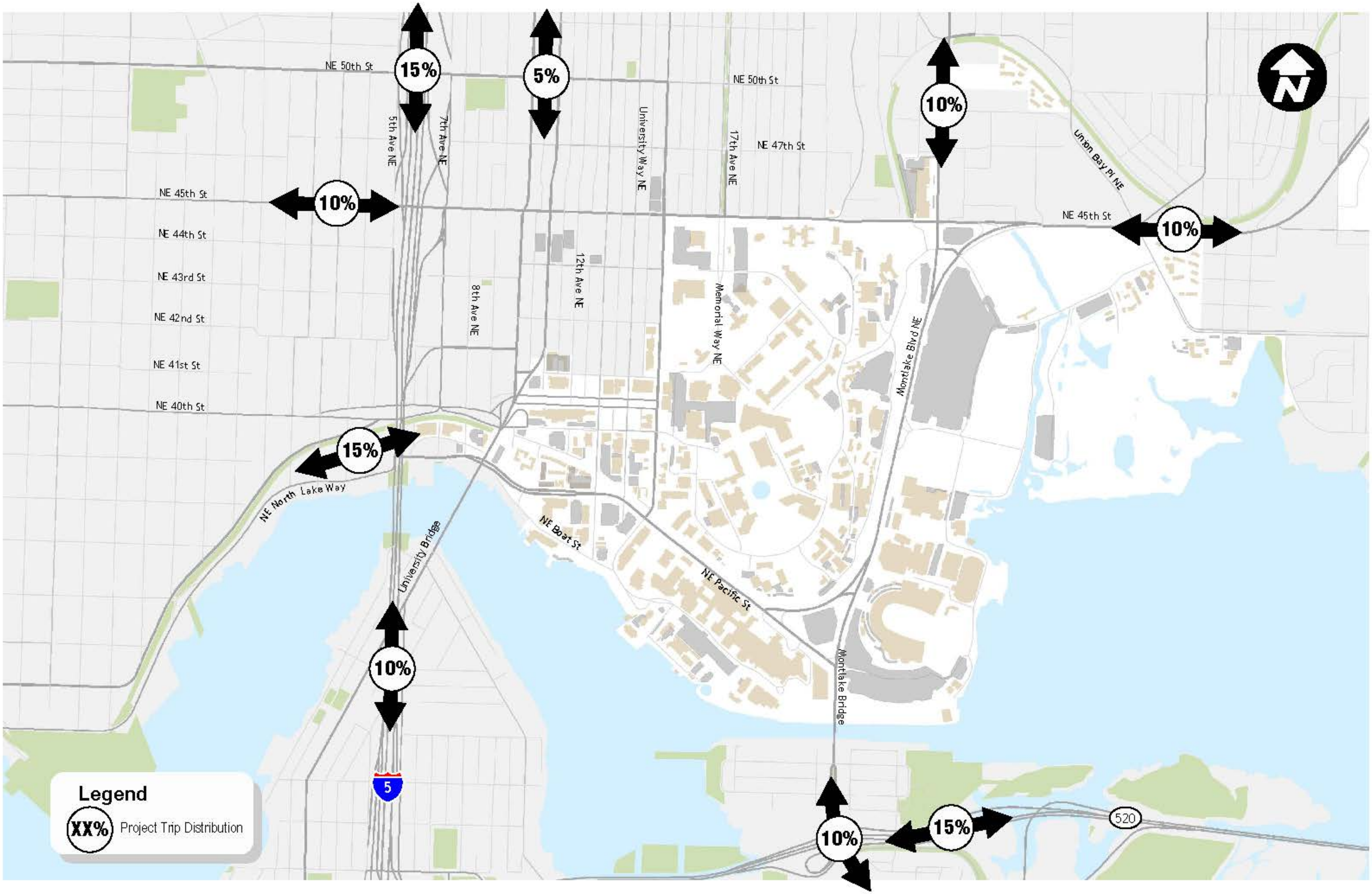
4.5.1 Traffic Volumes

Traffic volumes for the No Action scenario were forecast based on the Seattle Comprehensive Plan Preferred Alternative, which forecasts volumes to 2035. To establish future 2028 volumes a straight line interpolation between existing 2015 counts and 2035 volumes was completed.

Trip Distribution & Assignment

Trip distribution patterns to and from the existing garage locations were based on existing vehicle travel patterns, previous studies in the project vicinity, and U.S. Census Bureau's *OnTheMap* tool. *OnTheMap* is a web-based mapping and reporting application, which shows where workers are employed and where they live based on census data. The zip codes were evaluated to determine if a person would be more likely to travel from the zip code via vehicle or by other means. Trips to zip codes closer to the proposed project sites or in more transit oriented locations are more likely to use transit, walk, bicycle, or other non-SOV modes. Zip codes outside the Seattle City limits and/or further from the site are more likely to drive. The general trip distribution to/from the University is shown on Figure 4.6.

No Action project trips were assigned to existing West Campus garages following the above described trip distribution. The resulting 2028 No Action volumes are shown on Figure 4.7 and Figure 4.8.



Vehicle Trip Distribution

University of Washington 2018 Campus Master Plan

FIGURE
4.6

transpogroup WHAT TRANSPORTATION CAN BE.

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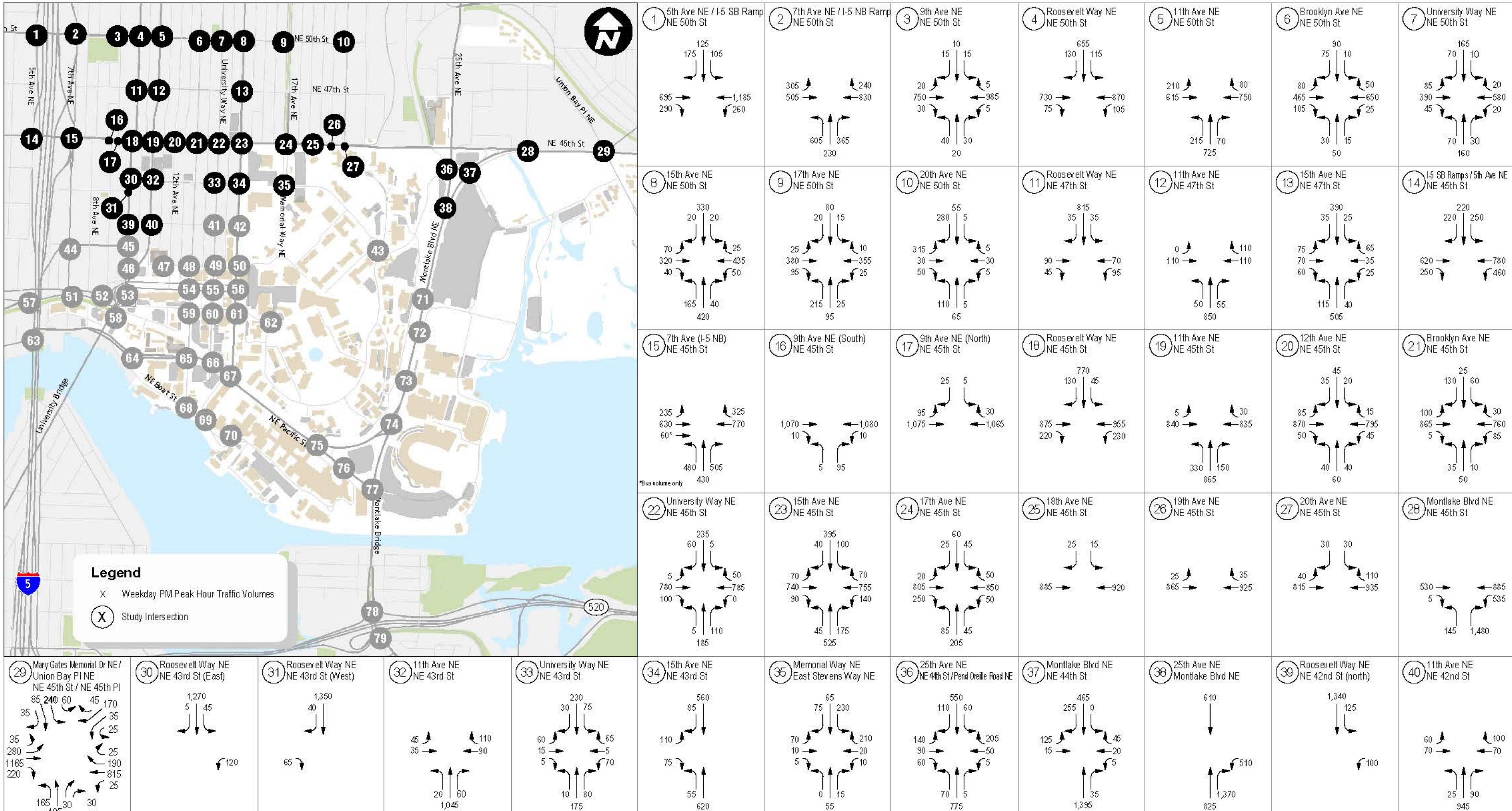

Future (2028) No Action (Intersections 1-40) Weekday PM Peak Hour Traffic Volumes

University of Washington 2018 Campus Master Plan

FIGURE **4.7**

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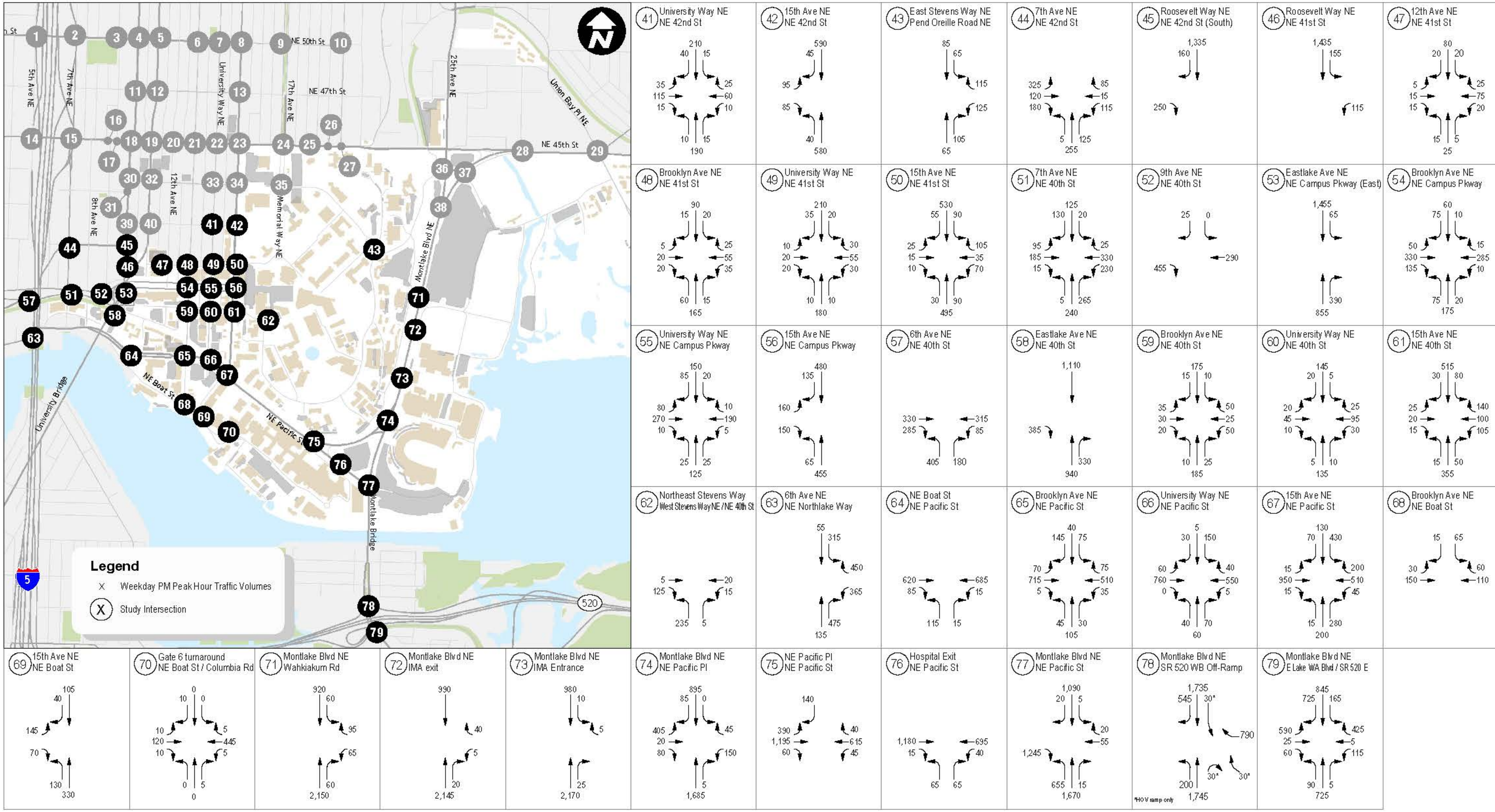

Future (2028) No Action (Intersections 41-79) Weekday PM Peak Hour Traffic Volumes

University of Washington 2018 Campus Master Plan

FIGURE 4.8

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4.5.2 Traffic Operations Performance

Methodology

The evaluation of traffic operations within the study area included an analysis of intersection LOS (level of service) and arterial travel speeds and associated LOS. The methodologies used are consistent with those described in the Affected Environment analysis. A detailed description of methodology can be found in Appendix B.

Planned/funded improvements within the study area have been reflected in the analysis. The list of these projects are included in Appendix C.

Intersection Operations

Weekday PM peak hour intersection traffic operations under the 2028 baseline conditions are shown in Figure 4.9 and Figure 4.10**.** The year 2028 geometry for all of the study-area intersections were assumed to remain the same as existing with the exception of the intersection of Montlake Boulevard E/SR 520 Westbound Off-Ramp. Signal timing splits were optimized under future 2028 baseline conditions. Complete intersection level of service summaries are provided in Appendix C.

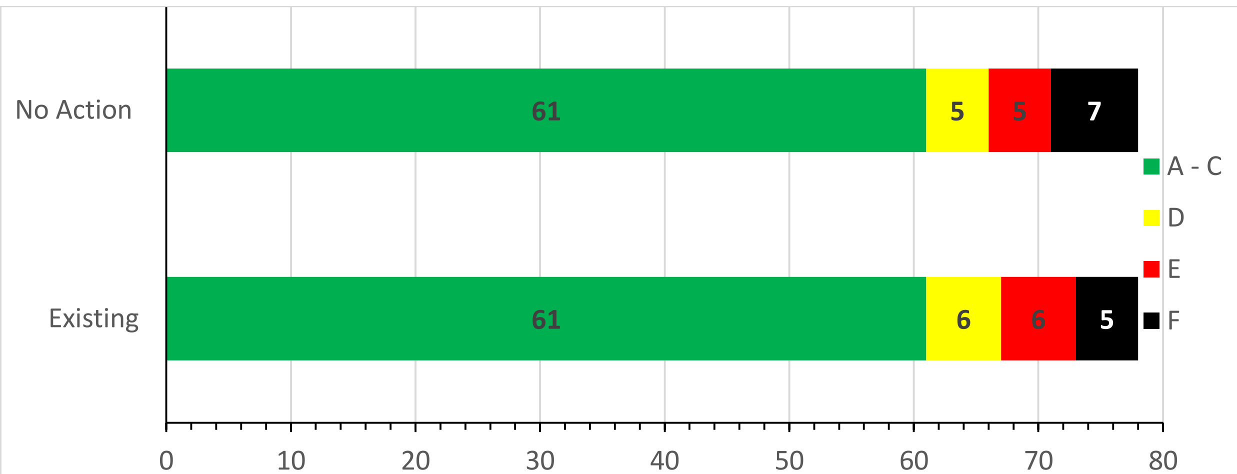


Figure 4.9 Existing/No Action Weekday 2028 PM Peak Hour Intersection Level of Service Summary

The following table illustrates changes in intersection traffic operations between the existing condition and future No Action Alternative weekday PM peak hour.

Table 4.9
FUTURE NO ACTION INTERSECTION LEVEL OF SERVICE SUMMARY

Intersection	Existing		No Action		Change in Delay (sec)
	LOS[1]	Delay[2]	LOS[1]	Delay[2]	
16. 9th Ave NE (North) / NE 45th St	E	38	E	48	10
17. 9th Ave NE (North) / NE 45th St	C	22	D	25	3
29. Montlake Blvd NE / Mary Gates Memorial Dr NE	D	54	E	56	2
30. Roosevelt Way NE / NE 43rd St (East)	E	48	F	68	20
31. Roosevelt Way NE / NE 43rd St (West)	E	36	E	45	9
46. Roosevelt Way NE / NE 41st St	E	39	F	434	395
47. 12th Ave NE / NE 41st St	E	41	F	76	35
49. University Way NE / NE 41st St	F	*	F	*	*
51. 7th Ave NE / NE 40th St	E	37	F	77	40
57. 6th Ave NE / NE 40th St	F	60	F	113	53
63. 6th Ave NE / NE Northlake Way	C	25	E	46	21
71. Montlake Blvd NE / Wahkiakum Rd	F	295	F	463	168
72. Montlake Blvd NE / IMA exit	D	34	E	38	4

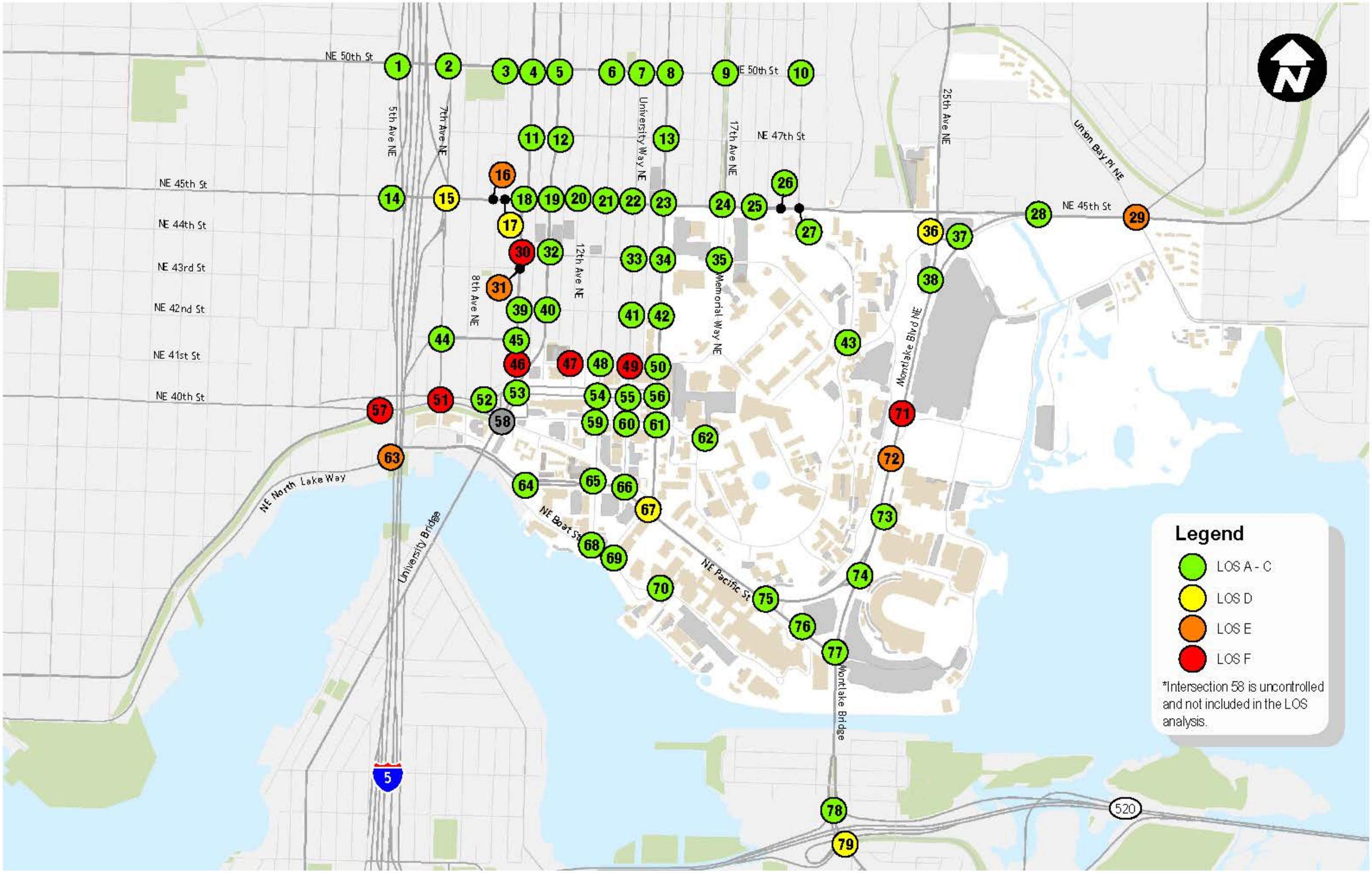
*Volume exceeds capacity and Synchro could not calculate the delay.
1. Level of service.
2. Average delay per vehicle in seconds rounded to the whole second.

During the weekday PM peak hour, 2 additional intersections are anticipated to operate at LOS F under No Action conditions as compared with existing conditions. Overall, 17 intersections are anticipated to operate at LOS D or worse during the weekday PM peak hour during baseline conditions compared with 17 for existing conditions.

The following intersections are anticipated to degrade to LOS D or below under future No Action conditions:

16. 9th Avenue NE (North)/NE 45th Street
29. Montlake Boulevard NE/ Mary Gates Memorial Drive NE
30. Roosevelt Way NE/NE 43rd Street (East)
46. Roosevelt Way NE/NE 41st Street
47. 12th Avenue NE/NE 41st Street
51. 7th Avenue NE/NE 40th Street
63. 6th Avenue NE/NE Northlake Way
72. Montlake Boulevard NE/IMA

With the reconfiguration of the Montlake Boulevard NE/SR 520 WB Ramps and implementation of a traffic signal, the Montlake Boulevard E/SR 520 Westbound Ramp intersection is anticipated to improve from LOS F to LOS C under baseline conditions. Additionally, modifications to the Montlake Boulevard NE/SR 520 EB Ramps were included and as a result the intersection is anticipated to improve from LOS F to LOS D under baseline conditions.



Future (2028) No Action Weekday PM Peak Hour Traffic Operations

University of Washington 2018 Campus Master Plan

FIGURE
4.10

transpogroup
WHAT TRANSPORTATION CAN BE.

4.5.3 Arterial Operations

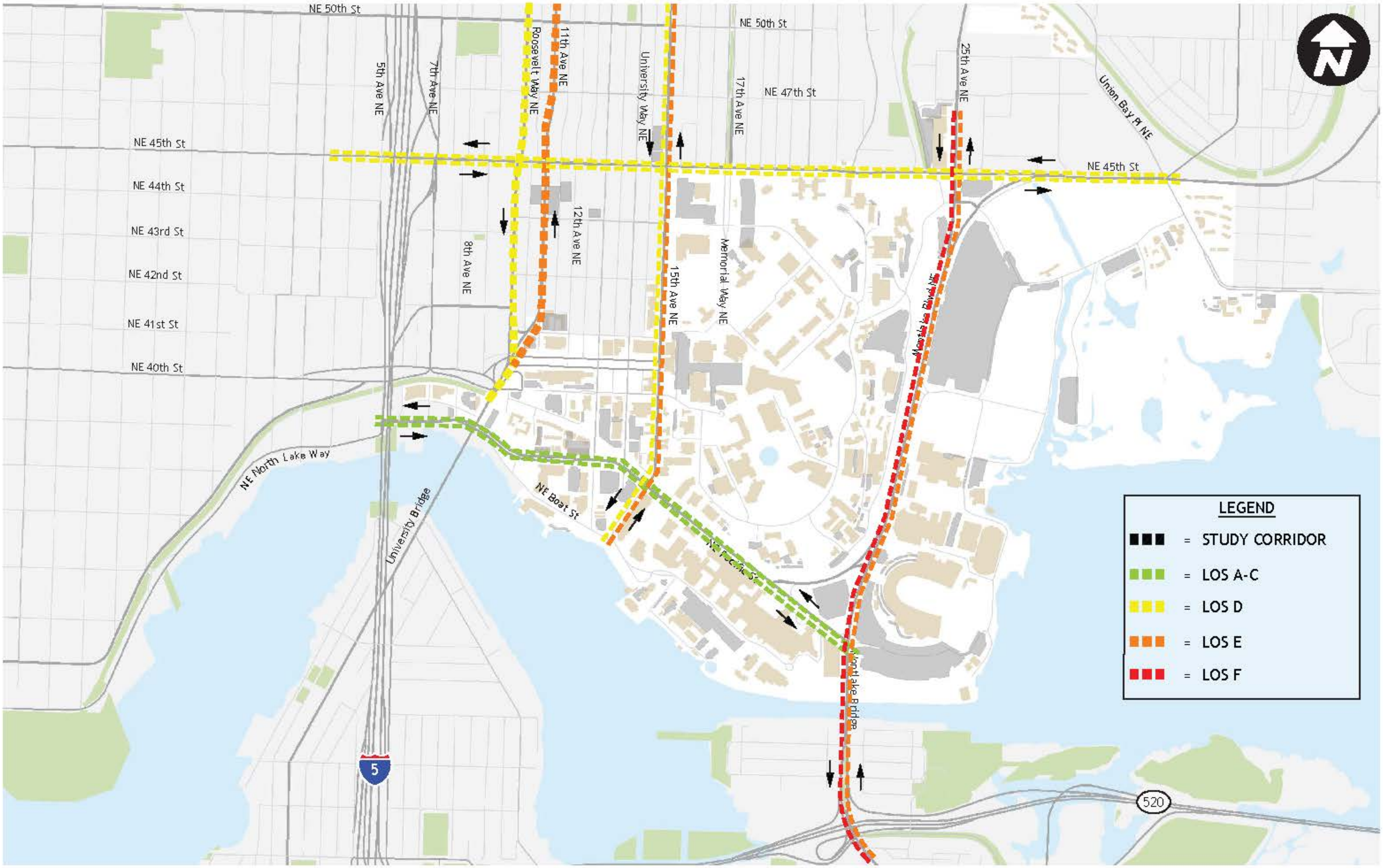
Arterial travel times and speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated using the Synchro 9 network used for the intersection operations analysis. The No Action results reflect the adjustment factors described in the Affected Environment section.

Table 4.10
EXISTING AND FUTURE NO ACTION WEEKDAY PM PEAK HOUR ARTERIAL LOS SUMMARY

Corridor	Existing		No Action	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	E	8.5	E	8.5
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	8.2	E	9.0
Southbound	D	9.4	D	9.2
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	14.0	E	10.8
Southbound	F	8.0	F	8.4
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	11.7	D	11.7
Westbound	D	12.0	D	10.8
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	D	15.9	C	18.1
Westbound	C	20.6	C	21.5
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	C	14.4	D	12.0

1. Level of service.
2. Average speed in miles per hour

As shown in Table 4.10 and on Figure 4.11, during the future No Action weekday PM peak hour conditions most corridors are anticipated to operate at the same LOS as under existing conditions with the exceptions of one arterial. Southbound Roosevelt Way NE is anticipated to degrade from LOS C to LOS D. Detailed corridor operations worksheets are provided in Appendix C.



Future (2028) No Action Weekday PM Peak Hour Corridor Traffic Operations

FIGURE **4.11**

University of Washington 2018 Campus Master Plan

transpogroup WHAT TRANSPORTATION CAN BE.

4.5.4 Screenline Analysis: Primary Impact Zone

> **Screenline:** An imaginary line across which the number of passing vehicles is counted.

The following section describes the screenline analysis completed for two designated screenlines within the study area. In this study, screenlines were selected to count vehicle traffic entering and exiting the University of Washington primary and secondary impact zones. As part of the Mayor's Seattle 2035 Comprehensive Plan (City of Seattle, 2016), two screenlines are identified within the vicinity of the University of Washington, as shown in Figure 3.32. Screenline 5.16 is an east-west screenline, measuring north-south travel, and extending along the ship canal to include the University and Montlake Bridges. Screenline 13.13 is a north-south screenline, measuring east-west travel, and extending east of I-5 between NE Pacific Street and NE Ravenna Boulevard.

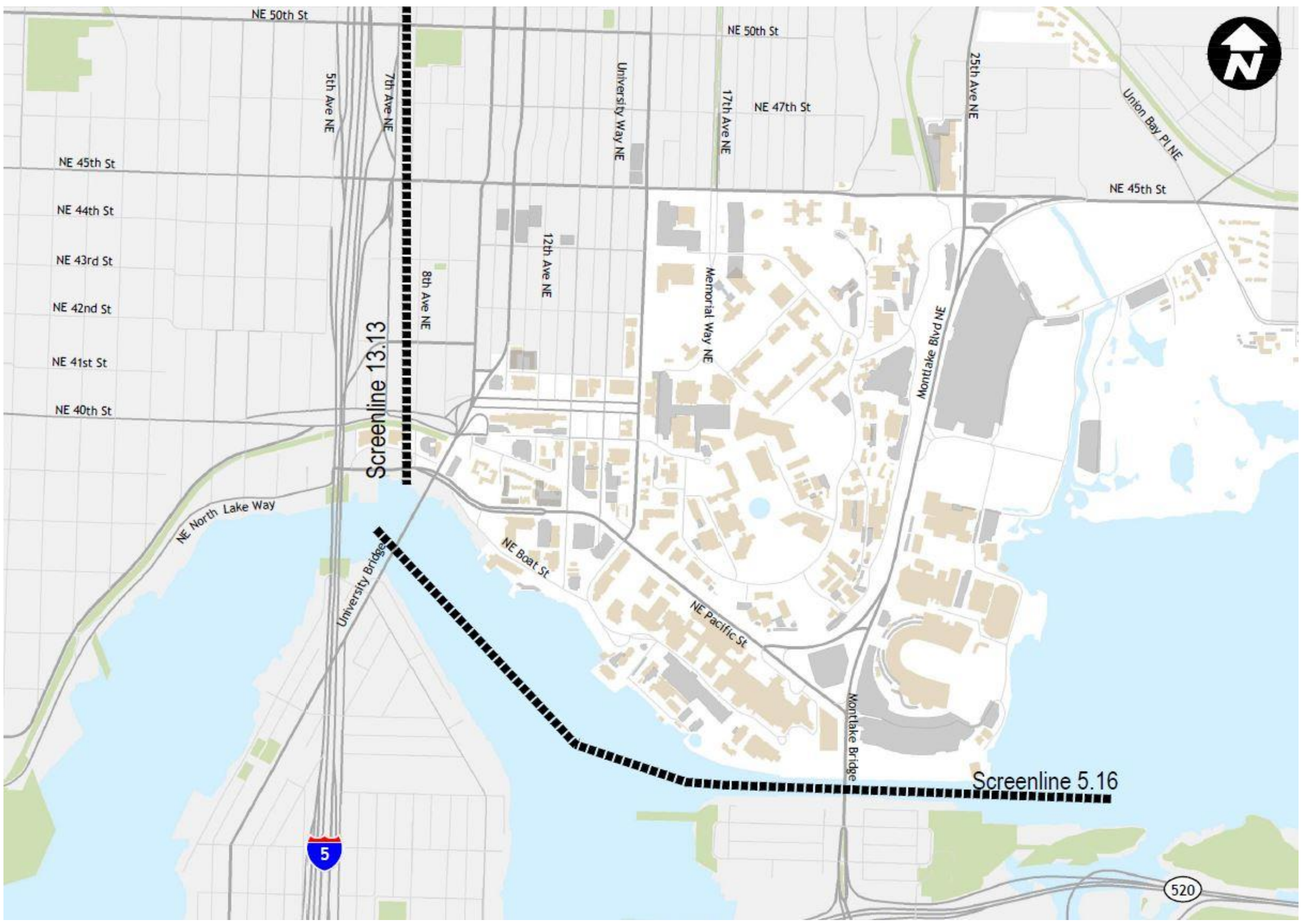


Figure 4.12 Study Area Screenlines

The screenline analysis includes volume to capacity (V/C) calculations for the vehicles traversing the screenlines using future (2028) No Action traffic volumes and interpolated roadway capacity estimates. Roadway capacity for the 2028 future horizon year was interpolated using 2016 capacity estimates described in Table 3.12 and 2035 capacity estimates referenced in the May 2016 Seattle Comprehensive

Plan Update Final EIS. Future (2028) roadway capacity estimates are shown in Table 3.12 below. Detailed screenline volumes and volume to capacity calculations are included in Appendix C.

Table 4.11
FUTURE (2028) CAPACITY

Screenline	Future (2028) Capacity
5.16 – Ship Canal, University and Montlake Bridges	
Northbound	4,210
Southbound	4,210
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard	
Eastbound	6,119
Westbound	6,119

Source: Transpo Group, 2016

Level of service standards for the screenline analysis are based on the volume to capacity ratio of a screenline. As described in the Seattle Comprehensive Plan Update EIS, the LOS standard volume to capacity ratio for Screenline 5.16 and Screenline 13.13 are 1.20 and 1.00, respectively. For this study, screenline volume to capacity ratios that do not exceed the LOS standard are acceptable. The No Action Alternative screenline analysis is included in Table 3.13. Detailed screenline analysis calculations are included in Appendix C.

Table 4.12
FUTURE (2028) NO ACTION SCREENLINE ANALYSIS

Screenline	Screenline Volume	Capacity	V/C	LOS Standard V/C
5.16 – Ship Canal, University and Montlake Bridges				
Northbound	3,805	4,210	0.90	1.20
Southbound	3,775	4,210	0.90	1.20
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard				
Eastbound	3,510	6,119	0.57	1.00
Westbound	3,780	6,119	0.62	1.00

Source: NACTO, Seattle Comprehensive Plan Update EIS, and Transpo Group, 2016

As shown in Table 3.13, all No Action Alternative screenline volume to capacity ratios meet the acceptable LOS standard.

4.5.5 Service/Freight Routes

With the addition of 211,000 gsf of net new development, overall campus service volumes would increase. The percentage increase in freight/service related traffic would be insignificant given the overall campus volumes, background traffic volumes, and service related volumes specific to this project. Future permitting of this project would further analyze the access needs and location based on the final location, design elements, and programs to be accommodated in the building.

4.5.6 Parking

The following identifies the parking impacts associated with the No Action alternative. Appendix B describes the methodology for forecasting future parking conditions.

Evaluation of parking impacts will consider:

- Adherence to the City University Agreement Parking Cap (12,300 Spaces)
- Supply and demand forecast for the overall campus as well as within each sector
- The potential to exacerbate off-site parking beyond the campus boundaries
- Potential measures that would mitigate the effect of potential impacts identified

Supply

As described in the Affected Environment, the current cap parking supply provided on-campus is currently 10,667 spaces. The analysis assumed parking supply would increase in the future to accommodate additional demands associated with the No Action Alternative's anticipated growth in parking demand as well as result in a peak parking utilization for the Sector of 85 percent. Development associated with the No Action Alternative is anticipated to occur in South Campus or West Campus; therefore, it was assumed that parking supply would increase by 236 spaces such that parking utilization for the South Sector would be would be 85 percent. This results in a future cap supply of 10,903 spaces.

Demand

Under the No Action Alternative, campus parking demand would increase as a result of the additional 211,000 square-feet of development. No Action parking demand was forecasted based on the increase in population consistent with the increase in square-footage. Table 4.13 provides a summary of the No Action parking demand compared to existing conditions.

Table 4.13
COMPARISON OF EXISTING AND NO ACTION PEAK PARKING DEMAND

	Vehicles Parked							
	Students[1]		Faculty[1]		Staff[1]		Total	
	Existing[2]	No Action[3]	Existing[2]	No Action[3]	Existing[2]	No Action[3]	Existing[2]	No Action[3]
On-Campus	1,844	1,857	1,090	1,097	3,786	3,814	6,720	6,768
On-Street	134	134	49	49	93	94	276	277
Total	**1,978**	**1,991**	**1,139**	**1,146**	**3,879**	**3,908**	**6,996**	**7,045**

Source: Transpo Group, 2016

1. Demand by population and parking destinations based on 3-year average of University of Washington 2012-2014 Transportation Surveys consistent with Affected Environment.
2. Existing parking demand based on University of Washington 2015 parking counts.
3. No Action forecasts based on projected increase in population.

As shown in the table, a parking demand of less than 50 additional vehicles is expected from the development of the remaining building under the existing Campus Master Plan entitlements. With an increase in parking supply, the No Action Alternative parking utilization for the overall campus would be slightly less than existing conditions, and would not result in a significant adverse impact.

The No Action on-campus parking demand and utilization was also reviewed by Sector to provide context on where parking demand would occur. Allocation of No Action parking demand by Sector was based on projected growth by Sector. It was assumed that under the No Action scenario on-street parking would continue to occur.

Table 4.14
ON-CAMPUS NO ACTION ALTERNATIVE PEAK PARKING DEMAND BY SECTOR

Sector	Future Cap Parking Supply	Parking Demand			% Utilization
		Existing[1]	No Action		
			Growth[2]	Total	
West	1,524	1,428	+48	1,476	96%
South	1,400	1,139	+0	1,139	81%
Central	3,129	2,689	+0	2,689	86%
East	4,853	1,464	+0	1,464	30%
Total	**10,903**	**6,720**	**+48**	**6,768**	**62%**

Source: Transpo Group, 2016
1. Existing parking demand based on University of Washington 2015 parking counts.
2. On-campus parking demand for No Action based on projected increase in population. This does not include on-street parking demand increases noted in the previous table since these would not be parking within the sector lot.

As indicated in the table above, the added parking demand with the new South Campus development under No Action conditions would result in an 85 percent parking utilization. The West Campus would continue to have a 94 percent parking utilization consistent with existing conditions; however, given the parking utilization in other Sectors portions of this demand could be accommodated elsewhere on campus if it becomes difficult to find parking in West Campus.

With the No Action Alternative, the campus as a whole would continue to have the ability to accommodate the total future parking demand within the existing parking supply and parking could be managed within the established parking cap constraints.

Secondary Parking Impacts
Parking outside the primary impact zone surrounding the campus would likely continue with the No Action Alternative. This would include students, faculty, and staff parking their vehicles within transit served areas with unrestricted parking and then using transit and the U-PASS to travel to campus. Given the minimal growth of the No Action Alternative, it is likely that parking levels would be similar to existing conditions.

4.6 IMPACTS DURING CONSTRUCTION

During any construction as part of the remaining development in the current (2003) Campus Master Plan, potential construction impacts could include temporary closures of pathways and streets, reallocation or removal of bike and auto parking, increased truck traffic, or other temporary disruptions. While temporary in nature, potential mitigation for construction could include TMP strategies to minimize impacts. Specific impacts and mitigation for development would be addressed as part of the SEPA review.

4.7 CUA COMPLIANCE – TRIP AND PARKING CAPS

Vehicle Trip Caps. As described in Affected Environment, the University overall travel demand is subject to maintaining compliance with the trip caps consistent with 1990 UW vehicle demand levels. Table 4.15 summarizes the trip cap summary for the No Action Alternative. No Action assumes that campus population growth would be limited to that associated with the completion of the existing 2003 Campus Master Plan, which would reflect a very minor increase in campus-generated traffic above existing levels. As shown the trip cap would continue to be met, assuming current (2015) mode splits are maintained.

Table 4.15
VEHICLE TRIP CAP SUMMARY – NO ACTION

Location/Peak Period	Trip Cap (vph)	2028 No Action
UW Campus		
AM Peak Period Inbound (7:00-9:00)	*7,900*	*7,005*
PM Peak Period Outbound (3:00-6:00)	*8,500*	*7,005*
University District		
AM Peak Period Inbound (7:00-9:00)	*10,100*	*8,750*
PM Peak Period Outbound (3:00-6:00)	*10,500*	*8,750*

Parking Caps. New parking would be provided only to replace parking removed for buildings.

5 ALTERNATIVE 1 2018 CMP WITH REQUESTED HEIGHT INCREASES

This section summarizes the results of the analysis conducted for Alternative 1. As in the previous sections, the analysis examines the impacts to the key transportation elements and transportation modes.

5.1 CHANGING CAMPUS CHARACTERISTICS

5.1.1 Description of the Alternative

This section summarizes the evaluation of Alternative 1 with respect to the transportation system elements identified in the Affected Environment section of this report. The proposed University of Washington Development under Alternative 1 is anticipated to be primarily located in West and South Campus. The technical analysis of Alternative 1 focuses on the weekday PM peak period.

Alternative 1, as shown in Figure 5.1, would include the development total of 6,000,000 gross square feet of gross floor area throughout the campus with a focus of this development in the West and South Campus sectors and more limited development in the Central and East Campus sectors. Approximately 3,000,000 square feet of development is proposed in West Campus and 1,350,000 square feet are proposed in South Campus. The remaining development would be located in Central and East Campus, approximately 900,000 gsf and 750,000 gsf, respectively.

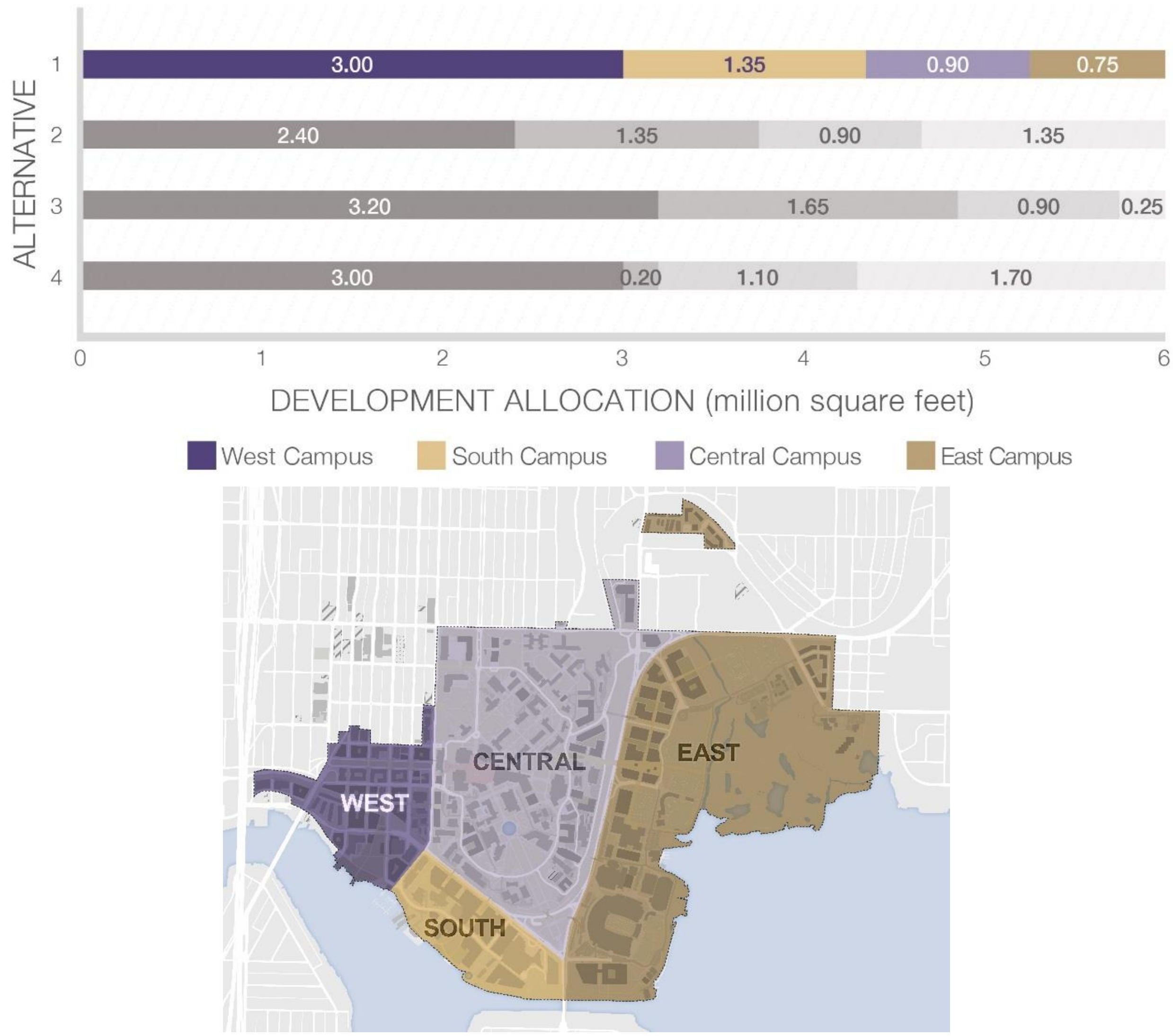


Figure 5.1 Alternative 1 Development Allocation

5.1.2 Trip Generation by Mode

The following provides a summary of the anticipated trip generation for pedestrian, bicycle, transit, and vehicle trips to campus. The trip generation methodology used for assessing the increase in trips under Alternative 1 is consistent with that previously described in the No Action Alternative. The increase in trips anticipated with Alternative 1 is compared against the No Action forecasts to determine the net increase associated with the population growth.

Weekday daily, AM, and PM peak hour vehicular trip generation including single occupant vehicles and carpools is summarized in Table 5.1 and applies to all Action Alternatives.

Table 5.1
ESTIMATED VEHICLE TRIPS (WEEKDAY)

Trip Type	Daily Trips	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
No Action							
Student	8,710	1,485	635	2,120	670	955	1,625
Faculty	6,880	1,465	630	2,095	1,035	1,470	2,505
Staff	12,260	3,190	1,370	4,560	1,885	2,685	4,570
Total No Action	***27,850***	***6,140***	***2,635***	***8,775***	***3,590***	***5,110***	***8,700***
Future 2028 (Alt 1)							
Student	10,390	1,775	760	2,535	800	1,140	1,940
Faculty	8,230	1,750	750	2,500	1240	1,765	3,005
Staff	14,860	3,860	1,655	5,515	2,280	3,250	5,530
Total Future	***33,480***	***7,385***	***3,170***	***10,550***	***4,320***	***6,155***	***10,475***
Net New Trips							
Student	1,680	290	125	415	130	185	315
Faculty	1,350	285	120	405	205	295	500
Staff	2,600	670	285	955	395	565	960
Total Net New Trips	***5,630***	***1,245***	***530***	***1,775***	***730***	***1,045***	***1,775***

Source: Transpo Group, 2016

As shown in Table 5.3, the University associated development is anticipated to generate 5,630 net new daily trips with approximately 1,775 occurring during the AM peak hour and 1,775 during the PM peak hour. Weekday daily, AM, and PM peak hour vehicular trip generation is summarized in Table 5.2.

Table 5.2
ESTIMATED NET NEW FUTURE VEHICLE TRIPS

Trip Type	Daily Trips	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Net New Trips							
Student	1,680	290	125	415	130	185	315
Faculty	1,350	285	120	405	205	295	500
Staff	2,600	670	285	955	395	565	960
Total Net New Trips	**5,630**	**1,245**	**530**	**1,775**	**730**	**1,045**	**1,775**
Visitors (10%)	565	125	55	180	75	105	180
Total UW Trips	**6,195**	**1,370**	**585**	**1,955**	**805**	**1,150**	**1,955**

Source: Transpo Group, 2016

Table 5.3 summarizes trip generation by mode, including transit, walk, bicycle, and other trips.

Table 5.3
ESTIMATED 2028 NO ACTION AND ALTERNATIVE 1 DAILY TRIPS BY MODE

	Transit	Walk	Bicycle	Other
No Action				
Student	34,890	14,270	2,775	240
Faculty	3,280	460	920	140
Staff	12,450	595	1,110	350
Total No Action	**50,620**	**15,325**	**4,805**	**730**
Future 2028 (Alt 1)				
Student	40,960	16,755	3,260	280
Faculty	3,850	540	1,080	165
Staff	15,810	755	1,410	445
Total Future	**60,620**	**18,050**	**5,750**	**890**
Net New Trips				
Student	6,290	2,570	500	45
Faculty	590	85	165	25
Staff	3,430	165	305	95
Total Net New Trips	**10,310**	**2,820**	**970**	**165**

Source: Transpo Group, 2016

As shown in Table 5.3, the proposed campus development is anticipated to generate 10,310 net new daily transit trips, 2,820 walking trips, 970 bicycle trips, and 165 other trips.

5.2 PEDESTRIANS

5.2.1 Performance Measures

Three pedestrian related performance measures have been identified to assess and compare alternatives.

- Proportion of development within 1/2 mile of Multi-Family Housing
- Proportion of development within 1/2 mile of University of Washington Residence Halls
- Quality of Pedestrian Environment

Proportion of development within 1/2 mile of multifamily housing
Walking makes up nearly one-third of all existing campus related trips to and from campus. Proximity of campus development to housing is therefore one important measure to assessing the propensity of people to walk. This measure assesses the proximity of the current campus buildings and development to nearby multifamily housing. As shown in Table 5.4 Alternative 1 development is completely within a 1/2-mile proximity to multifamily housing.

Table 5.4
ALTERNATIVE 1 PROPORTION OF DEVELOPMENT WITHIN 1/2MILE OF MULTIFAMILY HOUSING

Sector	No Action	Alternative 1
West	211,000	3,000,000 gsf
South	NA	1,350,000 gsf
Central	NA	900,000 gsf
East	NA	750,000 gsf
Total	**NA**	**6,000,000 gsf**
Percent	***100%***	***100%***

Proportion of development within 1/2 mile of University of Washington residence halls
Similar to the previous measure, this performance measure assesses the proximity of campus development within walking distance of residence halls. Residence halls were identified and then buffered by a 1/2-mile. As shown in Table 5.5, all of the new development is within a 1/2-mile proximity to multifamily housing.

Table 5.5
NO ACTION AND ALTERNATIVE 1 PROPORTION OF DEVELOPMENT WITHIN 1/2 MILE OF RESIDENCE HALLS

Sector	No Action	Alternative 1
West	211,000	3,000,000 gsf
South	NA	1,350,000 gsf
Central	NA	900,000 gsf
East	NA	750,000 gsf
Percent of Development	**100%**	**100%**

Quality of Pedestrian Environment (Primary & Secondary Impact Zones)

This Alternative would provide a number of quality enhancements to pedestrian travel within the MIO where development occurs. This alternative includes reserving space for a potential new open space area in West Campus with a number of new pedestrian facilities in and surrounding this area. The CMP identifies a new ADA accessible east-west connection between the potential West Campus open space to Central Campus, improving accessibility and providing an alternative route to the currently heavily used NE 40th Street/Grant Lane route. Pedestrian demand in and around West Campus would increase with added campus uses.

The CMP also identifies a number of new pedestrian connections in South Campus, better connecting Portage Bay with Central Campus by replacing the Medical Center. Compared to the No Action Alternative, this Alternative would greatly improve pedestrian circulation. The potential new land bridge to East Campus also would improve access to this area, especially for ADA access.

5.3 BICYCLES

5.3.1 Performance Measures

Performance of the bicycle system is assessed using two measures: Burke Gilman Trail Capacity and Quality of Bicycle Environment.

Burke-Gilman Trail Capacity

The Burke-Gilman Trail is anticipated to experience increased demand throughout all sectors of campus, but particularly in West and South Campus. The focus on development in West Campus with Alternative 1 could result in trail facility improvements, similar to those in the Mercer Court area. Increased cross traffic and travel along the newly updated trail segment is anticipated in South Campus with Alternative 1 development. Planned expansion of the Burke Gilman Trail separating pedestrian and bicycle uses will provide adequate capacity to meet CMP demands.

Cross traffic and travel along the older segment of the trail would increase in East Campus, especially with the addition of the land bridge. Existing Pronto travel patterns indicate the East Campus bicycle travel may increase, as the Burke-Gilman Trail provides a flat and direct route from East Campus to the South Campus and West Campus sectors.

Quality of Bicycle Environment (Primary & Secondary Impact Zones)

The quality of bicycle travel associated with this alternative generally improves in areas with development. This primarily includes new or improved dedicated bicycle facilities in West Campus and South Campus, or in the case of East Campus, improved access to the Burke-Gilman Trail. South Campus could see the largest improvement in internal circulation and improved access to Portage Bay.

In general, bicycle travel demand will increase throughout these areas as well as on regional bicycle facilities to/from them, however capacity constraints are not anticipated. Bicycle travel on Central Campus would grow but by a relatively small amount compared to existing travel demand, and limited improvements in dedicated bicycle facilities in Central Campus would be expected.

5.4 TRANSIT

5.4.1 Performance Measures

Transit system performance was measured for two criteria:

- Proportion of development within ½ mile of RapidRide
- Proportion of development within ½ mile of Light Rail

Proportion of development within 1/2 mile of RapidRide

This measure, as well as the next measure, assesses proximity of campus development to high capacity transit service including RapidRide. This measure was calculated by determining the ratio of each sector within a 1/2-mile walk of a RapidRide stop. For future years the 2025 Draft King County Long Range Plan service network[2] was used to determine the location of RapidRide routes and stop locations were inferred based on existing high-ridership stops, Link station locations and desired stop spacing. Because the CMP does not identify which development sites will be used within a sector, the ratio of the sector within 1/2-mile of RapidRide stops were used to scale an "average" percentage of development that might be expected to be within the 1/2-mile buffer. With the advent of RapidRide in the future, generally all of the proposed growth in No Action and Alternative 1 will have access to RapidRide within a 1/2-mile buffer area as shown in Table 5.6.

Table 5.6
NO ACTION AND ALTERNATIVE 1 PROPORTION OF DEVELOPMENT WITHIN 1/2 MILE OF RAPIDRIDE

Sector	No Action	Alternative 1
West	211,000	3,000,000 gsf
South	NA	1,350,000 gsf
Central	NA	900,000 gsf
East	NA	750,000 gsf
Total	**211,000 gsf**	**6,000,000 gsf**
Percent	***100%***	***100%***

Proportion of development within 1/2 mile of Light Rail

This measure is identical to the measure above, but proximity is measured to the University of Washington Light Rail Link Station. As shown in Table 5.7 below roughly 96% of the new development in No Action is within 1/2-mile proximity of Link Light Rail which is similar to Alternative 1 at 94%.

Table 5.7
NO ACTION AND ALTERNATIVE 1 PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF LIGHT RAIL

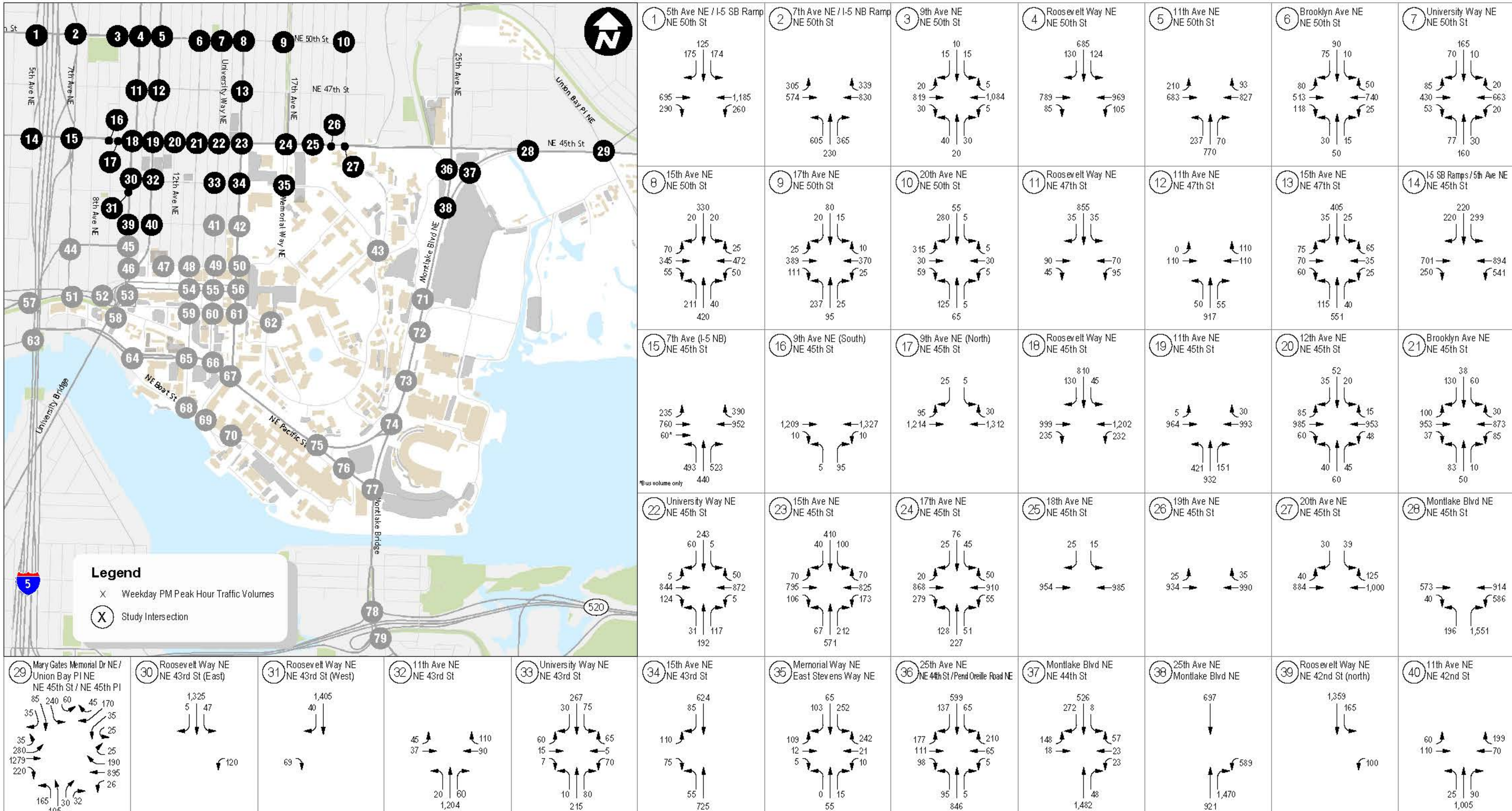
Area	No Action	Alternative 1
West	181,460	2,680,232 gsf
South	NA	1,350,000 gsf
Central	NA	900,000 gsf
East	NA	750,000 gsf
Total	181,460 gsf	5,680,232 gsf
Percent	96%	94%

5.5 VEHICLE

5.5.1 Traffic Volumes

Increased vehicle traffic associated with Alternative 1 was assigned to potential garage locations based on existing vehicle travel patterns, previous studies in the project vicinity, review of university information, and U.S. Census Bureau's *OnTheMap* tool. *OnTheMap* is a web-based mapping and reporting application, which shows where workers are employed and where they live based on census data. The zip codes were evaluated to determine if a person would be more likely to travel from the zip code via vehicle or by other means. Trips to zip codes closer to the proposed project sites or in more transit oriented locations are more likely to use transit, walk, bicycle, or other non-SOV modes. Zip codes outside the Seattle City limits and/or further from the site are more likely to drive. The general trip distribution to/from the University is shown on Figure 4.5.

Project trips for each potential garage location were assigned to the study intersections based on the general trip distribution patterns shown on Figure 4.5. The resulting future 2028 Alternative 1 volumes are shown on Figure 5.2 and Figure 5.3.



Future (2028) Alternative 1 (Intersections 1-40) Weekday PM Peak Hour Traffic Volumes

FIGURE 5.2

University of Washington 2018 Campus Master Plan

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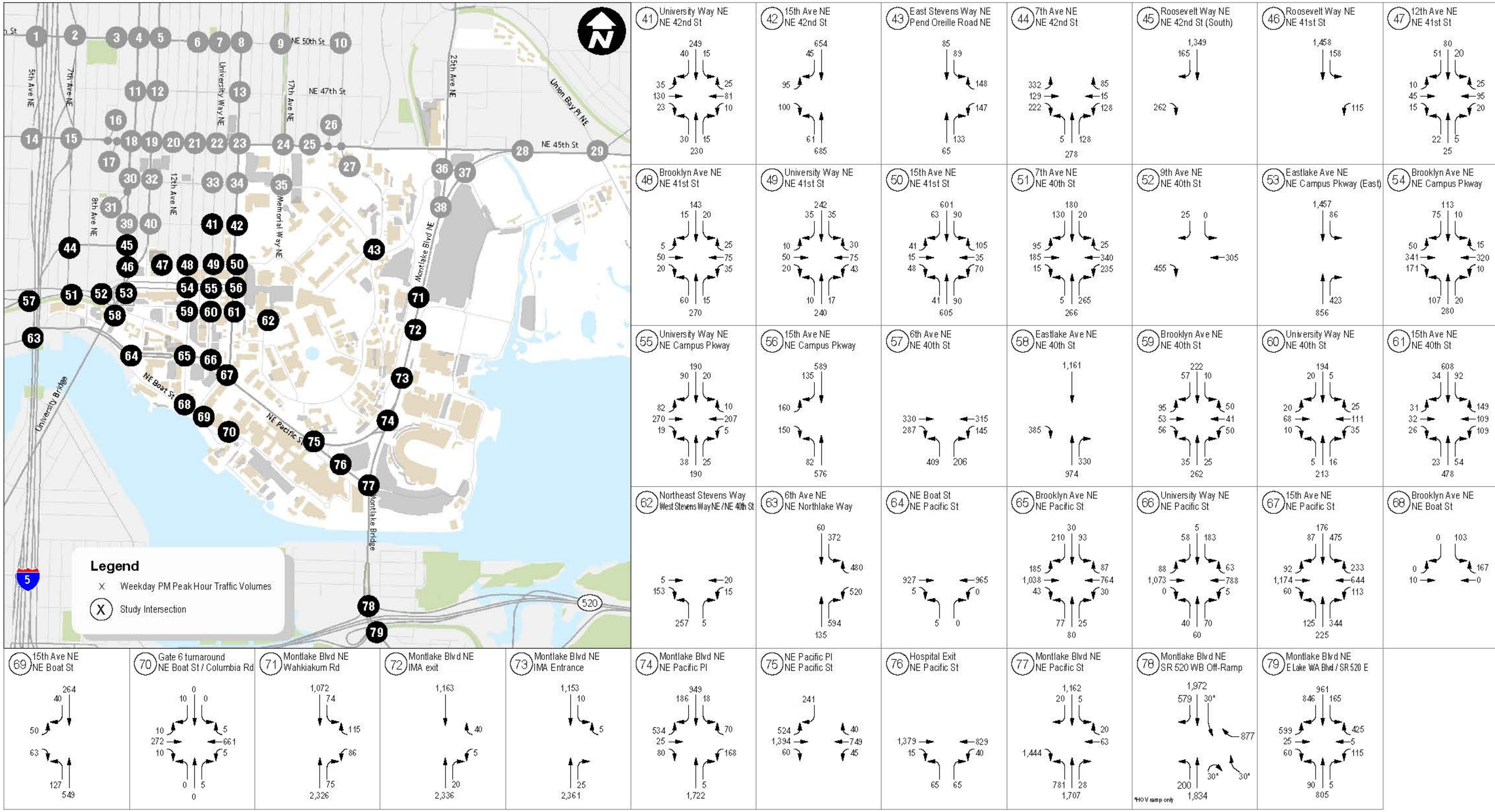

Future (2028) Alternative 1 (Intersections 41-79) Weekday PM Peak Hour Traffic Volumes

University of Washington 2018 Campus Master Plan

FIGURE
5.3

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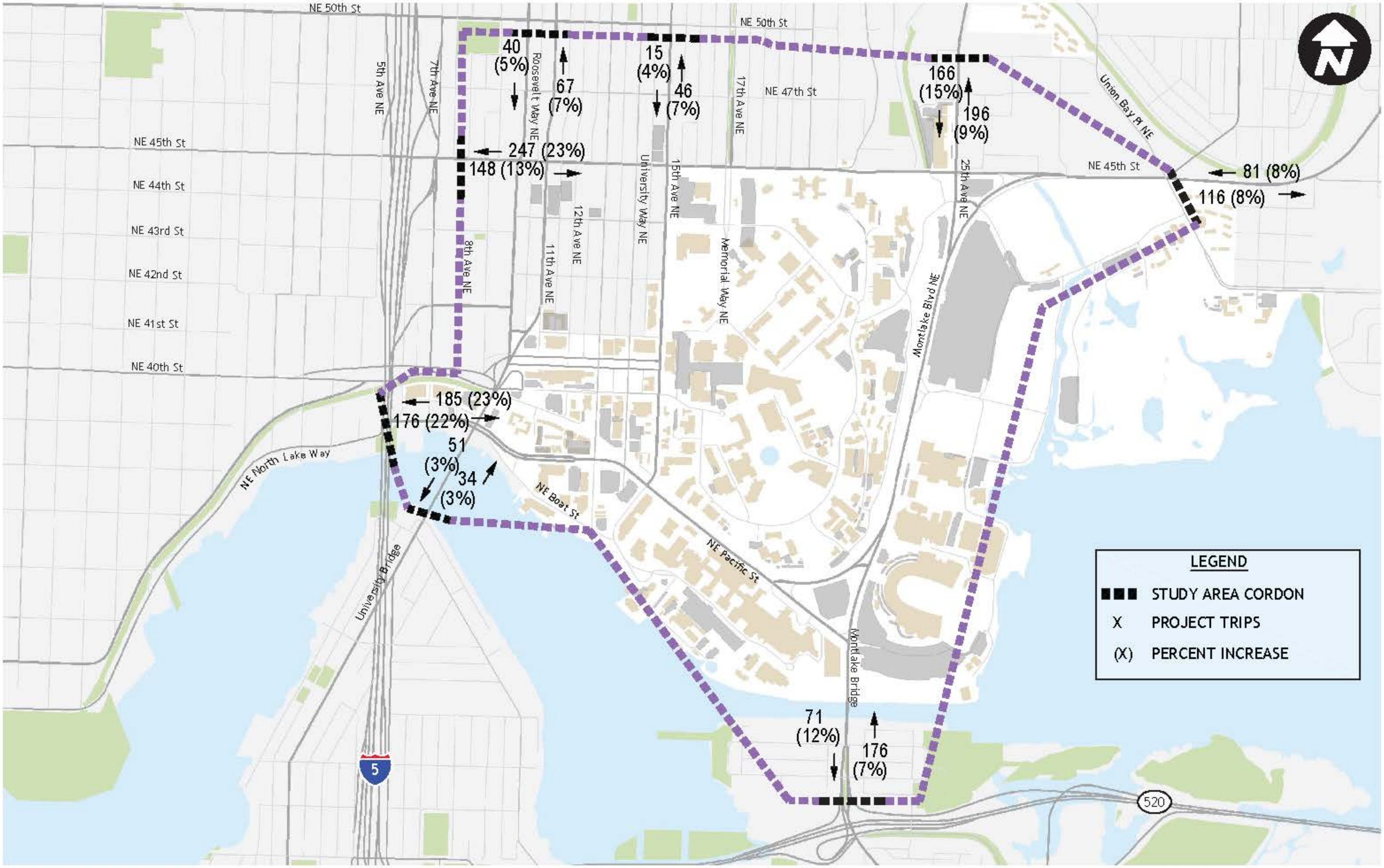
5.5.2 Cordon Volume Analysis

To understand the volumes associated with the University of Washington, related to background volumes under the different Alternative scenarios, a cordon volume analysis was completed. The cordon volume analysis focuses on the major roadways leading to and from the University. The cordon volume analysis also shows the percent of total trips along the corridor that are associated with the increased traffic generated by Alternative 1. The cordon volume and project share associated with Alternative 1 are shown on Figure 5.4. Note that this reflects the percent increase associated with continued development on campus. As shown on Figure 5.4, total percent project related volumes are similar to No Action even though Alternative 1 includes higher development. This may be due to the limited available capacity on arterials in the area.

