



Engineers, Planners & Landscape Architects

Engineering

Land/Site
Development

Municipal
Infrastructure

Environmental/
Water Resources

Traffic/
Transportation

Recreational

Planning

Land/Site
Development

Planning Application
Management

Municipal Planning

Urban Design

Expert Witness
(LPAT)

Wireless Industry

Landscape Architecture

Streetscapes &
Public Amenities

Open Space, Parks &
Recreation

Community &
Residential

Commercial &
Institutional

Environmental
Restoration



Proposed Industrial Development 5494, 5500, and 5510 Boundary Road Ottawa, Ontario

Transportation Impact Assessment

Engineering excellence.

Planning progress.

Liveable landscapes.

5494, 5500, and 5510 Boundary Road

Transportation Impact Assessment

Prepared By:

NOVATECH

Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

April 2021

Novatech File: 118168
Ref: R-2020-067

April 30, 2021

Ministry of Transportation - Eastern Region
Corridor Management Planner
1355 John Counter Blvd.
Kingston, Ontario K7L 5A3

Attention: Mr. Stephen Kapusta

City of Ottawa
Planning and Growth Management Department
110 Laurier Ave. W., 4th Floor,
Ottawa, Ontario K1P 1J1

Attention: Mr. Mike Giampa

Dear Sirs:

**Reference: 5494, 5500, and 5510 Boundary Road
Transportation Impact Assessment
Novatech File No. 118168**

We are pleased to submit the following Transportation Impact Assessment for Official Plan Amendment and Zoning By-Law Amendment applications for the development of a freight dock and warehouse facility at 5494, 5500, and 5510 Boundary Road. The structure and format of this report is in accordance with the City of Ottawa Transportation Impact Assessment Guidelines (June 2017) and the MTO General Guidelines for the Preparation of Traffic Impact Studies (September 2014).

If you have any questions or comments regarding this report, please feel free to contact Jennifer Luong, or the undersigned.

Yours truly,

NOVATECH



Joshua Audia, B.Sc.
E.I.T. | Transportation/Traffic



TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed¹ or registered² professional in good standing, whose field of expertise [check ☒ appropriate field(s)] is either transportation engineering ☒ or transportation planning ☐.

1,2 License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.

Dated at Ottawa this 30th day of April, 2021.
(City)

Name: Jennifer Luong, P.Eng.
(Please Print)

Professional Title: Senior Project Manager, Transportation/Traffic



Signature of Individual certifier that s/he meets the above four criteria

Office Contact Information (Please Print)	
Address:	240 Michael Cowpland Drive, Suite 200
City / Postal Code:	Ottawa, ON, K2M 1P6
Telephone / Extension:	613-254-9643 x 254
E-Mail Address:	j.luong@novatech-eng.com

TABLE OF CONTENTS

EXECUTIVE SUMMARY	I
1.0 SITE LOCATION.....	1
2.0 PROPOSED DEVELOPMENT	1
3.0 SCREENING.....	2
4.0 SCOPING.....	2
4.1 EXISTING CONDITIONS	2
4.1.1 Roadways.....	2
4.1.2 Intersections	3
4.1.3 Driveways.....	4
4.1.4 Pedestrian and Cycling Facilities	4
4.1.5 Area Traffic Management	4
4.1.6 Transit	5
4.1.7 Existing Traffic Volumes	5
4.1.8 Collision Data	5
4.2 PLANNED CONDITIONS	7
4.3 STUDY AREA AND TIME PERIODS	7
4.4 EXEMPTIONS REVIEW.....	8
5.0 FORECASTING.....	9
5.1 DEVELOPMENT-GENERATED TRAFFIC	9
5.1.1 Trip Generation.....	9
5.1.2 Trip Distribution.....	9
5.1.3 Trip Assignment.....	10
5.2 BACKGROUND TRAFFIC	10
5.2.1 General Background Traffic Growth Rate	10
5.2.2 Background Developments.....	10
5.2.3 Future Background and Total Traffic Volume Projections	10
6.0 ANALYSIS.....	18
6.1 DEVELOPMENT DESIGN	18
6.1.1 Design for Sustainable Modes	18
6.1.2 Circulation and Access	18
6.2 PARKING	18
6.3 BOUNDARY STREETS	19
6.3.1 Pedestrian Level of Service (PLOS).....	19
6.3.2 Bicycle Level of Service (BLOS)	19
6.3.3 Truck Level of Service (TkLOS)	19
6.3.4 Segment MMLOS Summary	20
6.4 ACCESS INTERSECTIONS.....	20
6.5 TRANSPORTATION DEMAND MANAGEMENT.....	22
6.6 TRANSIT.....	22
6.7 INTERSECTION ANALYSIS.....	22
6.7.1 Intersection MMLOS	22
6.7.2 2021 Background Intersection Operations	24
6.7.3 2021 Total Intersection Operations	25
6.7.4 2026 Background Intersection Operations	27
6.7.5 2026 Total Intersection Operations	28
6.7.6 2031 Background Intersection Operations	29

