Shaping our community together

CITY OF LACEY

Community & Economic Development
420 College Street SE
Lacey, Washington 98503
(360) 491-5642

COMMUNITY DEVELOPMENT DEPARTMENT
PRESUBMISSION CONFERENCE AGENDA

- The following projects will be considered on **Wednesday, January 25, 2023**
- **VIA VIDEO CONFERENCE – LINK WILL BE SENT PRIOR TO MEETING**
- SPR Team Meeting will be held on the Tuesday prior to presub meeting date

Meeting Time	Assigned Staff	Project Details
10:00	**R. Fant,** Planner **T. Stiles,** Public Works	**Case #23-0020 – "14th Avenue ADUs"** **Address/Parcel:** 4608 14th Avenue SE/74700000200 **Zoning:** MD, Moderate Density Residential **Description of Proposal:** Add up to 4 ADUs (480-600 sf) to property
11:00	**S. Seymour,** Planner **T. Stiles,** Public Works	**Case #23-0015 – "Gateway Christian Center Short Plat"** **Address/Parcel:** 3300 Marvin Road NE/37590000100 **Zoning:** LI, Light Industrial **Description of Proposal:** Divide property into two parcels
1:30	**S. Seymour,** Planner **T. Stiles,** Public Works	**Case #23-0021 – "ULINE Warehouse Expansion"** **Address/Parcel:** 3131 Hogum Bay Road NE/11802130301 **Zoning:** LI, Light Industrial **Description of Proposal:** 191,805 SF Building Addition & 195 space parking lot
2:30		
3:30		

RECEIVED
JAN 17 2023
BY 23-0020

CITY OF LACEY
Community Development Department
420 College Street SE
Lacey, WA 98503
(360) 491-5642

OFFICIAL USE ONLY
CASE NUMBER:
RELATED CASE NUMBERS:
PLANNER ASSIGNED:
PW ASSIGNED:

PRESUBMISSION CONFERENCE REQUEST FORM

ONE WEEK PRIOR TO REQUESTED DATE, SUBMIT VIA EMAIL TO PLANNING@CI.LACEY.WA.US, OR TO LACEY CITY HALL. NO FEE IS REQUIRED. SUBMISSION SHOULD INCLUDE COMPLETED APPLICATION, SITE PLAN DRAWING, VICINITY MAP,AND TRAFFIC GENERATION WORKSHEET.

APPLICANT: John Terranova

ADDRESS: 1620 Woodard Ave NW Unit B1 **CITY:** Olympia **STATE:** WA **ZIP:** 98502

PHONE NUMBER: 360-870-0233 **EMAIL:** johnte@mac.com

REPRESENTATIVE: self

ADDRESS: **CITY:** **STATE:** **ZIP:**

PHONE NUMBER: **EMAIL:**

PROJECT ADDRESS: 4608 14th Ave SE, Lacey, WA, 98503

ASSESSOR'S TAX PARCEL NUMBER(S): 74700000200

BRIEF DESCRIPTION OF PROJECT: Add up to 4 ADU sized (480-600 sq ft) dwelling units to property

TOTAL ACREAGE: 0.33 acres **TOTAL SQ. FT OF BLDG:** up to 2,040 **ZONING:** MD

PROPOSED LAND USE: ( ) SINGLE-FAMILY (X) MULTI-FAMILY ( ) INDUSTRIAL DUPLEX ( ) COMMERCIAL ( ) M.H. PARK

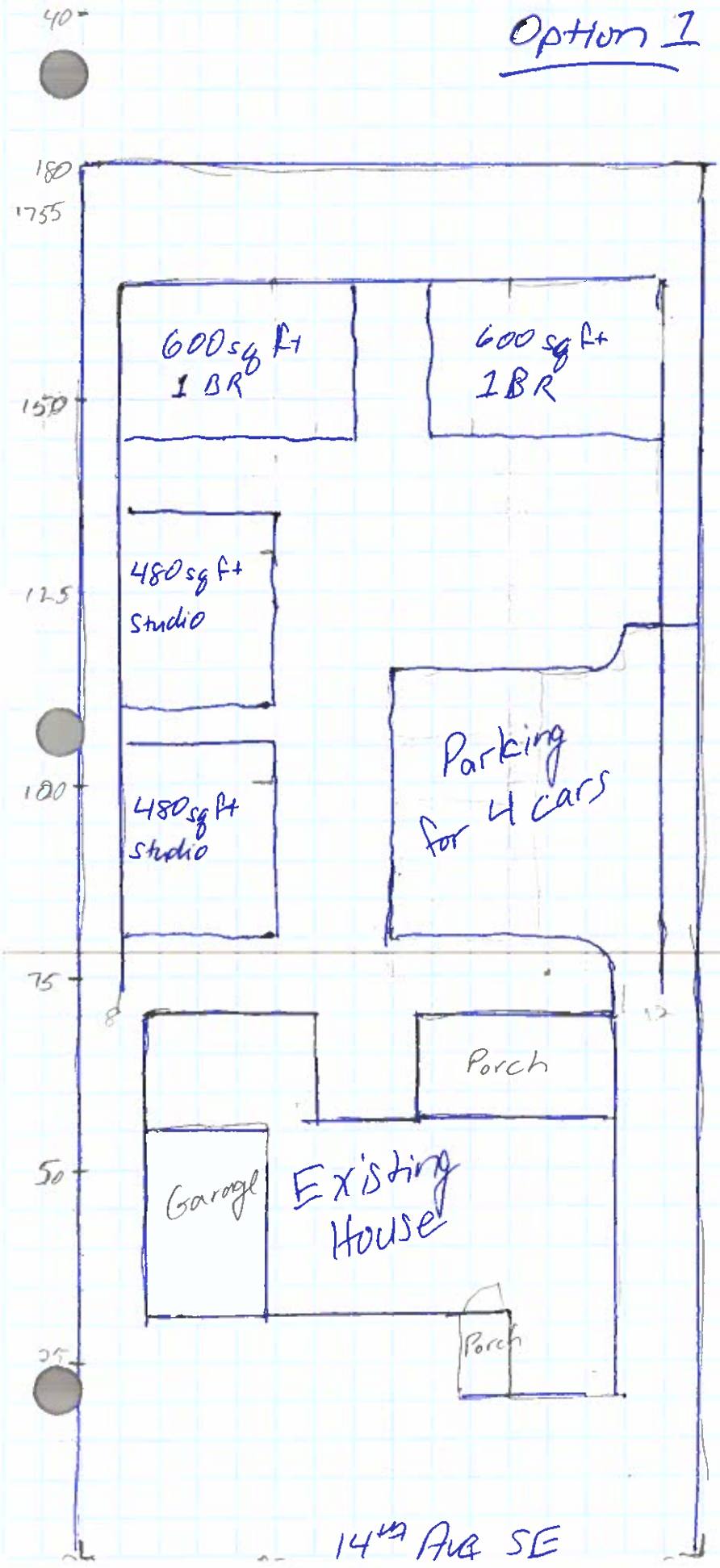
EXISTING ACCESS: driveway on 14th Ave SE **PROPOSED ACCESS:** driveway on 14th Ave SE

INDICATE PREFERENCE FOR A MEETING DATE AND TIME:

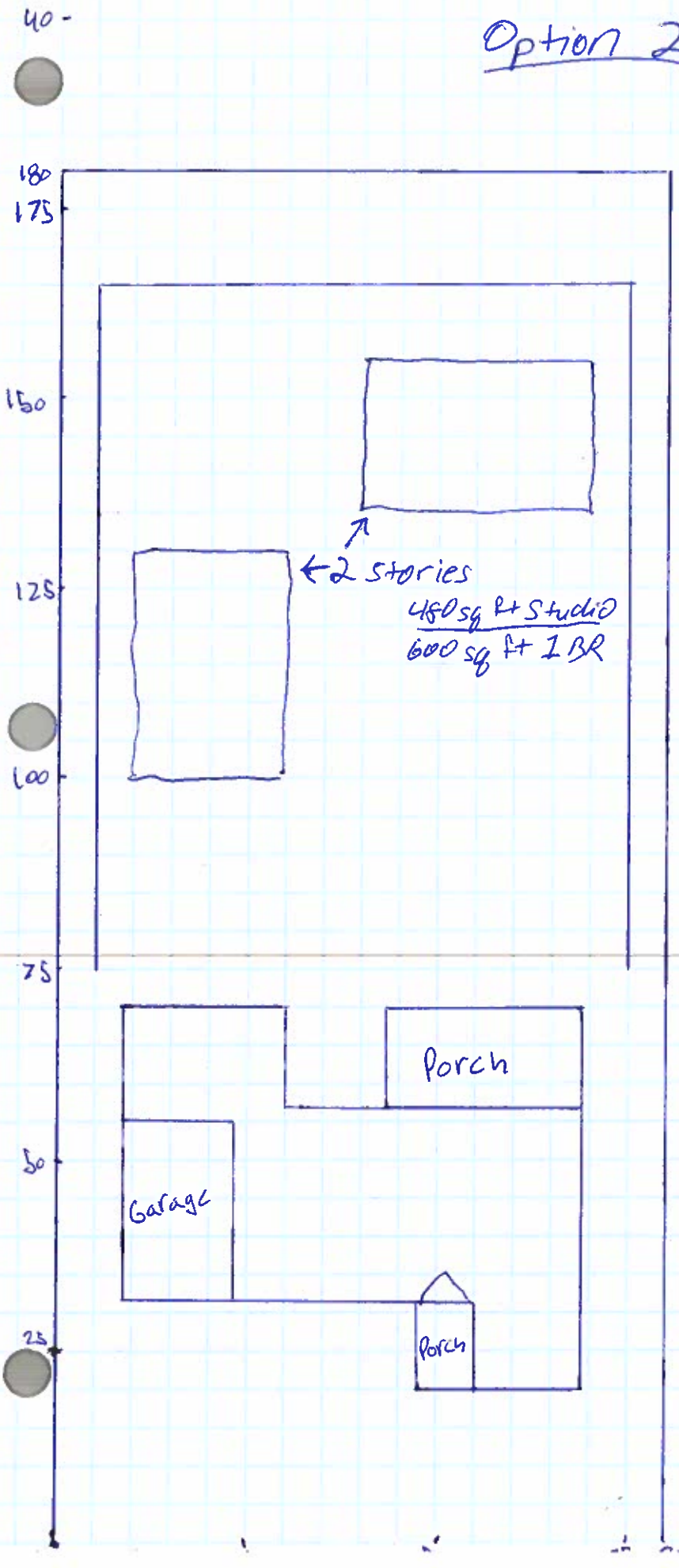
(MEETINGS ARE HELD THE 2ND AND 4TH WEDNESDAY OF EACH MONTH) **DATE:** Jan 25 **TIME:** morning

A presubmission conference is an opportunity for the developer and/or their representative to meet with staff to discuss preliminary studies or sketches of the proposed project. At the conference, staff will make available, pertinent information relating to the proposed development. The intent is to identify and/or eliminate as many potential problems as possible in order for the project to be processed without delay. The conference should take place prior to detailed work by an engineer or surveyor; however, the site drawing submitted, should have sufficient information to allow for staff review. Discussion topics will include such things as Comprehensive Plan, Street Plan, Storm Run Off & Retention, Shoreline Master Program, Zoning, Availability of Water/Sewer, Development Concepts, other requirements and permits, and the environmental impact. If the applicant owns adjacent land, the possibilities of future development will be discussed. Written information regarding process, specific requirements & related issues, will be furnished at the meeting. Staff will typically visit the site prior to the meeting and may enter the property if deemed necessary to gain a full understanding of the project.

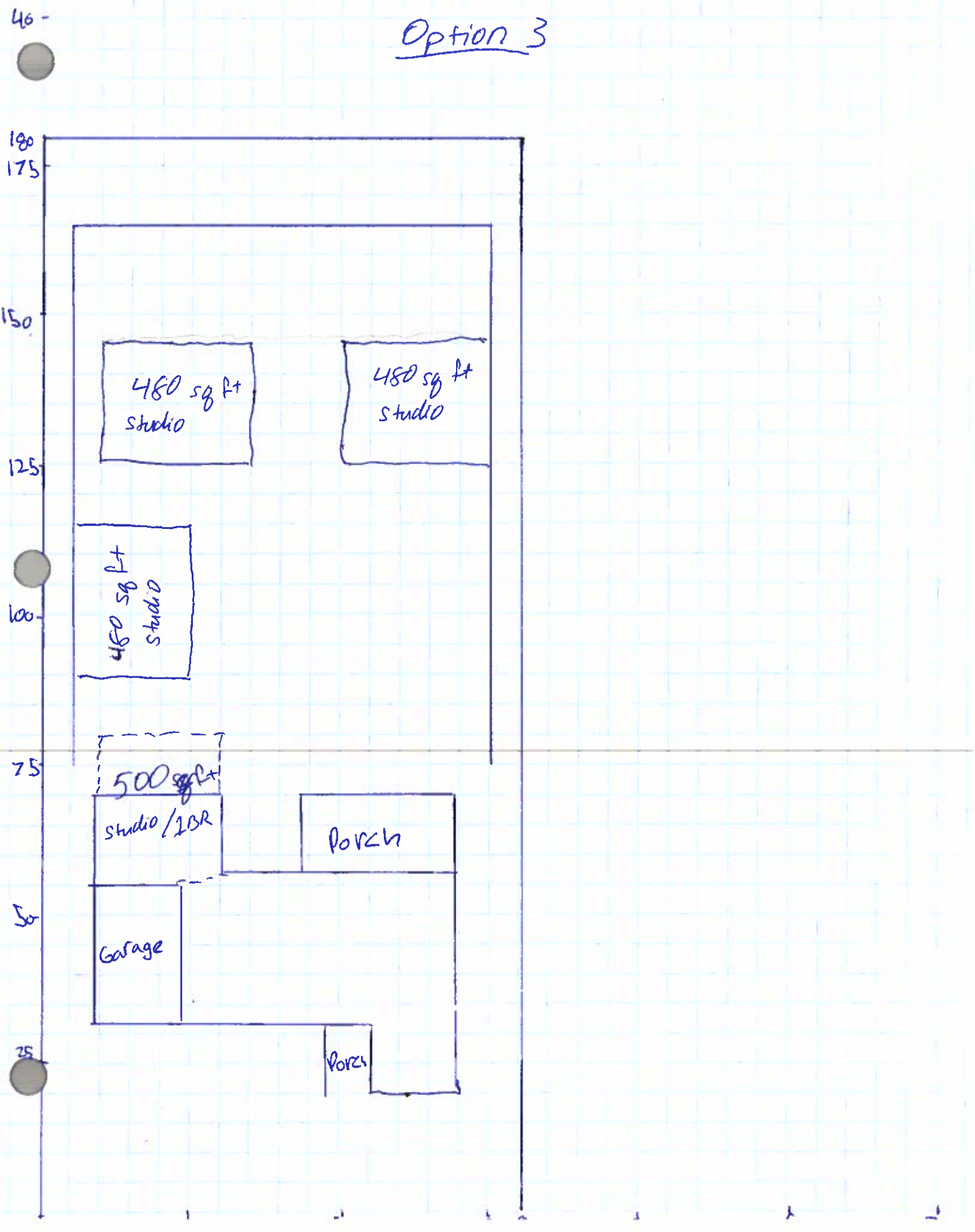
Option 1


40
180
175
150
125
100
75
50
25
600 sq ft
1 BR
600 sq ft
1 BR
480 sq ft
Studio
480 sq ft
Studio
Parking
for 4 cars
Porch
Garage
Existing
House
Porch
14th Ave SE

Option 2


40
180
175
150
125
100
75
50
25
2 stories
450 sq ft Studio
600 sq ft 1 BR
Porch
Garage
Porch

Option 3


46
180
175
150
125
100
75
50
25
480 sq ft studio
480 sq ft studio
460 sq ft studio
500 sq ft
studio / 1BR
Porch
Garage
Porch

RECEIVED
JAN 09 2023
BY

CITY OF LACEY
Community Development Department
420 College Street SE
Lacey, WA 98503
(360) 491-5642

OFFICIAL USE ONLY	
CASE NUMBER:	23-0015
RELATED CASE NUMBERS:	
PLANNER ASSIGNED:	
PW ASSIGNED:	

PRESUBMISSION CONFERENCE REQUEST FORM

ONE WEEK PRIOR TO REQUESTED DATE, SUBMIT VIA EMAIL TO PLANNING@CI.LACEY.WA.US, OR TO LACEY CITY HALL. NO FEE IS REQUIRED. SUBMISSION SHOULD INCLUDE COMPLETED APPLICATION, SITE PLAN DRAWING, VICINITY MAP,AND TRAFFIC GENERATION WORKSHEET.

APPLICANT: Gateway Christian Center

ADDRESS: 3300 Marvin Rd NE **CITY:** Lacey **STATE:** WA **ZIP:** 98516

PHONE NUMBER: 360-259-1894 **EMAIL:** sung.imagateway@gmail.com

REPRESENTATIVE: Sung Han

ADDRESS: 3300 Marvin Rd NE **CITY:** Lacey **STATE:** WA **ZIP:** 98516

PHONE NUMBER: 360-259-1894 **EMAIL:** sung.imagateway@gmail.com

PROJECT ADDRESS: 3300 Marvin Rd NE, Lacey WA 98516

ASSESSOR'S TAX PARCEL NUMBER(S): 37590000100

BRIEF DESCRIPTION OF PROJECT: We would like to short plat the referenced property into two parcels. One par has improvements, the other proposed parcel is vacant land.

TOTAL ACREAGE: 8.47 **TOTAL SQ. FT OF BLDG:** 4440 **ZONING:** LI

PROPOSED LAND USE: ( ) SINGLE-FAMILY ( ) MULTI-FAMILY ( ) INDUSTRIAL DUPLEX ( ) COMMERCIAL ( ) M.H. PARK

EXISTING ACCESS: Marvin Rd NE **PROPOSED ACCESS:** Marvin Rd NE

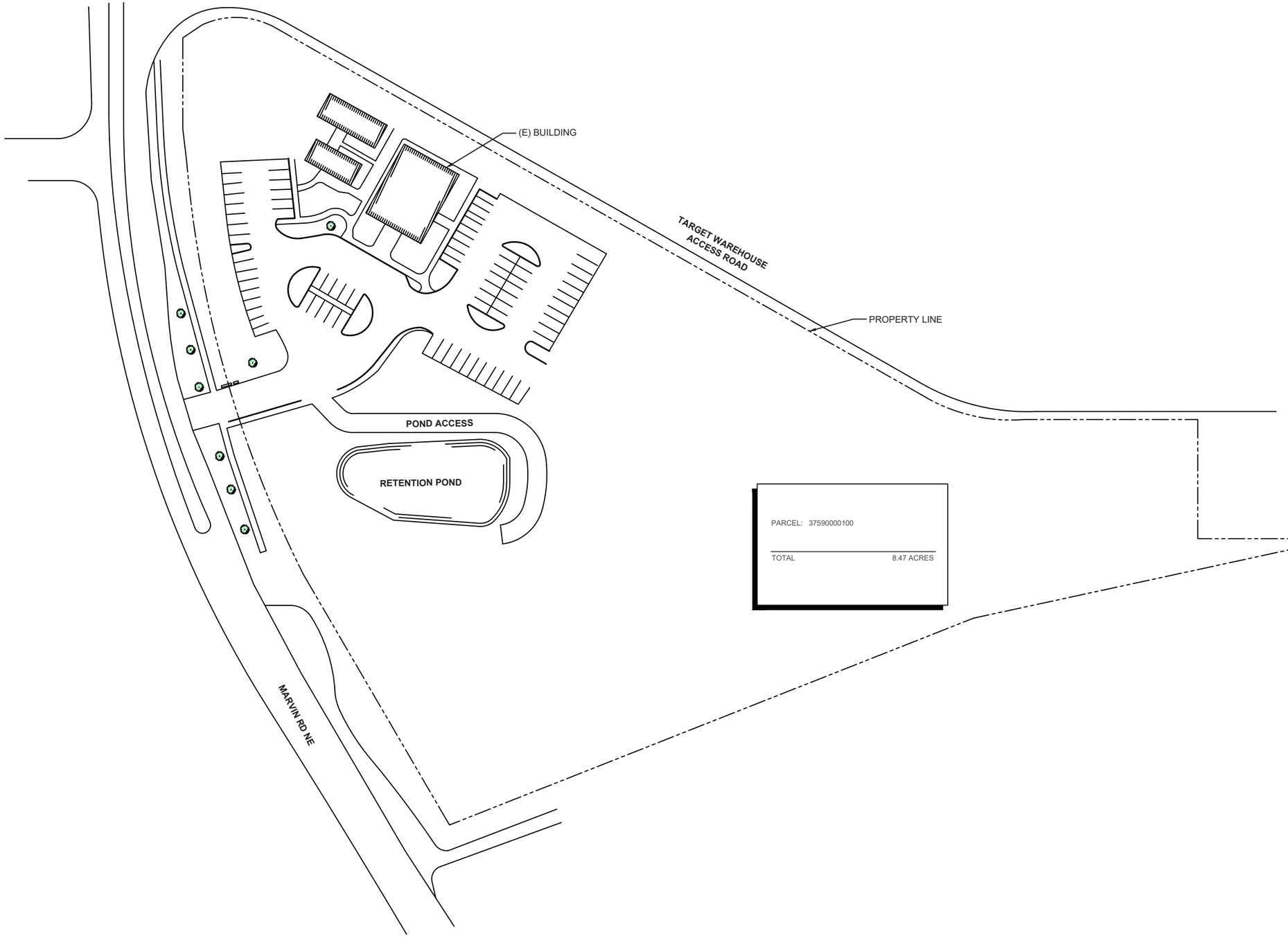
INDICATE PREFERENCE FOR A MEETING DATE AND TIME:

(MEETINGS ARE HELD THE 2ND AND 4TH WEDNESDAY OF EACH MONTH) **DATE:** 1/25/23 **TIME:** 11:00 am

A presubmission conference is an opportunity for the developer and/or their representative to meet with staff to discuss preliminary studies or sketches of the proposed project. At the conference, staff will make available, pertinent information relating to the proposed development. The intent is to identify and/or eliminate as many potential problems as possible in order for the project to be processed without delay. The conference should take place prior to detailed work by an engineer or surveyor; however, the site drawing submitted, should have sufficient information to allow for staff review. Discussion topics will include such things as Comprehensive Plan, Street Plan, Storm Run Off & Retention, Shoreline Master Program, Zoning, Availability of Water/Sewer, Development Concepts, other requirements and permits, and the environmental impact. If the applicant owns adjacent land, the possibilities of future development will be discussed. Written information regarding process, specific requirements & related issues, will be furnished at the meeting. Staff will typically visit the site prior to the meeting and may enter the property if deemed necessary to gain a full understanding of the project.

AS-BUIILT DOCUMENTATION

NOT FOR CONSTRUCTION



LEGEND

PRELIMINARY			
NO.	DATE	D/C	DESCRIPTION
0	05-31-19	MM	AS-BUILT

SUBMITTAL			
NO.	DATE	D/C	DESCRIPTION

SITE NAME:

GATEWAY CHRISTIAN CENTER

SITE ADDRESS:

3300 MARVIN RD NE
OLYMPIA, WA 98516

SHEET TITLE

OVERALL SITE PLAN

SHEET NO.

SP01

1 OVERALL SITE PLAN

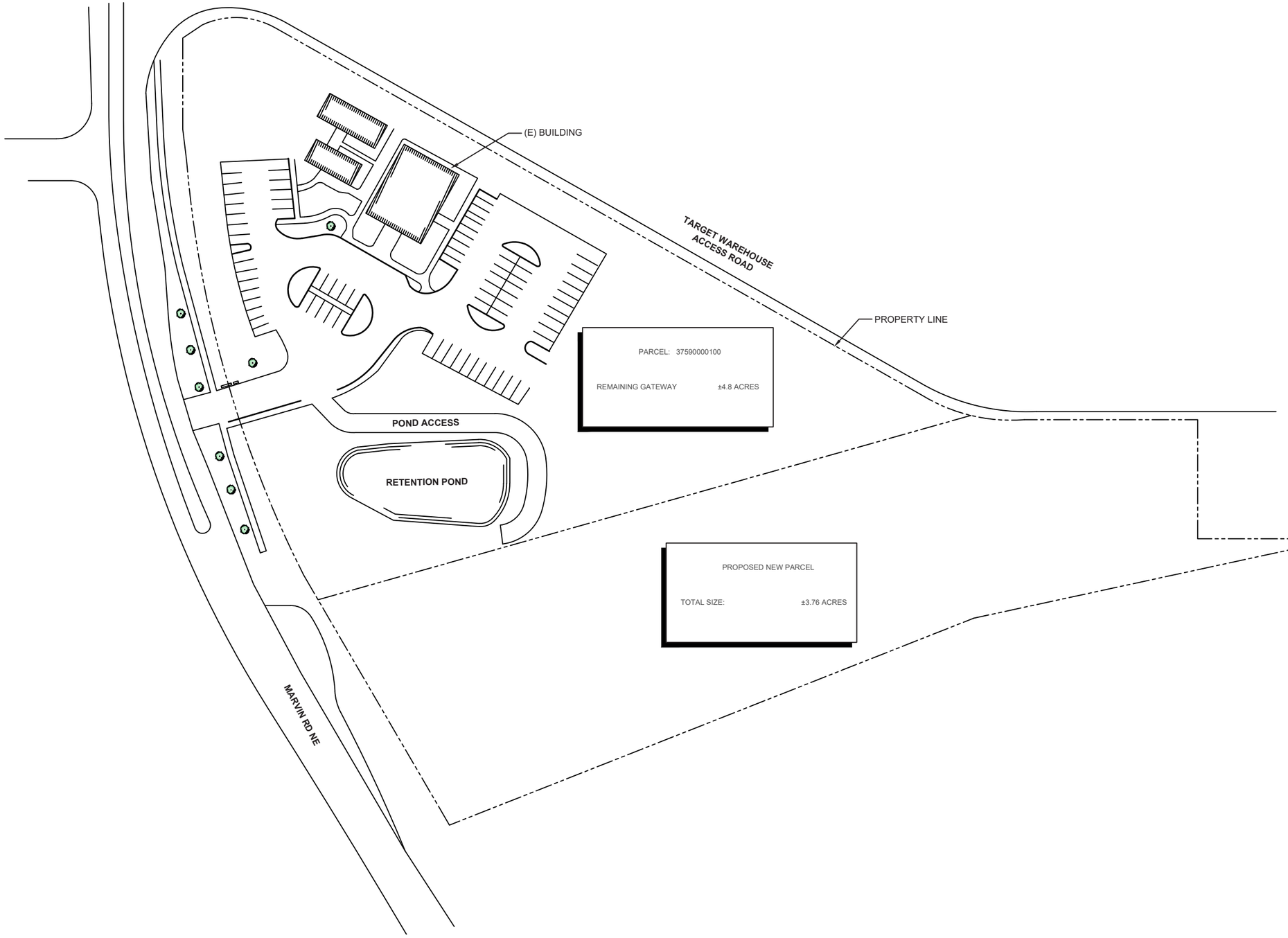
SCALE: 1" = 100'-0" (11X17)

SCALE: 1" = 50'-0" (22X34)

0' 50' 100' 200'

CONCEPTUAL PLAN

NOT FOR CONSTRUCTION



LEGEND

PRELIMINARY			
NO.	DATE	D/C	DESCRIPTION
0	05-31-19	MM	AS-BUILT

SUBMITTAL			
NO.	DATE	D/C	DESCRIPTION

SITE NAME:

GATEWAY CHRISTIAN CENTER

SITE ADDRESS:

3300 MARVIN RD NE
OLYMPIA, WA 98516

SHEET TITLE

PROPOSED SITE PLAN

SHEET NO.

SP02

1 PROPOSED SITE PLAN

SCALE: 1" = 100'-0" (11X17)

SCALE: 1" = 50'-0" (22X34)

0' 50' 100' 200'

RECEIVED

JAN 18 2023

BY

CITY OF LACEY
Community Development Department
420 College Street SE
Lacey, WA 98503
(360) 491-5642

OFFICIAL USE ONLY	
CASE NUMBER:	23-0021
RELATED CASE NUMBERS:	
PLANNER ASSIGNED:	
PW ASSIGNED:	

PRESUBMISSION CONFERENCE REQUEST FORM

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APPLICANT: Lacey Industrial, LLC

ADDRESS: 515 S. Figueroa St, Ste 1600 **CITY:** Los Angeles **STATE:** CA **ZIP:** 90071

PHONE NUMBER: 213/362-9300 **EMAIL:**

REPRESENTATIVE: Dan Sibson

ADDRESS: **CITY:** **STATE:** **ZIP:**

PHONE NUMBER: 213/362-9314 **EMAIL:** dsibson@idsrealestate.com

PROJECT ADDRESS: 3131 Hogum Bay Rd NE, Lacey WA

ASSESSOR'S TAX PARCEL NUMBER(S): 11802130301, 11802130302, 11802130303

BRIEF DESCRIPTION OF PROJECT: Build a 191,805 SF expansion to existing 811,000 SF warehouse, and add a 195 car parking lot.

TOTAL ACREAGE: 64.27 **TOTAL SQ. FT OF BLDG:** 191,805 new **ZONING:** LI

PROPOSED LAND USE: ( ) SINGLE-FAMILY ( ) MULTI-FAMILY ( ) INDUSTRIAL DUPLEX ( ) COMMERCIAL ( ) M.H. PARK

EXISTING ACCESS: Hogum Bay and Marvin **PROPOSED ACCESS:** No change

INDICATE PREFERENCE FOR A MEETING DATE AND TIME:

(MEETINGS ARE HELD THE 2ND AND 4TH WEDNESDAY OF EACH MONTH) **DATE:** 1/25/23 **TIME:** Anytime after 11:30 a

A presubmission conference is an opportunity for the developer and/or their representative to meet with staff to discuss preliminary studies or sketches of the proposed project. At the conference, staff will make available, pertinent information relating to the proposed development. The intent is to identify and/or eliminate as many potential problems as possible in order for the project to be processed without delay. The conference should take place prior to detailed work by an engineer or surveyor; however, the site drawing submitted, should have sufficient information to allow for staff review. Discussion topics will include such things as Comprehensive Plan, Street Plan, Storm Run Off & Retention, Shoreline Master Program, Zoning, Availability of Water/Sewer, Development Concepts, other requirements and permits, and the environmental impact. If the applicant owns adjacent land, the possibilities of future development will be discussed. Written information regarding process, specific requirements & related issues, will be furnished at the meeting. Staff will typically visit the site prior to the meeting and may enter the property if deemed necessary to gain a full understanding of the project.

Sarah Bartz

From: Dan Sibson <dsibson@idsrealestate.com>
Sent: Wednesday, January 18, 2023 3:01 PM
To: CD-Planning; Samra Seymour
Cc: Mike Hughes; Bob@hparchs.com; Dan Balmelli (dbalmelli@barghausen.com)
Subject: ULINE Expansion Pre-submission Conference Request
Attachments: PRE-2_Presubmission_Request.pdf; Scheme 1.pdf

Samra,
Thanks for your voicemail response regarding the Pre-submission meetings. Attached please find our request form with project information as well as a site plan showing the expansion.

The areas of work to be completed are:

1. the 191,805 SF Expansion – labeled and shown in darker blue shade,
2. the 195-car additional parking area shown in the lower right of the full site,
3. and a change in the fire lane configuration in rear left of the building.

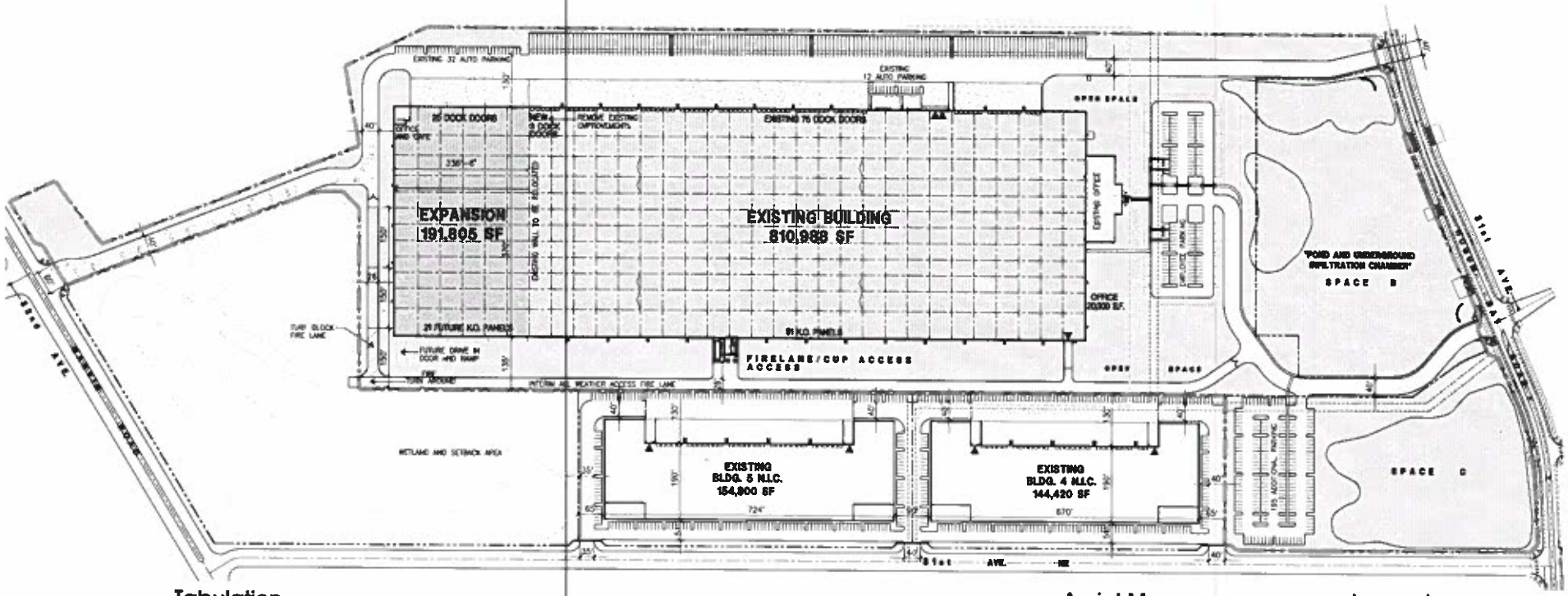
Please let us know if there are any questions and if a time next Wednesday can be accomplished.

We look forward to working with you and Lacey again.

Sincerely,

IDS
REAL ESTATE GROUP

Dan Sibson - BRE Lic. #00942560
Executive Vice President
I D S Real Estate Group
515 S. Figueroa Street, 16th Floor
Los Angeles, California 90071
T: 213.362.9314 F: 213.627.9937
E: dsibson@idsrealestate.com
www.idsrealestate.com



Tabulation

	EXISTING BUILDING	EXPANSION	TOTAL	SPACE B	SPACE C	GRAND TOTAL
SITE AREA						
Gross in s.f.	2,170,375		2,170,375	317,231	311,850	2,799,456
Gross in acres	49.83		49.83	7.28	7.16	64.27
BUILDING AREA						
Office - 1st Floor	17,210	3,180	18,390			18,390
Warehouse	793,779	190,625	983,941			983,941
TOTAL	810,989	191,805	1,002,794			1,002,794
COVERAGE	37.4%		46.2%			75.6%
AUTO PARKING REQUIRED						
Office 1/400 s.f.	43		43			43
WHSE 1/2000 s.f.	794		93			472
TOTAL	837		837			837
AUTO PARKING PROVIDED						
Standard (9' x 18')	668		668		194	862
TRAILER PARKING PROVIDED						
Trailer (10' x 50')	106		106			106
ZONING ORDINANCE FOR CITY						
Zoning Designation - Light Industrial						
MAXIMUM BUILDING HEIGHT ALLOWED						
Height - 65'						
MAXIMUM BUILDING COVERAGE ALLOWED						
Coverage - 85%						
DEVELOPMENT COVERAGE ALLOWED						
75% of Parcels						
SETBACKS						
Front - 10'						
Side - 25' (40' abutting Res zone)						
Rear - 25' (40' abutting Res zone)						
PERVIOUS REQUIRED						
Percentage - 30%						
PERVIOUS PROVIDED						
Percentage			27.9%	100.0%	73.9%	43.7%
SF's			604,749	317,231	241,336	1,167,312

Aerial Map

Legend

- OFFICE
- EXISTING BUILDING
- EXPANSION
- DRIVE THRU DOOR

Note: This is a conceptual plan. It is based on preliminary information which is not fully verified and may be incomplete. It is meant as a comparative aid in examining alternate development strategies and any quantities indicated are subject to revision as more reliable information becomes available.

north

1" = 100'
0 100 200 300

Conceptual Site Plan

Lacey Uline Addition

City of Lacey, Washington

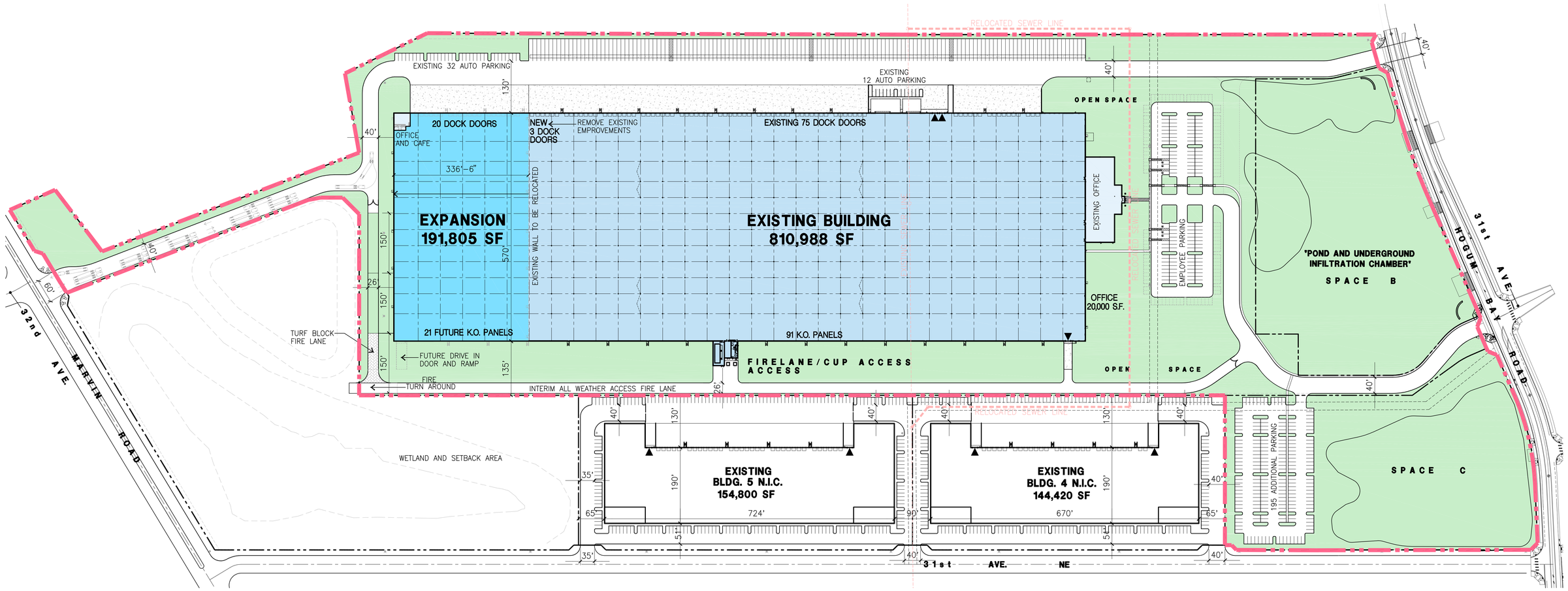
January 10, 2023 / Job #23006

Scheme 1

HPA ARCHITECTURE
18831 Bardeen Ave. - Ste. #100
Irvine, CA 92612
(949) 863-1770
www.hparchs.com

IDS REAL ESTATE GROUP

CAUTION: IF THIS SHEET IS NOT 30"X42", IT IS A REDUCED PRINT



Tabulation

	EXISTING BUILDING	EXPANSION	TOTAL	SPACE B	SPACE C	GRAND TOTAL
SITE AREA						
Gross in s.f.	2,170,275		2,170,275	317,231	311,950	2,799,456
Gross in acres	49.82		49.82	7.28	7.16	64.27
BUILDING AREA						
Office - 1st floor	17,270	1,682	18,952			18,952
Warehouse	793,718	190,123	983,841			983,841
TOTAL	810,988	191,805	1,002,793			1,002,793
COVERAGE	37.4%		46.2%			35.8%
AUTO PARKING REQUIRED						
Office: 1/400 s.f.	43		43			43
Whse: 1/1,000 s.f.	794		43			43
TOTAL	837		837			837
AUTO PARKING PROVIDED						
Standard (9' x 19')	168		168		195	363
TRAILER PARKING PROVIDED						
Trailer (10' x 55')	136		136			136
ZONING ORDINANCE FOR CITY						
Zoning Designation - Light Industrial						
MAXIMUM BUILDING HEIGHT ALLOWED						
Height - 60'						
MAXIMUM BUILDING COVERAGE ALLOWED						
Coverage - 40%						
DEVELOPMENT COVERAGE ALLOWED						
70% of the site						
SETBACKS						
Front - 15'						
Side - 25', 50' abutting R zone						
Rear - 25', 50' abutting R zone						
PERVIOUS REQUIREMENT						
Percentage - 30%						
PERVIOUS PROVIDED						
Percentage			27.9%	100.0%	78.6%	41.7%
In s.f.			604,745	317,231	245,336	1,167,312

Aerial Map

Legend

- OFFICE
- EXISTING BUILDING
- EXPANSION
- ▼ DRIVE THRU DOOR

Note: This is a conceptual plan. It is based on preliminary information which is not fully verified and may be incomplete. It is meant as a comparative aid in examining alternate development strategies and any quantities indicated are subject to revision as more reliable information becomes available.

north

1" = 100'

0 100 200 300

Conceptual Site Plan

Lacey Uline Addition

City of Lacey, Washington

HPA architecture 43 Years

18831 Bardeen Ave. - Ste. #100
Irvine, CA 92612
(949) 863-1770
www.hparchs.com

IDS REAL ESTATE GROUP

January 10, 2023 / Job #23006

Scheme 1

Hogum Bay Logistics Center
Lacey, WA

Revised Transportation Impact Analysis
December 14, 2016

12/14/16

Prepared for:

IDS Real Estate Group
515 South Figueroa Street
16th Floor
Los Angeles, CA 90071

Prepared by:

TENW

Transportation Engineering NorthWest

11400 SE 8th Street, Suite 200
Bellevue, WA 98004
Office: (425) 889-6747
Fax: (425) 889-8369

Table of Contents

Appendices

List of Figures and Tables

EXECUTIVE SUMMARY

Project Proposal. The proposed Hogum Bay Logistics Center is located between Marvin Road NE and Hogum Bay Road NE on the north side of the City's future planned 31st Ave NE extension. The proposed project includes a total of approximately 1.6 million square feet of development that will include a mix of industrial uses. The existing site includes 30,000 square feet of manufacturing use that would be removed with the proposed development.

Vehicle Access. Vehicle site access is proposed at seven driveways: one new driveway on Marvin Rd NE (aligned with the existing 32nd Avenue NE), two new driveways on Hogum Bay Road NE (one aligned with the existing 31st Ave NE), and four driveways on the future 31st Ave NE extension.

Trip Generation. The project at full buildout is estimated to generate 4,129 daily vehicular trips with 392 trips (300 in, 92 out) occurring during the AM peak hour and 412 trips (123 in, 289 out) occurring during the PM peak hour.

Lacey LOS Impacts & Concurrency. Based on scoping comments provided by the City of Lacey, future 2019 PM peak hour LOS analyses were conducted at 13 study intersections to determine traffic impacts of the project buildout. The results of the LOS analyses indicate that several of the study intersections are expected to operate at LOS F with or without the proposed project. However, most of these intersections are located on one of the City's established *Strategy Corridors*, and are exempt from the City's LOS standards. The Marvin Road/Hawks-Prairie intersection is expected to operate at LOS F with or without the project; the City has a planned project that will widen Marvin Road and improve the operation of the Marvin/Hawks-Prairie roundabout to acceptable LOS after 2020.

31st Ave NE Extension. The City has a future plan to build the 31st Ave extension between Hogum Bay Road and Marvin Road, eventually continuing west to Sleater-Kinney Road. The Hogum Bay Logistics Center development proposes to construct the 31st Ave extension along the south side of the site between Hogum Bay Road and Marvin Road.

Site Access Analysis. The results of the LOS analyses indicate that all turning movements in and out of the Hogum Bay Logistics Center site are anticipated to operate at LOS D or better in 2019 with buildout of the project.

Thurston County Impacts. Future 2019 PM peak hour LOS analyses were conducted at 4 study intersections along the Marvin Road corridor south of Pacific Ave. The results of these analyses indicate that all study intersections are anticipated to operate at LOS D or better in 2019 with or without the proposed project. Payment of the County's mitigation cost of $126,000 would mitigate the project impacts to the County's Marvin Road corridor.

Mitigation. The following measures have been identified to mitigate transportation impacts of the proposed Hogum Bay Logistics Center development.

- Lacey Impact Fees. To mitigate impacts to City of Lacey roads, payment of a transportation mitigation cost and truck impact fees are required. The mitigation cost calculation will be

determined by the City Transportation Department, and based on the number of PM peak hour trips generated by the proposed project affecting the current City TIP project list. The truck mitigation cost will be based on the number and type of trucks generated.

- Lacey Intersections. Due to the anticipated LOS F operation at the Marvin Road/Hawks-Prairie Road single-lane roundabout in 2019 prior to the City's construction of the 2-lane roundabout, an additional northbound lane would improve the operation to LOS D. To mitigate impacts of the proposed Hogum Bay Logistics Center, and prior to the City building the 2-lane roundabout, a payment in lieu of constructing the northbound lane is proposed in the amount of $100,000.

- Lacey Concurrency. The following measures have been identified consistent with the City's concurrency requirements for impacts to intersections on *strategy corridors*:

    1) Develop roads with integrated bicycle and pedestrian facilities.
    2) Complete and connect street grid roads identified in the City's 6-year TIP: construct 31st Ave NE connection between Hogum Bay Road and Marvin Road.
    3) Develop road grid consistent with City Access Management requirements.
    4) Identify parking management measures.
    5) Implement improvements designed to encourage pedestrian use.

    To satisfy the City's concurrency requirement for impacts to intersections on *strategy corridors*, the Hogum Bay Logistics Center will construct the 31st Ave extension on the south side of the site between Hogum Bay Road and Marvin Road.