Cordon: An imaginary line used to evaluate traffic in and out of the University area and measure the change or increase in traffic associated with the proposed alternatives.



Future (2028) Alternative 1 PM Peak Hour Cordon Volumes and Proportional Increase

FIGURE 5.4

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5.5.3 Traffic Operations Performance

Methodology

The methodology used in assessing intersection and corridor LOS is consistent with that described in the Affected Environment and No Action scenarios. A detailed description of methodology can be found in Appendix B.

Intersection LOS

Weekday PM peak hour intersection traffic operations during the 2028 Alternative 1 conditions are summarized in Figure 5.5 and Figure 5.6**.** The year 2028 geometry for all of the study-area intersections were assumed to remain the same as baseline No Action conditions except when modifications are expected as part of the Alternative. For example, existing traffic was rerouted when impacted by proposed street vacations. Additionally, all signal timing splits and offsets were optimized for Alternative 1. Complete intersection level of service summaries are provided in Appendix C.

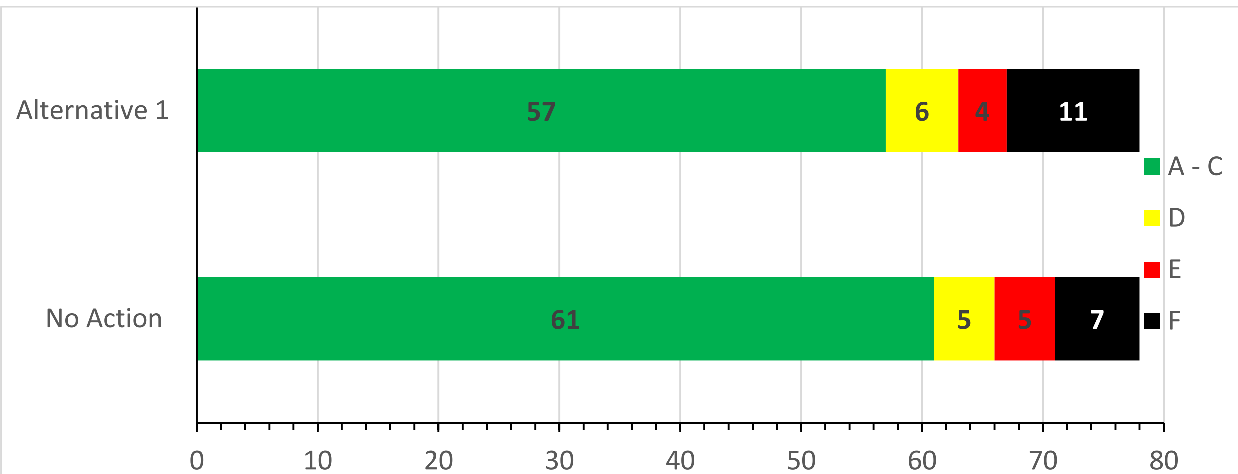


Figure 5.5 No Action/Alternative 1 Weekday PM Peak 2028 Intersection Level of Service Summary

The following table illustrates changes in intersection traffic operations at intersections anticipated to operate poorly between the future No Action Alternative and future Alternative 1 weekday PM peak hour.

Table 5.8
FUTURE ALTERNATIVE 1 INTERSECTION LEVEL OF SERVICE SUMMARY

Intersection	No Action		Alternative 1		Change in Delay (sec)	Project Share
	LOS[1]	Delay[2]	LOS[1]	Delay[2]		
15. 7th Ave (I-5 NB) / NE 45th St	D	44	E	61	17	11.0%
16. 9th Ave NE (South) / NE 45th St	E	48	F	83	35	14.5%
29. Montlake Blvd NE / Mary Gates Memorial Dr NE	E	56	E	67	11	5.0%
30. Roosevelt Way NE / NE 43rd St (East)	F	68	F	101	33	3.8%
31. Roosevelt Way NE / NE 43rd St (West)	E	45	F	62	17	3.9%
46. Roosevelt Way NE / NE 41st St	F	434	F	712	278	1.5%
47. 12th Ave NE / NE 41st St	F	76	F	906	830	22.5%
49. University Way NE / NE 41st St	F	*	F	*	*	22.9%
51. 7th Ave NE / NE 40th St	F	77	F	101	24	5.5%
57. 6th Ave NE / NE 40th St	F	113	F	135	22	5.4%
63. 6th Ave NE / NE Northlake Way	E	46	F	105	59	16.9%
67. 15th Ave NE / NE Pacific St	D	37	F	100	63	23.7%
69. 15th Ave NE / NE Boat St	C	15	E	41	26	23.7%
71. Montlake Blvd NE / Wahkiakum Rd	F	463	F	233	-230	10.6%
72. Montlake Blvd NE / IMA exit	E	38	E	49	11	10.2%
73. Montlake Blvd NE / IMA Entrance	C	24	D	28	4	10.2%
77. Montlake Blvd NE / NE Pacific St	C	31	D	40	9	8.7%
78. Montlake Blvd NE / SR 520 WB Off-Ramp	C	34	D	43	9	8.2%

*Volume exceeds capacity and Synchro could not calculate the delay.
1. Level of service.
2. Average delay per vehicle in seconds rounded to the whole second.

During the weekday PM peak hour, 4 additional intersections are anticipated to operate at LOS F under Alternative 1 traffic conditions compared with No Action conditions. Overall, 21 intersections are anticipated to operate at LOS D or worse during the weekday PM peak hour with Alternative 1, as compared to 17 under No Action conditions. The City of Seattle does not have an LOS standard, but generally considers LOS E and LOS F at signalized intersections to reflect poor operations and LOS F at unsignalized intersections as poor operations. For intersections that degrade from LOS D to LOS E or operate at LOS E or LOS F under the "with-project" condition, or increase of 5 or more seconds could be considered significant by the City.

The following intersections are anticipated to degrade to D or below in the future under Alternative 1 conditions:

15. 7th Avenue (I-5 NB)/ NE 45th Street
16. 9th Avenue NE (South)/NE 45th Street
31. Roosevelt Way NE/NE 43rd Street (West)
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
69. 15th Avenue NE/NE Boat Street
73. Montlake Boulevard NE/IMA Entrance
77. Montlake Boulevard NE/NE Pacific Street
78. Montlake Boulevard NE/SR 520 WB Ramps

Intersections where the LOS is E or F and where the Alternative 1 traffic increases delay by more than 5 seconds are shown in Table 5.9. As shown in Table 5.9, a majority of the intersections are unsignalized intersections. At the two-way stop controlled (TWSC) intersections the change in delay is represented both for the total intersection and for the worst movement.

Table 5.9
ALTERNATIVE 1 SUMMARY OF POTENTIAL IMPACTS

Intersection and number	Traffic Control	Change in Delay (seconds)[1]	Percent of Total (Project Share)
15. 7th Avenue NE (I-5 NB)/NE 45th Street	Signalized	18	11.0%
16. 9th Avenue NE (South)/NE 45th Street	TWSC	0.9/33	14.5%
29. Montlake Boulevard NE/Mary Gates Memorial Drive NE	Signalized	10	5.0%
30. Roosevelt Way NE/NE 43rd Street (East)	TWSC	2.9/37	3.8%
31. Roosevelt Way NE/NE 43rd Street (West)	TWSC	0.8/17	3.9%
46. Roosevelt Way NE/NE 41st Street	TWSC	18/278	1.5%
47. 12th Avenue NE/NE 41st Street	TWSC	275/830	22.5%
49. University Way NE/NE 41st Street	TWSC	-[2]	22.9%
51. 7th Avenue NE/NE 40th Street	AWSC	25	5.5%
57. 6th Avenue NE/NE 40th Street	AWSC	22	5.4%
63. 6th Avenue NE/NE Northlake Way	AWSC	59	16.9%
67. 15th Avenue NE/NE Pacific Street	Signalized	63	23.7%
69. 15th Avenue NE/NE Boat Street	AWSC	25	25.0%
71. Montlake Boulevard NE/Wahkiakum Road	TWSC	-9.3/-230	10.6%
72. Montlake Boulevard NE/IMA Exit	TWSC	0.1/10	10.2%

Note: TWSC = two-way stop controlled, AWSC = all-way stop controlled

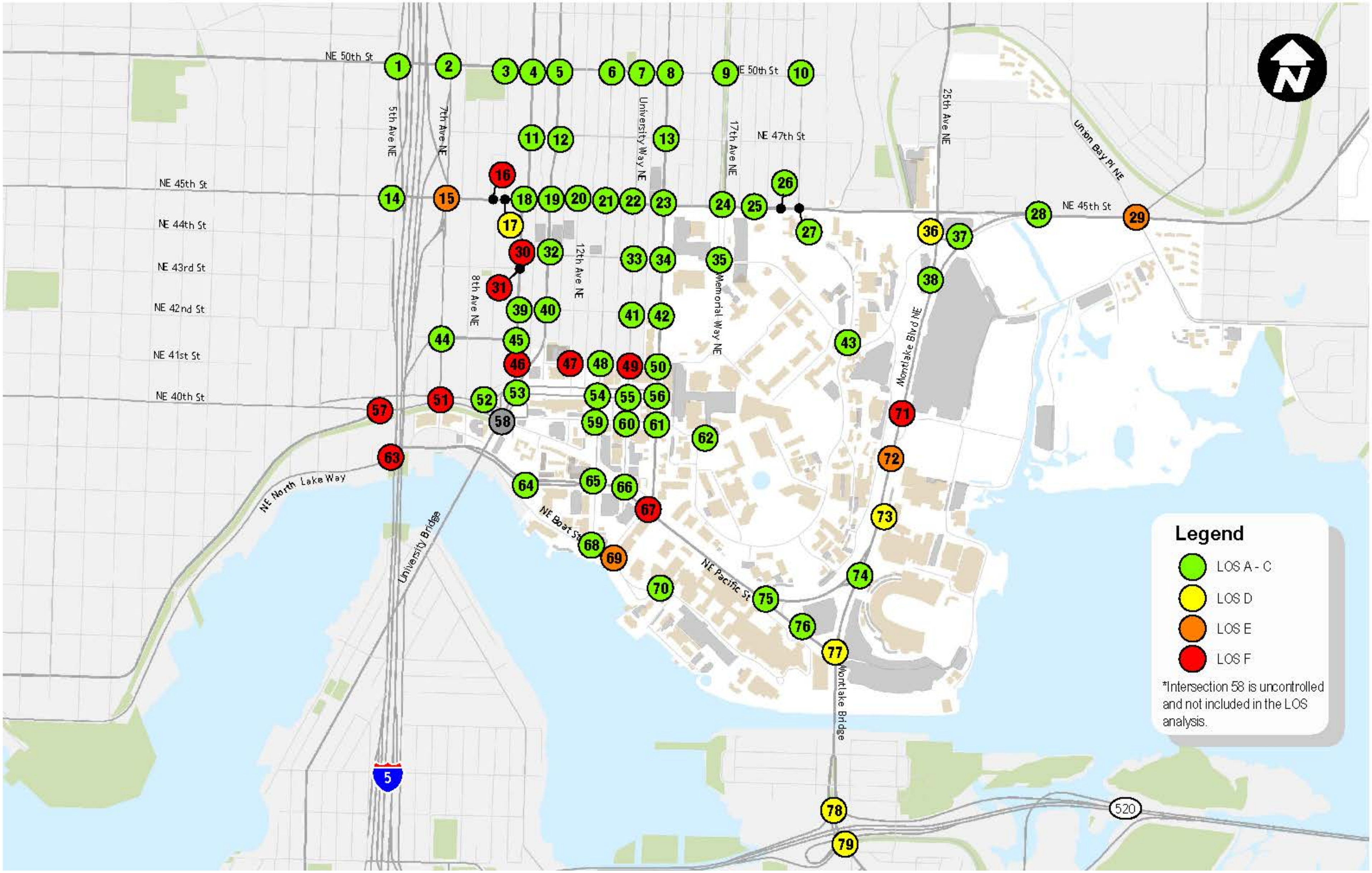
1. Change in total intersection delay/change in worst movement delay for two-way stop controlled intersections.

2. Volume exceeds capacity and Synchro could not calculate the delay.

Of the stop controlled intersections listed in Table 5.9 some of the increased delay can be attributed to the increase in pedestrian and bicycle volumes. Additionally, the following intersections are located at or near potential garage access locations resulting in higher share of alternative percentages:

47. 12th Avenue NE/NE 41st Street
49. University Way NE/NE 41st Street
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
69. 15th Avenue NE/NE Boat Street
71. Montlake Boulevard NE/Wahkiakum Road
72. Montlake Boulevard NE/IMA Exit

The specific location of the driveways impacts the overall trip distribution and individual movements at intersections near driveway locations. Given the preliminary planning nature of this evaluation, individual traffic impacts should be assessed when final building size and driveway locations are determined. Also, given the grid network, it is anticipated that if drivers experience long delays at unsignalized locations they may alter their trip pattern in an effort to reduce delays. It is also recognized that level of service for vehicle traffic, while a consideration, is increasingly balanced against assuming that pedestrian, bicycle, and transit travel modes are encouraged and facilitated. Intersections that are calculated to operate at poor levels of service for vehicle traffic are not always considered a high priority for improvement by the City.



Future (2028) Alternative 1 Weekday PM Peak Hour Traffic Operations

University of Washington 2018 Campus Master Plan

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FIGURE
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5.5.4 Arterial Operations

Arterial travel times and speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated with the addition of project generated traffic associated with Alternative 1, consistent with the previously described methodology for existing and future No Action conditions. This includes the application of the adjustment factors previously described.

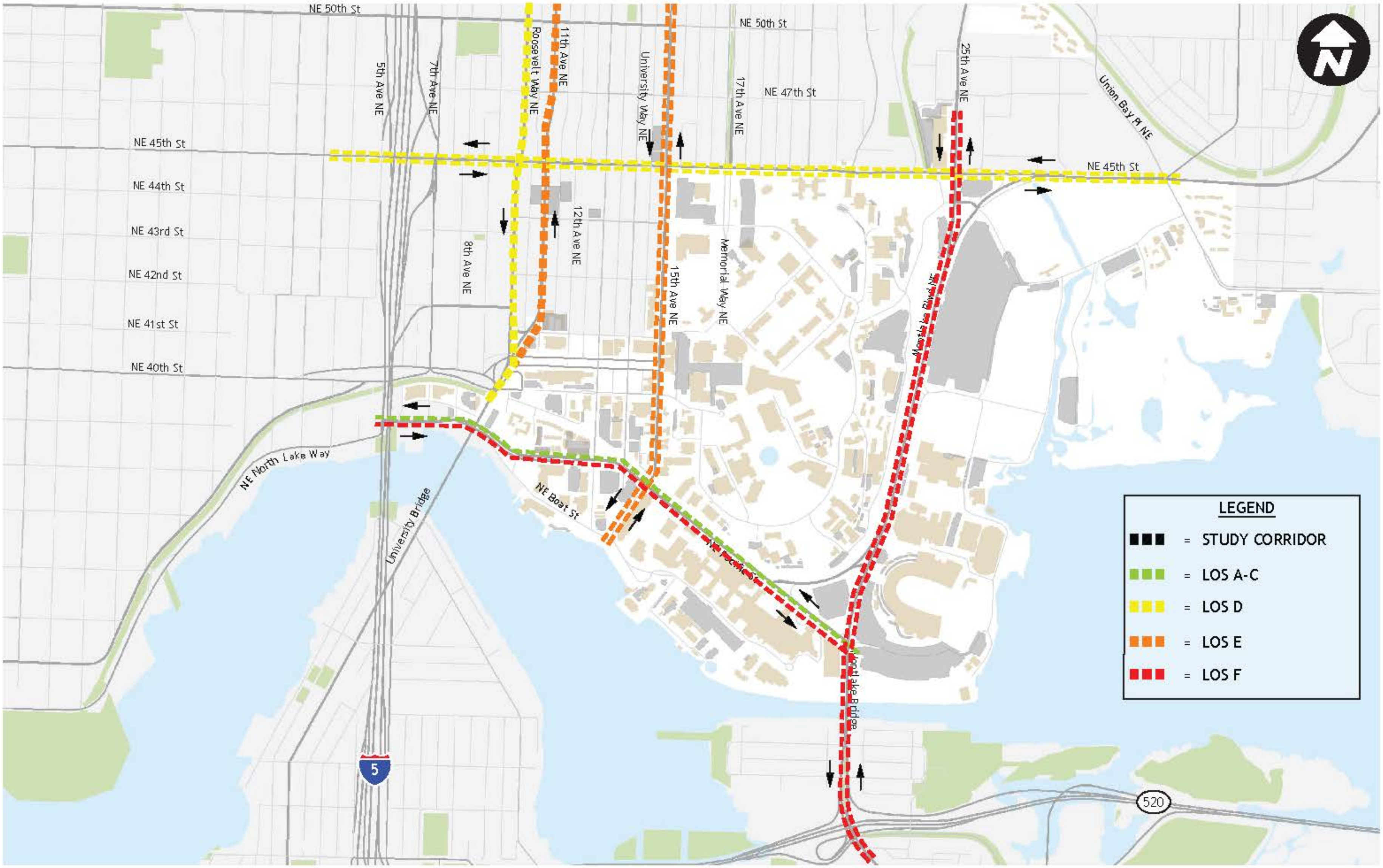
Table 5.10 and Figure 5.7 summarizes the No Action and Alternative 1 arterial travel times and speeds. Detailed corridor operations worksheets are provided in Appendix C.

Table 5.10
FUTURE NO ACTION AND ALTERNATIVE 1 WEEKDAY PM PEAK HOUR ARTERIAL OPERATIONS SUMMARY

Corridor	No Action		Alternative 1	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	D	11.7	D	10.7
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	9.0	E	8.9
Southbound	D	9.2	E	7.6
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	10.8	F	9.5
Southbound	F	8.4	F	8.4
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	11.7	D	10.7
Westbound	D	10.8	D	9.8
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.1	F	9.5
Westbound	D	10.8	D	9.8
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	12.0	D	11.8

1. Level of service.
2. Average speed in miles per hour

As shown in Table 5.10, under Alternative 1 the arterials will generally experience increases in delay and slower travel speeds. Under Alternative 1 the 15th Avenue NE arterial in the southbound direction is anticipated to degrade from LOS D to LOS E, the Montlake Boulevard NE arterial in the northbound direction is anticipated to degrade from LOS E to LOS F, and the NE Pacific Street arterial in the eastbound direction is anticipated to degrade from LOS C to LOS F.



Future (2028) Alternative 1 Weekday PM Peak Hour Corridor Traffic Operations

FIGURE 5.7

University of Washington 2018 Campus Master Plan

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5.5.5 Screenline Analysis: Primary Impact Zone

The following section describes the screenline analysis completed for two designated screenlines within the study area, consistent with City of Seattle Transportation Concurrency system. were selected to count vehicle traffic entering and exiting the University of Washington primary and secondary impact zones. As part of the Mayor's Seattle 2035 Comprehensive Plan (City of Seattle, 2016), two screenlines are identified within the vicinity of the University of Washington, as shown in Figure 3.32. Screenline 5.16 is an east-west screenline, measuring north-south travel, and extending along the ship canal to include the University and Montlake Bridges. Screenline 13.13 is a north-south screenline, measuring east-west travel, and extending east of I-5 between NE Pacific Street and NE Ravenna Boulevard.

Screenline: An imaginary line across which the number of passing vehicles is counted.

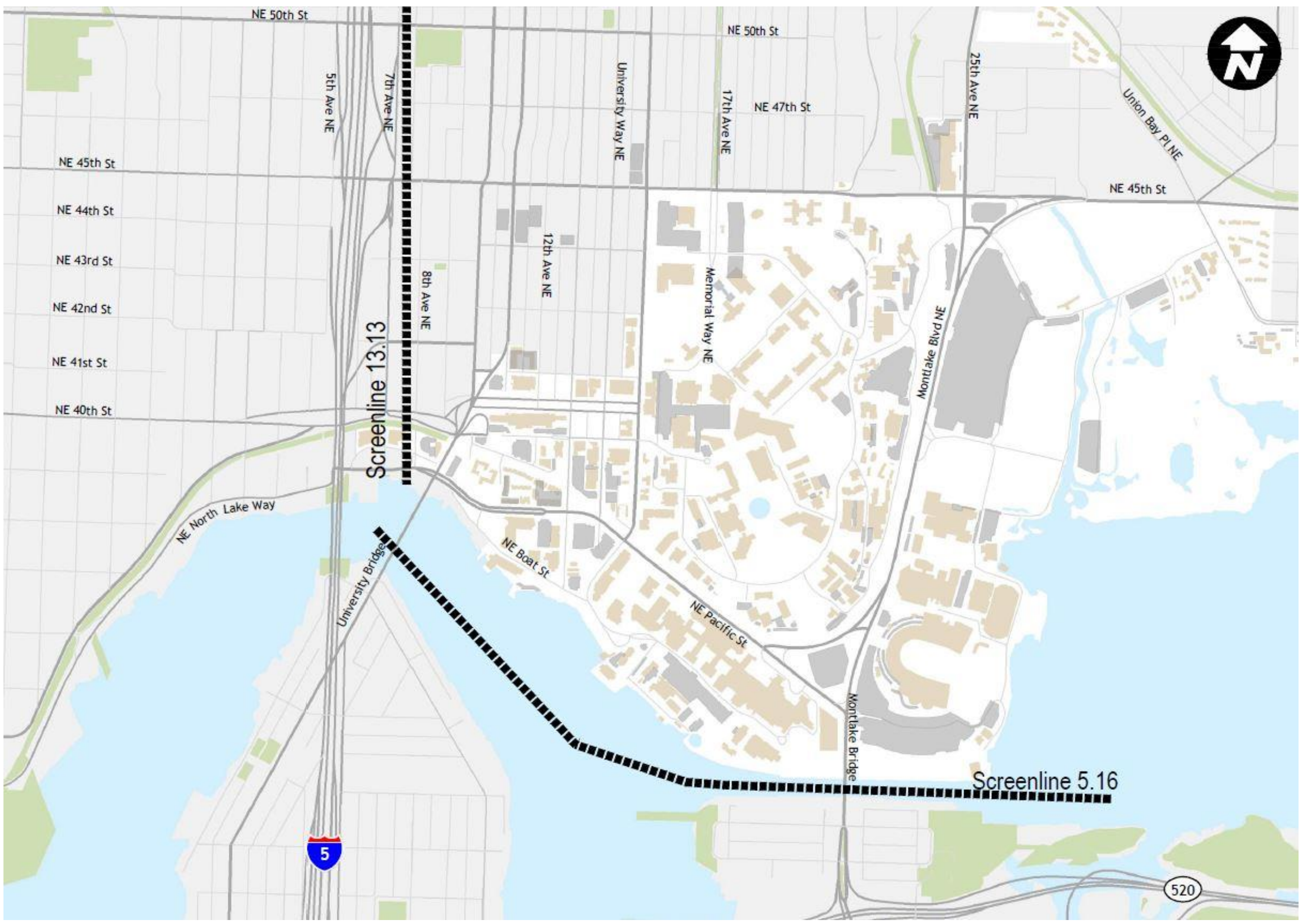


Figure 5.8 Study Area Screenlines

The screenline analysis includes volume to capacity (V/C) calculations for the vehicles traversing the screenlines using future (2028) Alternative 1 traffic volumes and interpolated roadway capacity estimates. Roadway capacity for the 2028 future horizon year was interpolated using 2016 capacity estimates described in Table 3.12 and 2035 capacity estimates referenced in the May 2016 Seattle

Comprehensive Plan Update Final EIS. Future (2028) roadway capacity estimates are shown in Table 5.11 below. Detailed screenline volumes and volume to capacity calculations are included in Appendix C.

Table 5.11
FUTURE (2028) CAPACITY

Screenline	Future (2028) Capacity
5.16 – Ship Canal, University and Montlake Bridges	
Northbound	4,210
Southbound	4,210
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard	
Eastbound	6,119
Westbound	6,119

Source: Transpo Group, 2016

Level of service standards for the screenline analysis are based on the volume to capacity ratio of a screenline. As described in the Seattle Comprehensive Plan Update EIS, the LOS standard volume to capacity ratio for Screenline 5.16 and Screenline 13.13 are 1.20 and 1.00, respectively. For this study, screenline volume to capacity ratios that do not exceed the LOS standard are acceptable. The Alternative 1 screenline analysis is included in Table 5.12. Detailed screenline analysis calculations are included in Appendix C.

Table 5.12
FUTURE (2028) ALTERNATIVE 1 SCREENLINE ANALYSIS

Screenline	Screenline Volume	Capacity	V/C	LOS Standard V/C
5.16 – Ship Canal, University and Montlake Bridges				
Northbound	4,015	4,210	0.95	1.20
Southbound	4,097	4,210	0.97	1.20
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard				
Eastbound	3,915	6,119	0.64	1.00
Westbound	4,339	6,119	0.71	1.00

Source: NACTO, Seattle Comprehensive Plan Update EIS, and Transpo Group, 2016

As shown in Table 5.12, all Alternative 1 screenline volume to capacity ratios meet the acceptable LOS standard.

5.5.6 Service/Freight Routes

Consistent with existing conditions, freight and delivery access would be provided for each building. The deliveries will largely come direct from the shippers. A proportion of deliveries may come through the University's interdepartmental delivery system. As the specific development sites or freight/service needs are not known, an analysis at a site specific level is not appropriate at this time. The Seattle Municipal Code outlines the desired location for and number of loading berths and zones required for a project. This information would be used as guidance during the permitting of any future site. In general, the increase in development area would result in an increase in delivery/service related traffic in the areas for which the development would occur. No significant impact due to added freight traffic associated with the proposed CMP was identified.

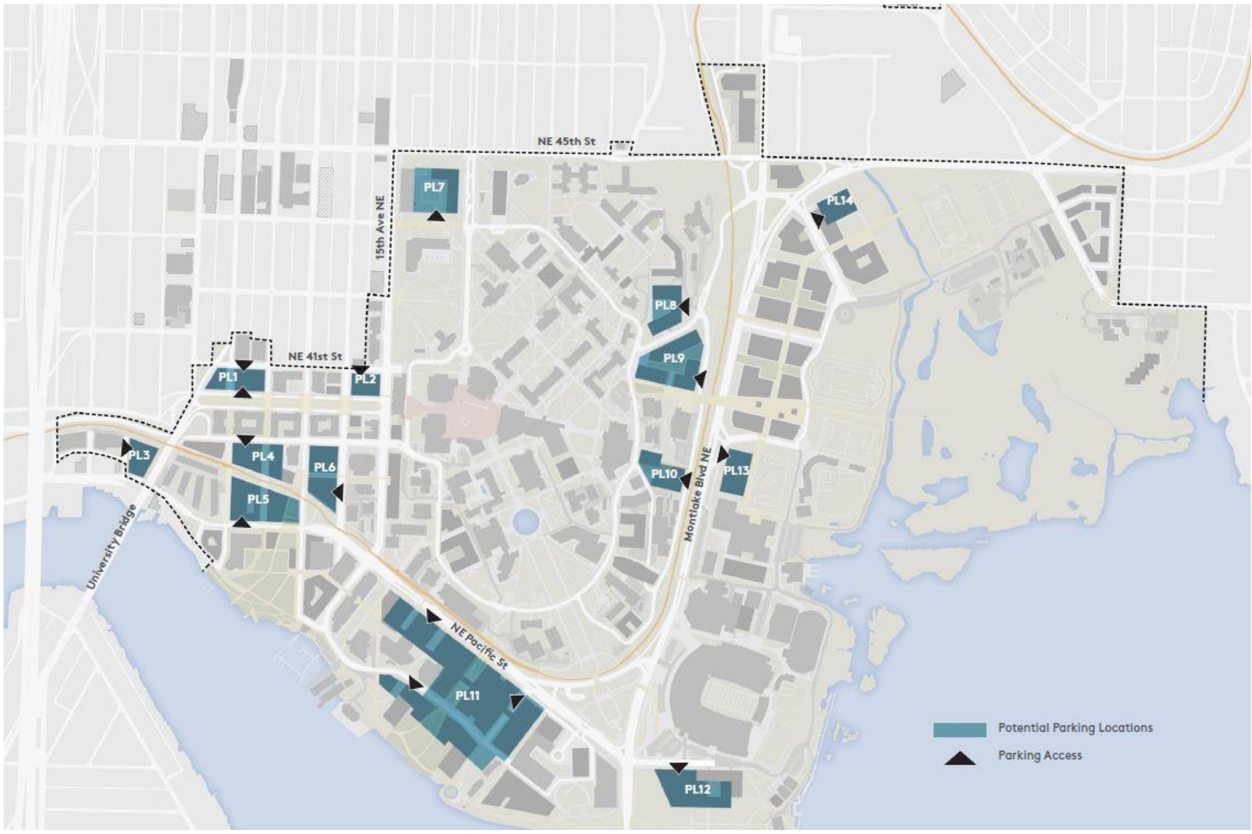
5.5.7 Parking

Supply

The identification of parking impacts is determined by evaluating the development Alternatives assuming parking supply would be increased or decreased within each Sector to achieve an 85 percent utilization without exceeding the parking cap. Alternative 1 parking cap supply would be 10,250 spaces. An 85 to 90 percent utilization reflects a level where drivers are typically able to find parking without difficulty and circulation through the parking areas while searching for parking is minimized.

Additional parking would be constructed on one or more of the identified parking sites reflected in Figure 5.9. Any increases in parking supply would be phased such that the existing CUA parking cap would be maintained. Strategies to maintain the parking cap could include:

- Factoring in the parking demand and the implications on the parking cap when determining phasing of development
- Removing parking in sectors that are underutilized so that parking can be constructed in more desirable locations consistent with parking demand projections
- Shifting modes to reduce the overall parking needs for the campus to minimize the amount of new parking needed



Source: Sasaki, October 2016

Figure 5.9 Potential Sites for Campus Parking

Demand

Alternative 1 would develop 6 million square-feet on-campus and vacate Boat Street. Table 5.13 provides a summary of the resulting increase in parking demand by population with Alternative 1. The evaluation assumes that with the changes in campus parking supply potential on-street parking demand would occur within the campus.

Table 5.13
COMPARISON OF NO ACTION AND ALTERNATIVE 1 PEAK PARKING DEMAND

	Vehicles Parked							
	Students[1]		Faculty[1]		Staff[1]		Total	
	No Action[2]	Alt 1[3,4]	No Action[2]	Alt 1[3,4]	No Action[2]	Alt 1[3,4]	No Action[2]	Alt 1[3,4]
On-Campus	1,857	2,298	1,096	1,358	3,814	4,768	6,768	8,424
Potential On-Street	134	136	49	50	94	96	277	282
Total	**1,991**	**2,435**	**1,146**	**1,408**	**3,908**	**4,863**	**7,045**	**8,706**

Source: Transpo Group, 2016

1. Demand by population assumes a SOV at 20 percent for the campus.
2. No Action forecasts based on projected increase in population.
3. With the street vacation identified in Alternative 1, the reduction in on-street parking supply (approximately 60 spaces) results in on-street parking demand shifted on-campus.
4. Approximately 3% of the total parking demand is anticipated to be generated by the proposed partner development (500,000 square-feet of development in West Campus).

As shown in the table, compared to the No Action, Alternative 1 would add a parking demand of approximately 1,660 vehicles assuming a 20 percent SOV for the campus. From the perspective of the campus as a whole, the Alternative 1 parking demand would continue to be accommodated within the existing parking supply and would not impact the CUA parking cap.

Similar to the No Action, the Alternative 1 on-campus parking demand and utilization was also reviewed by sector to provide context on where parking demand would occur (see Table 5.14). Allocation of Alternative 1 parking demand by sector was based on projected development as documented in Appendix B in the parking methodology. The evaluation assumes that on-street parking would be allocated to on-campus facilities given the increases and reallocation of parking supply to achieve an 85 percent utilization.

Table 5.14
ALTERNATIVE 1 PEAK PARKING DEMAND BY SECTOR

Sector	Future Cap Parking Supply	Parking Demand			% Utilization
		No Action[1]	Alternative 1		
			Growth[2]	Total	
West	2,820	1,428	969	2,397	85%
South	1,910	1,187	436	1,623	85%
Central	3,510	2,689	291	2,980	85%
East	2,010	1,464	242	1,706	85%
Total	**10,250**	**6,768**	**1,938**	**8,706**	**85%**

Source: Transpo Group, 2016

1. On-campus parking demand for No Action based on projected increase in population. This does not include on-street parking demand increases noted in the previous table since these would not be parking within the Sectors.
2. Growth in parking demand based on projected increase in population for Alternative 1. The analysis assumes with the street vacation and reallocation of parking supply in Alternative 1, on-street parking demand would shift to on-campus parking.

As the table above reflects, reallocation of parking would result in a parking supply under the existing cap and an 85 percent utilization by Sector and for the campus as a whole. The additional parking and reallocation of parking supply would provide a better relationship between localized supply and demand and thus reduce the likelihood of parking beyond the University facilities (i.e., within the neighborhoods).

Secondary Parking Impacts

Parking outside the primary impact zone surrounding the campus would likely continue with Alternative 1 similar to the No Action Alternative. This would include vehicles parking within transit served areas with unrestricted parking and then using transit to travel to campus. As the campus grows, this could occur at higher levels compared to the No Action Alternative.

5.6 AERIAL/STREET VACATIONS

The City of Seattle has established policies related to the review and consideration of alley and street vacations. The City's Street Vacation Policies (Clerk File 310078) are intended to guide City Council decisions regarding the vacation of public rights-of-way. Policy 1 which is related to Circulation and Access, states:

"Vacations may be approved only if they do not result in negative effects on both the current and future needs for the City's vehicular, bicycle, or pedestrian circulation systems or an access to private property, unless the negative effects can be mitigated."

Street vacations are proposed along Boat Street NE between the Fishery Science Building driveway and Brooklyn Avenue NE as well as along NE Northlake Place east of 8th Avenue NE. The evaluation of Alternative 1 takes into consideration the proposed vacation. In addition, an analysis without the vacations has been conducted as part of Alternative 5.

Potential impacts of the vicinity would be concentrated within the immediate vicinity of the Boat Street NE and NE Northlake Place area with no impacts anticipated outside this vicinity. The following provides an overview of potential pedestrian, bicycle, transit, and vehicle impacts for each of the street vacations.

NE Boat Street

- **Pedestrians and Bicycles.** The vacation of Boat Street is proposed to accommodate a green space, which would have multimodal pathways. Pedestrians and bicyclists would continue to be served through a new multimodal trial within the proposed green. The proposal would improve connectivity to the waterfront for pedestrians and bicyclists compared to the existing conditions.
- **Transit.** No buses currently use Boat Street NE between the Fishery Science Building driveway and Brooklyn Avenue NE. Primary bus services is located along NE Pacific Street, north of Boat Street NE. The proposed vacation would result in some increases in vehicle traffic along NE Pacific Street; however, increase in traffic and resulting changes in delay are anticipated to be relatively small so transit impacts would be minimal.
- **Vehicle.** The section of Boat Street NE proposed for street vacation currently accommodates two-way east/westbound and includes one travel lane in each direction. The street is classified as an access street by the City of Seattle.
    - **Traffic Volumes –** Average weekday AM peak hour volumes between Boat Street NE between the Fishery Science Building driveway and Brooklyn Avenue NE are approximately 125 vehicles in the eastbound direction and 90 vehicles in the westbound direction for a total of 215 vehicles. Average weekday PM peak hour volumes between Boat Street NE between the Fishery Science Building driveway and Brooklyn Avenue NE are approximately 90 vehicles in the eastbound direction and 105 vehicles in the westbound direction for a total of 195 vehicles. With the vacation, this traffic would

shift to NE Pacific Street resulting in an approximately 12 to 20 percent increase in traffic volumes.

- **Traffic Operations –** A review of weekday PM peak hour traffic operations along NE Pacific Street and NE Boast Street in the vicinity of the vacation shows most of the study intersections generally operate at LOS C or better with or without the vacation. The only exceptions are the 15th Avenue NE/NE Pacific Street intersection, which operates at LOS F with or without the vacation and the 15th Avenue NE/NE Boat Street intersection, which operates at LOS E with the vacation and LOS F without the vacation. The increase in delay at the 15th Avenue NE/NE Pacific Street intersection as a result of the vacation is approximately 15 seconds per vehicle.
- **Service/Freight Routes –** NE Boat Street provides access to the uses along this street but is not used as a freight route. Freight would experience the same traffic volume and operational impacts described above.
- **Parking -** Approximately 45 to 50 parking spaces would be removed along Boat Street with the vacation. Three of the parking stalls along Boat Street are associated with the University of Washington Police Department. The parking analysis described previously for Alternative 1 assumes this displaced parking would be accommodated on the campus. The results of the analysis show that there would be sufficient campus parking to accommodate this displacement.

<u>**NE Northlake Place**</u>

- **Pedestrians and Bicycles.** The vacation of Northlake Place would allow for a larger parcel to accommodate a new building. Pedestrian and bicycle use of this street is currently limited and generally is associated with the uses that have access along Northlake Place. With the vacation, these uses would be redeveloped. Pedestrian and bicycle facilities would be developed in the vicinity of the building with Alternative including the proposed green south of the Northlake Place parcels.
- **Transit.** No buses currently use Northlake Place. Primary bus service is located along NE Pacific Street, north of Boat Street NE. Given the relatively low traffic volumes of Northlake Place (approximately 30 vehicles during the weekday AM and PM peak hours), it is not anticipated that shifts in traffic would have a noticeable impact on transit.
- **Vehicle.** The section of NE Northlake Place proposed for street vacation accommodates two-way east/westbound and includes one travel lane in each direction. NE Northlake Place dead ends approximately 170 feet east of 8th Avenue NE. The street is classified as an access street by the City of Seattle.
    - **Traffic Volumes –** Traffic volumes are relatively low along Northlake Place with approximately 30 vehicles during both the AM and PM peak hours.
    - **Traffic Operations –** No operational impacts are anticipated as result of shifts in traffic volumes with the vacation of Northlake Place.

- **Service/Freight Routes –** No impacts are anticipated to service and freight routes as a result of the vacation.
- **Parking –** Approximately 10 to 15 stalls would be displaced with the vacation. The Alternative 1 parking analysis show that there would be sufficient campus parking to accommodate this displacement.

In addition to the street vacation, Alternative 1 also includes vacation of the existing pedestrian bridge across Montlake Boulevard NE south of Pend Oreille Road NE. This vacated pedestrian bridge would be replaced with a land bridge for pedestrians; therefore, no impacts are anticipated as a result of the aerial vacation.

Further analysis will be provided to the City consistent with the policy requirements at such time an application for an aerial or street vacation is made. The EIS alternatives and supporting analysis reflect the vacations as proposed.

5.7 IMPACTS DURING CONSTRUCTION

During construction of all Action Alternatives, potential construction impacts could include temporary closures of pathways, and streets, reallocation or removal of bike and auto parking, increased truck traffic or other temporary disruptions. While temporary in nature, potential mitigations for construction could include TMP strategies, outreach, and coordination to minimize impacts. Specific impacts and mitigations for development would be addressed as part of SEPA review.

5.8 CUA COMPLIANCE – VEHICLE TRIP AND PARKING CAPS

Vehicle Trip Caps. Table 5.15 summarizes the potential trip cap compliance. Historic SOV mode splits are between 18 and 20 percent (2014-2015). Recent opening of University of Washington Link light rail station and anticipated expansion in 2021 of light rail in the U-District would suggest the assumed 20 percent for SOV modes assumed in this analysis, is reasonable. As shown from the summary, the vehicle trip cap is forecast to be maintained, however the percentage of vehicle trips under the cap would decline with forecast growth levels. This suggests that the UW will need to continue to find ways through the Transportation Management Plan demand management strategies to evolve and further reduce the amount of single occupant vehicles that are generated during the critical peak periods subject to the Caps.

Table 5.15
VEHICLE TRIP CAP SUMMARY – ALTERNATIVE 1

Location/Peak Period	Trip Cap (vph)	Alternative 1 2028
UW Campus		
AM Peak Period Inbound (7:00-9:00)	*7,900*	*8,230*

PM Peak Period Outbound (3:00-6:00)	*8,500*	*8,230*
University District		
AM Peak Period Inbound (7:00-9:00)	*10,100*	*10,275*
PM Peak Period Outbound (3:00-6:00)	*10,500*	*10,275*

As described in Affected Environment, forecast 2028 trip cap outcomes are reflected as forecast *illustrations only,* and have no actual standing in the determination of compliance. They assume no change in mode split from 2015 levels, and thus may be considered conservative and worst case assumptions given the planned Link light rail expansions from the University of Washington to Northgate by 2021 and Lynnwood by 2023 When completed, these rail expansions greatly enhance access for students, faculty, and staff to reach the University by convenient transit and could reduce the overall proportion of drive alone travel to the University. While the approach is conservative and does not factor in the potential benefits of increased future light rail access, the University will continue to maintain compliance with the trip caps as part of their overall management effort, consistent with UW history, and implemented through the TMP. Assuming the more conservative 20 percent mode split would result in exceeding the University District cap in about 2025.

Transportation Management Plan (TMP): A transportation management program provides strategies for limiting traffic impacts and promoting active communities by managing vehicle trips and parking, as well as accommodating transit and non-motorized travel modes.

Parking Caps. Depending on the amount of new parking constructed to replace displaced parking and to provided additional parking more-proximate to actual new campus buildings, the on-campus parking supply will be managed to assure maintenance of the 12,300 total parking supply cap. This could require temporary or permanent elimination of some parking spaces, or repurposing the spaces during weekday conditions while maintaining their availability for use during major sporting events at Husky Stadium.

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6 ALTERNATIVE 2 2018 CMP WITH EXISTING HEIGHT LIMITS

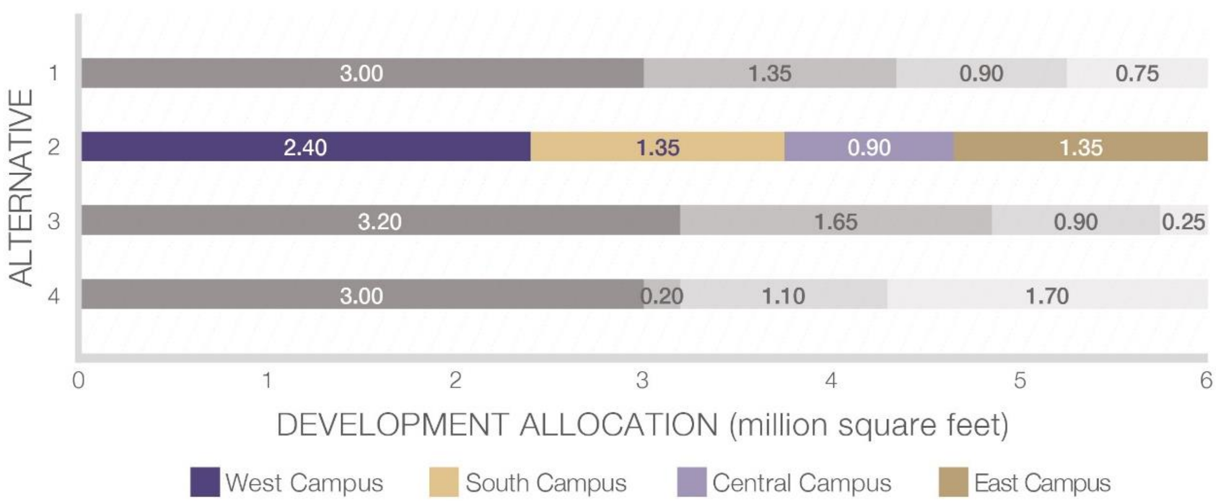
This section summarizes the results of the analysis conducted for Alternative 2. As in the previous sections, the analysis examines the impacts to the key transportation elements and transportation modes.

6.1 CHANGING CAMPUS CHARACTERISTICS

6.1.1 Description of the Alternative

The following summarizes the evaluation of Alternative 2 with respect to the transportation related elements identified in the Affected Environment section of this report. The proposed University of Washington Development under Alternative 2 is anticipated to be primarily located in West and East Campus, with less development assumed for West Campus because the same level of development cannot be accommodated with the existing height limits. The technical analysis of Alternative 2 focuses on the weekday PM peak period.

Alternative 2 would include the development total of 6,000,000 net new square feet of gross floor area of which approximately 2,400,000 gsf are located in West Campus, 1,350,000 gsf are located in South Campus, 900,000 gsf are located in Central Campus, and 1,350,000 are located East Campus, as shown in Figure 6.1.



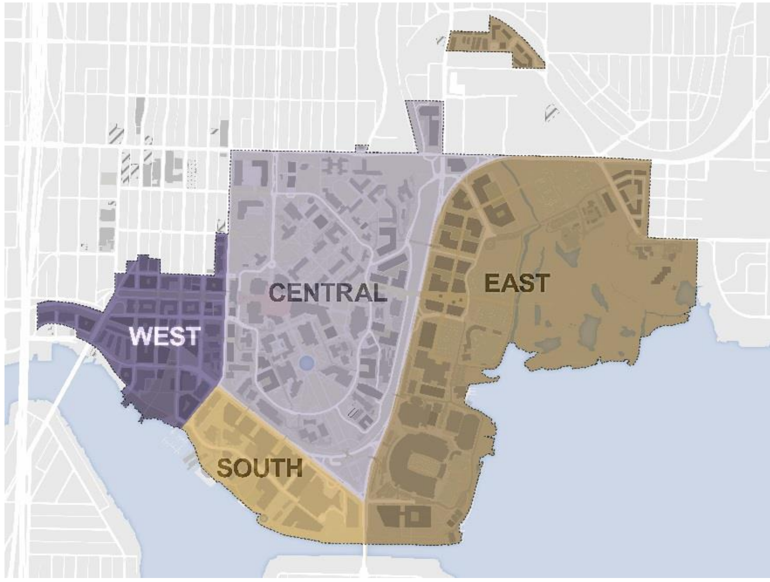


Figure 6.1 Alternative 2 Development Allocation

6.1.2 Trip Generation by Mode

The following provides a summary of the anticipated trip generation for pedestrian, bicycle, transit, and vehicle trips to campus.

The trip generation methodology used for assessing the increase in trips under Alternative 2 is consistent with that previously described in the No Action Alternative, as shown in Table 5.1, Table 5.2, and Table 5.3.

6.2 PEDESTRIANS

6.2.1 Performance Measures

Three pedestrian related performance measures have been identified to assess and compare alternatives.

- Proportion of development within ½ mile of Multi-Family Housing
- Proportion of development within ½ mile of University of Washington Residence Halls
- Quality of pedestrian environment

These measures reflect the effectiveness of the pedestrian network in providing safe and easy access to pedestrian destinations, specifically housing, and thereby maintaining a high walk mode choice on campus. Comparisons of future No Action conditions to existing conditions is provide for each measure below:

Proportion of development within ½ mile of multifamily housing

Walking makes up nearly 1/3 of all existing campus related trips to and from campus. Proximity of campus development to housing is therefore one important measure to assessing the propensity of people to walk. This measure assesses the proximity of the current campus buildings and development to nearby multifamily housing. As shown in Table 6.1, all of Alternative 2 within a 1/2-mile proximity to multifamily housing.

Table 6.1
NO ACTION, ALTERNATIVE 1 AND ALTERNATIVE 2 PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF MULTIFAMILY HOUSING

Sector	No Action	Alternative 1	Alternative 2
West	211,000	3,000,000 gsf	2,400,000
South	NA	1,350,000 gsf	1,350,000
Central	NA	900,000 gsf	900,000
East	NA	750,000 gsf	1,350,000
Total	211,000 gsf	6,000,000 gsf	6,000,000 gsf
Percent	***100%***	***100%***	***100%***

Proportion of development within ½ mile of University of Washington residence halls

Similar to the previous measure, this performance measure assesses the proximity of campus development within walking distance of residence halls. As shown in Table 6.2 Residence halls were identified and then buffered by a 1/2-mile. All of the new development in Alternative 2 is within a 1/2-mile proximity to multifamily housing.

Table 6.2
NO ACTION, ALTERNATIVE 1, AND ALTERNATIVE 2 PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF RESIDENCE HALLS

Sector	No Action	Alternative 1	Alternative 2
West	211,000	3,000,000 gsf	2,400,000 gsf
South	NA	1,350,000 gsf	1,350,000 gsf
Central	NA	900,000 gsf	900,000 gsf
East	NA	750,000 gsf	1,350,000 gsf
Total	211,000 gsf	6,000,00 gsf	6,000,000 gsf
Percent	***100%***	***100%***	***100%***

Quality of Pedestrian Environment (Primary & Secondary Impact Zones)
This Alternative would provide a number of enhancements to pedestrian travel within the MIO where development occurs. Improvements in West Campus would primarily include improvements to sidewalks and a new ADA accessible pedestrian connection between West and Central Campus. Pedestrian demand in and around West Campus would increase with added campus uses.

The new pedestrian connections in South Campus, would improve access to Portage Bay; however, improved access and connectivity could be less than Alternative 1. The potential new land bridge to East Campus improves access to this area, especially for ADA access. South Campus would see increase in pedestrian travel, although not on the same scale as West or East Campus.

6.3 BICYCLES

6.3.1 Performance Measures

Bicycle system performance was measured using two criteria: Burke-Gilman Trail capacity and quality of the bicycle environment.

Burke-Gilman Trail Capacity
The Burke-Gilman Trail is anticipated to experience increased demand in the West, South and East Sectors of Campus like in Alternative 1, however the balance of this growth will be more towards East Campus and less towards West Campus compared to Alternative 1. The development in West Campus with Alternative 2 could result in trail facility improvements, similar to those in the Mercer Court area. Increased cross traffic and travel along the trail segment is anticipated in all areas of campus particularly in East Campus with large redevelopment of E1 from parking to buildings. Planned expansion of the

Burke Gilman Trail separating pedestrian and bicycle uses will provide adequate capacity to meet CMP demands.

Quality of Bicycle Environment (Primary & Secondary Impact Zones)
Change to bicycle travel associated with this alternative is similar to Alternative 1, however added bicycle travel demand would be lower in West Campus and greater in East Campus.

6.4 TRANSIT

6.4.1 Transit Performance

Impact of the No Action Alternative and Alternative 1 and 2 on transit as compared to existing conditions is provided in this section.

Proportion of development within ½ mile of RapidRide
This measure, as well as the next measure, assesses proximity of campus development to high capacity transit service including RapidRide and Link Light Rail. This measure was calculated by determining the ratio of each sector within a 1/2-mile walk of a RapidRide stop. For future years the 2025 Draft King County Long Range Plan service network[2] was used to determine the location of RapidRide routes and stop locations were inferred based on existing high-ridership stops, Link station locations and desired stop spacing. The ratio of the sector within 1/2-mile of RapidRide stops were used to scale an "average" percentage of development that might be expected to be within the 1/2-mile buffer. As shown in Table 6.3, with the advent of RapidRide in the future, generally all of the proposed growth in No Action and Alternatives 1 and 2 will have access to RapidRide within a 1/2-mile buffer area.

Table 6.3
NO ACTION, ALTERNATIVE 1, AND ALTERNATIVE 2 PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF RAPIDRIDE

Sector	No Action	Alternative 1	Alternative 2
West	211,000	3,000,000 gsf	2,400,000 gsf
South	NA	1,350,000 gsf	1,350,000 gsf
Central	NA	900,000 gsf	900,000 gsf
East	NA	750,000 gsf	1,350,000 gsf
Total	**211,000 gsf**	**6,000,000 gsf**	**6,000,000 gsf**
Percent	***100%***	***100%***	***100%***

Proportion of development within ½ mile of Light Rail
This measure is identical to the measure above, but proximity is measured to the University of Washington Light Rail Link Station. As shown in Table 6.4 Alternative 2, 81% of the new development is within a 1/2-mile proximity to Link Light Rail.

Table 6.4
NO ACTION, ALTERNATIVE 1, AND ALTERNATIVE 2 PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF LIGHT RAIL

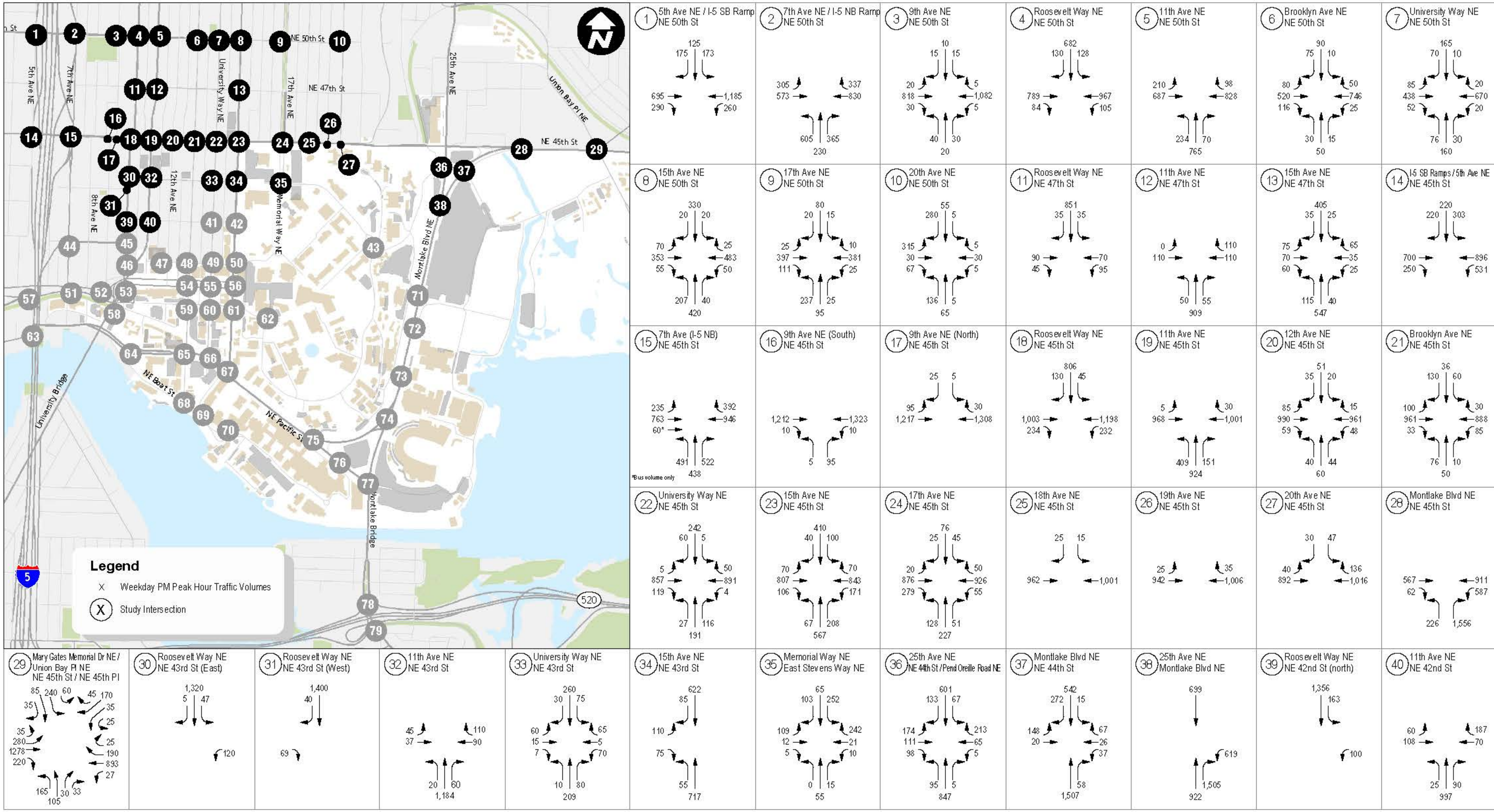
Sector	No Action	Alternative 1	Alternative 2
West	181,460	2,680,232 gsf	2,160,729 gsf
South	NA	1,350,000 gsf	1,350,000 gsf
Central	NA	900,000	900,000 gsf
East	NA	750,000 gsf	452,036 gsf
Total	**181,460 gsf**	**5,680,232gsf**	**4,862,766 gsf**
Percent	***86%***	***95%***	***81%***

6.5 VEHICLE

6.5.1 Traffic Volumes

Increased vehicle traffic associated with Alternative 2 were assigned to potential garage locations were based on existing vehicle travel patterns, previous studies in the project vicinity, review of University information, and U.S. Census Bureau's *OnTheMap* tool. *OnTheMap* is a web-based mapping and reporting application, which shows where workers are employed and where they live based on census data. The zip codes were evaluated to determine if a person would be more likely to travel from the zip code via vehicle or by other means. Trips to zip codes closer to the proposed project sites or in more transit oriented locations are more likely to use transit, walk, bicycle, or other non-SOV modes. Zip codes outside the Seattle City limits and/or further from the site are more likely to drive. The general trip distribution to/from the University is shown on Figure 4.5.

Project trips for each potential garage location were assigned to the study intersections based on the general trip distribution patterns shown on Figure 4.5. The resulting future 2028 Alternative 2 volumes are shown on Figure 6.2 and Figure 6.3.



Future (2028) Alternative 2 (Intersections 1-40) Weekday PM Peak Hour Traffic Volumes

FIGURE 6.2

University of Washington 2018 Campus Master Plan

transpogroup WHAT TRANSPORTATION CAN BE.

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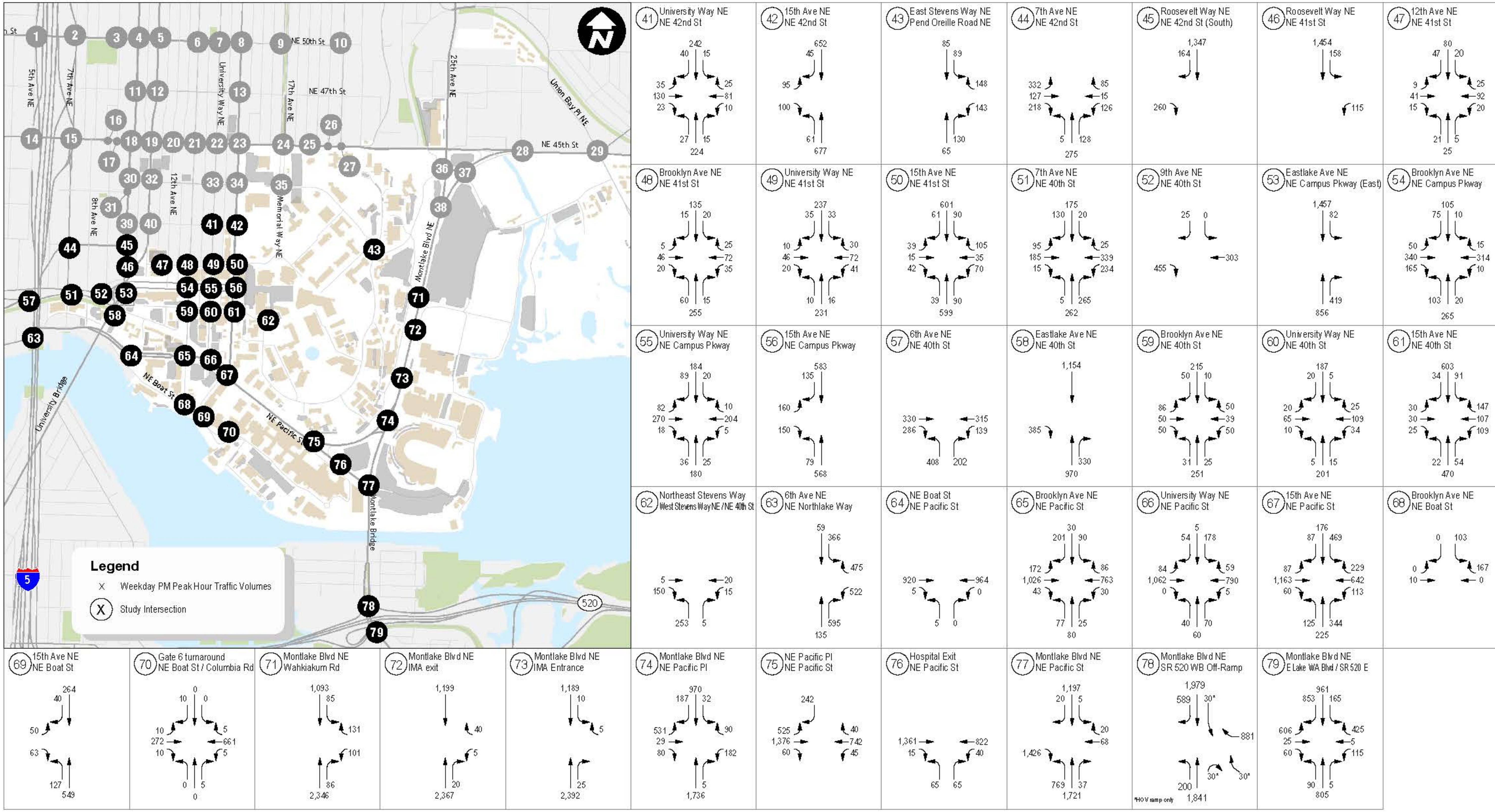

Future (2028) Alternative 2 (Intersections 41-79) Weekday PM Peak Hour Traffic Volumes

University of Washington 2018 Campus Master Plan

FIGURE
6.3

transpogroup WHAT TRANSPORTATION CAN BE.