6.7.7	2031 Total Intersection Operations	30
6.7.8	Summary of Mitigation Measures	31
7.0	CONCLUSIONS AND RECOMMENDATIONS	32

Figures

Figure 1:	Site Location and Study Area	1
Figure 2:	Existing Network Traffic Volumes	6
Figure 3:	Site Generated Trips	11
Figure 4:	2021 Future Background Traffic Volumes	12
Figure 5:	2026 Future Background Traffic Volumes	13
Figure 6:	2031 Future Background Traffic Volumes	14
Figure 7:	2021 Total Traffic Volumes with Site Generated Trips	15
Figure 8:	2026 Total Traffic Volumes with Site Generated Trips	16
Figure 9:	2031 Total Traffic Volumes with Site Generated Trips	17

Tables

Table 1:	Reported Collisions	5
Table 2:	TIA Exemptions	8
Table 3:	Site Generated Vehicle Trips	9
Table 4:	Minimum Parking Requirements	18
Table 5:	PLOS Segment Analysis	19
Table 6:	BLOS Segment Analysis	19
Table 7:	TkLOS Segment Analysis	19
Table 8:	Intersection MMLOS Analysis	22
Table 9:	2021 Background Traffic – Intersection Operations	24
Table 10:	2021 Total Traffic – Intersection Operations	26
Table 11:	2026 Background Traffic – Intersection Operations	27
Table 12:	2026 Total Traffic – Intersection Operations	28
Table 13:	2031 Background Traffic – Intersection Operations	29
Table 14:	2031 Total Traffic – Intersection Operations	30

Appendices

Appendix A:	Conceptual Site Plan
Appendix B:	TIA Screening Form
Appendix C:	OC Transpo System Information
Appendix D:	Traffic Count Data
Appendix E:	Collision Records
Appendix F:	Relevant Excerpts from Previous Traffic Studies
Appendix G:	TDM Checklists
Appendix H:	Roadway Modification Functional Design
Appendix I:	Intersection MMLOS
Appendix J:	Traffic Signal and Turn Lane Warrants
Appendix K:	Signal Timing Plans
Appendix L:	Synchro Analysis

EXECUTIVE SUMMARY

This Transportation Impact Assessment (TIA) has been prepared in support of Official Plan Amendment and Zoning By-Law Amendment applications for a freight dock and warehouse facility at 5494, 5500, and 5510 Boundary Road. The site is currently occupied with one single family dwelling with the remainder of the site undeveloped and has been used for stockpiling of fill. There are two existing access to the site, one for the single-family dwelling and one at the south limit.

The proposed development is planned to be completed by 2021, and includes an approximately 5,593 m² freight dock and warehouse facility with 96 loading docks, 141 parking spaces, 55 tractor parking spaces, and 134 trailer parking spaces. The facility will have about 120 employees. The development is planned to include two accesses to Boundary Road.

The study area intersections include the proposed accesses and the existing intersections of Boundary Road/Highway 417 WB Ramps, Boundary Road/Highway 417 EB Ramps, Boundary Road/Thunder Road, and Boundary Road/Mitch Owens Road.