- Frontage Improvements. In addition to construction of the 31st Ave extension, the project will construct half-street frontage improvements along its Marvin Road property frontage. The applicant is requesting applicable credit against City transportation impact fees for construction of frontage improvements on Marvin Road and 31st Ave NE.

- Thurston County Marvin Road. To mitigate impacts to the County's Marvin Road corridor project, payment of a transportation mitigation cost of $126,000 has been identified.

INTRODUCTION

Because the Hogum Bay Logistics Center development site is located within the City of Lacey limits, this traffic analysis was prepared consistent with City TIA guidelines. Section 4B.035 of the City of Lacey Development Guidelines and Public Works Standards, Chapter 4 – Transportation, identifies a standardized format for a Traffic Impact Analysis (TIA). A TIA is a specialized study of the impacts that a proposed development project will have on the transportation system.

It is the intent of this report to follow the City of Lacey TIA requirements in preparing this report. Impacts to Thurston County roads are also included, where appropriate.

The Hogum Bay Logistics Center development includes the development of approximately 1.6 million square feet development that will include a mix of industrial-type uses. Full project buildout is expected by 2019.

Traffic Scoping Report

The scope of work for this TIA was established based the Traffic Scoping Memo (dated June 16, 2016) and comments received from the City of Lacey, Thurston County, and WSDOT. Confirmation of scope was received in the City's Traffic Scoping letter dated July 14, 2016.

A total of 13 study intersections were identified for evaluation during future weekday PM peak hour conditions in year 2020. The Traffic Scope Memo and the City Traffic Scoping letter are provided in Appendix A.

Project Approach

To analyze the traffic impacts of the Hogum Bay Logistics Center development, the following tasks were undertaken consistent with City of Lacey TIA guidelines:

1. Prospectus
2. Existing Conditions
3. Development Traffic
4. Trip Generation
5. Trip Distribution
6. Future Traffic Conditions
7. Traffic Operations
8. Access Management
9. Traffic Calming
10. Alternate Modes of Transportation
11. Mitigation
12. City of Lacey Concurrency
13. Impacts to Marvin Road Corridor in Thurston County

Primary Data and Information Sources

- TENW Traffic Scoping Memo – dated June 16, 2016
- City of Lacey Traffic Scoping Letter – dated July 14, 2016.
- ITE *Trip Generation Manual*, 9th Edition, 2012.
- *Highway Capacity Manual*, TRB, Year 2010 Edition.
- Year 2016 PM Peak Period Traffic Volumes; source: TCC.
- City of Lacey 2030 Transportation Plan, adopted December 2012
- City of Lacey 2016-2021 TIP.

TRAFFIC IMPACT ANALYSIS

1. Prospectus

a) The Hogum Bay Logistics Center development site is located between Marvin Road NE and Hogum Bay Road NE on the north side of the City's future planned 31st Ave NE extension as shown in the Figure 1 vicinity map.

b) A preliminary site plan concept is provided in Figure 2. Vehicle access is proposed at 7 driveway locations: one new driveway on Marvin Rd NE (aligned with the existing 32nd Ave NE), two new driveways on Hogum Bay Rd NE (one aligned with the existing 31st Ave NE), and four driveways on the future 31st Ave NE extension.

c) Project buildout includes a total of approximately 1.6 million square feet of industrial-type development consisting of 800,000 square feet of high-cube warehouse/distribution center, 600,000 square feet of warehouse, and 200,000 square feet of manufacturing. The existing site includes approximately 30,000 square feet of manufacturing which will be removed as part of this project.

The Hogum Bay Logistics Center development proposes to construct the 31st Ave extension along the south side of the site between Hogum Bay Road and Marvin Road.

d) The horizon year for project buildout in this Traffic Impact Analysis is 2019.

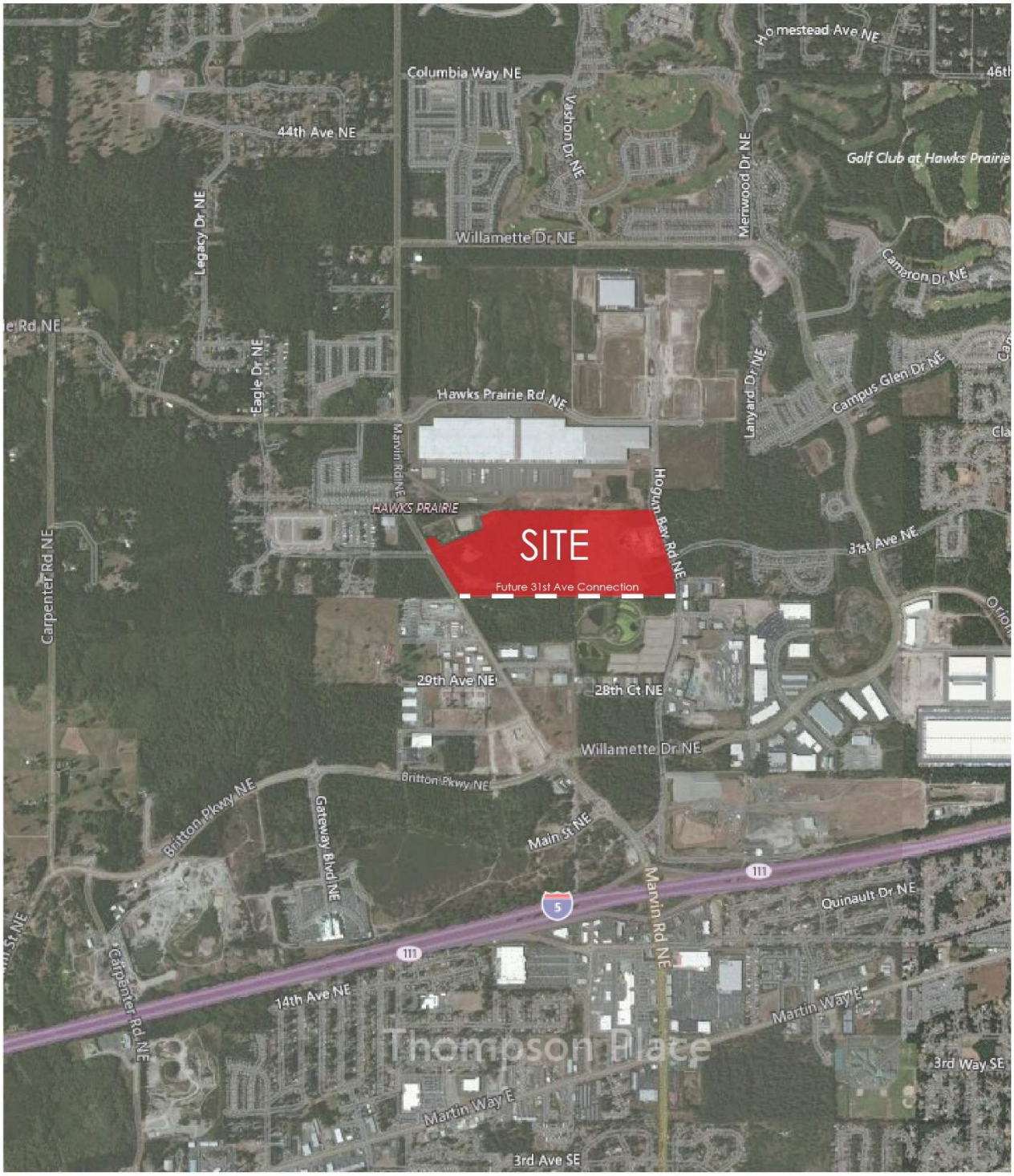


Figure 1: Project Site Vicinity

N
NOT TO SCALE

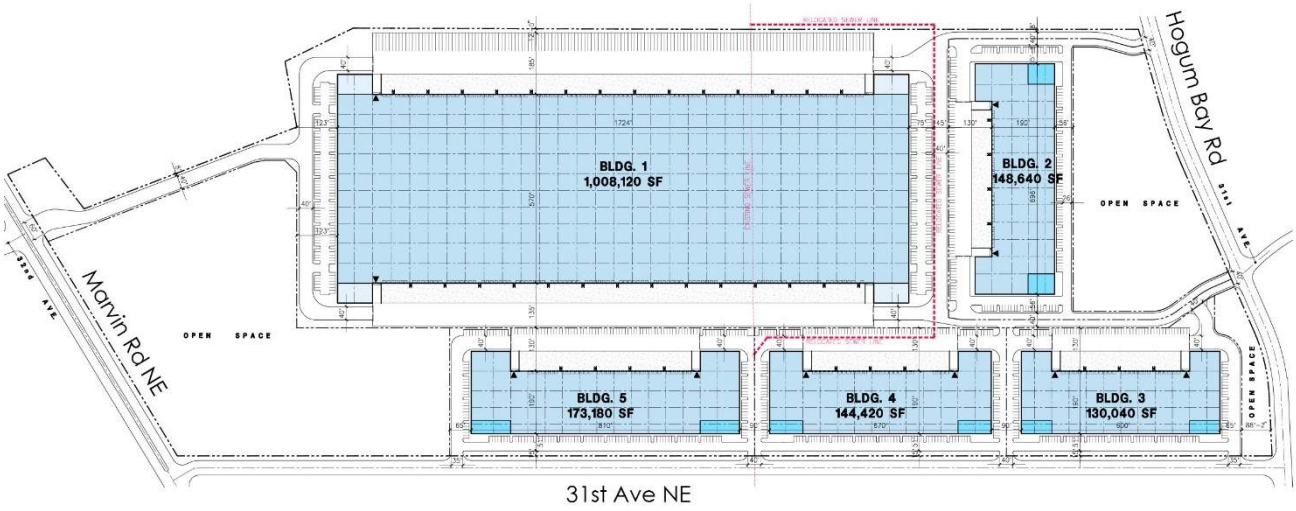


Figure 2: Preliminary Site Plan

2. Existing Conditions

a) The following describes existing transportation conditions in the study area, including an inventory of existing roads, existing traffic volumes, and public transportation services.

> Marvin Road is a north-south major arterial with a posted speed of 35 mph in the project vicinity. The road has 2 lanes north of Willamette, then widens to 5 lanes across I-5 and to the south. Curb, gutter, and sidewalks exist on both sides of the street south of Britton Parkway.
>
> Hogum Bay Road is a two-lane north-south major arterial with a posted speed limit of 35 mph. There is intermittent curb, gutter, and sidewalks on both sides of the street.

b) Weekday PM peak hour trips from approved pipeline projects were provided by the City in July 2016, and are included in this traffic analysis.

c) The layout and design of the proposed site driveways will take into consideration sight distance, crash potential, and pedestrian conflicts.

d) Existing traffic signal timing information used in the traffic analysis was provided by the City of Lacey.

e) The PM peak hour traffic count data sheets for each of the 13 study intersections are provided in Appendix B. The traffic counts were conducted in July 2016.

f) Figure 3 illustrates the existing PM peak hour turning movements at the 13 study intersections. The weekday PM peak hour traffic volumes represent the highest hourly volume of vehicles traveling through an intersection during a typical 4:00 to 6:00 p.m. peak period.

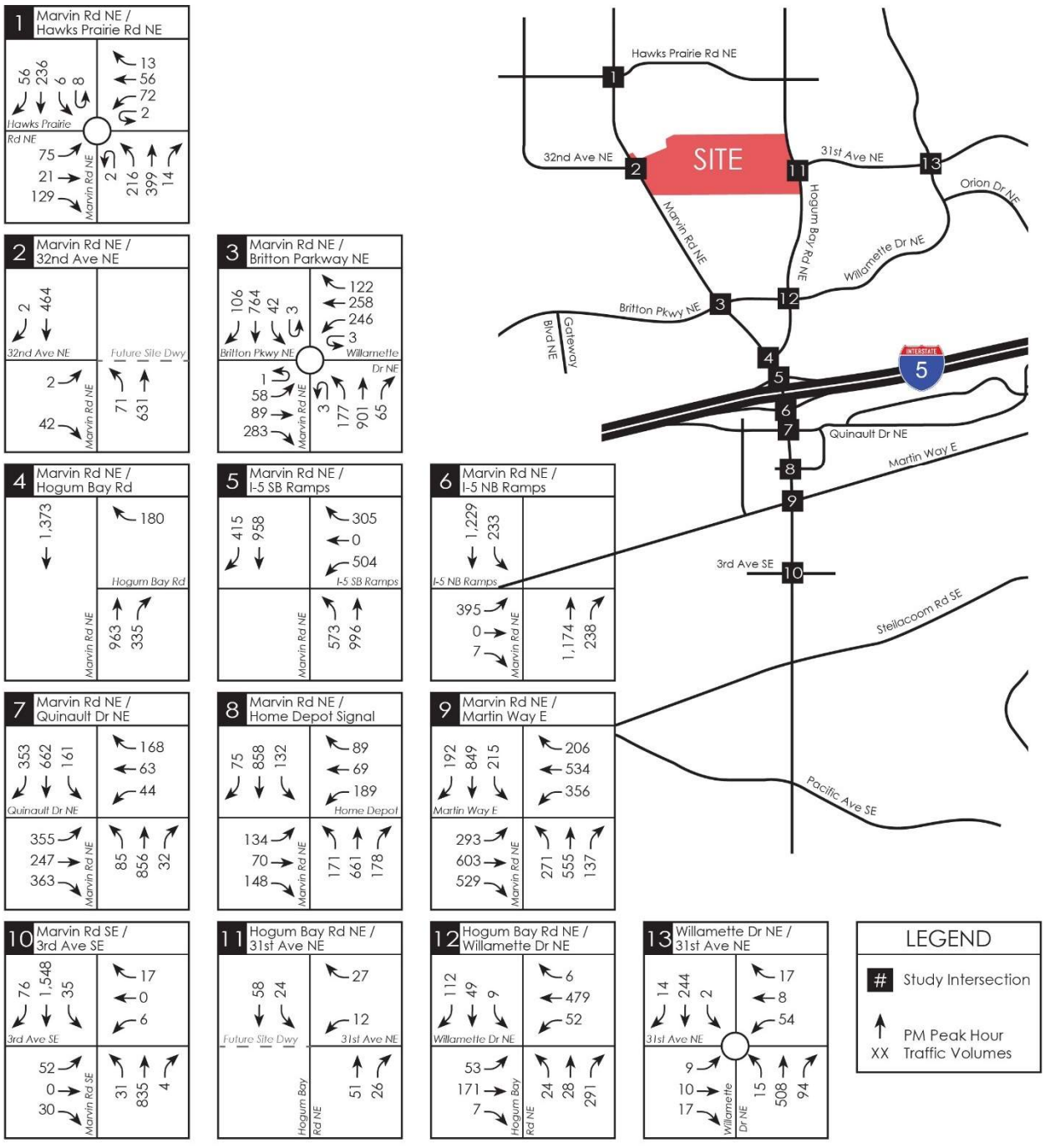


Figure 3: 2016 Existing PM Peak Hour Traffic Volumes

3. Development Traffic

Based on scoping confirmed by the City of Lacey, the following 13 study intersections were identified for evaluation in this traffic analysis. Each intersection was included in the study area for PM peak hour LOS analyses.

1.	Marvin Road / Hawks Prairie	Roundabout
2.	Marvin Road / 32nd Ave	Stop Controlled
3.	Marvin Road / Britton Pkwy / Willamette Drive	Roundabout
4.	Marvin Road / Hogum Bay Road	Stop Controlled
5.	Marvin Road / I-5 SB Ramps	Signal
6.	Marvin Road / I-5 NB Ramps	Signal
7.	Marvin Road / Quinault Drive	Signal
8.	Marvin Road / Lacey Marketplace	Signal
9.	Marvin Road / Martin Way	Signal
10.	Marvin Road / 3rd Ave	Signal
11.	Hogum Bay Road / 31st Avenue	Stop Controlled
12.	Hogum Bay Road / Willamette Dr	Future Roundabout
13.	Willamette Drive / 31st Avenue	Roundabout

It should be noted that the Hogum Bay Logistics Center development proposes to construct the 31st Ave NE road extension along the south side of the site between Hogum Bay Road and Marvin Road.

Additionally, traffic impacts to Thurston County intersections on Marvin Road south of Pacific were also considered, and are address in section 13 on page 25 of this report.

4. Project Trip Generation

The weekday daily, AM and PM peak hour trip generation estimates for the proposed Hogum Bay Logistics Center development were based on trip rates provided in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th edition. Buildout of the proposed development is anticipated to include 800,000 sf of high-cube/warehouse distribution center, 600,000 sf of warehousing, and 200,000 sf of manufacturing. The existing site includes 30,000 sf of manufacturing that would be removed with the project. Table 1 summarizes the net trip generation with detailed trip generation calculations provided in Appendix C.

Table 1
Hogum Bay Logistics Center – Trip Generation Summary

	Trips Generated		
Time Period	In	Out	Total
Weekday Daily	2,065	2,064	4,129
Weekday AM Peak Hour	300	92	392
Weekday PM Peak Hour	123	289	412

As shown in Table 1, buildout of the Hogum Bay Logistics Center is estimated to generate 4,129 net new weekday daily trips with 392 net new trips (300 in, 92 out) occurring during the AM peak hour and 412 net new trips (123 in, 289 out) occurring during the PM peak hour.

Truck Trip Generation:

Truck trip generation for the proposed Hogum Bay Logistics Center development was estimated based on truck trip generation rates included in Tables A.1 and A.4 of the ITE *Trip Generation Handbook*, 2nd Edition. The following Table 2 summarizes the results.

Table 2
Hogum Bay Logistics Center – Trip Generation Summary

		Truck Trip Generation				
		2 & 3 Axel		4 to 6 Axel		
Land Use	Area	Rate	Trucks	Rate	Trucks	All Trucks
Proposed Uses						
High-Cube Warehouse/Distribution Center[1]	800,000 sf	0.11	88	0.27	216	304
Warehousing[1]	600,000 sf	0.11	66	0.27	162	228
Manufacturing	200,000 sf	0.20	40	0.30	60	100
Less Existing Use						
Manufacturing	-30,000 sf	0.20	-6	0.30	-9	-15
	Net Total Trucks =		**188**		**429**	**617**

Notes:
1. Truck trip generation rate for "heavy warehouse" was utilized per table A.4 of the ITE *Trip Generation Handbook*, 2nd Edition.
2. Truck trip generation rates for manufacturing land use per table A.1 of the ITE *Trip Generation Handbook*, 2nd Edition.

5. Project Trip Distribution

The distribution of Hogum Bay Logistics Center project trips during the weekday PM peak hour was estimated based on the project specific select link analysis model distribution. The select zone analysis was provided by City staff which combined Zones 446 and 447 (also provided in Appendix E). A summary of the model's PM peak hour trip distribution is provided in the traffic scope memo in Appendix A.

It should be noted that the project-generated trip distribution based on the TRPC model was modified slightly to reflect the anticipated operation of the new Marvin Road/31st Ave NE intersection and the westbound left-turn onto Marvin Road NE in the interim being stop-controlled until such time the City constructs a roundabout. During peak congestion times, some of the project-generated traffic destined to Marvin Road southbound is expected re-route to Hogum Bay Road. For this analysis, 50% of the project-generated westbound left-turns at the Marvin Rd NE / 31st Ave NE intersection were shifted to southbound Hogum Bay Road NE.

The PM peak hour assignment of project trips with full project buildout (including a combination of both trucks and non-trucks) of the Hogum Bay Logistics Center development is shown in Figures 4 at each of the 13 study intersections and in Figure 5 at the 7 site access locations.

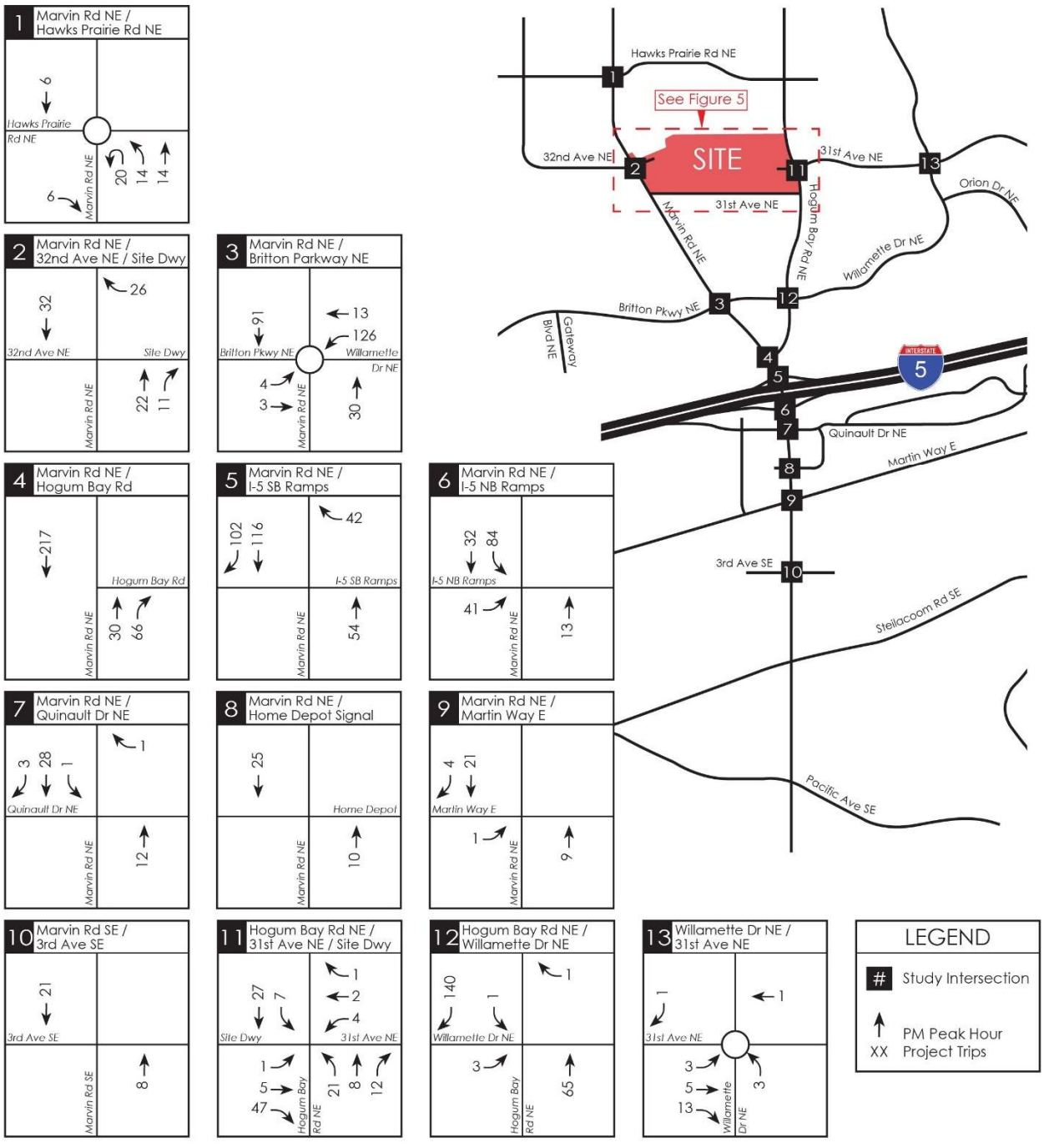


Figure 4: PM Peak Hour Project Trip Assignment - Study Intersections

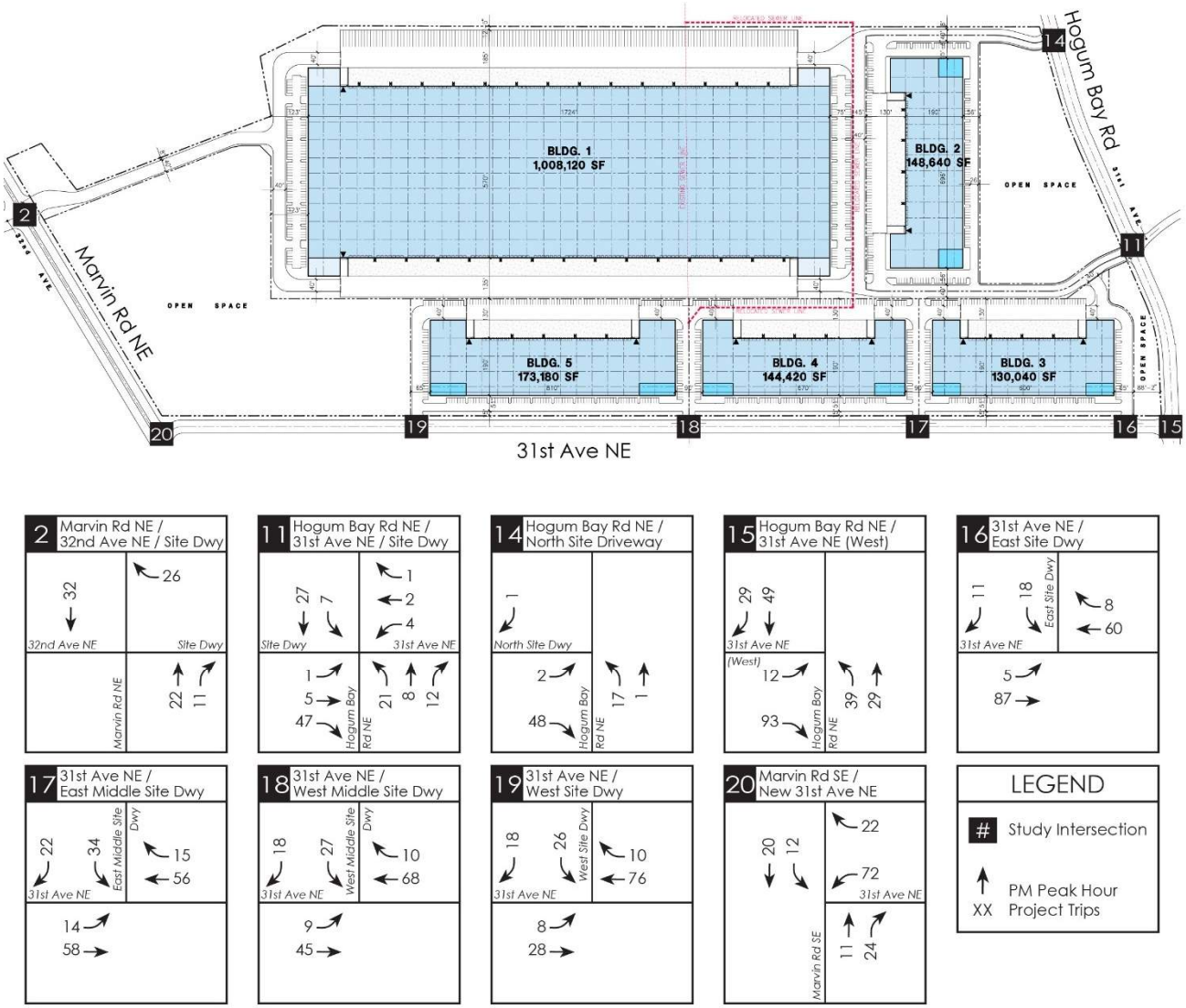


Figure 5: PM Peak Hour Project Trip Assignment - Site Access

6. Future Traffic Conditions

Future weekday PM peak hour traffic volumes without the proposed Hogum Bay Logistics Center development were estimated for future year 2019 conditions with and without project buildout. Future without-project traffic volumes at the study intersections were developed by applying a four (4) percent annual growth rate to existing PM peak hour traffic counts and including known pipeline project developments. Use of a four (4) percent annual growth rate in addition to the inclusion of pipeline traffic is conservative and would likely result in an overestimation of future traffic volumes.

The weekday PM peak hour traffic volumes for year 2019 without the project are illustrated on Figure 6. All future pipeline project traffic volumes were provided by the City. It should be noted that future without-project traffic volumes do not include the 31st Ave NE extension between Marvin Road and Hogum Bay Road, or the Marvin Road widening north of Willamette because it is not expected to be completed prior to 2020 according to the City's currently adopted six-year TIP.

Adding the project-generated PM peak hour trips (shown in Figures 4 and 5) to the future without-project traffic volumes (Figure 6), results in future with-project traffic volumes, as shown in Figure 7. With-project traffic volumes at the 7 site access locations are shown in Figure 8.

There are several planned transportation improvement projects identified in the *City of Lacey Six-Year 2016-2021 Transportation Improvement Program (TIP)* which are located in the site vicinity.

- Hogum Bay Road Truck Route (Interstate 5 to Hawks Prairie Road). The project will include improvements to Hogum Bay Road to accommodate more trucks, as well as a new roundabout at the Hogum Bay Rd/Willamette Rd intersection. Improvements will include roadway widening, bike lanes, sidewalks, and other urban amenities with an emphasis on structural loading for truck route.
- Marvin Road and Britton Parkway Intersection Improvements. This project will include a new slip lane and improved geometrics at the roundabout.
- Marvin Road Widening from Britton Parkway to Columbia Drive. This project is expected to be completed after 2020, and will include roadway widening of Marvin Road from 2 lanes to 5 lanes to Hawks Prairie Road, and then transition to 3 lane section, with bike lanes and sidewalks.
- Marvin Road and Hawks Prairie Road Intersection Improvements. This project will include converting the existing single-lane roundabout to a multi-lane roundabout.
- Martin Way / Marvin Road. Prepare an Interchange Justification Report.
- 31st Ave Extension from Hogum Bay to Marvin Road. This road extension project includes a Major Collector Type II from Hogum Bay Road that will ultimately be extended to Sleater-Kinney Road. This road will be constructed by the proposed Hogum Bay Logistics Center.

Only the Hogum Bay Truck Route project, which includes a roundabout at the intersection at Hogum Bay Road/Willamette Parkway, is planned by the City to be completed by year 2020.

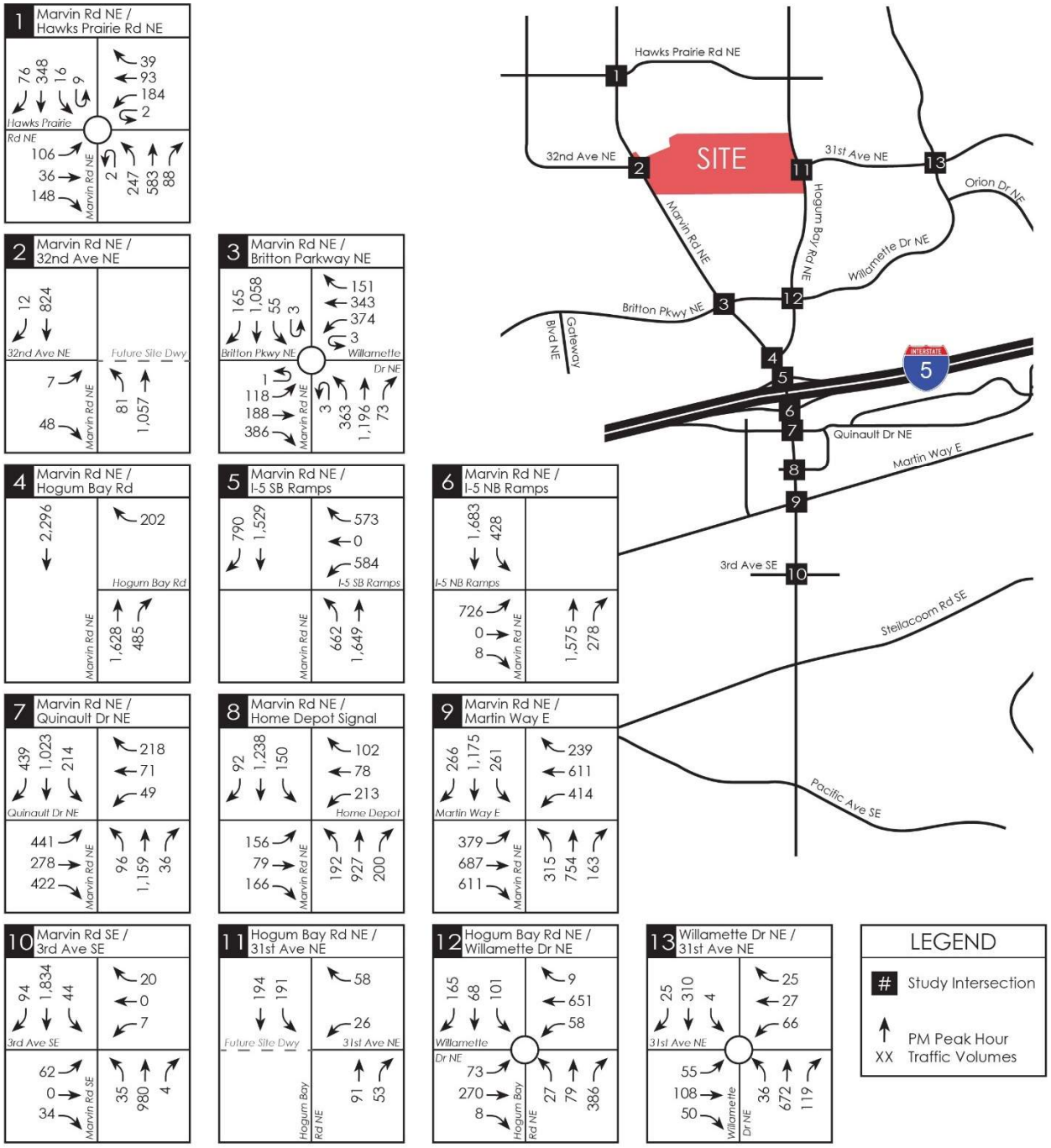


Figure 6: 2019 Without-Project PM Peak Hour Traffic Volumes

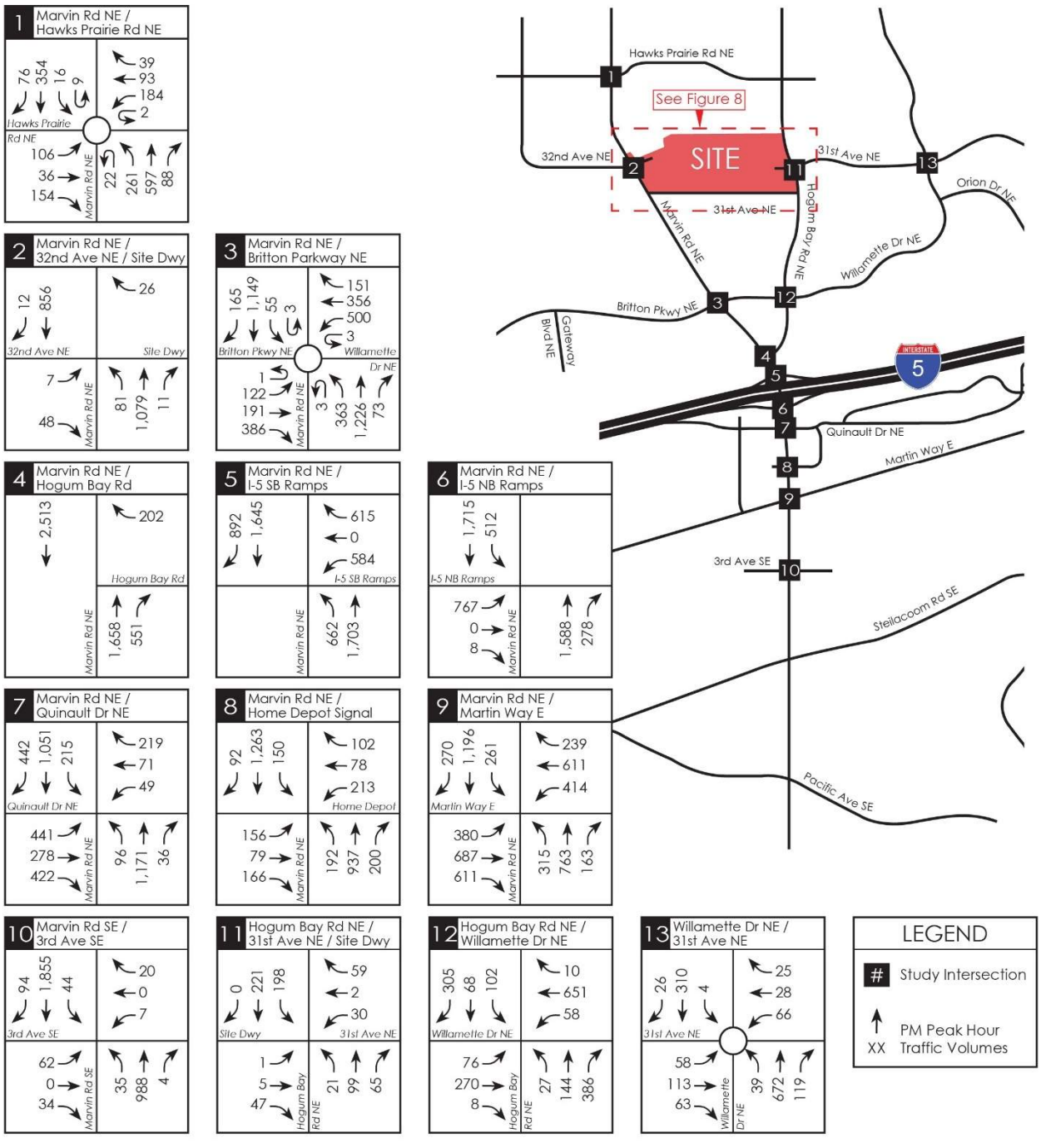


Figure 7: 2019 With-Project PM Peak Hour Traffic Volumes - Study Intersections

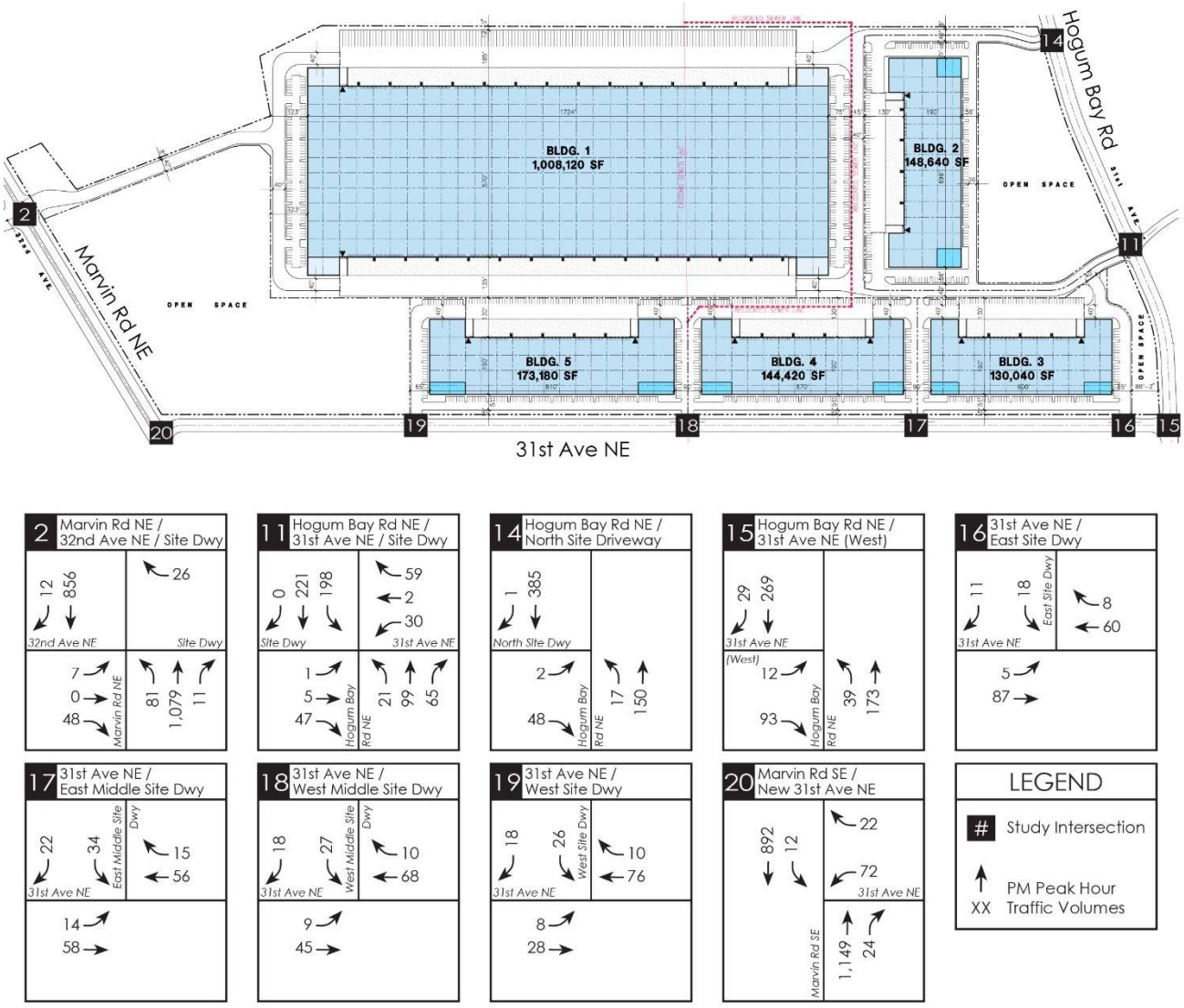


Figure 8: 2019 With-Project PM Peak Hour Traffic Volumes - Site Access

7. Traffic Operations with Project Buildout

Weekday PM peak hour level of service (LOS) analyses were conducted at the 13 study intersections for three conditions: (1) 2016 existing, (2) 2019 without-project, and (3) 2019 with-project buildout.

The signal timing data used at Lacey signalized study intersections was based on data provided by the City of Lacey. Existing weekday PM peak hour LOS analysis results are summarized in Table 3. Table 4 summarizes the future intersection LOS with and without the Hogum Bay Logistics Center development. Detailed LOS worksheets are provided in Appendix D.

Intersection LOS are established based on the methodology and procedures in the 2010 *Highway Capacity Manual*, TRB. Intersection LOS were determined using the *Synchro 8* program for the signalized intersections and the *SIDRA Intersection 6.1* program for roundabouts. Intersection LOS at unsignalized intersections was based on a weighted-average method. This method takes into account the delay experienced by all vehicles entering the intersection, including through vehicles on the major roadway.

The City of Lacey intersection LOS standard is LOS D outside Lacey Core Area, and LOS E for intersections within the Lacey Core Area. The study intersections located on Marvin Road (with exception to the Marvin Road NE / Hawks Prairie Road NE intersection) and Martin Way are located on one of the City's *Strategy Corridors*, which are exempt from the City's LOS standards.

As described earlier, about half of the project-generated traffic destined to Marvin Road southbound is expected re-route to Hogum Bay Road during peak congestion times.

The results of the LOS analyses shown in Table 4 indicate that several of the study intersections located in the City of Lacey are expected to operate at LOS E or F with or without the proposed Hogum Bay Logistics Center development. However, most these intersections are located along the Marvin Road or Martin Way Strategy Corridors, which are exempt from the City's LOS standards. The following mitigation has been identified consistent with the City's concurrency requirements for impacts to intersections on a strategy corridor:

(1) Develop roads with integrated bicycle and pedestrian facilities.
(2) Complete and connect street grid roads identified in the City's 6-year TIP: construct 31st Ave NE connection between Hogum Bay Road and Marvin Road.
(3) Develop road grid consistent with City Access Management requirements.
(4) Identify parking management measures.
(5) Implement improvements designed to encourage pedestrian use.

The Hogum Bay Logistics Center development proposes to construct the 31st Ave NE extension along the south side of the site between Hogum Bay Road and Marvin Road as a primary mitigation measure, which would satisfy the concurrency requirement identified in the City's strategy corridor.

There is one intersection not located along a City *strategy corridor* that is anticipated to operate at LOS F in the future with or without the Hogum Bay Logistics Center development.

Int. #1 – Marvin Road/Hawks-Prairie Road. This existing single-lane roundabout is anticipated to operate at LOS F in 2019 with or without the proposed development in the

PM peak hour due to growth in background traffic and documented pipeline development. The City's Marvin Road widening project will widen the roundabout from a single to a 2-lane roundabout as a result of the Marvin Road widening; this is expected to improve the operation of the intersection to LOS D. However, this project is not currently fully funded and not expected to be constructed until after 2020.

The proposed Hogum Bay Logistics Center development would impact this intersection with new traffic generation, and as a result mitigation is necessary to meet the City's LOS standards. Prior to the construction of the 2-lane roundabout, an additional northbound through lane at the roundabout would be necessary. As project mitigation, a payment in lieu of constructing the northbound lane is proposed in the amount of $100,000 provided the Applicant wants to obtain a building permit for first phase or until the City identifies a funding source for the roundabout.

Table 3
2016 Existing PM Peak Hour LOS Summary

Study Intersection (approach movement)		LOS[1]	Delay (sec)	V/C[2]
Roundabouts:				
1. Marvin Road / Hawks Prairie Rd	**overall**	**B**	**13.0**	**0.71**
Northbound		C	15.7	0.71
Southbound		B	11.0	0.45
Eastbound		A	8.6	0.33
Westbound		B	12.0	0.32
3. Marvin Road / Britton Pkwy *	**overall**	**C**	**24.6**	**0.81**
Northbound		B	14.7	0.68
Southbound		D	29.3	0.81
Eastbound		C	20.4	0.65
Westbound		E	38.8	0.81
13. Willamette Dr NE / 31st Ave NE	**overall**	**A**	**5.8**	**0.31**
Northbound		A	6.3	0.31
Southbound		A	4.7	0.14
Eastbound		A	4.7	0.05
Westbound		A	6.1	0.12
Signalized:				
5. Marvin Road / I-5 SB Ramps *		**C**	**30.5**	**--**
6. Marvin Road / I-5 NB Ramps *		**B**	**12.2**	**--**
7. Marvin Road / Quinault Drive *		**D**	**49.6**	**--**
8. Marvin Road / Lacey Marketplace *		**D**	**45.0**	**--**
9. Marvin Road / Martin Way *		**D**	**48.2**	**--**
10. Marvin Road / 3rd Ave SE		**B**	**12.3**	**--**
Stop Controlled:				
2. Marvin Road NE / 32nd Ave NE		**A**	**1.0**	**--**
4. Marvin Road / Hogum Bay Road NE *		**A**	**1.1**	**--**
11. Hogum Bay Rd NE / 31st Ave NE		**A**	**4.9**	**--**
12. Hogum Bay Rd NE / Willamette Dr NE		**A**	**7.5**	**--**

1. LOS = Level of Service, reported as intersection average for signalized and stop sign controlled intersections and by movement for RAB intersections.
2. V/C = Volume/Capacity ratio.

* Intersection is part of a Strategy Corridor as defined by the City of Lacey.