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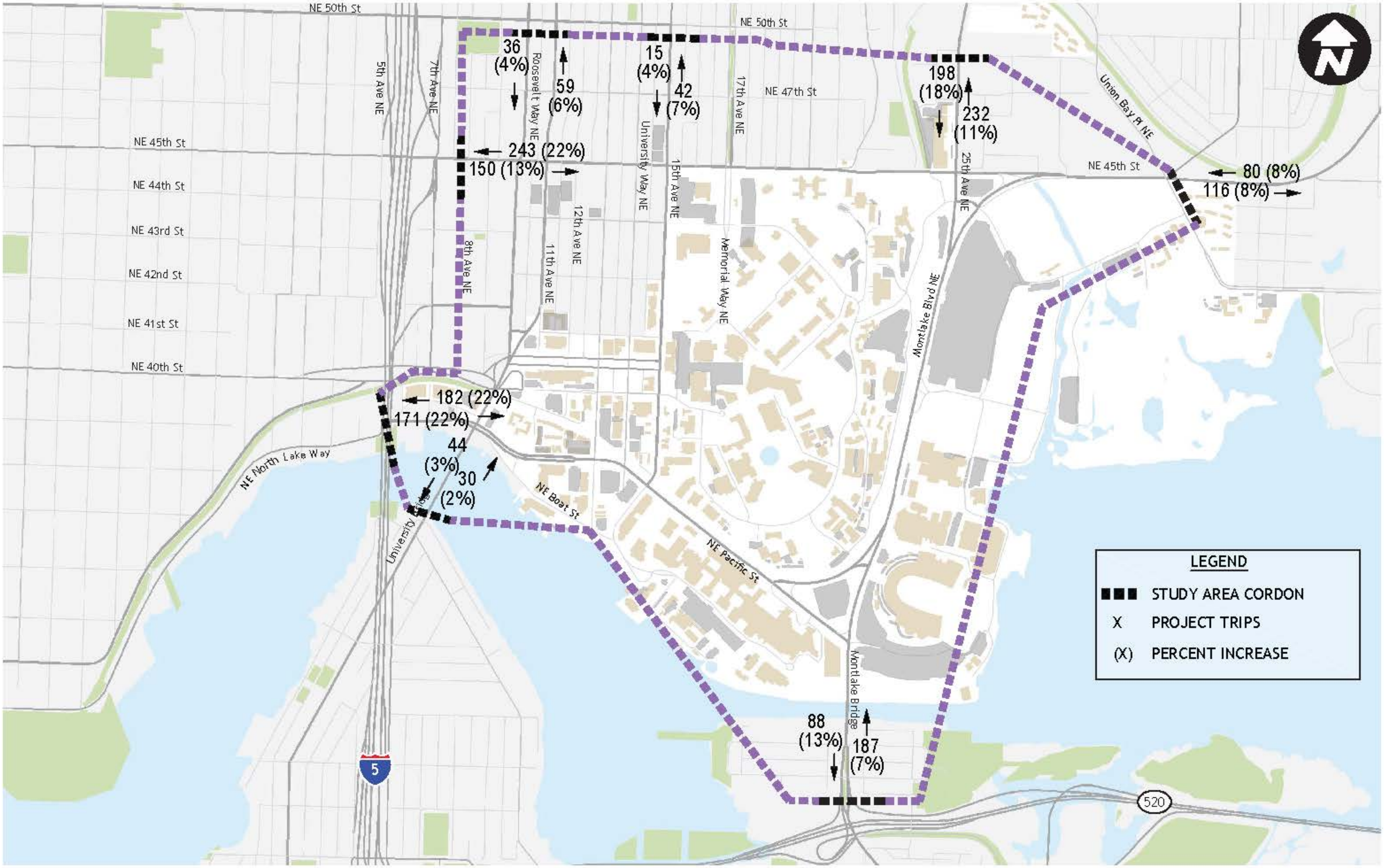
6.5.1 Cordon Volume Analysis

Cordon: An imaginary line used to evaluate traffic in and out of the University area and measure the change or increase in traffic associated with the proposed alternatives.

To understand the volumes associated with the University of Washington, related to background volumes under the different Alternative scenarios, a cordon volume analysis was completed. The cordon volume analysis focuses on the major roadways leading to and from the University. The cordon volume analysis also shows the percent of total trips along the corridor that are associated with the increased traffic generated by Alternative 2. The cordon volume and project share associated with Alternative 2 are shown on Figure 6.4. Note that this reflects the percent increase associated with continued development on campus. As shown on Figure 6.4, project related volumes will increase cordon volumes by 10 – 11%. Similar to Alternative 1, this increase may be constrained by the available arterial street capacity.



Future (2028) Alternative 2 PM Peak Hour Cordon Volumes and Proportional Increase

FIGURE **6.4**

University of Washington 2018 Campus Master Plan

transpogroup WHAT TRANSPORTATION CAN BE.

6.5.2 Traffic Operations Performance

Methodology

The methodology used in assessing intersection and corridor LOS is consistent with that described for the Affected Environment and No Action scenarios. A detailed description of methodology used can be found in Appendix B.

Intersection LOS

Weekday PM peak hour intersection traffic operations during the 2028 Alternative 2 conditions are summarized in Figure 6.5 and Figure 6.6**.** The year 2028 geometry for all of the study-area intersections were assumed to remain the same as baseline No Action conditions except when modifications are expected as part of the alternative. For example, existing traffic was rerouted when impacted by proposed street vacations. Additionally, signal timing splits and offsets were optimized under Alternative 2. Complete intersection level of service summaries are provided in Appendix C.

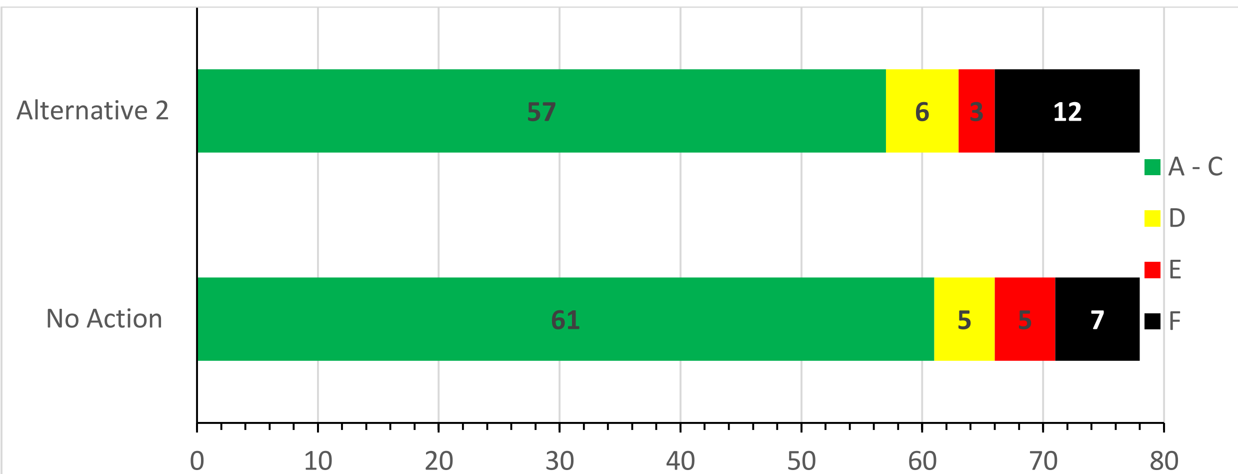


Figure 6.5 No Action/Alternative 2 Weekday 2028 Intersection Level of Service Summary

The following table illustrates changes in intersection traffic operations at locations anticipated to operate poorly between the future No Action Alternative and future Alternative 2 weekday PM peak hour.

Table 6.5
FUTURE ALTERNATIVE 2 INTERSECTION LEVEL OF SERVICE SUMMARY

Intersection	No Action		Alternative 2		Change in Delay (sec)	Project Share
	LOS[1]	Delay[2]	LOS[1]	Delay[2]		
15. 7th Ave (I-5 NB) / NE 45th St	D	44	E	61	17	10.9%
16. 9th Ave NE (South) / NE 45th St	E	48	F	83	35	14.5%
29. Montlake Blvd NE / Mary Gates Memorial Dr NE	E	56	E	67	11	4.9%
30. Roosevelt Way NE / NE 43rd St (East)	F	68	F	100	32	3.5%
31. Roosevelt Way NE / NE 43rd St (West)	E	45	F	62	17	3.6%
46. Roosevelt Way NE / NE 41st St	F	434	F	655	221	1.3%
47. 12th Ave NE / NE 41st St	F	76	F	593	517	20.0%
49. University Way NE / NE 41st St	F	*	F	*	*	19.3%
51. 7th Ave NE / NE 40th St	F	77	F	98	21	4.9%
57. 6th Ave NE / NE 40th St	F	113	F	131	18	4.8%
63. 6th Ave NE / NE Northlake Way	E	46	F	105	59	16.6%
67. 15th Ave NE / NE Pacific St	D	37	F	100	63	23.1%
69. 15th Ave NE / NE Boat St	C	15	E	41	26	25.0%
71. Montlake Blvd NE / Wahkiakum Rd	F	463	F	335	-128	12.8%
72. Montlake Blvd NE / IMA exit	E	38	F	51	13	11.9%
73. Montlake Blvd NE / IMA Entrance	C	24	D	28	4	11.9%
77. Montlake Blvd NE / NE Pacific St	C	31	D	41	10	9.3%
78. Montlake Blvd NE / SR 520 WB Off-Ramp	C	34	D	41	7	8.7%

*Volume exceeds capacity and Synchro could not calculate the delay.

1. Level of service.
2. Average delay per vehicle in seconds rounded to the whole second.

During the weekday PM peak hour, 5 additional intersections are anticipated to operate at LOS F under Alternative 2 traffic conditions compared with No Action conditions. Overall, 21 intersections are anticipated to operate at LOS D or worse during the weekday PM peak hour with Alternative 2, as compared to 17 under No Action conditions. The City of Seattle does not have an LOS standard but generally considers LOS E and LOS F at signalized intersections to reflect poor operations and LOS F at unsignalized intersections as poor operations. For intersections that degrade from LOS D to E or operate at LOS E or LOS F under the “with-project” condition, or increase of 5 or more seconds could be considered significant by the City.

The following intersections are anticipated to degrade to D or below during future Alternative 2 conditions:

15. 7th Avenue (1-5 NB)/NE 45th Street
16. 9th Avenue NE (South)/NE 45th Street
31. Roosevelt Way NE/NE 43rd Street (West)
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
69. 15th Avenue NE/NE Boat Street
72. Montlake Boulevard NE/IMA Exit
73. Montlake Boulevard NE/IMA Entrance
77. Montlake Boulevard NE/NE Pacific Street
78. Montlake Boulevard NE/SR 520 WB Off-Ramp

Intersections where the LOS is E or F and where the Alternative 2 traffic increases delay by more than 5 seconds are shown in Table 6.6. As shown in Table 6.6, a majority of the intersections are unsignalized intersections. At the two-way stop controlled intersections the change in delay is represented both for the total intersection and for the worst movement.

Table 6.6
ALTERNATIVE 2 SUMMARY OF POTENTIAL IMPACTS

Intersection	Traffic Control	Change in Delay (Seconds)[1]	Percent of Total (Project Share)
15. 7th Avenue (I-5 NB)/NE 45th Street	Signalized	17	10.9%
16. 9th Avenue NE (South)/NE 45th Street	TWSC	1/34	14.5%
29. Montlake Boulevard NE/Mary Gates Memorial Drive NE	Signalized	10	4.9%
30. Roosevelt Way NE/NE 43rd Street (East)	TWSC	2.4/32	3.5%
31. Roosevelt Way NE/NE 43rd Street (West)	TWSC	0.8/17	3.6%
46. Roosevelt Way NE/NE 41st Street	TWSC	18.2/222	1.3%
47. 12th Avenue NE/NE 41st Street	TWSC	275.1/517	20.0%
49. University Way NE/NE 41st Street	TWSC	-[2]	19.3%
51. 7th Avenue NE / NE 40th Street	AWSC	21	4.9%
57. 6th Avenue NE / NE 40th Street	AWSC	18	4.8%
63. 6th Avenue NE / NE Northlake Way	AWSC	59	16.6%
67. 15th Avenue NE / NE Pacific Street	Signalized	63	23.1%
69. 15th Avenue NE / NE Boat Street	AWSC	25	25.0%
71. Montlake Boulevard NE / Wahkiakum Road	TWSC	-1.3/-127.3	12.8%
72. Montlake Boulevard NE / IMA exit	TWSC	0.1/13	11.9%

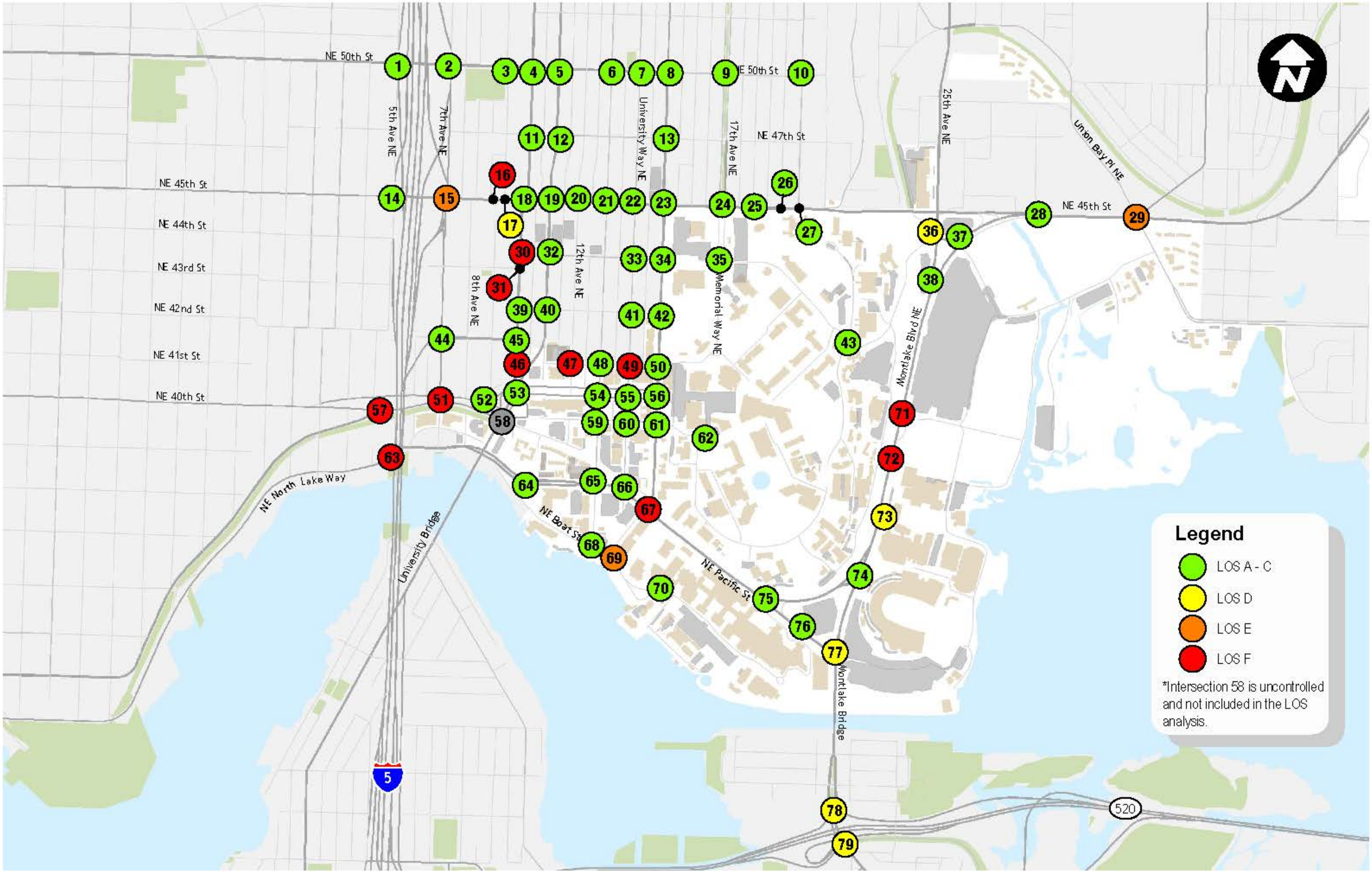
1. Change in total intersection delay/change in worst movement delay for two-way stop controlled (TWSC) intersections.
2. Volume exceeds capacity and Synchro could not calculate the delay.

Of the stop controlled intersections listed in Table 6.6 some of the increased delay can be attributed to the increase in pedestrian and bicycle volumes. Additionally, the following intersections are located at or near potential garage access locations resulting in higher share of alternative percentages:

47. 12th Avenue NE/NE 41st Street
49. University Way NE/NE 41st Street
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
69. 15th Avenue NE/NE Boat Street
71. Montlake Boulevard NE / Wahkiakum Road
72. Montlake Boulevard NE/IMA Exit

The specific location of the driveways impacts the overall trip distribution and individual movements at intersections near driveway locations. Given the preliminary planning nature of this evaluation, individual traffic impacts should be assessed when final building size and driveway locations are determined. Also, given the gridded network it is anticipated that if drivers experience long delays at unsignalized locations they may alter their trip pattern in an effort to reduce delays.

Similar to Alternative 1, the level of service for vehicle traffic, while a consideration, is increasingly balances against assuring that pedestrian, bicycle, and transit travel modes are encouraged and facilitated, thus intersections that are calculated to operate at poor levels of service for vehicle traffic are not always considered a high priority for improvements by the City.



Future (2028) Alternative 2 Weekday PM Peak Hour Traffic Operations

FIGURE **6.6**

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6.5.3 Arterial Operations

Arterial travel times and speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated with the addition of project generated traffic, consistent with the previously described methodology for existing and future No Action conditions. This includes the application of the adjustment factors previously described.

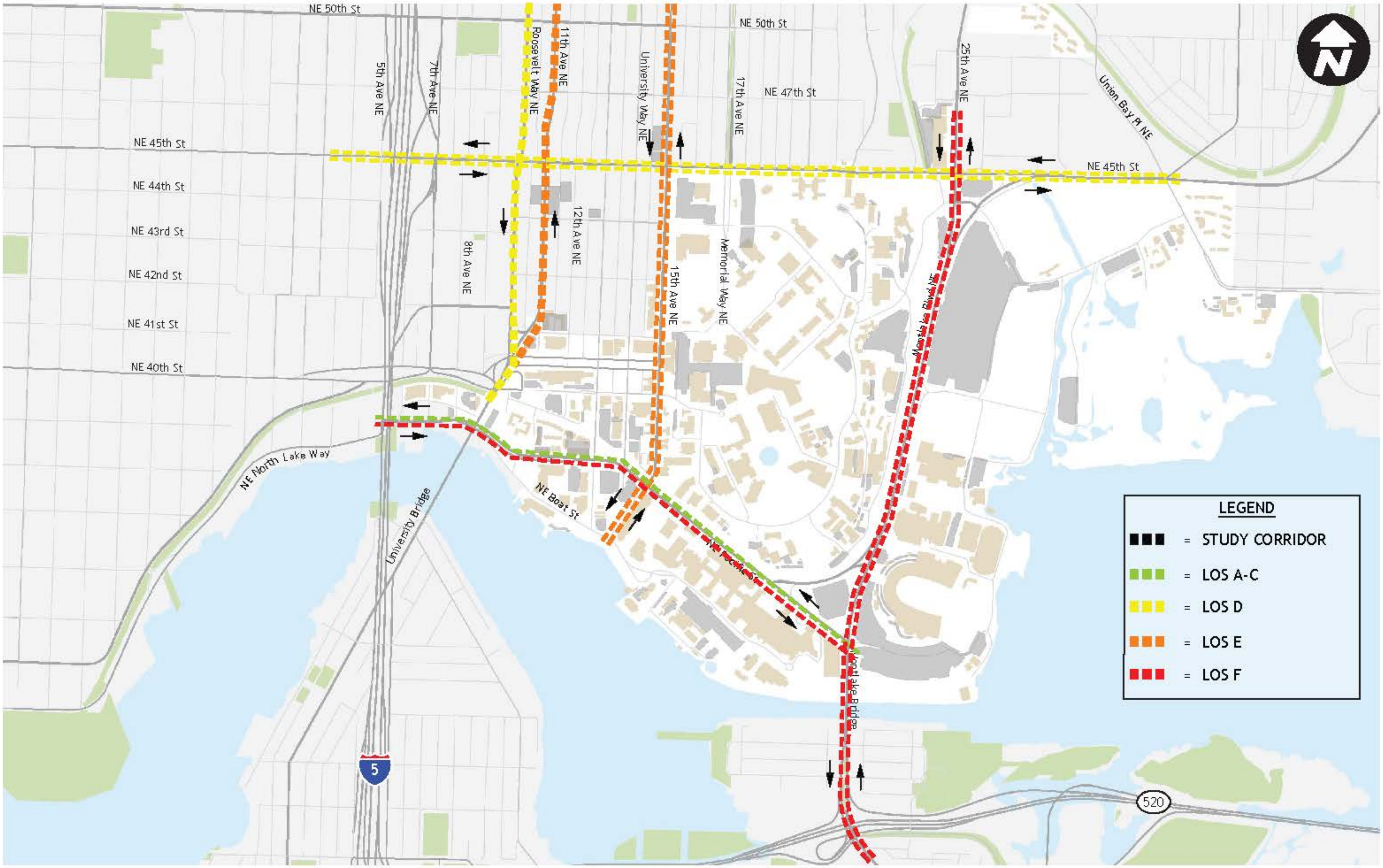
Table 6.7 and Figure 6.7 summarizes the No Action and Alternative 2 arterial travel times and speeds. Detailed arterial operations worksheets are provided in Appendix C.

Table 6.7
FUTURE NO ACTION AND ALTERNATIVE 2 WEEKDAY PM PEAK HOUR ARTERIAL LOS SUMMARY

Corridor	No Action		Alternative 2	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	E	8.5	E	7.8
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	9.0	E	9.0
Southbound	D	9.2	E	7.7
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	10.8	F	9.7
Southbound	F	8.4	F	8.2
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	11.7	D	10.6
Westbound	D	10.8	D	9.8
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.1	F	9.0
Westbound	C	21.5	C	20.3
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	12.0	D	11.8

1. Level of service.
2. Average speed in miles per hour

As shown in Table 6.7, under Alternative 2 the arterials will generally experience increases in delay and slower travel speeds. Under Alternative 2 the 15th Avenue NE arterial in the southbound direction is anticipated to degrade from LOS D to LOS E, the Montlake Boulevard NE arterial in the northbound direction is anticipated to degrade from LOS E to LOS F, and the NE Pacific Street arterial in the eastbound direction is anticipated to degrade from LOS C to LOS F.



Future (2028) Alternative 2 Weekday PM Peak Hour Corridor Traffic Operations

FIGURE **6.7**

University of Washington 2018 Campus Master Plan

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6.5.4 Screenline Analysis: Primary Impact Zone

Screenline: An imaginary line across which the number of passing vehicles is counted.

The following section describes the screenline analysis completed for two designated screenlines within the study area In this study, screenlines were selected to count vehicle traffic entering and exiting the University of Washington primary and secondary impact zones. As part of the Mayor's Seattle 2035 Comprehensive Plan (City of Seattle, 2016), two screenlines are identified within the vicinity of the University of Washington, as shown in Figure 6.8. Screenline 5.16 is an east-west screenline, measuring north-south travel, and extending along the ship canal to include the University and Montlake Bridges. Screenline 13.13 is a north-south screenline, measuring east-west travel, and extending east of I-5 between NE Pacific Street and NE Ravenna Boulevard.

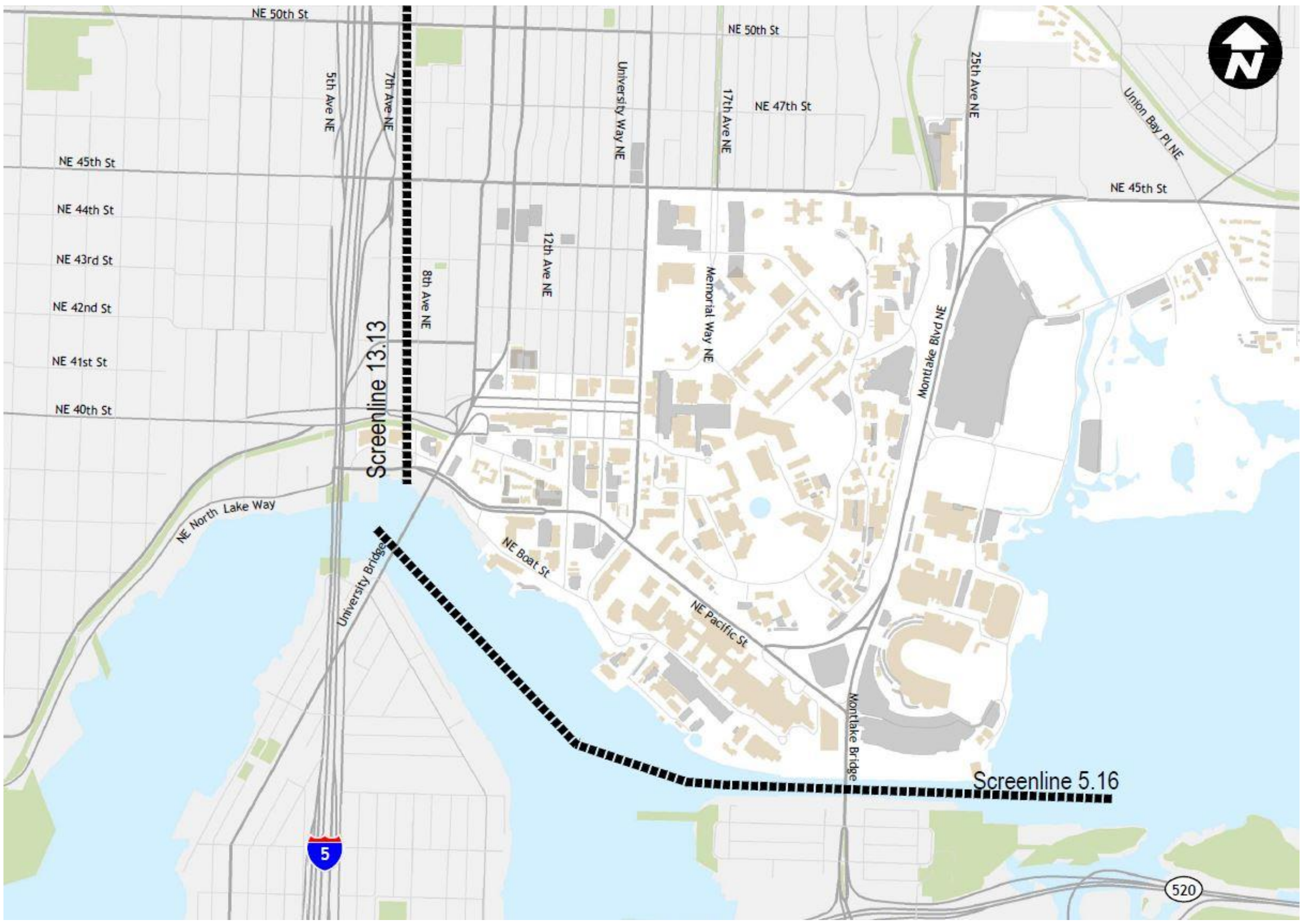


Figure 6.8 Study Area Screenlines

The screenline analysis includes volume to capacity (V/C) calculations for the vehicles traversing the screenlines using future (2028) Alternative 2 traffic volumes and interpolated roadway capacity estimates. Roadway capacity for the 2028 future horizon year was interpolated using 2016 capacity estimates described in Table 3.12 and 2035 capacity estimates referenced in the May 2016 Seattle

Comprehensive Plan Update Final EIS. Future (2028) roadway capacity estimates are shown in Table 6.8 below. Detailed screenline volumes and volume to capacity calculations are included in Appendix C.

Table 6.8
FUTURE (2028) CAPACITY

Screenline	Future (2028) Capacity
5.16 – Ship Canal, University and Montlake Bridges	
Northbound	4,210
Southbound	4,210
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard	
Eastbound	6,119
Westbound	6,119

Source: Transpo Group, 2016

Level of service standards for the screenline analysis are based on the volume to capacity ratio of a screenline. As described in the Seattle Comprehensive Plan Update EIS, the LOS standard volume to capacity ratio for Screenline 5.16 and Screenline 13.13 are 1.20 and 1.00, respectively. For this study, screenline volume to capacity ratios that do not exceed the LOS standard are acceptable. The Alternative 2 screenline analysis is included in Table 6.9. Detailed screenline analysis calculations are included in Appendix C.

Table 6.9
FUTURE (2028) ALTERNATIVE 2 SCREENLINE ANALYSIS

Screenline	Screenline Volume	Capacity	V/C	LOS Standard V/C
5.16 – Ship Canal, University and Montlake Bridges				
Northbound	4,022	4,210	0.96	1.20
Southbound	4,107	4,210	0.98	1.20
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard				
Eastbound	3,839	6,119	0.63	1.00
Westbound	4,604	6,119	0.75	1.00

Source: NACTO, Seattle Comprehensive Plan Update EIS, and Transpo Group, 2016

As shown in Table 6.9, all Alternative 2 screenline volume to capacity ratios meet the acceptable LOS standard.

6.5.5 Service/Freight Routes

On a campus wide level, the overall freight/service related activity under Alternative 2 is anticipated to be similar to that anticipated for Alternative 1 as the total development area is the same under each. Given the allocation of the development within the campus, the increase in volume will shift based on the allocation of development area. This would result in comparative increases in campus development related freight and service activity especially the East Sector, accessed off Montlake Boulevard. No significant impact to due to added freight traffic associated with the proposed CMP was identified.

6.5.6 Parking

Supply

Similar to Alternative 1, it was assumed that parking supply would be increased or decreased within each Sector to achieve an 85 percent utilization without exceeding the parking cap for Alternative 2. Alternative 2 parking cap supply would be 10,250 spaces. The location of parking and strategies used to maintain the existing CUA parking cap would be consistent with those outlined for Alternative 1.

Demand

Overall parking demand for Alternative 2 would be the same as Alternative 1. Alternative 2 on-campus parking demand and utilization was reviewed by sector to provide context on where parking demand would occur (see Table 6.10). Allocation of Alternative 2 parking demand by sector was based on projected development as documented in Appendix B. The evaluation assumes that on-street parking would be allocated to on-campus facilities given the increases and reallocation of parking supply to achieve an 85 percent utilization.

Table 6.10
ALTERNATIVE 2 PEAK PARKING DEMAND BY SECTOR

Sector	Future Cap Parking Supply	Parking Demand			% Utilization
		No Action[1]	Alternative 2		
			Growth[2]	Total	
West	1,910	1,428	436	1,623	85%
South	2,590	1,187	775	2,203	85%
Central	3,510	2,689	291	2,980	85%
East	2,240	1,464	436	1,900	85%
Total	**10,250**	**6,768**	**+1,938**	**8,706**	**85%**

Source: Transpo Group, 2016

1. On-campus parking demand for No Action based on projected increase in population. This does not include on-street parking demand increases noted in the previous table since these would not be parking within the Sectors.
2. Growth in parking demand based on projected increase in population for Alternative 2. The analysis assumes with the street vacation and reallocation of parking supply in Alternative 2, on-street parking demand would shift to on-campus parking.

As the table above reflects, reallocation of parking would result in a parking supply under the existing cap and an 85 percent utilization by Sector and for the campus as a whole. The additional parking and reallocation of parking supply would provide a better relationship between localized supply and demand and thus reduce the likelihood of parking beyond the University facilities (i.e., within the neighborhoods).

Secondary Parking Impacts

Parking outside the primary impact zone surrounding the campus would likely continue with Alternative 2 similar to the No Action Alternative. This would include vehicles parking within transit-served areas with unrestricted parking and then using transit to travel to campus. As the campus grows, this could occur at higher levels compared to the No Action Alternative.

6.6 AERIAL/STREET VACATIONS

Alternative 2 impacts for the aerial and street vacations would be consistent with those described for Alternative 1 in section 5.6. As noted in the Alternative 1 analysis the City of Seattle has defined policies related to the assessing and approving the vacation of public rights-of-way. Further analysis will be provided to the City consistent with the policy requirements at such time an application for an aerial or street vacation is made. The EIS alternatives and supporting analysis reflect the vacations as proposed.

6.7 IMPACTS DURING CONSTRUCTION

During construction of all Action Alternatives, potential construction impacts could include temporary closures of pathways, and streets, reallocation or removal of bike and auto parking, increased truck traffic or other temporary disruptions. While temporary in nature, potential mitigations for construction could include TMP strategies, outreach, and coordination to minimize impacts. Specific impacts and mitigations for development would be addressed as part of SEPA review.

6.8 CUA COMPLIANCE – VEHICLE TRIP AND PARKING CAPS

CUA vehicle trip caps are considered campus-wide and would not materially change between action alternatives. See discussion in Section 5.7 related to Alternative 1.

7 ALTERNATIVE 3 CAMPUS DEVELOPMENT WITH INCREASED WEST AND SOUTH CAMPUS DENSITY

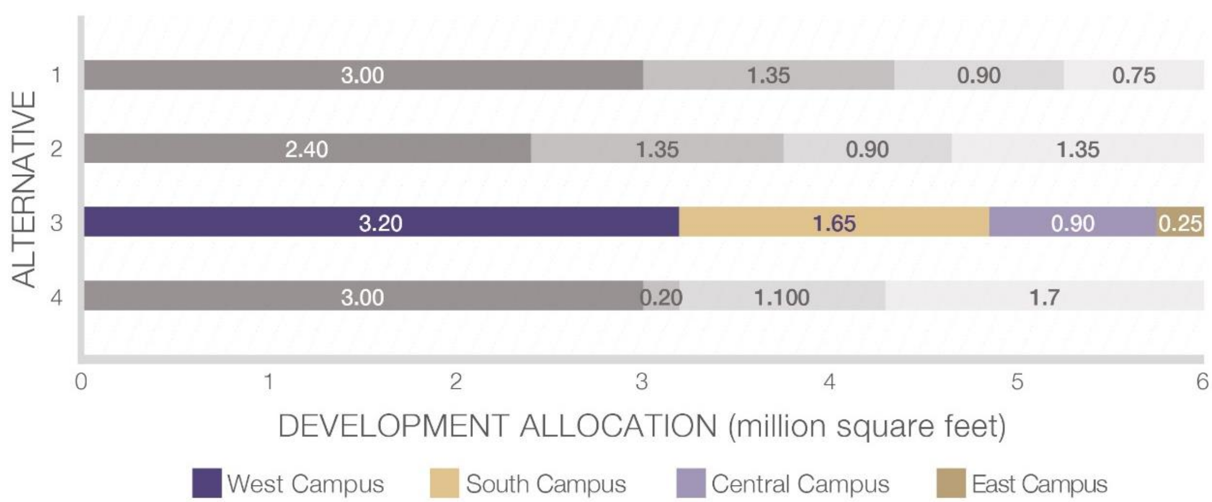
This section summarizes the results of the analysis conducted for Alternative 3. As in the previous sections, the analysis examines the impacts to the key transportation elements and transportation modes.

7.1 CHANGING CAMPUS CHARACTERISTICS

7.1.1 Description of the Alternatives

The following summarizes the evaluation of Alternative 3 with respect to the transportation related elements identified in the Affected Environment section of this report. The proposed University of Washington Development under Alternative 3 is anticipated to be primarily located in West and South Campus. The technical analysis of Alternative 3 focuses on the weekday PM peak period.

Alternative 3 would include the development total of 6,000,000 net new square feet of gross floor area throughout the campus with a focus this development in the West and South Campus sectors and more limited development in the Central and East Campus sectors. Approximately 3,200,000 square feet of development is proposed in West Campus and 1,650,000 square feet are located in South Campus. The remaining development would be located in Central and East Campus, approximately 900,000 gsf and 250,000 gsf, respectively. A summary of the Alternative 3 development allocation is provided in Figure 7.1.



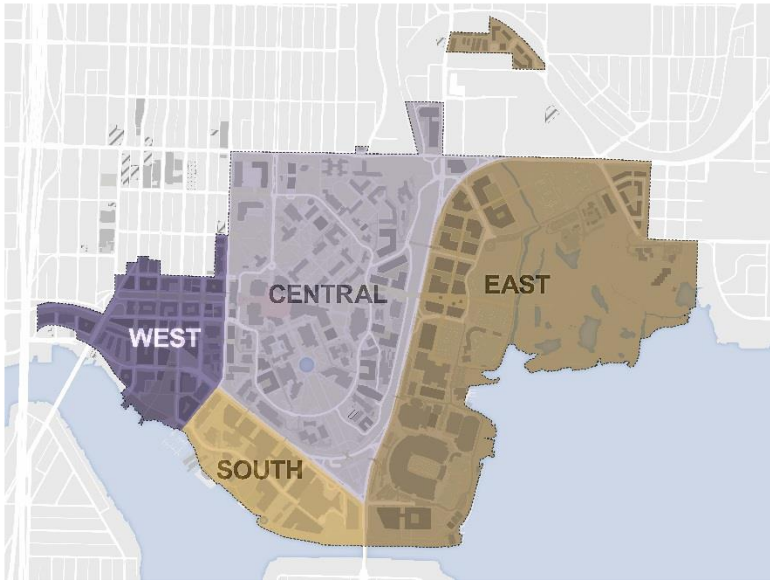


Figure 7.1 Alternative 3 Development Allocation

7.1.2 Trip Generation by Mode

The following provides a summary of the anticipated trip generation for pedestrian, bicycle, transit, and vehicle trips to campus.

The trip generation methodology used for assessing the increase in trips under Alternative 3 is consistent with that previously described in the No Action Alternative and is consistent with Alternatives 1 and 2.

7.2 PEDESTRIANS

7.2.1 Performance Measures

Three pedestrian related performance measures have been identified to assess and compare alternatives.

- Proportion of development within ½ mile of Multi-Family Housing
- Proportion of development within ½ mile of University of Washington Residence Halls
- Quality of Pedestrian Environment

These measures reflect the effectiveness of the pedestrian network in providing safe and easy access to pedestrian destinations, specifically housing, and thereby maintaining a high walk mode choice on campus. Comparisons of future on action conditions to existing conditions is provide for each measure below:

Proportion of development within ½ mile of multifamily housing
Walking makes up nearly 1/3rd of all existing campus related trips to and from campus. Proximity of campus development to housing is therefore one important measure to assessing the propensity of people to walk. This measure assesses the proximity of the current campus buildings and development to nearby multifamily housing. As shown in Table 7.1, almost all of Alternative 3 development is within a 1/2-mile proximity to multifamily housing, slightly less than other alternatives.

Table 7.1
NO ACTION, ALTERNATIVE 1, ALTERNATIVE 2, AND ALTERNATIVE 3 PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF MULTIFAMILY HOUSING

	No Action	Alternative 1	Alternative 2	Alternative 3
South	NA	1,350,000 gsf	1,350,000 gsf	1,650,000 gsf
West	211,000 gsf	3,000,000 gsf	2,400,000 gsf	3,200,000 gsf
East	NA	750,000 gsf	1,350,000 gsf	216,773 gsf
Central	NA	900,000 gsf	900,000 gsf	900,000 gsf
Total	**211,000 gsf**	**6,000,000 gsf**	**6,000,000 gsf**	**5,966,773 gsf**
Percent	***100 %***	***100%***	***100%***	***99.4%***

Proportion of development within ½ mile of University of Washington residence halls
Similar to the previous measure, this performance measure assesses the proportion of new development within walking distance of residence halls. Residence halls were identified and then buffered by a 1/2-mile. As shown in Table 7.2, almost all of the new development in Alternative 3 is within a 1/2-mile proximity to University of Washington Residence Halls.

Table 7.2
NO ACTION, ALTERNATIVE 1, ALTERNATIVE 2, AND ALTERNATIVE 3 PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF RESIDENCE HALLS

	No Action	Alternative 1	Alternative 2	Alternative 3
South	NA	1,350,000 gsf	1,350,000 gsf	1,650,000 gsf
West	211,000	3,000,000 gsf	2,400,000 gsf	3,200,000 gsf
East	NA	750,000 gsf	1,350,000 gsf	239,918 gsf
Central	NA	900,000 gsf	900,000 gsf	900,000 gsf
Total	**211,000 gsf**	**6,000,000 gsf**	**6,000,000 gsf**	**5,989,918 gsf**
Percent	***100%***	***100%***	***100%***	***99.9%***

Quality of Pedestrian Environment (Primary and Secondary Impact Zones)
The impacts of this Alternative are similar to those of Alternative 1. The primary difference is less development in East Campus, resulting in fewer connections and a less developed pedestrian network.

7.3 BICYCLES

7.3.1 Performance Measures

Bicycle system performance was measured using two criteria – Burke-Gilman Trail capacity and quality of the bicycle environment.

Burke-Gilman Trail Capacity
It is anticipated that this alternative would generally have the same impact on the pedestrian and bicycle demand on the Burke-Gilman Trail as Alternative 1, however due to the larger concentration of growth in West and South Campus, high travel demand would be anticipated in these areas along and crossing the Burke Gilman Trail. It is anticipated that East Campus would see the least growth in demand. Planned expansion of the Burke Gilman Trail separating pedestrian and bicycle uses will provide adequate capacity to meet CMP demands.

Quality of Bicycle Environment (Primary and Secondary Impact Zones)
This alternative would be expected to include the same general improvements to bicycle travel on campus as in Alternative 1, but with a greater concentration of added bicycle travel in the West and South Campus areas and less bicycle travel in East Campus.

The Burke-Gilman Trail is anticipated to experience increased demand in the West Campus and South Campus sectors. The focus on development in West Campus with Alternative 3 could result in trail facility improvements, similar to those in the Mercer Court area. Increased cross traffic and travel along the newly updated trail segment is anticipated in South Campus with Alternative 3 development. The Burke-Gilman Trail would provide better circulation from the southwest to the northeast areas of campus. Cross traffic and travel along the older segment of the trail would increase in East Campus, especially with the addition of the land bridge. Existing Pronto travel patterns indicate the East Campus bicycle travel may increase, as the Burke-Gilman Trail provides a flat and direct route from East Campus to the South Campus and West Campus sectors.

7.4 TRANSIT

7.4.1 Performance Measures

Impact of the No Action Alternative, Alternative 1, 2, and 3 on transit as compared to existing conditions is provided in this section for two performance measures.

Proportion of development within ½ mile of RapidRide

This measure, as well as the next measure, assesses proximity of campus development to high capacity transit service including RapidRide and Link Light Rail. This measure was calculated by determining the ratio of each sector within a 1/2-mile walk of a RapidRide stop. For future years the 2025 Draft King County Long Range Plan service network[2] was used to determine the location of RapidRide routes and stop locations were inferred based on existing high-ridership stops, Link station locations and desired stop spacing. The CMP identifies potential building sites that will be used within each sector. The ratio of the sector within 1/2-mile of RapidRide stops were estimate within the 1/2-mile buffer. With the advent of RapidRide in the future, generally all of the proposed growth in Alternative 3 will have access to RapidRide within a 1/2-mile buffer area as shown in Table 7.3.

Table 7.3
NO ACTION, ALTERNATIVE 1, ALTERNATIVE 2, AND ALTERNATIVE 3 PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF RAPIDRIDE

	No Action	Alternative 1	Alternative 2	Alternative 3
West	211,000 gsf	3,000,000 gsf	2,400,000 gsf	3,200,000 gsf
South	NA	1,350,000 gsf	1,350,000 gsf	1,650,000 gsf
East	NA	750,000 gsf	1,350,000 gsf	250,000 gsf
Central	NA	900,000 gsf	900,000 gsf	900,000 gsf
Total	**211,000 gsf**	**6,000,000 gsf**	**6,000,000 gsf**	**6,000,000 gsf**
Percent	***100%***	***100%***	***100%***	***100%***

Proportion of development within ½ mile of Light Rail
This measure is identical to the measure above, but proximity is measured to the University of Washington Light Rail Link Station. As shown in Table 7.4, in Alternative 3, 95% of the new development is within a 1/2-mile proximity to Link Light Rail.

Table 7.4
NO ACTION, ALTERNATIVE 1, ALTERNATIVE 2, AND ALTERNATIVE 3 PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF LIGHT RAIL

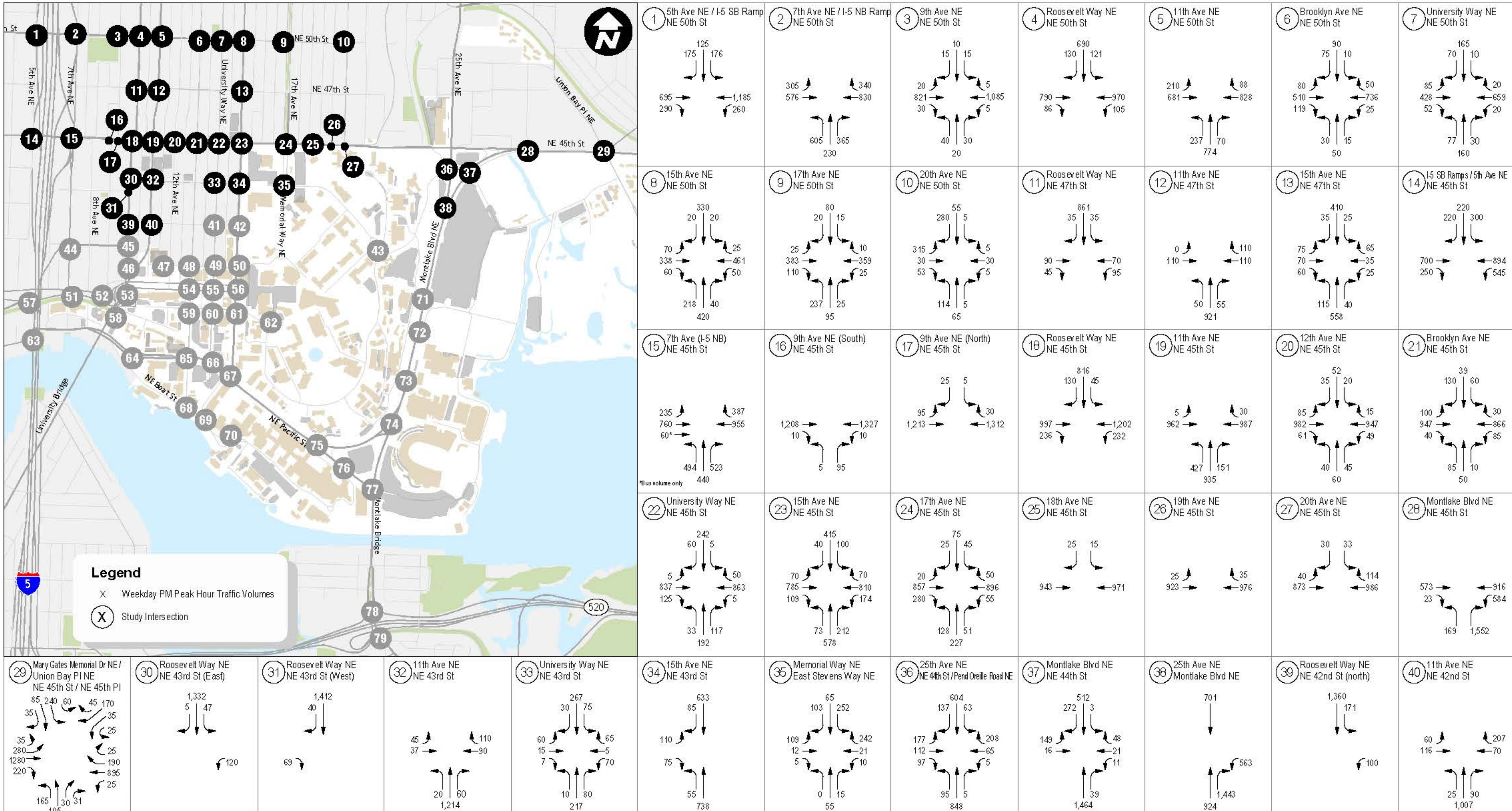
	No Action	Alternative 1	Alternative 2	Alternative 3
South	NA	1,350,000 gsf	1,350,000 gsf	1,650,000 gsf
West	181,460 gsf	2,680,232 gsf	2,160,729 gsf	2,880,973 gsf
East	NA	750,000 gsf	452,036 gsf	250,000 gsf
Central	NA	900,000 gsf	900,000 gsf	900,000 gsf
Total	**181,460 gsf**	**5,680,232 gsf**	**4,862,766 gsf**	**5,680,973 gsf**
Percent	***86%***	***95%***	***81%***	***95%***

7.5 VEHICLE

7.5.1 Traffic Volumes

Increased vehicle traffic associated with Alterative 3 were assigned to potential garage locations were based on existing vehicle travel patterns, previous studies in the project vicinity, review of University information, and U.S. Census Bureau's *OnTheMap* tool. *OnTheMap* is a web-based mapping and reporting application, which shows where workers are employed and where they live based on census data. The zip codes were evaluated to determine if a person would be more likely to travel from the zip code via vehicle or by other means. Trips to zip codes closer to the proposed project sites or in more transit oriented locations are more likely to use transit, walk, bike, or other non-SOV modes. Zip codes outside the Seattle City limits and/or further from the site are more likely to drive. The general trip distribution to/from the University is shown on Figure 4.6.

Project trips for each potential garage location were assigned to the study intersections based on the general trip distribution patterns shown on Figure 4.6. The resulting future 2028 Alternative 3 volumes are shown on Figure 7.2 and Figure 7.3.



Future (2028) Alternative 3 (Intersections 1-40) Weekday PM Peak Hour Traffic Volumes

University of Washington 2018 Campus Master Plan

FIGURE **7.2**

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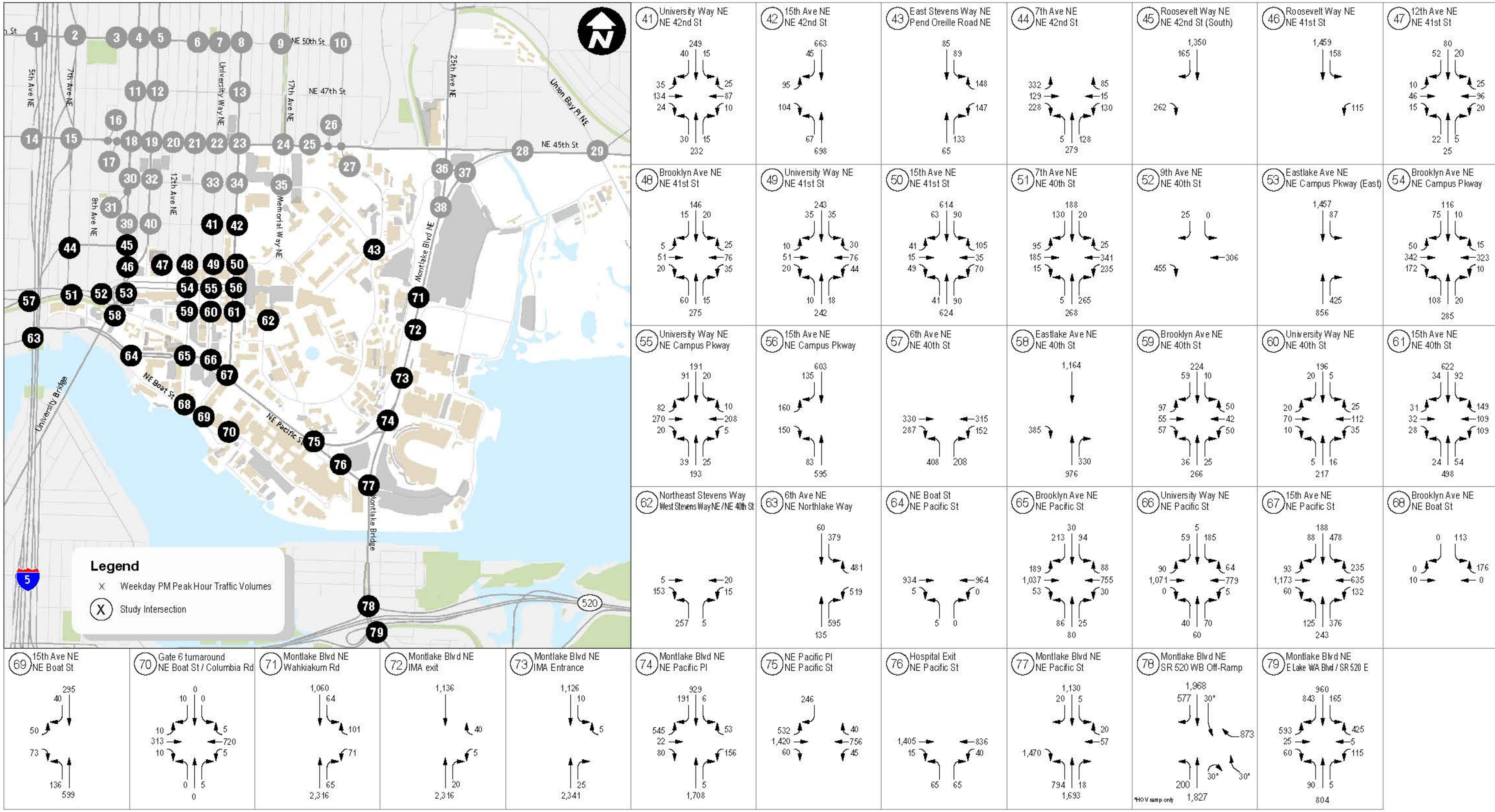

Future (2028) Alternative 3 (Intersections 41-79) Weekday PM Peak Hour Traffic Volumes

University of Washington 2018 Campus Master Plan

FIGURE 7.3

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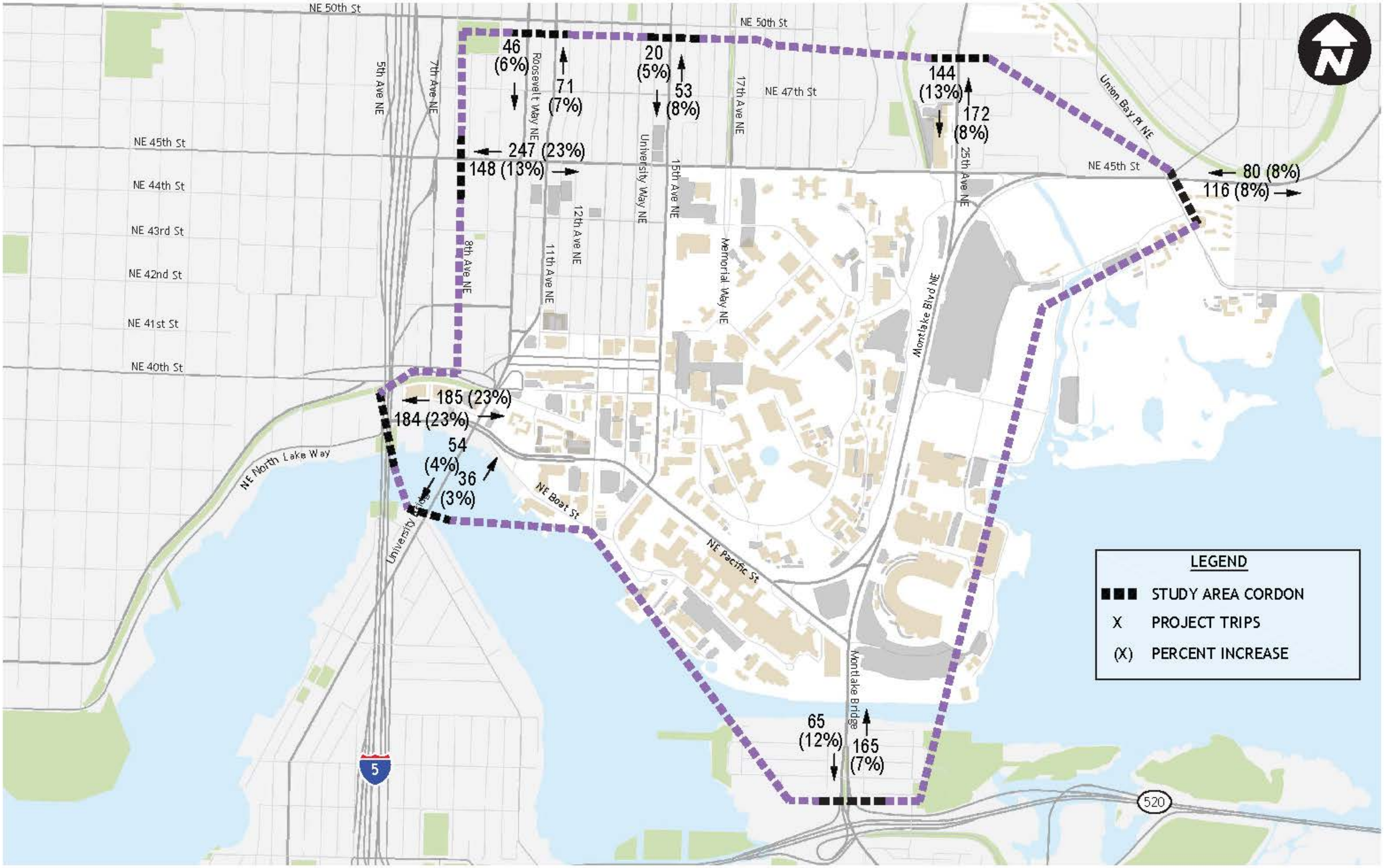
7.5.2 Cordon Volume Analysis

The proportionate share of traffic along the major roadways surrounding the campus under Alternative 3 is consistent with those previously described for Alternative 1 and 2. The street vacations included have a minimal impact on the surrounding roadways. The proportionate share of University of Washington traffic is shown in Figure 7.4.

Cordon: An imaginary line used to evaluate traffic in and out of the University area and measure the change or increase in traffic associated with the proposed alternatives.



Future (2028) Alternative 3 PM Peak Hour Cordon Volumes and Proportional Increase

FIGURE **7.4**

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7.5.3 Traffic Operations Performance

Methodology

The methodology used in assessing intersection and corridor LOS is consistent with that described in the Affected Environment and No Action scenarios. A detailed description of methodology used can be found in Appendix B.

Intersection LOS

Weekday PM peak hour intersection traffic operations during the 2028 Alternative 3conditions are summarized in Figure 7.5 and Figure 7.6**.** The year 2028 geometry for all of the study area intersections were assumed to remain the same as baseline No Action conditions except when modifications are expected as part of the alternative. Additionally, signal timing splits and offsets were optimized under Alternative 3. Complete intersection level of service summaries are provided in Appendix C.

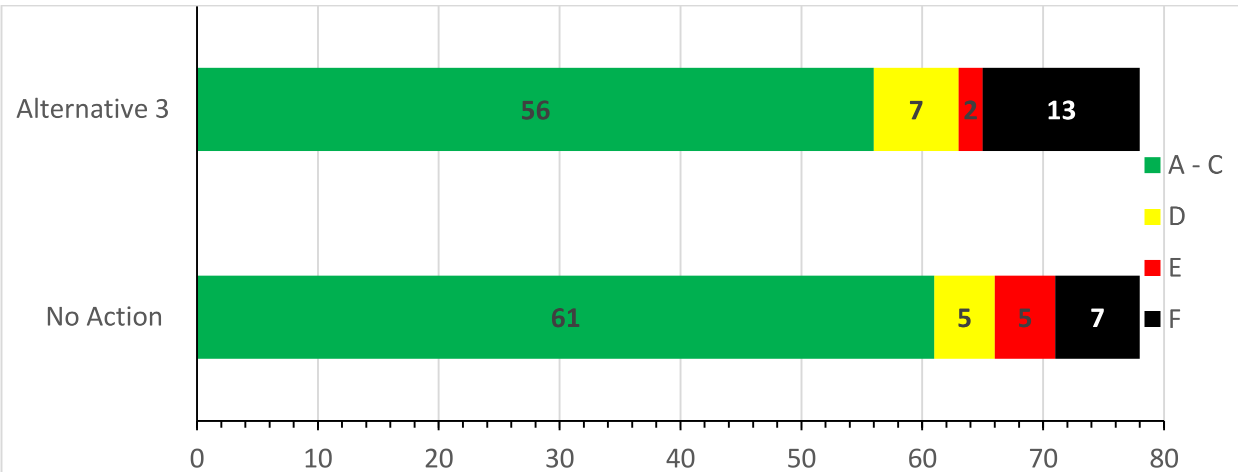


Figure 7.5 No Action/Alternative 3 Weekday 2028 Intersection Level of Service Summary

The following table illustrates changes in intersection traffic operations at intersections anticipated to operate poorly between the future No Action Alternative and future Alternative 3 weekday PM peak hour.

Table 7.5
FUTURE ALTERNATIVE 3 INTERSECTION LEVEL OF SERVICE SUMMARY

Intersection	No Action		Alternative 3		Change in Delay (sec)	Project Share
	LOS[1]	Delay[2]	LOS[1]	Delay[2]		
15. 7th Ave (I-5 NB) / NE 45th St	D	44	E	61	17	11.0%
16. 9th Ave NE (South) / NE 45th St	E	48	F	83	35	14.5%
29. Montlake Blvd NE / Mary Gates Memorial Dr NE	E	56	E	67	11	4.9%
30. Roosevelt Way NE / NE 43rd St (East)	F	68	F	105	37	4.3%
31. Roosevelt Way NE / NE 43rd St (West)	E	45	F	62	17	4.3%
46. Roosevelt Way NE / NE 41st St	F	434	F	732	298	1.6%
47. 12th Ave NE / NE 41st St	F	76	F	1056	980	23.1%
49. University Way NE / NE 41st St	F	*	F	*	*	22.6%
51. 7th Ave NE / NE 40th St	F	77	F	103	26	6.0%
57. 6th Ave NE / NE 40th St	F	113	F	137	24	5.9%
63. 6th Ave NE / NE Northlake Way	E	46	F	107	61	17.2%
67. 15th Ave NE / NE Pacific St	D	37	F	114	77	25.2%
69. 15th Ave NE / NE Boat St	C	15	F	57	42	31.3%
70. Gate 6 turnaround / NE Boat St / Columbia Rd	B	12	D	34	22	43.4%
71. Montlake Blvd NE / Wahkiakum Rd	F	463	F	6951	6488	8.9%
72. Montlake Blvd NE / IMA exit	E	38	F	61	23	9.0%
73. Montlake Blvd NE / IMA Entrance	C	24	D	27	3	9.0%
77. Montlake Blvd NE / NE Pacific St	C	31	D	38	7	8.3%
78. Montlake Blvd NE / SR 520 WB Off-Ramp	C	34	D	42	8	7.9%

*Volume exceeds capacity and Synchro could not calculate the delay.
1. Level of service.
2. Average delay per vehicle in seconds rounded to the whole second.

During the weekday PM peak hour, 6 additional intersections are anticipated to operate at LOS F during baseline traffic conditions compared with No Action conditions. Overall, 22 intersections are anticipated to operate at LOS D or worse during the weekday PM peak hour under Alternative 3 conditions, as compared to 17 under No Action conditions. The City of Seattle does not have an LOS standard, but generally considers LOS E and LOS F at signalized intersections to reflect poor operations and LOS F at unsignalized intersections as poor operations. For intersections that degrade from LOS D to LOS E or operate at LOS E or LOS F under the “with-project” condition, or increase of 5 or more seconds could be considered significant by the City.

The following intersections are anticipated to degrade to D or degrade from LOS D to LOS E or below under future Alternative 3 conditions:

15. 7th Avenue NE (I-5 NB)/NE 45th Street
16. 9th Avenue NE (South)/NE 45th Street
31. Roosevelt Way NE/NE 43rd St (West)
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
69. 15th Avenue NE/NE Boat Street
70. Gate 6 Turnaround/ NE Boat Street/ Columbia Road
72. Montlake Boulevard NE/IMA Exit
73. Montlake Boulevard NE/IMA Entrance
77. Montlake Boulevard NE/NE Pacific Street
78. Montlake Boulevard NE/SR 520 WB Off-Ramp

Intersections where the LOS is E or F and where the Alternative 3 traffic increases delay by more than 5 seconds are shown in Table 7.6. As shown in Table 7.6, a majority of the intersections are unsignalized intersections. At the two-way stop controlled intersections the change in delay is represented both for the total intersection and for the worst movement.