The selected time periods for the analysis are the weekday AM and PM peak hours, as they represent the 'worst case' combination of site generated traffic and adjacent street traffic. This TIA will perform analysis for the weekday AM and PM peak periods in the buildout year (2021), and the 2026 and 2031 horizon years.

The conclusions and recommendations of this TIA can be summarized as follows:

Development Design and Parking

- Pedestrian facilities will be provided on-site around the building. Connectivity for pedestrians is not provided to Boundary Road, as there are no sidewalks on Boundary Road.
- All relevant required TDM-supportive design and infrastructure measures in the TDM checklist are met. This will be confirmed at part of the Site Plan Control application.
- The minimum vehicle parking and loading space requirements as outlined in the ZBL, and the minimum accessible parking space requirements as outlined in the *Accessibility Design Standards*, will be confirmed as part of the Site Plan Control application.

Boundary Streets

- Boundary Road currently operates at a PLOS F, as no sidewalks are provided. To achieve the target PLOS C, sidewalks would have to be provided with a minimum width of 2.0m and a minimum boulevard width of 2.0m. This is not considered an appropriate measure, given the rural context of the site. Boundary Road currently has paved shoulders between the westbound ramp terminal of Highway 417 to approximately 280m south of Thunder Road. Paved shoulders are proposed as part of road modifications on Boundary Road at the north site access.
- Boundary Road currently operates at a BLOS F. The extension of paved shoulders further south would improve this segment to the target BLOS E. Paved shoulders are proposed as part of road modifications on Boundary Road at the north site access.

- Boundary Road currently operates at a TkLOS C. To achieve the target TkLOS B, a minimum lane width of 3.7m must be provided. This target will be met, as lane widths of 3.75m are proposed as part of recommended road modifications to Boundary Road.

Access Design

- The proposed development will be served by two driveways. The south driveway is a right-out egress, and is approximately 6.1m in width at the ROW. The north driveway is a full-movement access, and is approximately 14.2m in width at the ROW before narrowing to a width of 12m. This driveway is aligned with the future CRRRC driveway, and the installation of traffic signals is planned. The proposed roadway modifications associated with the proposed signalized access includes a southbound left turn lane and northbound direct right turn taper to the CRRRC development, and a southbound right turn lane and northbound left turn lane to the proposed development.
- The proposed accesses will meet all relevant requirements of the City's *Private Approach and Zoning By-Laws*, except the maximum width requirement of 9m for any two-way private approach. An exception for wider accesses is permitted for transport loading areas, and is therefore requested for the north site access. The minimum clear throat length and corner clearance requirements outlined in TAC's *Geometric Design Guide for Canadian Roads* will be met. All relevant requirements will be confirmed as part of the Site Plan Control application.

Transportation Demand Management

- Given the location of the proposed development, as well as the development's function as a truck transport terminal, no TDM measures have been proposed.

Transit

- The proposed development is not anticipated to generate any transit trips, and the nearest transit stops are located 1.8km north of the subject site.

Intersection MMLOS

- The results of the intersection MMLOS analysis can be summarized as follows:
 - Boundary Road/Thunder Road does not meet the target PLOS C;
 - Boundary Road/Thunder Road does not meet the target BLOS E;
 - Boundary Road/Thunder Road does not meet the target TkLOS B;
 - Boundary Road/Highway 417 WB Ramps, Boundary Road/Highway 417 EB Ramps, and Boundary Road/Thunder Road meet the target Auto LOS D, while Boundary Road/Mitch Owens Road does not.
- At Boundary Road/Thunder Road, all approaches do not meet the target PLOS, and cannot achieve the target without significantly reducing the number of lanes and restricting turning movements. Given the rural context of the study area, no modifications are recommended.
- At Boundary Road/Thunder Road, the east approach does not meet the target BLOS, based on right turn characteristics. Per Exhibit 12 of the MMLOS guidelines, providing a right turn lane greater than 50m when cyclists are in mixed traffic results in a BLOS F. As this is a private approach to the Amazon Distribution Centre, no modifications are recommended.