Table 4
2019 Future With and Without-Project PM Peak Hour LOS Summary

Study Intersection (approach movement)		Year 2019 Without-Project LOS[1]	Delay (sec)	V/C[2]	Year 2019 With-Project LOS	Delay (sec)	V/C
Roundabouts:							
1. Marvin Road / Hawks Prairie Rd #	**overall**	**F**	**54.6**	**1.11**	**F**	**68.4**	**1.18**
Northbound		F	83.0	1.11	F	108.9	1.18
Southbound		D	28.3	0.80	D	31.4	0.82
Eastbound		C	16.1	0.55	C	17.4	0.58
Westbound		E	44.9	0.85	E	45.6	0.85
3. Marvin Road / Britton Pkwy *	**overall**	**F**	**136.6**	**1.55**	**F**	**186.9**	**1.93**
Northbound		F	82.2	1.10	F	94.5	1.13
Southbound		F	144.5	1.24	F	187.2	1.34
Eastbound		F	52.0	0.95	F	58.6	0.98
Westbound		F	294.4	1.55	F	427.5	1.93
12. Hogum Bay Rd NE / Willamette Dr NE	**overall**	**B**	**12.6**	**0.71**	**C**	**22.8**	**0.93**
Northbound		C	19.1	0.71	D	27.8	0.83
Southbound		C	18.9	0.63	E	49.9	0.93
Eastbound		A	6.1	0.71	A	6.2	0.22
Westbound		A	8.4	0.41	A	9.2	0.44
13. Willamette Dr NE / 31st Ave NE	**overall**	**A**	**8.2**	**0.47**	**A**	**8.4**	**0.48**
Northbound		A	9.4	0.47	A	9.5	0.48
Southbound		A	5.4	0.19	A	5.4	0.19
Eastbound		A	8.0	0.30	A	8.6	0.33
Westbound		A	8.5	0.21	A	8.7	0.22
Signalized:							
5. Marvin Road / I-5 SB Ramps *		**F**	**153.2**	**--**	**F**	**173.7**	**--**
6. Marvin Road / I-5 NB Ramps *		**C**	**24.3**	**--**	**D**	**37.4**	**--**
7. Marvin Road / Quinault Drive *		**E**	**76.4**	**--**	**E**	**77.0**	**--**
8. Marvin Road / Lacey Marketplace *		**E**	**56.0**	**--**	**E**	**57.3**	**--**
9. Marvin Road / Martin Way *		**F**	**84.6**	**--**	**F**	**87.1**	**--**
10. Marvin Road / 3rd Ave SE		**C**	**21.8**	**--**	**C**	**22.8**	**--**
Stop Controlled:							
2. Marvin Road NE / 32nd Ave NE		**A**	**1.5**	**--**	**A**	**2.8**	**--**
4. Marvin Road / Hogum Bay Road NE *		**A**	**2.7**	**--**	**A**	**2.7**	**--**
11. Hogum Bay Rd NE / 31st Ave NE [3]		**A**	**6.8**	**--**	**A**	**9.5**	**--**
20. Marvin Rd NE / 31st Ave NE (extension) [3]		**-**	**-**	**--**	**D**	**34.1**	**--**

1. LOS = Level of Service, reported as intersection average for signalized and stop sign controlled intersections and by movement for RAB intersections.
2. V/C = Volume/Capacity ratio.
3. Half of the project-generated traffic destined to Marvin Road southbound is expected re-route to Hogum Bay Road during peak congestion times.

* Intersection is part of a Strategy Corridor as defined by the City of Lacey.
\# Mitigation proposed to bring the intersection to LOS D

8. Access Management

Vehicle access for the Hogum Bay Logistics Center development is proposed at seven driveways: one new driveway on Marvin Road NE (aligned with the existing 32nd Ave NE), two new driveways on Hogum Bay Rd NE (one aligned with the existing 31st Ave NE), and four driveways on the future 31st Ave NE extension. The following describes each of the driveways:

- The access on 32nd Ave NE would be limited to only right-in and right-out (RIRO) turn movements until the City completes the 5-lane widening of Marvin Road. The RIRO operation would be consistent with City Access Management strategy and would be accomplished with c-curb, a northbound right-turn lane, and exiting right-turn acceleration lane.
- The proposed location of the north access driveway on Hogum Bay Road will require modification in order to meet City Access Management standards with 660-foot spacing for an arterial. Either the location of the driveway will need to be modified, or coordination necessary with adjacent properties to modify access on opposite side of Hogum Bay Road.
- The location of the south access on Hogum Bay Road would align with the existing 31st Ave NE intersection, and would meet the City's Access Management requirements.
- The 4 access driveways on the new 31st Ave NE roadway extension would meet City Access Management requirements by being spaced at least 330 feet apart.

Weekday PM peak hour LOS and queues were evaluated at each of the site access locations and adjacent intersections. Tables 5 and 6 summarize the LOS and queue results, respectively, at the site access locations for future 2019 with-project conditions during the PM peak hour.

Table 5
Site Access PM Peak Hour LOS Summary

Study Intersection (stop sign controlled)	LOS[1]	Delay (sec)
2. Marvin Road NE / 32nd Ave NE [2]	A	2.8
11. Hogum Bay Rd NE / 31st Ave NE	A	9.5
14. Marvin Road NE / North Access	A	3.4
15. Hogum Bay Rd NE / 31st Ave NE (extension)	A	4.8
16. East Access / 31st Ave NE (extension)	A	1.7
17. East Middle Access / 31st Ave NE (extension)	A	3.3
18. West Middle Access / 31st Ave NE (extension)	A	2.8
19. West Access / 31st Ave NE (extension)	A	2.9
20. Marvin Rd NE / 31st Ave NE (extension)	D	34.1

1. LOS = Level of Service, reported as intersection average for stop sign controlled intersections.
2. The 32nd Ave NE access onto Marvin Road will be limited to right-in and right-out (RIRO) only.

As shown in Table 5, the turn movements at all site access driveways are anticipated to operate at LOS D or better in 2019 with full buildout of the project.

Table 6
Site Access PM Peak Hour Queue Summary

Study Intersection (approach movement)	95th % Queue (ft)
Stop Controlled:	
2. Marvin Road NE / 32nd Ave NE	
SB Left-Turn (entering trips)	0'
WB Right-Turn (exiting trips)	25'
11. Hogum Bay Rd NE / 31st Ave NE	
NB Left-Turn (entering trips)	< 25'
EB Approach (exiting trips)	< 25'
WB Approach (entering trips)	25'
14. Marvin Road NE / North Access	
NB Left-Turn (entering trips)	< 25'
EB Approach (exiting trips)	< 25'
15. Hogum Bay Rd NE / 31st Ave NE (extension)	
NB Left-Turn (entering trips)	< 25'
EB Left-Turn (exiting trips)	< 25'
EB Right-Turn (exiting trips)	25'
16. East Access / 31st Ave NE (extension)	
SB Approach (exiting trips)	< 25'
EB Left-Turn (entering trips)	0'
17. East Middle Access / 31st Ave NE (extension)	
SB Approach (exiting trips)	< 25'
EB Left-Turn (entering trips)	0'
18. West Middle Access / 31st Ave NE (extension)	
SB Approach (exiting trips)	< 25'
EB Left-Turn (entering trips)	0'
19. West Access / 31st Ave NE (extension)	
SB Approach (exiting trips)	< 25'
EB Left-Turn (entering trips)	0'

As shown in Table 6, the 95th-percentile queues for movements entering and exiting the site are estimated to be 25 feet or less at all site access locations.

9. Traffic Calming

City development guidelines require that internal traffic calming be incorporated into all developments to control cut-through traffic and reduce speed within the development. Cut-through traffic is not anticipated to be a concern within the Hogum Bay Logistics Center.

10. Alternate Modes of Transportation

The City of Lacey TIA guidelines encourage alternate modes of transportation. New developments are encouraged to implement Transportation Demand Management (TDM) practices. However, no bus routes are provided within a half mile of the site. Sidewalks will be provided on new roadways, and bicycle lanes on the new 31st Ave NE extension along the south side of the site. Employees will be encouraged to carpool.

11. Mitigation

The following measures have been identified to mitigate transportation impacts of the proposed Hogum Bay Logistics Center development.

- Lacey Impact Fees. To mitigate impacts to City of Lacey roads, payment of a transportation mitigation cost and truck impact fee are required. The mitigation cost calculation will be determined by the City Transportation Department, and based on the number of PM peak hour trips generated by the proposed project affecting the current City TIP project list.

- Lacey Intersections. Due to the anticipated LOS F operation at the Marvin Road/Hawks-Prairie Road single-lane roundabout in 2019 prior to the City's construction of the 2-lane roundabout, an additional northbound lane would improve the operation to LOS D. To mitigate impacts of the proposed Hogum Bay Logistics Center, and prior to the City building the 2-lane roundabout, a payment in lieu of constructing the northbound lane is proposed in the amount of $100,000.

- Lacey Concurrency. The following measures have been identified consistent with the City's concurrency requirements for impacts to intersections on *strategy corridors*:

    1) Develop roads with integrated bicycle and pedestrian facilities.
    2) Complete and connect street grid roads identified in the City's 6-year TIP: construct 31st Ave NE connection between Hogum Bay Road and Marvin Road.
    3) Develop road grid consistent with City Access Management requirements.
    4) Identify parking management measures.
    5) Implement improvements designed to encourage pedestrian use.

  To satisfy the City's concurrency requirement for impacts to intersections on *strategy corridors*, the Hogum Bay Logistics Center will construct the 31st Ave extension on the south side of the site between Hogum Bay Road and Marvin Road.

- Frontage Improvements. In addition to construction of the 31st Ave NE road extension, the project will construct half-street frontage improvements on Marvin Road. The applicant is requesting applicable credit against City transportation impact fees for construction of the 31st Ave NE extension on the south project frontage.

12. City of Lacey Concurrency

A new development cannot be approved if traffic generated by such development, when added to the background traffic volumes, causes the LOS on a transportation facility to decline below the LOS standard set forth in Thurston County or City of Lacey code, unless transportation improvements or strategies to cure such decline are made concurrent with the development. One such strategy is implementation of mitigations set forth in City of Lacey Municipal Code section 14.21.010(M) to be constructed or instituted for impacts to City-established *Strategy Corridors*.

Strategy Corridors are those streets or intersections which typically have been constructed or improved to 4 or 5 lanes in width between intersections, or are streets or intersections bounded by existing land use or environmental features that preclude further widening. Such *Strategy Corridors* are in areas where growth is encouraged and typically coincides with the designation of a High Density Corridor, City Centers, Core Areas or Activity Centers where a concentration of commercial and other uses is desired, especially when that growth increases densities and proximity of different types of land use. Peak hour vehicular congestion in these corridors is likely to exceed levels of service which would otherwise be acceptable within the transportation system. Strategy Corridors are identified in the City's 2030 Transportation Plan and are exempt from the City's LOS standards.

The following measures are proposed to address the City's Concurrency requirements and to mitigate the transportation impacts of the proposed Hogum Bay Logistics Center development at study intersections along the Marvin Road and Martin Way strategy corridors.

(1) Develop roads with integrated bicycle and pedestrian facilities.
(2) Complete and connect street grid roads identified in the City's 6-year TIP: construct 31st Ave NE connection between Hogum Bay Road and Marvin Road.
(3) Develop road grid consistent with City Access Management requirements.
(4) Identify parking management measures.
(5) Implement improvements designed to encourage pedestrian use.

The Hogum Bay Logistics Center will construct the 31st Ave extension on the south side of the site between Hogum Bay Road and Marvin Road as a primary mitigation measure, which would satisfy the concurrency requirement identified in the City's strategy corridor.

13. Impacts to Marvin Road Corridor in Thurston County

Thurston County has determined that based on previous traffic studies, the Level of Service on the Marvin Road corridor is expected to drop below adopted level of service standards in 2020. At that point, Thurston County will be responsible for implementing corridor improvements within six years.

Thurston County has developed an approach to allow for developments to move forward by shifting the year the Level of Service drops below adopted levels to 2018 or 2019 from the projected year of 2019. All new developments that contribute 1 or more trips to the Marvin Road corridor south of Pacific Avenue will need to submit a traffic study in order to make a concurrency determination.

Based on the *Marvin Road Corridor Concurrency White Paper*, the traffic impacts of the proposed Hogum Bay Logistics Center development were evaluated at the following 4 intersections:

1. Marvin Rd SE / Union Mills Rd
2. Marvin Rd SE / 19th Ave SE
3. Marvin Rd SE / 25th Ave SE
4. Marvin Rd SE / Mullen Rd SE

Future weekday PM peak hour traffic volumes without the proposed Hogum Bay Logistics Center development were estimated for future year 2019 conditions with and without project buildout. Future without-project traffic volumes at the 4 Thurston County study intersections were developed based on existing PM peak hour traffic counts increased to account for background growth and anticipated pipeline project developments. A four (4) percent annual growth rate was used to account for general traffic growth in the area in addition to known pipeline developments. LOS was evaluated based on a weighted-average of all approaches to each intersection.

The distribution of Hogum Bay Logistics Center trips to the Marvin Road corridor are based on the project-specific TRPC model distribution for Zones 446 and 447, which was provided by the City of Lacey.

Adding the project-generated PM peak hour trips to the future without-project traffic volumes, results in future with-project traffic volumes. Future 2019 PM peak hour traffic volumes without-project, the PM peak hour project trip assignment, and future 2019 PM peak hour with-project traffic volumes at the 4 Thurston County intersections are shown in Figure 9.

Intersection LOS are established based on the methodology and procedures in the 2010 *Highway Capacity Manual*, TRB. Intersection LOS were determined using the *Synchro 8* program for the signalized intersections. Intersection LOS at unsignalized intersections was based on a weighted-average method. This method takes into account the delay experienced by all vehicles entering the intersection, including through vehicles on the major roadway. The LOS analyses at the Thurston County intersections is summarized in Table 7.

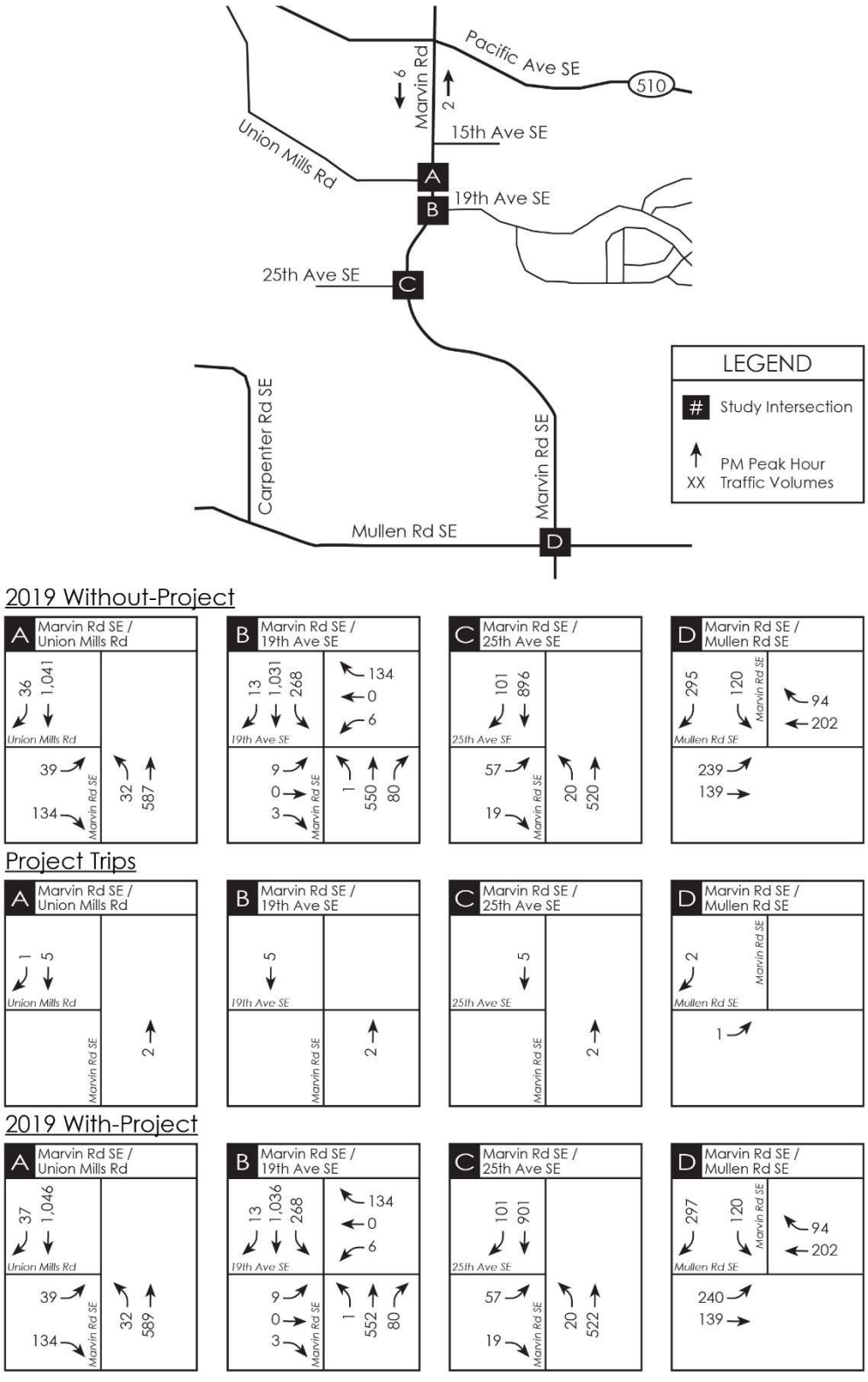


Figure 9: PM Peak Hour Traffic Volumes at Thurston County Intersections

Table 7
2019 Future PM Peak Hour LOS Summary at Thurston County Intersections

Concurrency Intersection	Without-Project LOS[1]	Without-Project Delay (sec)	With-Project LOS[1]	With-Project Delay (sec)
A. Marvin Rd SE / Union Mills Rd SE	C	20.9	C	23.7
B. Marvin Rd SE / 19th Ave SE	A	5.9	A	6.0
C. Marvin Rd SE / 25th Ave SE	A	3.1	A	3.1
D. Marvin Rd SE / Mullen Rd SE	D	32.4	D	33.3

1. LOS = Level of Service, reported as intersection average for stop sign controlled intersections.

As shown in Table 7, all four Thurston County study intersections are expected to operate at LOS D or better in 2019 with the Hogum Bay Logistics Center project.

To mitigate impacts to the County's Marvin Road corridor project, payment of a transportation mitigation cost of $126,000 has been identified.

Appendix A

TENW Traffic Scoping Memo – dated June 16, 2016

City of Lacey Traffic Scoping Comment Letter – dated July 14, 2016

MEMORANDUM

DATE: June 16, 2016

TO: Martin Hoppe / Pat McGuin
City of Lacey

FROM: Jeff Schramm / Curtis Chin, P.E.
TENW

SUBJECT: Traffic Scoping Memo for IDS Project Blue – Lacey, WA
TENW Project No. 5194

This memorandum is intended to provide the preliminary traffic information for the proposed IDS Project Blue development in Lacey for the purpose of establishing a scope of work for the traffic study. This memo includes a project description, trip generation calculations, PM peak hour trip distribution estimate, PM peak hour project trip assignment figure, and preliminary list of study intersections.

Please forward this Traffic Scope Memo to Thurston County and WSDOT for review.

Upon review of this information, we are requesting a consolidation of review comments and a Traffic Scoping Worksheet to confirm study intersections to be included in the traffic analysis.

Project Description

The proposed IDS Project Blue development site is located between Marvin Road NE and Hogum Bay Road NE on the north side of the City's future planned 31st Ave NE extension. **Attachment A** provides a Vicinity Map, and a preliminary site plan concept is provided in **Attachment B.**

The proposed project would include a total of up to 1.6 million square feet of development that will include a mix of industrial-type uses. For purposes of establishing a scope of work for the traffic analysis, the project proposes 800,000 sf high-cube warehouse/distribution center, 600,000 sf warehouse, and 200,000 sf manufacturing. The existing site includes approximately 30,000 sf manufacturing use which would be removed as part of the proposed project.

Vehicle access is proposed at several locations: one new driveway on Marvin Road NE (aligned with 32nd Ave), two new driveways on Hogum Bay Road NE (one aligned with 31st Ave), and two driveways on the future 31st Ave NE. The IDS Lacey project is expected to be completed and occupied by the year 2020.

Project Trip Generation

The net new weekday daily, AM and PM peak hour trip generation estimates for the project were calculated by subtracting trips generated by the existing use from the total gross project trips. Trip estimates for the existing and proposed uses were based on methodology included in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th edition. **Table 1** summarizes the net weekday trip generation with detailed trip generation calculations provided in **Attachment C**.

Table 1. IDS Lacey Project Trip Generation Summary

	Trips Generated		
Time Period	In	Out	Total
Weekday Daily	2,065	2,064	4,129
Weekday AM Peak Hour	300	92	392
Weekday PM Peak Hour	123	289	412

The project is estimated to generate 4,129 net new daily vehicular trips, with 392 trips (300 in, 92 out) occurring during the AM peak hour and 412 trips (123 in, 289 out) occurring during the PM peak hour.

Project Trip Distribution and Assignment

The distribution of project-generated trips during the weekday PM peak hour was estimated based on traffic model distribution from the TRPC traffic model (TAZ 446 & 447) as provided by the City of Lacey. The traffic model assumes future roadway buildout in the area based on the City's Transportation Plan, including the 31st Ave NE road connection between Marvin and Hogum Bay. The traffic model output is illustrated on the first page of **Attachment D.**

The model distribution was then used to assign the 123 inbound and 289 outbound weekday PM peak hour trips generated by the IDS Project Blue to the adjacent street network. The resulting project trip assignment is illustrated on the second page of **Attachment D**, which was developed by factoring the TRPC model distribution to the project trip generation (123 in, 289 out).

As shown in Attachment D, and based on future buildout of the project assuming the City's future road improvements including the 31st Ave NE connection, the 13 off-site intersections listed below are anticipated to be impacted by 20 or more PM peak hour project-generated trips from the proposed project.

1. Marvin Rd NE / Hawks Prairie Rd NE
2. Marvin Rd NE / Britton Pkwy-Willamette Drive NE
3. Marvin Rd NE / Hogum Bay Rd
4. Marvin Rd NE / I-5 SB Ramps
5. Marvin Rd NE / I-5 NB Ramps
6. Marvin Rd NE / Quinault Drive NE
7. Marvin Rd NE / Home Depot Signal
8. Marvin Rd NE / Martin Way
9. Marvin Rd / 3rd Ave SE
10. Marvin Rd / Steilacoom Rd SE
11. Hogum Bay Rd NE / Willamette Drive NE
12. Willamette Drive NE / 31st Ave NE

In addition to these 12 off-site intersections in City of Lacey, all of the site access intersections will be evaluated in the Traffic Impact Analysis. The locations of the site access intersections are provided in Attachment D.

City of Lacey Study Intersections

Upon your review of the list of off-site study intersections identified on the previous page, we are requesting that you provide a Traffic Scope Worksheet and confirmation of the study intersections to be included in the traffic analysis of weekday PM peak hour conditions.

Thurston County Concurrency Intersections

Thurston County has identified the following 4 intersections along the Marvin Road corridor for concurrency review and management, which are also illustrated in **Attachment E:**

A. Marvin Road / Union Mills Road
B. Marvin Road / 19th Ave
C. Marvin Road / 25th Ave
D. Marvin Road / Mullen Road

These four intersections are expected to be evaluated in the traffic analysis for the proposed IDS Lacey development in the context of the County's Memorandum dated June 30, 2015, and Thurston County Code 17.10 Transportation Facilities Concurrency Management System.

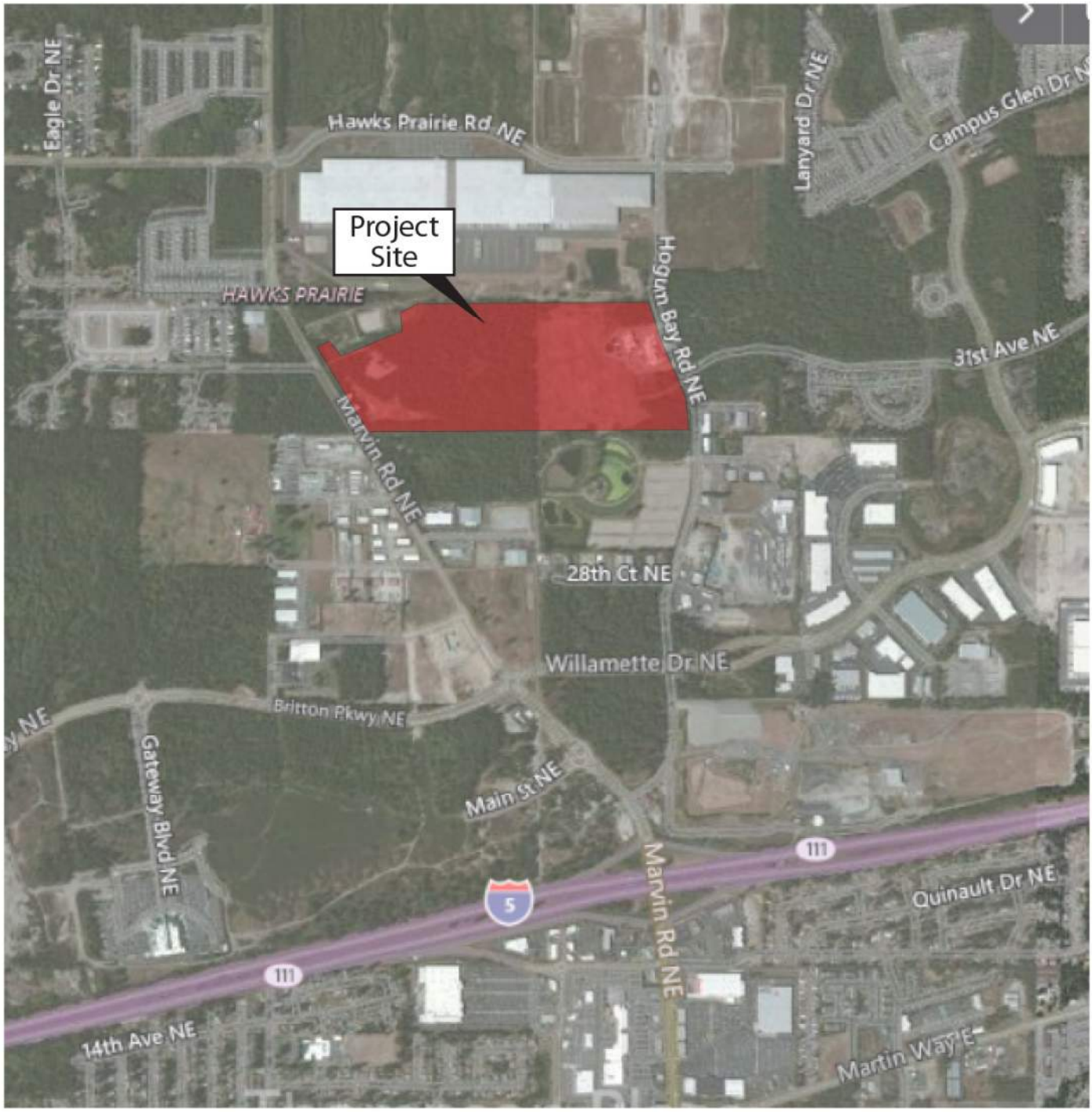
Pipeline Projects and Growth Rates

We are also requesting a list of "pipeline" projects that we will need to account for in the traffic analysis, as well as confirmation of the appropriate background growth rate to be used to evaluate PM peak hour LOS.

If you have any questions regarding the information presented in this Traffic Scoping Memo, please contact me at (206) 396-8286 or schramm@tenw.com.

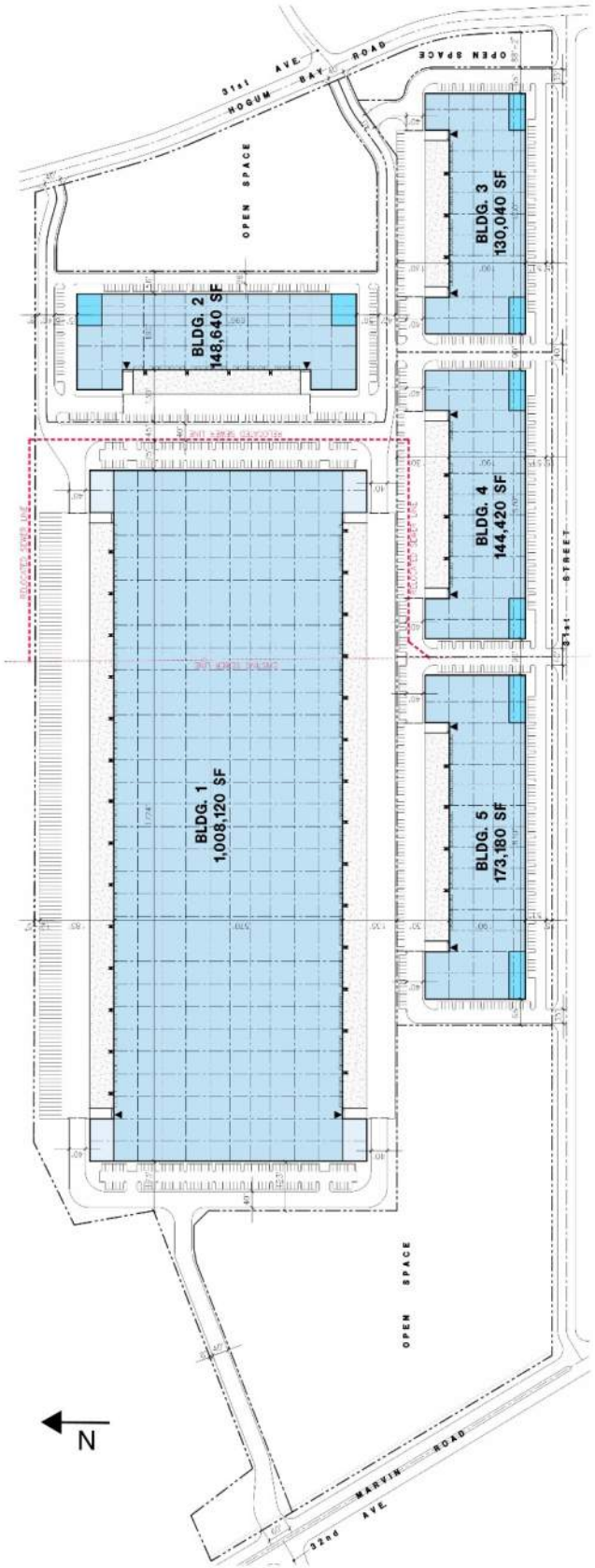
cc: Dan Sibson – IDS Real Estate
Mike Hughes – IDS Real Estate
Jeff Haynie, P.E. – TENW Principal

Attachments: A. Project Vicinity Map
B. Preliminary Site Plan Concept
C. Detailed Trip Generation Calculations
D. Traffic Model and PM Peak Hour Project Trip Assignment to City Intersections (2 pages)
E. PM Peak Hour Trip Assignment at Thurston County Concurrency Intersections



Attachment A: Project Site Vicinity

ATTACHMENT B
Preliminary Site Plan Concept



ATTACHMENT C

Trip Generation

IDS Lacey (1.6 Million square feet)
Trip Generation Estimate (800k High-Cube, 450k Warehousing, 350k Manufacturing)

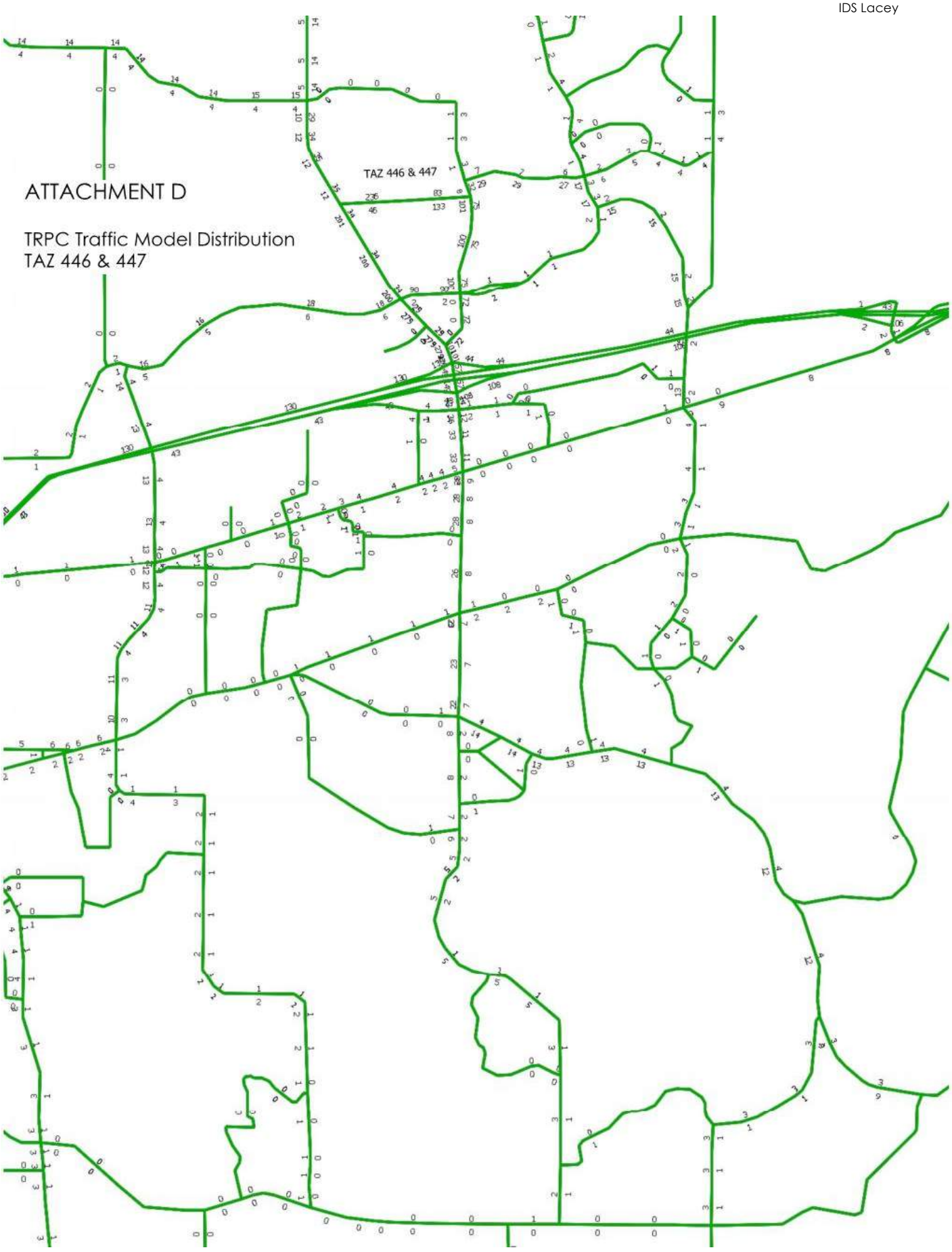
Land Use	Size	Units [1]	ITE LUC [2]	Trip Rate [2]	Directional Split		Trips Generation		
					Enter	Exit	Enter	Exit	Total
DAILY									
Proposed Uses:									
High-Cube Warehouse/Distribution Center	800,000	GFA	152	1.68	50%	50%	672	672	1,344
Warehousing	600,000	GFA	150	3.56	50%	50%	1,068	1,068	2,136
Manufacturing	200,000	GFA	140	3.82	50%	50%	382	382	764
							2,122	2122	4,244
Less Existing Use:									
Manufacturing	30,000	GFA	140	3.82	50%	50%	-57	-58	-115
							-57	-58	-115
				NEW DAILY TRIP GENERATION:			**2,065**	**2,064**	**4,129**
AM PEAK HOUR									
Proposed Uses:									
High-Cube Warehouse/Distribution Center	800,000	GFA	152	0.11	69%	31%	61	27	88
Warehousing	600,000	GFA	150	0.30	79%	21%	142	38	180
Manufacturing	200,000	GFA	140	0.73	78%	22%	114	32	146
							317	97	414
Less Existing Use:									
Manufacturing	30,000	GFA	140	0.73	78%	22%	-17	-5	-22
							-17	-5	-22
				NEW AM PEAK HOUR TRIP GENERATION:			**300**	**92**	**392**
PM PEAK HOUR									
Proposed Uses:									
High-Cube Warehouse/Distribution Center	800,000	GFA	152	0.12	31%	69%	30	66	96
Warehousing	600,000	GFA	150	0.32	25%	75%	48	144	192
Manufacturing	200,000	GFA	140	0.73	36%	64%	53	93	146
							131	303	434
Less Existing Use:									
Manufacturing	30,000	GFA	140	0.73	36%	64%	-8	-14	-22
							-8	-14	-22
				NEW PM PEAK HOUR TRIP GENERATION:			**123**	**289**	**412**

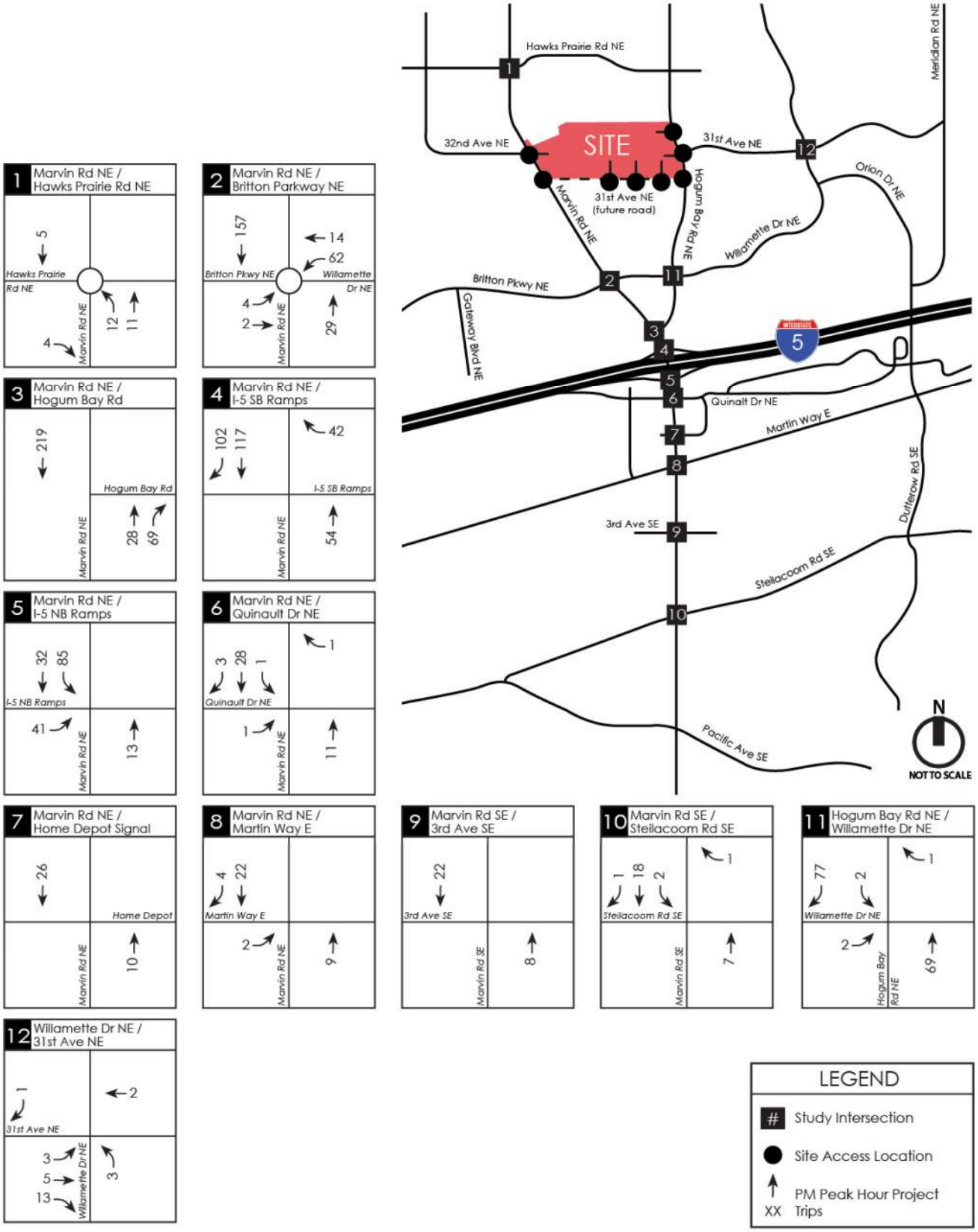
[1] GFA = Gross Floor Area.

[2] Land Use Code and trip rates based on ITE *Trip Generation* Manual, 9th Edition, 2012.

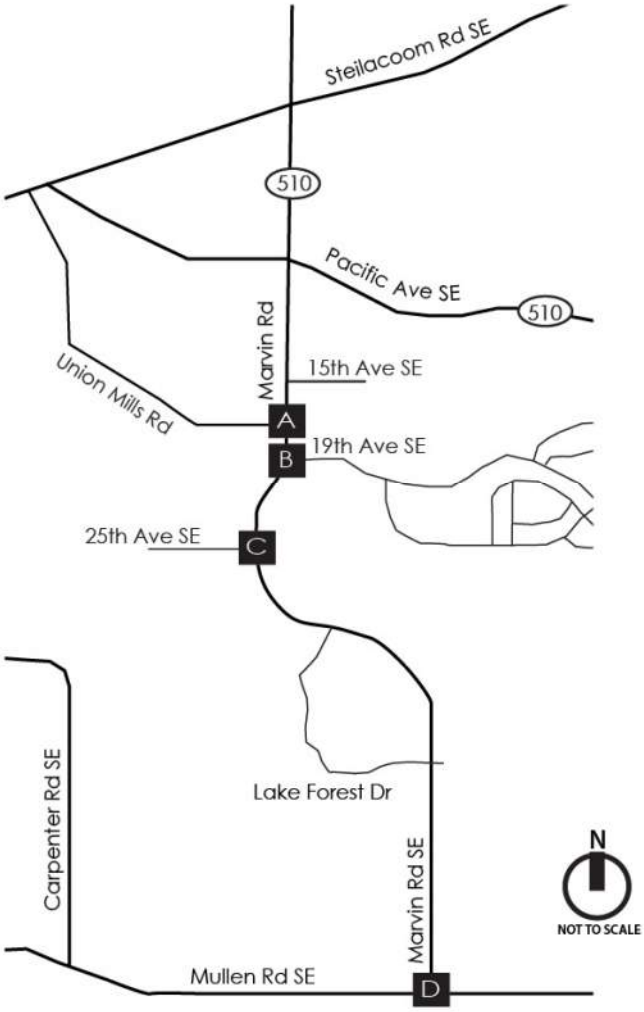
ATTACHMENT D

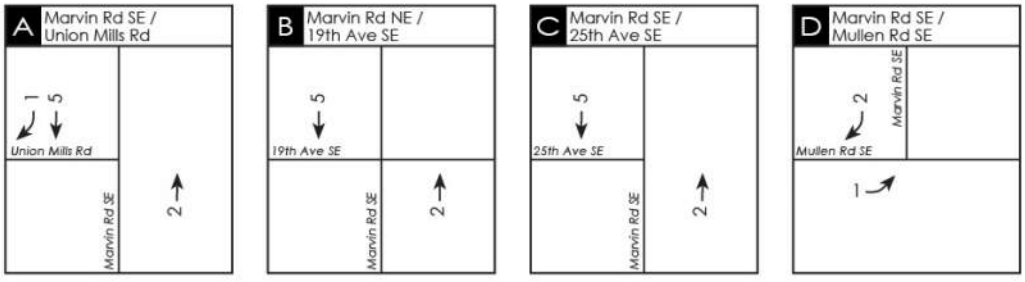
TRPC Traffic Model Distribution
TAZ 446 & 447





Attachment D: PM Peak Hour Project Trip Assignment





Attachment E: PM Peak Trip Assignment at Thurston County Concurrency Intersections

CITY OF LACEY

Shaping our community together

420 COLLEGE STREET SE
LACEY, WA 98503-1238

July 14, 2016
Transportation Engineering NorthWest
11400 SE 8th Street, Suite 200
Bellevue, WA 98004

SUBJECT: IDS Project Blue Industrial Uses, Traffic Scoping approval.

Dear Jeff:

I have reviewed the Traffic Scoping report submitted for this project and have determined there is transportation impact that requires a Traffic Impact Analysis. The methodology for completing a Traffic Impact Analysis is identified in Chapter 4 of the City of Lacey Development Guidelines and Public Works Standards, and mitigation and concurrency measures are identified in Lacey Municipal Code Chapter 14.21.

The scoping identified 12 intersections impacted by 20 or more trips, I have also included Marvin Road / Pacific Ave SE, please analyze these intersections in your report, the identified site access points and include them in attachment D:

1. Marvin Road NE / Hawks Prairie Rd NE (RAB)
2. Marvin Road NE / Britton Pkwy-Willamette Dr NE (RAB)
3. Marvin Road NE / Hogum Bay Rd NE (Unsignalized)
4. Marvin Road NE / I-5 SB Ramps (Signal)
5. Marvin Road NE / I-5 NB Ramps (Signal)
6. Marvin Road NE/ Quinault Dr NE (Signal)
7. Marvin Road NE / Lacey Market Pl NE (Signal)
8. Marvin Road NE / Martin Way East (Signal)
9. Marvin Road SE / 3rd Avenue SE (Signal)
10. Marvin Road SE / Steilacoom Rd SE (Signal)
11. Marvin Road SE / Pacific Ave SE (RAB)
12. Hogum Bay Rd NE / Willamette Drive NE (Funded future RAB)
13. Willamette Drive NE / 31st Ave NE (RAB)

The scoping also has identified intersections A through D. These intersections are included in a memorandum for the Marvin Road corridor dated April 9, 2015 (see attachments). The developer shall work with Thurston County Development Review to resolve these concurrency issues. The City is currently working with Thurston County as it has impacts to all of our traffic impact analysis reports associated with development projects.

A. Marvin Road SE and Union Mills Road SE
B. Marvin Road SE and 19th Avenue SE
C. Marvin Road SE and 25th Avenue SE
D. Marvin Road SE and Mullen Road SE

Please use the most current Teapac or Synchro software for signal analysis, Sidra software for the roundabouts and HCS 2010 software to analyze the stop controlled intersections with the level of service calculated as a total intersection.

Included are the pipeline trips, the printed intersection volume diagrams represents the approved cumulative pipeline projects for all intersections. The background growth rate for this project shall be 4% for each year. I have included all of the databases for the signalized intersections.

Calculate the truck generation in the report using Table A.4 of the ITE Trip Generation Handbook Appendix A. The truck trip fee will be calculated and will mitigate the structural impacts to existing roadways within the Hawks Prairie area of the City. The collected fee will be used to finance the construction of structural improvements to the roadways impacted by truck traffic in the area.

Please provide 5 signed and stamped Traffic Impact Analysis for distribution for the review necessary to evaluate this project. If you have any questions, do not hesitate to call me at (360) 438-2640.