Table 7.6
ALTERNATIVE 3 SUMMARY OF POTENTIAL IMPACTS

Intersection	Traffic Control	Change in Delay[1]	Percent of Total (Project Share)
15. 7th Avenue NE (I-5 NB)/NE 45th Street	Signalized	18	11.0%
16. 9th Avenue NE (South)/NE 45th Street	TWSC	0.9/34	14.5%
29. Montlake Boulevard NE/Mary Gates Memorial Drive NE	Signalized	10	4.9%
30. Roosevelt Way NE/NE 43rd Street (East)	TWSC	2.9/37	4.3%
31. Roosevelt Way NE/NE 43rd Street (West)	TWSC	0.8/18	4.3%
46. Roosevelt Way NE/NE 41st Street	TWSC	18.2/299	1.6%
47. 12th Avenue NE/NE 41st Street	TWSC	275.1/980	23.1%
49. University Way NE/NE 41st Street	TWSC	-[2]	22.6%
51. 7th Avenue NE/NE 40th Street	AWSC	26	6.0%
57. 6th Avenue NE/NE 40th Street	AWSC	24	5.9%
63. 6th Avenue NE/NE Northlake Way	AWSC	61	17.2%
67. 15th Avenue NE/NE Pacific Street	Signalized	77	25.2%
69. 15th Avenue NE/NE Boat Street	AWSC	42	31.3%
71. Montlake Boulevard NE/Wahkiakum Road	TWSC	6488	8.9%
72. Montlake Boulevard NE/IMA Exit	TWSC	0.1/23	9.0%

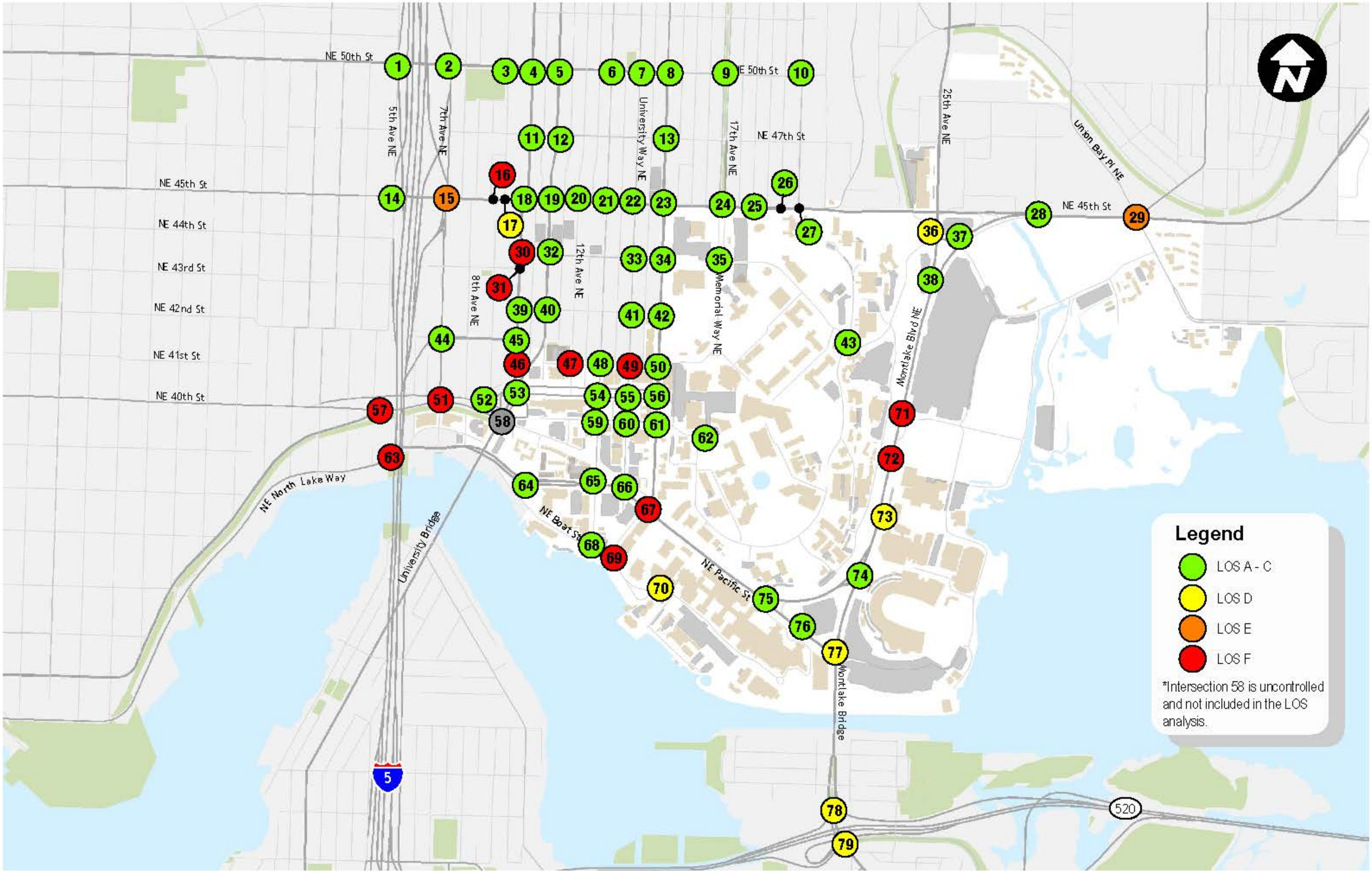
Note: TWSC = Two-way stop controlled, AWSC = all-way stop controlled
1. Change in total intersection delay/change in worst movement delay for two-way stop controlled (TWSC) intersections.
2. Volume exceeds capacity and Synchro could not calculate the delay.

Of the stop controlled intersections listed in Table 7.6 some of the increased delay can be attributed to the increase in pedestrian and bike volumes. Additionally, the following intersections are located at or near potential garage access locations resulting in higher share of alternative percentages:

47. 12th Avenue NE/NE 41st Street
49. University Way NE/NE 41st Street
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
69. 15th Avenue NE/NE Boat Street
71. Montlake Boulevard NE/Wahkiakum Road
72. Montlake Boulevard NE/IMA Exit

The specific location of the driveways impacts the overall trip distribution and individual movements at intersections near driveway locations. Given the preliminary planning nature of this evaluation, individual traffic impacts should be assessed when final building size and driveway locations are determined. Also, given the gridded network it is anticipated that if drivers experience long delays at unsignalized locations they may alter their trip pattern in an effort to reduce delays.

The level of service for vehicle traffic, while a consideration, is increasingly balances against assuring that pedestrian, bicycle, and transit travel modes are encouraged and facilitated, thus intersections that are calculated to operate at poor levels of service for vehicle traffic are not always considered a high priority for improvements by the City.



Future (2028) Alternative 3 Weekday PM Peak Hour Traffic Operations

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FIGURE
7.6

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7.5.4 Arterial Operations

Arterial travel times and speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated with the addition of project generated traffic, consistent with the previously described methodology for existing and future No Action conditions. This includes the application of the adjustment factors previously described.

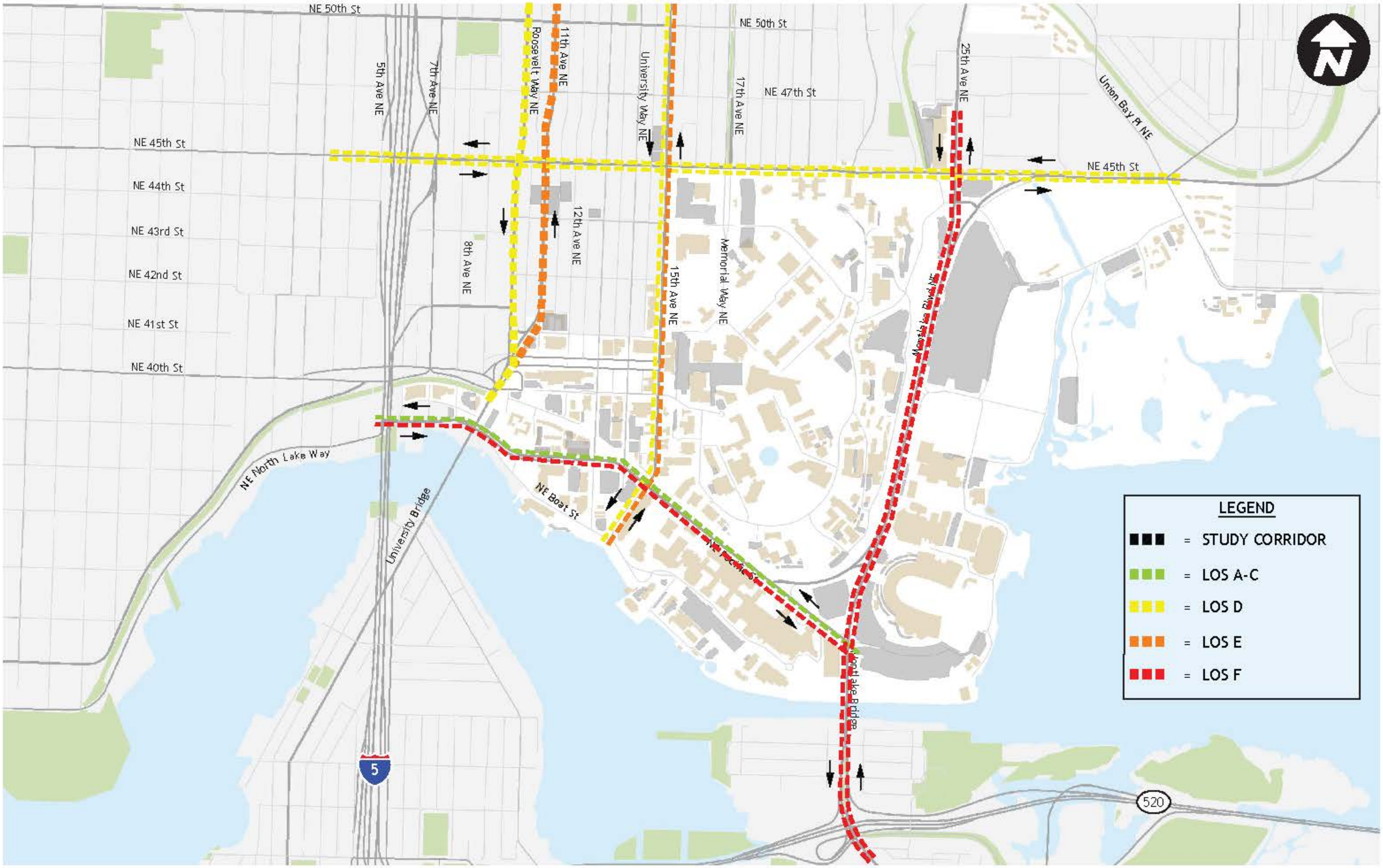
Table 7.7 and Figure 7.7 summarizes the No Action and Alternative 3 corridor LOS and travel times/speeds. Detailed corridor operations worksheets are provided in Appendix C.

Table 7.7
FUTURE NO ACTION AND ALTERNATIVE 3 WEEKDAY PM PEAK HOUR ARTERIAL LOS SUMMARY

Corridor	No Action		Alternative 3	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	E	8.5	E	7.6
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	9.0	E	8.9
Southbound	D	9.2	E	7.8
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	10.8	F	9.7
Southbound	F	8.4	F	8.4
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	11.7	D	10.7
Westbound	D	10.8	D	9.9
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.1	F	8.2
Westbound	C	21.5	C	19.7
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	12.0	D	11.8

1. Level of service.
2. Average speed in miles per hour

As shown in Table 7.7, under Alternative 3 the arterials will generally experience increases in delay and slower travel speeds. Under Alternative 3 the 15th Avenue NE arterial in the southbound direction is anticipated to degrade from LOS D to LOS E, the Montlake Boulevard NE arterial in the northbound direction is anticipated to degrade from LOS E to LOS F, and the NE Pacific Street arterial in the eastbound direction is anticipated to degrade from LOS C to LOS F.



Future (2028) Alternative 3 Weekday PM Peak Hour Corridor Traffic Operations

FIGURE **7.7**

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7.5.5 Screenline Analysis: Primary Impact Zone

Screenline: An imaginary line across which the number of passing vehicles is counted.

The following section describes the screenline analysis completed for two designated screenlines within the study area In this study, screenlines were selected to count vehicle traffic entering and exiting the University of Washington primary and secondary impact zones. As part of the Mayor's Seattle 2035 Comprehensive Plan (City of Seattle, 2016), two screenlines are identified within the vicinity of the University of Washington, as shown in Figure 7.8. Screenline 5.16 is an east-west screenline, measuring north-south travel, and extending along the ship canal to include the University and Montlake Bridges. Screenline 13.13 is a north-south screenline, measuring east-west travel, and extending east of I-5 between NE Pacific Street and NE Ravenna Boulevard.

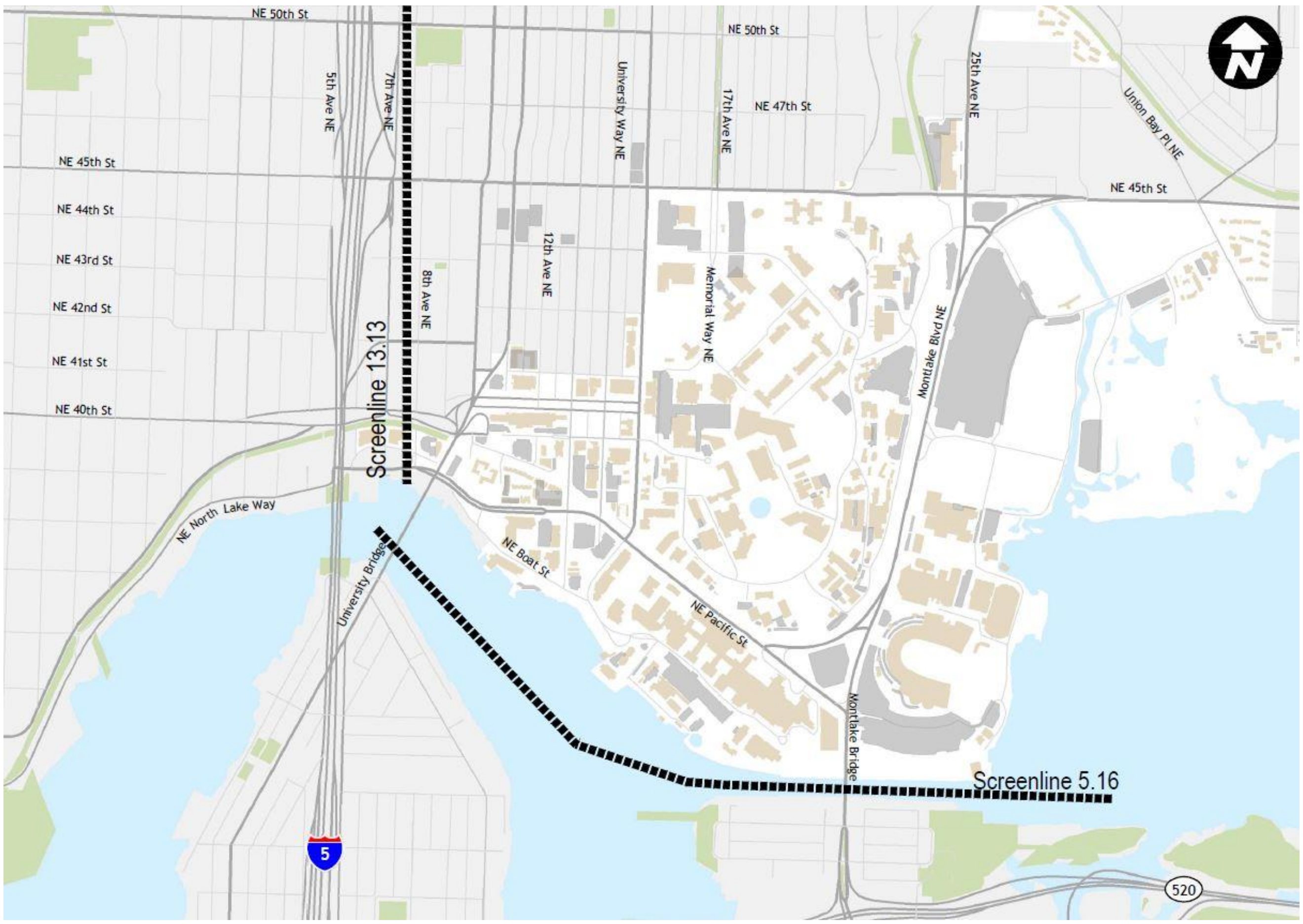


Figure 7.8 Study Area Screenlines

The screenline analysis includes volume to capacity (V/C) calculations for the vehicles traversing the screenlines using future (2028) Alternative 3 traffic volumes and interpolated roadway capacity estimates. Roadway capacity for the 2028 future horizon year was interpolated using 2016 capacity estimates described in Table 3.12 and 2035 capacity estimates referenced in the May 2016 Seattle

Comprehensive Plan Update Final EIS. Future (2028) roadway capacity estimates are shown in Table 7.8 below. Detailed screenline volumes and volume to capacity calculations are included in Appendix C.

Table 7.8
FUTURE (2028) CAPACITY

Screenline	Future (2028) Capacity
5.16 – Ship Canal, University and Montlake Bridges	
Northbound	4,210
Southbound	4,210
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard	
Eastbound	6,119
Westbound	6,119

Source: Transpo Group, 2016

Level of service standards for the screenline analysis are based on the volume to capacity ratio of a screenline. As described in the Seattle Comprehensive Plan Update EIS, the LOS standard volume to capacity ratio for Screenline 5.16 and Screenline 13.13 are 1.20 and 1.00, respectively. For this study, screenline volume to capacity ratios that do not exceed the LOS standard are acceptable. The Alternative 3 screenline analysis is included in Table 7.9. Detailed screenline analysis calculations are included in Appendix C.

Table 7.9
FUTURE (2028) ALTERNATIVE 3 SCREENLINE ANALYSIS

Screenline	Screenline Volume	Capacity	V/C	LOS Standard V/C
5.16 – Ship Canal, University and Montlake Bridges				
Northbound	4,066	4,210	0.95	1.20
Southbound	4,094	4,210	0.97	1.20
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard				
Eastbound	3,925	6,119	0.64	1.00
Westbound	4,343	6,119	0.71	1.00

Source: NACTO, Seattle Comprehensive Plan Update EIS, and Transpo Group, 2016

As shown in Table 7.9, all Alternative 3 screenline volume to capacity ratios meet the acceptable LOS standard.

7.5.6 Service/Freight Routes

Impacts would be similar to those identified in Alternative 1 or Alternative 2, depending on which primary Alternative is approved. In either case, no significant impact would result from added freight activity on campus.

7.5.7 Parking

Supply

Similar to the other Action Alternatives, it was assumed that parking supply would be increased or decreased within each Sector to achieve an 85 percent utilization without exceeding the parking cap for Alternative 3. Alternative 3 parking cap supply would be 10,240 spaces. The location of parking and strategies used to maintain the existing CUA parking cap would be consistent with those outlined for Alternative 1.

Demand

Overall parking demand for Alternative 3 would be the same as the other Action Alternatives. Alternative 3 on-campus parking demand and utilization was reviewed by sector to provide context on where parking demand would occur (see Table 7.10). Allocation of Alternative 3 parking demand by sector was based on projected development as documented in Appendix B. The evaluation assumes that on-street parking would be allocated to on-campus facilities given the increases and reallocation of parking supply to achieve an 85 percent utilization.

Table 7.10
ALTERNATIVE 3 PEAK PARKING DEMAND BY SECTOR

Sector	Future Cap Parking Supply	Parking Demand			% Utilization
		No Action[1]	Alternative 3		
			Growth[2]	Total	
West	2,020	1,428	533	1,720	110%
South	2,900	1,187	1,034	2,462	135%
East	1,820	1,464	81	1,545	31%
Central	3,500	2,689	290	2,979	89%
Total	**10,240**	**6,768**	**1,938**	**8,706**	**72%**

Source: Transpo Group, 2016

1. On-campus parking demand for No Action based on projected increase in population. This does not include on-street parking demand increases noted in the previous table since these would not be parking within the Sectors.
2. Growth in parking demand based on projected increase in population for Alternative 3. The analysis assumes with the street vacation and reallocation of parking supply in Alternative 3, on-street parking demand would shift to on-campus parking.

As the table above reflects, reallocation of parking would result in a parking supply under the existing cap and an 85 percent utilization by Sector and for the campus as a whole. The additional parking and reallocation of parking supply would provide a better relationship between localized supply and demand and thus reduce the likelihood of parking beyond the University facilities (i.e., within the neighborhoods).

Secondary Parking Impacts

Parking outside the primary impact zone surrounding the campus would likely continue with Alternative similar to the No Action Alternative. This would include vehicles parking within transit served areas with unrestricted parking and then using transit to travel to campus. As the campus grows, this could occur at higher levels compared to the No Action Alternative.

7.6 AERIAL/STREET VACATIONS

Alternative 3 impacts for the aerial and street vacations would be consistent with those described for Alternative 1 as noted in Section 5.6. As noted in the Alternative 1 analysis the City of Seattle has defined polices related to the assessing and approving the vacation of public rights-of-way. Further analysis will be provided to the City consistent with the policy requirements at such time an application for an aerial or street vacation is made. The EIS alternatives and supporting analysis reflect the vacations as proposed.

7.7 IMPACTS DURING CONSTRUCTION

During construction of all Action Alternatives, potential construction impacts could include temporary closures of pathways, and streets, reallocation or removal of bike and auto parking, increased truck traffic or other temporary disruptions. While temporary in nature, potential mitigations for construction could include TMP strategies, outreach, and coordination to minimize impacts. Specific impacts and mitigations for development would be addressed as part of SEPA review.

7.8 CUA COMPLIANCE – VEHICLE TRIP AND PARKING CAPS

CUA vehicle trip caps are considered campus-wide and would not materially change between action alternatives. See discussion in Section 5.7 related to Alternative 1.

8 ALTERNATIVE 4 CAMPUS DEVELOPMENT WITH INCREASED CENTRAL AND EAST CAMPUS DENSITY

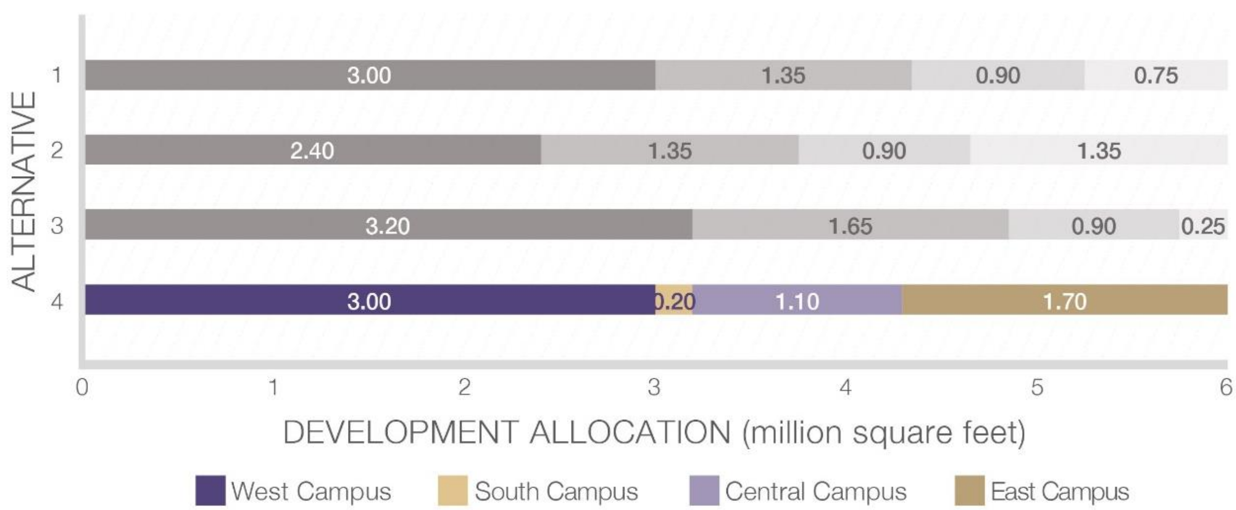
This section summarizes the results of the analysis conducted for Alternative 4. As in the previous sections, the analysis examines the impacts to the key transportation elements and transportation modes.

8.1 CHANGING CAMPUS CHARACTERISTICS

8.1.1 Description of the Alternative

The following summarizes the evaluation of Alternative 4 with respect to the transportation related elements identified in the Affected Environment section of this report. The proposed University of Washington Development under Alternative 4 is anticipated to be primarily located in West and East Campus. The technical analysis of Alternative 4 focuses on the weekday PM peak period.

Alternative 4 would include the development total of 6,000,000 net new square feet of gross floor area of which approximately 3,000,000 square feet are located in West Campus and 1,700,000 square feet are located in East Campus. The remaining development would be located in South and Central Campus, approximately 200,000 gsf and 1,100,000 gsf, respectively, as shown in Figure 8.1.



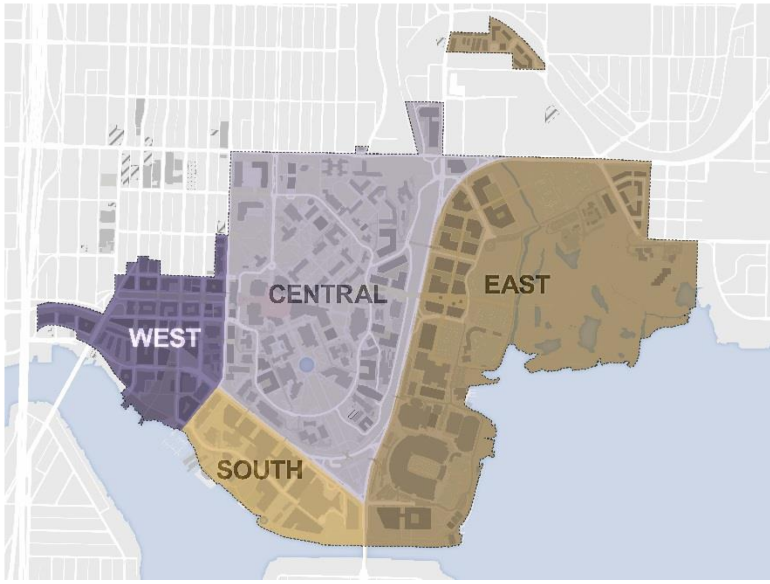


Figure 8.1 Alternative 4 Development Allocation

8.1.2 Trip Generation by Mode

The following provides a summary of the anticipated trip generation for pedestrian, bicycle, transit, and vehicle trips to campus.

The trip generation methodology used for assessing the increase in trips under Alternative 4 is consistent with that previously described in the No Action Alternative. The increase in trips anticipated with Alternative 4 is compared against the No Action forecasts to determine the net increase associated with the population growth.

8.2 PEDESTRIANS

8.2.1 Performance Measures

Three pedestrian related performance measures have been identified to assess and compare alternatives:

- Proportion of development within ½ mile of Multi-Family Housing
- Proportion of development within ½ mile of University of Washington Residence Halls
- Quality of Pedestrian Environment

These measures reflect the effectiveness of the pedestrian network in providing safe and easy access to pedestrian destinations, specifically housing, and thereby maintaining a high walk mode choice on campus. Comparisons of future on action conditions to existing conditions is provide for each measure below:

Proportion of development within ½ mile of multifamily housing

Walking makes up nearly 1/3rd of all existing campus related trips to and from campus. Proximity of campus development to housing is therefore one important measure to assessing the propensity of people to walk. This measure assesses the proximity of the current campus buildings and development to nearby multifamily housing. As shown in Table 8.1, all of Alternative 4 development is within a 1/2-mile proximity to multifamily housing.

Table 8.1
NO ACTION, ALTERNATIVE 1, ALTERNATIVE 2, ALTERNATIVE 3, AND ALTERNATIVE 4 PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF MULTIFAMILY HOUSING

Sector	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
West	211,000 gsf	3,000,000 gsf	2,400,000 gsf	3,200,000 gsf	3,000,000 gsf
South	NA	1,350,000 gsf	1,350,000 gsf	1,650,000 gsf	200,000 gsf
Central	NA	900,000 gsf	900,000 gsf	900,000 gsf	1,100,000 gsf
East	NA	750,000 gsf	1,350,000 gsf	216,773 gsf	1,700,000 gsf
Total	**211,000 gsf**	**6,000,000 gsf**	**6,000,000 gsf**	**5,966,773 gsf**	**6,000,000 gsf**
Percent	***100%***	***100%***	***100%***	***99.4%***	***100%***

Proportion of development within ½ mile of University of Washington residence halls

Similar to the previous measure, this performance measure assesses the proportion of new development within walking distance of residence halls. Residence halls were identified and then buffered by a 1/2-mile. As shown in Table 8.2, similar to No Action, all of the new development in Alternative 4 is within a 1/2-mile proximity to multifamily housing.

Table 8.2
NO ACTION, ALTERNATIVE 1, ALTERNATIVE 2, ALTERNATIVE 3, AND ALTERNATIVE 4
PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF RESIDENCE HALLS

Sector	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
West	211,000 gsf	3,000,000 gsf	2,400,000 gsf	3,200,000 gsf	3,000,000 gsf
South	NA	1,350,000 gsf	1,350,000 gsf	1,650,000 gsf	200,000 gsf
Central	NA	900,000 gsf	900,000 gsf	900,000 gsf	1,100,000 gsf
East	NA	750,000 gsf	1,350,000 gsf	239,918 gsf	1,700,000 gsf
Total	**211,000 gsf**	**6,000,000 gsf**	**6,000,000 gsf**	**5,989,918 gsf**	**6,000,000 gsf**
Percent	***100%***	***100%***	***100%***	***99.8%***	***100%***

Quality of Pedestrian Environment (Primary & Secondary Impact Zones)
This alternative would provide a number of enhancements to pedestrian travel within the MIO where development occurs. Improvements in West Campus would mirror those of Alternative 1 with new pedestrian facilities in the waterfront green space and accessible connections to Central Campus. As identified in the CMP, East Campus would have improved pedestrian facilities including a land bridge. South Campus would see little change in the pedestrian environment, maintaining the currently disconnected and impermeable Medical Center.

8.3 BICYCLES

8.3.1 Performance Measures

Two bicycle related performance measures have been identified to assess and compare alternatives:

- Burke-Gilman Trail Capacity
- Quality of Bicycle Environment

Burke-Gilman Trail Capacity
This Alternative would concentrate growth in East and South Campus resulting in the largest growth in pedestrian and bike demand in East Campus among the Alternatives. This Alternative would likely create the largest change in pedestrian and bicycle travel patterns along the Burke-Gilman trail because it would diversify uses on East Campus away from surface parking. This Alterative would also increase cross traffic at the new potential East Campus Land Bridge. The greatest of all Alternatives and would likely increase travel along the eastern segment of the Burke-Gilman Trail between Rainier Vista and Pend Oreille Road. Planned expansion of the Burke Gilman Trail separating pedestrian and bicycle uses will provide adequate capacity to meet CMP demands.

Quality of Bicycle Environment (Primary & Secondary Impact Zones)

The quality of bicycle facilities and demand anticipated with this alternative would be similar to Alternative 1 in West Campus. In South Campus, limited changes in facilities and demand would be expected. Compared to other alternatives, growth in bicycle travel demand within East Campus, would likely be largest under this Alternative. Due to the scale of development in East Campus, proximity to the Burke Gilman trail, flat terrain, existing bicycle travel patterns and longer walking distance to transit, this Alternative could result in the largest growth in bicycle travel.

8.4 TRANSIT

8.4.1 Transit Performance

Impact of the Alternative 4 on transit as compared to existing conditions is provided in this section. Two transit related performance measures have been identified to assess and compare alternatives:

- Proportion of development within ½ mile of RapidRide
- Proportion of development within ½ mile of Light Rail

Proportion of development within ½ mile of RapidRide

This measure, as well as the next measure, assesses proximity of campus development to high capacity transit service including RapidRide and Link Light Rail. This measure was calculated by determining the ratio of each sector within a 1/2-mile walk of a RapidRide stop. For future years the 2025 Draft King County Long Range Plan service network[2] was used to determine the location of RapidRide routes and stop locations were inferred based on existing high-ridership stops, Link station locations and desired stop spacing. The CMP identifies potential building sites that will be used within each sector. The ratio of the sector within 1/2-mile of RapidRide stops were estimate within the 1/2-mile buffer. With the advent of RapidRide in the future, generally all of the proposed growth in No Action and Alternative 4 will have access to RapidRide within a 1/2-mile buffer area as shown in Table 8.3.

Table 8.3
NO ACTION, ALTERNATIVE 1, ALTERNATIVE 2, ALTERNATIVE 3, AND ALTERNATIVE 4 PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF RAPIDRIDE

Sector	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
West	211,000 gsf	3,000,000 gsf	2,400,000 gsf	3,200,000 gsf	3,000,000 gsf
South	NA	1,350,000 gsf	1,350,000 gsf	1,650,000 gsf	200,000 gsf
Central	NA	900,000 gsf	900,000 gsf	900,000 gsf	1,100,000 gsf
East	NA	750,000 gsf	1,350,000 gsf	250,000 gsf	1,700,000 gsf
Total	**211,000 gsf**	**6,000,000 gsf**	**6,000,000 gsf**	**6,000,000 gsf**	**6,000,000 gsf**
Percent	***100%***	***100%***	***100%***	***100%***	***100%***

Proportion of development within ½ mile of Light Rail

This measure is identical to the measure above, but proximity is measured to the University of Washington Light Rail Link Station. As shown in Table 8.4, in Alternative 4, 78% of the new development is within a 1/2-mile proximity to Link Light Rail.

Table 8.4
NO ACTION, ALTERNATIVE 1, ALTERNATIVE 2, ALTERNATIVE 3, AND ALTERNATIVE 4
PROPORTION OF DEVELOPMENT WITHIN ½ MILE OF LIGHT RAIL

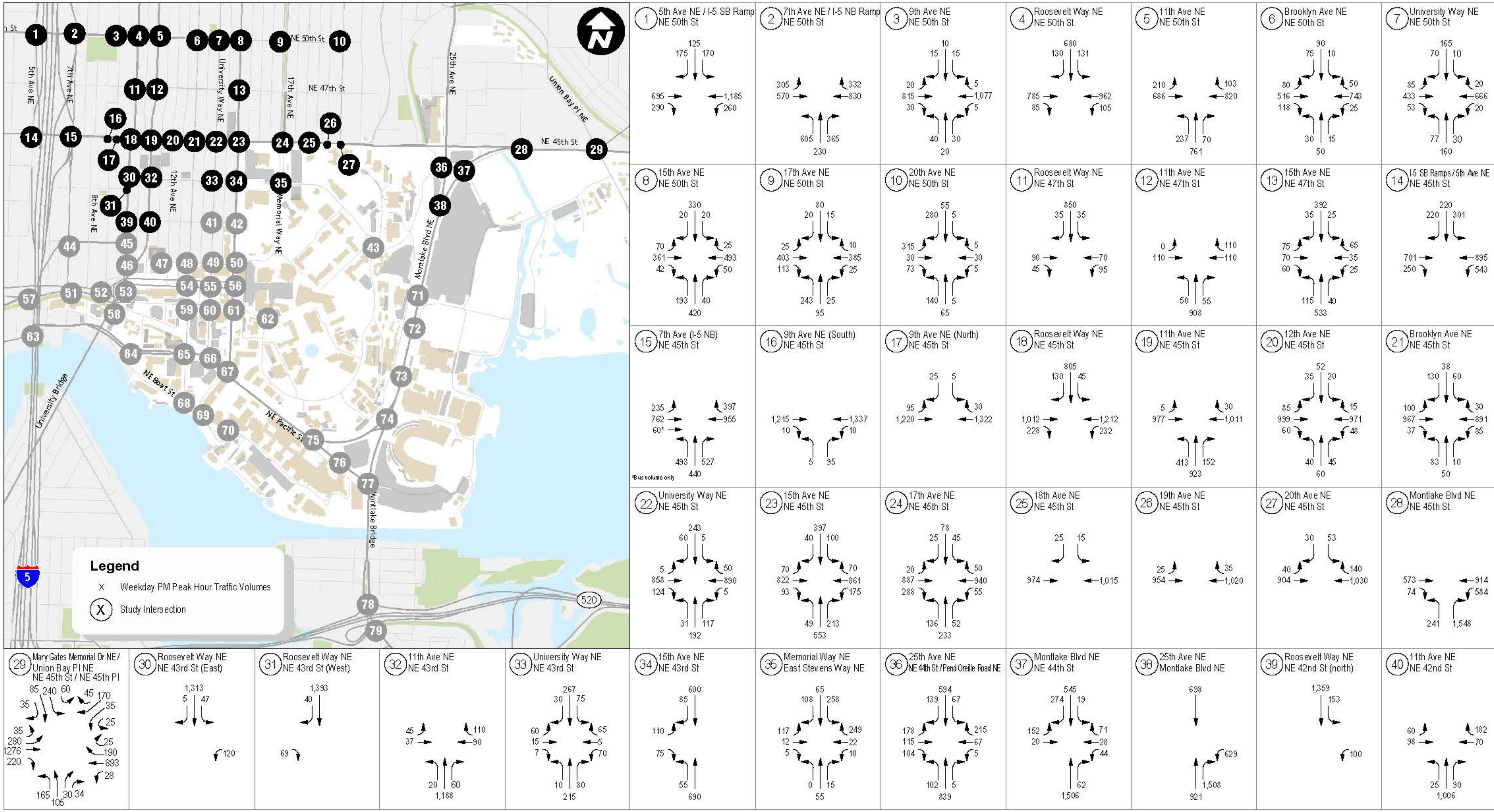
Sector	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
West	181,460 gsf	2,680,232 gsf	2,160,729 gsf	2,880,973 gsf	2,680,232 gsf
South	NA	1,350,000 gsf	1,350,000 gsf	1,650,000 gsf	200,000 gsf
Central	NA	900,000 gsf	900,000 gsf	900,000 gsf	1,100,000 gsf
East	NA	750,000 gsf	452,036 gsf	250,000 gsf	727,168 gsf
Total	**181,460 gsf**	**5,680,232 gsf**	**4,862,766 gsf**	**5,680,973 gsf**	**4,707,400 gsf**
Percent	***86%***	***95%***	***81%***	***96%***	***78%***

8.5 VEHICLE

8.5.1 Traffic Volumes

Increased vehicle traffic associated with Alternative 4 were assigned to potential garage locations were based on existing vehicle travel patterns, previous studies in the project vicinity, review of University information, and U.S. Census Bureau's *OnTheMap* tool. *OnTheMap* is a web-based mapping and reporting application, which shows where workers are employed and where they live based on census data. The zip codes were evaluated to determine if a person would be more likely to travel from the zip code via vehicle or by other means. Trips to zip codes closer to the proposed project sites or in more transit oriented locations are more likely to use transit, walk, bicycle, or other non-SOV modes. Zip codes outside the Seattle City limits and/or further from the site are more likely to drive. The general trip distribution to/from the University is shown on Figure 4.6.

Project trips for each potential garage location were assigned to the study intersections based on the general trip distribution patterns shown on Figure 4.6. The resulting future 2028 Alternative 4 volumes are shown on Figure 8.2 and Figure 8.3.



Future (2028) Alternative 4 (Intersections 1-40) Weekday PM Peak Hour Traffic Volumes

University of Washington 2018 Campus Master Plan

FIGURE **8.2**

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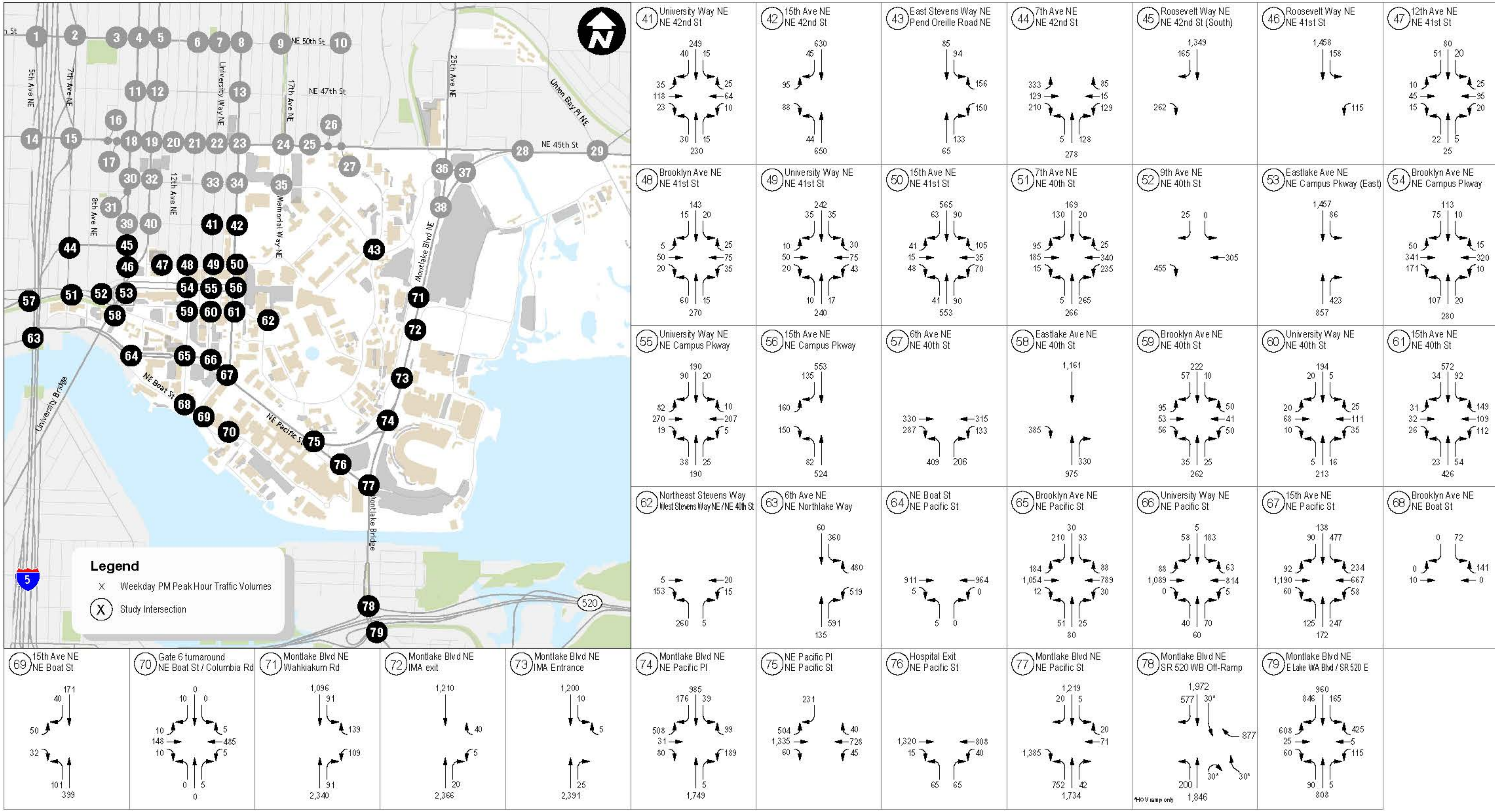

Future (2028) Alternative 4 (Intersections 41-79) Weekday PM Peak Hour Traffic Volumes

University of Washington 2018 Campus Master Plan

FIGURE
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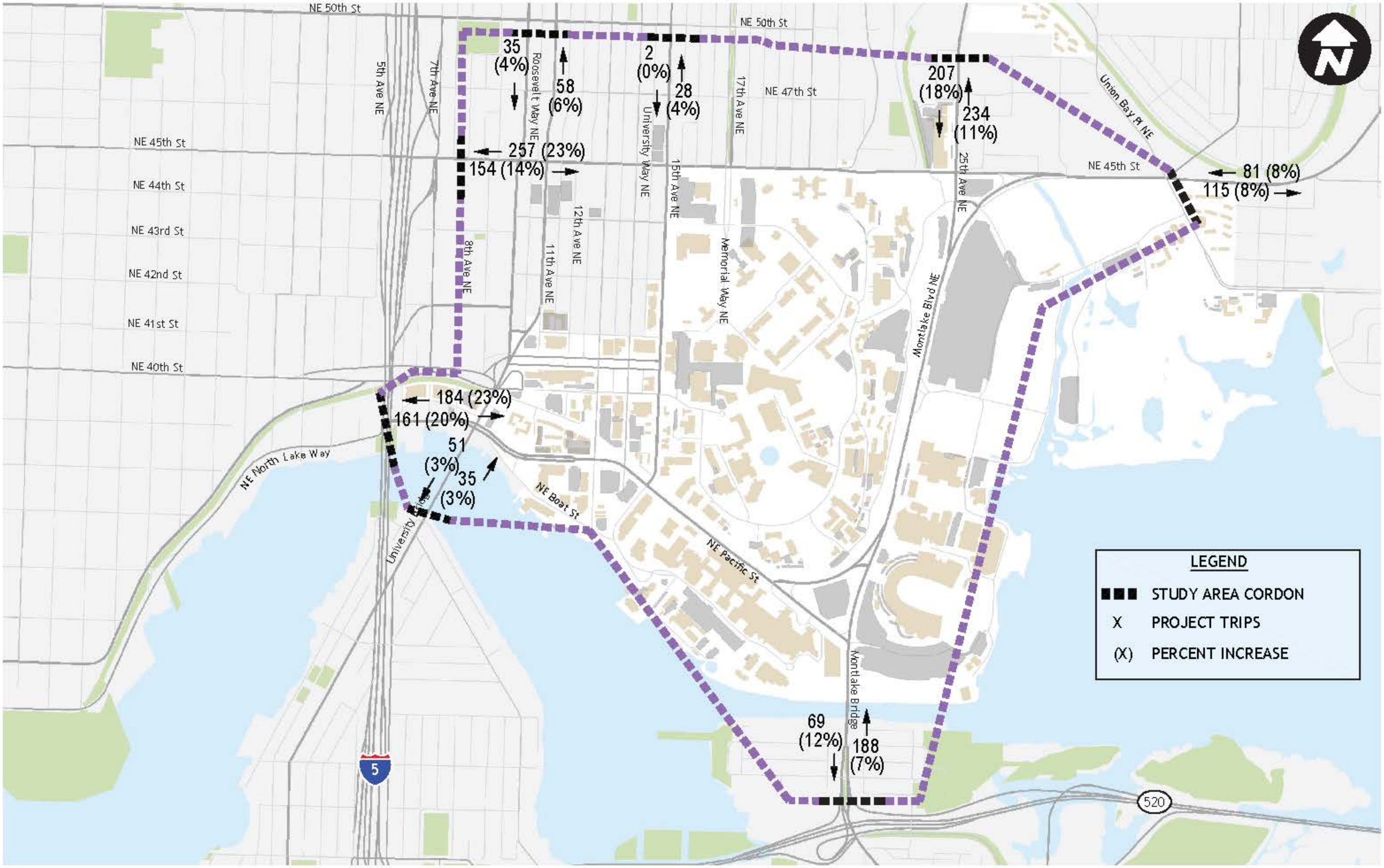
8.5.2 Cordon Volume Analysis

> **Cordon:** An imaginary line used to evaluate traffic in and out of the University area and measure the change or increase in traffic associated with the proposed alternatives.

To understand the volumes associated with the University of Washington, related to background volumes under the different Alternative scenarios, a cordon volume analysis was completed. The cordon volume analysis focuses on the major roadways leading to and from the University. The cordon volume analysis also shows the percent of total trips along the corridor that are associated with the increased traffic generated by Alternative 4. The cordon volume and project share associated with Alternative 4 are shown on Figure 8.4. Note that this reflects the percent increase associated with continued development on campus. As shown on Figure 8.4, project related volumes will increase cordon volumes by 10 – 11%. Similar to Alternative 1, this increase may be constrained by the available arterial street capacity.



Future (2028) Alternative 4 PM Peak Hour Cordon Volumes and Proportional Increase

FIGURE
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8.5.3 Traffic Operations Performance

Methodology

The methodology used in assessing intersection and corridor LOS is consistent with that described for the Affected Environment and No Action scenarios. A detailed description of methodology used can be found in Appendix B.

Intersection LOS

Weekday PM peak hour intersection traffic operations during the 2028 Alternative 4 conditions are summarized in Figure 8.5 and Figure 8.6**.** The year 2028 geometry for all of the study-area intersections were assumed to remain the same as baseline No Action conditions except when modifications are expected as part of the alternative. For example, existing traffic was rerouted when impacted by proposed street vacations. Additionally, signal timing splits and offsets were optimized under Alternative 4. Complete intersection level of service summaries are provided in Appendix C.

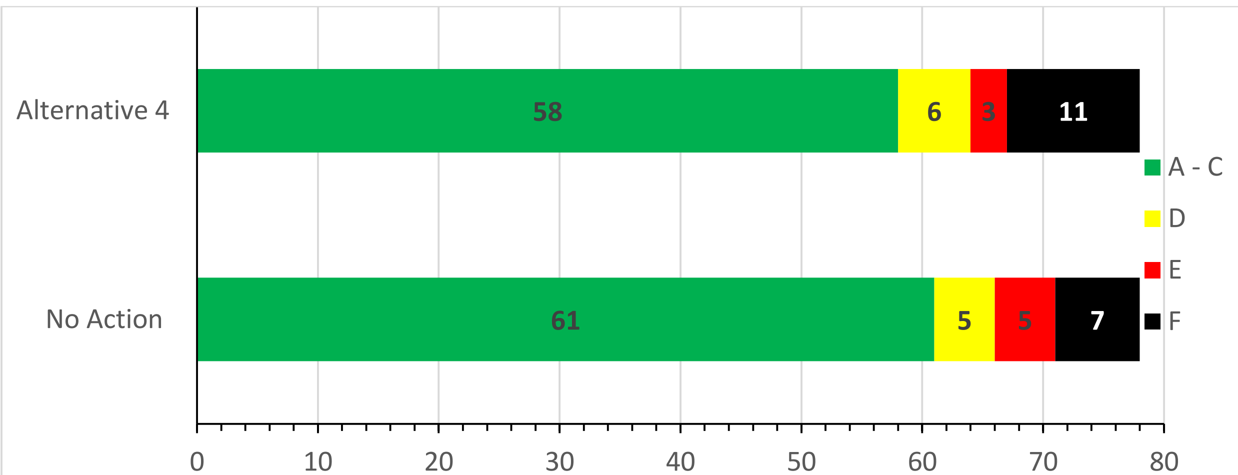


Figure 8.5 No Action/Alternative 4 Weekday 2028 Intersection Level of Service Summary

The following table illustrates changes in intersection traffic operations at intersections anticipated to operate poorly between the future No Action Alternative and future Alternative 4 weekday PM peak hour.

Table 8.5
FUTURE ALTERNATIVE 4 INTERSECTION LEVEL OF SERVICE SUMMARY

Intersection	No Action		Alternative 4		Change in Delay (sec)	Project Share
	LOS[1]	Delay[2]	LOS[1]	Delay[2]		
15. 7th Ave (I-5 NB) / NE 45th St	D	44	E	64	20	11.4%
16. 9th Ave NE (South) / NE 45th St	E	48	F	83	35	15.0%
29. Montlake Blvd NE / Mary Gates Memorial Dr NE	E	56	E	66	10	4.9%
30. Roosevelt Way NE / NE 43rd St (East)	F	68	F	98	30	3.0%
31. Roosevelt Way NE / NE 43rd St (West)	E	45	F	61	16	3.1%
46. Roosevelt Way NE / NE 41st St	F	434	F	712	278	1.5%
47. 12th Ave NE / NE 41st St	F	76	F	1021	945	22.5%
49. University Way NE / NE 41st St	F	*	F	*	*	21.9%
51. 7th Ave NE / NE 40th St	F	77	F	95	18	4.9%
57. 6th Ave NE / NE 40th St	F	113	F	132	19	4.8%
63. 6th Ave NE / NE Northlake Way	E	46	F	102	56	16.3%
67. 15th Ave NE / NE Pacific St	D	37	E	77	40	19.4%
71. Montlake Blvd NE / Wahkiakum Rd	F	463	F	376	-87	13.3%
72. Montlake Blvd NE / IMA exit	E	38	F	51	13	12.1%
73. Montlake Blvd NE / IMA Entrance	C	24	D	28	4	12.1%
77. Montlake Blvd NE / NE Pacific St	C	31	D	41	10	9.0%
78. Montlake Blvd NE / SR 520 WB Off-Ramp	C	34	D	42	8	8.4%

*Volume exceeds capacity and Synchro could not calculate the delay.
1. Level of service.
2. Average delay per vehicle in seconds rounded to the whole second.

During the weekday PM peak hour, 4 additional intersections are anticipated to operate at LOS F under Alternative 4 traffic conditions compared with No Action conditions. Overall, 20 intersections are anticipated to operate at LOS D or worse during the weekday PM peak hour with Alternative 4, as compared to 17 under No Action conditions. The City of Seattle does not have an LOS standard but generally considers LOS E and LOS F at signalized intersections to reflect poor operations and LOS F at unsignalized intersections as poor operations. For intersections that degrade from LOS D to E or operate at LOS E or LOS F under the "with-project" condition, or increase of 5 or more seconds could be considered significant by the City.

The following intersections are anticipated to degrade to D or below during future Alternative 4 conditions:

15. 7th Avenue (1-5 NB)/NE 45th Street
16. 9th Avenue NE (South)/NE 45th Street
31. Roosevelt Way NE/NE 43rd Street (West)
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
72. Montlake Boulevard NE/IMA Exit
73. Montlake Boulevard NE/IMA Entrance
77. Montlake Boulevard NE/NE Pacific Street
78. Montlake Boulevard NE/SR 520 WB Off-Ramp

Intersections where the LOS is E or F and where the Alternative 4 traffic increases delay by more than 5 seconds are shown in Table 8.6. As shown in Table 8.6, a majority of the intersections are unsignalized intersections. At the two-way stop controlled intersections the change in delay is represented both for the total intersection and for the worst movement.

Table 8.6
ALTERNATIVE 4 SUMMARY OF POTENTIAL IMPACTS

Intersection	Traffic Control	Change in Delay (Seconds)[1]	Percent of Total (Project Share)
15. 7th Avenue (I-5 NB)/NE 45th Street	Signalized	20	11.4%
16. 9th Avenue NE (South)/NE 45th Street	TWSC	1/34	15.0%
29. Montlake Boulevard NE/Mary Gates Memorial Drive NE	Signalized	10	4.9%
30. Roosevelt Way NE/NE 43rd Street (East)	TWSC	2.4/30	3.0%
31. Roosevelt Way NE/NE 43rd Street (West)	TWSC	0.8/16	3.1%
46. Roosevelt Way NE/NE 41st Street	TWSC	18.2/278	1.5%
47. 12th Avenue NE/NE 41st Street	TWSC	275.1/945	22.5%
49. University Way NE/NE 41st Street	TWSC	-[2]	21.9%
51. 7th Avenue NE / NE 40th Street	AWSC	18	4.9%
57. 6th Avenue NE / NE 40th Street	AWSC	19	4.8%
63. 6th Avenue NE / NE Northlake Way	AWSC	56	16.3%
67. 15th Avenue NE / NE Pacific Street	Signalized	40	19.4%
71. Montlake Boulevard NE / Wahkiakum Road	TWSC	-1.3/-87	13.3%
72. Montlake Boulevard NE / IMA exit	TWSC	0.1/13	12.1%

Note: TWSC = two-way stop controlled, AWSC = all-way stop controlled

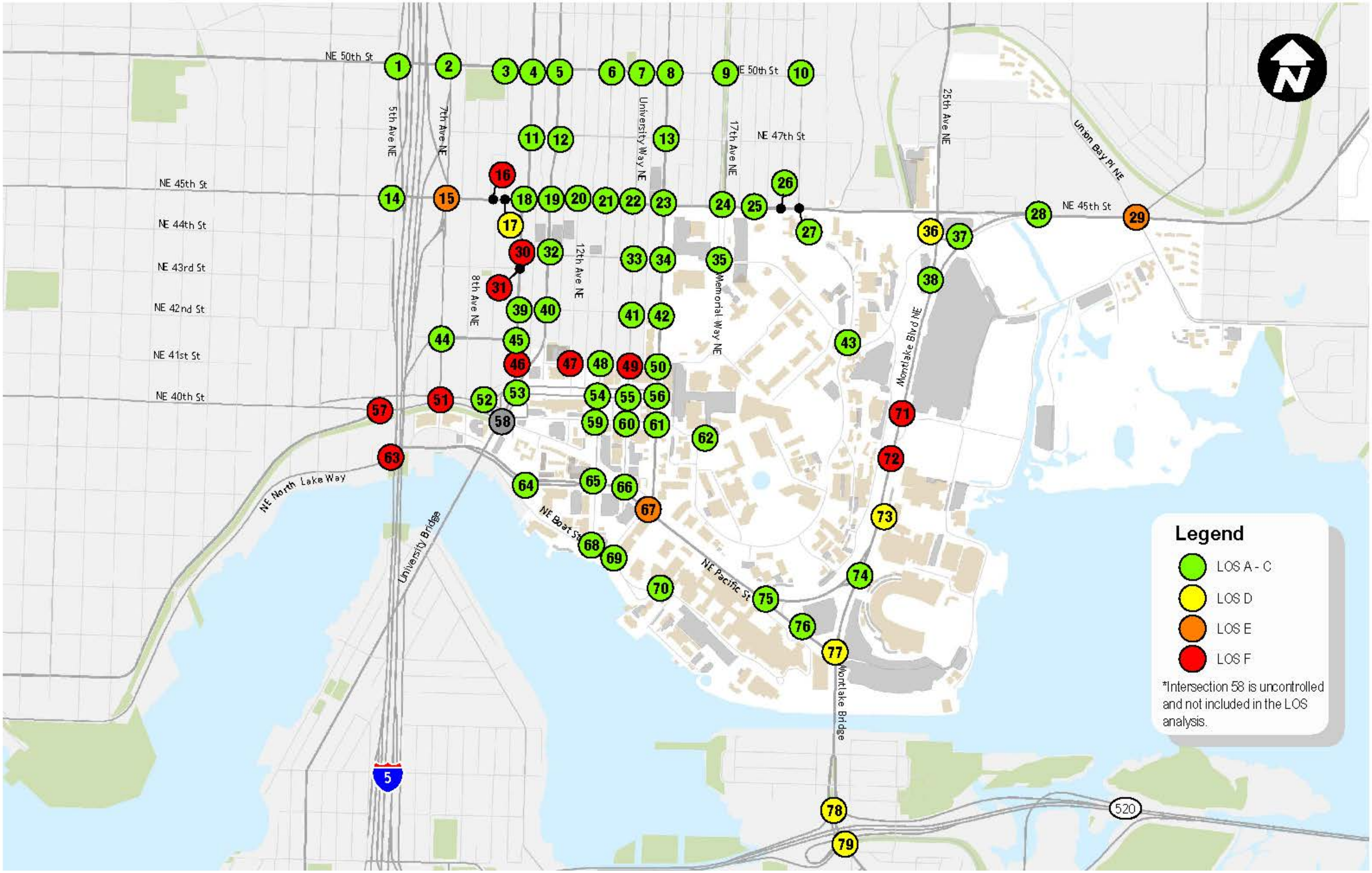
1. Change in total intersection delay/change in worst movement delay for two-way stop controlled (TWSC) intersections.

2. Volume exceeds capacity and Synchro could not calculate the delay.

Of the stop controlled intersections listed in Table 8.6 some of the increased delay can be attributed to the increase in pedestrian and bicycle volumes. Additionally, the following intersections are located at or near potential garage access locations resulting higher project share percentages:

47. 12th Avenue NE/NE 41st Street
49. University Way NE/NE 41st Street
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
71. Montlake Boulevard NE / Wahkiakum Road
72. Montlake Boulevard NE/IMA Exit

The specific location of the driveways impacts the overall trip distribution and individual movements at intersections near driveway locations. Given the preliminary planning nature of this evaluation, individual traffic impacts should be assessed when final building size and driveway locations are determined. Also, given the grid network, it is anticipated that if drivers experience long delays at unsignalized locations they may alter their trip pattern in an effort to reduce delays. It is also recognized that level of service for vehicle traffic, while a consideration, is increasingly balanced against assuming that pedestrian, bicycle, and transit travel modes are encouraged and facilitated. Intersections that are calculated to operate at poor levels of service for vehicle traffic are not always considered a high priority for improvement by the City.



Future (2028) Alternative 4 Weekday PM Peak Hour Traffic Operations

FIGURE
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8.5.4 Arterial Operations

Arterial travel times and speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated with the addition of project generated traffic, consistent with the previously described methodology for existing and future No Action conditions. This includes the application of the adjustment factors previously described.

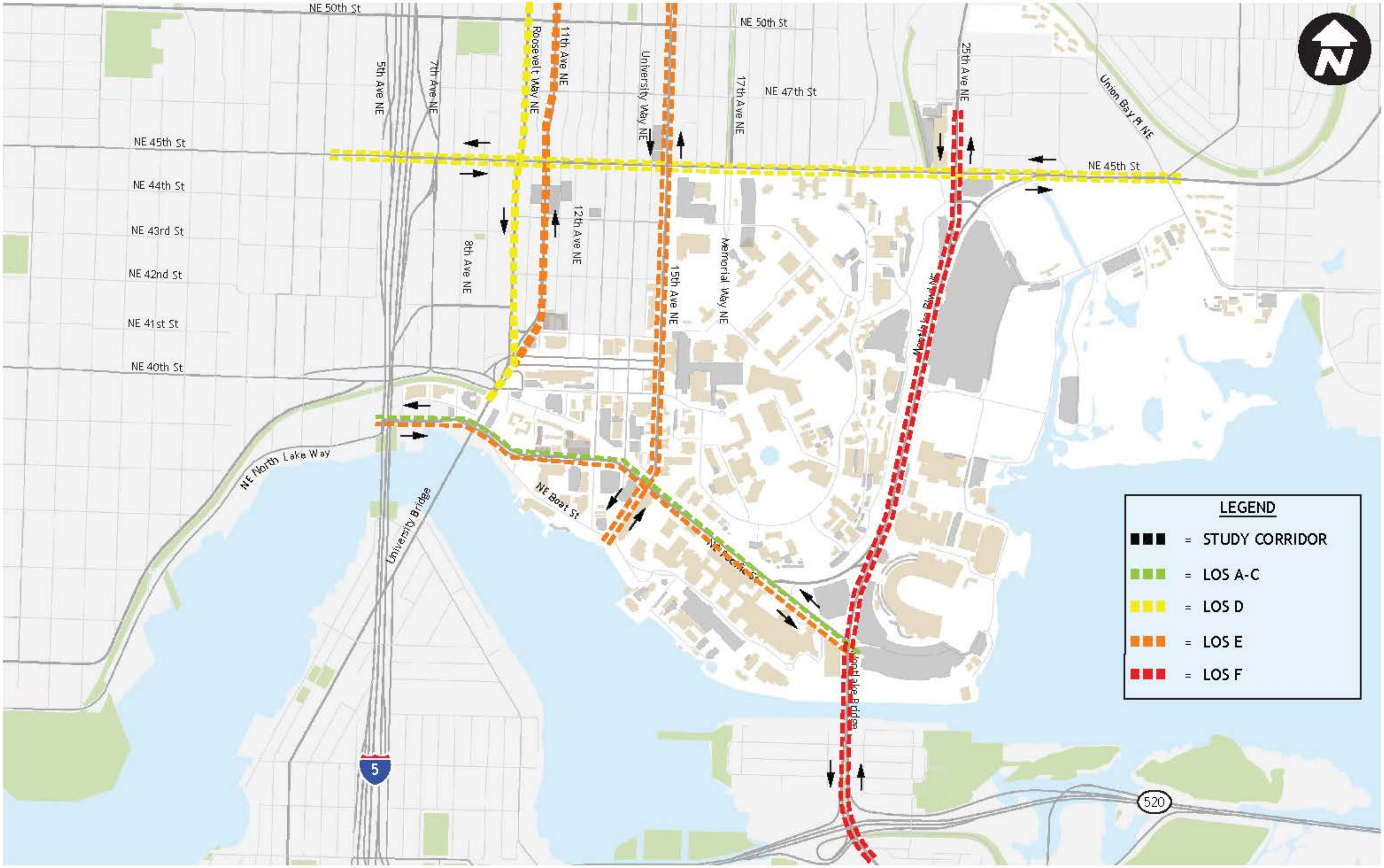
Table 8.7 and Figure 8.7 summarizes the No Action and Alternative 4 arterial travel times and speeds. Detailed arterial operations worksheets are provided in Appendix C.