- At Boundary Road/Thunder Road, all approaches do not meet the target TkLOS. Per Exhibit 21 of the MMLOS guidelines, a TkLOS C is the best possible level of service when only one receiving lane is provided. The east approach of this intersection is the visitor access to the Amazon Distribution Centre, and a truck access is provided to the south.
- At Boundary Road/Mitch Owens Road, the eastbound left turn movement does not meet the target Auto LOS based on delay during both peak hours, with a delay of 46 seconds in the AM peak and 39 seconds in the PM peak. This intersection is included in the City's 2019 Development Charges By-Law for signalization, and warrants for signalization and a northbound left turn lane are met based on existing volumes.

Intersection Analysis

- Signalization of Boundary Road/North Site Access/CRRRC is 48% warranted based on 2021 total traffic conditions, but is recommended from a delay and safety perspective.
- Starting in 2026, delays for the westbound left turn/right turn movement at Boundary Road/Highway 417 WB Ramps exceed the 35-second threshold to achieve an Auto LOS D during the AM peak hour. Based on the signalization warrant justifications included in OTM Book 12, the intersection will not meet warrants by the 2031 total traffic conditions. It is recommended that MTO monitor these ramps to determine if or when signals should be considered.
- The modifications to the existing road network listed below are identified for consideration by the following years:
 - Signals and auxiliary northbound left turn and southbound right turn lanes at Boundary Road/North Site Access/CRRRC (starting in 2021);
 - Signalization of Boundary Road/Mitch Owens Road, complete with northbound left turn lane (starting in 2021);
 - Optimization of signals in study area (starting in 2026);
 - Provisional underground plant at Boundary Road/Highway 417 WB Ramps (starting in 2031);
 - Additional northbound/southbound lanes on Boundary Road at Thunder Road (starting in 2031).
- The recommended signals and turn lanes at the proposed site access are identified as the developer's responsibility.
- The recommended modifications at the other study area intersections are identified for the City's/MTO's consideration.

1.0 SITE LOCATION

This Transportation Impact Assessment (TIA) has been prepared in support of Official Plan Amendment and Zoning By-Law Amendment applications for a freight dock and warehouse facility at 5494, 5500, and 5510 Boundary Road (see **Figure 1**). The site is currently occupied with one single-family dwelling, and the remainder of the site is undeveloped and has been used for stockpiling of fill. There are two existing accesses to the site, one for the single-family dwelling and one at the south limit. The site is surrounded by the following:

- Woodland, commercial development, Thunder Road, and Highway 417 to the north;
- Boundary Road, planned waste management facility, industrial development, and the Amazon Distribution Centre to the east;
- Woodland and Mitch Owens Road to the south; and,
- Agricultural land to the west.

Figure 1: Site Location and Study Area



2.0 PROPOSED DEVELOPMENT

The subject site is designated as 'Rural Natural Features Area' in Schedule A of the City of Ottawa's Official Plan and zoned RU (Rural Countryside) and RH1[260r] (Rural Heavy Industrial). Exception 260r prohibits all uses, except for a waste processing and transfer facility, and heavy equipment/vehicle sales. A zoning amendment is required for a warehouse and truck facility.

The proposed development (see **Appendix A**) is planned to be completed by 2021, and includes an approximately 5,593 m² freight dock and warehouse facility with 96 loading docks, 141 parking spaces, 55 tractor parking spaces, and 134 trailer parking spaces. The facility will have about 120 employees.

The development is planned to include two accesses to Boundary Road.

3.0 SCREENING

The City of Ottawa's 2017 TIA Guidelines identifies three triggers for completing a TIA report: trip generation, location, and safety. The criteria for each trigger are outlined in the City's TIA Screening Form. The proposed development satisfies the trip generation and safety triggers for completing a TIA since:

1. The development is expected to generate more than 60 peak hour person trips; and,
2. The posted speed limit on Boundary Road is 80 km/h.