Sincerely,

Patrick D. McGuin

Pat McGuin
Transportation Engineer

Cc
Tom Stiles, Development Manager
Samra Seymour, Associate Planner
File

Appendix B

Existing PM Peak Hour Traffic Counts

Prepared for: **TENW**

Traffic Count Consultants, Inc.

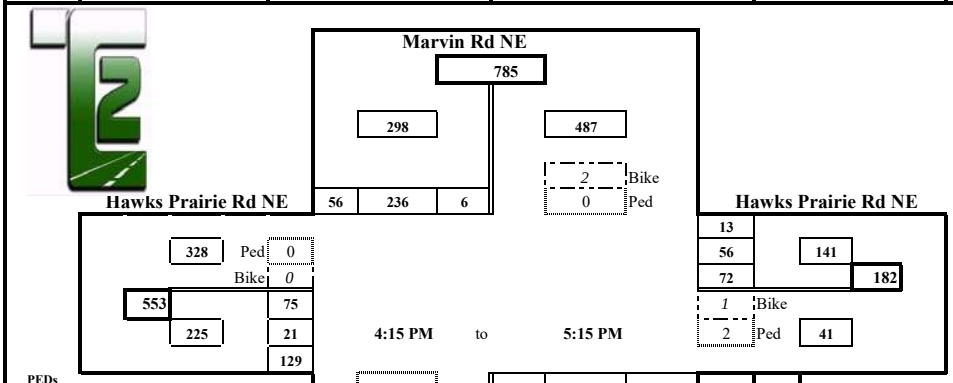
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Marvin Rd NE & Hawks Prairie Rd NE **Date of Count:** Thurs 6/09/2016

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Marvin Rd NE				From South on (NB) Marvin Rd NE				From East on (WB) Hawks Prairie Rd NE				From West on (EB) Hawks Prairie Rd NE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	2	0	57	13	1	53	90	11	2	3	6	1	2	20	9	24	287
4:30 P	0	4	64	6	4	62	106	6	0	5	7	0	3	21	9	29	319
4:45 P	2	1	58	22	1	44	93	4	1	39	20	7	0	22	1	39	350
5:00 P	3	0	57	14	1	50	100	1	0	8	14	0	0	23	4	34	305
5:15 P	1	1	57	14	1	60	100	3	2	20	15	6	1	9	7	27	319
5:30 P	0	1	55	8	3	53	91	1	0	11	16	8	0	16	2	31	293
5:45 P	1	1	78	20	1	57	123	2	0	5	3	2	0	25	1	29	346
6:00 P	1	4	53	13	1	54	95	1	0	3	6	1	0	25	4	27	286
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	10	12	479	110	13	433	798	29	5	94	87	25	6	161	37	240	2505
Peak Hour: 4:15 PM to 5:15 PM																	
Total	6	6	236	56	7	216	399	14	3	72	56	13	4	75	21	129	1293
Approach	298				629				141				225				1293
%HV	2.0%				1.1%				2.1%				1.8%				1.5%
PHF	0.92				0.90				0.53				0.91				0.92



1400 *1.0 PHF Peak Hour Volume*

PEDs Across:	N	S	E	W	
INT 01					0
INT 02			2		2
INT 03					0
INT 04					0
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	2	0	**2**

	PHF	%HV
EB	0.91	1.8%
WB	0.53	2.1%
NB	0.90	1.1%
SB	0.92	2.0%
T Int.	0.92	1.5%

Check In: 1293 Out: 1293

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04	2		1		3
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	2	0	1	0	3

	N U's	S U's	E U's	W U's
	1	0		0
	0	3		1
	0	1		0
	1	4		1
	0	2		0
	0	7		0
	1	1		1
	1	6		1
	4	24	0	4

Special Notes

Prepared for: **TENW**

Traffic Count Consultants, Inc.

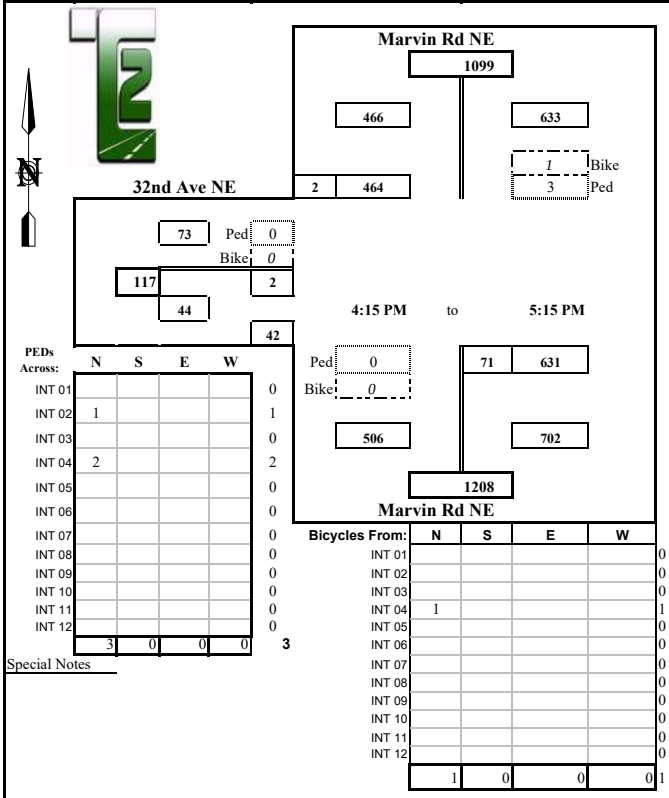
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Marvin Rd NE & 32nd Ave NE **Date of Count:** Thurs 6/09/2016

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Marvin Rd NE				From South on (NB) Marvin Rd NE				From East on (WB) 0				From West on (EB) 32nd Ave NE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	1	0	89	1	4	9	153	0	0	0	0	0	1	0	0	25	277
4:30 P	3	0	103	1	4	24	171	0	0	0	0	0	1	0	0	8	307
4:45 P	3	0	140	0	2	12	146	0	0	0	0	0	0	0	0	15	313
5:00 P	1	0	101	1	3	22	150	0	0	0	0	0	0	0	0	12	286
5:15 P	4	0	120	0	0	13	164	0	0	0	0	0	0	2	0	7	306
5:30 P	1	0	101	0	1	24	163	0	0	0	0	0	0	0	0	6	294
5:45 P	0	0	113	0	2	22	173	0	0	0	0	0	0	0	0	13	321
6:00 P	1	0	83	0	1	21	149	0	0	0	0	0	0	0	0	11	264
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	14	0	850	3	17	147	1269	0	0	0	0	0	2	2	0	97	2368
	Peak Hour: 4:15 PM to 5:15 PM																
Total	11	0	464	2	9	71	631	0	0	0	0	0	1	2	0	42	1212
Approach	466				702				0				44				1212
%HV	2.4%				1.3%				n/a				2.3%				1.7%
PHF	0.83				0.90				n/a				0.73				0.97



PEDs Across:

	N	S	E	W	
INT 01					0
INT 02	1				1
INT 03					0
INT 04	2				2
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	0	0	0	3

Bicycles From:

	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04	1				1
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	1	0	0	0	1

1284 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	0.73	2.3%
Check	WB	n/a	n/a
In: 1212	NB	0.90	1.3%
Out: 1212	SB	0.83	2.4%
	T Int.	0.97	1.7%

Conditions:

Special Notes

Prepared for: **TENW**

Traffic Count Consultants, Inc.

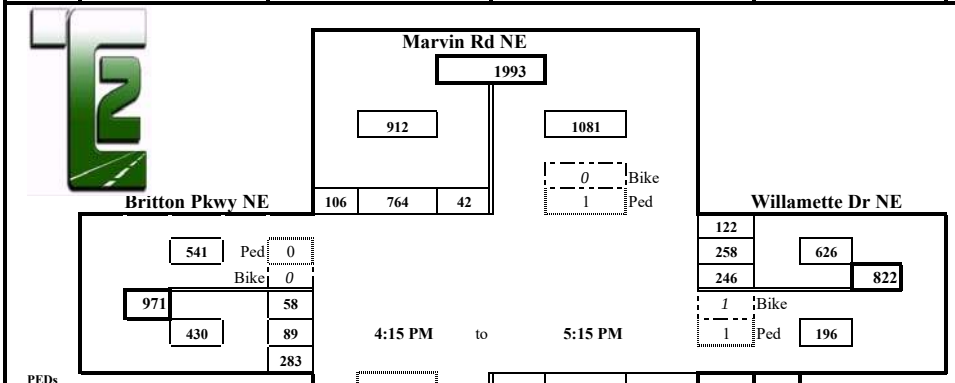
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Marvin Rd NE & Willamette Dr NE/Britton Pkwy NE **Date of Count:** Thurs 6/09/2016

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Marvin Rd NE				From South on (NB) Marvin Rd NE				From East on (WB) Willamette Dr NE				From West on (EB) Britton Pkwy NE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	3	8	225	19	5	50	209	12	2	108	38	8	2	11	34	87	809
4:30 P	5	12	192	22	7	20	268	17	3	44	60	24	1	15	29	80	783
4:45 P	4	11	195	20	8	38	212	15	3	55	74	32	1	16	25	75	768
5:00 P	1	10	183	35	8	53	204	21	4	56	53	34	0	14	16	67	746
5:15 P	4	9	194	29	3	66	217	12	0	91	71	32	1	13	19	61	814
5:30 P	2	12	155	41	1	69	184	20	4	48	45	24	1	16	40	62	716
5:45 P	0	13	160	41	7	57	197	15	6	35	57	42	1	17	28	54	716
6:00 P	0	15	122	43	2	73	152	19	4	51	32	21	0	16	27	56	627
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	19	90	1426	250	41	426	1643	131	26	488	430	217	7	118	218	542	5979
Peak Hour: 4:15 PM to 5:15 PM																	
Total	14	42	764	106	26	177	901	65	10	246	258	122	3	58	89	283	3111
Approach	912				1143				626				430				3111
%HV	1.5%				2.3%				1.6%				0.7%				1.7%
PHF	0.98				0.94				0.81				0.87				0.96



3256 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.87	0.7%
WB	0.81	1.6%
NB	0.94	2.3%
SB	0.98	1.5%
T Int.	0.96	1.7%

Check In: 3111 Out: 3111

PEDs Across:

	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04		1			1
INT 05	1		1		2
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	1	1	1	0	3

Bicycles From:

	N	S	E	W	
INT 01					0
INT 02					0
INT 03			1		1
INT 04					0
INT 05		2			2
INT 06					0
INT 07	1				1
INT 08	1				1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	2	2	1	0	5

	N U's	S U's	E U's	W U's
	0	0	1	0
	0	0	0	0
	0	0	1	1
	2	1	1	0
	1	2	1	0
	1	0	1	1
	3	0	1	0
	1	0	0	0
	8	3	6	2

Special Notes

Prepared for: **TENW**

Traffic Count Consultants, Inc.

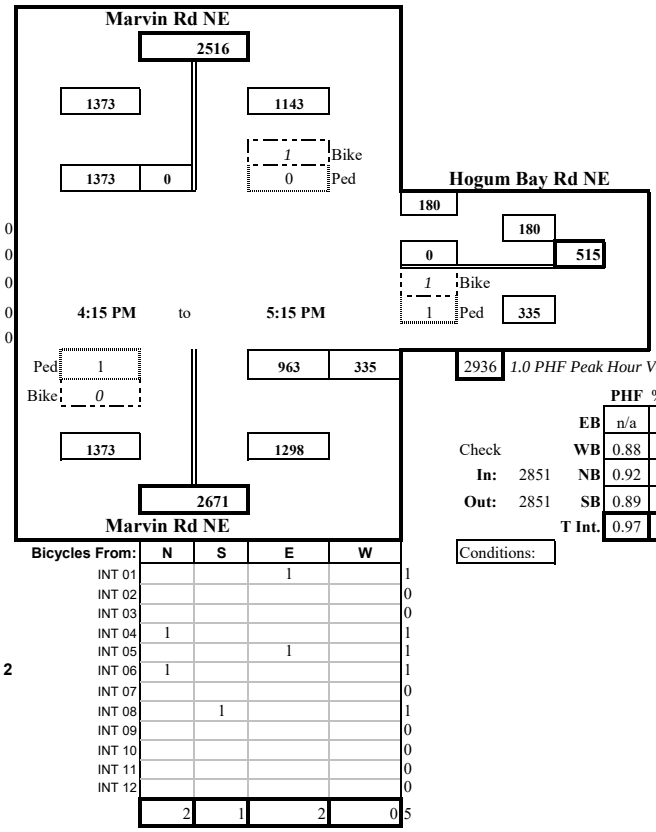
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Marvin Rd NE & Hogum Bay Rd NE **Date of Count:** Thurs 6/09/2016

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Marvin Rd NE				From South on (NB) Marvin Rd NE				From East on (WB) Hogum Bay Rd NE				From West on (EB) 0				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	6	0	362	0	15	0	232	83	4	0	0	39	0	0	0	0	716
4:30 P	11	0	316	0	11	0	254	97	3	0	0	51	0	0	0	0	718
4:45 P	9	0	387	0	16	0	218	69	3	0	0	47	0	0	0	0	721
5:00 P	8	0	313	0	7	0	238	87	3	0	0	40	0	0	0	0	678
5:15 P	6	0	357	0	5	0	253	82	3	0	0	42	0	0	0	0	734
5:30 P	8	0	280	0	5	0	234	88	2	0	0	39	0	0	0	0	641
5:45 P	7	0	284	0	9	0	250	85	1	0	0	19	0	0	0	0	638
6:00 P	6	0	217	0	8	0	232	73	3	0	0	12	0	0	0	0	534
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	61	0	2516	0	76	0	1911	664	22	0	0	289	0	0	0	0	5380
Peak Hour: 4:15 PM to 5:15 PM																	
Total	34	0	1373	0	39	0	963	335	12	0	0	180	0	0	0	0	2851
Approach			1373				1298				180				0		2851
%HV			2.5%				3.0%				6.7%				n/a		3.0%
PHF			0.89				0.92				0.88				n/a		0.97



PEDs Across:	N	S	E	W	
INT 01					0
INT 02					0
INT 03		1			1
INT 04			1		1
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	1	1	0	2

Bicycles From:	N	S	E	W	
INT 01			1		1
INT 02					0
INT 03					0
INT 04	1				1
INT 05			1		1
INT 06	1				1
INT 07					0
INT 08		1			1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	2	1	2	0	5

		PHF	%HV
	EB	n/a	n/a
Check	WB	0.88	6.7%
In: 2851	NB	0.92	3.0%
Out: 2851	SB	0.89	2.5%
	T Int.	0.97	3.0%

Conditions:

Special Notes

Prepared for: **TENW**

Traffic Count Consultants, Inc.

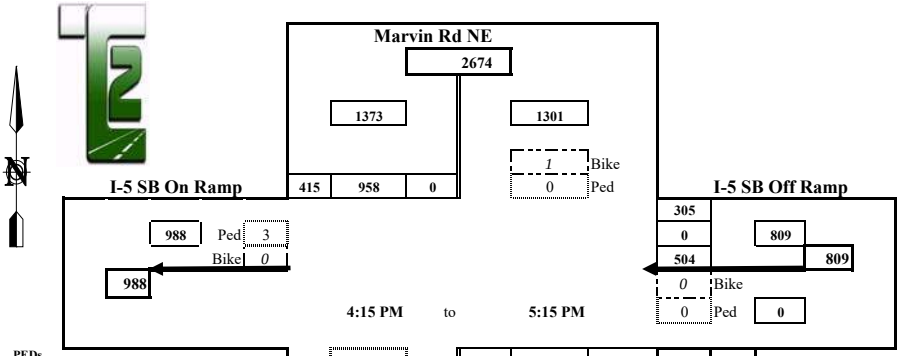
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Marvin Rd NE & I-5 SB Ramps **Date of Count:** Thurs 6/09/2016

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Marvin Rd NE				From South on (NB) Marvin Rd NE				From East on (WB) I-5 SB Off Ramp				From West on (EB) I-5 SB On Ramp				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	9	0	244	118	7	141	240	0	8	122	0	75	0	0	0	0	940
4:30 P	7	0	226	90	4	158	277	0	7	138	0	72	0	0	0	0	961
4:45 P	6	0	247	140	11	134	206	0	4	114	0	81	0	0	0	0	922
5:00 P	8	0	237	76	7	144	253	0	4	112	0	76	0	0	0	0	898
5:15 P	7	0	248	109	3	137	260	0	3	140	0	76	0	0	0	0	970
5:30 P	8	0	181	99	3	149	257	0	3	133	0	65	0	0	0	0	884
5:45 P	7	0	187	97	4	127	254	0	4	139	0	80	0	0	0	0	884
6:00 P	6	0	152	65	2	143	237	0	5	138	0	71	0	0	0	0	806
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	58	0	1722	794	41	1133	1984	0	38	1036	0	596	0	0	0	0	7265
Peak Hour: 4:15 PM to 5:15 PM																	
Total	28	0	958	415	25	573	996	0	18	504	0	305	0	0	0	0	3751
Approach	1373				1569				809				0				3751
%HV	2.0%				1.6%				2.2%				n/a				1.9%
PHF	0.89				0.90				0.94				n/a				0.97



PEDs Across:	N	S	E	W	
INT 01					0
INT 02				2	2
INT 03					0
INT 04				1	1
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	3	3

Special Notes

Ped 0
Bike 2

573 996 0

1462 1569

3031

Marvin Rd NE

Bicycles From:	N	S	E	W	
INT 01	1				1
INT 02					0
INT 03					0
INT 04	1	2			3
INT 05					0
INT 06	1	1			2
INT 07					0
INT 08		1			1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	4	0	0	7

3880 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	n/a	n/a
Check	WB	0.94	2.2%
In: 3751	NB	0.90	1.6%
Out: 3751	SB	0.89	2.0%
	T Int.	0.97	1.9%

N U's	S U's	E U's	W U's
0			
0			
0			
0			
0			
0			
1			
0			

1 0 0 0

TENW16069M_04p

Prepared for: **TENW**

Traffic Count Consultants, Inc.

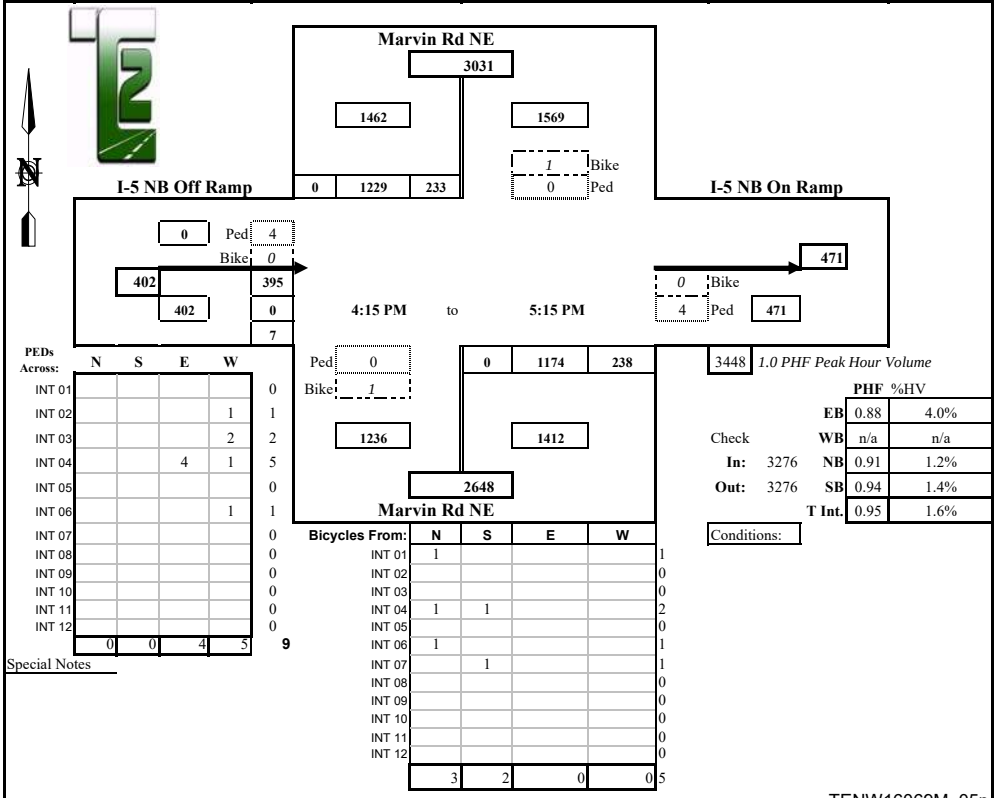
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Marvin Rd NE & I-5 NB Ramps **Date of Count:** Thurs 6/09/2016

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Marvin Rd NE				From South on (NB) Marvin Rd NE				From East on (WB) I-5 NB On Ramp				From West on (EB) I-5 NB Off Ramp				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	3	56	310	0	8	0	283	86	0	0	0	0	3	98	0	2	835
4:30 P	5	66	298	0	5	0	329	61	0	0	0	0	3	106	0	2	862
4:45 P	4	59	302	0	4	0	252	73	0	0	0	0	9	88	0	0	774
5:00 P	5	50	299	0	6	0	285	42	0	0	0	0	1	112	0	2	790
5:15 P	6	58	330	0	2	0	308	62	0	0	0	0	3	89	0	3	850
5:30 P	8	49	265	0	2	0	280	43	0	0	0	0	2	126	0	1	764
5:45 P	4	36	290	0	4	0	296	58	0	0	0	0	4	85	0	3	768
6:00 P	5	33	257	0	2	0	281	51	0	0	0	0	3	99	0	9	730
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	40	407	2351	0	33	0	2314	476	0	0	0	0	28	803	0	22	6373
Peak Hour: 4:15 PM to 5:15 PM																	
Total	20	233	1229	0	17	0	1174	238	0	0	0	0	16	395	0	7	3276
Approach			1462				1412				0				402		3276
%HV			1.4%				1.2%				n/a				4.0%		1.6%
PHF			0.94				0.91				n/a				0.88		0.95



3448 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.88	4.0%
WB	n/a	n/a
NB	0.91	1.2%
SB	0.94	1.4%
T Int.	0.95	1.6%

Check In: 3276 Out: 3276

Conditions:

PEDs Across:

	N	S	E	W	
INT 01					0
INT 02				1	1
INT 03				2	2
INT 04			4	1	5
INT 05					0
INT 06				1	1
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	4	5	9

Bicycles From:

	N	S	E	W	
INT 01	1				1
INT 02					0
INT 03					0
INT 04	1	1			2
INT 05					0
INT 06	1				1
INT 07		1			1
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	2	0	0	5

Special Notes

TENW16069M_05p

Prepared for: **TENW**

Traffic Count Consultants, Inc.

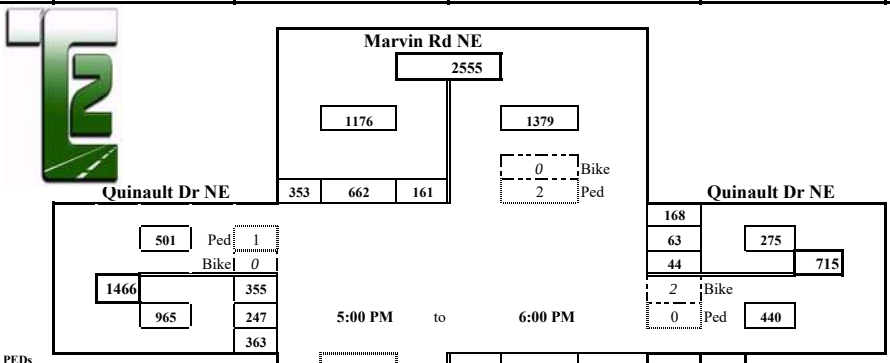
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Marvin Rd NE & Quinault Dr NE **Date of Count:** Thurs 6/09/2016

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Marvin Rd NE				From South on (NB) Marvin Rd NE				From East on (WB) Quinault Dr NE				From West on (EB) Quinault Dr NE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	2	34	148	80	14	6	212	9	1	17	7	49	5	108	67	65	802
4:30 P	2	42	174	98	4	16	236	13	1	17	12	48	0	106	46	82	890
4:45 P	1	37	149	86	4	14	185	9	1	5	11	54	2	86	57	68	761
5:00 P	2	45	173	98	3	12	185	9	1	14	13	30	3	112	50	82	823
5:15 P	2	34	166	53	1	22	245	9	9	6	7	43	1	82	57	76	800
5:30 P	11	36	167	105	3	21	202	5	1	12	16	44	0	77	72	84	841
5:45 P	2	48	168	94	2	19	209	12	0	15	23	42	2	103	64	105	902
6:00 P	4	43	161	101	1	23	200	6	2	11	17	39	1	93	54	98	846
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	26	319	1306	715	32	133	1674	72	16	97	106	349	14	767	467	660	6665
Peak Hour: 5:00 PM to 6:00 PM																	
Total	19	161	662	353	7	85	856	32	12	44	63	168	4	355	247	363	3389
Approach	1176				973				275				965				3389
%HV	1.6%				0.7%				4.4%				0.4%				1.2%
PHF	0.95				0.88				0.86				0.89				0.94



PEDs Across:	N	S	E	W	
INT 01			1		1
INT 02					0
INT 03				1	1
INT 04	3				3
INT 05				1	1
INT 06	1				1
INT 07					0
INT 08	1				1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	5	0	1	2	8

Special Notes

Bicycles From:	N	S	E	W	
INT 01	2				2
INT 02					0
INT 03					0
INT 04					0
INT 05			1		1
INT 06					0
INT 07		1	1		2
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	2	1	2	0	5

3608 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	0.89	0.4%
Check	WB	0.86	4.4%
In: 3389	NB	0.88	0.7%
Out: 3389	SB	0.95	1.6%
	T Int.	0.94	1.2%

N U's	S U's	E U's	W U's
1			
1			
0			
1			
0			
0			
0			
0			

Prepared for: **TENW**

Traffic Count Consultants, Inc.

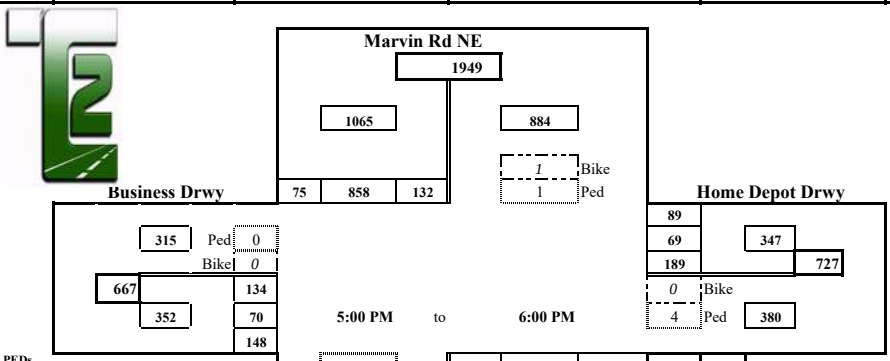
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Marvin Rd NE & Home Depot Drwy (Signal) **Date of Count:** Thurs 6/09/2016

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Marvin Rd NE				From South on (NB) Marvin Rd NE				From East on (WB) Home Depot Drwy				From West on (EB) Business Drwy				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	4	44	175	15	9	38	188	46	0	32	12	37	0	24	11	22	644
4:30 P	0	38	172	21	2	35	156	37	0	44	16	30	0	40	13	23	625
4:45 P	0	31	199	18	5	32	174	44	1	46	24	29	0	33	11	30	671
5:00 P	1	32	192	17	1	58	148	32	0	52	17	23	1	32	23	33	659
5:15 P	3	29	204	16	1	41	212	48	0	49	22	26	0	25	15	30	717
5:30 P	2	39	204	15	4	50	146	48	0	53	14	27	0	35	20	36	687
5:45 P	3	38	222	23	0	41	164	36	1	45	20	21	0	39	16	39	704
6:00 P	1	26	228	21	2	39	139	46	0	42	13	15	1	35	19	43	666
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	14	277	1596	146	24	334	1327	337	2	363	138	208	2	263	128	256	5373
Peak Hour: 5:00 PM to 6:00 PM																	
Total	9	132	858	75	7	171	661	178	1	189	69	89	1	134	70	148	2774
Approach	1065				1010				347				352				2774
%HV	0.8%				0.7%				0.3%				0.3%				0.6%
PHF	0.94				0.84				0.89				0.91				0.97



PEDs Across:	N	S	E	W	
INT 01	1	1	1		3
INT 02	5		1		6
INT 03			1		1
INT 04			1		1
INT 05	1		1		2
INT 06		2	2		4
INT 07		1	1		2
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	7	4	8	0	19

Special Notes

Bicycles From:	N	S	E	W	
INT 01			2		2
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	1				1
INT 07		2			2
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	1	2	2	0	5

2868 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	0.91	0.3%
Check	WB	0.89	0.3%
In: 2774	NB	0.84	0.7%
Out: 2774	SB	0.94	0.8%
	T Int.	0.97	0.6%

N U's	S U's	E U's	W U's
0			
0			
0			
1			
0			
0			
0			
0			
1	0	0	0

TENW16069M_07p

Prepared for: **TENW**

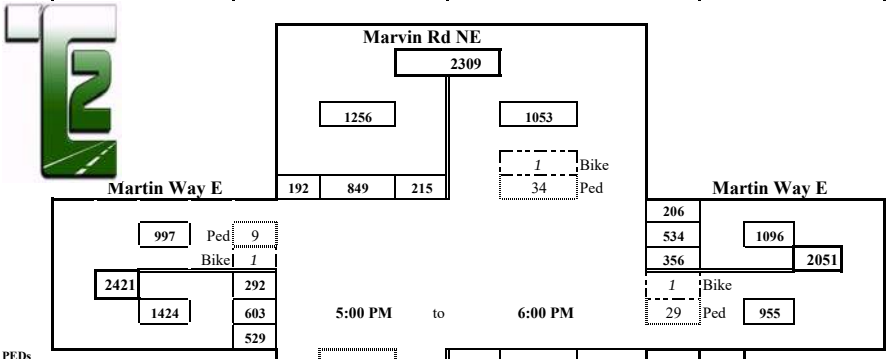
Traffic Count Consultants, Inc.

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Marvin Rd NE & Martin Way E
Location: Lacey, Washington
Date of Count: Thurs 6/09/2016
Checked By: Jess

Time Interval	From North on (SB) Marvin Rd NE				From South on (NB) Marvin Rd NE				From East on (WB) Martin Way E				From West on (EB) Martin Way E				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	2	25	144	49	7	57	133	38	2	89	152	36	8	73	144	124	1064
4:30 P	2	42	177	50	3	52	134	28	3	96	112	49	3	83	116	115	1054
4:45 P	0	38	174	47	7	65	130	33	1	88	118	49	4	79	136	127	1084
5:00 P	0	56	222	50	1	52	145	43	3	93	99	51	1	66	122	136	1135
5:15 P	3	42	191	50	2	62	152	35	3	112	150	57	4	77	152	131	1211
5:30 P	3	57	222	50	3	75	156	38	0	77	127	44	2	77	141	151	1215
5:45 P	3	52	198	39	1	67	102	31	1	82	132	46	2	76	148	112	1085
6:00 P	1	64	238	53	1	67	145	33	1	85	125	59	3	62	162	135	1228
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	14	376	1566	388	25	497	1097	279	14	722	1015	391	27	593	1121	1031	9076
Peak Hour:	5:00 PM to 6:00 PM																
Total	10	215	849	192	7	271	555	137	5	356	534	206	11	292	603	529	4739
Approach	1256				963				1096				1424				4739
%HV	0.8%				0.7%				0.5%				0.8%				0.7%
PHF	0.88				0.89				0.86				0.96				0.96



PEDs Across:	N	S	E	W	
INT 01	2	3	3	3	11
INT 02	1			1	2
INT 03	3		2	29	34
INT 04			3	2	5
INT 05	2			1	3
INT 06	1		1	7	9
INT 07	29		28		57
INT 08	2			1	3
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	40	3	37	44	124

Special Notes

Bicycles From:	N	S	E	W	
INT 01					0
INT 02			1		1
INT 03		1	1	1	3
INT 04	1		1	1	3
INT 05					0
INT 06	1	2	1		4
INT 07		1			1
INT 08				1	1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	2	4	4	3	13

4912 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	0.96	0.8%
Check	WB	0.86	0.5%
In: 4739	NB	0.89	0.7%
Out: 4739	SB	0.88	0.8%
	T Int.	0.96	0.7%

N U's	S U's	E U's	W U's
			1
			0
			0
			0
			0
			1
			0
			0
0	0	0	2

Prepared for: **TENW**

Traffic Count Consultants, Inc.

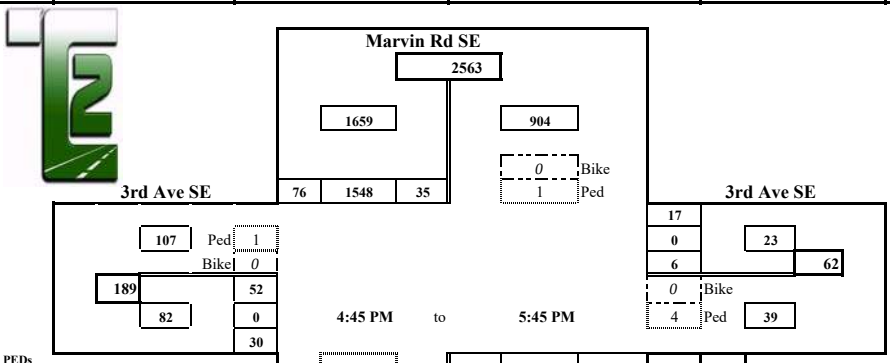
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Marvin Rd SE & 3rd Ave SE **Date of Count:** Thurs 6/09/2016

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Marvin Rd SE				From South on (NB) Marvin Rd SE				From East on (WB) 3rd Ave SE				From West on (EB) 3rd Ave SE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	7	2	331	21	8	5	214	3	0	6	0	4	2	11	10	4	611
4:30 P	2	6	331	27	2	10	176	1	1	2	0	7	1	12	1	8	581
4:45 P	4	4	341	15	7	4	216	5	2	1	1	4	1	15	0	5	611
5:00 P	2	9	379	19	1	9	213	3	2	3	0	5	0	13	0	7	660
5:15 P	4	9	390	17	1	10	204	0	1	2	0	4	0	12	0	8	656
5:30 P	2	8	406	20	4	7	227	0	0	0	0	6	2	10	0	11	695
5:45 P	2	9	373	20	0	5	191	1	0	1	0	2	2	17	0	4	623
6:00 P	1	5	394	22	3	8	182	2	1	1	0	4	0	10	1	5	634
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	24	52	2945	161	26	58	1623	15	7	16	1	36	8	100	12	52	5071
Peak Hour: 4:45 PM to 5:45 PM																	
Total	10	35	1548	76	6	31	835	4	3	6	0	17	4	52	0	30	2634
Approach	1659				870				23				82				2634
%HV	0.6%				0.7%				13.0%				4.9%				0.9%
PHF	0.96				0.93				0.72				0.98				0.95



PEDs Across:	N	S	E	W	
INT 01		2			2
INT 02	1				1
INT 03					0
INT 04					0
INT 05	1		1		2
INT 06					0
INT 07			3	1	4
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	2	2	4	1	9

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03	1				1
INT 04					0
INT 05		1			1
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	1	1	0	0	2

2780 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	0.98	4.9%
Check	WB	0.72	13.0%
In: 2634	NB	0.93	0.7%
Out: 2634	SB	0.96	0.6%
	T Int.	0.95	0.9%

Conditions:

Special Notes

Prepared for: **TENW**

Traffic Count Consultants, Inc.

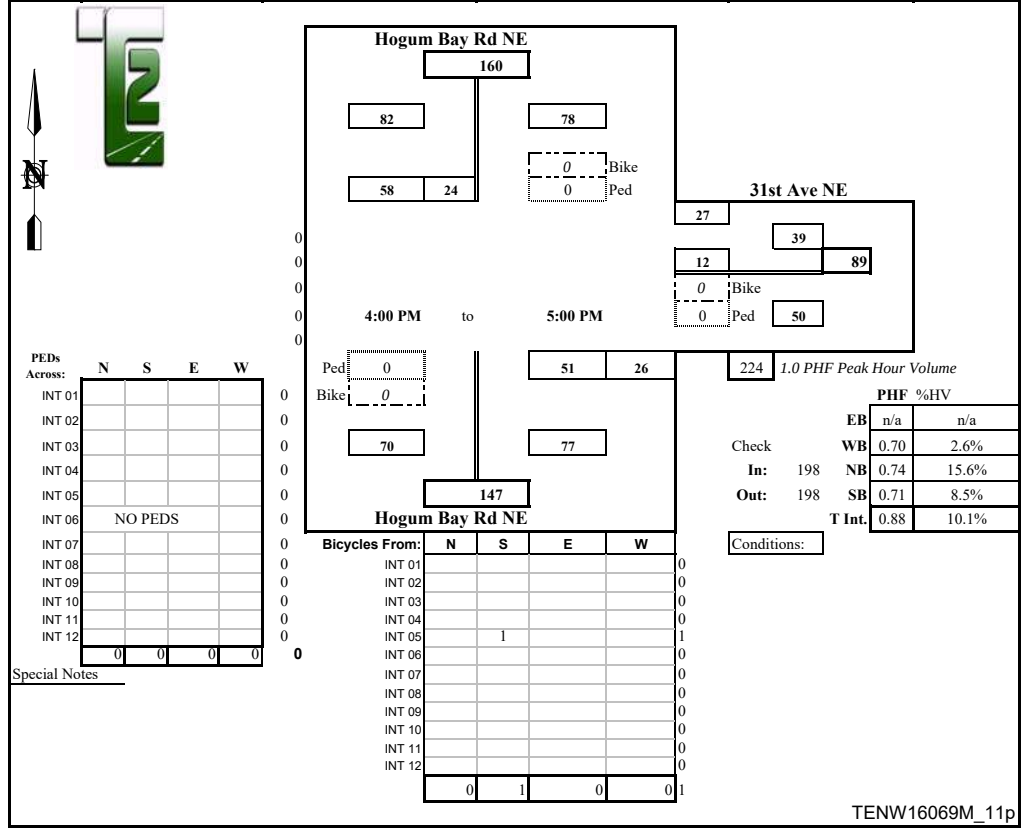
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Hogum Bay Rd NE & 31st Ave NE **Date of Count:** Wed 6/08/2016

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Hogum Bay Rd NE				From South on (NB) Hogum Bay Rd NE				From East on (WB) 31st Ave NE				From West on (EB) 0				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	2	4	16	0	4	0	11	7	1	2	0	12	0	0	0	0	52
4:30 P	1	3	13	0	2	0	7	5	0	6	0	5	0	0	0	0	39
4:45 P	3	10	19	0	3	0	17	4	0	2	0	4	0	0	0	0	56
5:00 P	1	7	10	0	3	0	16	10	0	2	0	6	0	0	0	0	51
5:15 P	1	6	19	0	0	0	5	9	0	2	0	3	0	0	0	0	44
5:30 P	3	5	11	0	2	0	11	11	0	3	0	5	0	0	0	0	46
5:45 P	2	3	17	0	1	0	14	8	0	7	0	6	0	0	0	0	55
6:00 P	6	6	14	0	3	0	11	9	0	5	0	0	0	0	0	0	45
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	19	44	119	0	18	0	92	63	1	29	0	41	0	0	0	0	388
Peak Hour: 4:00 PM to 5:00 PM																	
Total	7	24	58	0	12	0	51	26	1	12	0	27	0	0	0	0	198
Approach	82				77				39				0				198
%HV	8.5%				15.6%				2.6%				n/a				10.1%
PHF	0.71				0.74				0.70				n/a				0.88



TENW16069M_11p

Prepared for: **TENW**

Traffic Count Consultants, Inc.

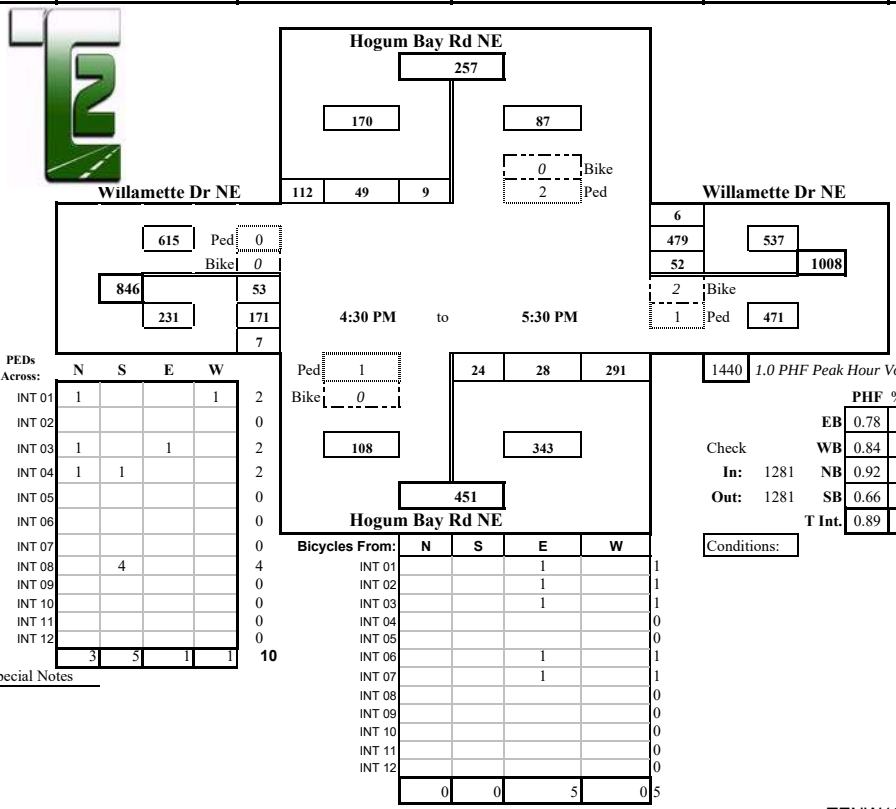
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Hogum Bay Rd NE & Willamette Dr NE **Date of Count:** Thurs 6/09/2016

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Hogum Bay Rd NE				From South on (NB) Hogum Bay Rd NE				From East on (WB) Willamette Dr NE				From West on (EB) Willamette Dr NE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	1	6	30	7	8	12	65	2	17	116	3	6	11	43	3	315
4:30 P	2	2	12	27	5	8	11	79	6	9	93	3	4	7	43	4	298
4:45 P	2	2	13	21	2	10	7	59	1	18	130	0	2	10	44	2	316
5:00 P	2	2	7	19	4	6	12	75	5	11	118	0	2	14	32	2	298
5:15 P	4	4	13	47	2	6	3	75	0	13	141	5	1	11	41	1	360
5:30 P	4	1	16	25	1	2	6	82	0	10	90	1	2	18	54	2	307
5:45 P	2	1	4	21	2	5	13	71	3	5	108	1	3	11	45	3	288
6:00 P	3	0	2	22	4	9	12	68	3	5	73	1	1	11	41	4	248
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	19	13	73	212	27	54	76	574	20	88	869	14	21	93	343	21	2430
	Peak Hour: 4:30 PM to 5:30 PM																
Total	12	9	49	112	9	24	28	291	6	52	479	6	7	53	171	7	1281
Approach	170				343				537				231				1281
%HV	7.1%				2.6%				1.1%				3.0%				2.7%
PHF	0.66				0.92				0.84				0.78				0.89



PEDs Across:	N	S	E	W	
INT 01	1			1	2
INT 02					0
INT 03	1		1		2
INT 04	1	1			2
INT 05					0
INT 06					0
INT 07					0
INT 08		4			4
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	5	1	1	**10**

Bicycles From:	N	S	E	W	
INT 01			1		1
INT 02			1		1
INT 03			1		1
INT 04					0
INT 05					0
INT 06			1		1
INT 07			1		1
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	5	0	5

1440 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	0.78	3.0%
Check	WB	0.84	1.1%
In: 1281	NB	0.92	2.6%
Out: 1281	SB	0.66	7.1%
	T Int.	0.89	2.7%

Conditions:

Special Notes

Prepared for: **TENW**

Traffic Count Consultants, Inc.