Table 8.7
FUTURE NO ACTION AND ALTERNATIVE 4 WEEKDAY PM PEAK HOUR ARTERIAL LOS SUMMARY

Corridor	No Action		Alternative 4	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	E	8.5	E	7.8
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	9.0	E	8.9
Southbound	D	9.2	E	8.5
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	10.8	F	9.7
Southbound	F	8.4	F	8.1
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	11.7	D	10.6
Westbound	D	10.8	D	9.6
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.1	E	10.9
Westbound	C	21.5	C	19.5
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	12.0	D	11.8

1. Level of service.
2. Average speed in miles per hour

As shown in Table 8.7, under Alternative 4 the arterials will generally experience increases in delay and slower travel speeds. Under Alternative 4 the 15th Avenue NE arterial in the southbound direction is anticipated to degrade from LOS D to LOS E, the Montlake Boulevard NE arterial in the northbound direction is anticipated to degrade from LOS E to LOS F, and the NE Pacific Street arterial in the eastbound direction is anticipated to degrade from LOS C to LOS E.



Future (2028) Alternative 4 Weekday PM Peak Hour Corridor Traffic Operations

FIGURE **8.7**

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8.5.5 Screenline Analysis: Primary Impact Zone

Screenline: An imaginary line across which the number of passing vehicles is counted.

The following section describes the screenline analysis completed for two designated screenlines within the study area. In this study, screenlines were selected to count vehicle traffic entering and exiting the University of Washington primary and secondary impact zones. As part of the Mayor's Seattle 2035 Comprehensive Plan (City of Seattle, 2016), two screenlines are identified within the vicinity of the University of Washington, as shown in Figure 8.8. Screenline 5.16 is an east-west screenline, measuring north-south travel, and extending along the ship canal to include the University and Montlake Bridges. Screenline 13.13 is a north-south screenline, measuring east-west travel, and extending east of I-5 between NE Pacific Street and NE Ravenna Boulevard.

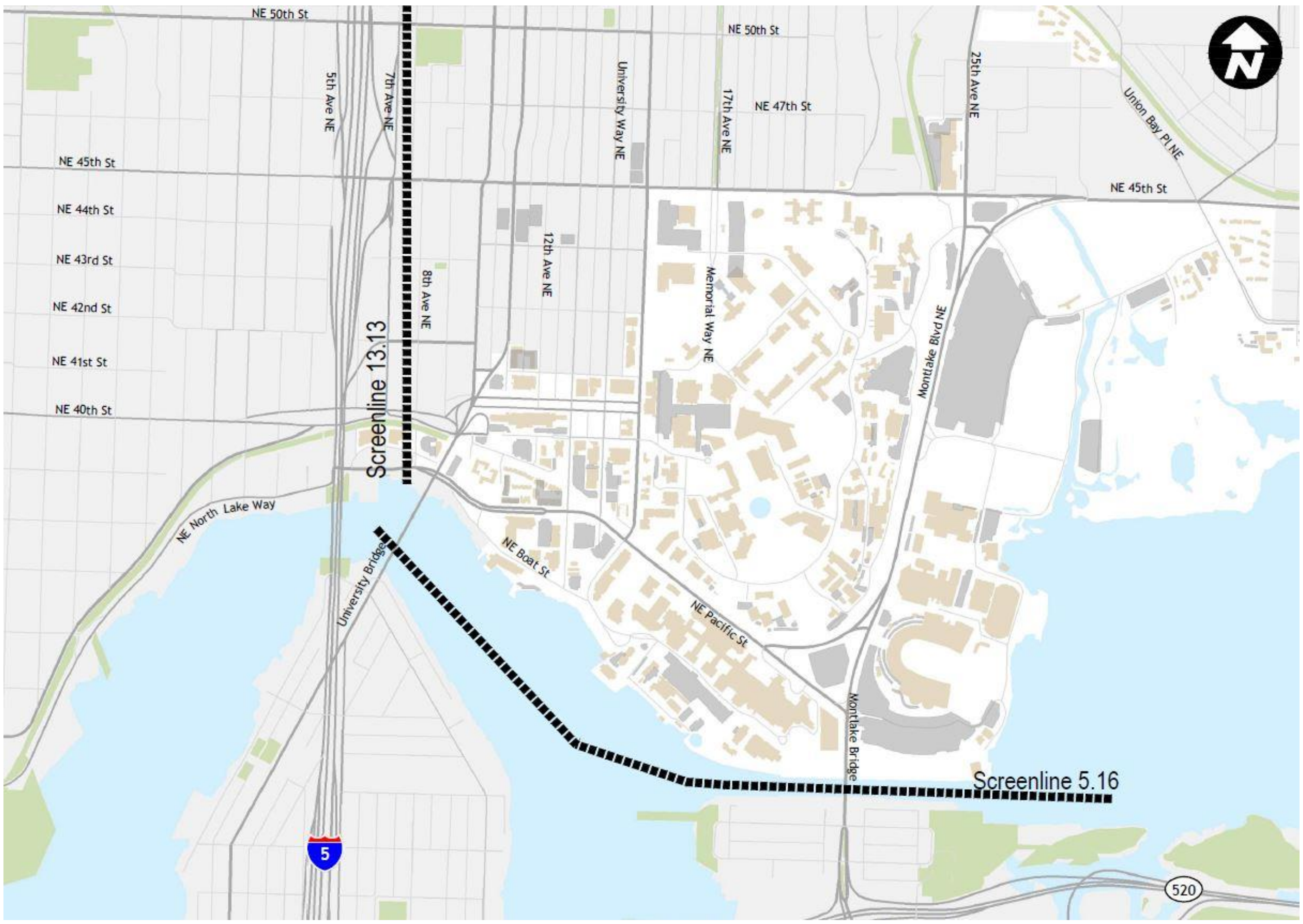


Figure 8.8 Study Area Screenlines

The screenline analysis includes volume to capacity (V/C) calculations for the vehicles traversing the screenlines using future (2028) Alternative 4 traffic volumes and interpolated roadway capacity estimates. Roadway capacity for the 2028 future horizon year was interpolated using 2016 capacity estimates described in Table 3.12 and 2035 capacity estimates referenced in the May 2016 Seattle

Comprehensive Plan Update Final EIS. Future (2028) roadway capacity estimates are shown in Table 8.8 below. Detailed screenline volumes and volume to capacity calculations are included in Appendix C.

Table 8.8
FUTURE (2028) CAPACITY

Screenline	Future (2028) Capacity
5.16 – Ship Canal, University and Montlake Bridges	
Northbound	4,210
Southbound	4,210
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard	
Eastbound	6,119
Westbound	6,119

Source: Transpo Group, 2016

Level of service standards for the screenline analysis are based on the volume to capacity ratio of a screenline. As described in the Seattle Comprehensive Plan Update EIS, the LOS standard volume to capacity ratio for Screenline 5.16 and Screenline 13.13 are 1.20 and 1.00, respectively. For this study, screenline volume to capacity ratios that do not exceed the LOS standard are acceptable. The Alternative 4 screenline analysis is included in Table 8.9. Detailed screenline analysis calculations are included in Appendix C.

Table 8.9
FUTURE (2028) ALTERNATIVE 4 SCREENLINE ANALYSIS

Screenline	Screenline Volume	Capacity	V/C	LOS Standard V/C
5.16 – Ship Canal, University and Montlake Bridges				
Northbound	4,028	4,210	0.96	1.20
Southbound	4,095	4,210	0.97	1.20
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard				
Eastbound	3,902	6,119	0.64	1.00
Westbound	4,342	6,119	0.71	1.00

Source: NACTO, Seattle Comprehensive Plan Update EIS, and Transpo Group, 2016

As shown in Table 8.9, all Alternative 4 screenline volume to capacity ratios meet the acceptable LOS standard.

8.5.6 Service/Freight Routes

On a campus wide level, the overall freight/service related activity under Alternative 4 is anticipated to be similar to that anticipated for Alternative 4 as the total development area is the same under each. Given the allocation of the development within the campus, the increase in volume will shift based on the allocation of development area. This would result in comparative increases in campus development related freight and service activity especially the East Sector, accessed off Montlake Boulevard. No significant impact to due to added freight traffic associated with the proposed CMP was identified.

8.5.7 Parking

Supply

Similar the other Action Alternatives, it was assumed that parking supply would be increased or decreased within each Sector to achieve an 85 percent utilization without exceeding the parking cap for Alternative 4. Alternative 4 parking cap supply would be 10,240 spaces. The location of parking and strategies used to maintain the existing CUA parking cap would be consistent with those outlined for Alternative 1.

Demand

Overall parking demand for Alternative 4 would be the same as the other Action Alternatives. Alternative 2 on-campus parking demand and utilization was reviewed by sector to provide context on where parking demand would occur (see Table 8.10). Allocation of Alternative 4 parking demand by sector was based on projected development as documented in Appendix B. The evaluation assumes that on-street parking would be allocated to on-campus facilities given the increases and reallocation of parking supply to achieve an 85 percent utilization.

Table 8.10
ALTERNATIVE 4 PEAK PARKING DEMAND BY SECTOR

Sector	Future Cap Parking Supply	Parking Demand			% Utilization
		No Action[1]	Alternative 4		
			Growth[2]	Total	
West	1,470	1,428	65	1,252	85%
South	2,820	1,187	969	2,397	85%
Central	3,580	2,689	355	3,044	85%
East	2,370	1,464	549	2,013	85%
Total	**10,240**	**6,768**	**1,938**	**8,706**	**85%**

Source: Transpo Group, 2016

3. On-campus parking demand for No Action based on projected increase in population. This does not include on-street parking demand increases noted in the previous table since these would not be parking within the Sectors.
4. Growth in parking demand based on projected increase in population for Alternative 4. The analysis assumes with the street vacation and reallocation of parking supply in Alternative 4, on-street parking demand would shift to on-campus parking.

As the table above reflects, reallocation of parking would result in a parking supply under the existing cap and an 85 percent utilization by Sector and for the campus as a whole. The additional parking and reallocation of parking supply would provide a better relationship between localized supply and demand and thus reduce the likelihood of parking beyond the University facilities (i.e., within the neighborhoods).

Secondary Parking Impacts

Parking outside the primary impact zone surrounding the campus would likely continue with Alternative 2 similar to the No Action Alternative. This would include vehicles parking within transit served areas with unrestricted parking and then using transit to travel to campus. As the campus grows, this could occur at higher levels compared to the No Action Alternative.

8.6 AERIAL/STREET VACATIONS

Alternative 4 impacts for the aerial and street vacations would be consistent with those described for Alternative 1 in Section 5.6. As noted in the Alternative 1 analysis, the City of Seattle has defined polices related to the assessing and approving the vacation of public rights-of-way. Further analysis will be provided to the City consistent with the policy requirements at such time an application for an aerial, alley, or street vacation is made. The EIS alternatives and supporting analysis reflect the vacations as proposed.

8.7 IMPACTS DURING CONSTRUCTION

During construction of all Action Alternatives, potential construction impacts could include temporary closures of pathways, and streets, reallocation or removal of bike and auto parking, increased truck traffic or other temporary disruptions. While temporary in nature, potential mitigations for construction could include TMP strategies, outreach, and coordination to minimize impacts. Specific impacts and mitigations for development would be addressed as part of SEPA review.

8.8 CUA COMPLIANCE – VEHICLE TRIP AND PARKING CAPS

See discussion in Section 5.7 related to Alternative 1. CUA vehicle trip caps are considered campus-wide and would not materially change between proposed Alternatives.

9 ALTERNATIVE 5 NO STREET, ALLEY OR AERIAL VACATIONS

This section summarizes the results of the analysis conducted for Alternative 5. As in the previous sections, the analysis examines the impacts to the key transportation elements and transportation modes. The only difference between Alternative 5 compared to Alternatives 1-4 is the assumption of no street, alley, or aerial vacations. The impact of assuming no street, alley, or aerial vacations on the action alternatives is limited to pedestrian, bicycle, and intersection operations impacts within the primary impact zone. The analysis is reported to compare impacts of the different growth alternatives shown in Figure 9.1 with and without the street, alley, and aerial vacations. The following sections identify each corresponding Action Alternative (Alternatives 1-4) described in Figure 9.1 without street, alley, or aerial vacations, which are noted as Alternative 5.1, Alternative 5.2, Alternative 5.3, and Alternative 5.4 respectively.

9.1 CHANGING CAMPUS CHARACTERISTICS

9.1.1 Description of the Alternative

The following summarizes the evaluation of Alternative 5 with respect to the transportation related elements identified in the Affected Environment section of this report. The technical analysis of Alternative 5 focuses on the weekday PM peak period.

Alternative 5 includes different alternatives of development totaling of 6,000,000 net new square feet of gross floor area throughout the campus. The various alternative growth scenarios are the same as described in Sections 5, 6, 7, and 8 of this Transportation Discipline Report, and the distribution by sectors are shown in Figure 9.1.

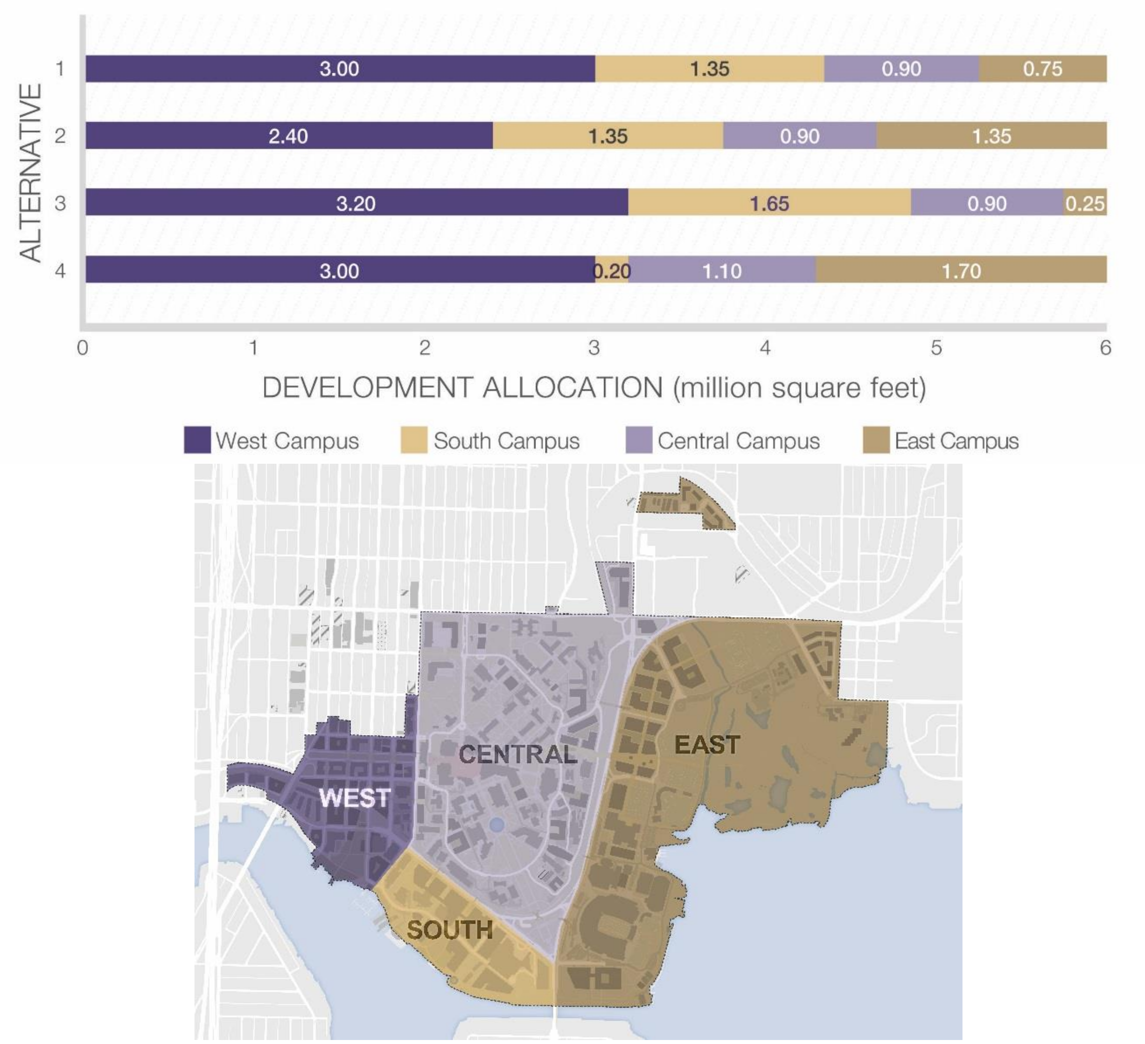


Figure 9.1 Alternatives 1-4 Development Allocation

9.1.2 Trip Generation by Mode

Trip generation for these alternatives is the same as the alternatives described in Sections 5-8.

9.2 PEDESTRIANS

9.2.1 Performance Measures

The pedestrian related performance measures have been identified to assess and compare alternatives. These measures reflect the change in pedestrian facilities and connectivity between areas. No changes are expected in proximity to housing and residence halls based as a result of the lack of street, alley and aerial vacations.

Quality of Pedestrian Environment (Primary & Secondary Impact Zones)
Pedestrian improvements under this alternative would primarily be the same in each alternative, excluding the pedestrian land bridge to East Campus and vacation of Boat Street for construction of an expanded and continuous Portage Bay Park in West Campus. It is assumed that under Alternative 5 the existing, non ADA compliant pedestrian bridge will remain. This means that relative to other alternatives, Alternative 5 would have the weakest pedestrian environment in East Campus and in West Campus.

9.3 BICYCLES

9.3.1 Performance Measures

Two bicycle related performance measures were identified to assess and compare alternatives:

- Burke-Gilman Trail Capacity
- Quality of Bicycle Environment

Burke-Gilman Trail Capacity
The Burke-Gilman Trail is anticipated to experience increased demand in all sectors depending on the concentration of growth throughout the MIO. Alternatives 5.1-5.4 could result in trail facility improvements, similar to those in the Mercer Court when projects are built adjacent to the Burke-Gilman Trail. Increased cross traffic and travel along trail segment is anticipated in West and South Campus particularly under Alternatives 5.1, 5.2 and 5.3. Growth in travel along and across the trail would generally be concentrated in West and East campus for and 5.4. Without a new land bridge to East Campus bicycle demand will likely be lower along the trail. Planned expansion of the Burke Gilman Trail separating pedestrian and bicycle uses will provide adequate capacity to meet CMP demands.

Quality of Bicycle Environment (Primary & Secondary Impact Zones)
Investments and demand for bicycle travel associated with this Alternative would be similar to other Alternatives with the exception of the land bridge to East Campus. The current bridge, which would be maintained, is not ADA or bicycle accessible, would not facilitate improved bicycle access to the Burke-Gilman trail and other destinations from East Campus.

9.4 TRANSIT

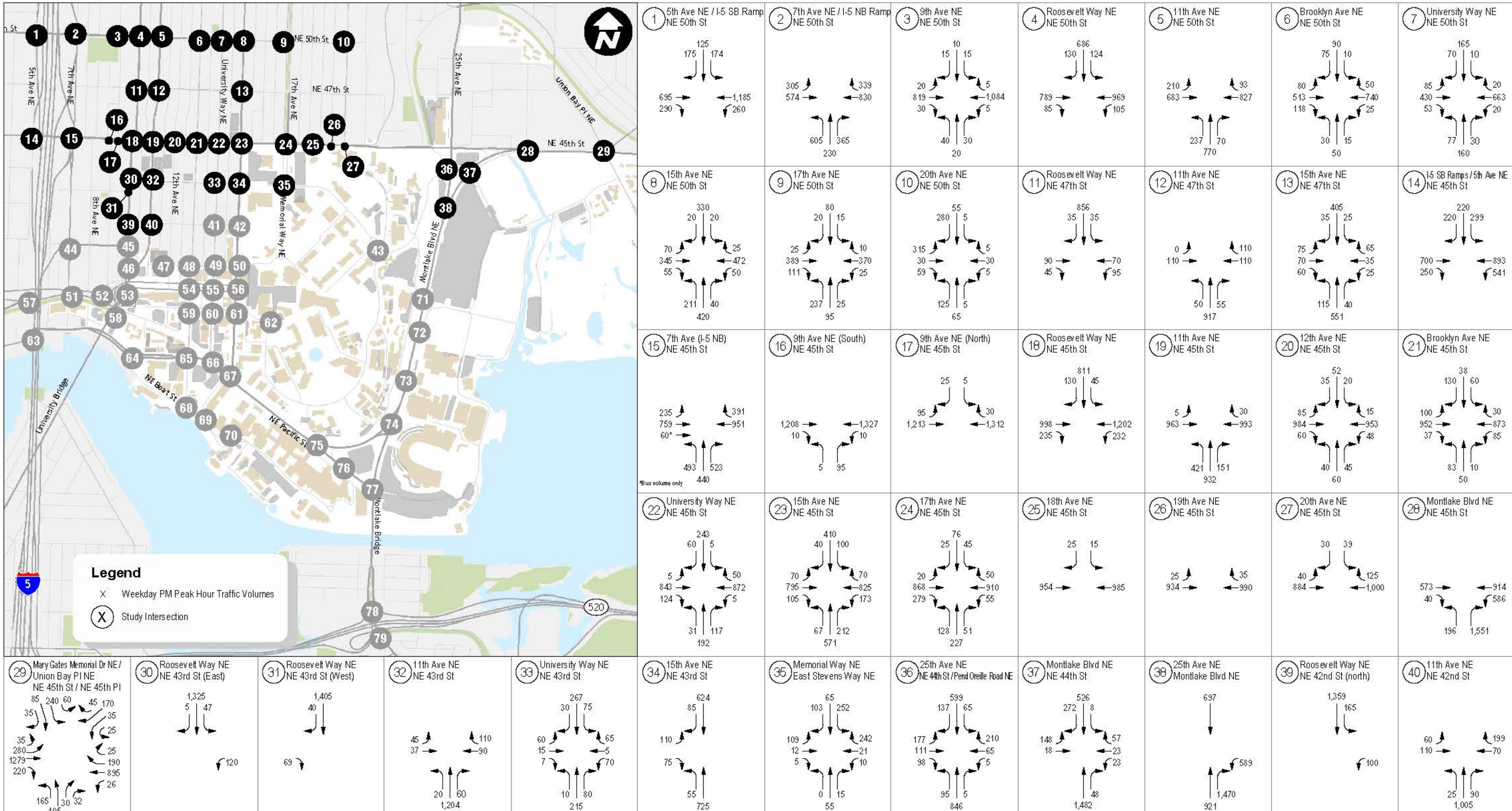
This alternative will have similar impacts to transit as Alternatives 1-4 in Sections 5-8. The lack of alley, street and aerial vacations is not expected to have an impact on transit.

9.5 VEHICLE

9.5.1 Traffic Volumes

Increased vehicle traffic associated with Alternatives 5.1-5.4 was assigned to potential garage locations based on existing vehicle travel patterns, previous studies in the project vicinity, review of University information, and U.S. Census Bureau's *OnTheMap* tool. *OnTheMap* is a web-based mapping and reporting application, which shows where workers are employed and where they live based on census data. The zip codes were evaluated to determine if a person would be more likely to travel from the zip code via vehicle or by other means. Trips to zip codes closer to the proposed project sites or in more transit oriented locations are more likely to use transit, walk, bicycle, or other non-SOV modes. Zip codes outside the Seattle City limits and/or further from the site are more likely to drive. The general trip distribution to/from the University is shown on Figure 4.6.

Project trips for each growth alternative and for each potential garage location were assigned to the study intersections based on the general trip distribution patterns shown on Figure 4.5. Minor redistributions of traffic were evaluated resulting from the lack of alley, street, and aerial vacations. Future traffic volumes for Alternatives 5.1-5.4 are shown in the following figures Figure 9.2 through Figure 9.9.



Future (2028) Alternative 5.1 (Intersections 1-40) Weekday PM Peak Hour Traffic Volumes

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FIGURE
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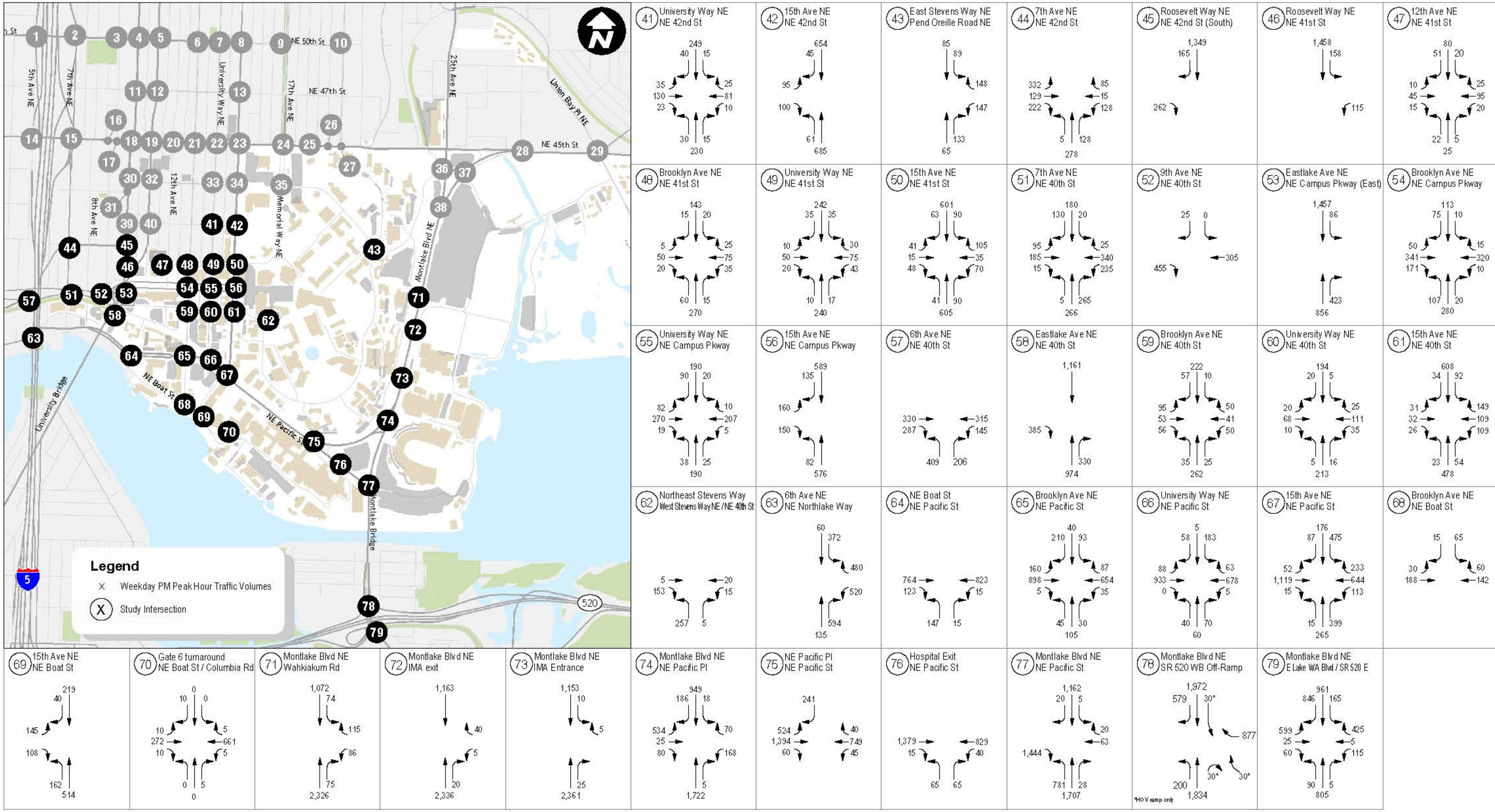

Future (2028) Alternative 5.1 (Intersections 41-79) Weekday PM Peak Hour Traffic Volumes

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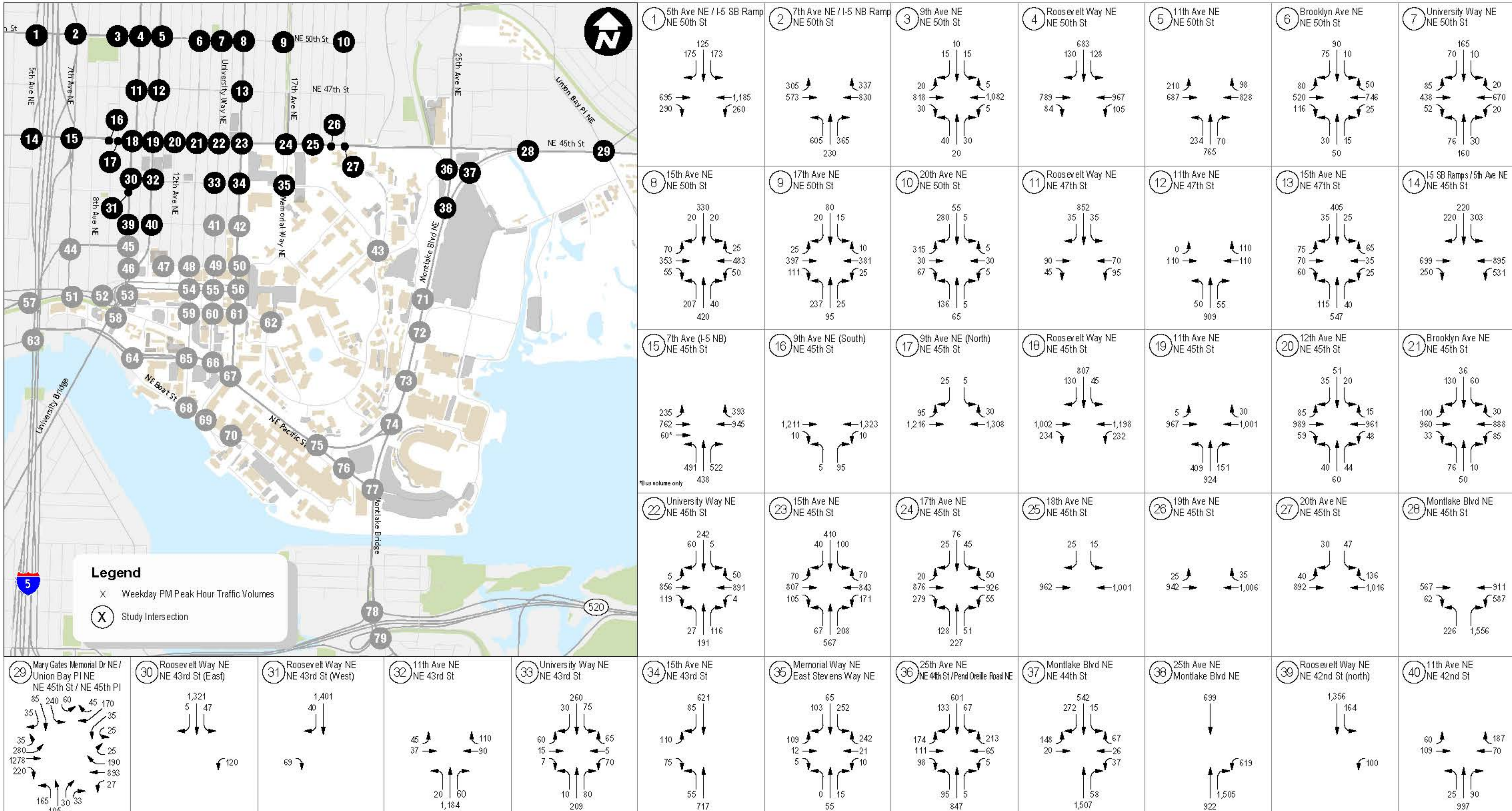
FIGURE **9.3**



Future (2028) Alternative 5.2 (Intersections 1-40) Weekday PM Peak Hour Traffic Volumes

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FIGURE 9.4

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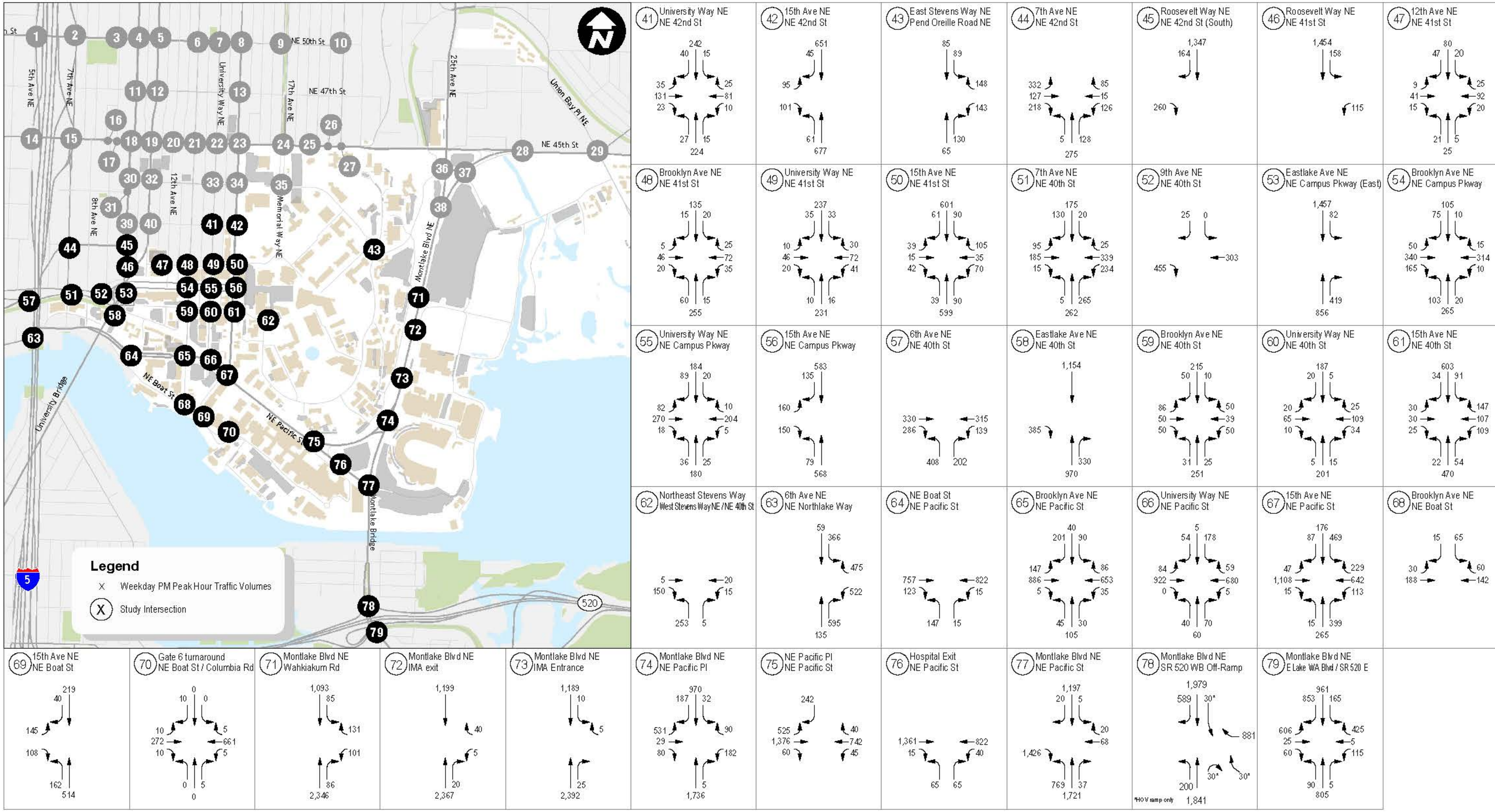

Future (2028) Alternative 5.2 (Intersections 41-79) Weekday PM Peak Hour Traffic Volumes

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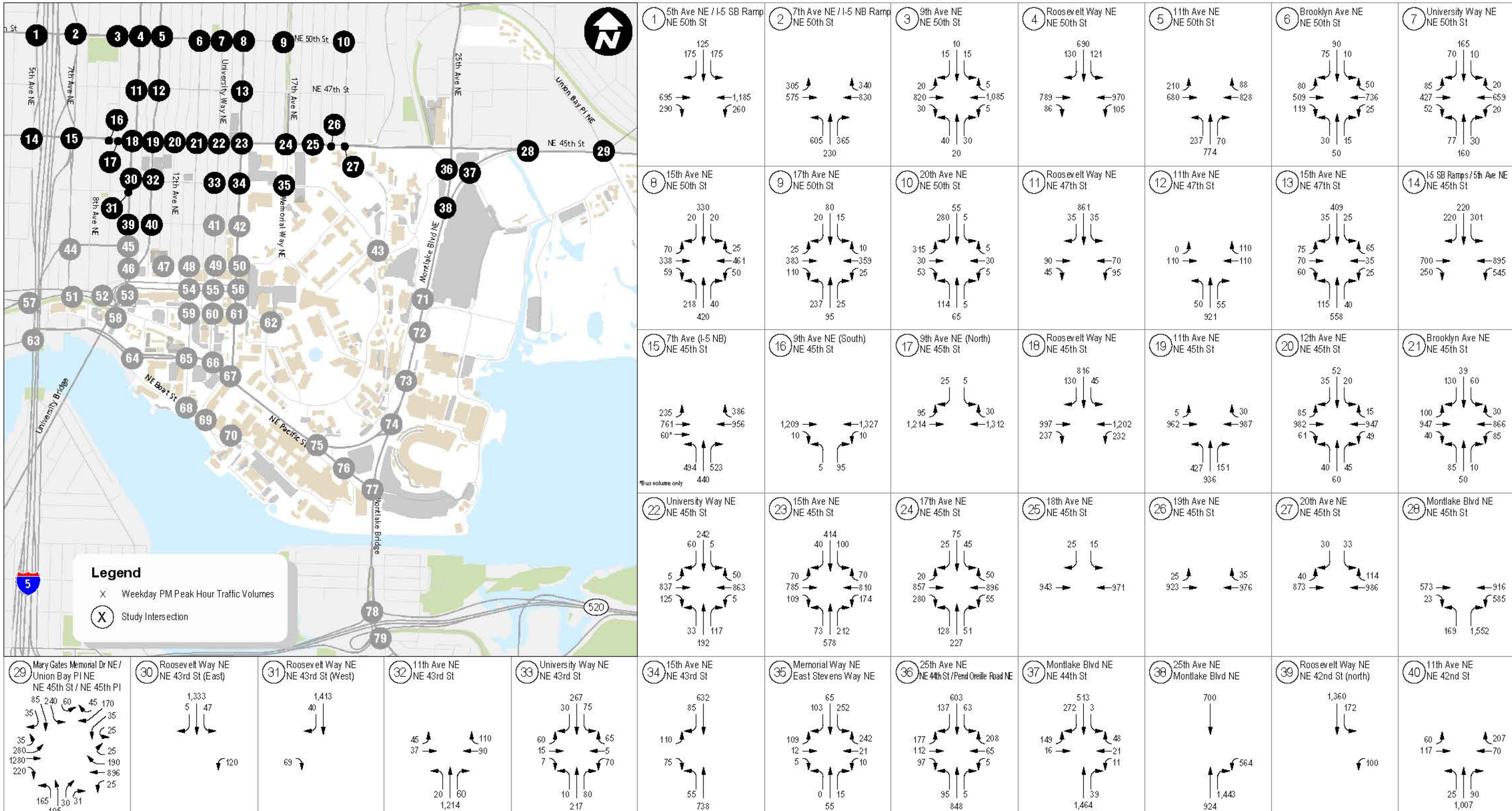
FIGURE 9.5



Future (2028) Alternative 5.3 (Intersections 1-40) Weekday PM Peak Hour Traffic Volumes

FIGURE **9.6**

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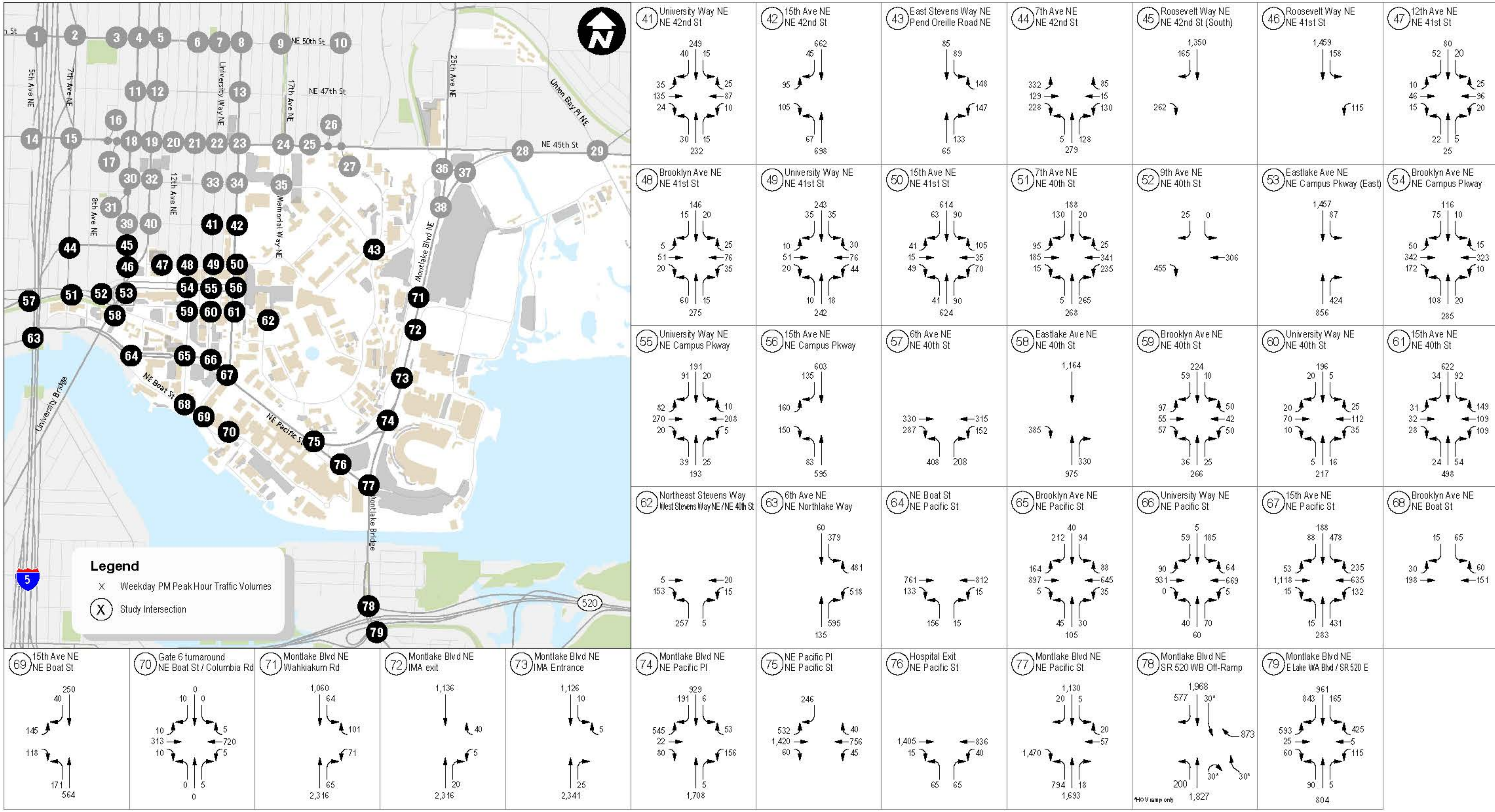

Future (2028) Alternative 5.3 (Intersections 41-79) Weekday PM Peak Hour Traffic Volumes

University of Washington 2018 Campus Master Plan

FIGURE
9.7

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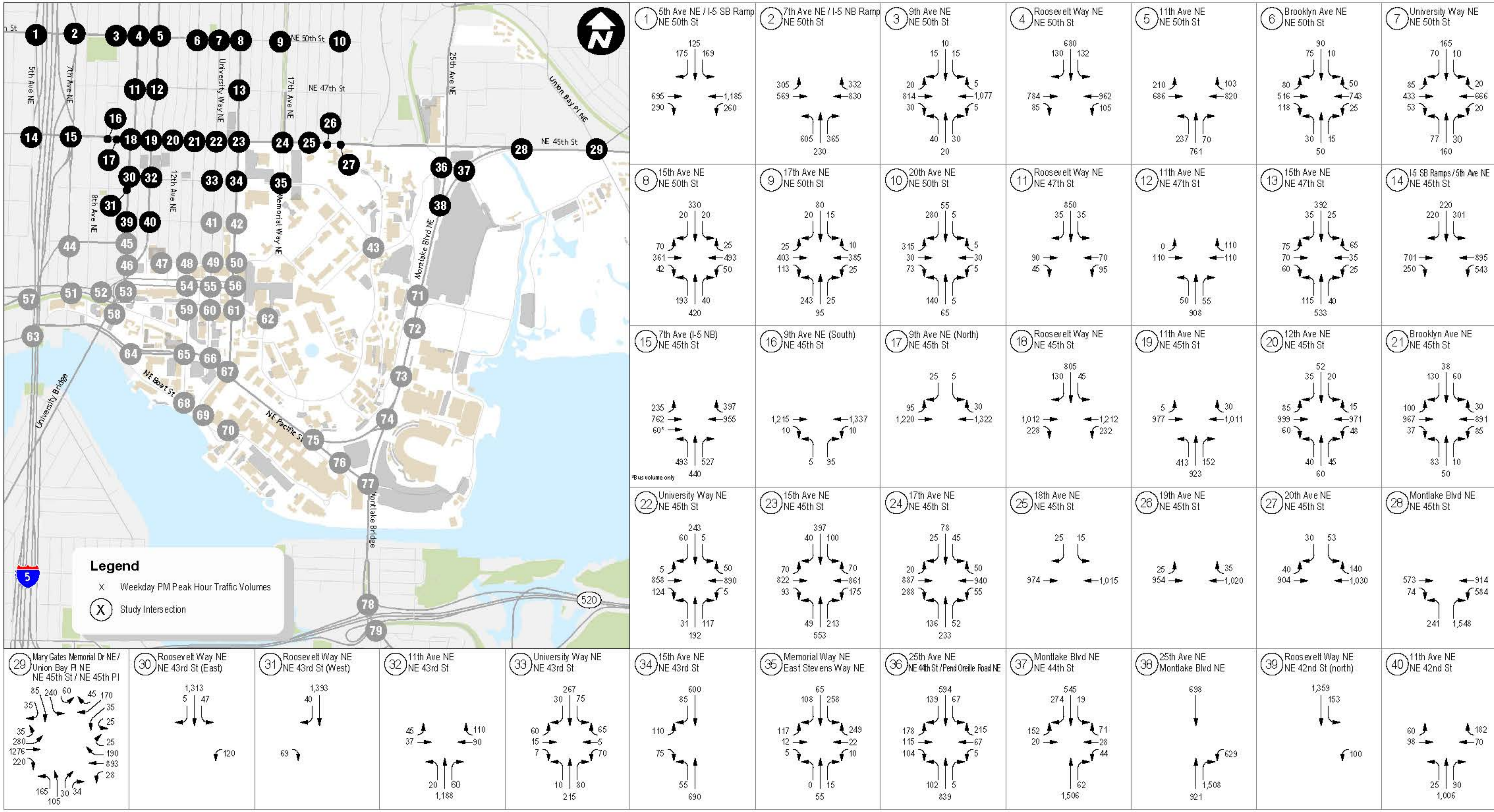

Future (2028) Alternative 5.4 (Intersections 1-40) Weekday PM Peak Hour Traffic Volumes

University of Washington 2018 Campus Master Plan

FIGURE **9.8**

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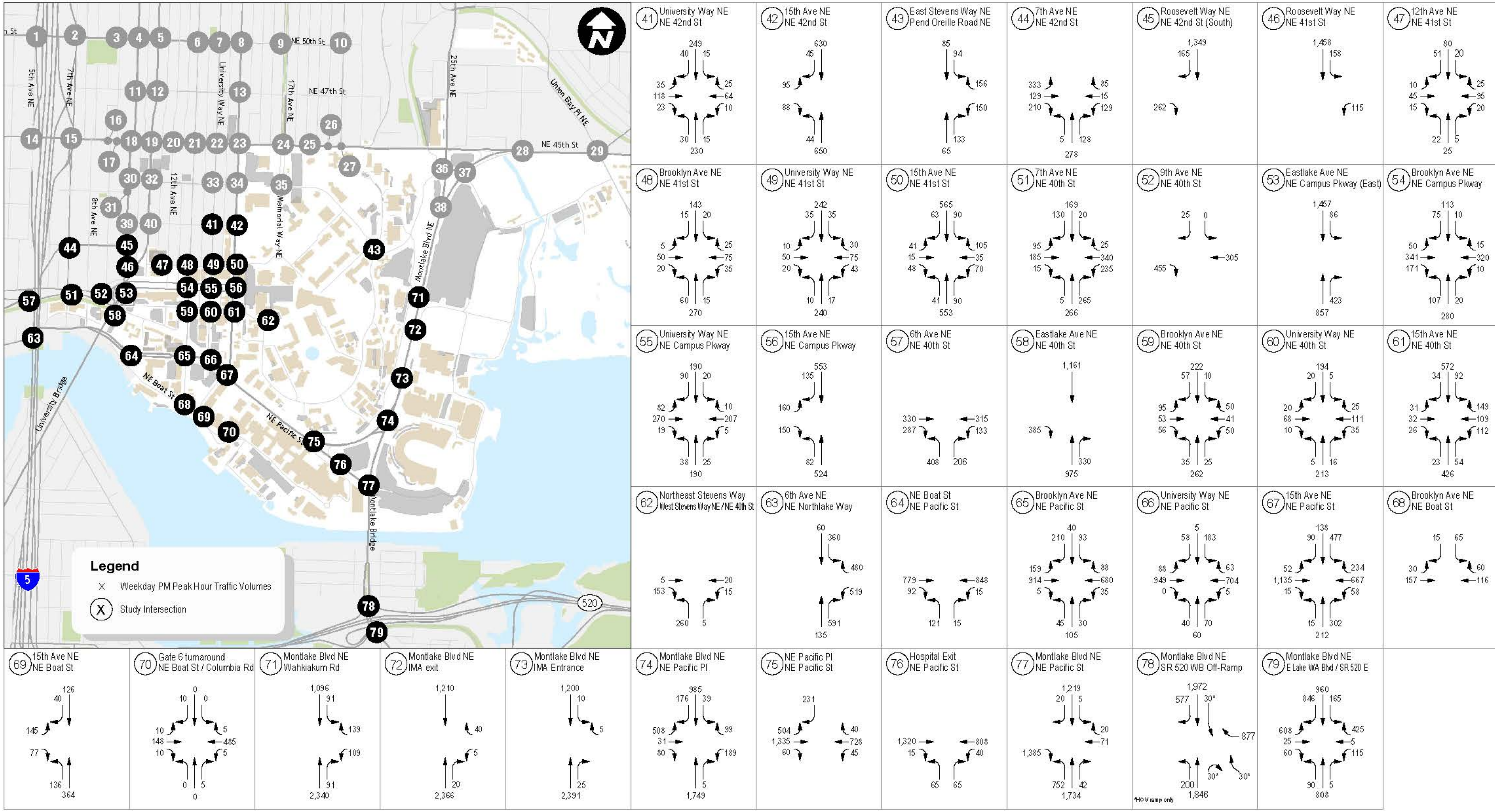


Future (2028) Alternative 5.4 (Intersections 41-79) Weekday PM Peak Hour Traffic Volumes

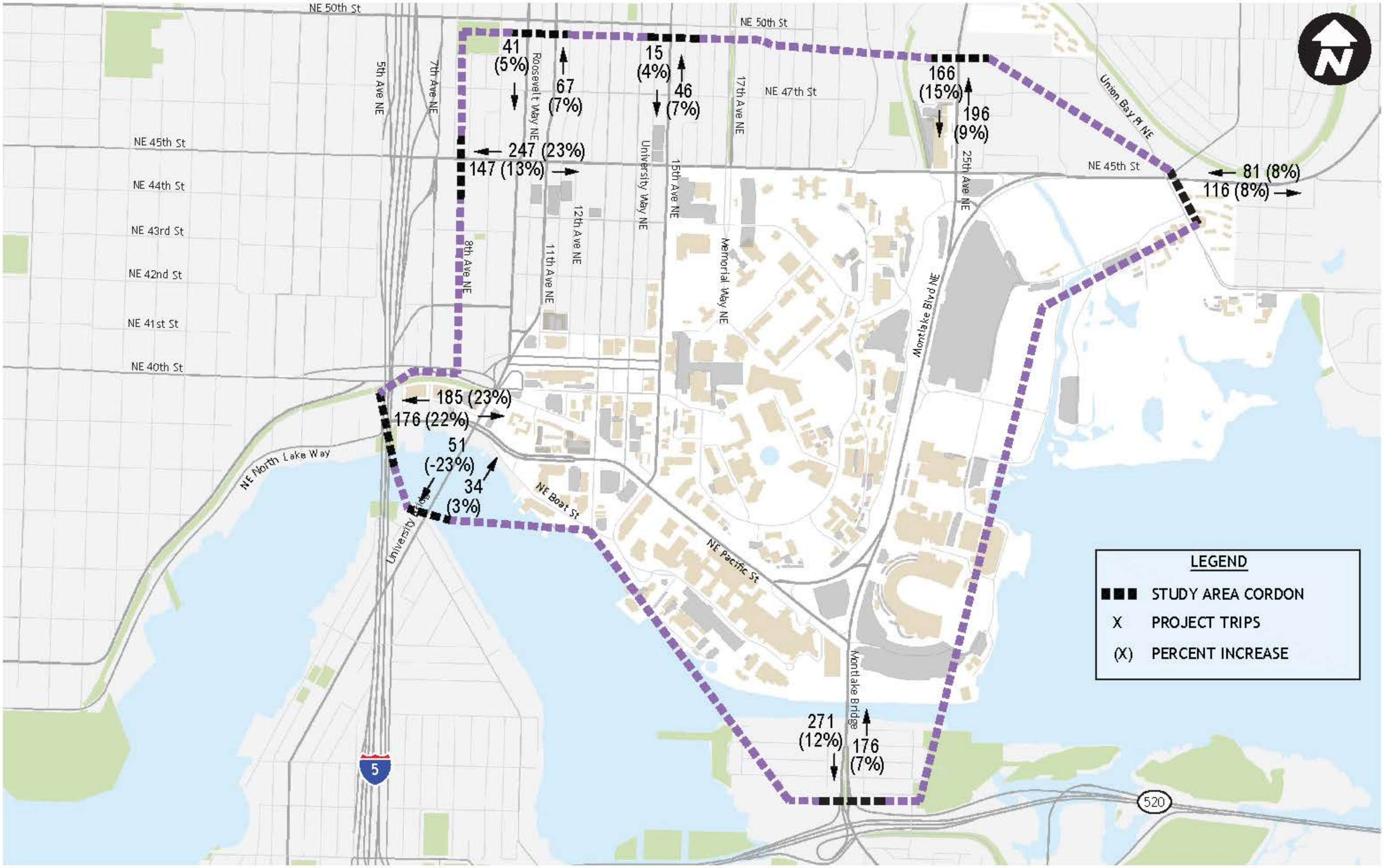
University of Washington 2018 Campus Master Plan

FIGURE 9.9

9.5.2 Cordon Volume Analysis

Cordon: An imaginary line used to evaluate traffic in and out of the University area and measure the change or increase in traffic associated with the proposed alternatives.

To understand the volumes associated with the University of Washington, related to background volumes under the different Alternative scenarios without street vacations, a cordon volume analysis was completed. The cordon volume analysis focuses on the major roadways leading to and from the University. The cordon volume analysis also shows the percent of total trips along the corridor that are associated with the increased traffic generated by Alternatives 5.1-5.4. The cordon volume and percent increase associated with Alternatives 5.1-5.4 are shown on the following figures. Note that this reflects the percent increase associated with continued development on campus in comparison to the No Action alternative. As shown on the following figures, total percent project related volumes are similar to No Action even though Alternatives 5.1-5.4 include higher development. This may be due to the limited available capacity on arterials in the area.



Future (2028) Alternative 5.1 PM Peak Hour Cordon Volumes and Proportional Increase

FIGURE **9.10**

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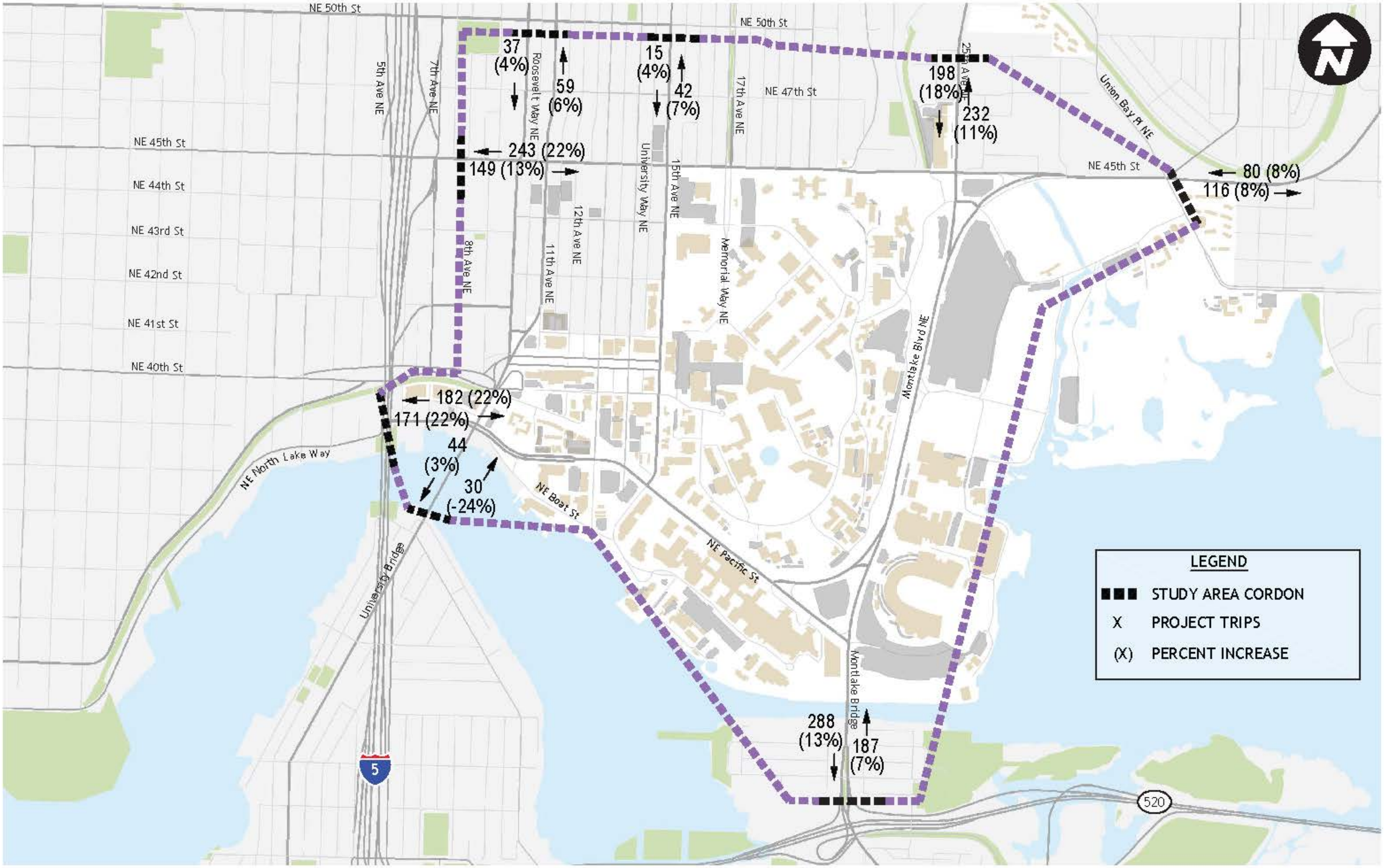

Future (2028) Alternative 5.2 PM Peak Hour Cordon Volumes and Proportional Increase

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FIGURE
9.11

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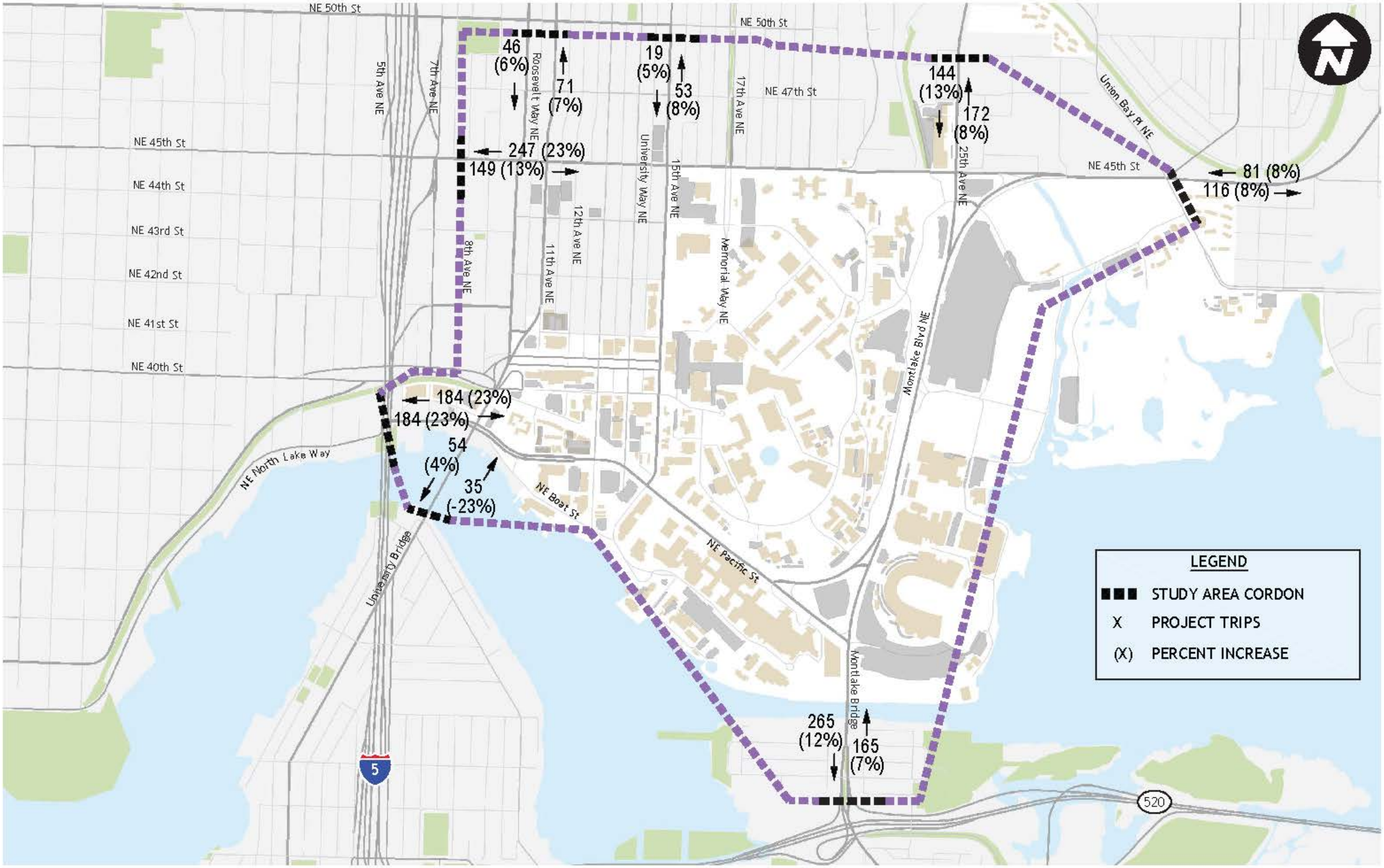

Future (2028) Alternative 5.3 PM Peak Hour Cordon Volumes and Proportional Increase

FIGURE 9.12

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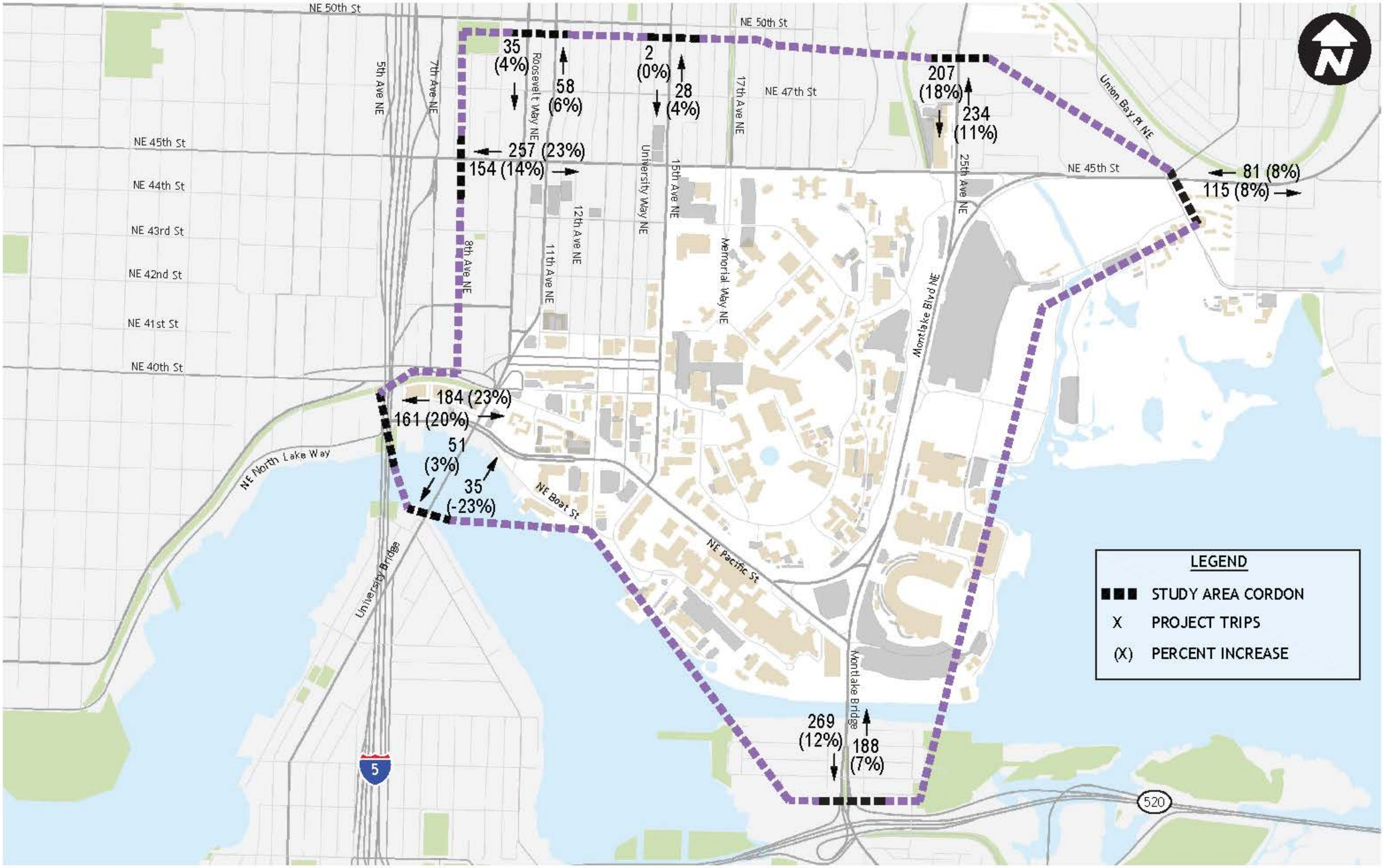

Future (2028) Alternative 5.4 PM Peak Hour Cordon Volumes and Proportional Increase

University of Washington 2018 Campus Master Plan

FIGURE
9.13

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WHAT TRANSPORTATION CAN BE.