The TIA Screening Form for this development is included in **Appendix B**.

4.0 SCOPING

4.1 Existing Conditions

4.1.1 Roadways

Highway 417 (Trans-Canada Highway) is a provincial highway that generally runs on an east-west alignment. Highway 417 has a divided four-lane rural cross-section within the study area, with single-lane westbound and eastbound on- and off-ramps at Boundary Road. The posted speed limit is 100 km/h within the study area, with an advisory speed of 40 km/h for the on- and off-ramps. The highway is classified as a truck route, allowing full loads. Paved shoulders are provided on Highway 417.

All other roadways within the study area fall under the jurisdiction of the City of Ottawa.

Boundary Road is an arterial roadway that generally runs on a north-south alignment, running between Russell Road and Victoria Street/Craig Street. North of Russell Road, Boundary Road continues as a local roadway for approximately 1,300 metres before terminating. South of Victoria Street/Craig Street, Boundary Road continues as Gregoire Road before terminating at Marionville Road. Boundary Road has an undivided two-lane rural cross-section and an 80 km/h posted speed limit within the study area. The roadway is classified as a truck route, allowing full loads and on-street parking is not permitted. The right-of-way (ROW) along the site frontage to Boundary Road is approximately 28m. A ROW protection of 30m is identified in the City's Official Plan for rural arterials unless otherwise noted, and therefore a widening will be required as part of this application.

Mitch Owens Road is an arterial roadway that generally runs on an east-west alignment, running between River Road and Boundary Road. West of River Road, the roadway continues as Bridge Street between River Road and Manotick Main Street, and as Maple Avenue between Manotick Main Street and Beaverwood Road. Mitch Owens Road has an undivided two-lane rural cross-section within the study area. The posted speed limit is 80 km/h within the study area, the roadway is classified as a truck route, allowing full loads, and on-street parking is not permitted.

Thunder Road is a collector roadway that generally runs on an east-west alignment, running between Ramsayville Road and Boundary Road. Thunder Road has an undivided two-lane rural cross-section within the study area. The posted speed limit is 60 km/h within the study area, and the roadway is not classified as a truck route in this area.

4.1.2 Intersections

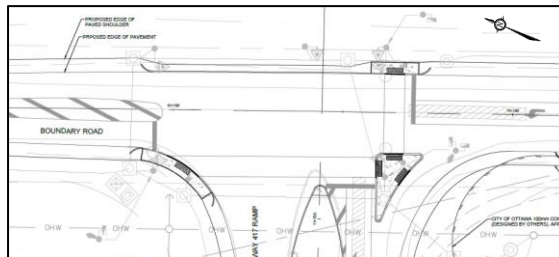
Boundary Road/Highway 417 Westbound Ramps (Northern Terminal)

- Minor STOP controlled intersection (STOP on Hwy Off-ramp)
- North Approach (Boundary Road): one shared left turn/through lane
- South Approach (Boundary Road): one shared through/right turn lane
- East Approach (Highway 417 WB Ramps): one shared left turn/right turn lane



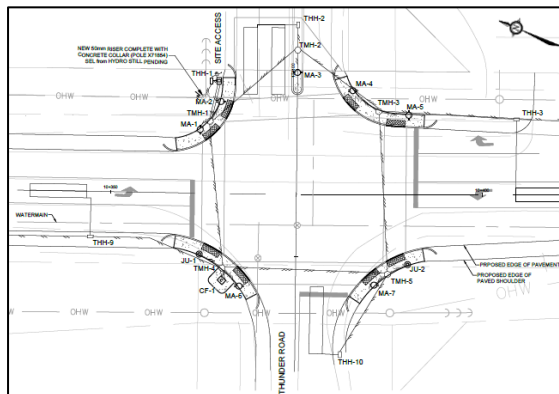
Boundary Road/Highway 417 Eastbound Ramps (Southern Terminal)