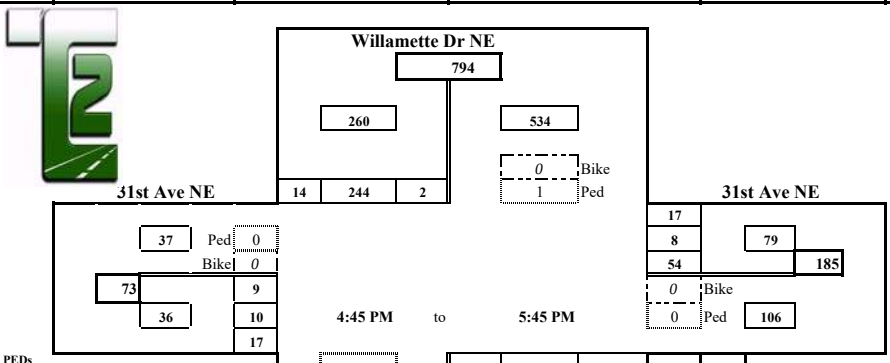
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Willamette Dr NE & 31st Ave NE **Date of Count:** Wed 6/08/2016

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Willamette Dr NE				From South on (NB) Willamette Dr NE				From East on (WB) 31st Ave NE				From West on (EB) 31st Ave NE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	2	0	56	1	2	8	89	11	1	17	4	3	0	3	0	7	199
4:30 P	6	2	71	2	0	5	117	21	1	15	1	4	0	2	0	5	245
4:45 P	6	1	74	3	1	5	105	21	1	9	0	3	0	2	1	6	230
5:00 P	2	1	55	4	2	3	126	16	0	14	3	5	0	3	1	4	235
5:15 P	1	0	71	2	0	5	109	22	0	15	0	3	0	3	4	3	237
5:30 P	2	0	62	5	0	3	142	30	0	11	3	5	2	1	2	6	270
5:45 P	1	1	56	3	1	4	131	26	1	14	2	4	0	2	3	4	250
6:00 P	1	1	48	2	0	3	110	27	0	10	3	3	0	1	1	3	212
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	21	6	493	22	6	36	929	174	4	105	16	30	2	17	12	38	1878
Peak Hour:	4:45 PM to 5:45 PM																
Total	6	2	244	14	3	15	508	94	1	54	8	17	2	9	10	17	992
Approach	260				617				79				36				992
%HV	2.3%				0.5%				1.3%				5.6%				1.2%
PHF	0.89				0.88				0.90				0.90				0.92



PEDs Across:	N	S	E	W	
INT 01		1			1
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06					0
INT 07	1				1
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	1	1	0	0	2

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04		1			1
INT 05		1			1
INT 06		1			1
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	3	0	0	3

1080 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.90	5.6%
WB	0.90	1.3%
NB	0.88	0.5%
SB	0.89	2.3%
T Int.	0.92	1.2%

Check In: 992 Out: 992

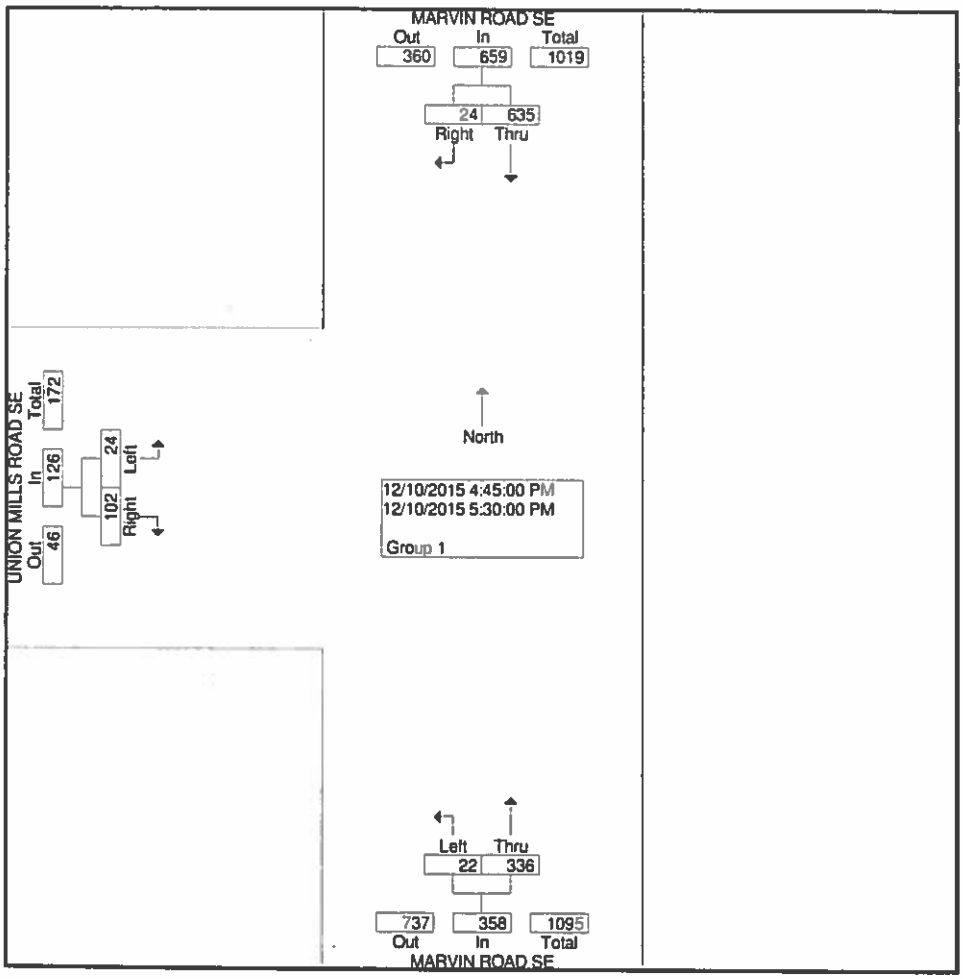
N U's	S U's	E U's	W U's
	2		
	0		
	0		
	0		
	0		
	0		
	0		
	0		
0	2	0	0

Special Notes

Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3646d
Site Code : 00003646
Start Date : 12/10/2015
Page No : 2

	MARVIN ROAD SE Southbound				UNION MILLS ROAD SE Westbound				MARVIN ROAD SE Northbound				UNION MILLS ROAD SE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:45 PM																
Volume	24	635	0	659	0	0	0	0	0	336	22	358	102	0	24	126	1143
Percent	3.6	96.4	0.0		0.0	0.0	0.0		0.0	93.9	6.1		81.0	0.0	19.0		
05:30 Volume	6	179	0	185	0	0	0	0	0	92	7	99	28	0	10	38	322
Peak Factor																	0.887
High Int.	05:30 PM				3:45:00 PM				05:30 PM				05:30 PM				
Volume	6	179	0	185	0	0	0	0	0	92	7	99	28	0	10	38	
Peak Factor				0.891								0.904				0.829	



Prepared for: **TENW**

Traffic Count Consultants, Inc.

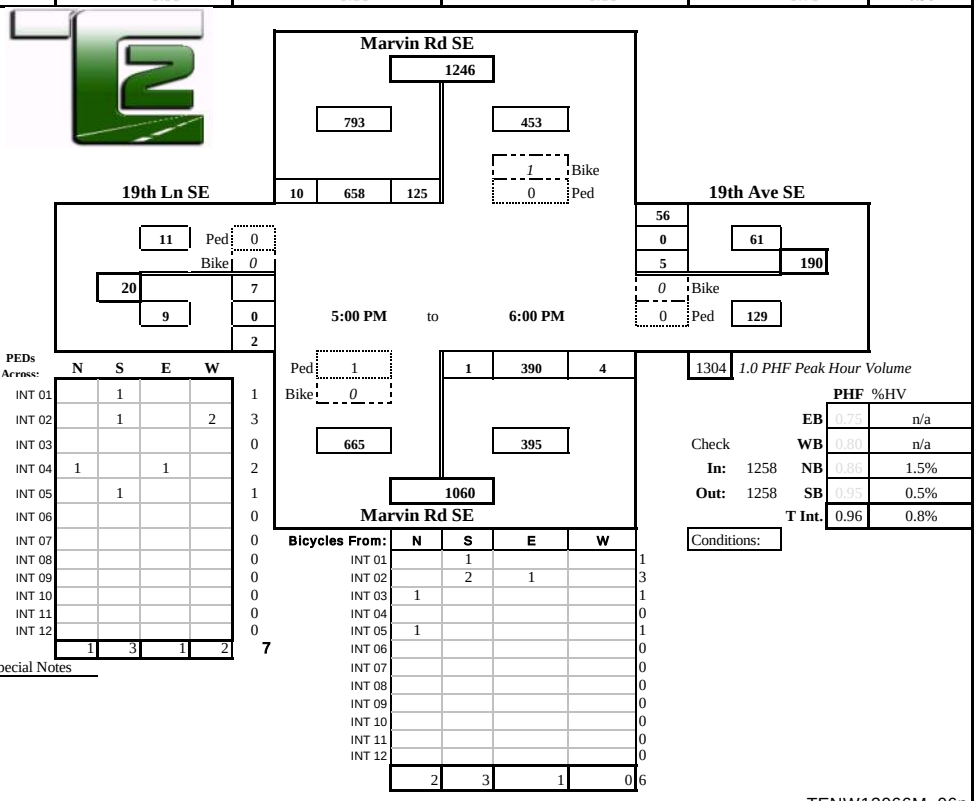
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Marvin Rd SE & 19th Ave SE **Date of Count:** Tues 04/16/2013

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Marvin Rd SE				From South on (NB) Marvin Rd SE				From East on (WB) 19th Ave SE				From West on (EB) 19th Ln SE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	4	27	132	7	2	1	65	2	1	2	0	23	0	4	0	0	263
4:30 P	0	21	135	6	3	0	69	1	0	3	0	18	1	3	0	0	256
4:45 P	3	33	152	6	1	0	60	2	1	3	0	13	0	3	0	0	272
5:00 P	0	26	141	6	0	1	89	2	1	0	0	14	0	2	0	1	282
5:15 P	3	33	157	3	1	0	115	0	0	1	0	15	0	2	0	0	326
5:30 P	0	24	168	2	4	1	99	1	0	1	0	18	0	1	0	1	316
5:45 P	1	33	160	4	0	0	86	3	0	1	0	13	0	2	0	0	302
6:00 P	0	35	173	1	1	0	90	0	0	2	0	10	0	2	0	1	314
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	11	232	1218	35	12	3	673	11	3	13	0	124	1	19	0	3	2331
Peak Hour: 5:00 PM to 6:00 PM																	
Total	4	125	658	10	6	1	390	4	0	5	0	56	0	7	0	2	1258
Approach			793				395				61				9		1258
%HV			0.5%				1.5%				n/a				n/a		0.8%
PHF			0.95				0.86				0.80				0.75		0.96



PEDs Across:	N	S	E	W	
INT 01		1			1
INT 02		1		2	3
INT 03					0
INT 04	1		1		2
INT 05		1			1
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	1	3	1	2	7

Bicycles From:	N	S	E	W	
INT 01		1			1
INT 02		2	1		3
INT 03	1				1
INT 04					0
INT 05	1				1
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	2	3	1	0	6

		PHF	%HV
	EB	0.75	n/a
Check	WB	0.80	n/a
In: 1258	NB	0.86	1.5%
Out: 1258	SB	0.95	0.5%
	T Int.	0.96	0.8%

Conditions:

Special Notes

Prepared for: **TENW**

Traffic Count Consultants, Inc.

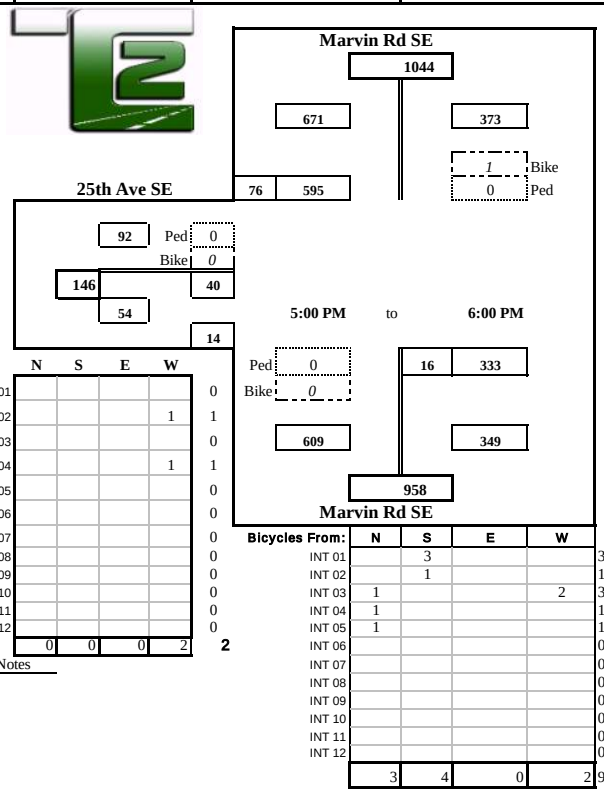
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Marvin Rd SE & 25th Ave SE **Date of Count:** Tues 04/16/2013

Location: Lacey, Washington **Checked By:** Jess

Time Interval	From North on (SB) Marvin Rd SE				From South on (NB) Marvin Rd SE				From East on (WB) 0				From West on (EB) 25th Ave SE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	4	0	115	14	3	5	66	0	0	0	0	0	0	7	0	2	209
4:30 P	0	0	125	11	2	1	67	0	0	0	0	0	0	4	0	4	212
4:45 P	2	0	142	19	0	1	63	0	0	0	0	0	1	10	0	2	237
5:00 P	0	0	126	10	0	1	92	0	0	0	0	0	1	10	0	5	244
5:15 P	3	0	147	18	1	4	92	0	0	0	0	0	0	11	0	3	275
5:30 P	0	0	145	16	3	3	77	0	0	0	0	0	0	14	0	6	261
5:45 P	0	0	155	16	0	7	90	0	0	0	0	0	0	12	0	3	283
6:00 P	0	0	148	26	0	2	74	0	0	0	0	0	0	3	0	2	255
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	9	0	1103	130	9	24	621	0	0	0	0	0	2	71	0	27	1976
Peak Hour:	5:00 PM to 6:00 PM																
Total	3	0	595	76	4	16	333	0	0	0	0	0	0	40	0	14	1074
Approach	671				349				0				54				1074
%HV	0.4%				1.1%				n/a				n/a				0.7%
PHF	0.96				0.90				n/a				0.68				0.95



PEDs Across:	N	S	E	W	
INT 01					0
INT 02				1	1
INT 03					0
INT 04				1	1
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	2	**2**

Bicycles From:	N	S	E	W	
INT 01		3			3
INT 02		1			1
INT 03	1			2	3
INT 04	1				1
INT 05	1				1
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	4	0	2	9

1132 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	0.68	n/a
Check	WB	n/a	n/a
In: 1074	NB	0.90	1.1%
Out: 1074	SB	0.96	0.4%
	T Int.	0.95	0.7%

Conditions:

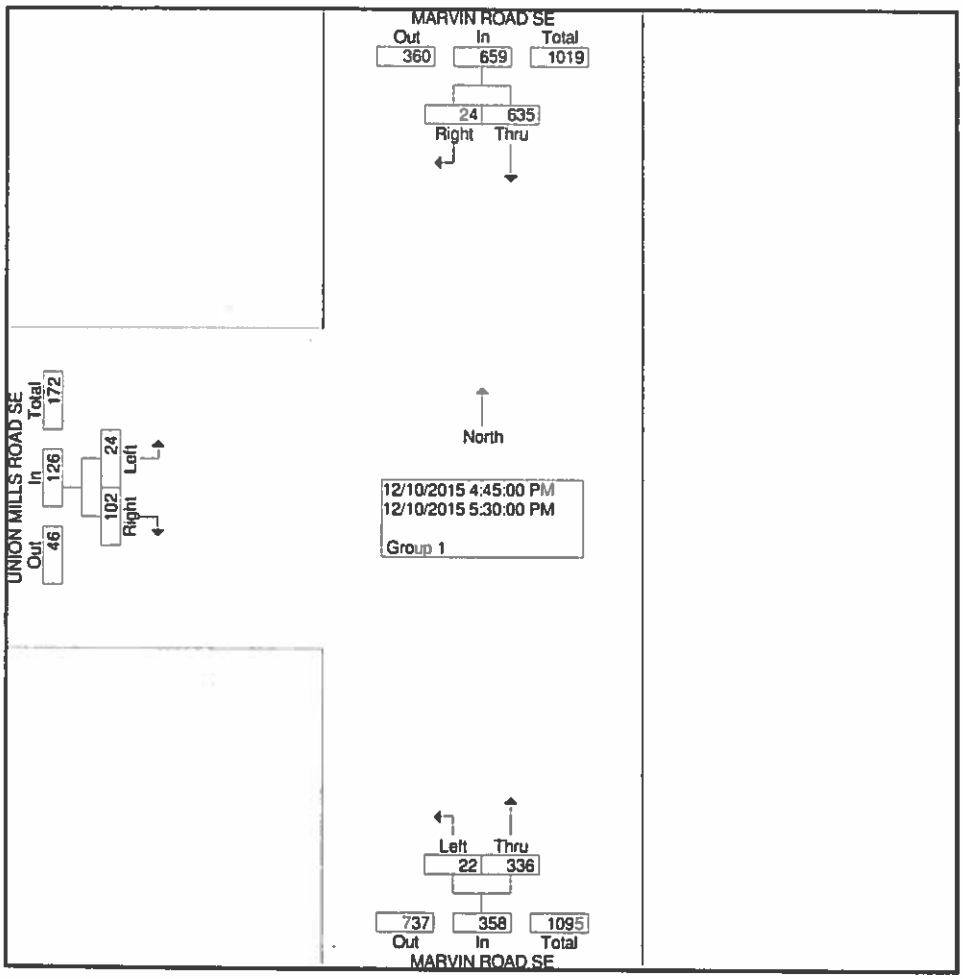
Special Notes

TENW13066M_07p

Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3646d
Site Code : 00003646
Start Date : 12/10/2015
Page No : 2

	MARVIN ROAD SE Southbound				UNION MILLS ROAD SE Westbound				MARVIN ROAD SE Northbound				UNION MILLS ROAD SE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:45 PM																
Volume	24	635	0	659	0	0	0	0	0	336	22	358	102	0	24	126	1143
Percent	3.6	96.4	0.0		0.0	0.0	0.0		0.0	93.9	6.1		81.0	0.0	19.0		
05:30 Volume	6	179	0	185	0	0	0	0	0	92	7	99	28	0	10	38	322
Peak Factor																	0.887
High Int.	05:30 PM				3:45:00 PM				05:30 PM				05:30 PM				
Volume	6	179	0	185	0	0	0	0	0	92	7	99	28	0	10	38	
Peak Factor				0.891								0.904				0.829	



Appendix C

Trip Generation Calculations

IDS Lacey
Trip Generation Estimate

Land Use	Size	Units [1]	ITE LUC [2]	Trip Rate [2]	Directional Split		Trips Generation		
					Enter	Exit	Enter	Exit	Total
DAILY									
Proposed Uses:									
High-Cube Warehouse/Distribution Center	800,000	GFA	152	1.68	50%	50%	672	672	1,344
Warehousing	600,000	GFA	150	3.56	50%	50%	1,068	1,068	2,136
Manufacturing	200,000	GFA	140	3.82	50%	50%	382	382	764
							2,122	2122	4,244
Less Existing Use:									
Manufacturing	30,000	GFA	140	3.82	50%	50%	-57	-58	-115
							-57	-58	-115
NEW DAILY TRIP GENERATION:							**2,065**	**2,064**	**4,129**
AM PEAK HOUR									
Proposed Uses:									
High-Cube Warehouse/Distribution Center	800,000	GFA	152	0.11	69%	31%	61	27	88
Warehousing	600,000	GFA	150	0.30	79%	21%	142	38	180
Manufacturing	200,000	GFA	140	0.73	78%	22%	114	32	146
							317	97	414
Less Existing Use:									
Manufacturing	30,000	GFA	140	0.73	78%	22%	-17	-5	-22
							-17	-5	-22
NEW AM PEAK HOUR TRIP GENERATION:							**300**	**92**	**392**
PM PEAK HOUR									
Proposed Uses:									
High-Cube Warehouse/Distribution Center	800,000	GFA	152	0.12	31%	69%	30	66	96
Warehousing	600,000	GFA	150	0.32	25%	75%	48	144	192
Manufacturing	200,000	GFA	140	0.73	36%	64%	53	93	146
							131	303	434
Less Existing Use:									
Manufacturing	30,000	GFA	140	0.73	36%	64%	-8	-14	-22
							-8	-14	-22
NEW PM PEAK HOUR TRIP GENERATION:							**123**	**289**	**412**

[1] GFA = Gross Floor Area.

[2] Land Use Code and trip rates based on ITE *Trip Generation* Manual, 9th Edition, 2012.

Appendix D

Intersection LOS Results

2016 Existing LOS

Unsignalized LOS Summary (Weighted Average Method)
2016 Existing - PM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Intersection	1	2	3	4	5	6	7	8	9	10	11	12
2. Marvin Rd NE / 32nd Ave NE												
Volume (HFR)	44						71	631			466	
Control Delay	13.1	0	0	0	0	0	8.7	0	0	0	0	0
Intersection Delay	1.0	A										
4. Marvin Rd NE / Hogum Bay Rd NE												
Volume (HFR)						180		963	335		1,373	
Control Delay	0	0	0	0	0	17.9	0	0	0	0	0	0
Intersection Delay	1.1	A										
13. Hogum Bay Rd NE / 31st Ave NE												
Volume (HFR)				39				78		82		
Control Delay	0	0	0	9.1	0	0	0	0	0	7.5	0	0
Intersection Delay	4.9	A										
14. Hogum Bay Rd NE / Willamette Dr NE												
Volume (HFR)	53	178		52	485		343			170		
Control Delay	8.8	0.2	0	7.7	0.2	0	16.4	0	0	17.4	0	0
Intersection Delay	7.5	A										

Note: **FOR TOTAL INTERSECTION DELAY**

Major Approach: Left-Through-Right Shared is added together and entered as the left movement with the LT delay.
It is assumed drivers do not pass a queued left-turn and are assigned delay.
HCS assumes there is no delay for the TH movement.
If there is an exclusive Left-turn lane enter the Through and the Right volume without delay
Delay max 1000 sec.

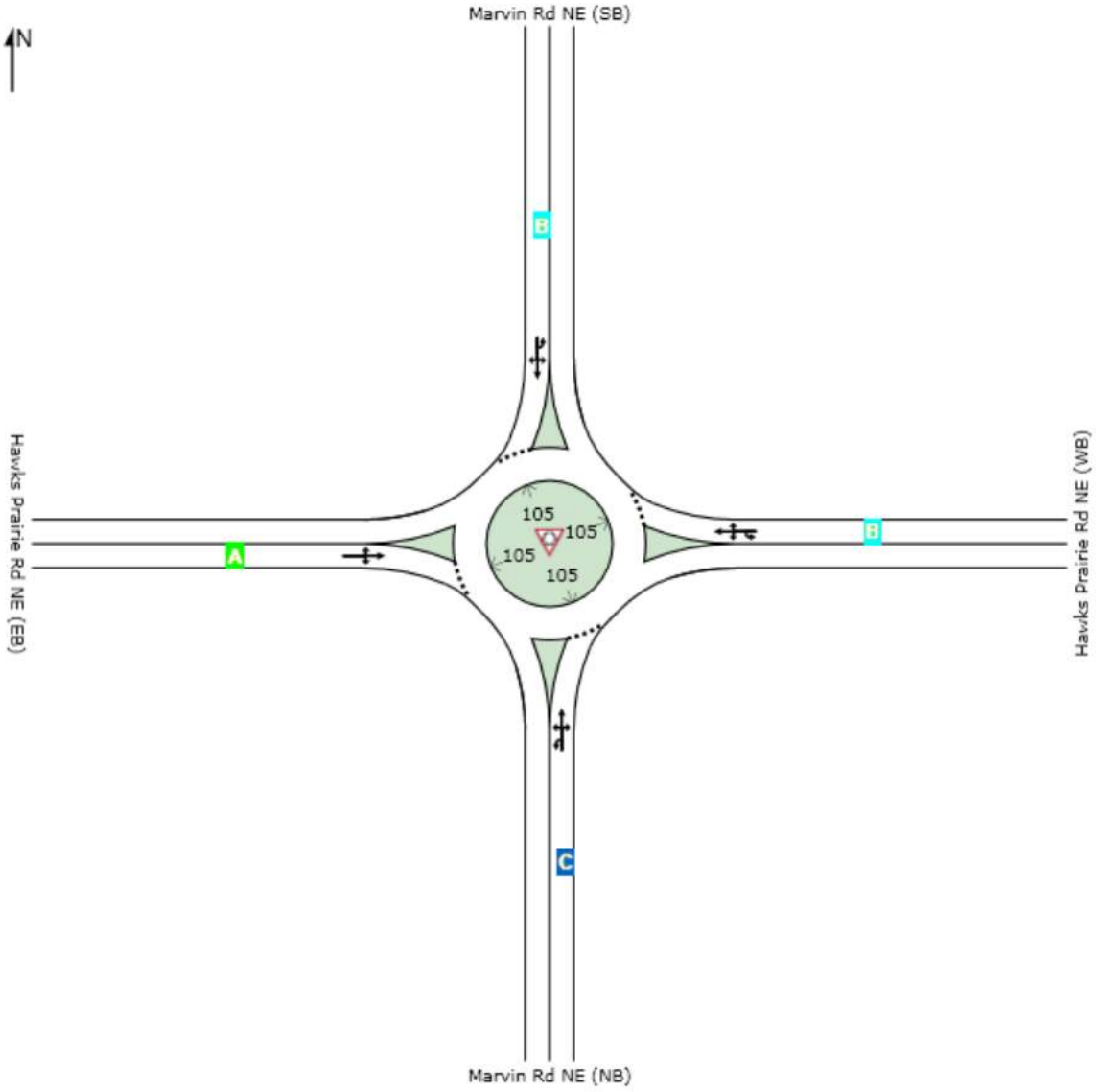
LEVEL OF SERVICE

Site: 2016 Existing PM Peak

Hogum Bay Logistics Center
Marvin Rd NE / Hawks Prairie Rd NE
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	C	B	B	A	B



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: 2016 Existing PM Peak

Hogum Bay Logistics Center
Marvin Rd NE / Hawks Prairie Rd NE
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Marvin Rd NE (NB)													
Lane 1[d]	701	1.0	985	0.711	100	15.7	LOS C	6.4	160.6	Full	1600	0.0	0.0
Approach	701	1.0		0.711		15.7	LOS C	6.4	160.6				
East: Hawks Prairie Rd NE (WB)													
Lane 1[d]	159	2.0	504	0.315	100	12.0	LOS B	1.2	29.8	Full	1600	0.0	0.0
Approach	159	2.0		0.315		12.0	LOS B	1.2	29.8				
North: Marvin Rd NE (SB)													
Lane 1[d]	340	2.0	749	0.454	100	11.0	LOS B	2.2	57.1	Full	1600	0.0	0.0
Approach	340	2.0		0.454		11.0	LOS B	2.2	57.1				
West: Hawks Prairie Rd NE (EB)													
Lane 1[d]	250	2.0	766	0.327	100	8.6	LOS A	1.3	34.2	Full	1600	0.0	0.0
Approach	250	2.0		0.327		8.6	LOS A	1.3	34.2				
Intersection	1450	1.5		0.711		13.0	LOS B	6.4	160.6				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	2	42	71	631	464	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	180			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			35	35	
Link Distance (ft)	853			820	1051	
Travel Time (s)	23.3			16.0	20.5	
Confl. Peds. (#/hr)	3					
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	1%	1%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	2	42	71	631	464	2
Conflicting Peds, #/hr	3	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	180	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	1	1	2	2
Mvmt Flow	2	47	79	701	516	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1379	520	521	0	-	0
Stage 1	520	-	-	-	-	-
Stage 2	859	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.11	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.209	-	-	-
Pot Cap-1 Maneuver	159	556	1050	-	-	-
Stage 1	597	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	146	555	1050	-	-	-
Mov Cap-2 Maneuver	146	-	-	-	-	-
Stage 1	596	-	-	-	-	-
Stage 2	383	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.1	0.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1050	-	492	-	-
HCM Lane V/C Ratio	0.075	-	0.099	-	-
HCM Control Delay (s)	8.7	-	13.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.3	-	-

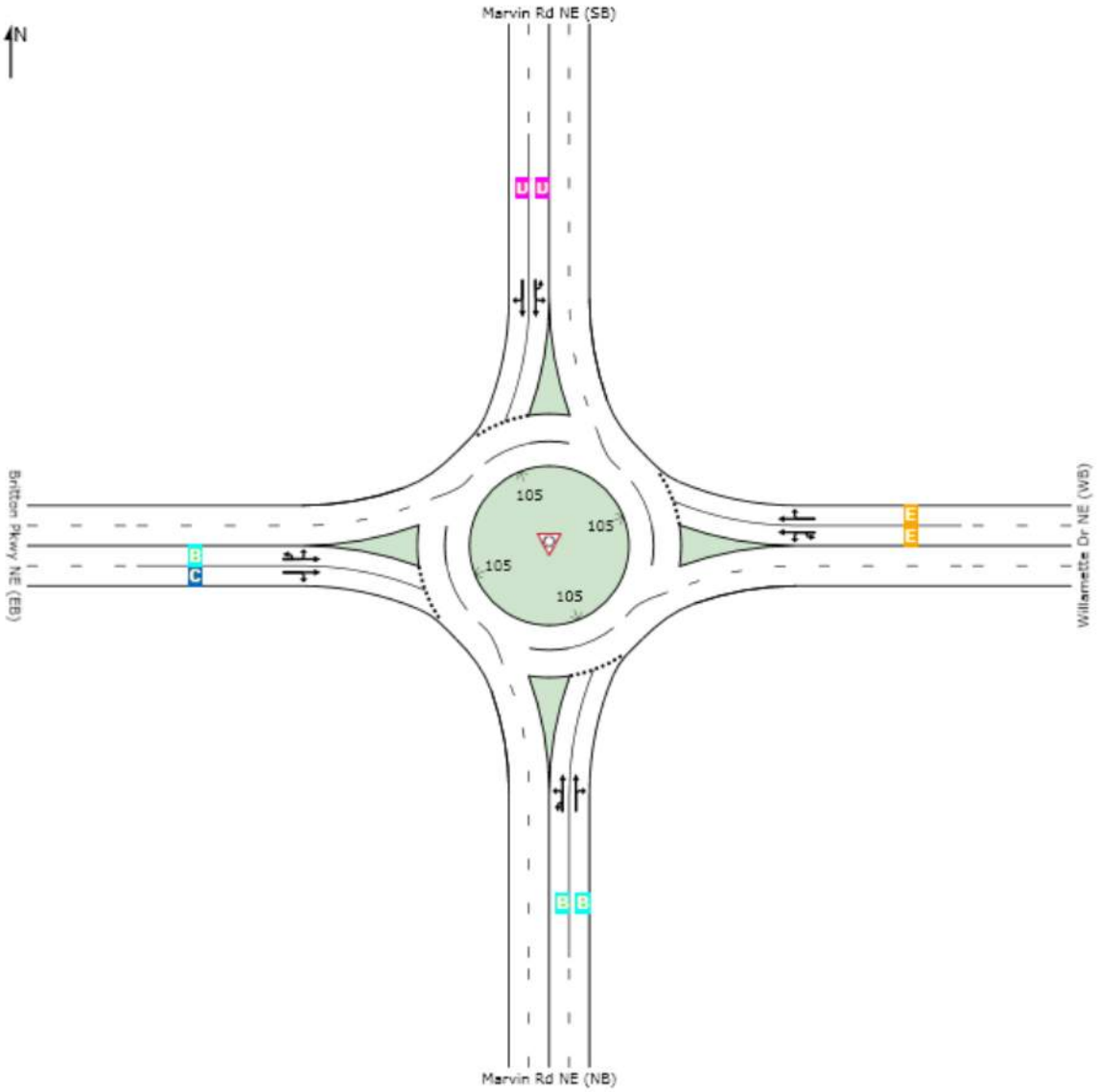
LEVEL OF SERVICE

Site: 2016 Existing PM Peak

Hogum Bay Logistics Center
Marvin Rd NE / Britton Pkwy NE
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	B	E	D	C	C



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: 2016 Existing PM Peak

Hogum Bay Logistics Center
Marvin Rd NE / Britton Pkwy NE
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Marvin Rd NE (NB)													
Lane 1	633	2.0	938	0.675	100	14.8	LOS B	4.5	113.3	Full	1600	0.0	0.0
Lane 2[d]	640	2.0	948	0.675	100	14.7	LOS B	4.2	107.3	Full	1600	0.0	0.0
Approach	1273	2.0		0.675		14.7	LOS B	4.5	113.3				
East: Willamette Dr NE (WB)													
Lane 1	338	2.0	420	0.806	100	39.8	LOS E	4.3	109.2	Full	1600	0.0	0.0
Lane 2[d]	361	2.0	448	0.806	100	37.9	LOS E	4.2	107.1	Full	1600	0.0	0.0
Approach	699	2.0		0.806		38.8	LOS E	4.3	109.2				
North: Marvin Rd NE (SB)													
Lane 1	498	2.0	617	0.808	100	29.8	LOS D	5.5	139.9	Full	1600	0.0	0.0
Lane 2[d]	518	2.0	642	0.808	100	28.9	LOS D	5.3	135.5	Full	1600	0.0	0.0
Approach	1017	2.0		0.808		29.3	LOS D	5.5	139.9				
West: Britton Pkwy NE (EB)													
Lane 1	164	1.0	454	0.362	56[5]	14.2	LOS B	1.2	29.1	Full	1600	0.0	0.0
Lane 2[d]	314	1.0	482	0.652	100	23.7	LOS C	2.8	69.5	Full	1600	0.0	0.0
Approach	479	1.0		0.652		20.4	LOS C	2.8	69.5				
Intersection	3468	1.9		0.808		24.6	LOS C	5.5	139.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	180	963	335	0	1373
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		185	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Link Speed (mph)	35		35			35
Link Distance (ft)	1465		473			837
Travel Time (s)	28.5		9.2			16.3
Confl. Peds. (#/hr)		1		1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	0	180	963	335	0	1373
Conflicting Peds, #/hr	0	1	0	1	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	185	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	7	7	3	3	3	3
Mvmt Flow	0	200	1070	372	0	1526

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1681	536	0	0	1071	0
Stage 1	1071	-	-	-	-	-
Stage 2	610	-	-	-	-	-
Critical Hdwy	6.39	7.04	-	-	4.16	-
Critical Hdwy Stg 1	5.94	-	-	-	-	-
Critical Hdwy Stg 2	6.14	-	-	-	-	-
Follow-up Hdwy	3.72	3.37	-	-	2.23	-
Pot Cap-1 Maneuver	103	476	-	-	641	-
Stage 1	273	-	-	-	-	-
Stage 2	461	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	103	476	-	-	641	-
Mov Cap-2 Maneuver	103	-	-	-	-	-
Stage 1	273	-	-	-	-	-
Stage 2	461	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	476	641	-
HCM Lane V/C Ratio	-	-	0.42	-	-
HCM Control Delay (s)	-	-	17.9	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	2.1	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	504	0	305	573	996	0	0	958	415
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	375		0	0		0
Storage Lanes	0		0	1		1	2		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		981			877			793			473	
Travel Time (s)		22.3			19.9			15.4			9.2	
Confl. Peds. (#/hr)												3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)				50%								
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				4	4		1	6			2	
Permitted Phases						4						2
Detector Phase				4	4	4	1	6			2	2
Switch Phase												
Minimum Initial (s)				6.0	6.0	6.0	4.0	6.0			6.0	6.0
Minimum Split (s)				32.0	32.0	32.0	9.0	23.0			25.0	25.0
Total Split (s)				38.0	38.0	38.0	42.0	82.0			40.0	40.0
Total Split (%)				31.7%	31.7%	31.7%	35.0%	68.3%			33.3%	33.3%
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				1.0	1.0	1.0	1.0	1.0			1.0	1.0
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Recall Mode				None	None	None	C-Max	C-Max			Max	Max

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 78 (65%), Referenced to phase 1:NBL and 6:NBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Marvin Rd NE & I-5 SB Ramps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	504	0	305	573	996	0	0	958	415
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	1863	1863	0	0	1863	1863
Adj Flow Rate, veh/h				560	0	339	637	1107	0	0	1064	0
Adj No. of Lanes				2	0	1	2	2	0	0	2	1
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				852	0	380	1061	2395	0	0	1156	517
Arrive On Green				0.24	0.00	0.24	0.62	1.00	0.00	0.00	0.33	0.00
Sat Flow, veh/h				3548	0	1583	3442	3632	0	0	3632	1583
Grp Volume(v), veh/h				560	0	339	637	1107	0	0	1064	0
Grp Sat Flow(s),veh/h/ln				1774	0	1583	1721	1770	0	0	1770	1583
Q Serve(g_s), s				17.1	0.0	24.8	13.5	0.0	0.0	0.0	34.7	0.0
Cycle Q Clear(g_c), s				17.1	0.0	24.8	13.5	0.0	0.0	0.0	34.7	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				852	0	380	1061	2395	0	0	1156	517
V/C Ratio(X)				0.66	0.00	0.89	0.60	0.46	0.00	0.00	0.92	0.00
Avail Cap(c_a), veh/h				976	0	435	1061	2395	0	0	1156	517
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.69	0.69	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				41.1	0.0	44.1	18.5	0.0	0.0	0.0	38.9	0.0
Incr Delay (d2), s/veh				1.3	0.0	18.5	0.6	0.4	0.0	0.0	13.2	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				8.6	0.0	12.8	6.3	0.1	0.0	0.0	19.1	0.0
LnGrp Delay(d),s/veh				42.5	0.0	62.6	19.1	0.4	0.0	0.0	52.1	0.0
LnGrp LOS				D		E	B	A			D	
Approach Vol, veh/h					899			1744			1064	
Approach Delay, s/veh					50.1			7.3			52.1	
Approach LOS					D			A			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	42.0	44.2		33.8		86.2		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	37.0	35.0		33.0		77.0		
Max Q Clear Time (g_c+I1), s	15.5	36.7		26.8		2.0		
Green Ext Time (p_c), s	11.0	0.0		2.0		16.0		

Intersection Summary		
HCM 2010 Ctrl Delay		30.5
HCM 2010 LOS		C

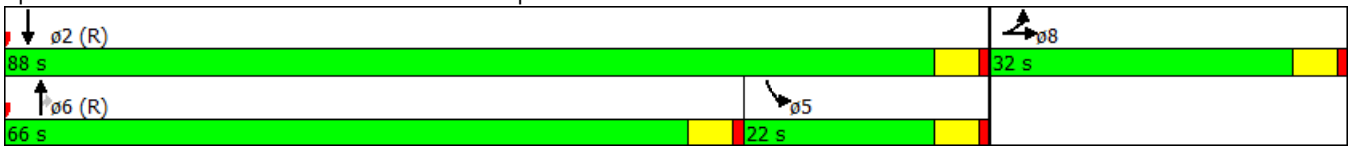
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	395	0	7	0	0	0	0	1174	238	233	1229	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	255		0
Storage Lanes	1		0	0		0	0		1	2		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		974			913			445			793	
Travel Time (s)		22.1			20.8			8.7			15.4	
Confl. Peds. (#/hr)									4			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)	49%											
Turn Type	Split	NA						NA	Perm	Prot	NA	
Protected Phases	8	8						6		5	2	
Permitted Phases									6			
Detector Phase	8	8						6	6	5	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0						6.0	6.0	4.0	6.0	
Minimum Split (s)	32.0	32.0						23.0	23.0	9.0	23.0	
Total Split (s)	32.0	32.0						66.0	66.0	22.0	88.0	
Total Split (%)	26.7%	26.7%						55.0%	55.0%	18.3%	73.3%	
Yellow Time (s)	4.0	4.0						4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0						1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0						0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0						5.0	5.0	5.0	5.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Recall Mode	None	None						C-Max	C-Max	None	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 34 (28%), Referenced to phase 2:SBT and 6:NBT, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Splits and Phases: 6: Marvin Rd NE & I-5 NB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	395	0	7	0	0	0	0	1174	238	233	1229	0
Number	3	8	18				1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1900				0	1881	1881	1881	1881	0
Adj Flow Rate, veh/h	446	0	0				0	1304	264	259	1366	0
Adj No. of Lanes	2	1	0				0	2	1	2	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	4				0	1	1	1	1	0
Cap, veh/h	527	277	0				0	1817	811	748	2735	0
Arrive On Green	0.15	0.00	0.00				0.00	1.00	1.00	0.22	0.77	0.00
Sat Flow, veh/h	3480	1827	0				0	3668	1595	3476	3668	0
Grp Volume(v), veh/h	446	0	0				0	1304	264	259	1366	0
Grp Sat Flow(s),veh/h/ln	1740	1827	0				0	1787	1595	1738	1787	0
Q Serve(g_s), s	15.0	0.0	0.0				0.0	0.0	0.0	7.6	17.4	0.0
Cycle Q Clear(g_c), s	15.0	0.0	0.0				0.0	0.0	0.0	7.6	17.4	0.0
Prop In Lane	1.00		0.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	527	277	0				0	1817	811	748	2735	0
V/C Ratio(X)	0.85	0.00	0.00				0.00	0.72	0.33	0.35	0.50	0.00
Avail Cap(c_a), veh/h	783	411	0				0	1817	811	748	2735	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.47	0.47	0.41	0.41	0.00
Uniform Delay (d), s/veh	49.5	0.0	0.0				0.0	0.0	0.0	39.9	5.4	0.0
Incr Delay (d2), s/veh	5.6	0.0	0.0				0.0	1.2	0.5	0.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	0.0				0.0	0.3	0.1	3.6	8.6	0.0
LnGrp Delay(d),s/veh	55.2	0.0	0.0				0.0	1.2	0.5	40.0	5.6	0.0
LnGrp LOS	E							A	A	D	A	
Approach Vol, veh/h		446						1568			1625	
Approach Delay, s/veh		55.2						1.1			11.1	
Approach LOS		E						A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		96.8			30.8	66.0		23.2
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0
Max Green Setting (Gmax), s		83.0			17.0	61.0		27.0
Max Q Clear Time (g_c+I1), s		19.4			9.6	2.0		17.0
Green Ext Time (p_c), s		17.3			5.4	15.8		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	12.2
HCM 2010 LOS	B

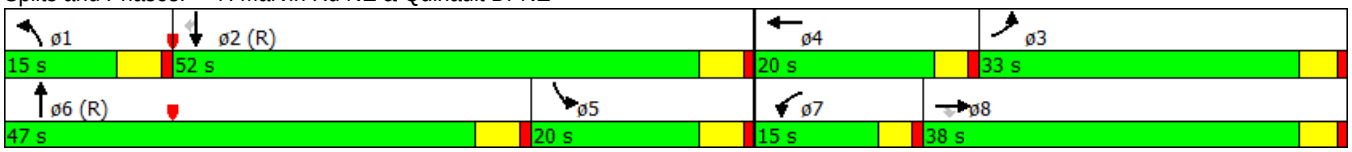
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	355	247	363	44	63	168	85	856	32	161	662	353
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		400	125		0	265		0	0		270
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		778			475			949			445	
Travel Time (s)		17.7			10.8			18.5			8.7	
Confl. Peds. (#/hr)						2						1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	1%	1%	1%	2%	2%	2%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									2
Detector Phase	3	8	8	7	4		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	6.0
Minimum Split (s)	8.5	30.5	30.5	8.0	20.0		9.0	24.0		9.0	31.0	31.0
Total Split (s)	33.0	38.0	38.0	15.0	20.0		15.0	47.0		20.0	52.0	52.0
Total Split (%)	27.5%	31.7%	31.7%	12.5%	16.7%		12.5%	39.2%		16.7%	43.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.0	3.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.0	4.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 49 (41%), Referenced to phase 2:SBT and 6:NBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Splits and Phases: 7: Marvin Rd NE & Quinault Dr NE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	355	247	363	44	63	168	85	856	32	161	662	353
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1827	1827	1900	1881	1881	1900	1863	1863	1863
Adj Flow Rate, veh/h	394	274	303	49	70	187	94	951	36	179	736	281
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	4	4	4	1	1	1	2	2	2
Cap, veh/h	419	623	529	63	59	157	118	1229	47	229	1461	653
Arrive On Green	0.23	0.33	0.33	0.04	0.13	0.13	0.02	0.12	0.12	0.26	0.83	0.83
Sat Flow, veh/h	1792	1881	1599	1740	439	1174	1792	3512	133	1774	3539	1581
Grp Volume(v), veh/h	394	274	303	49	0	257	94	484	503	179	736	281
Grp Sat Flow(s),veh/h/ln	1792	1881	1599	1740	0	1613	1792	1787	1858	1774	1770	1581
Q Serve(g_s), s	25.9	13.7	18.8	3.4	0.0	16.0	6.3	31.6	31.6	11.3	7.5	2.7
Cycle Q Clear(g_c), s	25.9	13.7	18.8	3.4	0.0	16.0	6.3	31.6	31.6	11.3	7.5	2.7
Prop In Lane	1.00		1.00	1.00		0.73	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	419	623	529	63	0	215	118	625	650	229	1461	653
V/C Ratio(X)	0.94	0.44	0.57	0.78	0.00	1.19	0.79	0.77	0.77	0.78	0.50	0.43
Avail Cap(c_a), veh/h	426	623	529	159	0	215	149	625	650	229	1461	653
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.79	0.79	0.79	0.84	0.84	0.84
Uniform Delay (d), s/veh	45.2	31.4	33.1	57.4	0.0	52.0	57.9	48.5	48.5	43.0	6.8	1.5
Incr Delay (d2), s/veh	29.0	0.5	1.5	18.5	0.0	123.9	16.5	7.3	7.0	13.9	1.1	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.2	7.2	8.5	1.9	0.0	14.5	3.7	16.9	17.5	6.3	3.7	1.4
LnGrp Delay(d),s/veh	74.2	31.9	34.6	75.9	0.0	175.9	74.4	55.7	55.5	56.9	7.9	3.2
LnGrp LOS	E	C	C	E		F	E	E	E	E	A	A
Approach Vol, veh/h		971			306			1081			1196	
Approach Delay, s/veh		49.9			159.9			57.2			14.1	
Approach LOS		D			F			E			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.9	54.5	32.5	20.0	20.5	47.0	8.3	44.2
Change Period (Y+Rc), s	5.0	5.0	4.5	4.0	5.0	5.0	4.0	4.5
Max Green Setting (Gmax), s	10.0	47.0	28.5	16.0	15.0	42.0	11.0	33.5
Max Q Clear Time (g_c+I1), s	8.3	9.5	27.9	18.0	13.3	33.6	5.4	20.8
Green Ext Time (p_c), s	0.0	7.7	0.1	0.0	0.2	3.9	0.0	3.4

Intersection Summary	
HCM 2010 Ctrl Delay	49.6
HCM 2010 LOS	D

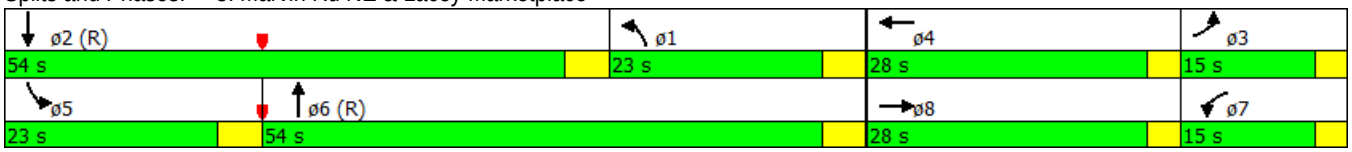
Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	134	70	148	189	69	89	171	661	178	132	858	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	330		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		288			352			666			949	
Travel Time (s)		7.9			9.6			13.0			18.5	
Confl. Peds. (#/hr)			3			1			4			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases												
Detector Phase	3	8		7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Minimum Split (s)	8.0	27.0		8.0	27.0		8.5	22.0		20.0	22.0	
Total Split (s)	15.0	28.0		15.0	28.0		23.0	54.0		23.0	54.0	
Total Split (%)	12.5%	23.3%		12.5%	23.3%		19.2%	45.0%		19.2%	45.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lead		Lag	Lead		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Splits and Phases: 8: Marvin Rd NE & Lacey Marketplace