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9.5.3 Traffic Operations Performance

Methodology

The methodology used in assessing intersection and corridor LOS is consistent with that described in the Affected Environment and No Action scenarios. A detailed description of methodology used can be found in Appendix B.

Without the implementation of street vacations, the level of service changes at one intersection in Alternative 5.2 and one intersection in Alternative 5.3. The 15th Avenue NE/ Boat Street intersection degrades from LOS E to LOS F without the implementation of the street vacation from Alternative 2. The Montlake Boulevard NE/ IMA exit intersection improves from LOS F to LOS E without the implementation of the street vacation from Alternative 3. The intersection operations at all other study intersections remains the same without implementation of the street vacations. This is summarized in Table 9.1.

Table 9.1
FUTURE ALTERNATIVE 5 INTERSECTION LEVEL OF SERVICE COMPARISON SUMMARY

Intersection	No Action		Alt. 2		Alt. 5.2		Alt. 3		Alt. 5.3	
	LOS[1]	Delay[2]	LOS[1]	Delay[2]	LOS[1]	Delay[2]	LOS[1]	Delay[2]	LOS[1]	Delay[2]
69. 15th Avenue NE/ NE Boat Street	C	15	E	41	F	62	F	57	F	90
72. Montlake Boulevard NE/ IMA exit	E	38	F	51	F	51	F	61	E	47

Note: Other alternatives experienced no change in traffic operations without the implementation of street vacations.
1. Level of service.
2. Average delay per vehicle in seconds rounded to the whole second.

Alternative 5.1 Intersection LOS

Weekday PM peak hour intersection traffic operations during the 2028 Alternative 1 conditions without street vacations are summarized in Figure 9.14 and Figure 9.15**.** The year 2028 geometry for all of the study-area intersections were assumed to remain the same as baseline No Action conditions except when modifications are expected as part of the Alternative. Additionally, all signal timing splits and offsets were optimized for Alternative 5.1. Complete intersection level of service summaries are provided in Appendix C.

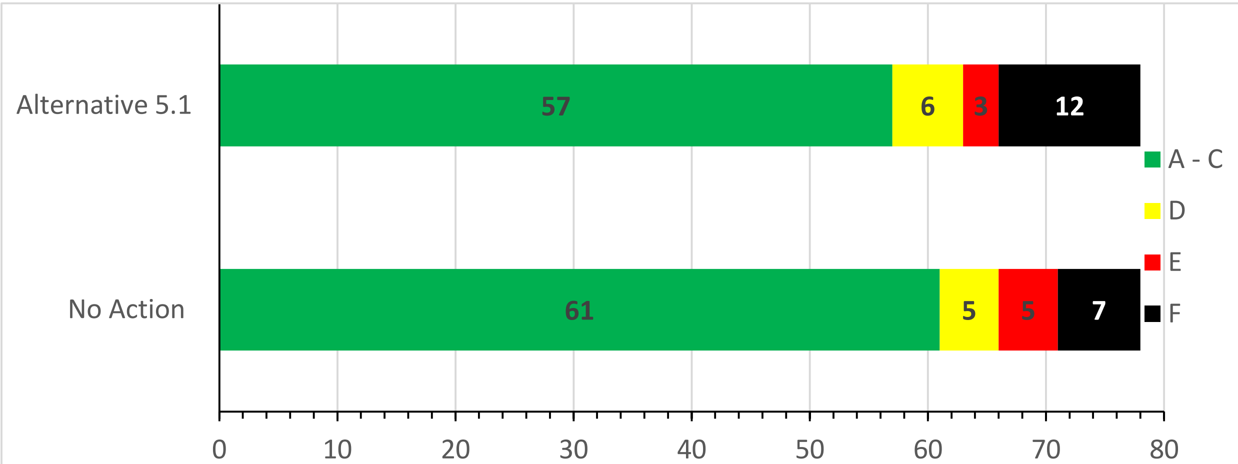


Figure 9.14 No Action/Alternative 5.1 Weekday PM Peak 2028 Intersection Level of Service Summary

During the weekday PM peak hour, 5 additional intersections are anticipated to operate at LOS F under Alternative 5.1 traffic conditions compared with No Action conditions. Overall, 21 intersections are anticipated to operate at LOS D or worse during the weekday PM peak hour with Alternative 5.1, as compared to 17 under No Action conditions. The City of Seattle does not have an LOS standard, but generally considers LOS E and LOS F at signalized intersections to reflect poor operations and LOS F at unsignalized intersections as poor operations. For intersections that degrade from LOS D to LOS E or operate at LOS E or LOS F under the "with-project" condition, or increase of 5 or more seconds could be considered significant by the City.

The following intersections are anticipated to degrade to D or below in the future under Alternative 5.1 conditions:

15. 7th Avenue (I-5 NB)/ NE 45th Street
16. 9th Avenue NE (South)/NE 45th Street
31. Roosevelt Way NE/NE 43rd Street (West)
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
69. 15th Avenue NE/NE Boat Street
73. Montlake Boulevard NE/IMA Entrance
77. Montlake Boulevard NE/NE Pacific Street
78. Montlake Boulevard NE/SR 520 WB Ramps

Intersections where the LOS is E or F and where the Alternative 5.1 traffic increases delay by more than 5 seconds are shown in Table 9.2. As shown in Table 9.2, a majority of the intersections are unsignalized intersections. At the two-way stop controlled intersections the change in delay is represented both for the total intersection and for the worst movement.

Table 9.2
ALTERNATIVE 5.1 SUMMARY OF POTENTIAL IMPACTS

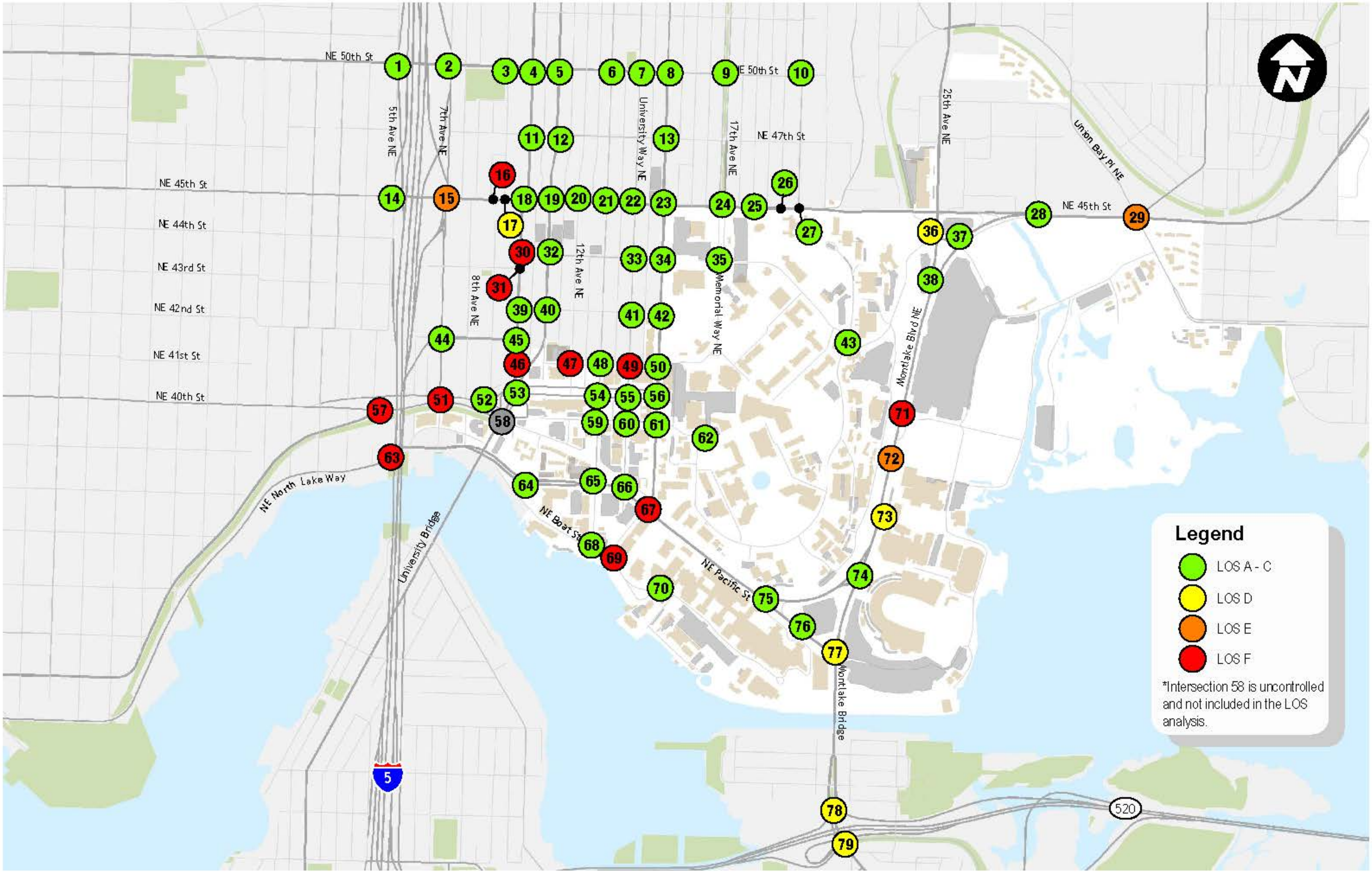
Intersection and number	Traffic Control	Change in Delay (seconds)[1]	Percent of Total (Project Share)
15. 7th Avenue NE (I-5 NB)/NE 45th Street	Signalized	18	11.0%
16. 9th Avenue NE (South)/NE 45th Street	TWSC	0.9/34	14.5%
29. Montlake Boulevard NE/Mary Gates Memorial Drive NE	Signalized	10	5.0%
30. Roosevelt Way NE/NE 43rd Street (East)	TWSC	2.9/35	3.9%
31. Roosevelt Way NE/NE 43rd Street (West)	TWSC	0.8/17	4.0%
46. Roosevelt Way NE/NE 41st Street	TWSC	18/278	1.5%
47. 12th Avenue NE/NE 41st Street	TWSC	275/830	22.5%
49. University Way NE/NE 41st Street	TWSC	-[2]	21.9%
51. 7th Avenue NE/NE 40th Street	AWSC	25	5.5%
57. 6th Avenue NE/NE 40th Street	AWSC	22	5.4%
63. 6th Avenue NE/NE Northlake Way	AWSC	59	16.9%
67. 15th Avenue NE/NE Pacific Street	Signalized	48	20.4%
69. 15th Avenue NE/NE Boat Street	AWSC	47	31.0%
72. Montlake Boulevard NE/IMA Exit	TWSC	0.1/10	10.2%

Note: TWSC = two-way stop controlled, AWSC = all-way stop controlled
1. Change in total intersection delay/change in worst movement delay for two-way stop controlled (TWSC) intersections.
2. Volume exceeds capacity and Synchro could not calculate the delay.

Of the stop controlled intersections listed in Table 9.2 some of the increased delay can be attributed to the increase in pedestrian and bicycle volumes. Additionally, the following intersections are located at or near potential garage access locations resulting in higher share of alternative percentages:

47. 12th Avenue NE/NE 41st Street
49. University Way NE/NE 41st Street
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
69. 15th Avenue NE/NE Boat Street
72. Montlake Boulevard NE/IMA Exit

The specific location of the driveways impacts the overall trip distribution and individual movements at intersections near driveway locations. Given the preliminary planning nature of this evaluation, individual traffic impacts should be assessed when final building size and driveway locations are determined. Also, given the grid network, it is anticipated that if drivers experience long delays at unsignalized locations they may alter their trip pattern in an effort to reduce delays. It is also recognized that level of service for vehicle traffic, while a consideration, is increasingly balanced against assuming that pedestrian, bicycle, and transit travel modes are encouraged and facilitated. Intersections that are calculated to operate at poor levels of service for vehicle traffic are not always considered a high priority for improvement by the City.



Future (2028) Alternative 5.1 Weekday PM Peak Hour Traffic Operations

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FIGURE
9.15

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Alternative 5.2 Intersection LOS

Weekday PM peak hour intersection traffic operations during the 2028 Alternative 2 conditions without street vacations are summarized in Figure 9.16 and Figure 9.17**.** The year 2028 geometry for all of the study-area intersections were assumed to remain the same as baseline No Action conditions except when modifications are expected as part of the Alternative. Additionally, all signal timing splits and offsets were optimized for Alternative 5.2. Complete intersection level of service summaries are provided in Appendix C.

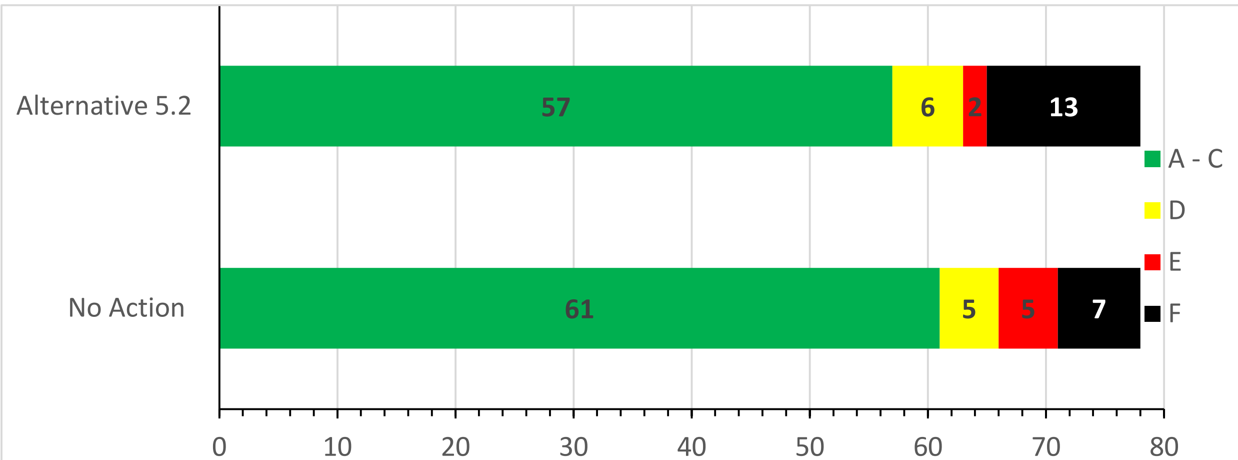


Figure 9.16 No Action/Alternative 5.2 Weekday PM Peak 2028 Intersection Level of Service Summary

During the weekday PM peak hour, 6 additional intersections are anticipated to operate at LOS F under Alternative 5.2 traffic conditions compared with No Action conditions. Overall, 21 intersections are anticipated to operate at LOS D or worse during the weekday PM peak hour with Alternative 5.2, as compared to 17 under No Action conditions. The City of Seattle does not have an LOS standard, but generally considers LOS E and LOS F at signalized intersections to reflect poor operations and LOS F at unsignalized intersections as poor operations. For intersections that degrade from LOS D to LOS E or operate at LOS E or LOS F under the "with-project" condition, or increase of 5 or more seconds could be considered significant by the City.

The following intersections are anticipated to degrade to D or below in the future under Alternative 5.2 conditions:

15. 7th Avenue (I-5 NB)/ NE 45th Street
16. 9th Avenue NE (South)/NE 45th Street
31. Roosevelt Way NE/NE 43rd Street (West)
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
69. 15th Avenue NE/NE Boat Street
72. Montlake Boulevard NE/IMA exit
73. Montlake Boulevard NE/IMA Entrance
77. Montlake Boulevard NE/NE Pacific Street
78. Montlake Boulevard NE/SR 520 WB Ramps

Intersections where the LOS is E or F and where the Alternative 5.2 traffic increases delay by more than 5 seconds are shown in Table 9.3. As shown in Table 9.3, a majority of the intersections are unsignalized intersections. At the two-way stop controlled intersections the change in delay is represented both for the total intersection and for the worst movement.

Table 9.3
ALTERNATIVE 5.2 SUMMARY OF POTENTIAL IMPACTS

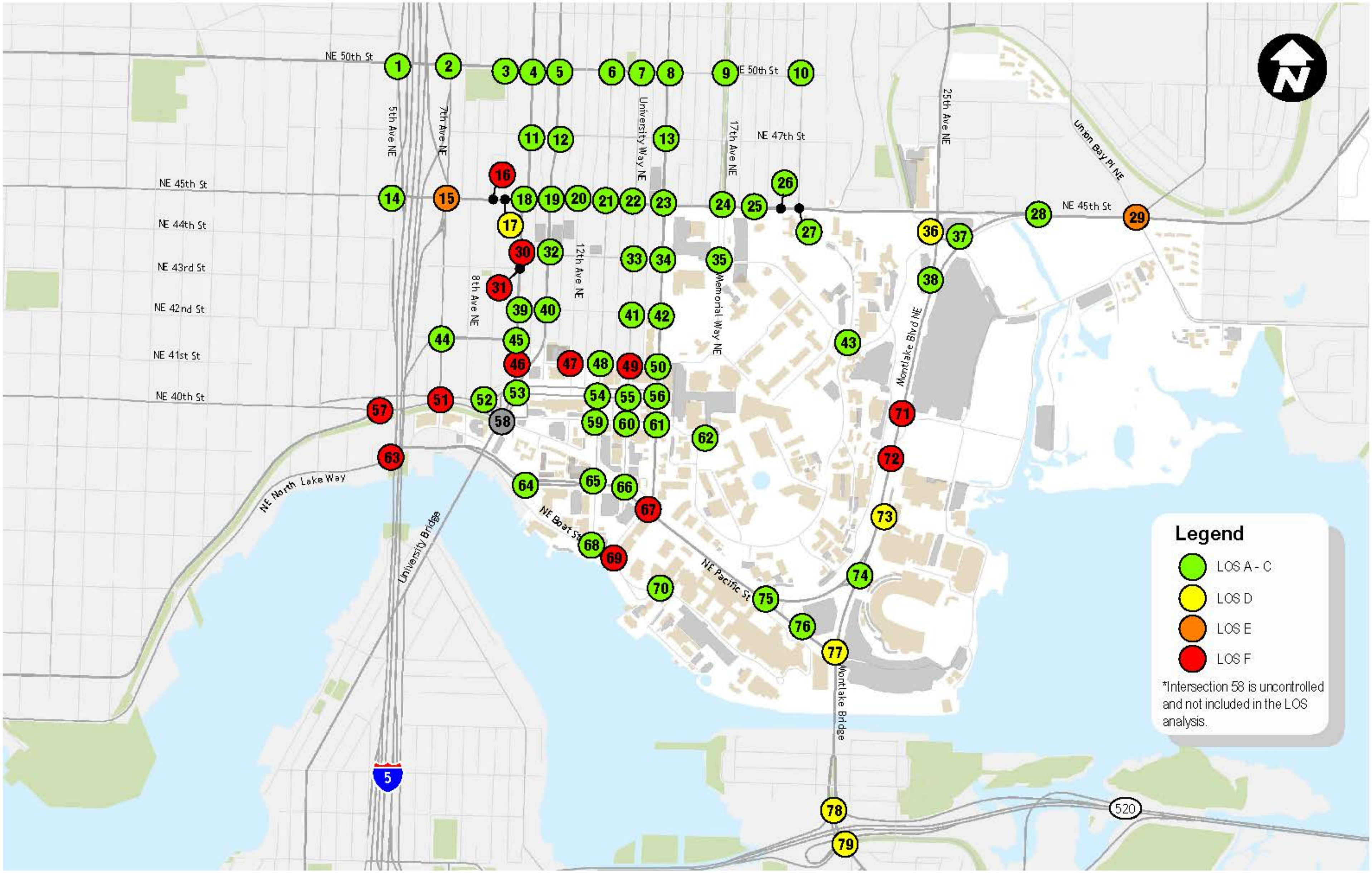
Intersection and number	Traffic Control	Change in Delay (seconds)[1]	Percent of Total (Project Share)
15. 7th Avenue NE (I-5 NB)/NE 45th Street	Signalized	17	10.9%
16. 9th Avenue NE (South)/NE 45th Street	TWSC	0.9/34	14.5%
29. Montlake Boulevard NE/Mary Gates Memorial Drive NE	Signalized	10	4.9%
30. Roosevelt Way NE/NE 43rd Street (East)	TWSC	2.9/32	3.5%
31. Roosevelt Way NE/NE 43rd Street (West)	TWSC	0.8/17	3.6%
46. Roosevelt Way NE/NE 41st Street	TWSC	18/222	1.3%
47. 12th Avenue NE/NE 41st Street	TWSC	275/517	20.0%
49. University Way NE/NE 41st Street	TWSC	-[2]	19.3%
51. 7th Avenue NE/NE 40th Street	AWSC	21	4.9%
57. 6th Avenue NE/NE 40th Street	AWSC	5	4.8%
63. 6th Avenue NE/NE Northlake Way	AWSC	59	16.6%
67. 15th Avenue NE/NE Pacific Street	Signalized	45	19.8%
69. 15th Avenue NE/NE Boat Street	AWSC	47	31.0%
72. Montlake Boulevard NE/IMA Exit	TWSC	0.1/13	11.9%

Note: TWSC = two-way stop controlled, AWSC = all-way stop controlled
2. Change in total intersection delay/change in worst movement delay for two-way stop controlled (TWSC) intersections.
2. Volume exceeds capacity and Synchro could not calculate the delay.

Of the stop controlled intersections listed in Table 9.3 some of the increased delay can be attributed to the increase in pedestrian and bicycle volumes. Additionally, the following intersections are located at or near potential garage access locations resulting in higher share of alternative percentages:

47. 12th Avenue NE/NE 41st Street
49. University Way NE/NE 41st Street
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
69. 15th Avenue NE/NE Boat Street
72. Montlake Boulevard NE/IMA Exit

The specific location of the driveways impacts the overall trip distribution and individual movements at intersections near driveway locations. Given the preliminary planning nature of this evaluation, individual traffic impacts should be assessed when final building size and driveway locations are determined. Also, given the grid network, it is anticipated that if drivers experience long delays at unsignalized locations they may alter their trip pattern in an effort to reduce delays. It is also recognized that level of service for vehicle traffic, while a consideration, is increasingly balanced against assuming that pedestrian, bicycle, and transit travel modes are encouraged and facilitated. Intersections that are calculated to operate at poor levels of service for vehicle traffic are not always considered a high priority for improvement by the City.



Future (2028) Alternative 5.2 Weekday PM Peak Hour Traffic Operations

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FIGURE **9.17**

Alternative 5.3 Intersection LOS

Weekday PM peak hour intersection traffic operations during the 2028 Alternative 3 conditions without street vacations are summarized in Figure 9.18 and Figure 9.19**.** The year 2028 geometry for all of the study-area intersections were assumed to remain the same as baseline No Action conditions except when modifications are expected as part of the Alternative. Additionally, all signal timing splits and offsets were optimized for Alternative 5.3. Complete intersection level of service summaries are provided in Appendix C.

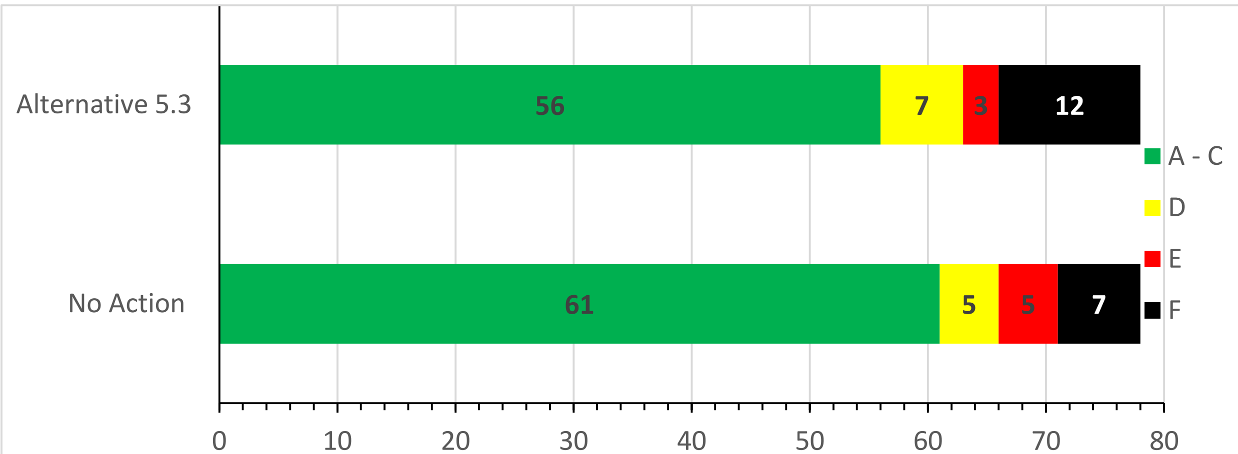


Figure 9.18 No Action/Alternative 5.3 Weekday PM Peak 2028 Intersection Level of Service Summary

During the weekday PM peak hour, 5 additional intersections are anticipated to operate at LOS F under Alternative 5.3 traffic conditions compared with No Action conditions. Overall, 22 intersections are anticipated to operate at LOS D or worse during the weekday PM peak hour with Alternative 5.3, as compared to 17 under No Action conditions. The City of Seattle does not have an LOS standard, but generally considers LOS E and LOS F at signalized intersections to reflect poor operations and LOS F at unsignalized intersections as poor operations. For intersections that degrade from LOS D to LOS E or operate at LOS E or LOS F under the "with-project" condition, or increase of 5 or more seconds could be considered significant by the City.

The following intersections are anticipated to degrade to D or below in the future under Alternative 5.3 conditions:

15. 7th Avenue (I-5 NB)/ NE 45th Street
16. 9th Avenue NE (South)/NE 45th Street
31. Roosevelt Way NE/NE 43rd Street (West)
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
69. 15th Avenue NE/NE Boat Street
70. Gate 6 turnaround/NE Boat Street/Columbia Road
73. Montlake Boulevard NE/IMA Entrance
77. Montlake Boulevard NE/NE Pacific Street
78. Montlake Boulevard NE/SR 520 WB Ramps

Intersections where the LOS is E or F and where the Alternative 5.3 traffic increases delay by more than 5 seconds are shown in Table 9.4. As shown in Table 9.4, a majority of the intersections are unsignalized intersections. At the two-way stop controlled intersections the change in delay is represented both for the total intersection and for the worst movement.

Table 9.4
ALTERNATIVE 5.3 SUMMARY OF POTENTIAL IMPACTS

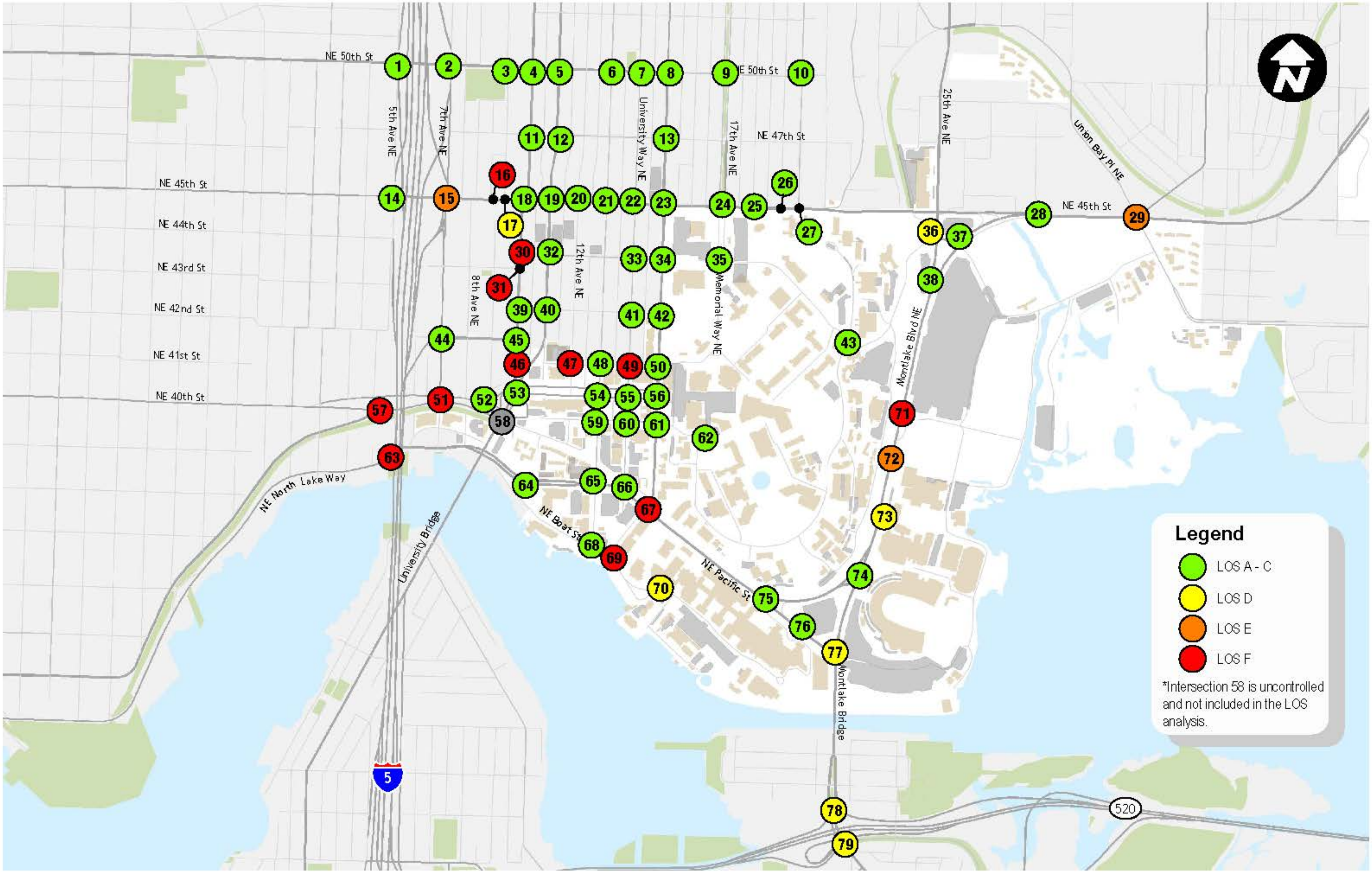
Intersection and number	Traffic Control	Change in Delay (seconds)[1]	Percent of Total (Project Share)
15. 7th Avenue NE (I-5 NB)/NE 45th Street	Signalized	18	11.1%
16. 9th Avenue NE (South)/NE 45th Street	TWSC	0.9/34	14.5%
29. Montlake Boulevard NE/Mary Gates Memorial Drive NE	Signalized	11	5.0%
30. Roosevelt Way NE/NE 43rd Street (East)	TWSC	2.9/39	4.3%
31. Roosevelt Way NE/NE 43rd Street (West)	TWSC	0.8/19	4.4%
46. Roosevelt Way NE/NE 41st Street	TWSC	18/298	1.6%
47. 12th Avenue NE/NE 41st Street	TWSC	275/980	23.1%
49. University Way NE/NE 41st Street	TWSC	-[2]	22.6%
51. 7th Avenue NE/NE 40th Street	AWSC	26	6.0%
57. 6th Avenue NE/NE 40th Street	AWSC	24	5.9%
63. 6th Avenue NE/NE Northlake Way	AWSC	57	17.2%
67. 15th Avenue NE/NE Pacific Street	Signalized	58	22.1%
69. 15th Avenue NE/NE Boat Street	AWSC	74	36.3%
71. Montlake Boulevard NE/Wahkiakum Road	TWSC	326/6488	8.9%
72. Montlake Boulevard NE/IMA Exit	TWSC	0.1/9	9.0%

Note: TWSC = two-way stop controlled, AWSC = all-way stop controlled
1. Change in total intersection delay/change in worst movement delay for two-way stop controlled (TWSC) intersections.
2. Volume exceeds capacity and Synchro could not calculate the delay.

Of the stop controlled intersections listed in Table 9.4 some of the increased delay can be attributed to the increase in pedestrian and bicycle volumes. Additionally, the following intersections are located at or near potential garage access locations resulting in higher share of alternative percentages:

47. 12th Avenue NE/NE 41st Street
49. University Way NE/NE 41st Street
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
69. 15th Avenue NE/NE Boat Street
71. Montlake Boulevard NE/Wahkiakum Road
72. Montlake Boulevard NE/IMA Exit

The specific location of the driveways impacts the overall trip distribution and individual movements at intersections near driveway locations. Given the preliminary planning nature of this evaluation, individual traffic impacts should be assessed when final building size and driveway locations are determined. Also, given the grid network, it is anticipated that if drivers experience long delays at unsignalized locations they may alter their trip pattern in an effort to reduce delays. It is also recognized that level of service for vehicle traffic, while a consideration, is increasingly balanced against assuming that pedestrian, bicycle, and transit travel modes are encouraged and facilitated. Intersections that are calculated to operate at poor levels of service for vehicle traffic are not always considered a high priority for improvement by the City.



Future (2028) Alternative 5.3 Weekday PM Peak Hour Traffic Operations

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FIGURE **9.19**

Alternative 5.4 Intersection LOS

Weekday PM peak hour intersection traffic operations during the 2028 Alternative 4 conditions without street vacations are summarized in Figure 9.20 and Figure 9.21**.** The year 2028 geometry for all of the study-area intersections were assumed to remain the same as baseline No Action conditions except when modifications are expected as part of the Alternative. Additionally, all signal timing splits and offsets were optimized for Alternative 5.4. Complete intersection level of service summaries are provided in Appendix C.

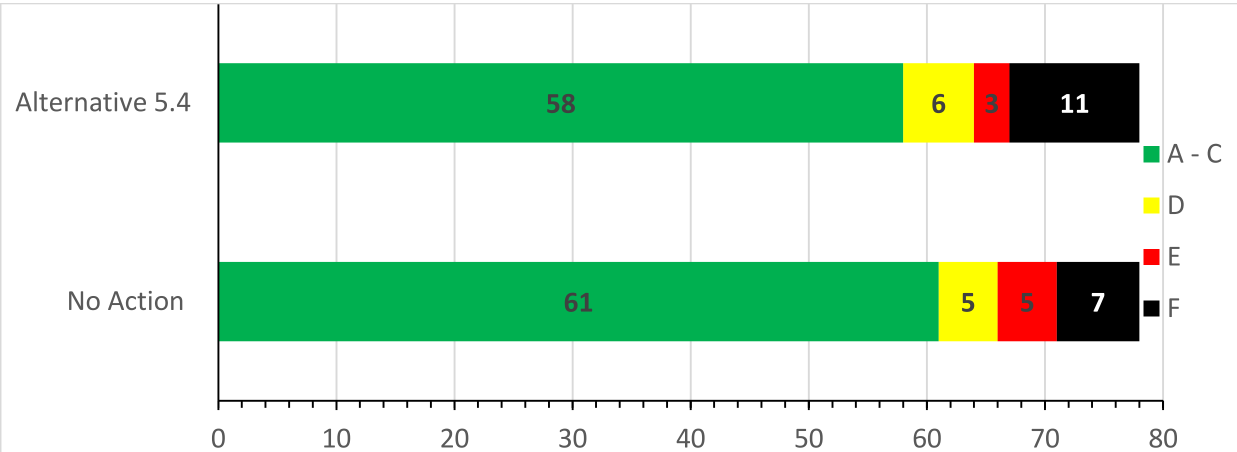


Figure 9.20 No Action/Alternative 5.4 Weekday PM Peak 2028 Intersection Level of Service Summary

During the weekday PM peak hour, 4 additional intersections are anticipated to operate at LOS F under Alternative 5.4 traffic conditions compared with No Action conditions. Overall, 20 intersections are anticipated to operate at LOS D or worse during the weekday PM peak hour with Alternative 5.4, as compared to 17 under No Action conditions. The City of Seattle does not have an LOS standard, but generally considers LOS E and LOS F at signalized intersections to reflect poor operations and LOS F at unsignalized intersections as poor operations. For intersections that degrade from LOS D to LOS E or operate at LOS E or LOS F under the "with-project" condition, or increase of 5 or more seconds could be considered significant by the City.

The following intersections are anticipated to degrade to D or below in the future under Alternative 5.4 conditions:

15. 7th Avenue (I-5 NB)/ NE 45th Street
16. 9th Avenue NE (South)/NE 45th Street
31. Roosevelt Way NE/NE 43rd Street (West)
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
72. Montlake Boulevard NE/IMA exit
73. Montlake Boulevard NE/IMA Entrance
77. Montlake Boulevard NE/NE Pacific Street
78. Montlake Boulevard NE/SR 520 WB Ramps

Intersections where the LOS is E or F and where the Alternative 1 traffic increases delay by more than 5 seconds are shown in Table 9.5. As shown in Table 9.5, a majority of the intersections are unsignalized intersections. At the two-way stop controlled intersections the change in delay is represented both for the total intersection and for the worst movement.

Table 9.5
ALTERNATIVE 5.4 SUMMARY OF POTENTIAL IMPACTS

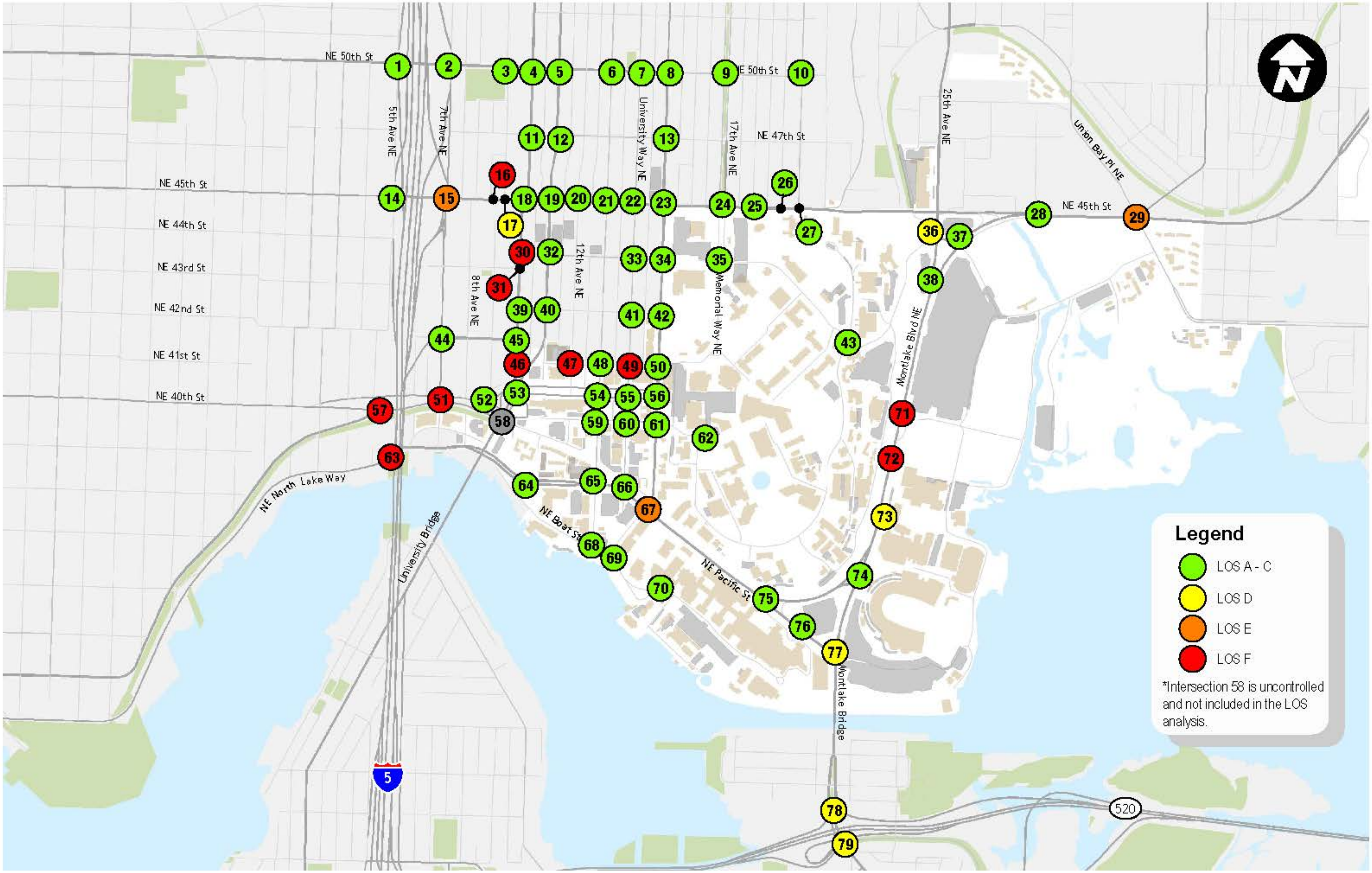
Intersection and number	Traffic Control	Change in Delay (seconds)[1]	Percent of Total (Project Share)
15. 7th Avenue NE (I-5 NB)/NE 45th Street	Signalized	20	11.4%
16. 9th Avenue NE (South)/NE 45th Street	TWSC	0.9/34	15.0%
29. Montlake Boulevard NE/Mary Gates Memorial Drive NE	Signalized	10	4.9%
30. Roosevelt Way NE/NE 43rd Street (East)	TWSC	2.9/30	3.0%
31. Roosevelt Way NE/NE 43rd Street (West)	TWSC	0.8/16	3.1%
46. Roosevelt Way NE/NE 41st Street	TWSC	18/278	1.5%
47. 12th Avenue NE/NE 41st Street	TWSC	275/945	22.5%
49. University Way NE/NE 41st Street	TWSC	-[2]	21.9%
51. 7th Avenue NE/NE 40th Street	AWSC	18	4.9%
57. 6th Avenue NE/NE 40th Street	AWSC	19	4.7%
63. 6th Avenue NE/NE Northlake Way	AWSC	56	16.3%
67. 15th Avenue NE/NE Pacific Street	Signalized	22	15.8%
72. Montlake Boulevard NE/IMA Exit	TWSC	0.1/13	12.1%

Note: TWSC = two-way stop controlled, AWSC = all-way stop controlled
3. Change in total intersection delay/change in worst movement delay for two-way stop controlled (TWSC) intersections.
2. Volume exceeds capacity and Synchro could not calculate the delay.

Of the stop controlled intersections listed in Table 9.5 some of the increased delay can be attributed to the increase in pedestrian and bicycle volumes. Additionally, the following intersections are located at or near potential garage access locations resulting in higher share of alternative percentages:

47. 12th Avenue NE/NE 41st Street
49. University Way NE/NE 41st Street
63. 6th Avenue NE/NE Northlake Way
67. 15th Avenue NE/NE Pacific Street
72. Montlake Boulevard NE/IMA Exit

The specific location of the driveways impacts the overall trip distribution and individual movements at intersections near driveway locations. Given the preliminary planning nature of this evaluation, individual traffic impacts should be assessed when final building size and driveway locations are determined. Also, given the grid network, it is anticipated that if drivers experience long delays at unsignalized locations they may alter their trip pattern in an effort to reduce delays. It is also recognized that level of service for vehicle traffic, while a consideration, is increasingly balanced against assuming that pedestrian, bicycle, and transit travel modes are encouraged and facilitated. Intersections that are calculated to operate at poor levels of service for vehicle traffic are not always considered a high priority for improvement by the City.



Future (2028) Alternative 5.4 Weekday PM Peak Hour Traffic Operations

FIGURE
9.21

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9.5.4 Arterial Operations

Alternative 5.1 Arterial Operations

Arterial travel times and speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated with the addition of project generated traffic associated with Alternative 5.1, consistent with the previously described methodology for existing and future No Action conditions. This includes the application of the adjustment factors previously described.

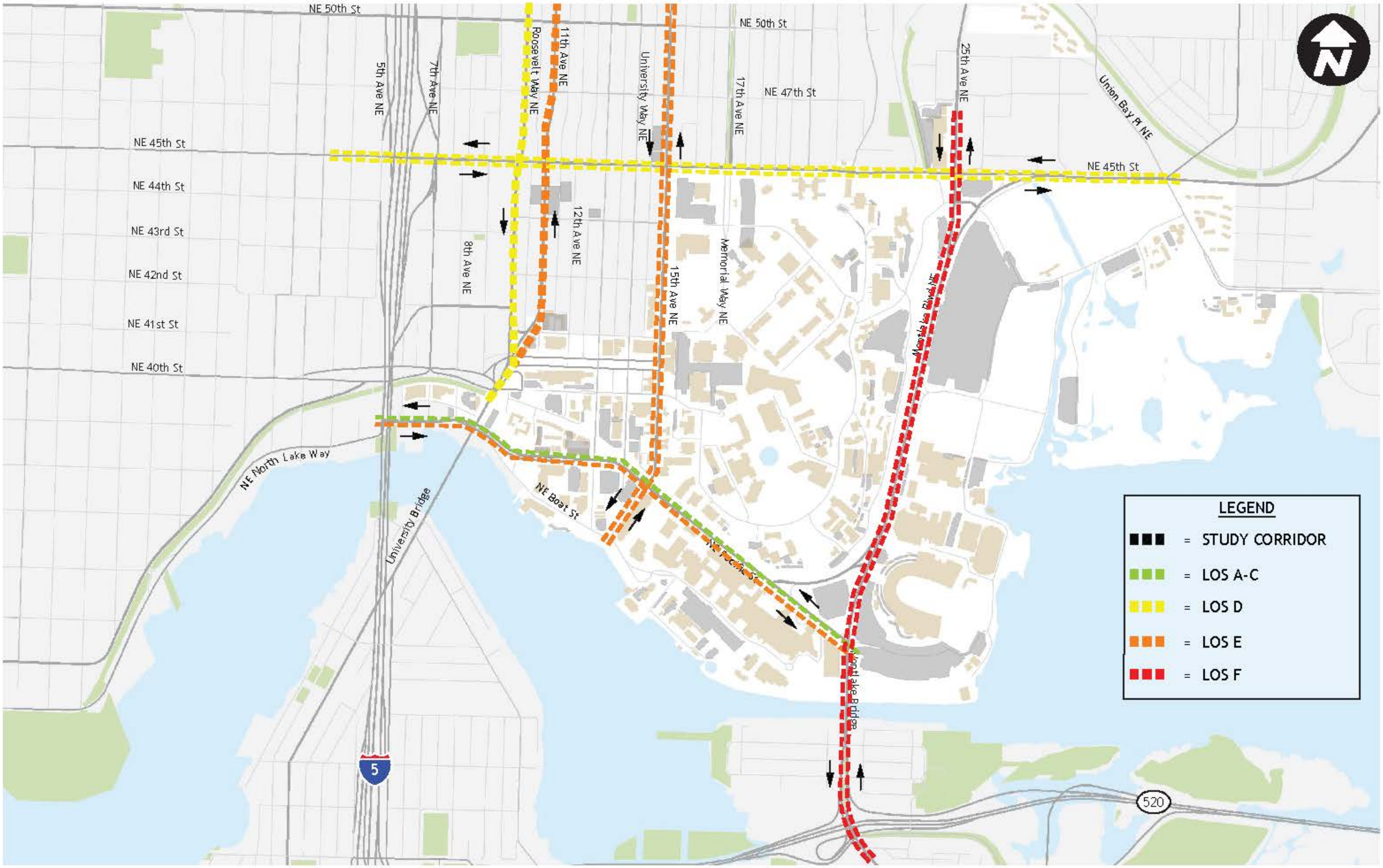
Table 9.6 and Figure 9.22 summarizes the No Action and Alternative 5.1 arterial travel times and speeds. Detailed corridor operations worksheets are provided in Appendix C.

Table 9.6
FUTURE NO ACTION AND ALTERNATIVE 5.1 WEEKDAY PM PEAK HOUR ARTERIAL OPERATIONS SUMMARY

Corridor	No Action		Alternative 5.1	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	E	8.5	E	7.7
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	9.0	E	8.8
Southbound	D	9.2	E	8.0
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	10.8	F	9.5
Southbound	F	8.4	F	8.4
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	11.7	D	10.7
Westbound	D	10.8	D	9.8
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.1	E	10.3
Westbound	C	21.5	C	21.2
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	12.0	D	11.8

1. Level of service.
2. Average speed in miles per hour

As shown in Table 9.6, under Alternative 5.1 the arterials will generally experience increases in delay and slower travel speeds. Under Alternative 5.1 the 15th Avenue NE arterial in the southbound direction is anticipated to degrade from LOS D to LOS E, the Montlake Boulevard NE arterial in the northbound direction is anticipated to degrade from LOS E to LOS F, and the NE Pacific Street arterial in the eastbound direction is anticipated to degrade from LOS C to LOS E.



Future (2028) Alternative 5.1 Weekday PM Peak Hour Corridor Traffic Operations

FIGURE **9.22**

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Alternative 5.2 Arterial Operations

Arterial travel times and speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated with the addition of project generated traffic associated with Alternative 5.2, consistent with the previously described methodology for existing and future No Action conditions. This includes the application of the adjustment factors previously described.

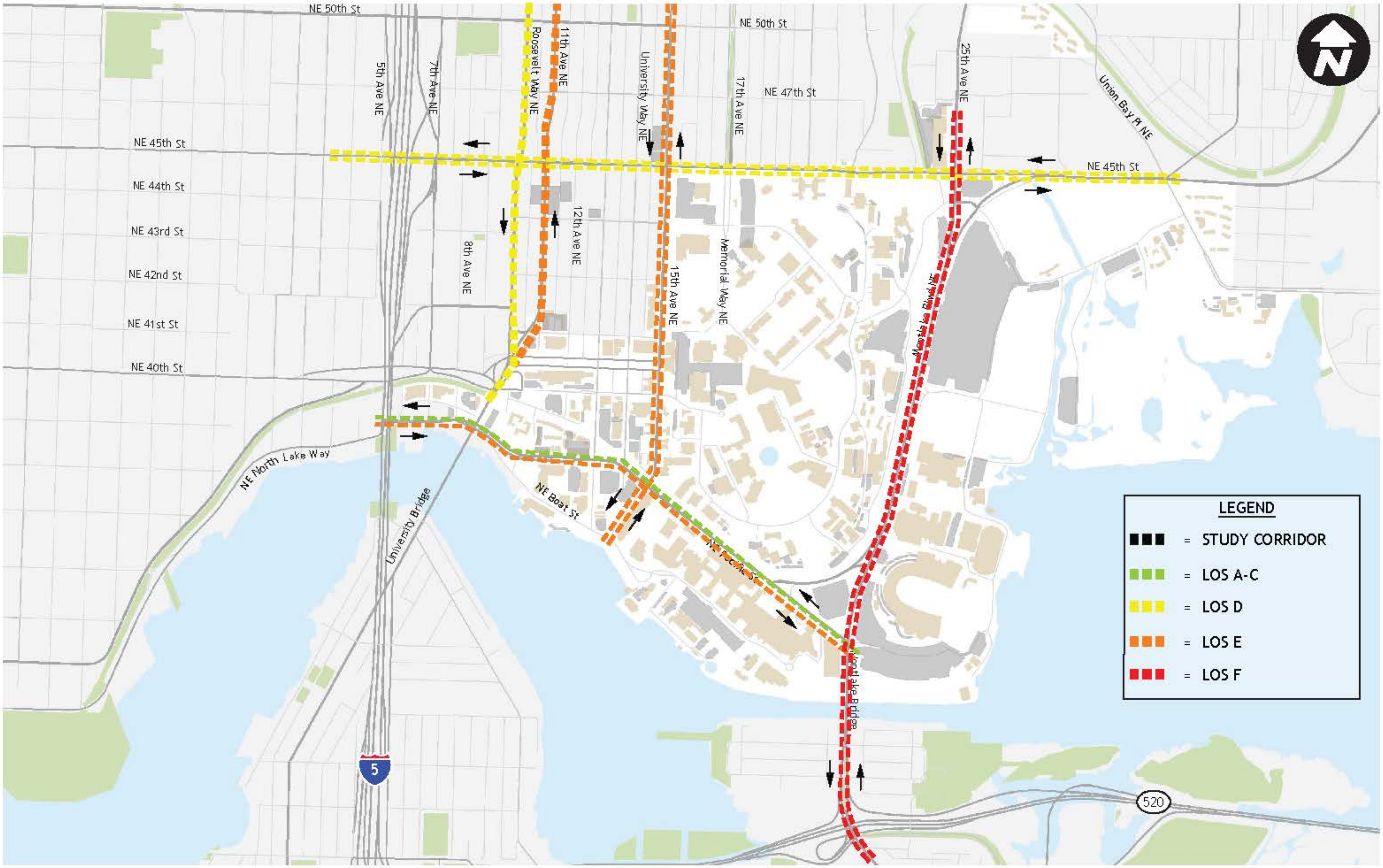
Table 9.7 and Figure 9.23 summarizes the No Action and Alternative 5.2 arterial travel times and speeds. Detailed corridor operations worksheets are provided in Appendix C.

Table 9.7
FUTURE NO ACTION AND ALTERNATIVE 5.2 WEEKDAY PM PEAK HOUR ARTERIAL OPERATIONS SUMMARY

Corridor	No Action		Alternative 5.2	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	E	8.5	E	7.8
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	9.0	E	8.8
Southbound	D	9.2	E	8.1
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	10.8	F	9.7
Southbound	F	8.4	F	8.2
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	11.7	D	10.6
Westbound	D	10.8	D	9.8
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.1	E	10.5
Westbound	C	21.5	C	21.2
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	12.0	D	11.8

1. Level of service.
2. Average speed in miles per hour

As shown in Table 9.7, under Alternative 5.2 the arterials will generally experience increases in delay and slower travel speeds. Under Alternative 5.2 the 15th Avenue NE arterial in the southbound direction is anticipated to degrade from LOS D to LOS E, the Montlake Boulevard NE arterial in the northbound direction is anticipated to degrade from LOS E to LOS F, and the NE Pacific Street arterial in the eastbound direction is anticipated to degrade from LOS C to LOS E.



Future (2028) Alternative 5.2 Weekday PM Peak Hour Corridor Traffic Operations

FIGURE **9.23**

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Alternative 5.3 Arterial Operations

Arterial travel times and speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated with the addition of project generated traffic associated with Alternative 5.3, consistent with the previously described methodology for existing and future No Action conditions. This includes the application of the adjustment factors previously described.

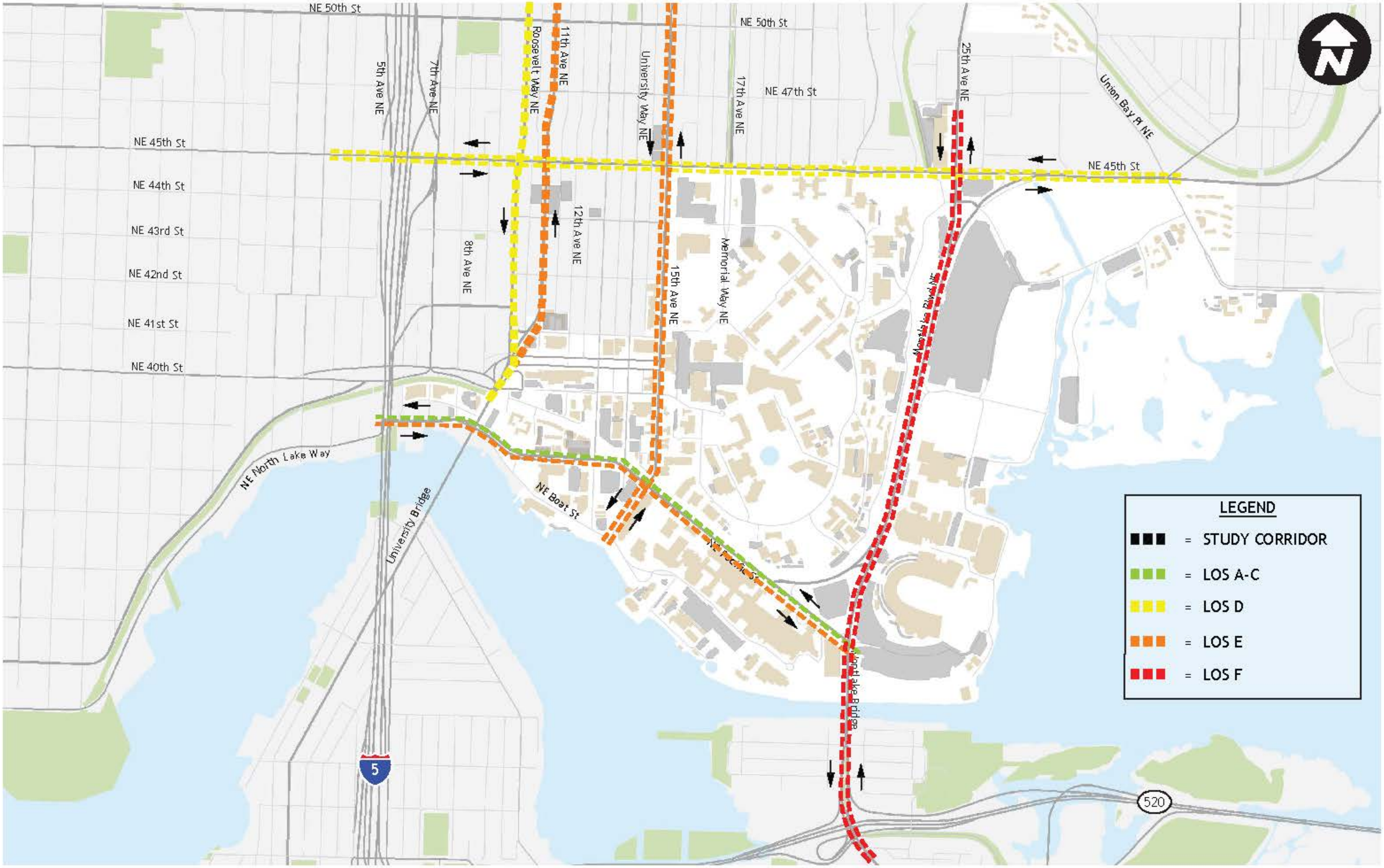
Table 9.8 and Figure 9.24 summarizes the No Action and Alternative 5.3 arterial travel times and speeds. Detailed corridor operations worksheets are provided in Appendix C.

Table 9.8
FUTURE NO ACTION AND ALTERNATIVE 5.3 WEEKDAY PM PEAK HOUR ARTERIAL OPERATIONS SUMMARY

Corridor	No Action		Alternative 5.3	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	E	8.5	E	7.6
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	9.0	E	8.8
Southbound	D	9.2	E	7.8
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	10.8	F	9.7
Southbound	F	8.4	F	8.4
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	11.7	D	10.7
Westbound	D	10.8	D	9.8
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.1	E	10.2
Westbound	C	21.5	C	21.3
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	12.0	D	11.8

1. Level of service.
2. Average speed in miles per hour

As shown in Table 9.8, under Alternative 5.3 the arterials will generally experience increases in delay and slower travel speeds. Under Alternative 5.3 the 15th Avenue NE arterial in the southbound direction is anticipated to degrade from LOS D to LOS E, the Montlake Boulevard NE arterial in the northbound direction is anticipated to degrade from LOS E to LOS F, and the NE Pacific Street arterial in the eastbound direction is anticipated to degrade from LOS C to LOS E.



Future (2028) Alternative 5.3 Weekday PM Peak Hour Corridor Traffic Operations

FIGURE

9.24

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Alternative 5.4 Arterial Operations

Arterial travel times and speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated with the addition of project generated traffic associated with Alternative 5.4., consistent with the previously described methodology for existing and future No Action conditions. This includes the application of the adjustment factors previously described.

Table 9.9 and Figure 9.25 summarizes the No Action and Alternative 5.4 arterial travel times and speeds. Detailed corridor operations worksheets are provided in Appendix C.