- Signalized three-legged intersection
- North Approach (Boundary Road): one shared through/right turn lane
- South Approach (Boundary Road): one left turn lane and one through lane
- West Approach (Highway 417 EB Ramps): one left turn lane and one right turn lane with channelized island



Boundary Road/Thunder Road/Amazon

- Signalized four-legged intersection
- North Approach (Boundary Road): one left turn lane and one shared through/right turn lane
- South Approach (Boundary Road): one left turn lane, one through lane, and one right turn lane
- East Approach (Amazon Site Access): one shared left turn/through lane and one right turn lane
- West Approach (Thunder Road): one shared left turn/through/right turn lane



Boundary Road/Mitch Owens Road

- Minor STOP controlled intersection (STOP on Mitch Owens)
- North Approach (Boundary Road): one through lane and one right turn lane
- South Approach (Boundary Road): one shared left turn/through lane
- West Approach (Mitch Owens Road): one shared left turn and one right turn lane



4.1.3 Driveways

The City of Ottawa's 2017 TIA Guidelines requires a review of driveways on the boundary streets within 200m of any proposed access, which can be described as follows.

Boundary Road, West Side:

- One residential driveway at 5384 Boundary Road
- One residential driveway at 5494 Boundary Road
- One driveway at south end of 5510 Boundary Road

Boundary Road, East Side:

- One residential driveway at 5409 Boundary Road
- One industrial driveway at 5425 Boundary Road
- One industrial driveway at 5455 Boundary Road
- One industrial driveway at 5485 Boundary Road
- Two commercial driveways at 5495 Boundary Road
- One driveway to industrial use at 5507 Boundary Road
- A public street at Indcum Road

4.1.4 Pedestrian and Cycling Facilities

No sidewalks or bike lanes are provided on any study area roadways. In the City of Ottawa's primary cycling network, Mitch Owens Road is classified as a Spine Route. The section of Boundary Road connecting Mitch Owens Road and Devine Road is also classified as a Spine Route. No other study area roadways are designated in the City's primary cycling network.

4.1.5 Area Traffic Management

There are no Area Traffic Management (ATM) studies within the study area that have been completed or are currently in progress.

4.1.6 Transit

There are no existing transit stops within the study area. The nearest stops are approximately 1.8 km north of the site and are served only by OC Transpo Route 222 (see **Appendix C**). This route is a peak direction route that runs between the Vars rural community and Blair O-Train Station.

4.1.7 Existing Traffic Volumes

Weekday traffic counts (6:00am-10:00am and 3:00pm-7:00pm) were coordinated by Novatech and have been used to determine the existing pedestrian, cyclist, and vehicular traffic volumes at the study area intersections. The counts were completed at each intersection on January 7, 2020.

Traffic count data are included in **Appendix D**. AM and PM peak hours traffic volumes within the study area are shown in **Figure 2**.

4.1.8 Collision Data

Historical collision data from the last five years were obtained from the City's Public Works and Service Department at the study area intersections. Copies of the collision summary reports are included in **Appendix E**.

The collision data have been evaluated to determine if there are any identifiable collision patterns, defined in the 2017 TIA Guidelines as 'more than six collisions in five years' for any one movement. The number of collisions at each intersection from January 1, 2014 to December 31, 2018 is summarized in **Table 1**.

Table 1: Reported Collisions

Intersection	Angle	Rear End	Sideswipe	Single/ Other	Turning	Total
Boundary Road/ Hwy 417 WB Ramps	0	2	0	1	0	3
Boundary Road/ Hwy 417 EB Ramps	2	6	1	1	0	10
Boundary Road/ Thunder Road	0	0	0	0	2	2
Boundary Road/ Mitch Owens Road	7	3	0	8	0	18