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	134	70	148	189	69	89	171	661	178	132	858	75
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	149	78	164	210	77	99	190	734	198	147	953	83
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	253	89	188	179	93	119	360	1443	389	178	1386	121
Arrive On Green	0.14	0.17	0.17	0.10	0.12	0.12	0.40	1.00	1.00	0.03	0.14	0.14
Sat Flow, veh/h	1792	539	1134	1792	748	961	1792	2782	750	1792	3327	290
Grp Volume(v), veh/h	149	0	242	210	0	176	190	471	461	147	512	524
Grp Sat Flow(s),veh/h/ln	1792	0	1674	1792	0	1709	1792	1787	1745	1792	1787	1830
Q Serve(g_s), s	9.3	0.0	16.9	12.0	0.0	12.1	9.7	0.0	0.0	9.8	32.7	32.7
Cycle Q Clear(g_c), s	9.3	0.0	16.9	12.0	0.0	12.1	9.7	0.0	0.0	9.8	32.7	32.7
Prop In Lane	1.00		0.68	1.00		0.56	1.00		0.43	1.00		0.16
Lane Grp Cap(c), veh/h	253	0	277	179	0	212	360	927	905	178	745	763
V/C Ratio(X)	0.59	0.00	0.87	1.17	0.00	0.83	0.53	0.51	0.51	0.83	0.69	0.69
Avail Cap(c_a), veh/h	253	0	349	179	0	356	360	927	905	284	745	763
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.73	0.73	0.73	0.84	0.84	0.84
Uniform Delay (d), s/veh	48.2	0.0	48.8	54.0	0.0	51.3	31.5	0.0	0.0	57.0	44.3	44.3
Incr Delay (d2), s/veh	3.5	0.0	17.8	121.2	0.0	8.1	1.0	1.4	1.5	9.0	4.3	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	0.0	9.2	12.0	0.0	6.2	4.9	0.4	0.4	5.3	17.1	17.5
LnGrp Delay(d),s/veh	51.8	0.0	66.7	175.2	0.0	59.4	32.6	1.4	1.5	66.0	48.6	48.5
LnGrp LOS	D		E	F		E	C	A	A	E	D	D
Approach Vol, veh/h		391			386			1122			1183	
Approach Delay, s/veh		61.0			122.4			6.7			50.7	
Approach LOS		E			F			A			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.1	54.0	20.0	17.9	15.9	66.2	15.0	22.9
Change Period (Y+Rc), s	4.0	4.0	3.0	3.0	4.0	4.0	3.0	3.0
Max Green Setting (Gmax), s	19.0	50.0	12.0	25.0	19.0	50.0	12.0	25.0
Max Q Clear Time (g_c+I1), s	11.7	34.7	11.3	14.1	11.8	2.0	14.0	18.9
Green Ext Time (p_c), s	0.8	5.9	0.1	0.7	0.2	8.0	0.0	0.7

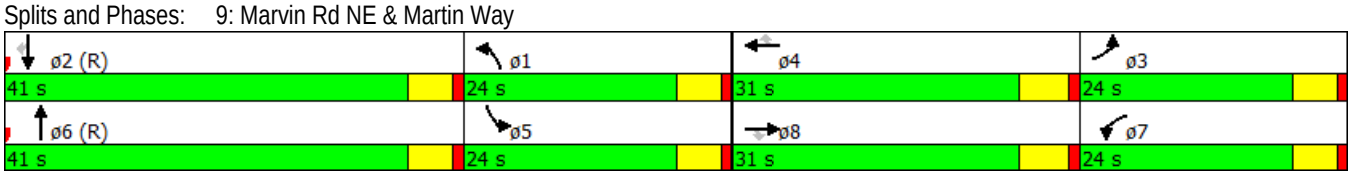
Intersection Summary	
HCM 2010 Ctrl Delay	45.0
HCM 2010 LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	293	603	529	356	534	206	271	555	137	215	849	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	350		400	325		175	150		0	200		310
Storage Lanes	2		1	2		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			35			35	
Link Distance (ft)		947			894			1633			666	
Travel Time (s)		16.1			15.2			31.8			13.0	
Confl. Peds. (#/hr)						34			29			9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4						2
Detector Phase	3	8	8	7	4	4	1	6		5	2	2
Switch Phase												
Minimum Initial (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Minimum Split (s)	9.0	28.5	28.5	9.0	30.5	30.5	9.0	33.0		9.0	33.0	33.0
Total Split (s)	24.0	31.0	31.0	24.0	31.0	31.0	24.0	41.0		24.0	41.0	41.0
Total Split (%)	20.0%	25.8%	25.8%	20.0%	25.8%	25.8%	20.0%	34.2%		20.0%	34.2%	34.2%
Yellow Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.5	5.5	5.0	5.5	5.5	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 2 (2%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Splits and Phases: 9: Marvin Rd NE & Martin Way



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	293	603	529	356	534	206	271	555	137	215	849	192
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	326	670	0	396	593	0	301	617	152	239	943	102
Adj No. of Lanes	2	2	1	2	2	1	1	2	0	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	503	734	328	474	705	315	336	848	208	336	1072	475
Arrive On Green	0.14	0.21	0.00	0.14	0.20	0.00	0.19	0.30	0.30	0.37	0.60	0.60
Sat Flow, veh/h	3476	3574	1599	3476	3574	1599	1792	2826	695	1792	3574	1585
Grp Volume(v), veh/h	326	670	0	396	593	0	301	390	379	239	943	102
Grp Sat Flow(s),veh/h/ln	1738	1787	1599	1738	1787	1599	1792	1787	1734	1792	1787	1585
Q Serve(g_s), s	10.6	22.0	0.0	13.3	19.2	0.0	19.7	23.4	23.5	13.7	26.8	3.5
Cycle Q Clear(g_c), s	10.6	22.0	0.0	13.3	19.2	0.0	19.7	23.4	23.5	13.7	26.8	3.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	503	734	328	474	705	315	336	536	520	336	1072	475
V/C Ratio(X)	0.65	0.91	0.00	0.84	0.84	0.00	0.90	0.73	0.73	0.71	0.88	0.21
Avail Cap(c_a), veh/h	550	760	340	550	760	340	336	536	520	336	1072	475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.94	0.94	0.94	0.64	0.64	0.64
Uniform Delay (d), s/veh	48.4	46.6	0.0	50.5	46.4	0.0	47.6	37.6	37.6	34.8	22.2	17.5
Incr Delay (d2), s/veh	2.4	15.1	0.0	9.6	8.0	0.0	24.1	7.9	8.2	4.5	7.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	12.4	0.0	7.0	10.3	0.0	12.0	12.8	12.5	7.1	13.9	1.6
LnGrp Delay(d),s/veh	50.8	61.7	0.0	60.1	54.4	0.0	71.7	45.5	45.8	39.3	29.1	18.2
LnGrp LOS	D	E		E	D		E	D	D	D	C	B
Approach Vol, veh/h		996			989			1070			1284	
Approach Delay, s/veh		58.1			56.6			53.0			30.2	
Approach LOS		E			E			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.5	41.0	22.3	29.2	27.5	41.0	21.4	30.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.5	5.0	5.0	5.0	5.5
Max Green Setting (Gmax), s	19.0	36.0	19.0	25.5	19.0	36.0	19.0	25.5
Max Q Clear Time (g_c+I1), s	21.7	28.8	12.6	21.2	15.7	25.5	15.3	24.0
Green Ext Time (p_c), s	0.0	3.7	1.5	1.5	0.6	3.5	1.0	0.7

Intersection Summary	
HCM 2010 Ctrl Delay	48.2
HCM 2010 LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	0	30	6	0	17	31	835	4	35	1548	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	245		0	270		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		250			272			2103			1633	
Travel Time (s)		6.8			7.4			41.0			31.8	
Confl. Peds. (#/hr)	1					1			4			1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	5%	5%	13%	13%	13%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8		4	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	10.0		6.0	10.0	
Minimum Split (s)	24.6	24.6		24.6	24.6		10.6	20.9		10.6	20.9	
Total Split (s)	27.0	27.0		27.0	27.0		20.0	43.0		20.0	43.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		22.2%	47.8%		22.2%	47.8%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.9		3.6	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.6			4.6		4.6	4.9		4.6	4.9	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 66.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 10: Marvin Rd NE & 3rd Ave SE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	52	0	30	6	0	17	31	835	4	35	1548	76
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1810	1900	1900	1681	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	58	0	33	7	0	19	34	928	4	39	1720	84
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	5	5	5	13	13	13	1	1	1	1	1	1
Cap, veh/h	176	6	48	96	16	98	77	2295	10	85	2198	107
Arrive On Green	0.09	0.00	0.09	0.09	0.00	0.09	0.04	0.63	0.63	0.05	0.63	0.63
Sat Flow, veh/h	863	70	531	224	174	1082	1792	3650	16	1792	3470	168
Grp Volume(v), veh/h	91	0	0	26	0	0	34	454	478	39	881	923
Grp Sat Flow(s),veh/h/ln	1465	0	0	1481	0	0	1792	1787	1878	1792	1787	1851
Q Serve(g_s), s	2.6	0.0	0.0	0.0	0.0	0.0	1.1	7.7	7.7	1.3	21.6	22.1
Cycle Q Clear(g_c), s	3.6	0.0	0.0	1.0	0.0	0.0	1.1	7.7	7.7	1.3	21.6	22.1
Prop In Lane	0.64		0.36	0.27		0.73	1.00		0.01	1.00		0.09
Lane Grp Cap(c), veh/h	230	0	0	210	0	0	77	1124	1181	85	1132	1173
V/C Ratio(X)	0.40	0.00	0.00	0.12	0.00	0.00	0.44	0.40	0.40	0.46	0.78	0.79
Avail Cap(c_a), veh/h	623	0	0	591	0	0	455	1124	1181	455	1132	1173
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	0.0	0.0	25.5	0.0	0.0	28.3	5.6	5.6	28.1	8.0	8.1
Incr Delay (d2), s/veh	1.1	0.0	0.0	0.3	0.0	0.0	3.9	1.1	1.0	3.8	5.3	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	0.4	0.0	0.0	0.6	4.0	4.2	0.7	12.2	12.8
LnGrp Delay(d),s/veh	27.7	0.0	0.0	25.8	0.0	0.0	32.2	6.7	6.6	31.9	13.3	13.5
LnGrp LOS	C			C			C	A	A	C	B	B
Approach Vol, veh/h		91			26			966			1843	
Approach Delay, s/veh		27.7			25.8			7.5			13.8	
Approach LOS		C			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.2	43.3		10.1	7.5	43.0		10.1
Change Period (Y+Rc), s	4.6	4.9		4.6	4.6	4.9		4.6
Max Green Setting (Gmax), s	15.4	38.1		22.4	15.4	38.1		22.4
Max Q Clear Time (g_c+I1), s	3.1	24.1		3.0	3.3	9.7		5.6
Green Ext Time (p_c), s	0.0	12.4		0.6	0.0	23.0		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	12.3
HCM 2010 LOS	B

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	12	27	51	26	24	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	35		35			35
Link Distance (ft)	3172		630			743
Travel Time (s)	61.8		12.3			14.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	16%	16%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	12	27	51	26	24	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	16	16	9	9
Mvmt Flow	13	30	57	29	27	64

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	189	71	0	0	86	0
Stage 1	71	-	-	-	-	-
Stage 2	118	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.19	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.281	-
Pot Cap-1 Maneuver	798	989	-	-	1467	-
Stage 1	949	-	-	-	-	-
Stage 2	905	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	783	989	-	-	1467	-
Mov Cap-2 Maneuver	783	-	-	-	-	-
Stage 1	949	-	-	-	-	-
Stage 2	888	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	2.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	915	1467	-
HCM Lane V/C Ratio	-	-	0.047	0.018	-
HCM Control Delay (s)	-	-	9.1	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	171	7	52	479	6	24	28	291	9	49	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		734			541			1465			2325	
Travel Time (s)		14.3			10.5			28.5			45.3	
Confl. Peds. (#/hr)	2		1	1		2	1		2	3		2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	3%	3%	3%	7%	7%	7%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	53	171	7	52	479	6	24	28	291	9	49	112
Conflicting Peds, #/hr	2	0	1	1	0	2	1	0	2	3	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	1	1	1	3	3	3	7	7	7
Mvmt Flow	59	190	8	58	532	7	27	31	323	10	54	124

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	542	0	0	200	0	0	726	971	103	884	972	274
Stage 1	-	-	-	-	-	-	314	314	-	654	654	-
Stage 2	-	-	-	-	-	-	412	657	-	230	318	-
Critical Hdwy	4.16	-	-	4.12	-	-	7.56	6.56	6.96	7.64	6.64	7.04
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	5.56	-	6.64	5.64	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	5.56	-	6.64	5.64	-
Follow-up Hdwy	2.23	-	-	2.21	-	-	3.53	4.03	3.33	3.57	4.07	3.37
Pot Cap-1 Maneuver	1016	-	-	1377	-	-	310	250	929	232	243	709
Stage 1	-	-	-	-	-	-	669	652	-	410	449	-
Stage 2	-	-	-	-	-	-	585	457	-	738	640	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1014	-	-	1375	-	-	200	219	926	126	213	706
Mov Cap-2 Maneuver	-	-	-	-	-	-	276	299	-	228	310	-
Stage 1	-	-	-	-	-	-	624	609	-	382	421	-
Stage 2	-	-	-	-	-	-	394	429	-	425	597	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	0.9	16.4	17.4
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	693	1014	-	-	1375	-	-	477
HCM Lane V/C Ratio	0.55	0.058	-	-	0.042	-	-	0.396
HCM Control Delay (s)	16.4	8.8	0.2	-	7.7	0.2	-	17.4
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	3.4	0.2	-	-	0.1	-	-	1.9

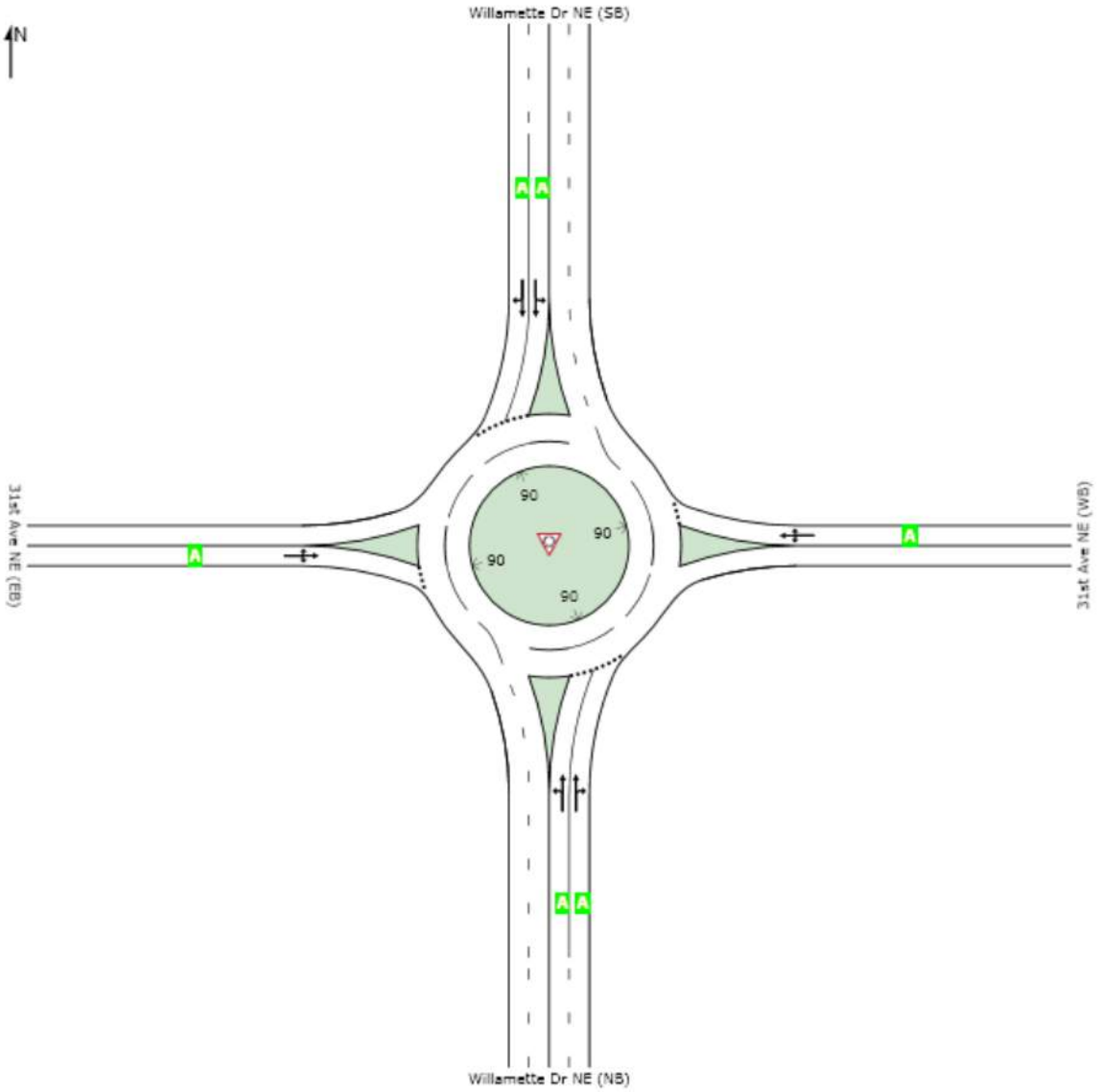
LEVEL OF SERVICE

Site: 2016 Existing PM Peak

Hogum Bay Logistics Center
Willamette Dr NE / 31st Ave NE
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	A	A	A	A	A



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: 2016 Existing PM Peak

Hogum Bay Logistics Center
Willamette Dr NE / 31st Ave NE
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Willamette Dr NE (NB)													
Lane 1	343	1.0	1098	0.312	100	6.3	LOS A	1.1	28.3	Full	1600	0.0	0.0
Lane 2[d]	343	1.0	1100	0.312	100	6.3	LOS A	1.0	26.4	Full	1600	0.0	0.0
Approach	686	1.0		0.312		6.3	LOS A	1.1	28.3				
East: 31st Ave NE (WB)													
Lane 1[d]	88	1.0	736	0.119	100	6.1	LOS A	0.3	7.9	Full	1600	0.0	0.0
Approach	88	1.0		0.119		6.1	LOS A	0.3	7.9				
North: Willamette Dr NE (SB)													
Lane 1	144	2.0	1037	0.139	100	4.7	LOS A	0.4	10.1	Full	1600	0.0	0.0
Lane 2[d]	145	2.0	1042	0.139	100	4.7	LOS A	0.4	9.4	Full	1600	0.0	0.0
Approach	289	2.0		0.139		4.7	LOS A	0.4	10.1				
West: 31st Ave NE (EB)													
Lane 1[d]	40	6.0	841	0.048	100	4.7	LOS A	0.1	2.9	Full	1600	0.0	0.0
Approach	40	6.0		0.048		4.7	LOS A	0.1	2.9				
Intersection	1102	1.4		0.312		5.8	LOS A	1.1	28.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

2019 Without-Project LOS

Unsignalized LOS Summary (Weighted Average Method)
2019 Baseline - PM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Intersection	1	2	3	4	5	6	7	8	9	10	11	12
2. Marvin Rd NE / 32nd Ave NE												
Volume (HFR)	55						81	1,057			836	
Control Delay	38.8	0	0	0	0	0	10.6	0	0	0	0	0
Intersection Delay	1.5	A										
4. Marvin Rd NE / Hogum Bay Rd NE												
Volume (HFR)						202		1,628	485		2,296	
Control Delay	0	0	0	0	0	60.6	0	0	0	0	0	0
Intersection Delay	2.7	A										
11. Hogum Bay Rd NE / 31st Ave NE												
Volume (HFR)				84				144		385		
Control Delay	0	0	0	12.7	0	0	0	0	0	8.1	0	0
Intersection Delay	6.8	A										
A. Marvin Rd SE / Union Mills Rd SE												
Volume (HFR)	173						32	587			1,077	
Control Delay	224	0	0	0	0	0	11.6	0	0	0	0	0
Intersection Delay	20.9	C										
B. Marvin Rd SE / 19th Ave SE												
Volume (HFR)	12			140			1	630		268	1,044	
Control Delay	395.5	0	0	34.5	0	0	10.6	0	0	10.5	0	0
Intersection Delay	5.9	A										
C. Marvin Rd SE / 25th Ave SE												
Volume (HFR)	76						20	520			997	
Control Delay	62.8	0	0	0	0	0	10.6	0	0	0	0	0
Intersection Delay	3.1	A										
D. Marvin Rd SE / Mullen Rd SE												
Volume (HFR)	378				296					415		
Control Delay	8.7	0	0	0	0	0	0	0	0	77.2	0	0
Intersection Delay	32.4	D										

Note: **FOR TOTAL INTERSECTION DELAY**

Major Approach: Left-Through-Right Shared is added together and entered as the left movement with the LT delay.
It is assumed drivers do not pass a queued left-turn and are assigned delay.
HCS assumes there is no delay for the TH movement.
If there is an exclusive Left-turn lane enter the Through and the Right volume without delay
Delay max 1000 sec.

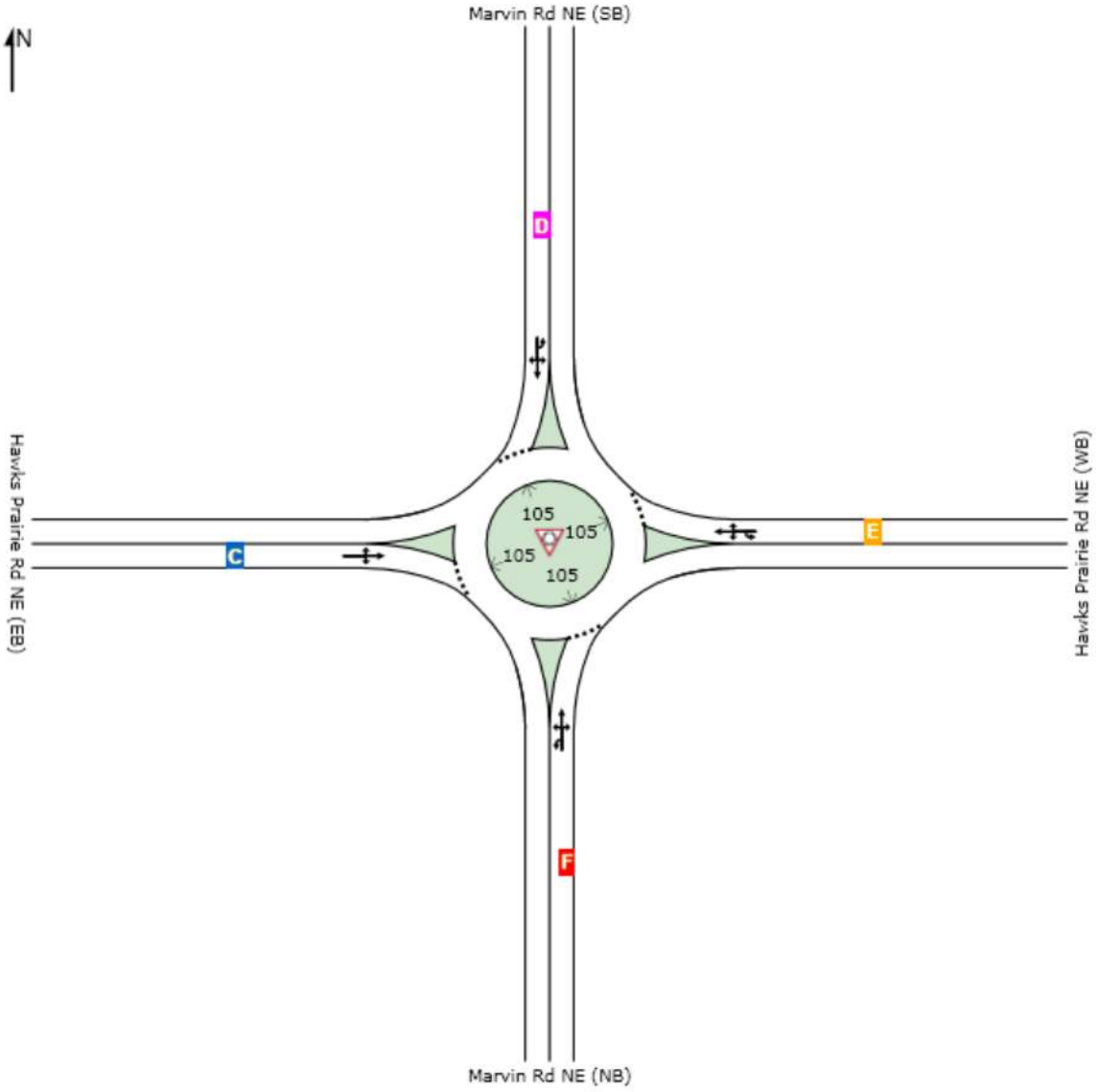
LEVEL OF SERVICE

Site: 2019 Without Project PM Peak

Hogum Bay Logistics Center
Marvin Rd NE / Hawks Prairie Rd NE
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	F	E	D	C	F



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: 2019 Without Project PM Peak

Hogum Bay Logistics Center
Marvin Rd NE / Hawks Prairie Rd NE
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Marvin Rd NE (NB)													
Lane 1[d]	1022	1.0	924	1.107	100	83.0	LOS F	60.8	1532.4	Full	1600	0.0	3.7
Approach	1022	1.0		1.107		83.0	LOS F	60.8	1532.4				
East: Hawks Prairie Rd NE (WB)													
Lane 1[d]	353	2.0	418	0.845	100	44.9	LOS E	6.3	160.1	Full	1600	0.0	0.0
Approach	353	2.0		0.845		44.9	LOS E	6.3	160.1				
North: Marvin Rd NE (SB)													
Lane 1[d]	499	2.0	627	0.795	100	28.3	LOS D	7.0	176.6	Full	1600	0.0	0.0
Approach	499	2.0		0.795		28.3	LOS D	7.0	176.6				
West: Hawks Prairie Rd NE (EB)													
Lane 1[d]	322	2.0	587	0.549	100	16.1	LOS C	2.9	73.7	Full	1600	0.0	0.0
Approach	322	2.0		0.549		16.1	LOS C	2.9	73.7				
Intersection	2197	1.5		1.107		54.6	LOS F	60.8	1532.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	7	48	81	1057	824	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	180			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			35	35	
Link Distance (ft)	853			820	1051	
Travel Time (s)	23.3			16.0	20.5	
Confl. Peds. (#/hr)	3					
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	1%	1%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	7	48	81	1057	824	12
Conflicting Peds, #/hr	3	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	180	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	1	1	2	2
Mvmt Flow	8	53	90	1174	916	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2279	925	932	0	-	0
Stage 1	925	-	-	-	-	-
Stage 2	1354	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.11	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.209	-	-	-
Pot Cap-1 Maneuver	44	326	738	-	-	-
Stage 1	386	-	-	-	-	-
Stage 2	240	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	38	325	738	-	-	-
Mov Cap-2 Maneuver	38	-	-	-	-	-
Stage 1	385	-	-	-	-	-
Stage 2	210	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	38.8	0.8	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	738	-	166	-	-
HCM Lane V/C Ratio	0.122	-	0.368	-	-
HCM Control Delay (s)	10.6	-	38.8	-	-
HCM Lane LOS	B	-	E	-	-
HCM 95th %tile Q(veh)	0.4	-	1.6	-	-

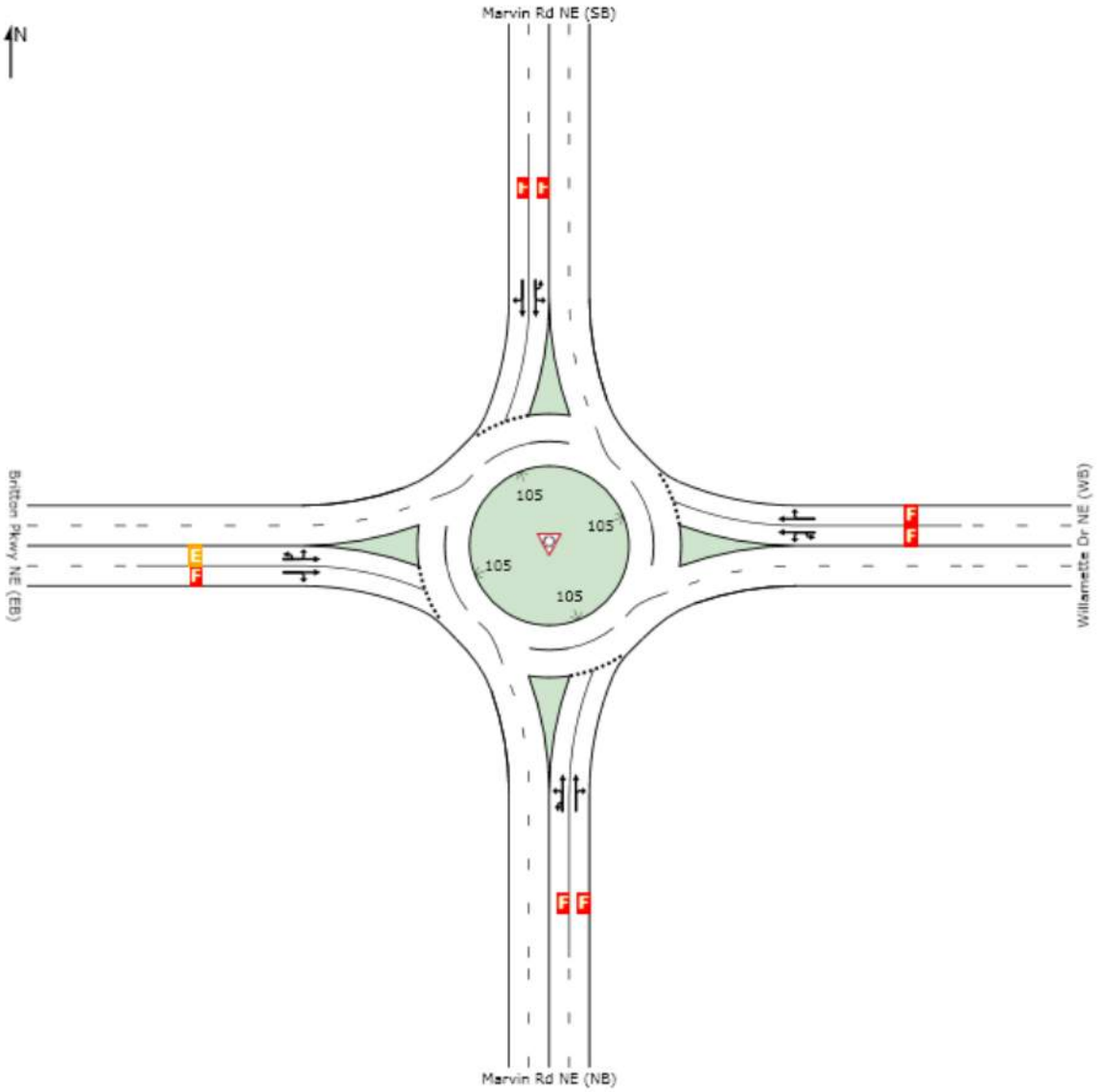
LEVEL OF SERVICE

Site: 2019 Without Project PM Peak

Hogum Bay Logistics Center
Marvin Rd NE / Britton Pkwy NE
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	F	F	F	F	F



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: 2019 Without Project PM Peak

Hogum Bay Logistics Center
Marvin Rd NE / Britton Pkwy NE
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Marvin Rd NE (NB)													
Lane 1	899	2.0	820	1.096	100	82.4	LOS F	41.9	1063.2	Full	1600	0.0	0.0
Lane 2[d]	917	2.0	837	1.096	100	81.9	LOS F	41.9	1065.5	Full	1600	0.0	0.0
Approach	1817	2.0		1.096		82.2	LOS F	41.9	1065.5				
East: Willamette Dr NE (WB)													
Lane 1	463	2.0	298	1.553	100	296.2	LOS F	57.6	1462.8	Full	1600	0.0	2.4
Lane 2[d]	505	2.0	325	1.553	100	292.9	LOS F	62.3	1581.3	Full	1600	0.0	4.7
Approach	968	2.0		1.553		294.4	LOS F	62.3	1581.3				
North: Marvin Rd NE (SB)													
Lane 1	696	2.0	562	1.238	100	145.2	LOS F	50.8	1290.5	Full	1600	0.0	0.0
Lane 2[d]	728	2.0	588	1.238	100	143.9	LOS F	52.6	1335.7	Full	1600	0.0	0.0
Approach	1423	2.0		1.238		144.5	LOS F	52.6	1335.7				
West: Britton Pkwy NE (EB)													
Lane 1	341	1.0	422	0.809	85[5]	40.0	LOS E	4.4	110.6	Full	1600	0.0	0.0
Lane 2[d]	429	1.0	450	0.953	100	61.7	LOS F	8.4	212.2	Full	1600	0.0	0.0
Approach	770	1.0		0.953		52.0	LOS F	8.4	212.2				
Intersection	4978	1.8		1.553		136.6	LOS F	62.3	1581.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	202	1628	485	0	2296
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		185	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Link Speed (mph)	35		35			35
Link Distance (ft)	1465		473			837
Travel Time (s)	28.5		9.2			16.3
Confl. Peds. (#/hr)		1		1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	0	202	1628	485	0	2296
Conflicting Peds, #/hr	0	1	0	1	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	185	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	7	7	3	3	3	3
Mvmt Flow	0	224	1809	539	0	2551

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2830	905	0	0	1810	0
Stage 1	1810	-	-	-	-	-
Stage 2	1020	-	-	-	-	-
Critical Hdwy	6.39	7.04	-	-	4.16	-
Critical Hdwy Stg 1	5.94	-	-	-	-	-
Critical Hdwy Stg 2	6.14	-	-	-	-	-
Follow-up Hdwy	3.72	3.37	-	-	2.23	-
Pot Cap-1 Maneuver	20	270	-	-	332	-
Stage 1	108	-	-	-	-	-
Stage 2	275	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	20	270	-	-	332	-
Mov Cap-2 Maneuver	20	-	-	-	-	-
Stage 1	108	-	-	-	-	-
Stage 2	275	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	60.6	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	270	332	-
HCM Lane V/C Ratio	-	-	0.831	-	-
HCM Control Delay (s)	-	-	60.6	0	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	6.8	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	584	0	573	662	1649	0	0	1529	790
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	375		0	0		0
Storage Lanes	0		0	1		1	2		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		981			877			793			473	
Travel Time (s)		22.3			19.9			15.4			9.2	
Confl. Peds. (#/hr)												3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)				50%								
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				4	4		1	6			2	
Permitted Phases						4						2
Detector Phase				4	4	4	1	6			2	2
Switch Phase												
Minimum Initial (s)				6.0	6.0	6.0	4.0	6.0			6.0	6.0
Minimum Split (s)				32.0	32.0	32.0	9.0	23.0			25.0	25.0
Total Split (s)				38.0	38.0	38.0	42.0	82.0			40.0	40.0
Total Split (%)				31.7%	31.7%	31.7%	35.0%	68.3%			33.3%	33.3%
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				1.0	1.0	1.0	1.0	1.0			1.0	1.0
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Recall Mode				None	None	None	C-Max	C-Max			Max	Max

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 38 (32%), Referenced to phase 1:NBL and 6:NBT, Start of Green	
Natural Cycle: 130	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Marvin Rd NE & I-5 SB Ramps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	584	0	573	662	1649	0	0	1529	790
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	1863	1863	0	0	1863	1863
Adj Flow Rate, veh/h				649	0	637	736	1832	0	0	1699	0
Adj No. of Lanes				2	0	1	2	2	0	0	2	1
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				976	0	435	1061	2271	0	0	1032	462
Arrive On Green				0.28	0.00	0.28	0.21	0.43	0.00	0.00	0.29	0.00
Sat Flow, veh/h				3548	0	1583	3442	3632	0	0	3632	1583
Grp Volume(v), veh/h				649	0	637	736	1832	0	0	1699	0
Grp Sat Flow(s),veh/h/ln				1774	0	1583	1721	1770	0	0	1770	1583
Q Serve(g_s), s				19.5	0.0	33.0	23.8	54.2	0.0	0.0	35.0	0.0
Cycle Q Clear(g_c), s				19.5	0.0	33.0	23.8	54.2	0.0	0.0	35.0	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				976	0	435	1061	2271	0	0	1032	462
V/C Ratio(X)				0.67	0.00	1.46	0.69	0.81	0.00	0.00	1.65	0.00
Avail Cap(c_a), veh/h				976	0	435	1061	2271	0	0	1032	462
HCM Platoon Ratio				1.00	1.00	1.00	0.67	0.67	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.11	0.11	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				38.6	0.0	43.5	42.4	27.7	0.0	0.0	42.5	0.0
Incr Delay (d2), s/veh				1.7	0.0	220.7	0.2	0.4	0.0	0.0	295.0	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				9.8	0.0	41.1	11.3	26.6	0.0	0.0	59.4	0.0
LnGrp Delay(d),s/veh				40.3	0.0	264.2	42.6	28.1	0.0	0.0	337.5	0.0
LnGrp LOS				D		F	D	C			F	
Approach Vol, veh/h					1286			2568			1699	
Approach Delay, s/veh					151.2			32.2			337.5	
Approach LOS					F			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	42.0	40.0		38.0		82.0		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	37.0	35.0		33.0		77.0		
Max Q Clear Time (g_c+I1), s	25.8	37.0		35.0		56.2		
Green Ext Time (p_c), s	9.7	0.0		0.0		16.6		

Intersection Summary		
HCM 2010 Ctrl Delay		153.2
HCM 2010 LOS		F

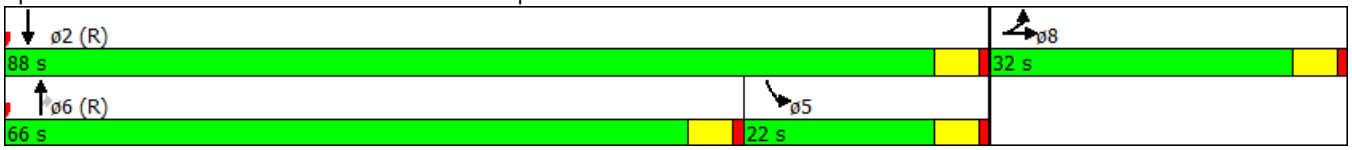
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	726	0	8	0	0	0	0	1575	278	428	1683	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	255		0
Storage Lanes	1		0	0		0	0		1	2		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		974			913			445			793	
Travel Time (s)		22.1			20.8			8.7			15.4	
Confl. Peds. (#/hr)									4			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)	49%											
Turn Type	Split	NA						NA	Perm	Prot	NA	
Protected Phases	8	8						6		5	2	
Permitted Phases									6			
Detector Phase	8	8						6	6	5	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0						6.0	6.0	4.0	6.0	
Minimum Split (s)	32.0	32.0						23.0	23.0	9.0	23.0	
Total Split (s)	32.0	32.0						66.0	66.0	22.0	88.0	
Total Split (%)	26.7%	26.7%						55.0%	55.0%	18.3%	73.3%	
Yellow Time (s)	4.0	4.0						4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0						1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0						0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0						5.0	5.0	5.0	5.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Recall Mode	None	None						C-Max	C-Max	None	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 34 (28%), Referenced to phase 2:SBT and 6:NBT, Start of Green	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	

Splits and Phases: 6: Marvin Rd NE & I-5 NB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	726	0	8	0	0	0	0	1575	278	428	1683	0
Number	3	8	18				1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1900				0	1881	1881	1881	1881	0
Adj Flow Rate, veh/h	815	0	0				0	1750	309	476	1870	0
Adj No. of Lanes	2	1	0				0	2	1	2	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	4				0	1	1	1	1	0
Cap, veh/h	783	411	0				0	1817	811	492	2472	0
Arrive On Green	0.22	0.00	0.00				0.00	1.00	1.00	0.14	0.69	0.00
Sat Flow, veh/h	3480	1827	0				0	3668	1595	3476	3668	0
Grp Volume(v), veh/h	815	0	0				0	1750	309	476	1870	0
Grp Sat Flow(s),veh/h/ln	1740	1827	0				0	1787	1595	1738	1787	0
Q Serve(g_s), s	27.0	0.0	0.0				0.0	0.0	0.0	16.3	40.6	0.0
Cycle Q Clear(g_c), s	27.0	0.0	0.0				0.0	0.0	0.0	16.3	40.6	0.0
Prop In Lane	1.00		0.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	783	411	0				0	1817	811	492	2472	0
V/C Ratio(X)	1.04	0.00	0.00				0.00	0.96	0.38	0.97	0.76	0.00
Avail Cap(c_a), veh/h	783	411	0				0	1817	811	492	2472	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.09	0.09	0.09	0.09	0.00
Uniform Delay (d), s/veh	46.5	0.0	0.0				0.0	0.0	0.0	51.2	12.0	0.0
Incr Delay (d2), s/veh	43.3	0.0	0.0				0.0	2.1	0.1	6.4	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.6	0.0	0.0				0.0	0.5	0.0	8.3	19.8	0.0
LnGrp Delay(d),s/veh	89.8	0.0	0.0				0.0	2.1	0.1	57.6	12.2	0.0
LnGrp LOS	F							A	A	E	B	
Approach Vol, veh/h		815						2059			2346	
Approach Delay, s/veh		89.8						1.8			21.4	
Approach LOS		F						A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		88.0			22.0	66.0		32.0
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0
Max Green Setting (Gmax), s		83.0			17.0	61.0		27.0
Max Q Clear Time (g_c+I1), s		42.6			18.3	2.0		29.0
Green Ext Time (p_c), s		26.0			0.0	27.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	24.3
HCM 2010 LOS	C

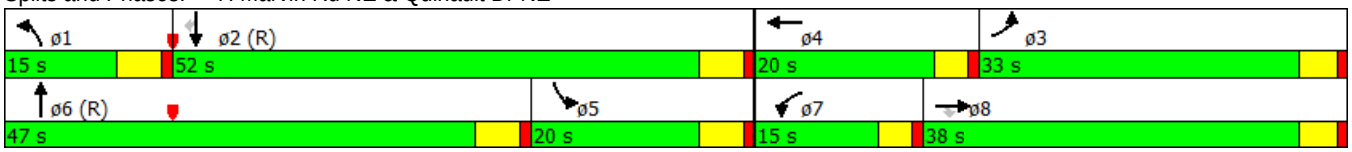
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	441	278	422	49	71	218	96	1159	36	214	1023	439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		400	125		0	265		0	0		270
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		778			475			949			445	
Travel Time (s)		17.7			10.8			18.5			8.7	
Confl. Peds. (#/hr)						2						1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	1%	1%	1%	2%	2%	2%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									2
Detector Phase	3	8	8	7	4		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	6.0
Minimum Split (s)	8.5	30.5	30.5	8.0	20.0		9.0	24.0		9.0	31.0	31.0
Total Split (s)	33.0	38.0	38.0	15.0	20.0		15.0	47.0		20.0	52.0	52.0
Total Split (%)	27.5%	31.7%	31.7%	12.5%	16.7%		12.5%	39.2%		16.7%	43.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.0	3.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.0	4.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 49 (41%), Referenced to phase 2:SBT and 6:NBT, Start of Green	
Natural Cycle: 130	
Control Type: Actuated-Coordinated	

Splits and Phases: 7: Marvin Rd NE & Quinault Dr NE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	441	278	422	49	71	218	96	1159	36	214	1023	439
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1827	1827	1900	1881	1881	1900	1863	1863	1863
Adj Flow Rate, veh/h	490	309	358	54	79	242	107	1288	40	238	1137	377
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	4	4	4	1	1	1	2	2	2
Cap, veh/h	426	623	529	69	53	162	133	1239	38	222	1419	634
Arrive On Green	0.24	0.33	0.33	0.04	0.13	0.13	0.02	0.12	0.12	0.25	0.80	0.80
Sat Flow, veh/h	1792	1881	1599	1740	395	1211	1792	3539	110	1774	3539	1581
Grp Volume(v), veh/h	490	309	358	54	0	321	107	650	678	238	1137	377
Grp Sat Flow(s),veh/h/ln	1792	1881	1599	1740	0	1607	1792	1787	1862	1774	1770	1581
Q Serve(g_s), s	28.5	15.8	23.2	3.7	0.0	16.0	7.1	42.0	42.0	15.0	21.4	5.1
Cycle Q Clear(g_c), s	28.5	15.8	23.2	3.7	0.0	16.0	7.1	42.0	42.0	15.0	21.4	5.1
Prop In Lane	1.00		1.00	1.00		0.75	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	426	623	529	69	0	214	133	625	652	222	1419	634
V/C Ratio(X)	1.15	0.50	0.68	0.78	0.00	1.50	0.81	1.04	1.04	1.07	0.80	0.59
Avail Cap(c_a), veh/h	426	623	529	159	0	214	149	625	652	222	1419	634
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.53	0.53	0.53	0.57	0.57	0.57
Uniform Delay (d), s/veh	45.7	32.1	34.6	57.1	0.0	52.0	57.7	53.1	53.1	45.0	9.2	1.8
Incr Delay (d2), s/veh	92.0	0.6	3.4	16.9	0.0	247.2	14.4	37.0	37.0	66.5	2.8	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.9	8.3	10.7	2.1	0.0	21.8	4.1	27.2	28.4	11.4	10.3	2.4
LnGrp Delay(d),s/veh	137.8	32.7	38.0	74.0	0.0	299.2	72.0	90.1	90.0	111.5	12.1	4.2
LnGrp LOS	F	C	D	E		F	E	F	F	F	B	A
Approach Vol, veh/h		1157			375			1435			1752	
Approach Delay, s/veh		78.9			266.8			88.7			23.9	
Approach LOS		E			F			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.9	53.1	33.0	20.0	20.0	47.0	8.8	44.2
Change Period (Y+Rc), s	5.0	5.0	4.5	4.0	5.0	5.0	4.0	4.5
Max Green Setting (Gmax), s	10.0	47.0	28.5	16.0	15.0	42.0	11.0	33.5
Max Q Clear Time (g_c+I1), s	9.1	23.4	30.5	18.0	17.0	44.0	5.7	25.2
Green Ext Time (p_c), s	0.0	11.5	0.0	0.0	0.0	0.0	0.0	3.3

Intersection Summary	
HCM 2010 Ctrl Delay	76.4
HCM 2010 LOS	E

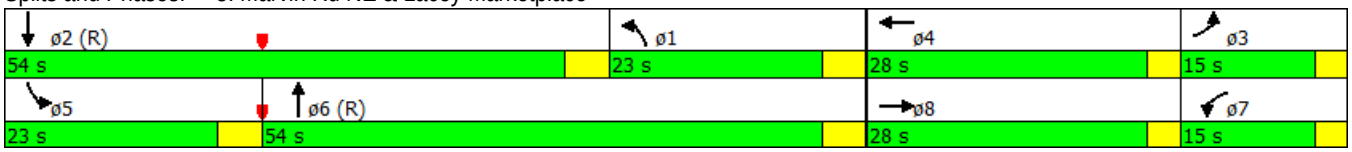
Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	156	79	166	213	78	102	192	927	200	150	1238	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	330		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		288			352			666			949	
Travel Time (s)		7.9			9.6			13.0			18.5	
Confl. Peds. (#/hr)			3			1			4			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases												
Detector Phase	3	8		7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Minimum Split (s)	8.0	27.0		8.0	27.0		8.5	22.0		20.0	22.0	
Total Split (s)	15.0	28.0		15.0	28.0		23.0	54.0		23.0	54.0	
Total Split (%)	12.5%	23.3%		12.5%	23.3%		19.2%	45.0%		19.2%	45.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lead		Lag	Lead		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	