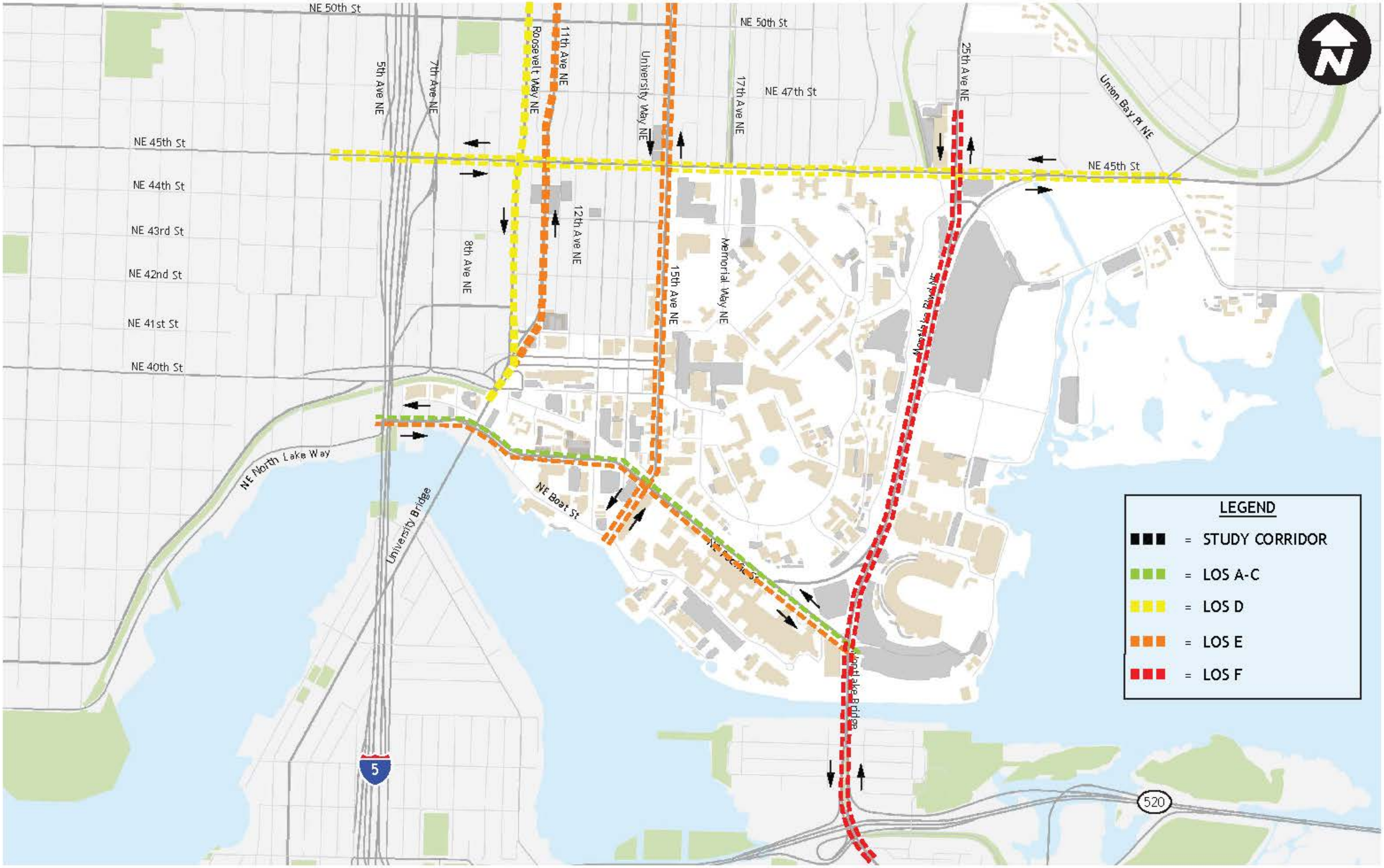
Table 9.9

FUTURE NO ACTION AND ALTERNATIVE 5.4 WEEKDAY PM PEAK HOUR ARTERIAL OPERATIONS SUMMARY

Corridor	No Action		Alternative 5.4	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	E	8.5	E	7.8
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	9.0	E	8.8
Southbound	D	9.2	E	8.5
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	10.8	F	9.7
Southbound	F	8.4	F	8.1
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	11.7	D	10.6
Westbound	D	10.8	D	9.6
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.1	E	13.7
Westbound	C	21.5	C	21.0
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	12.0	D	11.8

1. Level of service.
2. Average speed in miles per hour

As shown in Table 9.9, under Alternative 5.4 the arterials will generally experience increases in delay and slower travel speeds. Under Alternative 5.4 the 15th Avenue NE arterial in the southbound direction is anticipated to degrade from LOS D to LOS E, the Montlake Boulevard NE arterial in the northbound direction is anticipated to degrade from LOS E to LOS F, and the NE Pacific Street arterial in the eastbound direction is anticipated to degrade from LOS C to LOS E.



Future (2028) Alternative 5.4 Weekday PM Peak Hour Corridor Traffic Operations

FIGURE **9.25**

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9.5.5 Service/Freight Routes

Consistent with existing conditions, freight and delivery access would be provided for each building. The deliveries will largely come direct from the shippers. The lack of street vacations is not expected to impact freight routes.

9.5.6 Parking

Parking impacts for Alternative 5 would be the same as described for Alternatives 1-4. The lack of street vacations is not anticipated to change the impacts.

9.6 IMPACTS DURING CONSTRUCTION

During construction of all Action Alternatives, potential construction impacts could include temporary closures of pathways, and streets, reallocation or removal of bike and auto parking, increased truck traffic or other temporary disruptions. While temporary in nature, potential mitigations for construction could include TMP strategies, outreach, and coordination to minimize impacts. Specific impacts and mitigations for development would be addressed as part of SEPA review.

9.7 CUA COMPLIANCE – VEHICLE TRIP AND PARKING CAPS

The lack of alley, street and aerial vacations will not impact vehicle trip and parking caps as compared to the growth alternatives in Sections 5-8. Results to CUA trip and parking compliance will be similar to Alternative 1 in Section 5.7.

10 SECONDARY AND CUMULATIVE IMPACTS

The cumulative impacts of these CMP alternatives with background growth and proposed U District Upzoning results in an overall increase in trips throughout the University District. This section describes the cumulative impacts to the transportation systems.

10.1 PEDESTRIAN, BICYCLE, TRANSIT AND FREIGHT

Move Seattle: A citywide strategic vision and 9-year levy for transportation investments in the City of Seattle.

With the combined growth and development in the University District of trips from background growth, the CMP development and the U District Upzone, overall travel will increase putting pressure on all transportation systems. For Pedestrian and Bicycles systems, there are expected improvements in pedestrian system capacity and connectivity including those associated with building and new development, those identified within Move Seattle, and continued expansion of the regional Burke Gilman Trail. With on-going implementation of TMP programs and the U-PASS, transit ridership and demands should continue to grow; however, transit providers including King County Metro, and Sound Transit will be providing increased service like RapidRide and expansion of Link light rail at the same time the City creates transit priority facilities on arterial streets. Future proposed expansions of the Sound Transit system through ST 3 could further expand convenient transit access to University District and University of Washington transit riders. With the designation of minor truck streets as part of the Freight Master Plan, trucks will be accommodated on arterials within the University District including around those arterials providing access to the University of Washington. SEPA permitting for buildings will also identify near term improvements as buildings come on line to ensure bicycle parking and accessible pathways are developed.

10.2 VEHICULAR OPERATIONS

Similar to the operational analysis completed for No Action, Alternatives 1-4, and Alternatives 5.1-5.4, a cumulative analysis was completed which utilized the volumes associated with the U District Upzone EIS. The difference between the volumes associated with the City of Seattle Comprehensive plan and the U District Up Zone are associated with proposed height and density changes in the U District primarily around the future U District Link Light Rail Station. Consistent with the U District Upzone EIS an arterial level of service analysis was completed for No Action, Alternative 1, Alternative 2, Alternative 3, Alternative 4, and Alternatives 5.1-5.4. Notably Alternatives 5.1-5.4 are similar in volume and distribution to Alternatives 1-4 respectively, but do not include street vacations. The same arterials analyzed for the traffic operations section were analyzed for the cumulative analysis. Additionally, the cordon volumes around the University of Washington were reviewed for all alternatives under University District Upzone conditions.

10.3 NO ACTION

10.3.1 Cumulative Arterial Operations

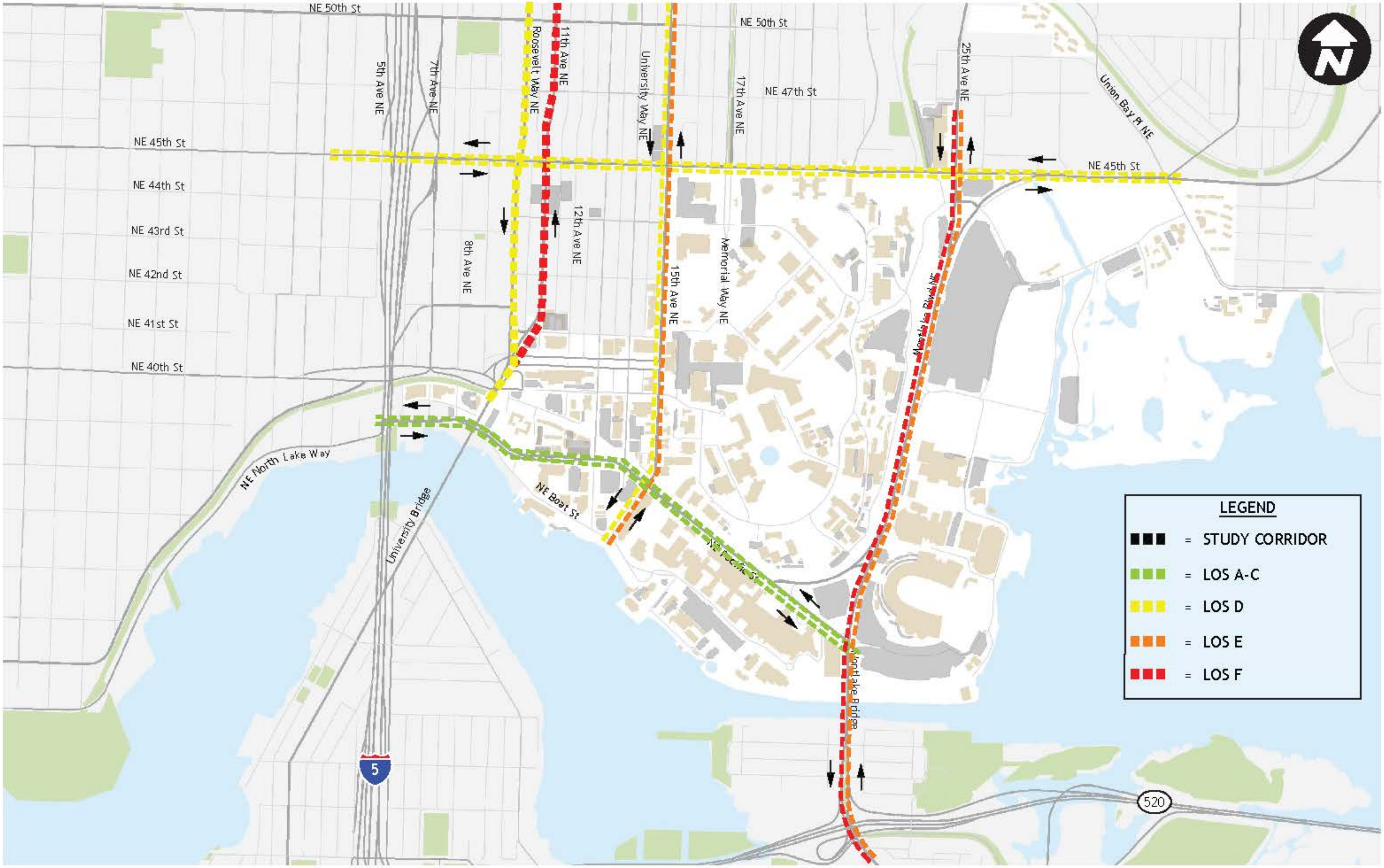
Corridor travel times/speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated using the Synchro 9 network used for the intersection operations analysis. The No Action results, shown in Table 10.1, reflect the adjustment factors described in the Affected Environment section.

Table 10.1
EXISTING AND FUTURE NO ACTION CUMULATIVE WEEKDAY PM PEAK HOUR CORRIDOR LOS SUMMARY

Corridor	Existing		No Action - Cumulative	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	E	8.5	F	5.0
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	8.2	E	8.0
Southbound	D	9.4	D	9.2
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	14.0	E	11.5
Southbound	F	8.0	F	3.7
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	11.7	D	12.0
Westbound	D	12.0	D	11.6
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	D	15.9	C	18.3
Westbound	C	20.6	C	21.9
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	C	14.4	D	10.4

1. Level of service.
2. Average speed.

As shown in Table 10.1 and on Figure 10.1, during the future No Action weekday PM peak hour conditions most corridors are anticipated to operate at the same LOS as under existing conditions with the exceptions of two corridors. Northbound 11th Avenue NE is anticipated to degrade from LOS E to LOS F, eastbound Pacific Street is anticipated to improve from LOS D to LOS C, and southbound Roosevelt Way NE is anticipated to degrade from LOS C to LOS D. Corridor operations improvements are primarily due to the optimization of signal timing splits and offsets under No Action. Detailed corridor operations worksheets are provided in Appendix C.



Future (2028) No Action Weekday PM Peak Hour Corridor Traffic Operations - Cumulative Analysis

FIGURE **10.1**

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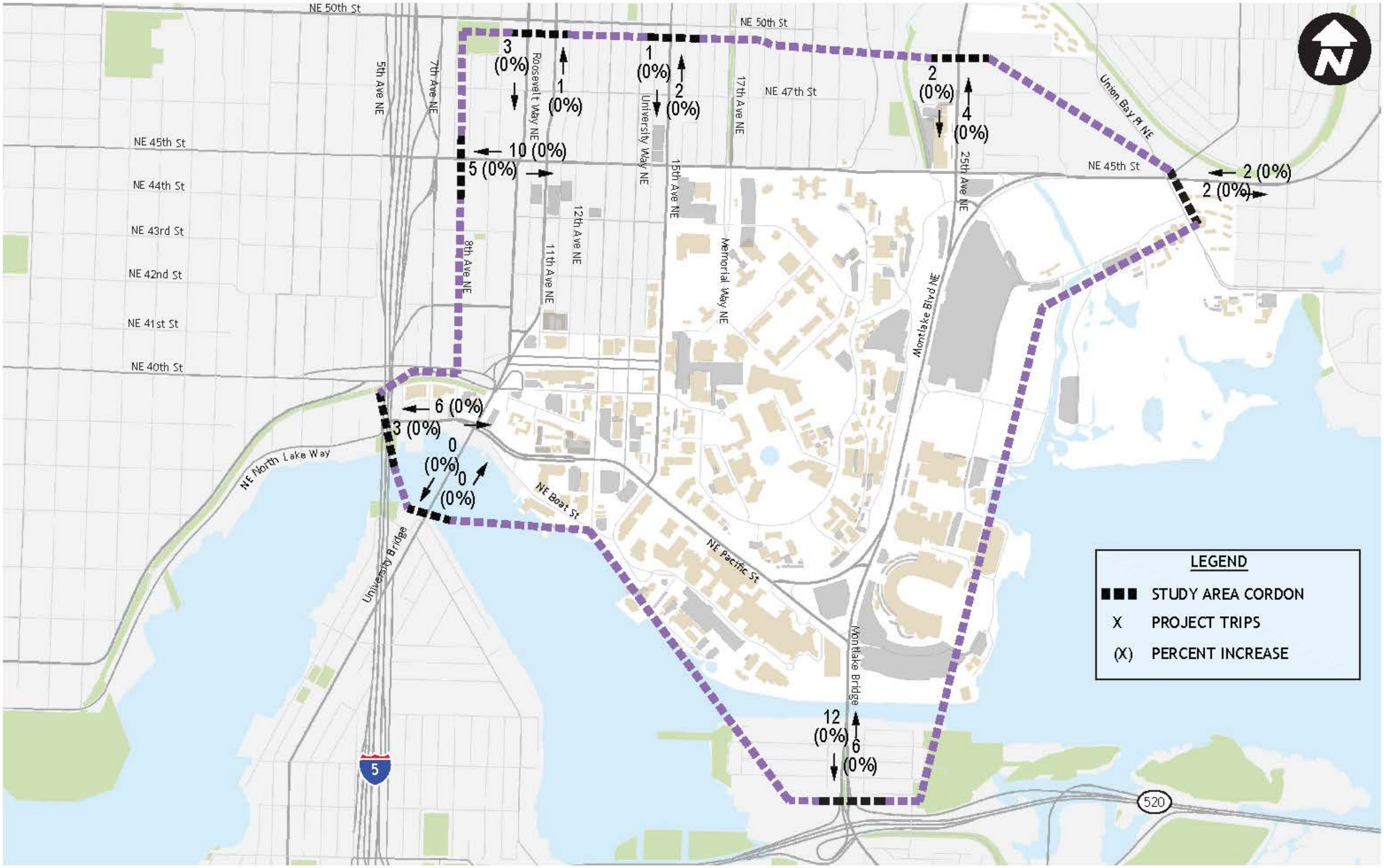
10.3.2 Cumulative Cordon Volume Analysis

Cordon: An imaginary line used to evaluate traffic in and out of the University area and measure the change or increase in traffic associated with the proposed alternatives.

To understand the volumes associated with the University of Washington, related to background volumes under the different Alternative scenarios, a cordon volume analysis was completed. The cordon volume analysis focuses on the major roadways leading to and from the University. The cordon volume analysis also shows the percent of total trips along the corridor that are associated with the increased traffic generated by the No Action alternative. The cordon volume and project share associated with the No Action alternative cumulative analysis are shown on Figure 10.2. Note that this reflects the percent increase associated with continued development on campus.



Future (2028) No Action PM Peak Hour Cordon Volumes and Proportional Increase - Cumulative Analysis

FIGURE **10.2**

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10.4 ALTERNATIVE 1

10.4.1 Cumulative Arterial Operations

Corridor travel times/speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated with the addition of project generated traffic associated with Alternative 1, consistent with the previously described methodology for existing and future No Action conditions. This includes the application of the adjustment factors previously described.

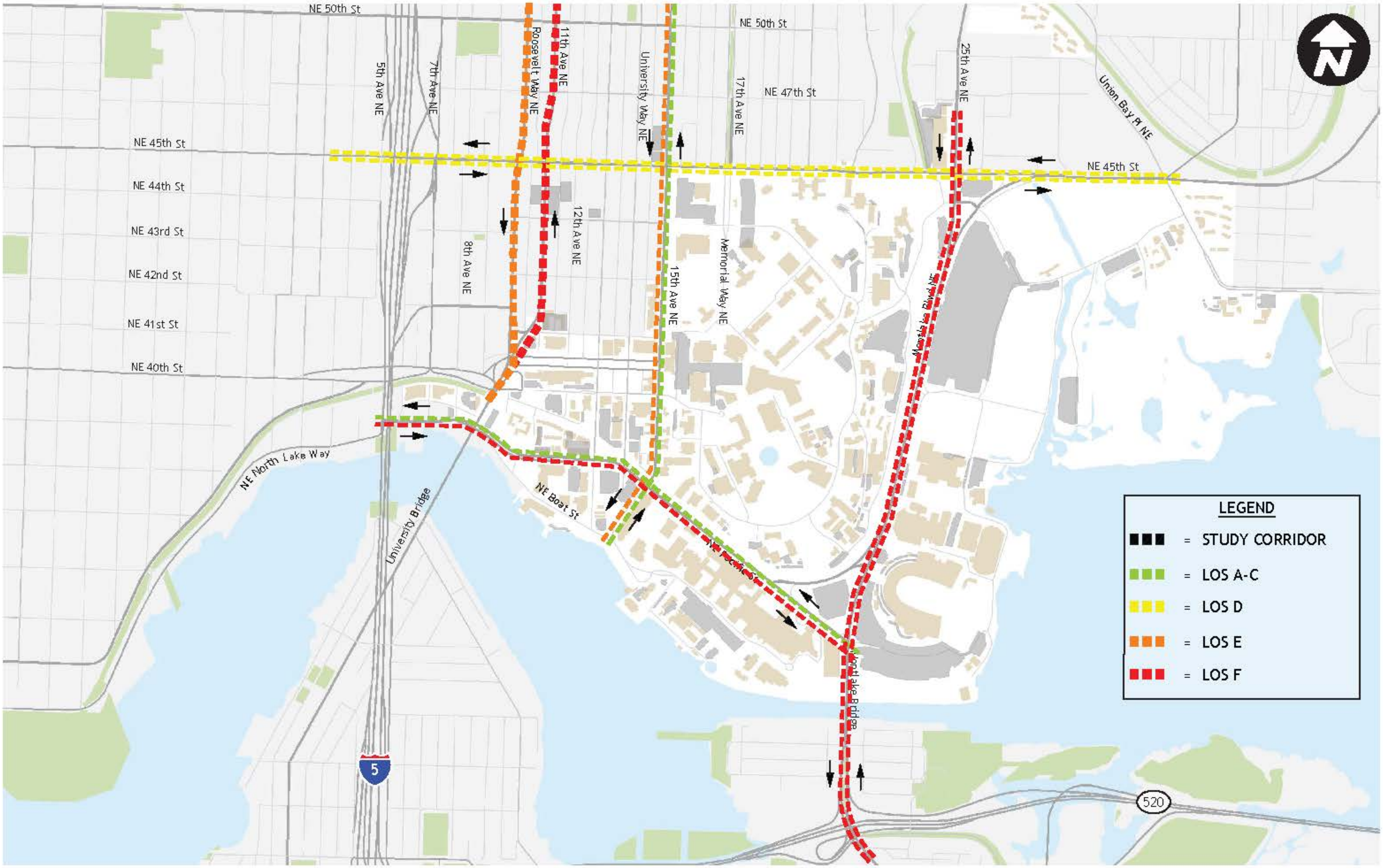
Table 10.2 summarizes the No Action and Alternative 1 corridor travel times and speeds. Detailed corridor operations worksheets are provided in Appendix C. Generally, it was observed that traffic volume increases along Montlake Boulevard NE were less under the U District Up Zone EIS Alternative 2B model than those observed in the Seattle Comprehensive Alternative 5.

Table 10.2
FUTURE NO ACTION AND ALTERNATIVE 1 CUMULATIVE WEEKDAY PM PEAK HOUR CORRIDOR LOS SUMMARY

Corridor	No Action - Cumulative		Alternative 1 - Cumulative	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	F	5.0	F	3.9
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	8.0	E	7.5
Southbound	D	9.2	F	7.0
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	11.5	F	9.9
Southbound	F	3.7	F	8.5
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	12.0	D	11.3
Westbound	D	11.6	D	11.0
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.3	E	11.6
Westbound	C	21.9	C	20.7
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	10.4	E	8.8

1. Level of service.
2. Average speed

As shown in Table 10.2 and on Figure 10.3, during the future Alternative 1 weekday PM peak hour conditions most corridors are anticipated to operate at the same LOS as under No Action conditions with the exceptions of four corridors. Southbound 15th Avenue NE is anticipated to degrade from LOS D to LOS F, northbound Montlake Boulevard NE is anticipated to degrade from LOS E to LOS F, eastbound NE Pacific Street is anticipated to degrade from LOS C to LOS E, and southbound Roosevelt Way NE is anticipated to degrade from LOS D to LOS E. Detailed corridor operations worksheets are provided in Appendix C.



Future (2028) Alternative 1 Weekday PM Peak Hour Corridor Traffic Operations - Cumulative Analysis

FIGURE **10.3**

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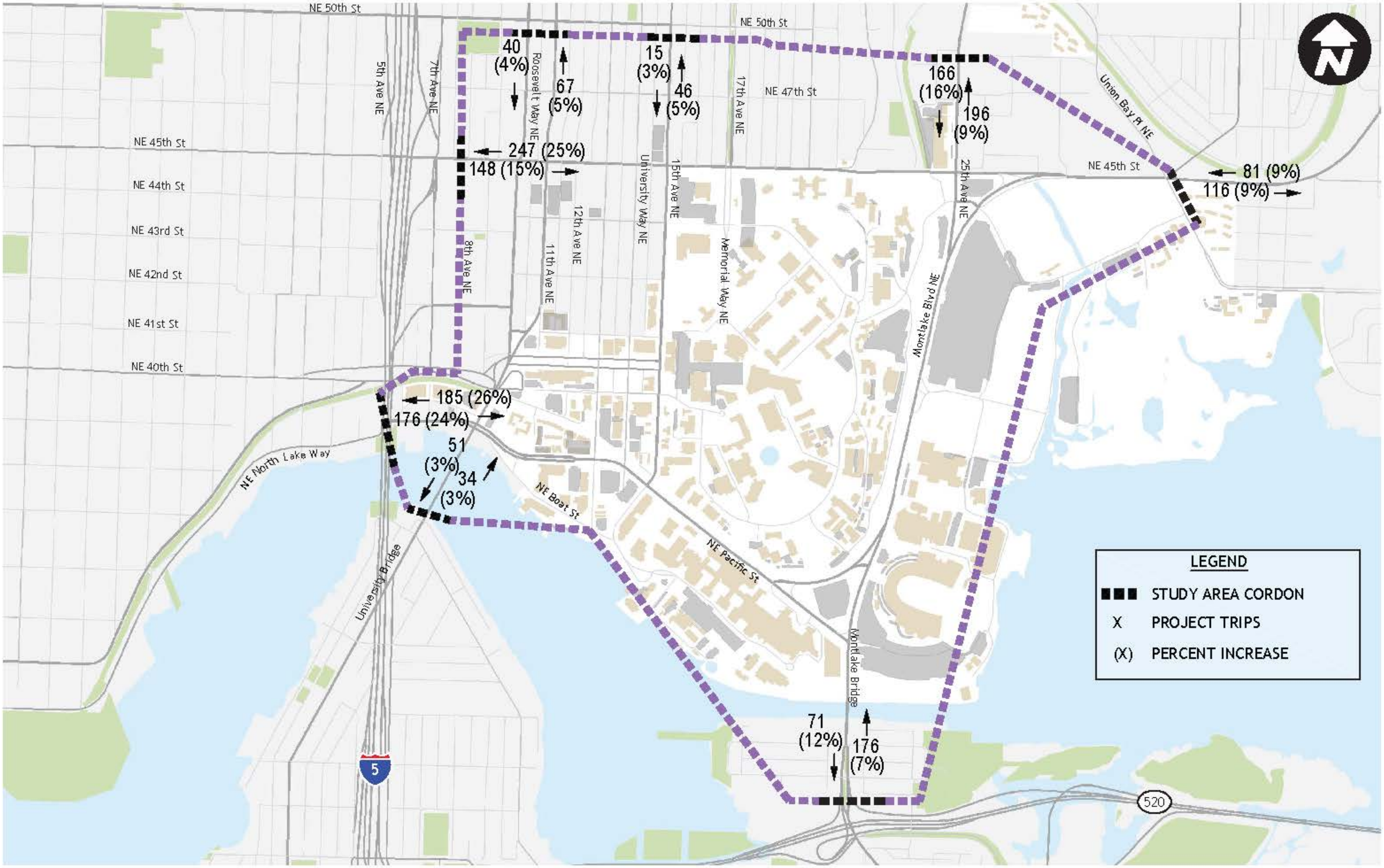
10.4.2 Cumulative Cordon Volume Analysis

To understand the volumes associated with the University of Washington, related to background volumes under the different Alternative scenarios, a cordon volume analysis was completed. The cordon volume analysis focuses on the major roadways leading to and from the University. The cordon volume analysis also shows the percent of total trips along the corridor that are associated with the increased traffic generated by Alternative 1. The cordon volume and project share associated with the Alternative 1 cumulative analysis are shown on Figure 10.4. Note that this reflects the percent increase associated with continued development on campus.



Future (2028) Alternative 1 PM Peak Hour Cordon Volumes and Proportional Increase - Cumulative Analysis

FIGURE 10.4

University of Washington 2018 Campus Master Plan

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10.4.3 Cumulative Screenline Analysis: Primary Impact Zone

> **Screenline:** An imaginary line across which the number of passing vehicles is counted.

The following section describes the screenline analysis completed for two designated screenlines within the study area. In this study, screenlines were selected to count vehicle traffic entering and exiting the University of Washington primary and secondary impact zones. As part of the Mayor's Seattle 2035 Comprehensive Plan (City of Seattle, 2016), two screenlines are identified within the vicinity of the University of Washington, as shown in Figure 10.5. Screenline 5.16 is an east-west screenline, measuring north-south travel, and extending along the ship canal to include the University and Montlake Bridges. Screenline 13.13 is a north-south screenline, measuring east-west travel, and extending east of I-5 between NE Pacific Street and NE Ravenna Boulevard.

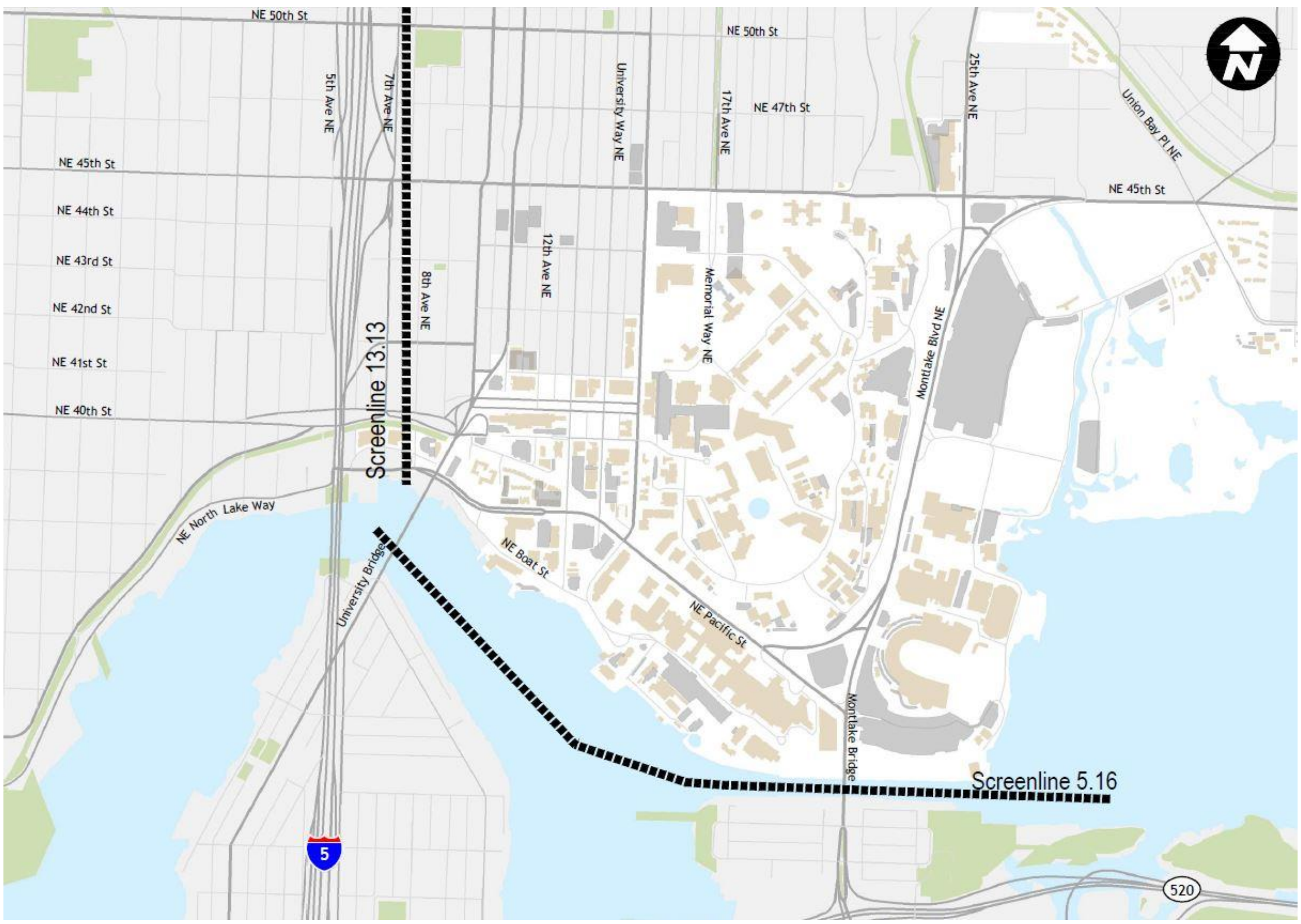


Figure 10.5 Study Area Screenlines

The screenline analysis includes volume to capacity (V/C) calculations for the vehicles traversing the screenlines using future (2028) Alternative 1 cumulative analysis traffic volumes and interpolated roadway capacity estimates. Roadway capacity for the 2028 future horizon year was interpolated using 2016 capacity estimates described in Table 3.12 and 2035 capacity estimates referenced in the May 2016 Seattle Comprehensive Plan Update Final EIS. Future (2028) roadway capacity estimates are shown in Table 10.3 below. Detailed screenline volumes and volume to capacity calculations are included in Appendix C.

Table 10.3
FUTURE (2028) CAPACITY

Screenline	Future (2028) Capacity
5.16 – Ship Canal, University and Montlake Bridges	
Northbound	4,210
Southbound	4,210
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard	
Eastbound	6,119
Westbound	6,119

Source: Transpo Group, 2016

Level of service standards for the screenline analysis are based on the volume to capacity ratio of a screenline. As described in the Seattle Comprehensive Plan Update EIS, the LOS standard volume to capacity ratio for Screenline 5.16 and Screenline 13.13 are 1.20 and 1.00, respectively. For this study, screenline volume to capacity ratios that do not exceed the LOS standard are acceptable. The Alternative 1 cumulative screenline analysis is included in Table 10.4. Detailed screenline analysis calculations are included in Appendix C.

Table 10.4
FUTURE (2028) ALTERNATIVE 1 CUMULATIVE SCREENLINE ANALYSIS

Screenline	Screenline Volume	Capacity	V/C	LOS Standard V/C
5.16 – Ship Canal, University and Montlake Bridges				
Northbound	4,045	4,210	0.96	1.20
Southbound	4,322	4,210	1.03	1.20
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard				
Eastbound	3,645	6,119	0.60	1.00
Westbound	3,894	6,119	0.64	1.00

Source: NACTO, Seattle Comprehensive Plan Update EIS, and Transpo Group, 2016

As shown in Table 10.4, all Alternative 1 cumulative screenline volume to capacity ratios meet the acceptable LOS standard.

10.5 ALTERNATIVE 2

10.5.1 Cumulative Arterial Operations

Corridor travel times/speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated with the addition of project generated traffic associated with Alternative 2, consistent with the previously described methodology for existing and future No Action conditions. This includes the application of the adjustment factors previously described.

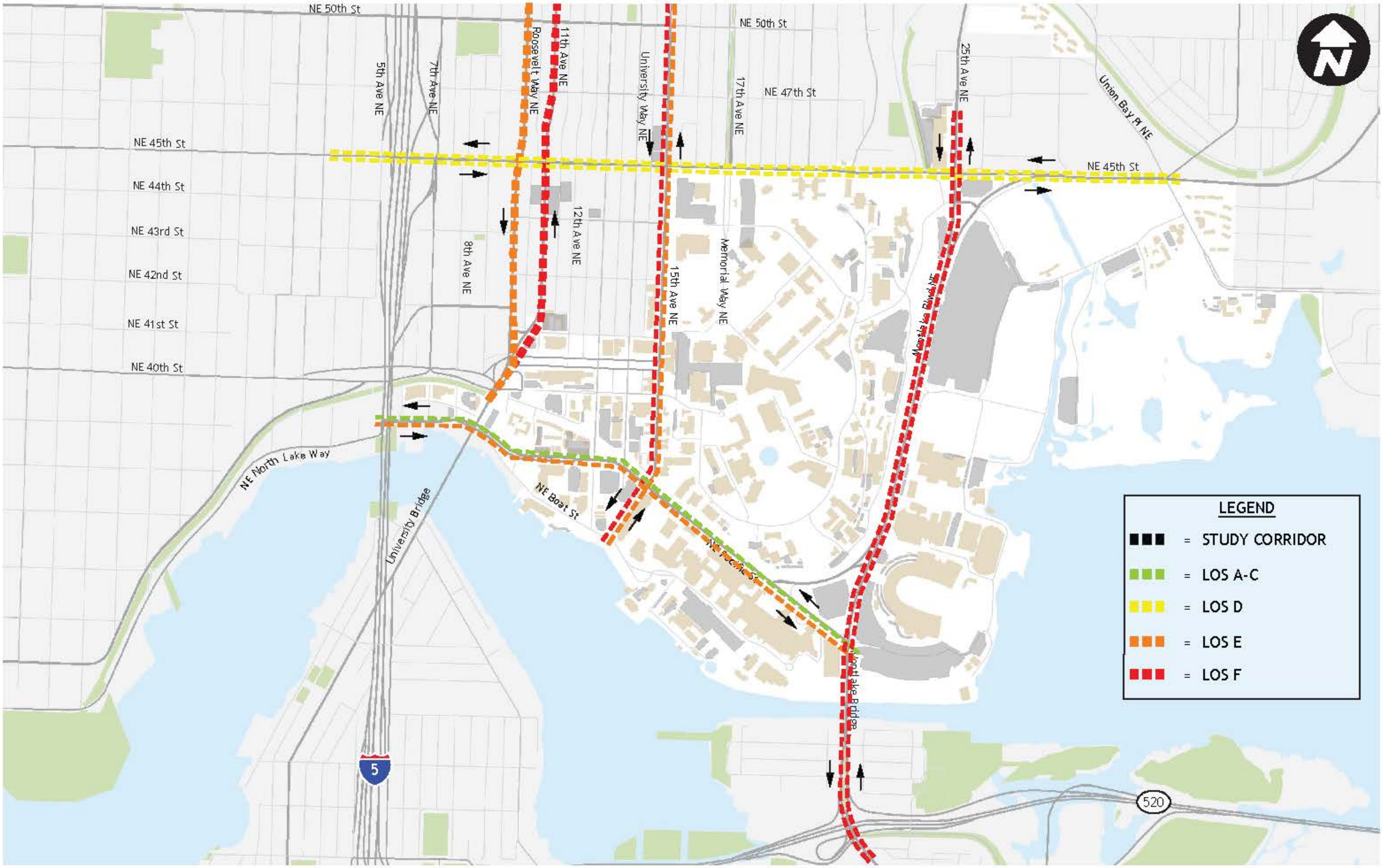
Table 10.5 summarizes the No Action and Alternative 2 corridor travel times and speeds. Detailed corridor operations worksheets are provided in Appendix C. Generally, it was observed that traffic volume increases along Montlake Boulevard NE were less under the U District Up Zone EIS Alternative 2B model than those observed in the Seattle Comprehensive Alternative 5.

Table 10.5
FUTURE NO ACTION AND ALTERNATIVE 2 CUMULATIVE WEEKDAY PM PEAK HOUR CORRIDOR LOS SUMMARY

Corridor	No Action - Cumulative		Alternative 2 - Cumulative	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	F	5.0	F	4.0
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	8.0	E	7.6
Southbound	D	9.2	E	7.1
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	11.5	F	9.7
Southbound	F	3.7	F	8.4
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	12.0	D	11.3
Westbound	D	11.6	D	11.0
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.3	E	11.1
Westbound	C	21.9	C	20.6
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	10.4	E	8.9

1. Level of service.
2. Average speed.

As shown in Table 10.5 and on Figure 10.6, during the future Alternative 2 weekday PM peak hour conditions most corridors are anticipated to operate at the same LOS as under No Action conditions with the exceptions of four corridors. Southbound 15th Avenue NE is anticipated to degrade from LOS D to LOS E, northbound Montlake Boulevard NE is anticipated to degrade from LOS E to LOS F, eastbound NE Pacific Street is anticipated to degrade from LOS C to LOS E, and southbound Roosevelt Way NE is anticipated to degrade from LOS D to LOS E. Detailed corridor operations worksheets are provided in Appendix C.



Future (2028) Alternative 2 Weekday PM Peak Hour Corridor Traffic Operations - Cumulative Analysis

FIGURE **10.6**

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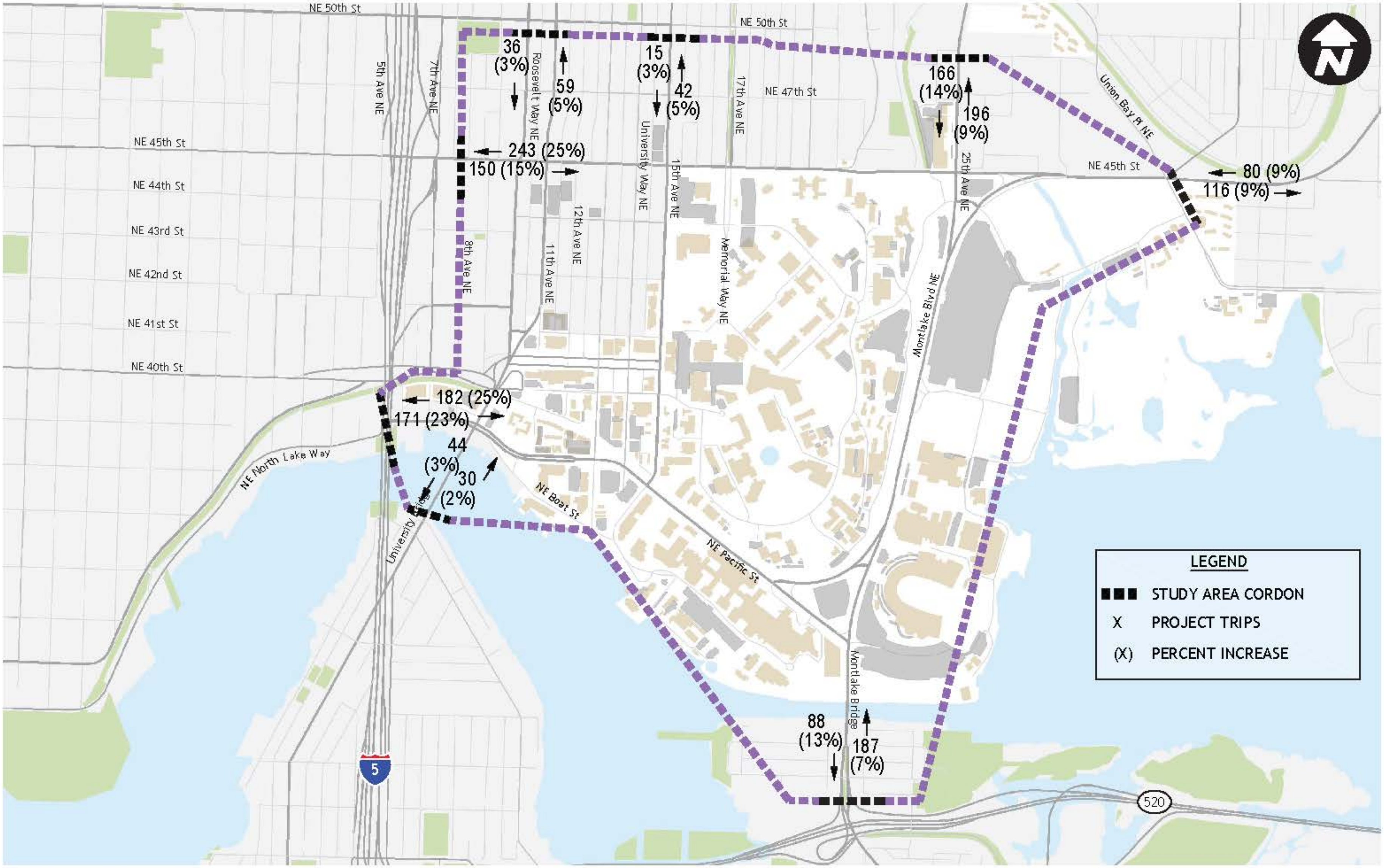
10.5.2 Cumulative Cordon Volume Analysis

To understand the volumes associated with the University of Washington, related to background volumes under the different Alternative scenarios, a cordon volume analysis was completed. The cordon volume analysis focuses on the major roadways leading to and from the University. The cordon volume analysis also shows the percent of total trips along the corridor that are associated with the increased traffic generated by Alternative 2. The cordon volume and project share associated with the Alternative 2 cumulative analysis are shown on Figure 10.7. Note that this reflects the percent increase associated with continued development on campus.



Future (2028) Alternative 2 PM Peak Hour Cordon Volumes and Proportional Increase - Cumulative Analysis

FIGURE **10.7**

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10.5.3 Cumulative Screenline Analysis: Primary Impact Zone

The following section describes the screenline analysis completed for two designated screenlines within the study area. Screenlines are imaginary lines across which the number of passing vehicles is counted. In this study, screenlines were selected to count vehicle traffic entering and exiting the University of Washington primary and secondary impact zones. As part of the Mayor's Seattle 2035 Comprehensive Plan (City of Seattle, 2016), two screenlines are identified within the vicinity of the University of Washington, as shown in Figure 10.8. Screenline 5.16 is an east-west screenline, measuring north-south travel, and extending along the ship canal to include the University and Montlake Bridges. Screenline 13.13 is a north-south screenline, measuring east-west travel, and extending east of I-5 between NE Pacific Street and NE Ravenna Boulevard.

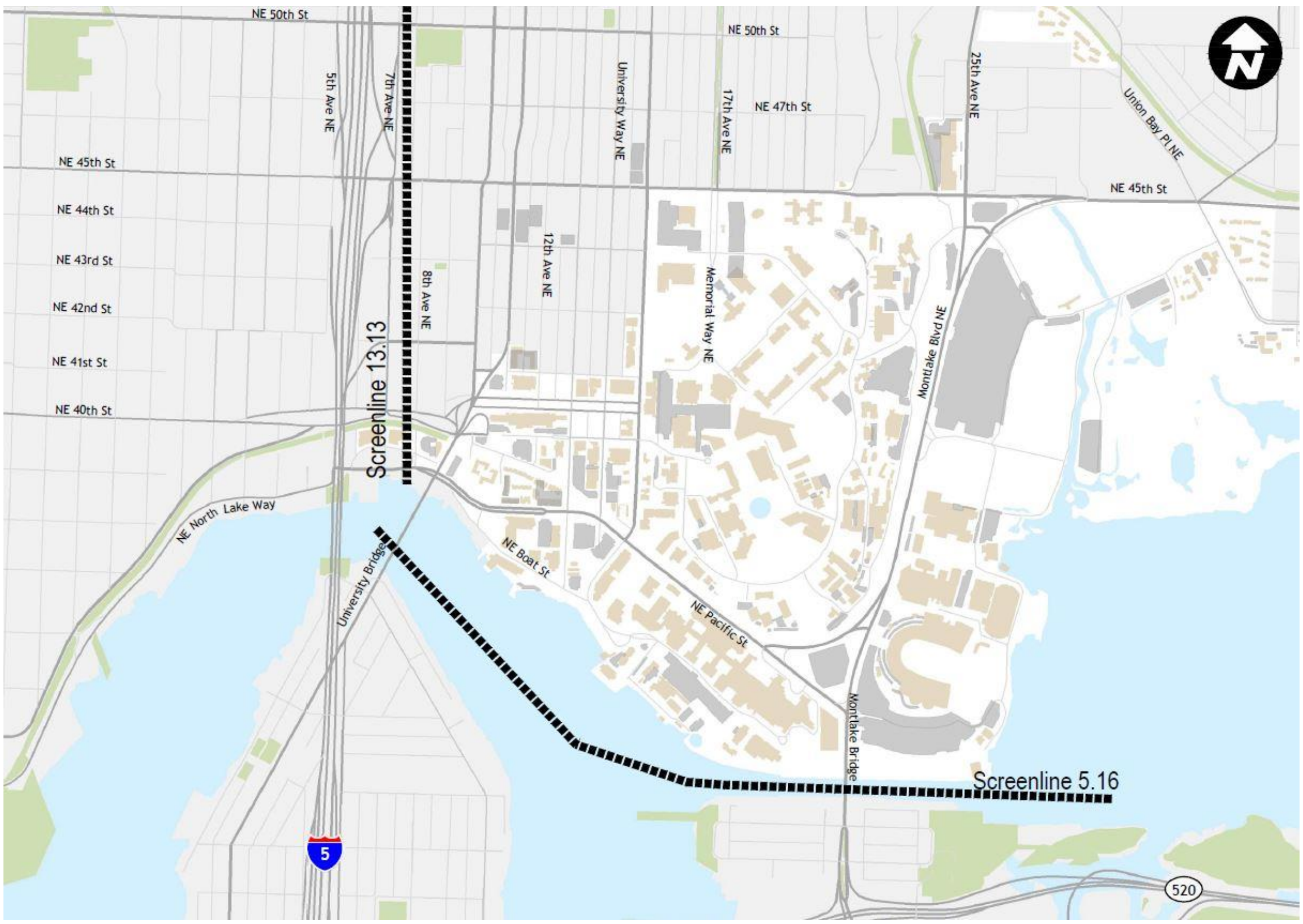


Figure 10.8 Study Area Screenlines

The screenline analysis includes volume to capacity (V/C) calculations for the vehicles traversing the screenlines using future (2028) Alternative 2 cumulative analysis traffic volumes and interpolated roadway capacity estimates. Roadway capacity for the 2028 future horizon year was interpolated using 2016 capacity estimates described in Table 3.12 and 2035 capacity estimates referenced in the May 2016 Seattle Comprehensive Plan Update Final EIS. Future (2028) roadway capacity estimates are shown

in Table 10.6 below. Detailed screenline volumes and volume to capacity calculations are included in Appendix C.

Table 10.6
FUTURE (2028) CAPACITY

Screenline	Future (2028) Capacity
5.16 – Ship Canal, University and Montlake Bridges	
Northbound	4,210
Southbound	4,210
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard	
Eastbound	6,119
Westbound	6,119

Source: Transpo Group, 2016

Level of service standards for the screenline analysis are based on the volume to capacity ratio of a screenline. As described in the Seattle Comprehensive Plan Update EIS, the LOS standard volume to capacity ratio for Screenline 5.16 and Screenline 13.13 are 1.20 and 1.00, respectively. For this study, screenline volume to capacity ratios that do not exceed the LOS standard are acceptable. The Alternative 2 cumulative screenline analysis is included in Table 10.7. Detailed screenline analysis calculations are included in Appendix C.

Table 10.7
FUTURE (2028) ALTERNATIVE 2 CUMULATIVE SCREENLINE ANALYSIS

Screenline	Screenline Volume	Capacity	V/C	LOS Standard V/C
5.16 – Ship Canal, University and Montlake Bridges				
Northbound	4,052	4,210	0.96	1.20
Southbound	4,332	4,210	1.03	1.20
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard				
Eastbound	3,641	6,119	0.60	1.00
Westbound	3,883	6,119	0.63	1.00

Source: NACTO, Seattle Comprehensive Plan Update EIS, and Transpo Group, 2016

As shown in Table 10.7, all Alternative 2 cumulative screenline volume to capacity ratios meet the acceptable LOS standard.

10.6 ALTERNATIVE 3

10.6.1 Cumulative Arterial Operations

Corridor travel times/speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated with the addition of project generated traffic associated with Alternative 3, consistent with the previously described methodology for existing and future No Action conditions. This includes the application of the adjustment factors previously described.

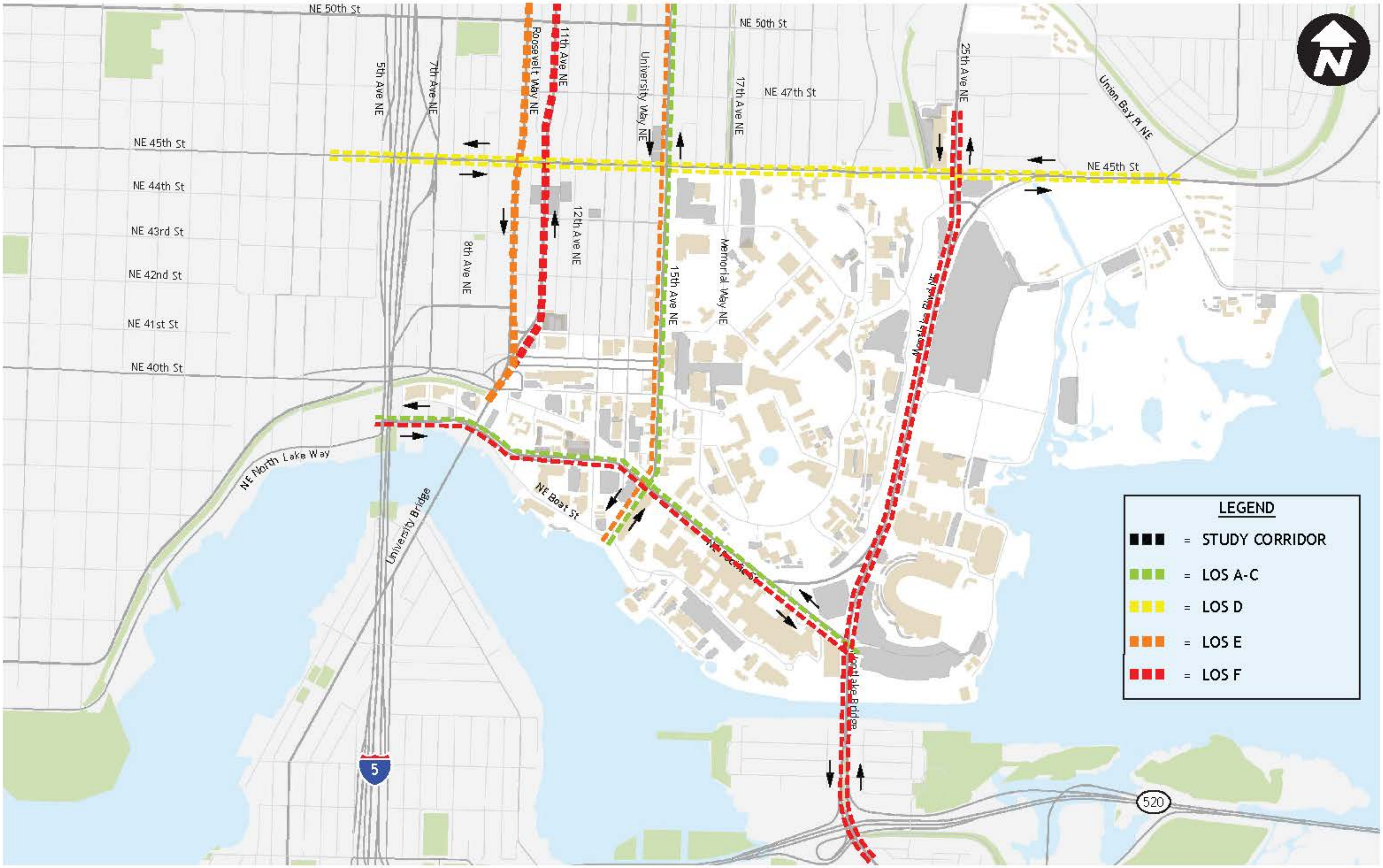
Table 10.8 summarizes the No Action and Alternative 3 corridor travel times and speeds. Detailed corridor operations worksheets are provided in Appendix C. Generally, it was observed that traffic volume increases along Montlake Boulevard NE were less under the U District Up Zone EIS Alternative 2B model than those observed in the Seattle Comprehensive Alternative 5.

Table 10.8
FUTURE NO ACTION AND ALTERNATIVE 3 CUMULATIVE WEEKDAY PM PEAK HOUR CORRIDOR LOS SUMMARY

Corridor	No Action - Cumulative		Alternative 3 - Cumulative	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	F	5.0	F	3.9
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	8.0	E	7.4
Southbound	D	9.2	E	7.2
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	11.5	F	10.0
Southbound	F	3.7	F	8.6
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	12.0	D	11.3
Westbound	D	11.6	D	11.0
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.3	F	10.0
Westbound	C	21.9	C	20.6
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	10.4	E	8.8

1. Level of service.
2. Average speed.

As shown in Table 10.8 and on Figure 10.9, during the future Alternative 3 weekday PM peak hour conditions most corridors are anticipated to operate at the same LOS as under No Action conditions with the exceptions of four corridors. Southbound 15th Avenue NE is anticipated to degrade from LOS D to LOS E, northbound Montlake Boulevard NE are anticipated to degrade from LOS E to LOS F, and eastbound NE Pacific Street is anticipated to degrade from LOS C to LOS F. Detailed corridor operations worksheets are provided in Appendix C.



Future (2028) Alternative 3 Weekday PM Peak Hour Corridor Traffic Operations - Cumulative Analysis

FIGURE **10.9**

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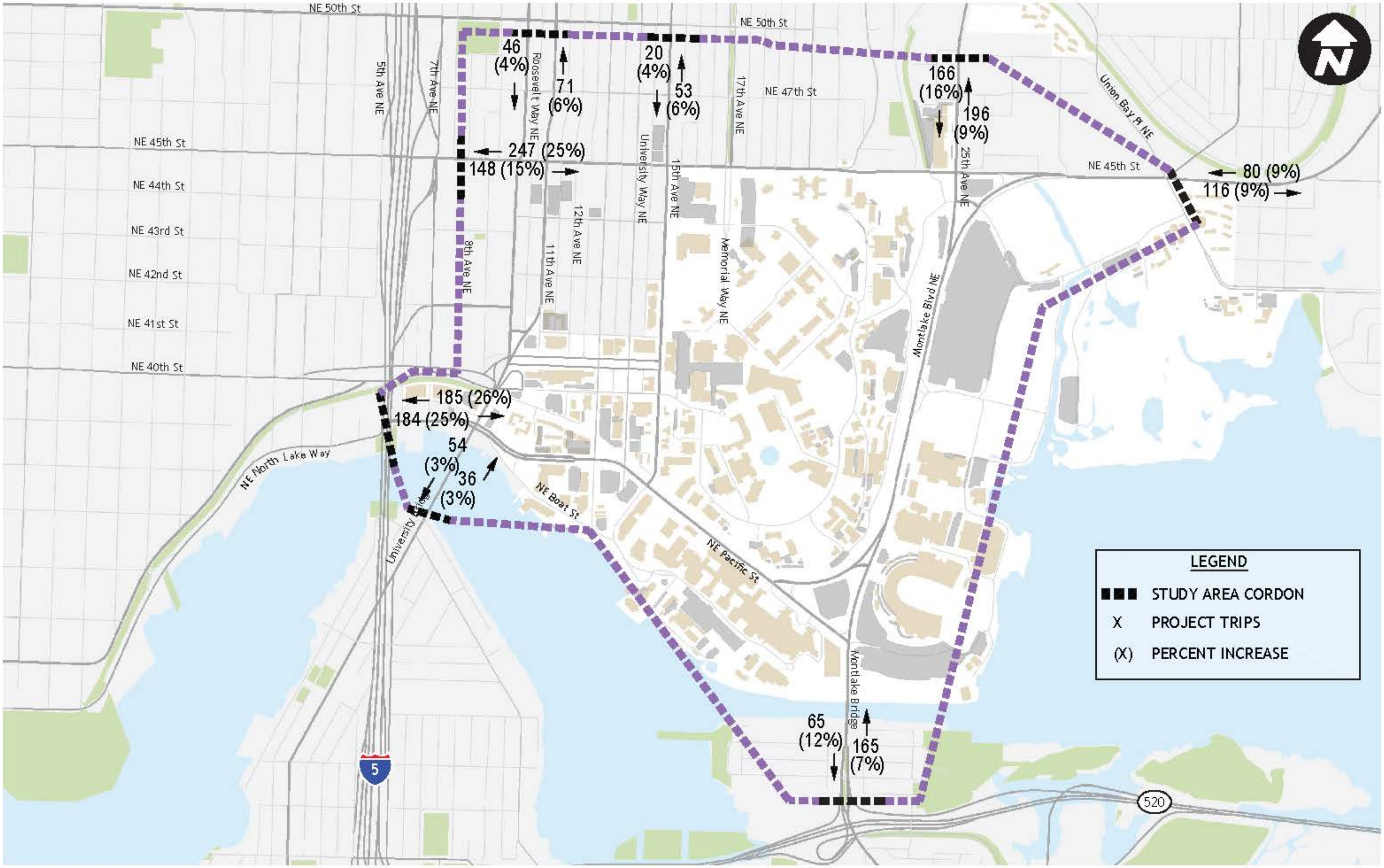
10.6.2 Cumulative Cordon Volume Analysis

To understand the volumes associated with the University of Washington, related to background volumes under the different Alternative scenarios, a cordon volume analysis was completed. The cordon volume analysis focuses on the major roadways leading to and from the University. The cordon volume analysis also shows the percent of total trips along the corridor that are associated with the increased traffic generated by Alternative 3. The cordon volume and project share associated with the Alternative 3 cumulative analysis are shown on Figure 10.10. Note that this reflects the percent increase associated with continued development on campus.



Future (2028) Alternative 3 PM Peak Hour Cordon Volumes and Proportional Increase - Cumulative Analysis

FIGURE 10.10

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10.6.3 Cumulative Screenline Analysis: Primary Impact Zone

The following section describes the screenline analysis completed for two designated screenlines within the study area. Screenlines are imaginary lines across which the number of passing vehicles is counted. In this study, screenlines were selected to count vehicle traffic entering and exiting the University of Washington primary and secondary impact zones. As part of the Mayor's Seattle 2035 Comprehensive Plan (City of Seattle, 2016), two screenlines are identified within the vicinity of the University of Washington, as shown in Figure 10.11. Screenline 5.16 is an east-west screenline, measuring north-south travel, and extending along the ship canal to include the University and Montlake Bridges. Screenline 13.13 is a north-south screenline, measuring east-west travel, and extending east of I-5 between NE Pacific Street and NE Ravenna Boulevard.

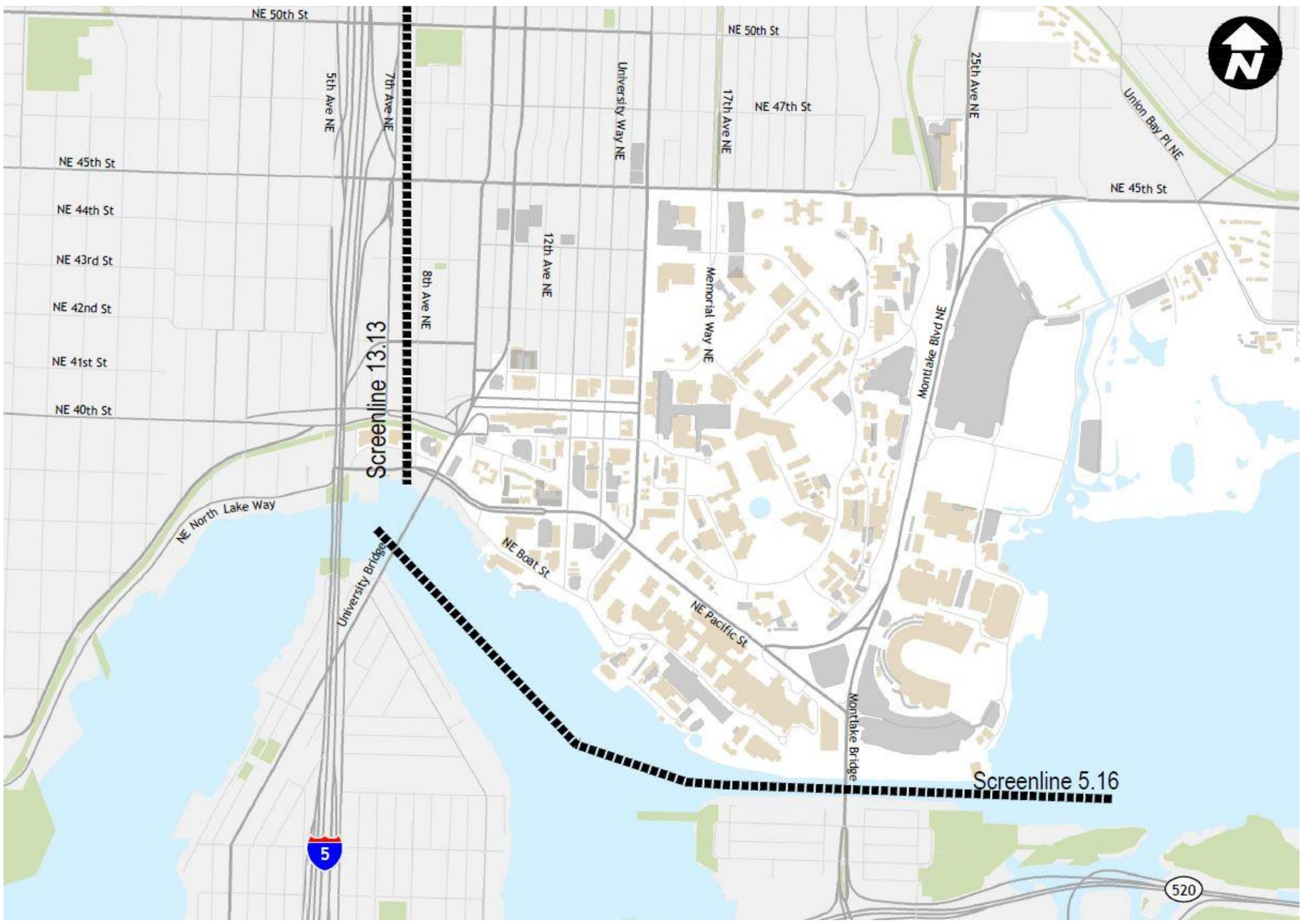


Figure 10.11 Study Area Screenlines

The screenline analysis includes volume to capacity (V/C) calculations for the vehicles traversing the screenlines using future (2028) Alternative 3 cumulative analysis traffic volumes and interpolated roadway capacity estimates. Roadway capacity for the 2028 future horizon year was interpolated using 2016 capacity estimates described in Table 3.12 and 2035 capacity estimates referenced in the May 2016 Seattle Comprehensive Plan Update Final EIS. Future (2028) roadway capacity estimates are shown

in Table 10.9 below. Detailed screenline volumes and volume to capacity calculations are included in Appendix C.