Splits and Phases: 8: Marvin Rd NE & Lacey Marketplace



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	156	79	166	213	78	102	192	927	200	150	1238	92
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	173	88	184	237	87	113	213	1030	222	167	1376	102
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	257	98	205	179	103	133	332	1438	309	198	1406	104
Arrive On Green	0.14	0.18	0.18	0.10	0.14	0.14	0.37	0.98	0.98	0.04	0.14	0.14
Sat Flow, veh/h	1792	542	1133	1792	743	965	1792	2926	629	1792	3375	249
Grp Volume(v), veh/h	173	0	272	237	0	200	213	628	624	167	726	752
Grp Sat Flow(s),veh/h/ln	1792	0	1675	1792	0	1708	1792	1787	1767	1792	1787	1837
Q Serve(g_s), s	11.0	0.0	19.1	12.0	0.0	13.7	11.8	2.4	2.5	11.1	48.6	48.9
Cycle Q Clear(g_c), s	11.0	0.0	19.1	12.0	0.0	13.7	11.8	2.4	2.5	11.1	48.6	48.9
Prop In Lane	1.00		0.68	1.00		0.56	1.00		0.36	1.00		0.14
Lane Grp Cap(c), veh/h	257	0	304	179	0	236	332	878	868	198	745	765
V/C Ratio(X)	0.67	0.00	0.90	1.32	0.00	0.85	0.64	0.72	0.72	0.84	0.98	0.98
Avail Cap(c_a), veh/h	257	0	349	179	0	356	332	878	868	284	745	765
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.42	0.42	0.42	0.56	0.56	0.56
Uniform Delay (d), s/veh	48.8	0.0	48.0	54.0	0.0	50.5	34.5	0.5	0.5	56.8	51.1	51.3
Incr Delay (d2), s/veh	6.8	0.0	22.5	178.7	0.0	11.4	1.7	2.1	2.2	8.6	19.5	20.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	0.0	10.7	14.8	0.0	7.2	6.0	0.9	0.9	6.0	28.1	29.2
LnGrp Delay(d),s/veh	55.5	0.0	70.5	232.7	0.0	61.9	36.2	2.7	2.7	65.4	70.6	71.6
LnGrp LOS	E		E	F		E	D	A	A	E	E	E
Approach Vol, veh/h		445			437			1465			1645	
Approach Delay, s/veh		64.7			154.5			7.6			70.5	
Approach LOS		E			F			A			E	

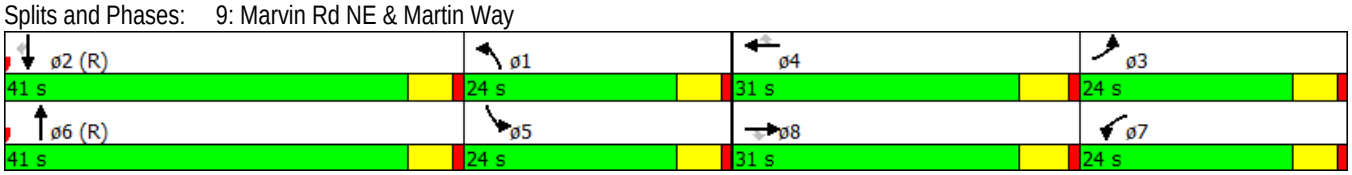
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.2	54.0	20.2	19.6	17.3	63.0	15.0	24.8
Change Period (Y+Rc), s	4.0	4.0	3.0	3.0	4.0	4.0	3.0	3.0
Max Green Setting (Gmax), s	19.0	50.0	12.0	25.0	19.0	50.0	12.0	25.0
Max Q Clear Time (g_c+I1), s	13.8	50.9	13.0	15.7	13.1	4.5	14.0	21.1
Green Ext Time (p_c), s	0.5	0.0	0.0	0.8	0.2	12.4	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	56.0
HCM 2010 LOS	E

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	379	687	611	414	611	239	315	754	163	261	1175	266
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	350		400	325		175	150		0	200		310
Storage Lanes	2		1	2		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			35			35	
Link Distance (ft)		947			894			1633			666	
Travel Time (s)		16.1			15.2			31.8			13.0	
Confl. Peds. (#/hr)						34			29			9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4						2
Detector Phase	3	8	8	7	4	4	1	6		5	2	2
Switch Phase												
Minimum Initial (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Minimum Split (s)	9.0	28.5	28.5	9.0	30.5	30.5	9.0	33.0		9.0	33.0	33.0
Total Split (s)	24.0	31.0	31.0	24.0	31.0	31.0	24.0	41.0		24.0	41.0	41.0
Total Split (%)	20.0%	25.8%	25.8%	20.0%	25.8%	25.8%	20.0%	34.2%		20.0%	34.2%	34.2%
Yellow Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.5	5.5	5.0	5.5	5.5	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 2 (2%), Referenced to phase 2:SBT and 6:NBT, Start of Green	
Natural Cycle: 135	
Control Type: Actuated-Coordinated	

Splits and Phases: 9: Marvin Rd NE & Martin Way



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	379	687	611	414	611	239	315	754	163	261	1175	266
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	421	763	0	460	679	0	350	838	181	290	1306	185
Adj No. of Lanes	2	2	1	2	2	1	1	2	0	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	542	760	340	525	742	332	297	872	188	297	1072	475
Arrive On Green	0.16	0.21	0.00	0.15	0.21	0.00	0.17	0.30	0.30	0.33	0.60	0.60
Sat Flow, veh/h	3476	3574	1599	3476	3574	1599	1792	2908	628	1792	3574	1585
Grp Volume(v), veh/h	421	763	0	460	679	0	350	515	504	290	1306	185
Grp Sat Flow(s),veh/h/ln	1738	1787	1599	1738	1787	1599	1792	1787	1748	1792	1787	1585
Q Serve(g_s), s	14.0	25.5	0.0	15.5	22.3	0.0	19.9	34.0	34.0	19.2	36.0	7.3
Cycle Q Clear(g_c), s	14.0	25.5	0.0	15.5	22.3	0.0	19.9	34.0	34.0	19.2	36.0	7.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.36	1.00		1.00
Lane Grp Cap(c), veh/h	542	760	340	525	742	332	297	536	524	297	1072	475
V/C Ratio(X)	0.78	1.00	0.00	0.88	0.92	0.00	1.18	0.96	0.96	0.98	1.22	0.39
Avail Cap(c_a), veh/h	550	760	340	550	760	340	297	536	524	297	1072	475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.89	0.89	0.89	0.13	0.13	0.13
Uniform Delay (d), s/veh	48.6	47.2	0.0	49.8	46.5	0.0	50.1	41.3	41.3	39.9	24.0	18.3
Incr Delay (d2), s/veh	6.8	33.8	0.0	14.3	15.5	0.0	107.4	28.1	28.5	13.8	99.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	16.1	0.0	8.5	12.6	0.0	18.7	20.9	20.5	10.5	32.1	3.2
LnGrp Delay(d),s/veh	55.5	81.0	0.0	64.2	62.0	0.0	157.5	69.4	69.8	53.7	123.3	18.6
LnGrp LOS	E	F		E	E		F	E	E	D	F	B
Approach Vol, veh/h		1184			1139			1369			1781	
Approach Delay, s/veh		71.9			62.9			92.1			101.1	
Approach LOS		E			E			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.9	41.0	23.7	30.4	24.9	41.0	23.1	31.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.5	5.0	5.0	5.0	5.5
Max Green Setting (Gmax), s	19.0	36.0	19.0	25.5	19.0	36.0	19.0	25.5
Max Q Clear Time (g_c+I1), s	21.9	38.0	16.0	24.3	21.2	36.0	17.5	27.5
Green Ext Time (p_c), s	0.0	0.0	1.1	0.5	0.0	0.0	0.6	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	84.6
HCM 2010 LOS	F

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	0	34	7	0	20	35	980	4	44	1834	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	245		0	270		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		250			272			2103			1633	
Travel Time (s)		6.8			7.4			41.0			31.8	
Confl. Peds. (#/hr)	1					1			4			1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	5%	5%	13%	13%	13%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8		4	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	10.0		6.0	10.0	
Minimum Split (s)	24.6	24.6		24.6	24.6		10.6	20.9		10.6	20.9	
Total Split (s)	27.0	27.0		27.0	27.0		20.0	43.0		20.0	43.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		22.2%	47.8%		22.2%	47.8%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.9		3.6	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.6			4.6		4.6	4.9		4.6	4.9	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 67.7	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 10: Marvin Rd NE & 3rd Ave SE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	62	0	34	7	0	20	35	980	4	44	1834	94
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1810	1900	1900	1681	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	69	0	38	8	0	22	39	1089	4	49	2038	104
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	5	5	5	13	13	13	1	1	1	1	1	1
Cap, veh/h	185	9	54	95	20	114	85	2239	8	99	2149	109
Arrive On Green	0.11	0.00	0.11	0.11	0.00	0.11	0.05	0.61	0.61	0.06	0.62	0.62
Sat Flow, veh/h	858	84	519	206	188	1083	1792	3652	13	1792	3462	175
Grp Volume(v), veh/h	107	0	0	30	0	0	39	533	560	49	1044	1098
Grp Sat Flow(s),veh/h/ln	1461	0	0	1477	0	0	1792	1787	1879	1792	1787	1850
Q Serve(g_s), s	3.2	0.0	0.0	0.0	0.0	0.0	1.3	10.2	10.2	1.7	33.1	34.4
Cycle Q Clear(g_c), s	4.3	0.0	0.0	1.1	0.0	0.0	1.3	10.2	10.2	1.7	33.1	34.4
Prop In Lane	0.64		0.36	0.27		0.73	1.00		0.01	1.00		0.09
Lane Grp Cap(c), veh/h	249	0	0	229	0	0	85	1095	1152	99	1109	1149
V/C Ratio(X)	0.43	0.00	0.00	0.13	0.00	0.00	0.46	0.49	0.49	0.50	0.94	0.96
Avail Cap(c_a), veh/h	607	0	0	578	0	0	444	1095	1152	444	1109	1149
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.7	0.0	0.0	25.4	0.0	0.0	28.8	6.6	6.6	28.5	10.7	11.0
Incr Delay (d2), s/veh	1.2	0.0	0.0	0.3	0.0	0.0	3.9	1.5	1.5	3.8	16.1	18.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.0	0.5	0.0	0.0	0.7	5.4	5.6	0.9	20.9	22.8
LnGrp Delay(d),s/veh	27.9	0.0	0.0	25.7	0.0	0.0	32.7	8.2	8.1	32.3	26.8	28.9
LnGrp LOS	C			C			C	A	A	C	C	C
Approach Vol, veh/h		107			30			1132			2191	
Approach Delay, s/veh		27.9			25.7			9.0			28.0	
Approach LOS		C			C			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.5	43.5		11.1	8.0	43.0		11.1
Change Period (Y+Rc), s	4.6	4.9		4.6	4.6	4.9		4.6
Max Green Setting (Gmax), s	15.4	38.1		22.4	15.4	38.1		22.4
Max Q Clear Time (g_c+I1), s	3.3	36.4		3.1	3.7	12.2		6.3
Green Ext Time (p_c), s	0.0	1.6		0.7	0.1	23.8		0.6

Intersection Summary		
HCM 2010 Ctrl Delay		21.8
HCM 2010 LOS		C

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	26	58	91	53	191	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	35		35			35
Link Distance (ft)	3172		630			743
Travel Time (s)	61.8		12.3			14.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	16%	16%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	4.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	26	58	91	53	191	194
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	16	16	9	9
Mvmt Flow	29	64	101	59	212	216

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	771	131	0	0	160	0
Stage 1	131	-	-	-	-	-
Stage 2	640	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.19	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.281	-
Pot Cap-1 Maneuver	367	916	-	-	1378	-
Stage 1	893	-	-	-	-	-
Stage 2	523	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	303	916	-	-	1378	-
Mov Cap-2 Maneuver	303	-	-	-	-	-
Stage 1	893	-	-	-	-	-
Stage 2	431	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.7	0	4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	563	1378	-
HCM Lane V/C Ratio	-	-	0.166	0.154	-
HCM Control Delay (s)	-	-	12.7	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.5	-

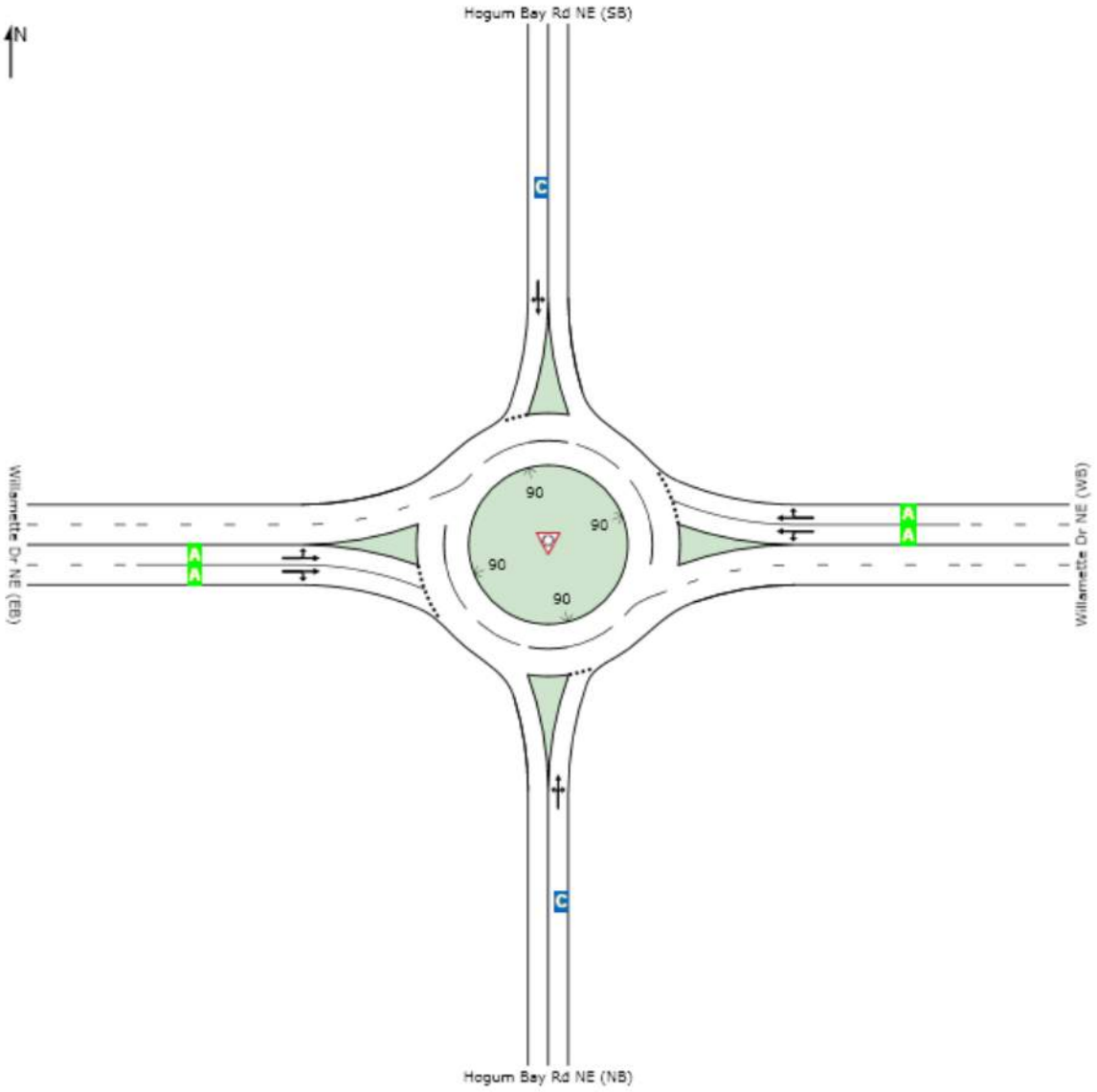
LEVEL OF SERVICE

Site: 2019 Without Project PM Peak

Hogum Bay Logistics Center
Willamette Dr NE / Hogum Bay Rd NE
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	C	A	C	A	B



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: 2019 Without Project PM Peak

Hogum Bay Logistics Center
Willamette Dr NE / Hogum Bay Rd NE
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Hogum Bay Rd NE (NB)													
Lane 1[d]	547	3.0	766	0.713	100	19.1	LOS C	4.3	109.5	Full	1600	0.0	0.0
Approach	547	3.0		0.713		19.1	LOS C	4.3	109.5				
East: Willamette Dr NE (WB)													
Lane 1	397	1.0	958	0.414	100	8.5	LOS A	1.6	40.6	Full	1600	0.0	0.0
Lane 2[d]	401	1.0	968	0.414	100	8.4	LOS A	1.5	38.3	Full	1600	0.0	0.0
Approach	798	1.0		0.414		8.4	LOS A	1.6	40.6				
North: Hogum Bay Rd NE (SB)													
Lane 1[d]	371	7.0	592	0.627	100	18.9	LOS C	2.7	70.1	Full	1600	0.0	0.0
Approach	371	7.0		0.627		18.9	LOS C	2.7	70.1				
West: Willamette Dr NE (EB)													
Lane 1	194	3.0	899	0.216	100	6.2	LOS A	0.6	16.6	Full	1600	0.0	0.0
Lane 2[d]	196	3.0	911	0.216	100	6.1	LOS A	0.6	15.6	Full	1600	0.0	0.0
Approach	390	3.0		0.216		6.1	LOS A	0.6	16.6				
Intersection	2106	2.9		0.713		12.6	LOS B	4.3	109.5				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

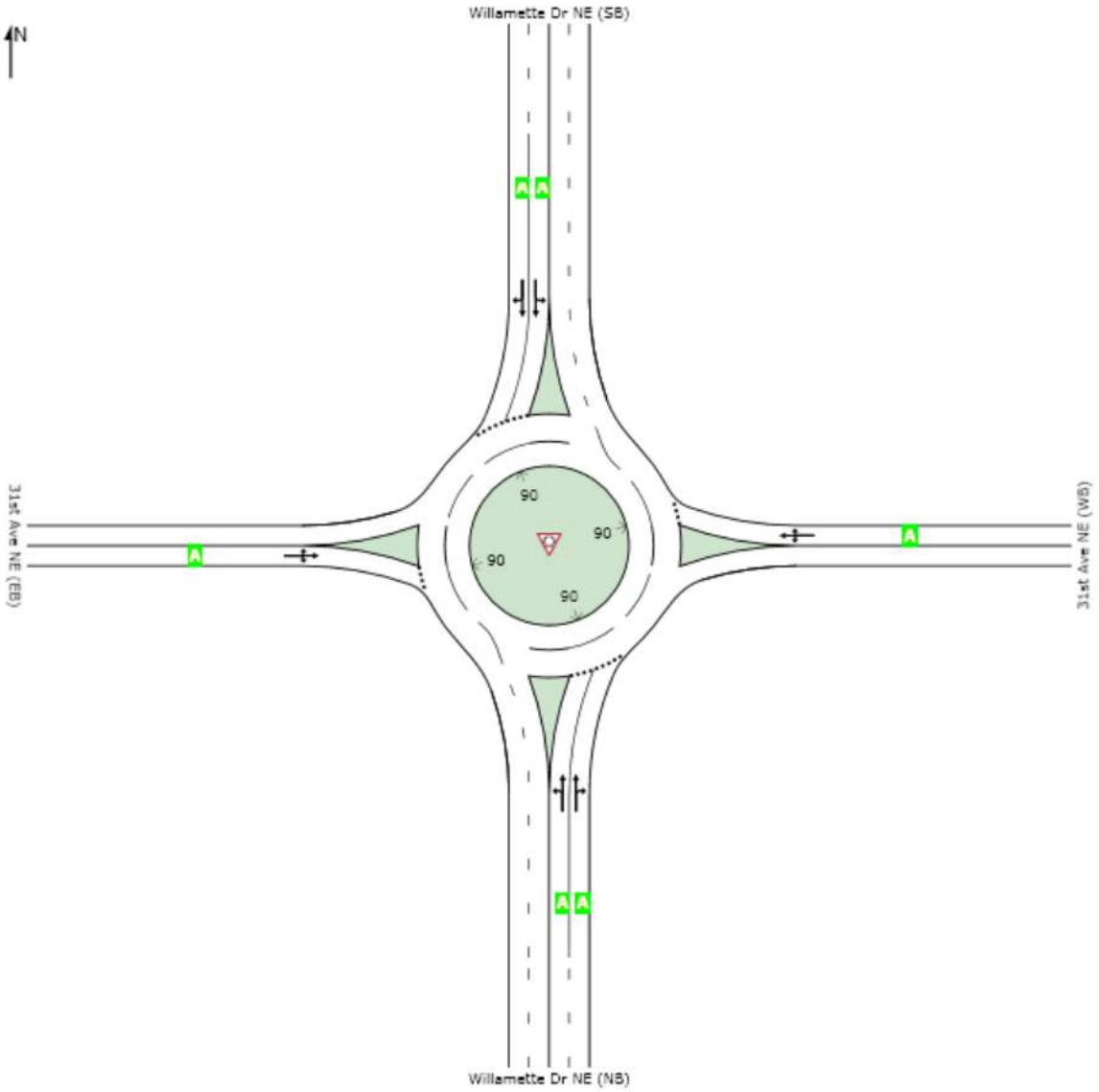
LEVEL OF SERVICE

Site: 2019 Without Project PM Peak

Hogum Bay Logistics Center
Willamette Dr NE / 31st Ave NE
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	A	A	A	A	A



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: 2019 Without Project PM Peak

Hogum Bay Logistics Center
Willamette Dr NE / 31st Ave NE
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Willamette Dr NE (NB)													
Lane 1	457	1.0	965	0.474	100	9.4	LOS A	2.0	50.7	Full	1600	0.0	0.0
Lane 2[d]	462	1.0	975	0.474	100	9.3	LOS A	1.9	47.9	Full	1600	0.0	0.0
Approach	919	1.0		0.474		9.4	LOS A	2.0	50.7				
East: 31st Ave NE (WB)													
Lane 1[d]	131	1.0	613	0.214	100	8.5	LOS A	0.6	14.8	Full	1600	0.0	0.0
Approach	131	1.0		0.214		8.5	LOS A	0.6	14.8				
North: Willamette Dr NE (SB)													
Lane 1	188	2.0	993	0.189	100	5.4	LOS A	0.6	14.4	Full	1600	0.0	0.0
Lane 2[d]	189	2.0	1000	0.189	100	5.4	LOS A	0.5	13.5	Full	1600	0.0	0.0
Approach	377	2.0		0.189		5.4	LOS A	0.6	14.4				
West: 31st Ave NE (EB)													
Lane 1[d]	237	6.0	789	0.300	100	8.0	LOS A	0.9	22.7	Full	1600	0.0	0.0
Approach	237	6.0		0.300		8.0	LOS A	0.9	22.7				
Intersection	1663	1.9		0.474		8.2	LOS A	2.0	50.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	39	134	32	587	1041	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	30			35	35	
Link Distance (ft)	498			553	345	
Travel Time (s)	11.3			10.8	6.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	20.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	39	134	32	587	1041	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	44	151	36	660	1170	40

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1921	1190	1210	0	-	0
Stage 1	1190	-	-	-	-	-
Stage 2	731	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.11	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.209	-	-	-
Pot Cap-1 Maneuver	75	231	580	-	-	-
Stage 1	291	-	-	-	-	-
Stage 2	480	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	70	231	580	-	-	-
Mov Cap-2 Maneuver	70	-	-	-	-	-
Stage 1	291	-	-	-	-	-
Stage 2	450	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	224	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	580	-	152	-	-
HCM Lane V/C Ratio	0.062	-	1.279	-	-
HCM Control Delay (s)	11.6	-	224	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	11.6	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	0	3	6	0	134	1	550	80	268	1031	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	250		0	215		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		174			564			243			553	
Travel Time (s)		4.7			15.4			4.7			10.8	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	9	0	3	6	0	134	1	550	80	268	1031	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	215	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	1	1	1
Mvmt Flow	9	0	3	6	0	140	1	573	83	279	1074	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2325	2297	1081	2258	2263	615	1088	0	0	656	0	0
Stage 1	1639	1639	-	617	617	-	-	-	-	-	-	-
Stage 2	686	658	-	1641	1646	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.12	-	-	4.11	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.218	-	-	2.209	-	-
Pot Cap-1 Maneuver	26	39	267	30	41	495	641	-	-	936	-	-
Stage 1	128	160	-	481	484	-	-	-	-	-	-	-
Stage 2	441	464	-	128	159	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	14	27	267	23	29	495	641	-	-	936	-	-
Mov Cap-2 Maneuver	14	27	-	23	29	-	-	-	-	-	-	-
Stage 1	128	112	-	480	483	-	-	-	-	-	-	-
Stage 2	316	463	-	89	112	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 395.5	34.5	0	2.1
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	641	-	-	18	263	936	-	-
HCM Lane V/C Ratio	0.002	-	-	0.694	0.554	0.298	-	-
HCM Control Delay (s)	10.6	-	-	$ 395.5	34.5	10.5	-	-
HCM Lane LOS	B	-	-	F	D	B	-	-
HCM 95th %tile Q(veh)	0	-	-	1.8	3.1	1.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	57	19	20	520	896	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			35	35	
Link Distance (ft)	615			481	1001	
Travel Time (s)	16.8			9.4	19.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	57	19	20	520	896	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	60	20	21	547	943	106

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1585	996	1049	0	-	0
Stage 1	996	-	-	-	-	-
Stage 2	589	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.11	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.209	-	-	-
Pot Cap-1 Maneuver	120	299	667	-	-	-
Stage 1	360	-	-	-	-	-
Stage 2	558	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	116	299	667	-	-	-
Mov Cap-2 Maneuver	116	-	-	-	-	-
Stage 1	360	-	-	-	-	-
Stage 2	540	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	62.8	0.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	667	-	137	-	-
HCM Lane V/C Ratio	0.032	-	0.584	-	-
HCM Control Delay (s)	10.6	-	62.8	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.1	-	3	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	239	139	202	94	120	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		35	35		40	
Link Distance (ft)		1373	1335		3911	
Travel Time (s)		26.7	26.0		66.7	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	31.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	239	139	202	94	120	295
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	263	153	222	103	132	324

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	325	0	-	0	952	274
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	678	-
Critical Hdwy	4.1	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.2	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1246	-	-	-	289	767
Stage 1	-	-	-	-	774	-
Stage 2	-	-	-	-	506	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1246	-	-	-	222	767
Mov Cap-2 Maneuver	-	-	-	-	222	-
Stage 1	-	-	-	-	774	-
Stage 2	-	-	-	-	389	-

Approach	EB	WB	SB
HCM Control Delay, s	5.5	0	77.2
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1246	-	-	-	449
HCM Lane V/C Ratio	0.211	-	-	-	1.016
HCM Control Delay (s)	8.7	0	-	-	77.2
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.8	-	-	-	13.5

2019 With-Project LOS

Unsignalized LOS Summary (Weighted Average Method)
2019 With-Project - PM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Intersection	1	2	3	4	5	6	7	8	9	10	11	12
2. Marvin Rd NE / 32nd Ave NE												
Volume (HFR)	55					26	81	1,079	11		868	
Control Delay	78.7	0	0	0	0	24.5	10.8	0	0	0	0	0
Intersection Delay	2.8	A										
4. Marvin Rd NE / Hogum Bay Rd NE												
Volume (HFR)						202		1,658	551		2,513	
Control Delay	0	0	0	0	0	65.4	0	0	0	0	0	0
Intersection Delay	2.7	A										
11. Hogum Bay Rd NE / 31st Ave NE												
Volume (HFR)	53			91			185			419		
Control Delay	12.4	0	0	17.1	0	0	8.0	0	0	8.2	0	0
Intersection Delay	9.5	A										
14. Marvin Rd NE / North Access												
Volume (HFR)	50						167				386	
Control Delay	12.1	0	0	0	0	0	8.5	0	0	0	0	0
Intersection Delay	3.4	A										
15. Hogum Bay Rd NE / 31st Ave NE (extension)												
Volume (HFR)	12		93				212				298	
Control Delay	13.8	0	11.2	0	0	0	8.3	0	0	0	0	0
Intersection Delay	4.8	A										
16. East Access / 31st Ave NE (extension)												
Volume (HFR)	5	87			68					29		
Control Delay	7.5	0	0	0	0	0	0	0	0	9.7	0	0
Intersection Delay	1.7	A										
17. East Middle Access / 31st Ave NE (extension)												
Volume (HFR)	14	58			71					56		
Control Delay	7.6	0	0	0	0	0	0	0	0	9.7	0	0
Intersection Delay	3.3	A										
18. West Middle Access / 31st Ave NE (extension)												
Volume (HFR)	9	45			78					45		
Control Delay	7.6	0	0	0	0	0	0	0	0	9.6	0	0
Intersection Delay	2.8	A										
19. West Access / 31st Ave NE (extension)												
Volume (HFR)	8	28			86					44		
Control Delay	7.6	0	0	0	0	0	0	0	0	9.6	0	0
Intersection Delay	2.9	A										
20. Marvin Rd NE / 31st Ave NE (extension)												
Volume (HFR)				72		22		1,173		904		
Control Delay	0	0	0	867.8	0	28.1	0	0	0	12	0	0
Intersection Delay	34.1	D										
A. Marvin Rd SE / Union Mills Rd SE												
Volume (HFR)	193						32	589			1,083	
Control Delay	231.3	0	0	0	0	0	11.7	0	0	0	0	0
Intersection Delay	23.7	C										
B. Marvin Rd SE / 19th Ave SE												
Volume (HFR)	12			140			1	632		268	1,049	
Control Delay	395.5	0	0	35.9	0	0	10.7	0	0	10.5	0	0
Intersection Delay	6.0	A										
C. Marvin Rd SE / 25th Ave SE												
Volume (HFR)	76						20	522			1,002	
Control Delay	63.7	0	0	0	0	0	10.6	0	0	0	0	0
Intersection Delay	3.1	A										
D. Marvin Rd SE / Mullen Rd SE												
Volume (HFR)	379				296					417		
Control Delay	8.7	0	0	0	0	0	0	0	0	79.2	0	0
Intersection Delay	33.3	D										

Note: **FOR TOTAL INTERSECTION DELAY**

Major Approach: Left-Through-Right Shared is added together and entered as the left movement with the LT delay.
It is assumed drivers do not pass a queued left-turn and are assigned delay.
HCS assumes there is no delay for the TH movement.
If there is an exclusive Left-turn lane enter the Through and the Right volume without delay
Delay max 1000 sec.

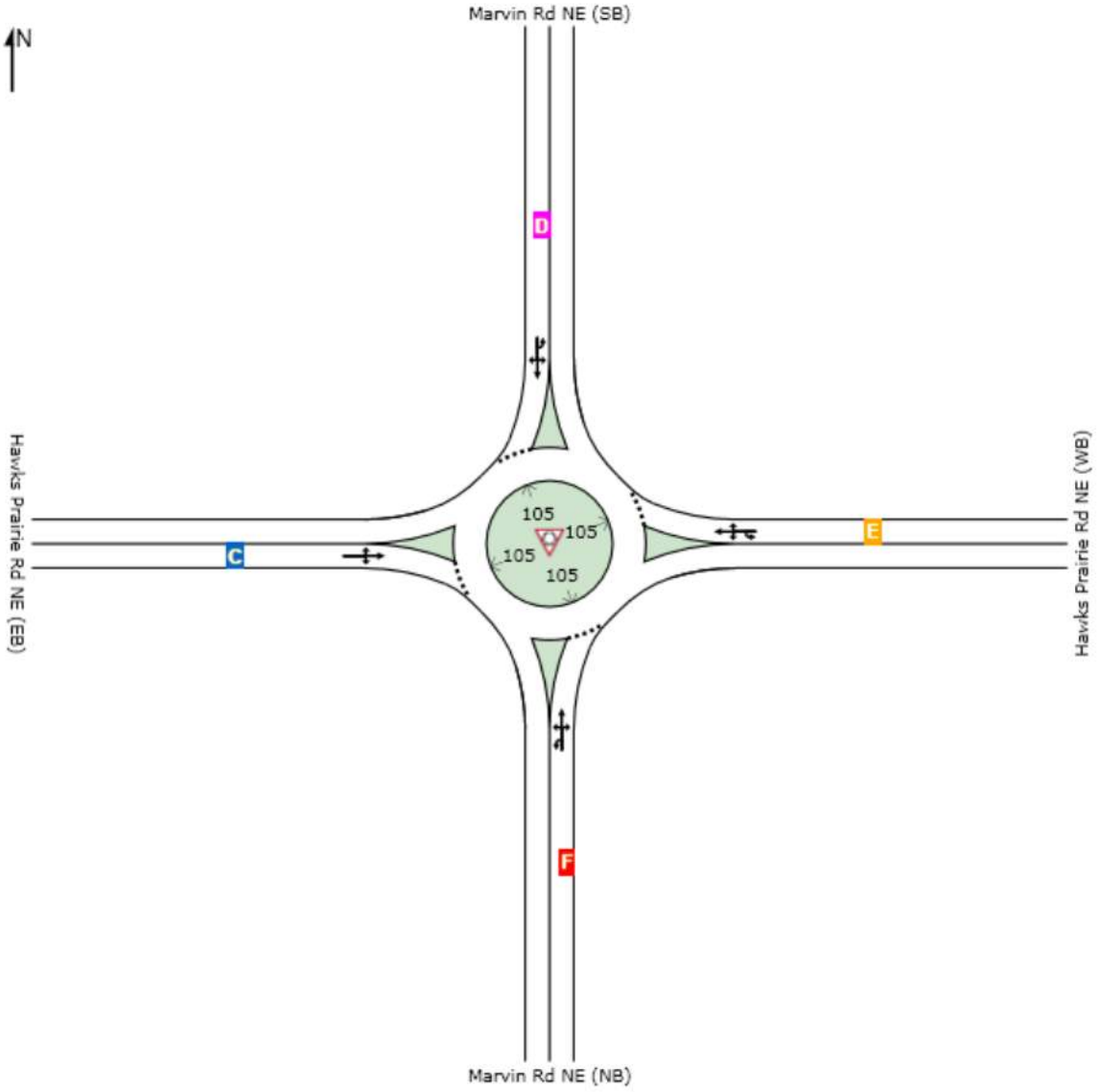
LEVEL OF SERVICE

Site: 2019 With Project PM Peak

Hogum Bay Logistics Center
Marvin Rd NE / Hawks Prairie Rd NE
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	F	E	D	C	F



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: 2019 With Project PM Peak

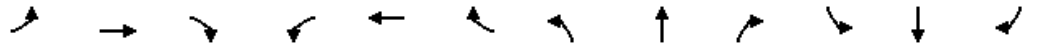
Hogum Bay Logistics Center
Marvin Rd NE / Hawks Prairie Rd NE
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Marvin Rd NE (NB)													
Lane 1[d]	1076	2.0	915	1.176	100	108.9	LOS F	79.3	2013.4	Full	1600	0.0	12.2
Approach	1076	2.0		1.176		108.9	LOS F	79.3	2013.4				
East: Hawks Prairie Rd NE (WB)													
Lane 1[d]	353	2.0	416	0.849	100	45.6	LOS E	6.4	162.1	Full	1600	0.0	0.0
Approach	353	2.0		0.849		45.6	LOS E	6.4	162.1				
North: Marvin Rd NE (SB)													
Lane 1[d]	506	2.0	615	0.822	100	31.4	LOS D	7.6	193.4	Full	1600	0.0	0.0
Approach	506	2.0		0.822		31.4	LOS D	7.6	193.4				
West: Hawks Prairie Rd NE (EB)													
Lane 1[d]	329	2.0	572	0.575	100	17.4	LOS C	3.1	79.2	Full	1600	0.0	0.0
Approach	329	2.0		0.575		17.4	LOS C	3.1	79.2				
Intersection	2263	2.0		1.176		68.4	LOS F	79.3	2013.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	0	48	0	0	26	81	1079	11	0	856	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	180		150	180		0
Storage Lanes	0		0	0		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		853			309			803			1051	
Travel Time (s)		23.3			8.4			15.6			20.5	
Confl. Peds. (#/hr)	3					3						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	12%	12%	12%	2%	2%	2%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	0	48	0	0	26	81	1079	11	0	856	12
Conflicting Peds, #/hr	3	0	0	0	0	3	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	180	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	12	12	12	2	2	2	3	3	3
Mvmt Flow	8	0	53	0	0	29	90	1199	12	0	951	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2343	2343	961	2369	2349	1202	967	0	0	1202	0	0
Stage 1	961	961	-	1382	1382	-	-	-	-	-	-	-
Stage 2	1382	1382	-	987	967	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.22	6.62	6.32	4.12	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.22	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.22	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.608	4.108	3.408	2.218	-	-	2.227	-	-
Pot Cap-1 Maneuver	25	36	311	23	34	214	712	-	-	577	-	-
Stage 1	308	335	-	169	201	-	-	-	-	-	-	-
Stage 2	178	211	-	286	320	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	19	31	310	17	30	213	712	-	-	577	-	-
Mov Cap-2 Maneuver	19	31	-	17	30	-	-	-	-	-	-	-
Stage 1	268	334	-	147	175	-	-	-	-	-	-	-
Stage 2	134	184	-	237	319	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	78.7	24.5	0.7	0
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	712	-	-	105	213	577	-	-
HCM Lane V/C Ratio	0.126	-	-	0.582	0.136	-	-	-
HCM Control Delay (s)	10.8	-	-	78.7	24.5	0	-	-
HCM Lane LOS	B	-	-	F	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	2.8	0.5	0	-	-

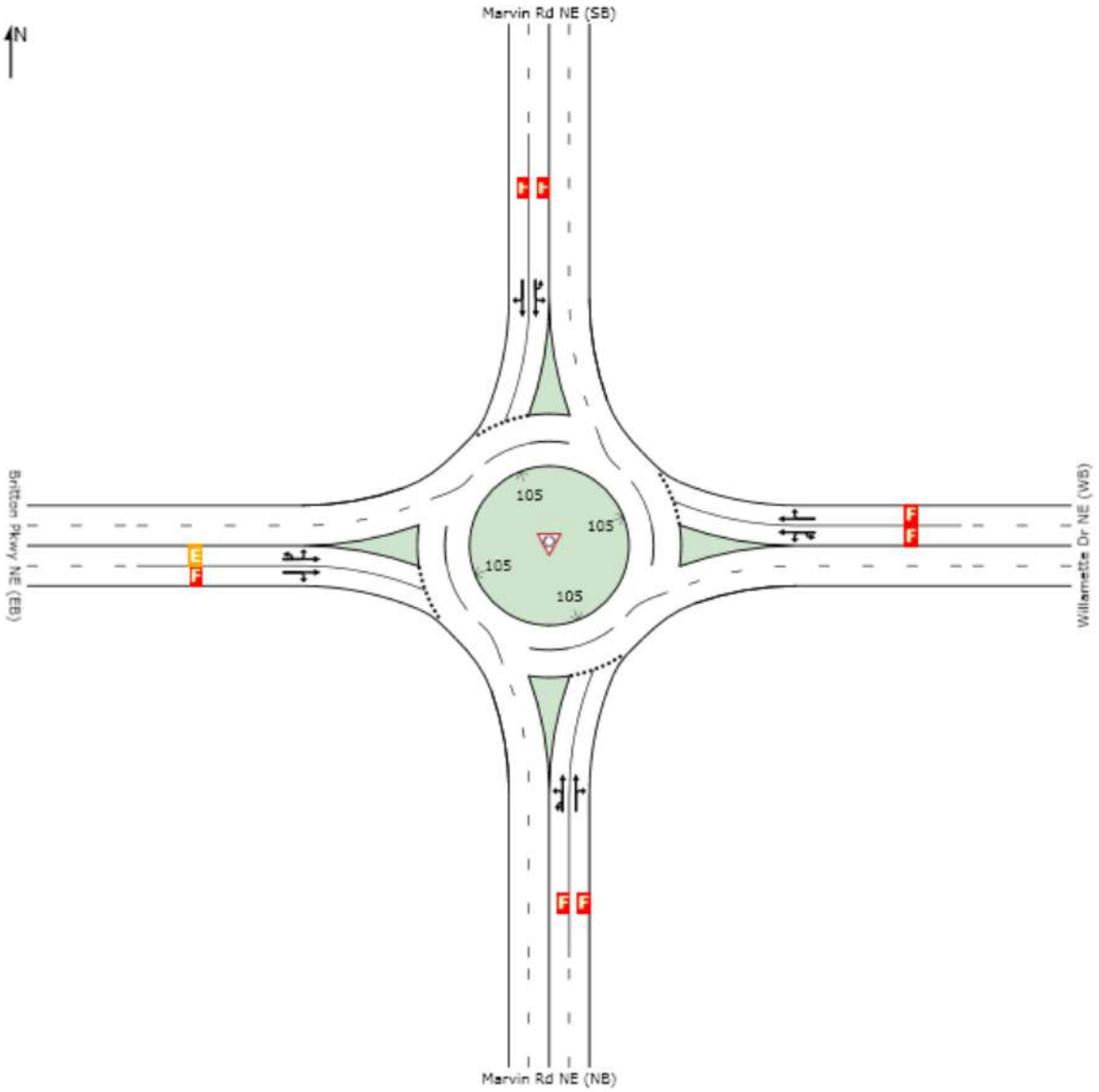
LEVEL OF SERVICE

Site: 2019 With Project PM Peak

Hogum Bay Logistics Center
Marvin Rd NE / Britton Pkwy NE
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	F	F	F	F	F



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: 2019 With Project PM Peak

Hogum Bay Logistics Center
Marvin Rd NE / Britton Pkwy NE
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Marvin Rd NE (NB)													
Lane 1	916	3.0	810	1.131	100	94.8	LOS F	49.2	1259.9	Full	1600	0.0	0.0
Lane 2[d]	934	3.0	826	1.131	100	94.3	LOS F	49.5	1267.8	Full	1600	0.0	0.0
Approach	1850	3.0		1.131		94.5	LOS F	49.5	1267.8				
East: Willamette Dr NE (WB)													
Lane 1	559	5.0	289	1.933	100	461.5	LOS F	91.0	2367.1	Full	1600	0.0	18.1
Lane 2[d]	563	5.0	316	1.785	92[5]	393.7	LOS F	83.7	2177.4	Full	1600	0.0	15.0
Approach	1122	5.0		1.933		427.5	LOS F	91.0	2367.1				
North: Marvin Rd NE (SB)													
Lane 1	745	3.0	555	1.342	100	187.8	LOS F	68.2	1745.2	Full	1600	0.0	7.6
Lane 2[d]	780	3.0	581	1.342	100	186.7	LOS F	70.8	1812.4	Full	1600	0.0	8.8
Approach	1524	3.0		1.342		187.2	LOS F	70.8	1812.4				
West: Britton Pkwy NE (EB)													
Lane 1	349	1.0	410	0.851	87[5]	46.4	LOS E	5.0	126.8	Full	1600	0.0	0.0
Lane 2[d]	429	1.0	439	0.978	100	68.4	LOS F	9.7	245.7	Full	1600	0.0	0.0
Approach	778	1.0		0.978		58.6	LOS F	9.7	245.7				
Intersection	5274	3.1		1.933		186.9	LOS F	91.0	2367.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	202	1658	551	0	2513
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		185	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Link Speed (mph)	35		35			35
Link Distance (ft)	1465		473			837
Travel Time (s)	28.5		9.2			16.3
Confl. Peds. (#/hr)		1		1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	4%	4%	4%	4%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	0	202	1658	551	0	2513
Conflicting Peds, #/hr	0	1	0	1	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	185	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	7	7	4	4	4	4
Mvmt Flow	0	224	1842	612	0	2792

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2960	922	0	0	1843	0
Stage 1	1843	-	-	-	-	-
Stage 2	1117	-	-	-	-	-
Critical Hdwy	6.39	7.04	-	-	4.18	-
Critical Hdwy Stg 1	5.94	-	-	-	-	-
Critical Hdwy Stg 2	6.14	-	-	-	-	-
Follow-up Hdwy	3.72	3.37	-	-	2.24	-
Pot Cap-1 Maneuver	16	263	-	-	318	-
Stage 1	103	-	-	-	-	-
Stage 2	243	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	16	263	-	-	318	-
Mov Cap-2 Maneuver	16	-	-	-	-	-
Stage 1	103	-	-	-	-	-
Stage 2	243	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	65.4	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	263	318	-
HCM Lane V/C Ratio	-	-	0.853	-	-
HCM Control Delay (s)	-	-	65.4	0	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	7.1	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	584	0	615	662	1703	0	0	1645	892
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	600		600	375		0	0		0
Storage Lanes	0		0	1		1	2		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		681			877			793			473	
Travel Time (s)		15.5			19.9			15.4			9.2	
Confl. Peds. (#/hr)												3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	2%	2%	2%	4%	4%	4%
Shared Lane Traffic (%)				50%								
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				4	4		1	6			2	
Permitted Phases						4						2
Detector Phase				4	4	4	1	6			2	2
Switch Phase												
Minimum Initial (s)				6.0	6.0	6.0	4.0	6.0			6.0	6.0
Minimum Split (s)				32.0	32.0	32.0	9.0	23.0			25.0	25.0
Total Split (s)				38.0	38.0	38.0	42.0	82.0			40.0	40.0
Total Split (%)				31.7%	31.7%	31.7%	35.0%	68.3%			33.3%	33.3%
Yellow Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				1.0	1.0	1.0	1.0	1.0			1.0	1.0
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag							Lag				Lead	Lead
Lead-Lag Optimize?							Yes				Yes	Yes
Recall Mode				None	None	None	C-Max	C-Max			Max	Max

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 78 (65%), Referenced to phase 1:NBL and 6:NBT, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Marvin Rd NE & I-5 SB Ramps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	584	0	615	662	1703	0	0	1645	892
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1845	1845	1845	1863	1863	0	0	1827	1827
Adj Flow Rate, veh/h				649	0	683	736	1892	0	0	1828	0
Adj No. of Lanes				2	0	1	2	2	0	0	2	1
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				3	3	3	2	2	0	0	4	4
Cap, veh/h				966	0	431	1061	2271	0	0	1012	453
Arrive On Green				0.28	0.00	0.28	0.62	1.00	0.00	0.00	0.29	0.00
Sat Flow, veh/h				3514	0	1568	3442	3632	0	0	3563	1553
Grp Volume(v), veh/h				649	0	683	736	1892	0	0	1828	0
Grp Sat Flow(s),veh/h/ln				1757	0	1568	1721	1770	0	0	1736	1553
Q Serve(g_s), s				19.7	0.0	33.0	17.2	0.0	0.0	0.0	35.0	0.0
Cycle Q Clear(g_c), s				19.7	0.0	33.0	17.2	0.0	0.0	0.0	35.0	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				966	0	431	1061	2271	0	0	1012	453
V/C Ratio(X)				0.67	0.00	1.58	0.69	0.83	0.00	0.00	1.81	0.00
Avail Cap(c_a), veh/h				966	0	431	1061	2271	0	0	1012	453
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.09	0.09	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				38.7	0.0	43.5	19.2	0.0	0.0	0.0	42.5	0.0
Incr Delay (d2), s/veh				1.8	0.0	273.7	0.2	0.4	0.0	0.0	366.5	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				9.8	0.0	47.0	8.0	0.1	0.0	0.0	68.3	0.0
LnGrp Delay(d),s/veh				40.5	0.0	317.2	19.4	0.4	0.0	0.0	409.0	0.0
LnGrp LOS				D		F	B	A			F	
Approach Vol, veh/h					1332			2628			1828	
Approach Delay, s/veh					182.4			5.7			409.0	
Approach LOS					F			A			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	42.0	40.0		38.0		82.0		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	37.0	35.0		33.0		77.0		
Max Q Clear Time (g_c+I1), s	19.2	37.0		35.0		2.0		
Green Ext Time (p_c), s	14.8	0.0		0.0		41.0		

Intersection Summary		
HCM 2010 Ctrl Delay		173.7
HCM 2010 LOS		F

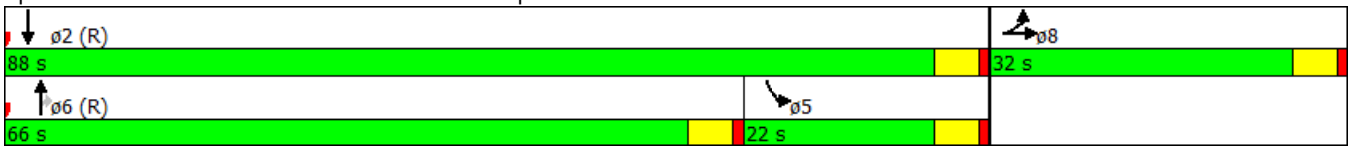
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	767	0	8	0	0	0	0	1588	278	512	1715	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	255		0
Storage Lanes	1		0	0		0	0		1	2		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		974			913			445			793	
Travel Time (s)		22.1			20.8			8.7			15.4	
Confl. Peds. (#/hr)									4			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Shared Lane Traffic (%)	49%											
Turn Type	Split	NA						NA	Perm	Prot	NA	
Protected Phases	8	8						6		5	2	
Permitted Phases									6			
Detector Phase	8	8						6	6	5	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0						6.0	6.0	4.0	6.0	
Minimum Split (s)	32.0	32.0						23.0	23.0	9.0	23.0	
Total Split (s)	32.0	32.0						66.0	66.0	22.0	88.0	
Total Split (%)	26.7%	26.7%						55.0%	55.0%	18.3%	73.3%	
Yellow Time (s)	4.0	4.0						4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0						1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0						0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0						5.0	5.0	5.0	5.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Recall Mode	None	None						C-Max	C-Max	None	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 34 (28%), Referenced to phase 2:SBT and 6:NBT, Start of Green	
Natural Cycle: 130	
Control Type: Actuated-Coordinated	

Splits and Phases: 6: Marvin Rd NE & I-5 NB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	767	0	8	0	0	0	0	1588	278	512	1715	0
Number	3	8	18				1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1900				0	1881	1881	1845	1845	0
Adj Flow Rate, veh/h	860	0	0				0	1764	309	569	1906	0
Adj No. of Lanes	2	1	0				0	2	1	2	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	5	5	5				0	1	1	3	3	0
Cap, veh/h	776	407	0				0	1817	811	483	2424	0
Arrive On Green	0.22	0.00	0.00				0.00	1.00	1.00	0.14	0.69	0.00
Sat Flow, veh/h	3447	1810	0				0	3668	1595	3408	3597	0
Grp Volume(v), veh/h	860	0	0				0	1764	309	569	1906	0
Grp Sat Flow(s),veh/h/ln	1723	1810	0				0	1787	1595	1704	1752	0
Q Serve(g_s), s	27.0	0.0	0.0				0.0	0.0	0.0	17.0	44.1	0.0
Cycle Q Clear(g_c), s	27.0	0.0	0.0				0.0	0.0	0.0	17.0	44.1	0.0
Prop In Lane	1.00		0.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	776	407	0				0	1817	811	483	2424	0
V/C Ratio(X)	1.11	0.00	0.00				0.00	0.97	0.38	1.18	0.79	0.00
Avail Cap(c_a), veh/h	776	407	0				0	1817	811	483	2424	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.09	0.09	0.09	0.09	0.00
Uniform Delay (d), s/veh	46.5	0.0	0.0				0.0	0.0	0.0	51.5	12.5	0.0
Incr Delay (d2), s/veh	66.5	0.0	0.0				0.0	2.5	0.1	82.5	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.0	0.0	0.0				0.0	0.6	0.0	13.5	21.0	0.0
LnGrp Delay(d),s/veh	113.0	0.0	0.0				0.0	2.5	0.1	134.0	12.7	0.0
LnGrp LOS	F							A	A	F	B	
Approach Vol, veh/h		860						2073			2475	
Approach Delay, s/veh		113.0						2.1			40.6	
Approach LOS		F						A			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		88.0			22.0	66.0		32.0
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0
Max Green Setting (Gmax), s		83.0			17.0	61.0		27.0
Max Q Clear Time (g_c+I1), s		46.1			19.0	2.0		29.0
Green Ext Time (p_c), s		25.6			0.0	27.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	37.4
HCM 2010 LOS	D

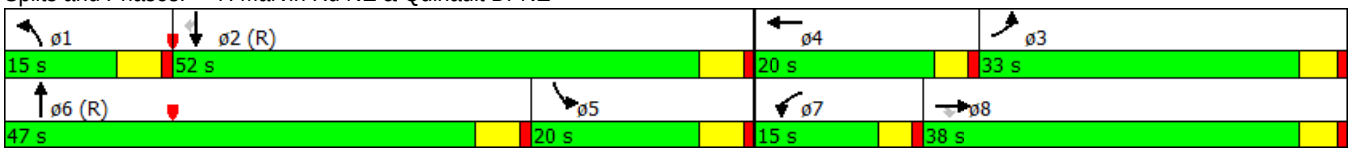
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	441	278	422	49	71	219	96	1171	36	215	1051	442
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		400	125		0	265		0	0		270
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		778			475			949			445	
Travel Time (s)		17.7			10.8			18.5			8.7	
Confl. Peds. (#/hr)						2						1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	1%	1%	1%	2%	2%	2%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									2
Detector Phase	3	8	8	7	4		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	6.0
Minimum Split (s)	8.5	30.5	30.5	8.0	20.0		9.0	24.0		9.0	31.0	31.0
Total Split (s)	33.0	38.0	38.0	15.0	20.0		15.0	47.0		20.0	52.0	52.0
Total Split (%)	27.5%	31.7%	31.7%	12.5%	16.7%		12.5%	39.2%		16.7%	43.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.0	3.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.0	4.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 49 (41%), Referenced to phase 2:SBT and 6:NBT, Start of Green	
Natural Cycle: 130	
Control Type: Actuated-Coordinated	

Splits and Phases: 7: Marvin Rd NE & Quinault Dr NE



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	441	278	422	49	71	219	96	1171	36	215	1051	442
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1827	1827	1900	1881	1881	1900	1863	1863	1863
Adj Flow Rate, veh/h	490	309	358	54	79	243	107	1301	40	239	1168	380
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	4	4	4	1	1	1	2	2	2
Cap, veh/h	426	623	529	69	53	162	133	1239	38	222	1419	634
Arrive On Green	0.24	0.33	0.33	0.04	0.13	0.13	0.02	0.12	0.12	0.25	0.80	0.80
Sat Flow, veh/h	1792	1881	1599	1740	394	1212	1792	3540	109	1774	3539	1581
Grp Volume(v), veh/h	490	309	358	54	0	322	107	656	685	239	1168	380
Grp Sat Flow(s),veh/h/ln	1792	1881	1599	1740	0	1607	1792	1787	1862	1774	1770	1581
Q Serve(g_s), s	28.5	15.8	23.2	3.7	0.0	16.0	7.1	42.0	42.0	15.0	23.1	5.2
Cycle Q Clear(g_c), s	28.5	15.8	23.2	3.7	0.0	16.0	7.1	42.0	42.0	15.0	23.1	5.2
Prop In Lane	1.00		1.00	1.00		0.75	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	426	623	529	69	0	214	133	625	652	222	1419	634
V/C Ratio(X)	1.15	0.50	0.68	0.78	0.00	1.50	0.81	1.05	1.05	1.08	0.82	0.60
Avail Cap(c_a), veh/h	426	623	529	159	0	214	149	625	652	222	1419	634
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.53	0.53	0.53	0.52	0.52	0.52
Uniform Delay (d), s/veh	45.7	32.1	34.6	57.1	0.0	52.0	57.7	53.1	53.1	45.0	9.4	1.8
Incr Delay (d2), s/veh	92.0	0.6	3.4	16.9	0.0	249.3	14.2	40.0	40.0	66.1	3.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.9	8.3	10.7	2.1	0.0	21.9	4.1	27.7	28.9	11.3	11.3	2.4
LnGrp Delay(d),s/veh	137.8	32.7	38.0	74.0	0.0	301.3	71.8	93.1	93.1	111.1	12.4	4.0
LnGrp LOS	F	C	D	E		F	E	F	F	F	B	A
Approach Vol, veh/h		1157			376			1448			1787	
Approach Delay, s/veh		78.9			268.6			91.5			23.8	
Approach LOS		E			F			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.9	53.1	33.0	20.0	20.0	47.0	8.8	44.2
Change Period (Y+Rc), s	5.0	5.0	4.5	4.0	5.0	5.0	4.0	4.5
Max Green Setting (Gmax), s	10.0	47.0	28.5	16.0	15.0	42.0	11.0	33.5
Max Q Clear Time (g_c+I1), s	9.1	25.1	30.5	18.0	17.0	44.0	5.7	25.2
Green Ext Time (p_c), s	0.0	11.3	0.0	0.0	0.0	0.0	0.0	3.3

Intersection Summary	
HCM 2010 Ctrl Delay	77.0
HCM 2010 LOS	E

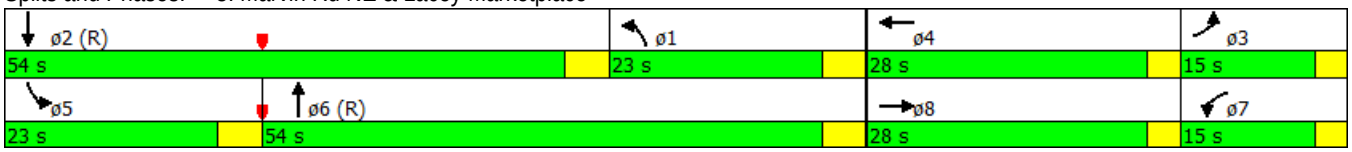
Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	156	79	166	213	78	102	192	937	200	150	1263	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	330		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		288			352			666			949	
Travel Time (s)		7.9			9.6			13.0			18.5	
Confl. Peds. (#/hr)			3			1			4			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases												
Detector Phase	3	8		7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Minimum Split (s)	8.0	27.0		8.0	27.0		8.5	22.0		20.0	22.0	
Total Split (s)	15.0	28.0		15.0	28.0		23.0	54.0		23.0	54.0	
Total Split (%)	12.5%	23.3%		12.5%	23.3%		19.2%	45.0%		19.2%	45.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lead		Lag	Lead		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	

Splits and Phases: 8: Marvin Rd NE & Lacey Marketplace



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	156	79	166	213	78	102	192	937	200	150	1263	92
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	173	88	184	237	87	113	213	1041	222	167	1403	102
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	257	98	205	179	103	133	332	1441	306	198	1408	102
Arrive On Green	0.14	0.18	0.18	0.10	0.14	0.14	0.37	0.98	0.98	0.04	0.14	0.14
Sat Flow, veh/h	1792	542	1133	1792	743	965	1792	2932	623	1792	3380	245
Grp Volume(v), veh/h	173	0	272	237	0	200	213	633	630	167	739	766
Grp Sat Flow(s),veh/h/ln	1792	0	1675	1792	0	1708	1792	1787	1768	1792	1787	1838
Q Serve(g_s), s	11.0	0.0	19.1	12.0	0.0	13.7	11.8	2.5	2.6	11.1	49.6	50.0
Cycle Q Clear(g_c), s	11.0	0.0	19.1	12.0	0.0	13.7	11.8	2.5	2.6	11.1	49.6	50.0
Prop In Lane	1.00		0.68	1.00		0.56	1.00		0.35	1.00		0.13
Lane Grp Cap(c), veh/h	257	0	304	179	0	236	332	878	869	198	745	766
V/C Ratio(X)	0.67	0.00	0.90	1.32	0.00	0.85	0.64	0.72	0.72	0.84	0.99	1.00
Avail Cap(c_a), veh/h	257	0	349	179	0	356	332	878	869	284	745	766
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.40	0.40	0.40	0.53	0.53	0.53
Uniform Delay (d), s/veh	48.8	0.0	48.0	54.0	0.0	50.5	34.5	0.5	0.5	56.8	51.6	51.7
Incr Delay (d2), s/veh	6.8	0.0	22.5	178.7	0.0	11.4	1.7	2.1	2.2	8.3	22.5	23.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	0.0	10.7	14.8	0.0	7.2	6.0	0.9	0.9	6.0	29.2	30.5
LnGrp Delay(d),s/veh	55.5	0.0	70.5	232.7	0.0	61.9	36.2	2.7	2.7	65.0	74.0	75.4
LnGrp LOS	E		E	F		E	D	A	A	E	E	E
Approach Vol, veh/h		445			437			1476			1672	
Approach Delay, s/veh		64.7			154.5			7.5			73.8	
Approach LOS		E			F			A			E	

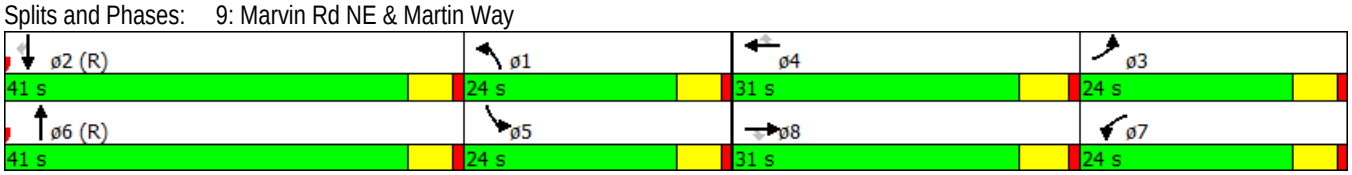
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.2	54.0	20.2	19.6	17.3	63.0	15.0	24.8
Change Period (Y+Rc), s	4.0	4.0	3.0	3.0	4.0	4.0	3.0	3.0
Max Green Setting (Gmax), s	19.0	50.0	12.0	25.0	19.0	50.0	12.0	25.0
Max Q Clear Time (g_c+I1), s	13.8	52.0	13.0	15.7	13.1	4.6	14.0	21.1
Green Ext Time (p_c), s	0.5	0.0	0.0	0.8	0.2	12.6	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	57.3
HCM 2010 LOS	E

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	380	687	611	414	611	239	315	763	163	261	1196	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	350		400	325		175	150		0	200		310
Storage Lanes	2		1	2		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			35			35	
Link Distance (ft)		947			894			1633			666	
Travel Time (s)		16.1			15.2			31.8			13.0	
Confl. Peds. (#/hr)						34			29			9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4						2
Detector Phase	3	8	8	7	4	4	1	6		5	2	2
Switch Phase												
Minimum Initial (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Minimum Split (s)	9.0	28.5	28.5	9.0	30.5	30.5	9.0	33.0		9.0	33.0	33.0
Total Split (s)	24.0	31.0	31.0	24.0	31.0	31.0	24.0	41.0		24.0	41.0	41.0
Total Split (%)	20.0%	25.8%	25.8%	20.0%	25.8%	25.8%	20.0%	34.2%		20.0%	34.2%	34.2%
Yellow Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.5	5.5	5.0	5.5	5.5	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 2 (2%), Referenced to phase 2:SBT and 6:NBT, Start of Green	
Natural Cycle: 135	
Control Type: Actuated-Coordinated	

Splits and Phases: 9: Marvin Rd NE & Martin Way



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	380	687	611	414	611	239	315	763	163	261	1196	270
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	422	763	0	460	679	0	350	848	181	290	1329	189
Adj No. of Lanes	2	2	1	2	2	1	1	2	0	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	542	760	340	525	742	332	297	874	187	297	1072	475
Arrive On Green	0.16	0.21	0.00	0.15	0.21	0.00	0.17	0.30	0.30	0.33	0.60	0.60
Sat Flow, veh/h	3476	3574	1599	3476	3574	1599	1792	2915	622	1792	3574	1585
Grp Volume(v), veh/h	422	763	0	460	679	0	350	520	509	290	1329	189
Grp Sat Flow(s),veh/h/ln	1738	1787	1599	1738	1787	1599	1792	1787	1750	1792	1787	1585
Q Serve(g_s), s	14.0	25.5	0.0	15.5	22.3	0.0	19.9	34.5	34.5	19.2	36.0	7.5
Cycle Q Clear(g_c), s	14.0	25.5	0.0	15.5	22.3	0.0	19.9	34.5	34.5	19.2	36.0	7.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.36	1.00		1.00
Lane Grp Cap(c), veh/h	542	760	340	525	742	332	297	536	525	297	1072	475
V/C Ratio(X)	0.78	1.00	0.00	0.88	0.92	0.00	1.18	0.97	0.97	0.98	1.24	0.40
Avail Cap(c_a), veh/h	550	760	340	550	760	340	297	536	525	297	1072	475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.89	0.89	0.89	0.09	0.09	0.09
Uniform Delay (d), s/veh	48.6	47.2	0.0	49.8	46.5	0.0	50.1	41.5	41.5	39.9	24.0	18.3
Incr Delay (d2), s/veh	6.9	33.8	0.0	14.3	15.5	0.0	107.4	29.8	30.3	11.0	108.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	16.1	0.0	8.5	12.6	0.0	18.7	21.5	21.1	10.2	33.4	3.3
LnGrp Delay(d),s/veh	55.6	81.0	0.0	64.2	62.0	0.0	157.4	71.3	71.7	50.9	132.5	18.5
LnGrp LOS	E	F		E	E		F	E	E	D	F	B
Approach Vol, veh/h		1185			1139			1379			1808	
Approach Delay, s/veh		72.0			62.9			93.3			107.5	
Approach LOS		E			E			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.9	41.0	23.7	30.4	24.9	41.0	23.1	31.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.5	5.0	5.0	5.0	5.5
Max Green Setting (Gmax), s	19.0	36.0	19.0	25.5	19.0	36.0	19.0	25.5
Max Q Clear Time (g_c+I1), s	21.9	38.0	16.0	24.3	21.2	36.5	17.5	27.5
Green Ext Time (p_c), s	0.0	0.0	1.1	0.5	0.0	0.0	0.6	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	87.1
HCM 2010 LOS	F

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	0	34	7	0	20	35	988	4	44	1855	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	245		0	270		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		250			272			2103			1633	
Travel Time (s)		6.8			7.4			41.0			31.8	
Confl. Peds. (#/hr)	1					1			4			1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	5%	5%	15%	15%	15%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8		4	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	10.0		6.0	10.0	
Minimum Split (s)	24.6	24.6		24.6	24.6		10.6	20.9		10.6	20.9	
Total Split (s)	27.0	27.0		27.0	27.0		20.0	43.0		20.0	43.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		22.2%	47.8%		22.2%	47.8%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.9		3.6	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.6			4.6		4.6	4.9		4.6	4.9	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 67.7	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 10: Marvin Rd NE & 3rd Ave SE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	62	0	34	7	0	20	35	988	4	44	1855	94
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1810	1900	1900	1652	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	69	0	38	8	0	22	39	1098	4	49	2061	104
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	5	5	5	15	15	15	1	1	1	1	1	1
Cap, veh/h	185	9	55	95	19	112	85	2239	8	99	2151	108
Arrive On Green	0.10	0.00	0.10	0.10	0.00	0.10	0.05	0.61	0.61	0.06	0.62	0.62
Sat Flow, veh/h	859	84	519	202	185	1064	1792	3653	13	1792	3464	173
Grp Volume(v), veh/h	107	0	0	30	0	0	39	537	565	49	1055	1110
Grp Sat Flow(s),veh/h/ln	1462	0	0	1451	0	0	1792	1787	1879	1792	1787	1850
Q Serve(g_s), s	3.1	0.0	0.0	0.0	0.0	0.0	1.3	10.3	10.3	1.7	33.9	35.3
Cycle Q Clear(g_c), s	4.3	0.0	0.0	1.2	0.0	0.0	1.3	10.3	10.3	1.7	33.9	35.3
Prop In Lane	0.64		0.36	0.27		0.73	1.00		0.01	1.00		0.09
Lane Grp Cap(c), veh/h	249	0	0	226	0	0	85	1096	1152	99	1110	1149
V/C Ratio(X)	0.43	0.00	0.00	0.13	0.00	0.00	0.46	0.49	0.49	0.50	0.95	0.97
Avail Cap(c_a), veh/h	607	0	0	569	0	0	444	1096	1152	444	1110	1149
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.7	0.0	0.0	25.4	0.0	0.0	28.8	6.7	6.7	28.5	10.9	11.2
Incr Delay (d2), s/veh	1.2	0.0	0.0	0.3	0.0	0.0	3.9	1.6	1.5	3.8	17.5	19.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.0	0.5	0.0	0.0	0.7	5.6	5.8	0.9	21.8	23.8
LnGrp Delay(d),s/veh	27.9	0.0	0.0	25.7	0.0	0.0	32.7	8.2	8.1	32.3	28.4	30.8
LnGrp LOS	C			C			C	A	A	C	C	C
Approach Vol, veh/h		107			30			1141			2214	
Approach Delay, s/veh		27.9			25.7			9.0			29.7	
Approach LOS		C			C			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.5	43.5		11.1	8.0	43.0		11.1
Change Period (Y+Rc), s	4.6	4.9		4.6	4.6	4.9		4.6
Max Green Setting (Gmax), s	15.4	38.1		22.4	15.4	38.1		22.4
Max Q Clear Time (g_c+I1), s	3.3	37.3		3.2	3.7	12.3		6.3
Green Ext Time (p_c), s	0.0	0.7		0.7	0.1	23.8		0.6

Intersection Summary		
HCM 2010 Ctrl Delay		22.8
HCM 2010 LOS		C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	5	47	30	2	59	21	99	65	198	221	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			35			35			35	
Link Distance (ft)		310			1574			630			743	
Travel Time (s)		8.5			30.7			12.3			14.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	34%	34%	34%	4%	4%	4%	18%	18%	18%	11%	11%	11%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	5	47	30	2	59	21	99	65	198	221	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	34	34	34	4	4	4	18	18	18	11	11	11
Mvmt Flow	1	6	52	33	2	66	23	110	72	220	246	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	913	915	246	907	879	146	246	0	0	182	0	0
Stage 1	686	686	-	193	193	-	-	-	-	-	-	-
Stage 2	227	229	-	714	686	-	-	-	-	-	-	-
Critical Hdwy	7.44	6.84	6.54	7.14	6.54	6.24	4.28	-	-	4.21	-	-
Critical Hdwy Stg 1	6.44	5.84	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.44	5.84	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.806	4.306	3.606	3.536	4.036	3.336	2.362	-	-	2.299	-	-
Pot Cap-1 Maneuver	223	242	720	255	284	896	1232	-	-	1341	-	-
Stage 1	390	403	-	804	737	-	-	-	-	-	-	-
Stage 2	709	659	-	419	445	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	172	192	720	195	225	896	1232	-	-	1341	-	-
Mov Cap-2 Maneuver	172	192	-	195	225	-	-	-	-	-	-	-
Stage 1	382	326	-	787	722	-	-	-	-	-	-	-
Stage 2	641	645	-	309	360	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.4	17.1	0.9	3.9
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1232	-	-	546	398	1341	-	-
HCM Lane V/C Ratio	0.019	-	-	0.108	0.254	0.164	-	-
HCM Control Delay (s)	8	0	-	12.4	17.1	8.2	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	1	0.6	-	-

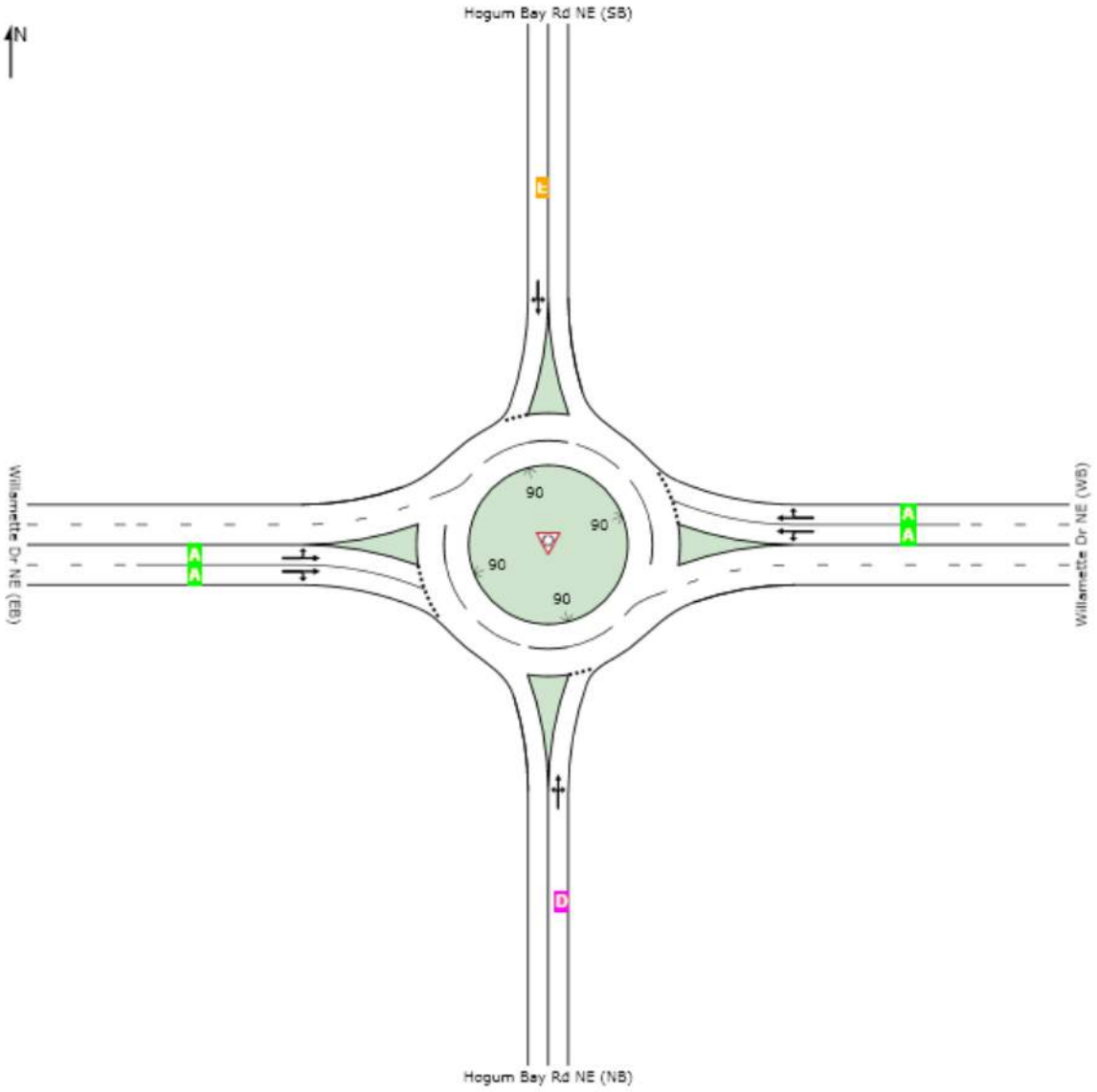
LEVEL OF SERVICE

Site: 2019 With Project PM Peak

Hogum Bay Logistics Center
Willamette Dr NE / Hogum Bay Rd NE
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	D	A	E	A	C



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: 2019 With Project PM Peak

Hogum Bay Logistics Center
Willamette Dr NE / Hogum Bay Rd NE
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Hogum Bay Rd NE (NB)													
Lane 1[d]	619	5.0	746	0.829	100	27.8	LOS D	6.4	167.5	Full	1600	0.0	0.0
Approach	619	5.0		0.829		27.8	LOS D	6.4	167.5				
East: Willamette Dr NE (WB)													
Lane 1	397	1.0	902	0.440	100	9.3	LOS A	1.7	43.3	Full	1600	0.0	0.0
Lane 2[d]	402	1.0	915	0.440	100	9.2	LOS A	1.6	41.0	Full	1600	0.0	0.0
Approach	799	1.0		0.440		9.2	LOS A	1.7	43.3				
North: Hogum Bay Rd NE (SB)													
Lane 1[d]	528	12.0	565	0.934	100	49.9	LOS E	8.2	224.1	Full	1600	0.0	0.0
Approach	528	12.0		0.934		49.9	LOS E	8.2	224.1				
West: Willamette Dr NE (EB)													
Lane 1	195	3.0	892	0.219	100	6.3	LOS A	0.7	16.9	Full	1600	0.0	0.0
Lane 2[d]	198	3.0	904	0.219	100	6.2	LOS A	0.6	15.9	Full	1600	0.0	0.0
Approach	393	3.0		0.219		6.2	LOS A	0.7	16.9				
Intersection	2339	4.9		0.934		22.8	LOS C	8.2	224.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

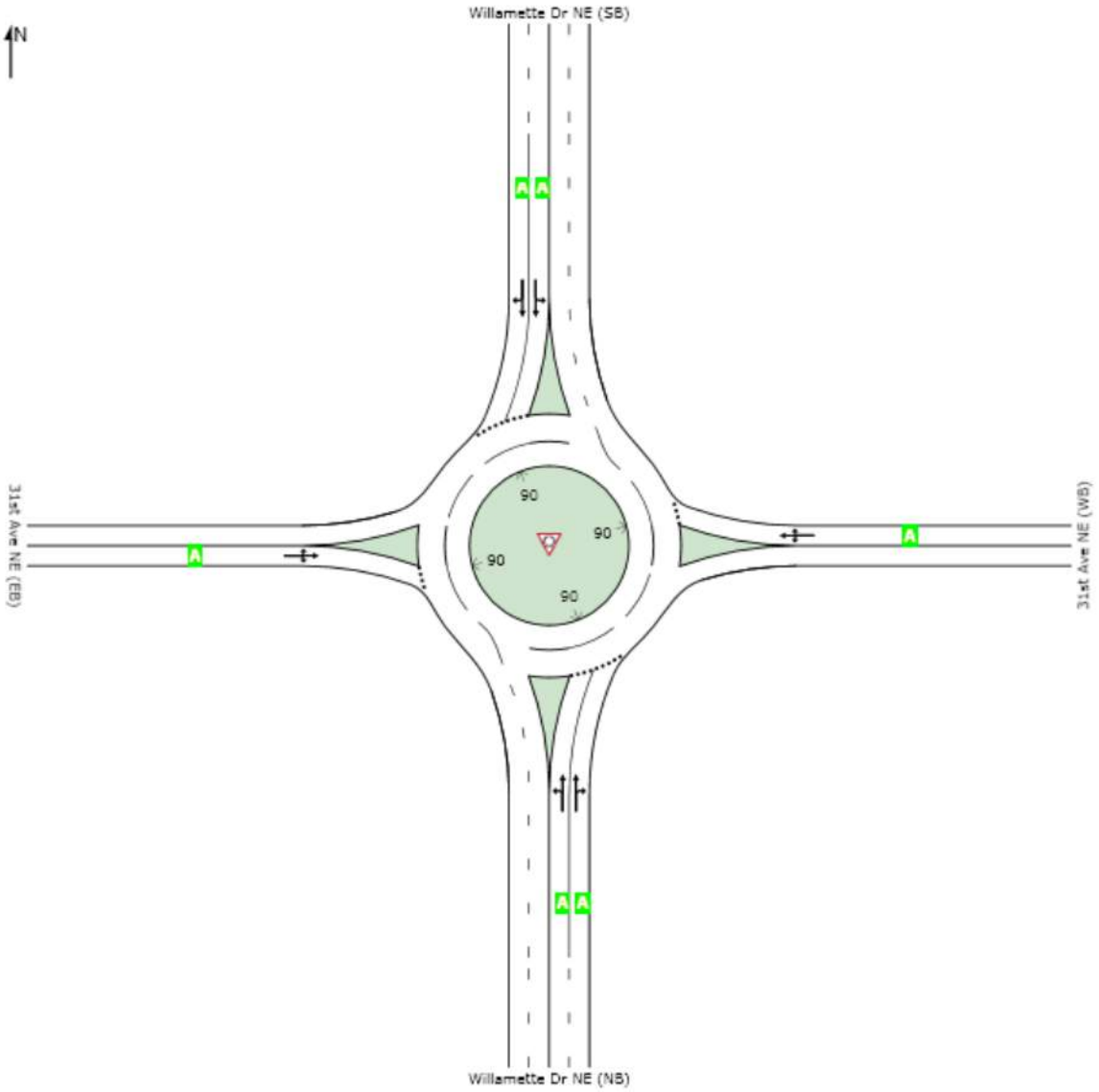
LEVEL OF SERVICE

Site: 2019 With Project PM Peak

Hogum Bay Logistics Center
Willamette Dr NE / 31st Ave NE
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	A	A	A	A	A



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: 2019 With Project PM Peak

Hogum Bay Logistics Center
Willamette Dr NE / 31st Ave NE
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Willamette Dr NE (NB)													
Lane 1	459	1.0	957	0.479	100	9.6	LOS A	2.0	51.4	Full	1600	0.0	0.0
Lane 2[d]	464	1.0	967	0.479	100	9.5	LOS A	1.9	48.6	Full	1600	0.0	0.0
Approach	922	1.0		0.479		9.5	LOS A	2.0	51.4				
East: 31st Ave NE (WB)													
Lane 1[d]	132	2.0	604	0.219	100	8.7	LOS A	0.6	15.1	Full	1600	0.0	0.0
Approach	132	2.0		0.219		8.7	LOS A	0.6	15.1				
North: Willamette Dr NE (SB)													
Lane 1	188	2.0	989	0.190	100	5.4	LOS A	0.6	14.5	Full	1600	0.0	0.0
Lane 2[d]	190	2.0	996	0.190	100	5.4	LOS A	0.5	13.6	Full	1600	0.0	0.0
Approach	378	2.0		0.190		5.4	LOS A	0.6	14.5				
West: 31st Ave NE (EB)													
Lane 1[d]	260	7.0	781	0.333	100	8.6	LOS A	1.0	25.9	Full	1600	0.0	0.0
Approach	260	7.0		0.333		8.6	LOS A	1.0	25.9				
Intersection	1692	2.2		0.479		8.4	LOS A	2.0	51.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	2	48	17	150	385	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			30	30	
Link Distance (ft)	585			743	1244	
Travel Time (s)	16.0			16.9	28.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	30%	30%	16%	16%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	2	48	17	150	385	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	30	30	16	16	9	9
Mvmt Flow	2	53	19	167	428	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	632	428	429	0	-	0
Stage 1	428	-	-	-	-	-
Stage 2	204	-	-	-	-	-
Critical Hdwy	6.7	6.5	4.26	-	-	-
Critical Hdwy Stg 1	5.7	-	-	-	-	-
Critical Hdwy Stg 2	5.7	-	-	-	-	-
Follow-up Hdwy	3.77	3.57	2.344	-	-	-
Pot Cap-1 Maneuver	403	571	1060	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	768	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	395	571	1060	-	-	-
Mov Cap-2 Maneuver	395	-	-	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	753	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1060	-	561	-	-
HCM Lane V/C Ratio	0.018	-	0.099	-	-
HCM Control Delay (s)	8.5	0	12.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	12	93	39	173	269	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0	0			0
Storage Lanes	1	1	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	30			35	35	
Link Distance (ft)	440			2325	630	
Travel Time (s)	10.0			45.3	12.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	20%	20%	18%	18%	15%	15%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	12	93	39	173	269	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	20	20	18	18	15	15
Mvmt Flow	13	103	43	192	299	32

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	594	315	331	0	-	0
Stage 1	315	-	-	-	-	-
Stage 2	279	-	-	-	-	-
Critical Hdwy	6.6	6.4	4.28	-	-	-
Critical Hdwy Stg 1	5.6	-	-	-	-	-
Critical Hdwy Stg 2	5.6	-	-	-	-	-
Follow-up Hdwy	3.68	3.48	2.362	-	-	-
Pot Cap-1 Maneuver	439	685	1144	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	729	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	421	685	1144	-	-	-
Mov Cap-2 Maneuver	421	-	-	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	698	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	1.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1144	-	421	685	-	-
HCM Lane V/C Ratio	0.038	-	0.032	0.151	-	-
HCM Control Delay (s)	8.3	0	13.8	11.2	-	-
HCM Lane LOS	A	A	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.5	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	5	87	60	8	18	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Link Speed (mph)		30	30		30	
Link Distance (ft)		510	440		182	
Travel Time (s)		11.6	10.0		4.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	19%	19%	27%	27%	28%	28%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	87	60	8	18	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	19	19	27	27	28	28
Mvmt Flow	6	97	67	9	20	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	76	0	-	0	179	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	4.29	-	-	-	6.68	6.48
Critical Hdwy Stg 1	-	-	-	-	5.68	-
Critical Hdwy Stg 2	-	-	-	-	5.68	-
Follow-up Hdwy	2.371	-	-	-	3.752	3.552
Pot Cap-1 Maneuver	1422	-	-	-	755	924
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	856	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1422	-	-	-	752	924
Mov Cap-2 Maneuver	-	-	-	-	739	-
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	852	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1422	-	-	-	800
HCM Lane V/C Ratio	0.004	-	-	-	0.04
HCM Control Delay (s)	7.5	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	14	58	56	15	34	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Link Speed (mph)		30	30		30	
Link Distance (ft)		510	510		166	
Travel Time (s)		11.6	11.6		3.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	18%	18%	27%	27%	16%	16%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	14	58	56	15	34	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	18	18	27	27	16	16
Mvmt Flow	16	64	62	17	38	24

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	79	0	-	0	167	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	96	-
Critical Hdwy	4.28	-	-	-	6.56	6.36
Critical Hdwy Stg 1	-	-	-	-	5.56	-
Critical Hdwy Stg 2	-	-	-	-	5.56	-
Follow-up Hdwy	2.362	-	-	-	3.644	3.444
Pot Cap-1 Maneuver	1424	-	-	-	792	954
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	894	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1424	-	-	-	783	954
Mov Cap-2 Maneuver	-	-	-	-	767	-
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	884	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1424	-	-	-	831
HCM Lane V/C Ratio	0.011	-	-	-	0.075
HCM Control Delay (s)	7.6	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	9	45	68	10	27	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Link Speed (mph)		30	30		30	
Link Distance (ft)		470	510		190	
Travel Time (s)		10.7	11.6		4.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	19%	19%	24%	24%	20%	20%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	9	45	68	10	27	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	19	19	24	24	20	20
Mvmt Flow	10	50	76	11	30	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	87	0	-	0	151	81
Stage 1	-	-	-	-	81	-
Stage 2	-	-	-	-	70	-
Critical Hdwy	4.29	-	-	-	6.6	6.4
Critical Hdwy Stg 1	-	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	5.6	-
Follow-up Hdwy	2.371	-	-	-	3.68	3.48
Pot Cap-1 Maneuver	1408	-	-	-	800	931
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	909	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1408	-	-	-	794	931
Mov Cap-2 Maneuver	-	-	-	-	774	-
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	903	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1408	-	-	-	830
HCM Lane V/C Ratio	0.007	-	-	-	0.06
HCM Control Delay (s)	7.6	-	-	-	9.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	8	28	76	10	26	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Link Speed (mph)		30	30		30	
Link Distance (ft)		1367	470		170	
Travel Time (s)		31.1	10.7		3.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	17%	17%	24%	24%	18%	18%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	8	28	76	10	26	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	17	17	24	24	18	18
Mvmt Flow	9	31	84	11	29	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	96	0	-	0	139	90
Stage 1	-	-	-	-	90	-
Stage 2	-	-	-	-	49	-
Critical Hdwy	4.27	-	-	-	6.58	6.38
Critical Hdwy Stg 1	-	-	-	-	5.58	-
Critical Hdwy Stg 2	-	-	-	-	5.58	-
Follow-up Hdwy	2.353	-	-	-	3.662	3.462
Pot Cap-1 Maneuver	1409	-	-	-	818	925
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	934	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1409	-	-	-	813	925
Mov Cap-2 Maneuver	-	-	-	-	786	-
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	928	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1409	-	-	-	837
HCM Lane V/C Ratio	0.006	-	-	-	0.058
HCM Control Delay (s)	7.6	-	-	-	9.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	72	22	1149	24	12	892
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Link Speed (mph)	30		35			35
Link Distance (ft)	1367		1411			803
Travel Time (s)	31.1		27.5			15.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	23%	23%	2%	2%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	29.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	72	22	1149	24	12	892
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	23	23	2	2	2	2
Mvmt Flow	80	24	1277	27	13	991

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2308	1290	0	0	1303	0
Stage 1	1290	-	-	-	-	-
Stage 2	1018	-	-	-	-	-
Critical Hdwy	6.63	6.43	-	-	4.12	-
Critical Hdwy Stg 1	5.63	-	-	-	-	-
Critical Hdwy Stg 2	5.63	-	-	-	-	-
Follow-up Hdwy	3.707	3.507	-	-	2.218	-
Pot Cap-1 Maneuver	~ 36	180	-	-	531	-
Stage 1	233	-	-	-	-	-
Stage 2	319	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 34	180	-	-	531	-
Mov Cap-2 Maneuver	~ 34	-	-	-	-	-
Stage 1	233	-	-	-	-	-
Stage 2	302	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 671.3	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	34	180	531	-
HCM Lane V/C Ratio	-	-	2.353	0.136	0.025	-
HCM Control Delay (s)	-	-	$ 867.8	28.1	12	0
HCM Lane LOS	-	-	F	D	B	A
HCM 95th %tile Q(veh)	-	-	9.1	0.5	0.1	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	39	134	32	589	1046	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	30			35	35	
Link Distance (ft)	498			553	345	
Travel Time (s)	11.3			10.8	6.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	21.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	39	134	32	589	1046	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	44	151	36	662	1175	42

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1930	1196	1217	0	-	0
Stage 1	1196	-	-	-	-	-
Stage 2	734	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.11	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.209	-	-	-
Pot Cap-1 Maneuver	74	229	577	-	-	-
Stage 1	289	-	-	-	-	-
Stage 2	478	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	69	229	577	-	-	-
Mov Cap-2 Maneuver	69	-	-	-	-	-
Stage 1	289	-	-	-	-	-
Stage 2	448	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	231.3	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	577	-	150	-	-
HCM Lane V/C Ratio	0.062	-	1.296	-	-
HCM Control Delay (s)	11.7	-	231.3	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	11.8	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	0	3	6	0	134	1	552	80	268	1036	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	250		0	215		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		174			564			243			553	
Travel Time (s)		4.7			15.4			4.7			10.8	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	9	0	3	6	0	134	1	552	80	268	1036	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	215	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	1	1	1
Mvmt Flow	9	0	3	6	0	140	1	575	83	279	1079	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2333	2304	1086	2265	2270	617	1093	0	0	658	0	0
Stage 1	1644	1644	-	619	619	-	-	-	-	-	-	-
Stage 2	689	660	-	1646	1651	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.12	-	-	4.11	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.218	-	-	2.209	-	-
Pot Cap-1 Maneuver	26	39	265	29	41	494	638	-	-	935	-	-
Stage 1	127	159	-	480	483	-	-	-	-	-	-	-
Stage 2	439	463	-	127	158	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	14	27	265	22	29	494	638	-	-	935	-	-
Mov Cap-2 Maneuver	14	27	-	22	29	-	-	-	-	-	-	-
Stage 1	127	112	-	479	482	-	-	-	-	-	-	-
Stage 2	314	462	-	88	111	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 395.5	35.9	0	2.1
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	638	-	-	18	257	935	-	-
HCM Lane V/C Ratio	0.002	-	-	0.694	0.567	0.299	-	-
HCM Control Delay (s)	10.7	-	-	$ 395.5	35.9	10.5	-	-
HCM Lane LOS	B	-	-	F	E	B	-	-
HCM 95th %tile Q(veh)	0	-	-	1.8	3.2	1.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	57	19	20	522	901	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			35	35	
Link Distance (ft)	615			481	1001	
Travel Time (s)	16.8			9.4	19.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	57	19	20	522	901	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	60	20	21	549	948	106

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1594	1002	1055	0	-	0
Stage 1	1002	-	-	-	-	-
Stage 2	592	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.11	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.209	-	-	-
Pot Cap-1 Maneuver	119	297	664	-	-	-
Stage 1	358	-	-	-	-	-
Stage 2	557	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	115	297	664	-	-	-
Mov Cap-2 Maneuver	115	-	-	-	-	-
Stage 1	358	-	-	-	-	-
Stage 2	539	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	63.7	0.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	664	-	136	-	-
HCM Lane V/C Ratio	0.032	-	0.588	-	-
HCM Control Delay (s)	10.6	-	63.7	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.1	-	3	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	240	139	202	94	120	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		35	35		40	
Link Distance (ft)		1373	1335		3911	
Travel Time (s)		26.7	26.0		66.7	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	32.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	240	139	202	94	120	297
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	264	153	222	103	132	326

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	325	0	-	0	954	274
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	680	-
Critical Hdwy	4.1	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.2	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1246	-	-	-	288	767
Stage 1	-	-	-	-	774	-
Stage 2	-	-	-	-	505	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1246	-	-	-	221	767
Mov Cap-2 Maneuver	-	-	-	-	221	-
Stage 1	-	-	-	-	774	-
Stage 2	-	-	-	-	388	-

Approach	EB	WB	SB
HCM Control Delay, s	5.5	0	79.2
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1246	-	-	-	448
HCM Lane V/C Ratio	0.212	-	-	-	1.023
HCM Control Delay (s)	8.7	0	-	-	79.2
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.8	-	-	-	13.8

Appendix E

TAZ 446 & 447 Model Distribution Plot

(5/26/2013, City of Lacey)

ATTACHMENT D

TRPC Traffic Model Distribution
TAZ 446 & 447