Table 10.9
FUTURE (2028) CAPACITY

Screenline	Future (2028) Capacity
5.16 – Ship Canal, University and Montlake Bridges	
Northbound	4,210
Southbound	4,210
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard	
Eastbound	6,119
Westbound	6,119

Source: Transpo Group, 2016

Level of service standards for the screenline analysis are based on the volume to capacity ratio of a screenline. As described in the Seattle Comprehensive Plan Update EIS, the LOS standard volume to capacity ratio for Screenline 5.16 and Screenline 13.13 are 1.20 and 1.00, respectively. For this study, screenline volume to capacity ratios that do not exceed the LOS standard are acceptable. The Alternative 3 cumulative screenline analysis is included in Table 10.10. Detailed screenline analysis calculations are included in Appendix C.

Table 10.10
FUTURE (2028) ALTERNATIVE 3 CUMULATIVE SCREENLINE ANALYSIS

Screenline	Screenline Volume	Capacity	V/C	LOS Standard V/C
5.16 – Ship Canal, University and Montlake Bridges				
Northbound	4,036	4,210	0.96	1.20
Southbound	4,319	4,210	1.03	1.20
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard				
Eastbound	3,655	6,119	0.60	1.00
Westbound	3,896	6,119	0.64	1.00

Source: NACTO, Seattle Comprehensive Plan Update EIS, and Transpo Group, 2016

As shown in Table 10.10, all Alternative 3 cumulative screenline volume to capacity ratios meet the acceptable LOS standard.

10.7 ALTERNATIVE 4

10.7.1 Cumulative Arterial Operations

Corridor travel times/speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated with the addition of project generated traffic associated with Alternative 4, consistent with the previously described methodology for existing and future No Action conditions. This includes the application of the adjustment factors previously described.

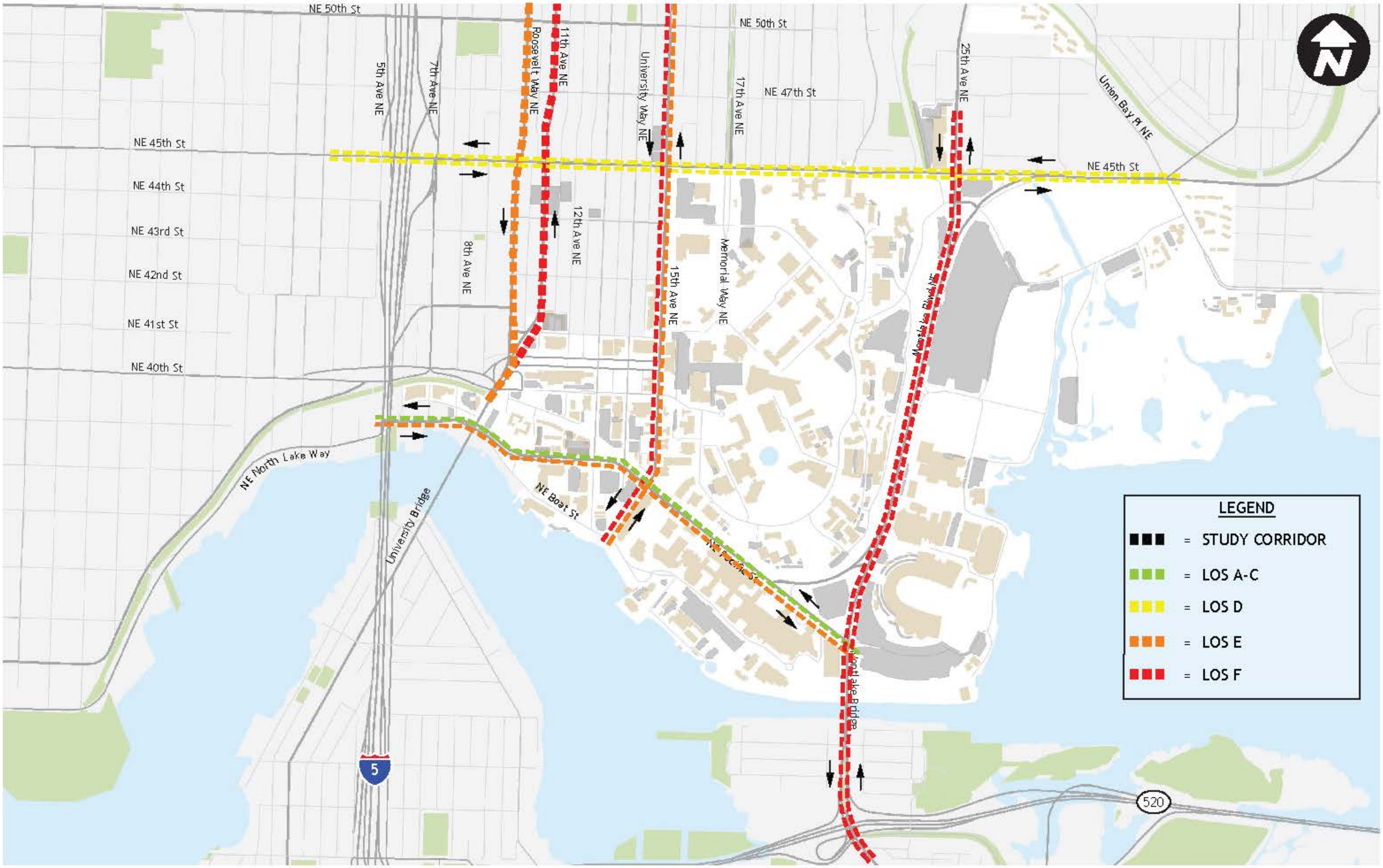
Table 10.11 summarizes the No Action and Alternative 4 corridor travel times and speeds. Detailed corridor operations worksheets are provided in Appendix C. Generally, it was observed that traffic volume increases along Montlake Boulevard NE were less under the U District Up Zone EIS Alternative 2B model than those observed in the Seattle Comprehensive Alternative 5.

Table 10.11
FUTURE NO ACTION AND ALTERNATIVE 4 CUMULATIVE WEEKDAY PM PEAK HOUR CORRIDOR LOS SUMMARY

Corridor	No Action - Cumulative		Alternative 4 - Cumulative	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	F	5.0	F	4.0
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	8.0	E	7.5
Southbound	D	9.2	F	6.8
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	11.5	F	10.0
Southbound	F	3.7	F	8.7
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	12.0	D	11.3
Westbound	D	11.6	D	10.8
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.3	E	11.9
Westbound	C	21.9	C	20.8
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	10.4	E	8.9

1. Level of service.
2. Average speed.

As shown in Table 10.11 and on Figure 10.12, during the future Alternative 4 weekday PM peak hour conditions most corridors are anticipated to operate at the same LOS as under No Action conditions with the exceptions of four corridors. Southbound 15th Avenue NE is anticipated to degrade from LOS D to LOS F, northbound Montlake Boulevard NE is anticipated to degrade from LOS E to LOS F, and eastbound NE Pacific Street is anticipated to degrade from LOS C to LOS E. Detailed corridor operations worksheets are provided in Appendix C.



Future (2028) Alternative 4 Weekday PM Peak Hour Corridor Traffic Operations - Cumulative Analysis

FIGURE 10.12

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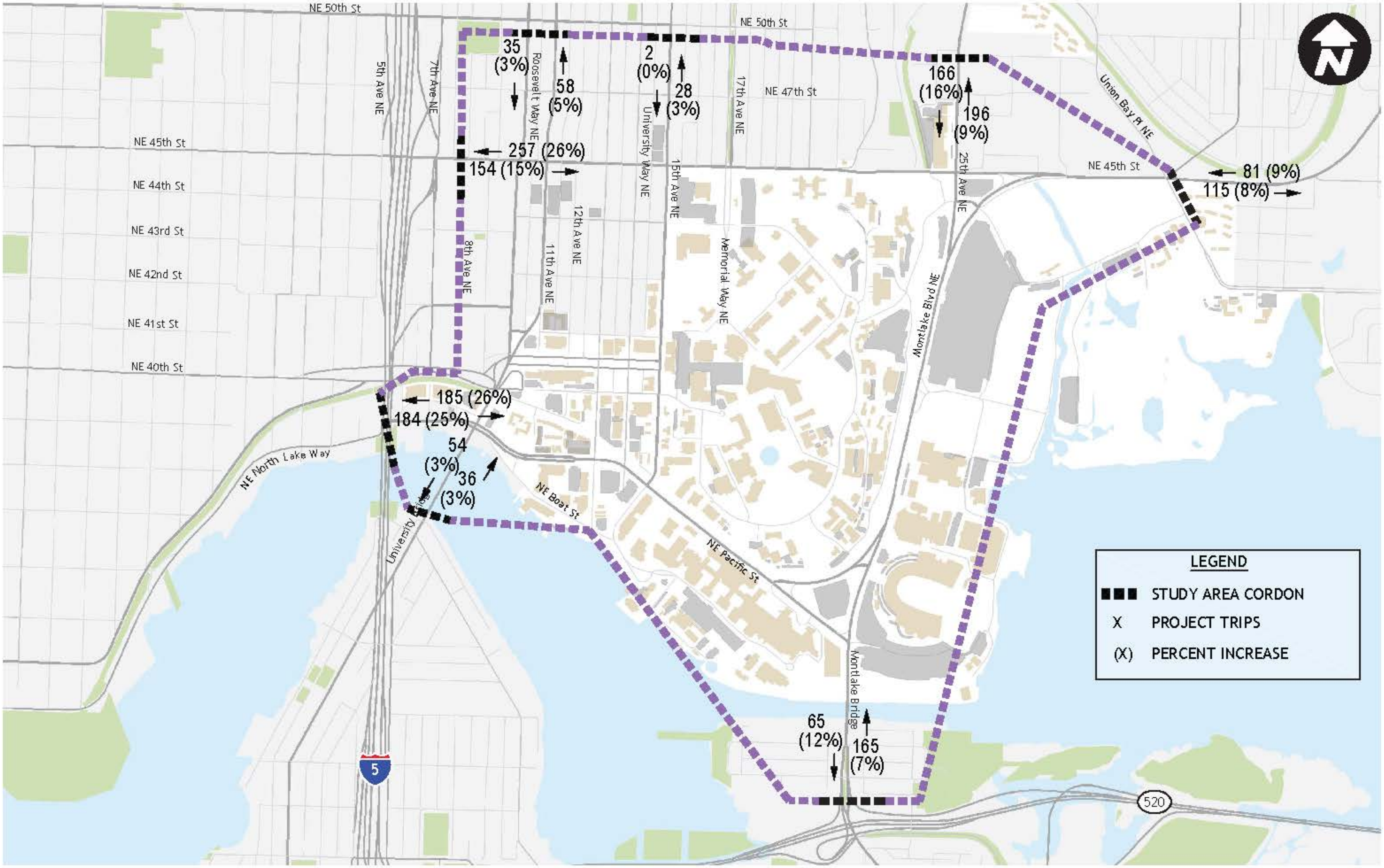
10.7.2 Cumulative Cordon Volume Analysis

To understand the volumes associated with the University of Washington, related to background volumes under the different Alternative scenarios, a cordon volume analysis was completed. The cordon volume analysis focuses on the major roadways leading to and from the University. The cordon volume analysis also shows the percent of total trips along the corridor that are associated with the increased traffic generated by Alternative 4. The cordon volume and project share associated with the Alternative 4 cumulative analysis are shown on Figure 10.13. Note that this reflects the percent increase associated with continued development on campus.



Future (2028) Alternative 4 PM Peak Hour Cordon Volumes and Proportional Increase - Cumulative Analysis

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FIGURE **10.13**

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10.7.3 Cumulative Screenline Analysis: Primary Impact Zone

The following section describes the screenline analysis completed for two designated screenlines within the study area. Screenlines are imaginary lines across which the number of passing vehicles is counted. In this study, screenlines were selected to count vehicle traffic entering and exiting the University of Washington primary and secondary impact zones. As part of the Mayor's Seattle 2035 Comprehensive Plan (City of Seattle, 2016), two screenlines are identified within the vicinity of the University of Washington, as shown in Figure 10.14. Screenline 5.16 is an east-west screenline, measuring north-south travel, and extending along the ship canal to include the University and Montlake Bridges. Screenline 13.13 is a north-south screenline, measuring east-west travel, and extending east of I-5 between NE Pacific Street and NE Ravenna Boulevard.

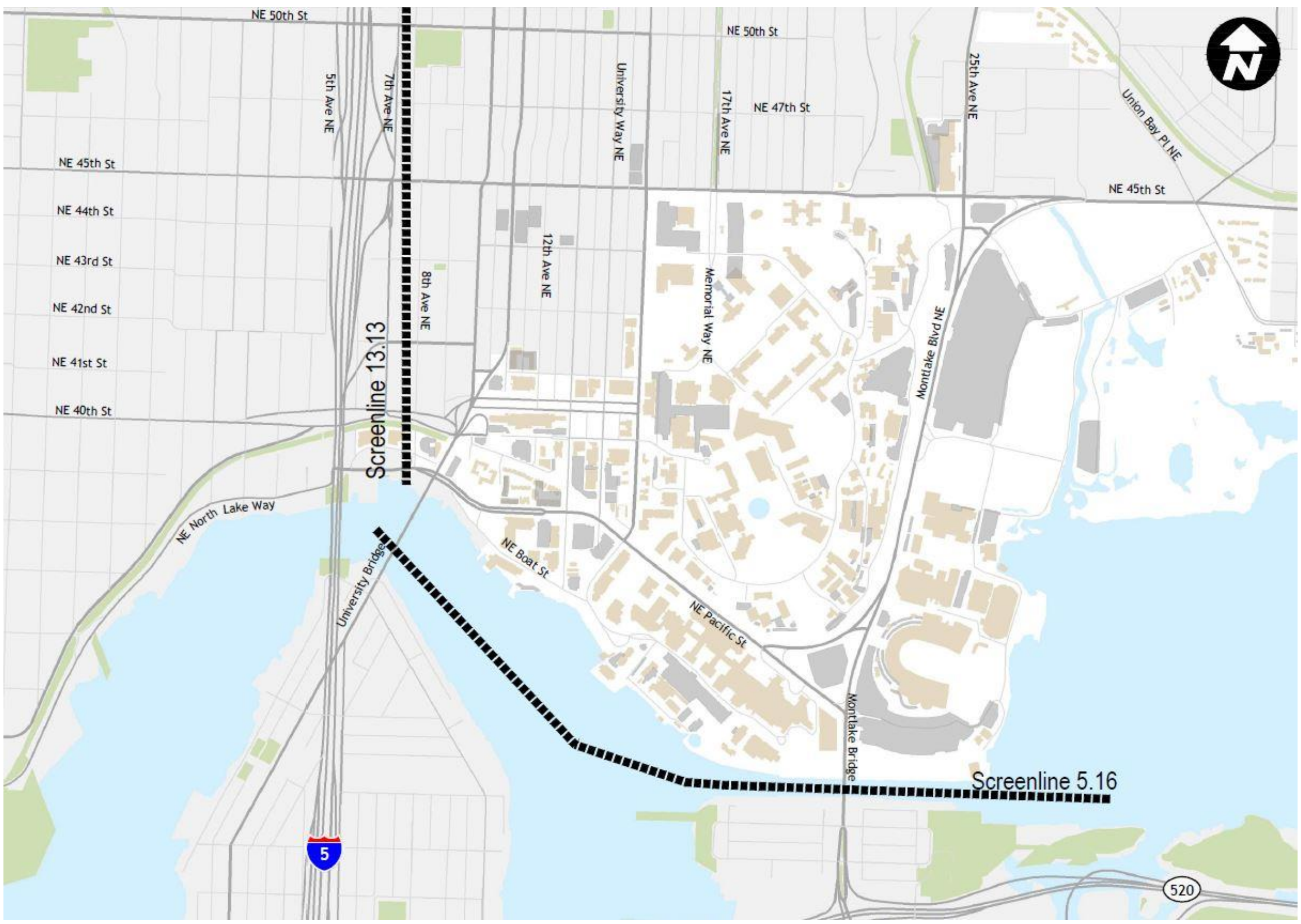


Figure 10.14 Study Area Screenlines

The screenline analysis includes volume to capacity (V/C) calculations for the vehicles traversing the screenlines using future (2028) Alternative 4 cumulative analysis traffic volumes and interpolated roadway capacity estimates. Roadway capacity for the 2028 future horizon year was interpolated using 2016 capacity estimates described in Table 3.12 and 2035 capacity estimates referenced in the May 2016 Seattle Comprehensive Plan Update Final EIS. Future (2028) roadway capacity estimates are shown

in Table 10.12 below. Detailed screenline volumes and volume to capacity calculations are included in Appendix C.

Table 10.12
FUTURE (2028) CAPACITY

Screenline	Future (2028) Capacity
5.16 – Ship Canal, University and Montlake Bridges	
Northbound	4,210
Southbound	4,210
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard	
Eastbound	6,119
Westbound	6,119

Source: Transpo Group, 2016

Level of service standards for the screenline analysis are based on the volume to capacity ratio of a screenline. As described in the Seattle Comprehensive Plan Update EIS, the LOS standard volume to capacity ratio for Screenline 5.16 and Screenline 13.13 are 1.20 and 1.00, respectively. For this study, screenline volume to capacity ratios that do not exceed the LOS standard are acceptable. The Alternative 4 cumulative screenline analysis is included in Table 10.13. Detailed screenline analysis calculations are included in Appendix C.

Table 10.13
FUTURE (2028) ALTERNATIVE 4 CUMULATIVE SCREENLINE ANALYSIS

Screenline	Screenline Volume	Capacity	V/C	LOS Standard V/C
5.16 – Ship Canal, University and Montlake Bridges				
Northbound	4,036	4,210	0.96	1.20
Southbound	4,319	4,210	1.03	1.20
13.13 – East of I-5, NE Pacific Street to NE Ravenna Boulevard				
Eastbound	3,655	6,119	0.60	1.00
Westbound	3,898	6,119	0.64	1.00

Source: NACTO, Seattle Comprehensive Plan Update EIS, and Transpo Group, 2016

As shown in Table 10.13, all Alternative 4 cumulative screenline volume to capacity ratios meet the acceptable LOS standard.

10.8 ALTERNATIVE 5

10.8.1 Cumulative Arterial Operations

Corridor travel times/speeds along NE 45th Street, Pacific Street, 11th Avenue NE, Roosevelt Way NE, 15th Avenue NE, and Montlake Boulevard NE were evaluated with the addition of project generated traffic associated with Alternatives 5.1-5.4, consistent with the previously described methodology for existing and future No Action conditions. This includes the application of the adjustment factors previously described.

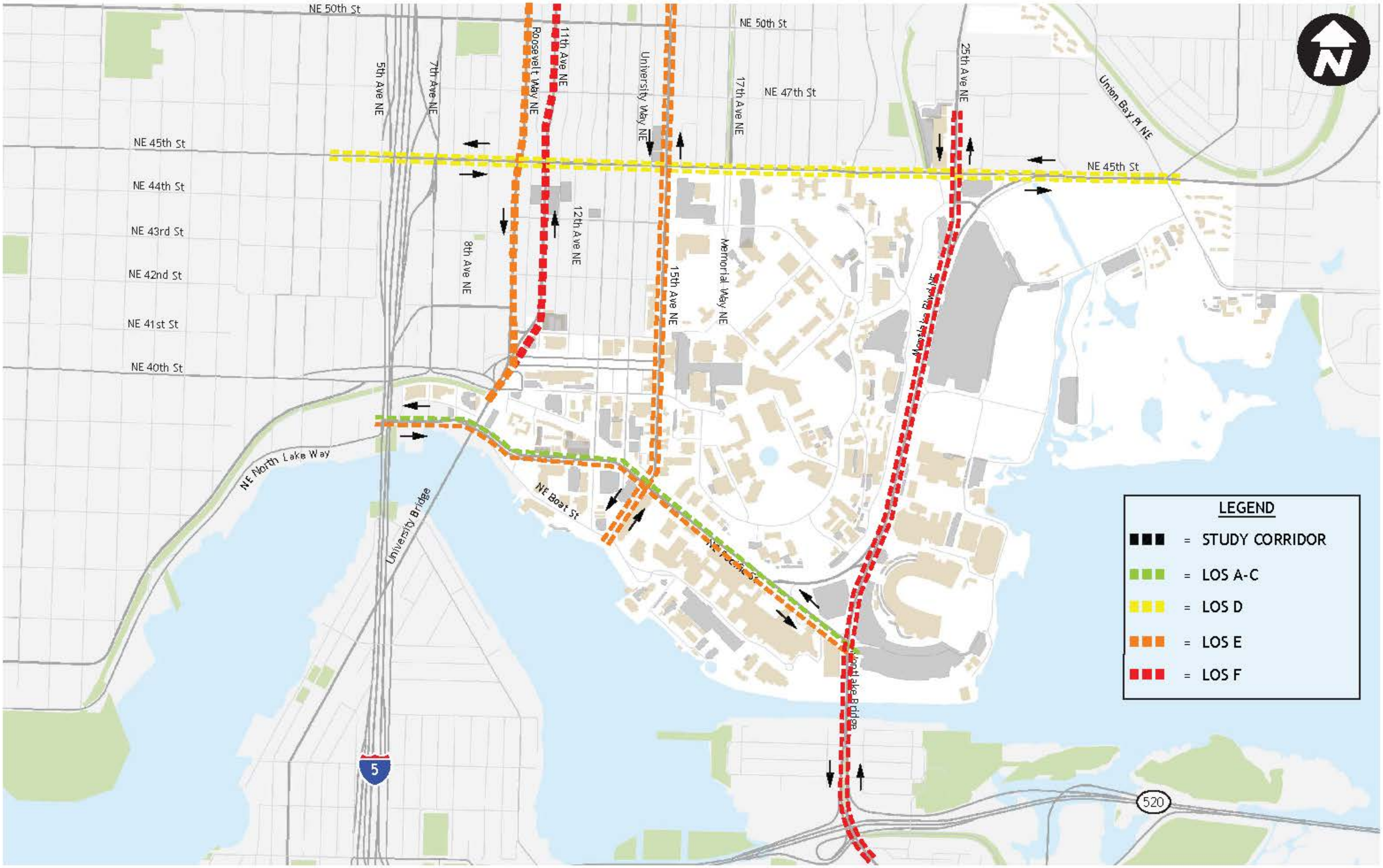
Table 10.14 summarizes the No Action and Alternative 5.1 corridor travel times and speeds. Detailed corridor operations worksheets are provided in Appendix C. Generally, it was observed that traffic volume increases along Montlake Boulevard NE were less under the U District Up Zone EIS Alternative 2B model than those observed in the Seattle Comprehensive Alternative 5.

Table 10.14
FUTURE NO ACTION AND ALTERNATIVE 5.1 CUMULATIVE WEEKDAY PM PEAK HOUR CORRIDOR LOS SUMMARY

Corridor	No Action - Cumulative		Alternative 5.1 - Cumulative	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	F	5.0	F	3.9
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	8.0	E	7.4
Southbound	D	9.2	E	7.4
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	11.5	F	9.9
Southbound	F	3.7	F	8.5
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	12.0	D	11.3
Westbound	D	11.6	D	11.0
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.3	E	12.9
Westbound	C	21.9	C	21.8
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	10.4	E	8.8

1. Level of service.
2. Average speed.

As shown in Table 10.14 and on Figure 10.15, during the future Alternative 5.1 weekday PM peak hour conditions most corridors are anticipated to operate at the same LOS as under No Action conditions with the exceptions of four corridors. Southbound 15th Avenue NE is anticipated to degrade from LOS D to LOS E, northbound Montlake Boulevard NE is anticipated to degrade from LOS E to LOS F, eastbound NE Pacific Street is anticipated to degrade from LOS C to LOS E, and southbound Roosevelt Way NE is anticipated to degrade from LOS D to LOS E. Detailed corridor operations worksheets are provided in Appendix C.



Future (2028) Alternative 5.1 Weekday PM Peak Hour Corridor Traffic Operations - Cumulative Analysis

FIGURE **10.15**

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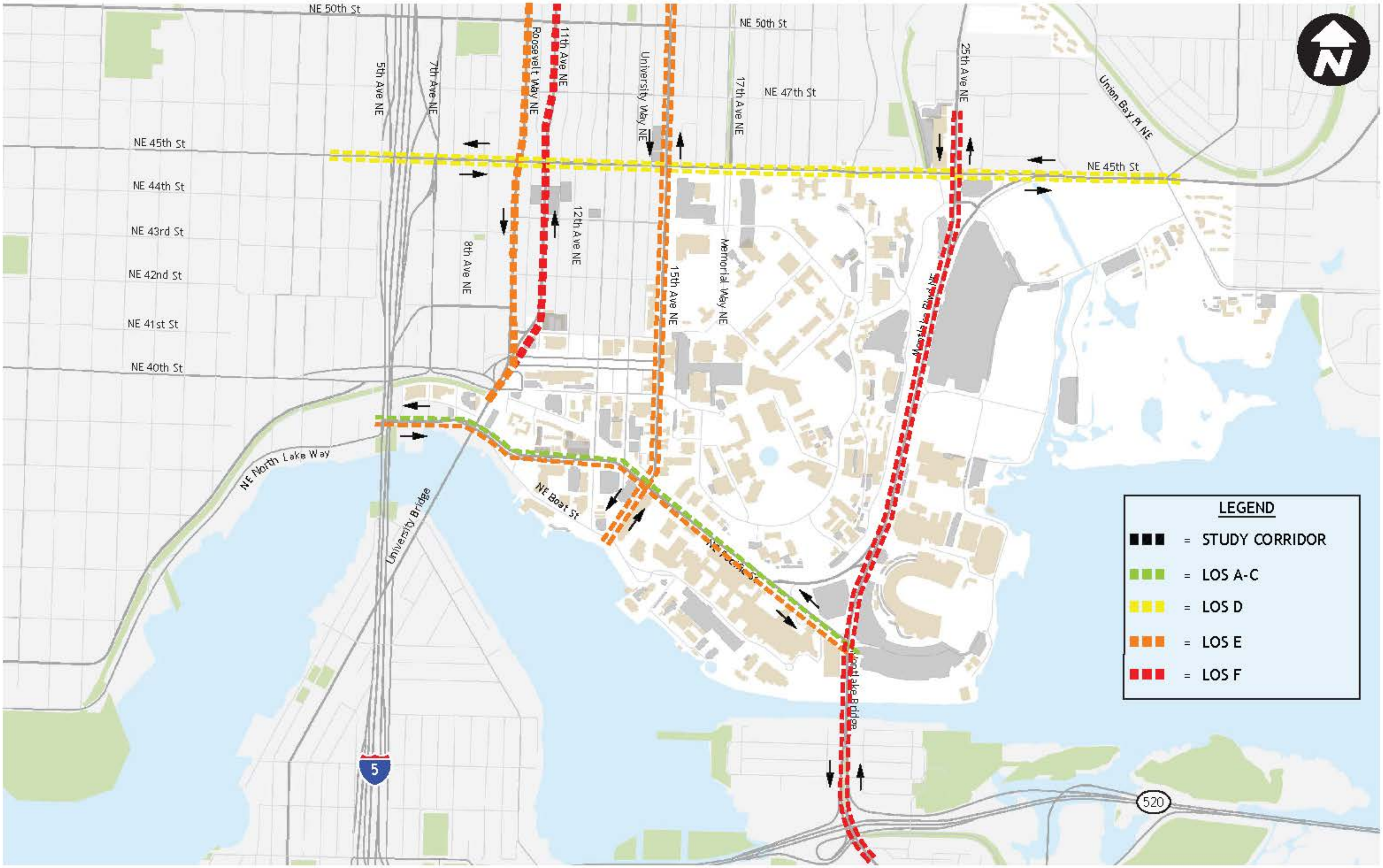
Table 10.15 summarizes the No Action and Alternative 5.2 corridor travel times and speeds. Detailed corridor operations worksheets are provided in Appendix C. Generally, it was observed that traffic volume increases along Montlake Boulevard NE were less under the U District Up Zone EIS Alternative 2B model than those observed in the Seattle Comprehensive Alternative 5.

Table 10.15
FUTURE NO ACTION AND ALTERNATIVE 5.2 CUMULATIVE WEEKDAY PM PEAK HOUR CORRIDOR LOS SUMMARY

Corridor	No Action - Cumulative		Alternative 5.2 - Cumulative	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	F	5.0	F	4.0
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	8.0	E	7.5
Southbound	D	9.2	E	7.5
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	11.5	F	9.7
Southbound	F	3.7	F	8.4
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	12.0	D	11.3
Westbound	D	11.6	D	11.0
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.3	E	13.2
Westbound	C	21.9	C	21.8
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	10.4	E	8.9

1. Level of service.
2. Average speed.

As shown in Table 10.15 and on Figure 10.16, during the future Alternative 5.2 weekday PM peak hour conditions most corridors are anticipated to operate at the same LOS as under No Action conditions with the exceptions of four corridors. Southbound 15th Avenue NE is anticipated to degrade from LOS D to LOS E, northbound Montlake Boulevard NE is anticipated to degrade from LOS E to LOS F, eastbound NE Pacific Street is anticipated to degrade from LOS C to LOS E, and southbound Roosevelt Way NE is anticipated to degrade from LOS D to LOS E. Detailed corridor operations worksheets are provided in Appendix C.



Future (2028) Alternative 5.2 Weekday PM Peak Hour Corridor Traffic Operations - Cumulative Analysis

FIGURE **10.16**

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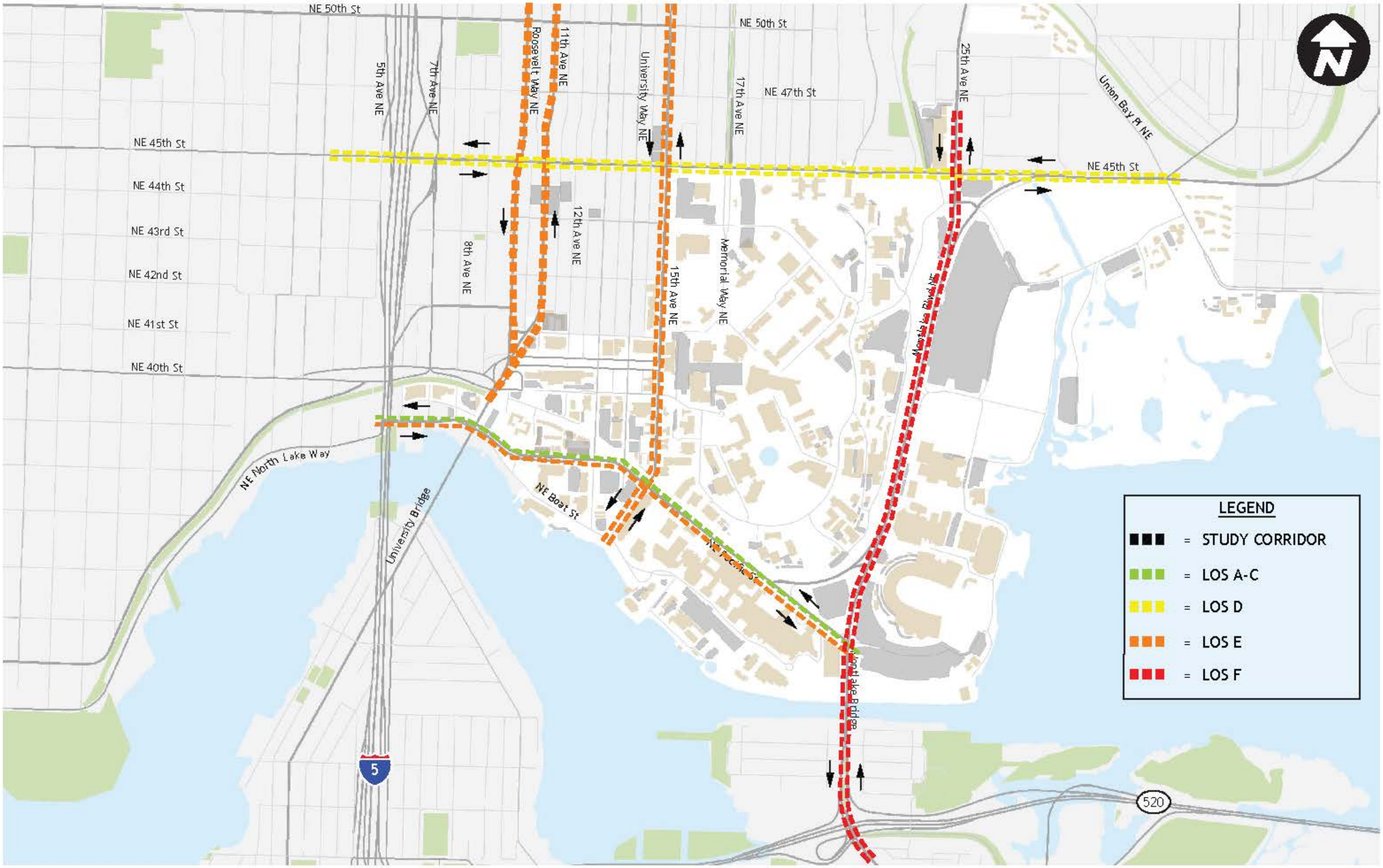
Table 10.16 summarizes the No Action and Alternative 5.3 corridor travel times and speeds. Detailed corridor operations worksheets are provided in Appendix C. Generally, it was observed that traffic volume increases along Montlake Boulevard NE were less under the U District Up Zone EIS Alternative 2B model than those observed in the Seattle Comprehensive Alternative 5.

Table 10.16
FUTURE NO ACTION AND ALTERNATIVE 5.3 CUMULATIVE WEEKDAY PM PEAK HOUR CORRIDOR LOS SUMMARY

Corridor	No Action - Cumulative		Alternative 5.3 - Cumulative	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	F	5.0	E	7.9
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	8.0	E	7.3
Southbound	D	9.2	E	7.2
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	11.5	F	10.0
Southbound	F	3.7	F	8.6
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	12.0	D	11.3
Westbound	D	11.6	D	11.0
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.3	E	12.8
Westbound	C	21.9	C	21.9
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	10.4	E	8.7

1. Level of service.
2. Average speed.

As shown in Table 10.16 and on Figure 10.17, during the future Alternative 5.3 weekday PM peak hour conditions most corridors are anticipated to operate at the same LOS as under No Action conditions with the exceptions of five corridors. Northbound 11th Avenue NE is anticipated to improve from LOS F to LOS E, southbound 15th Avenue NE is anticipated to degrade from LOS D to LOS E, northbound Montlake Boulevard NE is anticipated to degrade from LOS E to LOS F, eastbound NE Pacific Street is anticipated to degrade from LOS C to LOS E, and southbound Roosevelt Way NE is anticipated to degrade from LOS D to LOS E. Detailed corridor operations worksheets are provided in Appendix C.



Future (2028) Alternative 5.3 Weekday PM Peak Hour Corridor Traffic Operations - Cumulative Analysis

FIGURE **10.17**

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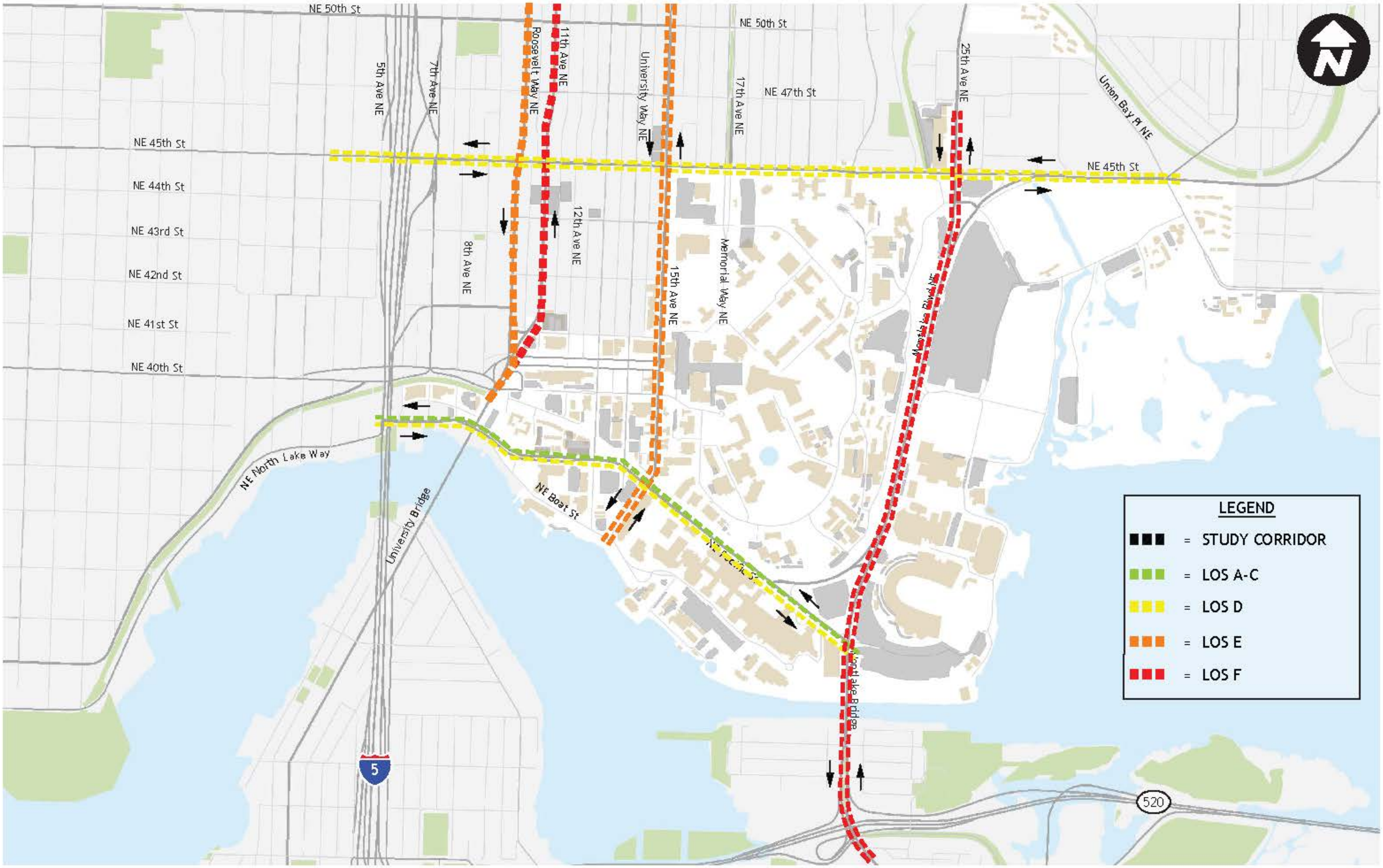
Table 10.17 summarizes the No Action and Alternative 5.4 corridor travel times and speeds. Detailed corridor operations worksheets are provided in Appendix C. Generally, it was observed that traffic volume increases along Montlake Boulevard NE were less under the U District Up Zone EIS Alternative 2B model than those observed in the Seattle Comprehensive Alternative 5.

Table 10.17
FUTURE NO ACTION AND ALTERNATIVE 5.4 CUMULATIVE WEEKDAY PM PEAK HOUR CORRIDOR LOS SUMMARY

Corridor	No Action - Cumulative		Alternative 5.4 - Cumulative	
	LOS[1]	Speed[2]	LOS[1]	Speed[2]
11th Avenue NE between NE Campus Parkway and NE 50th Street				
Northbound	F	5.0	F	4.0
15th Avenue NE between NE Boat Street and NE 50th Street				
Northbound	E	8.0	E	7.5
Southbound	D	9.2	E	7.8
Montlake Boulevard NE between E Lake Washington Boulevard and NE 45th Street				
Northbound	E	11.5	F	9.7
Southbound	F	3.7	F	8.3
NE 45th Street between 5th Avenue NE and Union Bay Place NE				
Eastbound	D	12.0	D	11.3
Westbound	D	11.6	D	10.8
NE Pacific Street (NE Northlake Way) between 6th Avenue NE and Montlake Boulevard E				
Eastbound	C	18.3	D	15.9
Westbound	C	21.9	C	21.6
Roosevelt Way NE between NE Campus Parkway and NE 50th Street				
Southbound	D	10.4	E	8.9

1. Level of service.
2. Average speed.

As shown in Table 10.17 and on Figure 10.18, during the future Alternative 5.4 weekday PM peak hour conditions most corridors are anticipated to operate at the same LOS as under No Action conditions with the exceptions of four corridors. Southbound 15th Avenue NE is anticipated to degrade from LOS D to LOS E, northbound Montlake Boulevard NE is anticipated to degrade from LOS E to LOS F, eastbound NE Pacific Street is anticipated to degrade from LOS C to LOS D, and southbound Roosevelt Way NE is anticipated to degrade from LOS D LOS E. Detailed corridor operations worksheets are provided in Appendix C.



Future (2028) Alternative 5.4 Weekday PM Peak Hour Corridor Traffic Operations - Cumulative Analysis

FIGURE **10.18**

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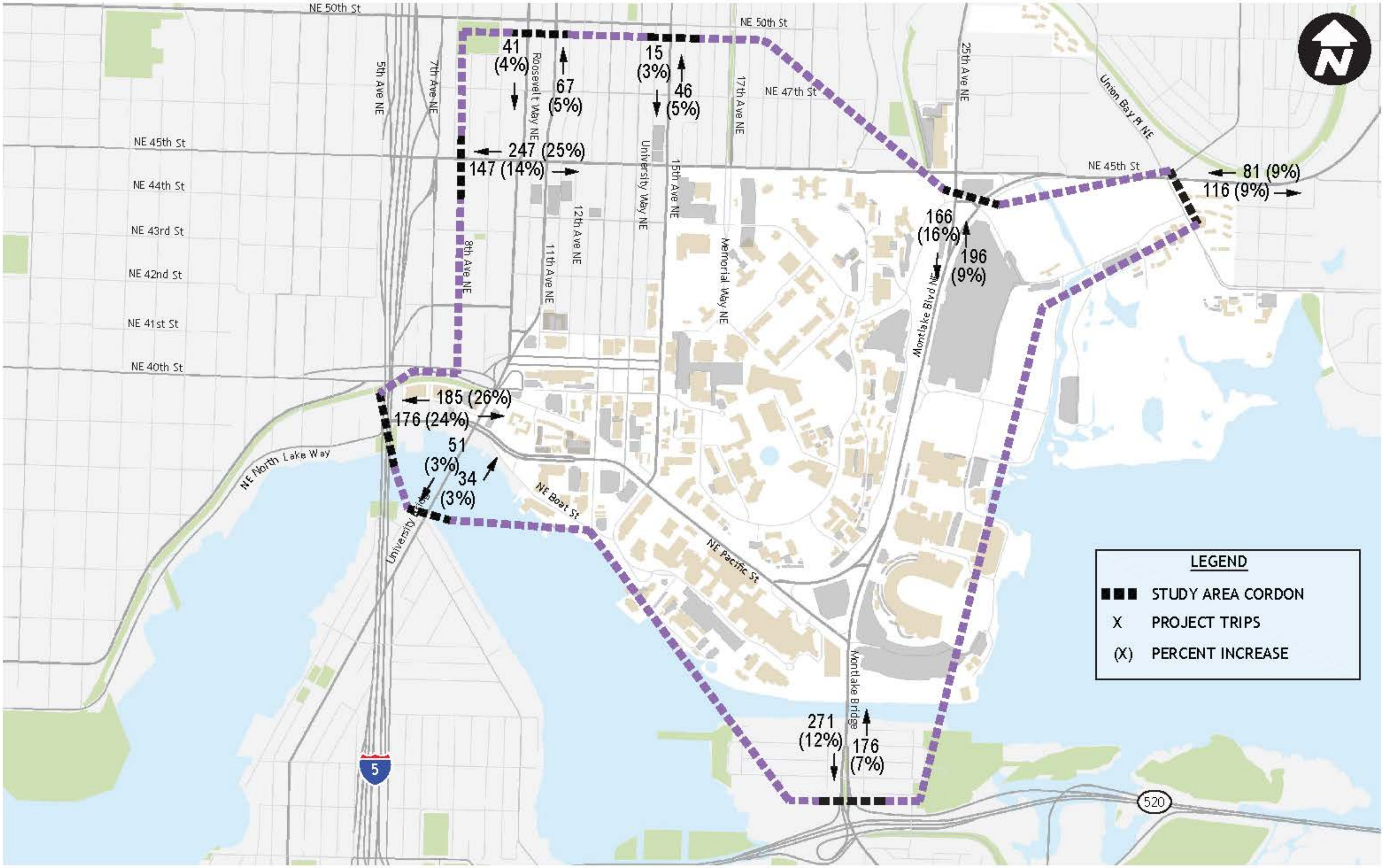
10.8.2 Cumulative Cordon Volume Analysis

To understand the volumes associated with the University of Washington, related to background volumes under the different Alternative scenarios, a cordon volume analysis was completed. The cordon volume analysis focuses on the major roadways leading to and from the University. The cordon volume analysis also shows the percent of total trips along the corridor that are associated with the increased traffic generated by Alternatives 5.1-5.4. The cordon volume and project share associated with the Alternatives 5.1-5.4 cumulative analysis are shown on the following figures. Note that this reflects the percent increase associated with continued development on campus.

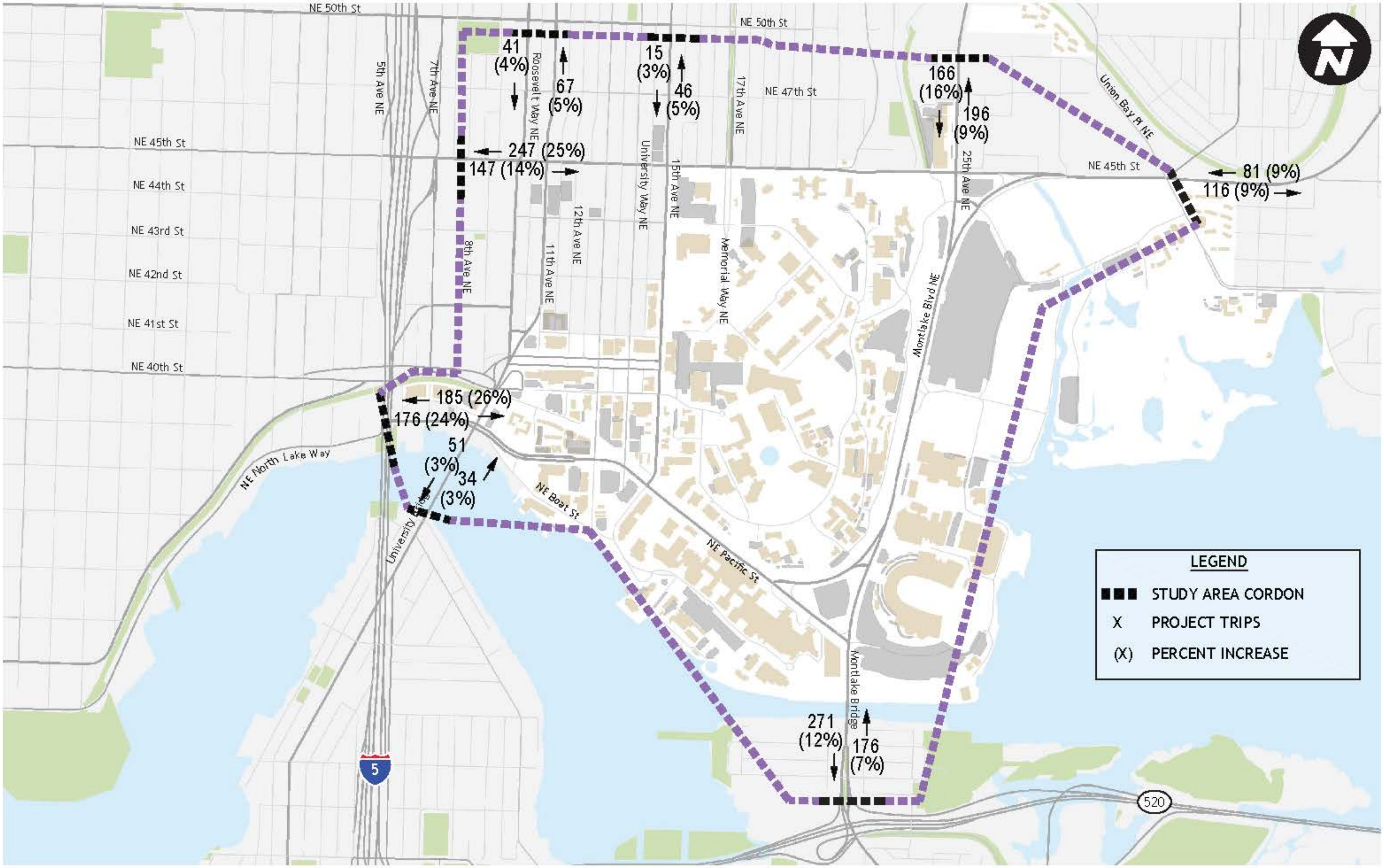


Future (2028) Alternative 5.1 PM Peak Hour Cordon Volumes and Proportional Increase - Cumulative Analysis

FIGURE **10.19**

University of Washington 2018 Campus Master Plan

transpogroup WHAT TRANSPORTATION CAN BE.



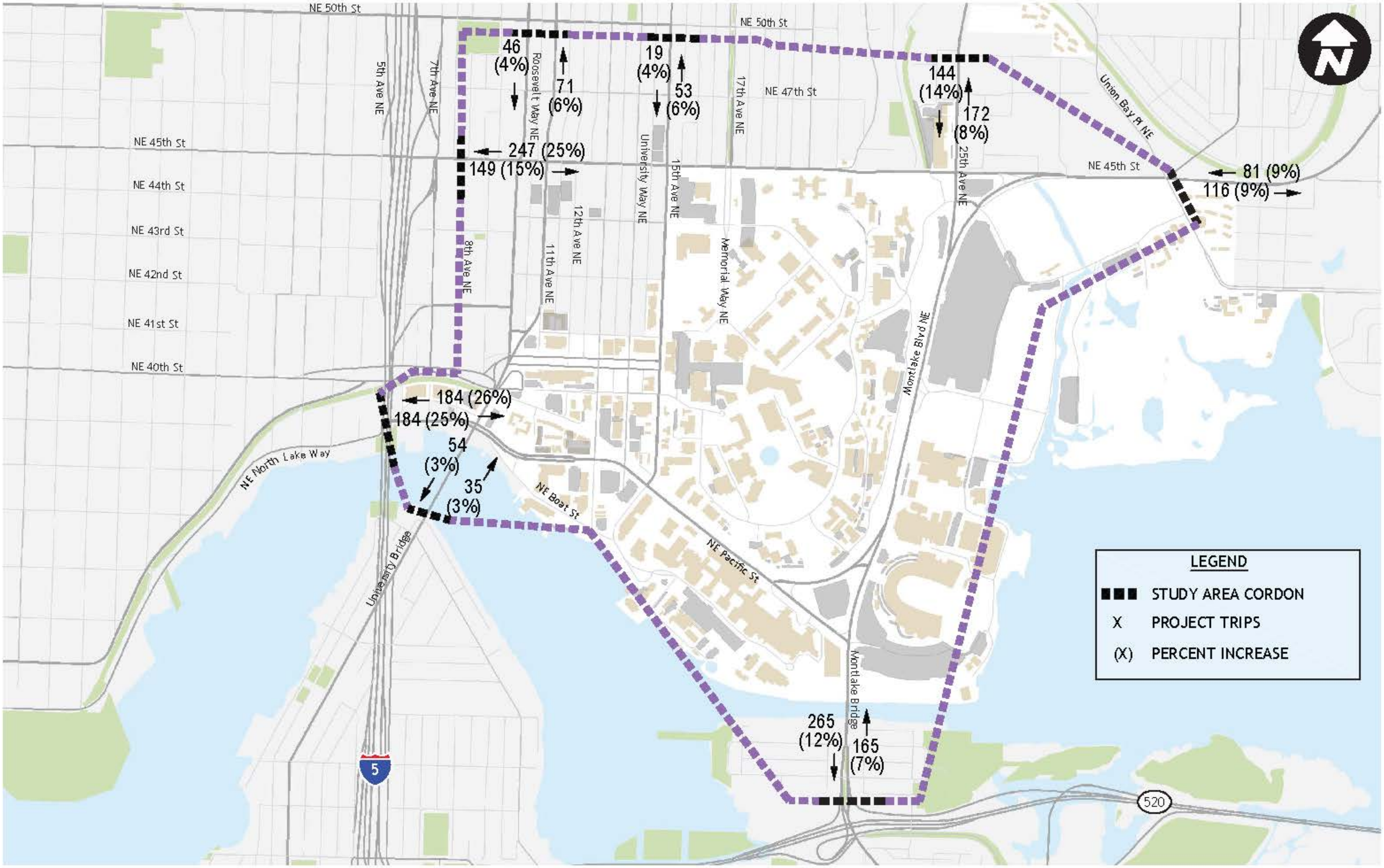
Future (2028) Alternative 5.2 PM Peak Hour Cordon Volumes and Proportional Increase - Cumulative Analysis

University of Washington 2018 Campus Master Plan

transpogroup WHAT TRANSPORTATION CAN BE.

FIGURE **10.20**

Aug 30, 2016 - 9:23am francescal \\srv-dfs-wa\MM_Projects\Projects\14\14284.03 - UW Master Plan EIS\Graphics\Draft EIS Graphics_Alt 5.1.dwg Layout: Cordon_Alt 5.1-C

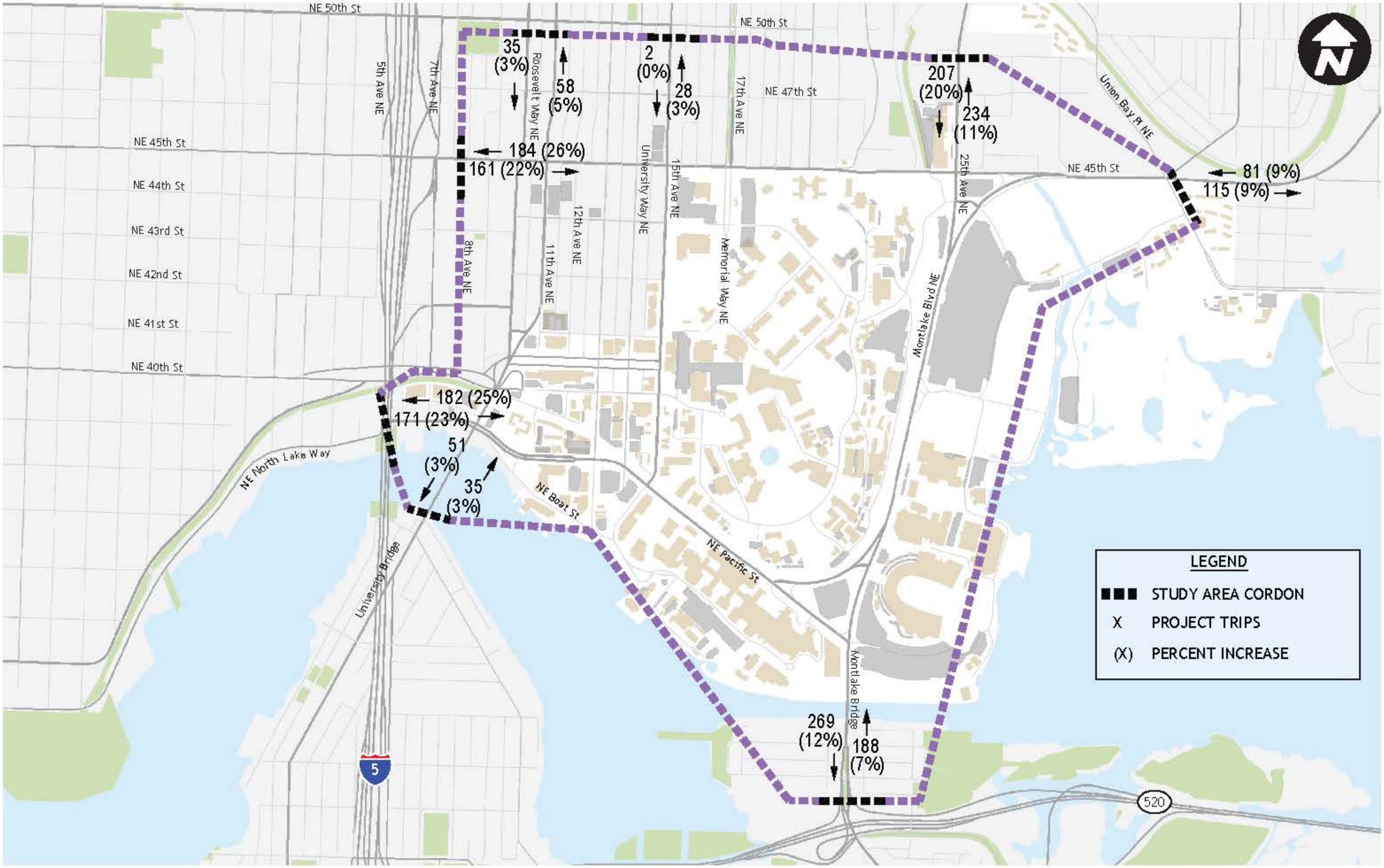


Future (2028) Alternative 5.3 PM Peak Hour Cordon Volumes and Proportional Increase - Cumulative Analysis

University of Washington 2018 Campus Master Plan

FIGURE
10.21

transpogroup
WHAT TRANSPORTATION CAN BE.



Future (2028) Alternative 5.4 PM Peak Hour Cordon Volumes and Proportional Increase - Cumulative Analysis

FIGURE **10.22**

University of Washington 2018 Campus Master Plan

transpogroup WHAT TRANSPORTATION CAN BE.

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11 MITIGATION

The 2028 CMP development would accommodate up to 6.0 million net new gross square feet of new development. As part of this development, improvements such as new and wider sidewalks and bikeways, bicycle lockers, and loading areas are anticipated, as well as replacing and relocating parking. Table 11.1 summarizes improvements by campus sector and travel mode.

Table 11.1
CAMPUS PROPOSED PEDESTRIAN, BICYCLE, AND VEHICULAR IMPROVEMENTS SUMMARY

West Campus	South Campus	East Campus
Pedestrian		
• Mid-block connections south of Gould Hall • Walkways adjacent to West Campus Green • Improvements along NE Campus Parkway • Mid-block connector east from West Campus Green	• Connection between Central Campus & waterfront along East Campus Lawn • Connection along Continuous Waterfront Trail	• Potential East Campus Land Bridge • Improved pedestrian network
Bicycle		
• Connection between West Campus Park and Burke-Gilman Trail • Improved bicycle parking facilities	• Improved bicycle parking facilities	• Improved bicycle parking facilities • Improved bicycle network and Burke Gilman Trail access
Vehicular		
• Removal of University of Washington NE Cowlitz Road • Extensions of 11th and 12th Avenues	• Removal of University of Washington NE San Juan Road • New University of Washington roadway connections between NE Columbia/NE Pacific • Enhanced access for Marine Sciences from NE Columbia Road	

11.1 TRANSPORTATION MANAGEMENT PLAN

As described in Section 1 of this document, the UW has successfully maintained traffic levels that fall well below the agreed upon traffic and parking caps, which hold University traffic and parking impacts at and below 1990 levels. The University has accomplished this by successfully reducing the percentage of student, faculty, and staff commuters choosing single occupant vehicles (SOV) as their commute mode, despite growing campus population by over one-third since 1990. The implementation of the TMP within which the U-PASS program exists, has been the means through which all primary and supporting strategies have been implemented.

Since the University has actually reduced the level of traffic generation (and parking) over the past 25 years, and remains well below City University Agreement Cap goals, actual impact levels taken over the long term are less than reflected in the current CMP growth horizon.

The stated goal of the proposed CMP is to continue to limit UW peak period, peak direction vehicle trips by commuter students, faculty, and staff to or below the 1990 levels. As a result, actual impacts associated with the proposed growth, even assuming no further improvement (reduction) in SOV travel would be less than described in the preceding analyses.

The UW will continue to mitigate transportation impacts through the implementation of the TMP and assure that 1990 levels of impact are not exceeded, despite ongoing growth. Specific strategies will continue to be refined annually, subsequent to the annual transportation survey and publication of the CMP Annual Monitoring Reports.

Potential TMP strategies included in the Plan presently include, but are not limited to, maintenance or enhancements to programs related to:

- U-PASS
- Transit
- Parking Management
- Shared Use Transportation
- Pedestrian and Bicycle Travel
- Telecommuting

Transportation Management Plan and Program or TMP: A transportation management program provides strategies for limiting traffic impacts and promoting active communities by managing vehicle trips and parking, as well as accommodating transit and non-motorized travel modes.

The recently-opened Link Light Rail station at Husky Stadium will result in substantial changes in the way commuters access the campus. Additionally, anticipated extensions of Link light rail to Northgate in 2021 and to Lynnwood, Redmond, and Federal Way in 2023 will improve the opportunities and access to transit for University students, faculty, staff and visitors. Prior to the publication of the Final EIS for this master plan, the 2016 data reflecting this opening will be collected and summarized for inclusion in the annual CMP report.

11.2 INTERSECTION OPERATIONS

Mitigation measures were reviewed at the signal controlled intersections that are anticipated to operate at LOS E or F and experience a 5 second or greater increase in delay. Additionally, one unsignalized intersection was reviewed for potential mitigations measures. Mitigation was reviewed at the following intersections:

15. 7th Avenue NE (I-5 NB)/NE 45th Street (Signalized)
29. Montlake Boulevard NE/Mary Gates Memorial Drive NE (Signalized)
67. 15th Avenue NE/NE Pacific Street (Signalized)
69. 15th Avenue NE/NE Boat Street (All Way Stop)

For the currently signal controlled intersections, mitigation was reviewed in the form of modifications to the signal timing such as phasing, offsets, and cycle length due to limitations in right-of-way at the intersections. While modifications to the signal timing could decrease the delay at the signalized intersections it won’t decrease the delay to at or near No Action conditions. For the 15th Avenue NE/NE Boat Street intersection, installation of traffic signals at the intersection would improve the intersection operations to LOS A under Alternative 1 conditions. Installation of traffic signals should be monitored and only implemented if warranted.

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12 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Implementation of the University of Washington 2018 Campus Master Plan would result in increases to all travel modes – pedestrian, bicycle, transit, vehicle, and freight. Local agency partners like the City of Seattle, King County Metro and Sound Transit all have plans to expand transportation facilities and services in and surrounding the campus. These include expanding the Burke-Gilman Trail, completing pedestrian and bicycle networks and expanding frequency, capacity and travel time of transit. Additionally, the University will be working to enhance connectivity and circulation with each development. Finally, the University, as specified in their City-University Agreement, continues to annually monitor parking and trips. The University also conducts annual surveys of mode splits. With access to Light rail at the University of Washington Station that opened in March 2016, the University is already seeing a significant (roughly 13%) increase in transit ridership. With the opening in 2021 of another new light rail station serving the University District, access to expanded RapidRide and new regional trail connections across Montlake students, faculty, staff and visitors will have more reliable transportation choices as alternatives to driving alone. With planned construction of multi-family housing nearby, drive alone trips may continue to decline as students, faculty and staff have choices for living near campus. With implementation of the identified mitigation measures, no significant unavoidable adverse impacts are anticipated.