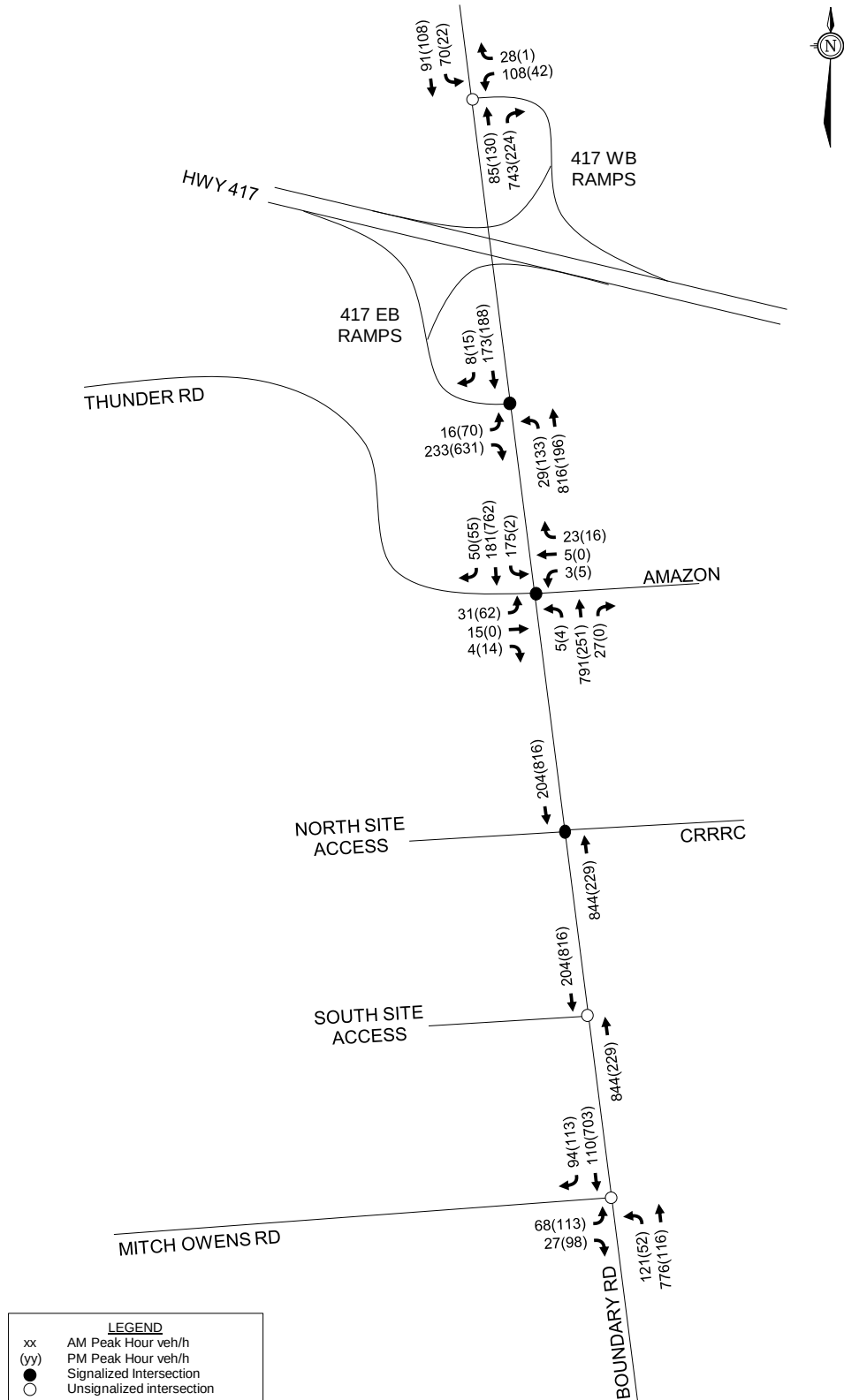
Boundary Road/Highway 417 WB Ramps

None of the collisions caused an injury and there were no fatalities. Two collisions occurred in clear conditions and one in rain conditions.

Boundary Road/Highway 417 EB Ramps

One of the collisions caused a fatality and one caused an injury. The fatality (October 2017) occurred in rain conditions and was an angle impact between an eastbound right turning vehicle and a southbound through vehicle. Eight collisions occurred in clear conditions and two in rain conditions. Traffic signals and turn lanes were constructed in 2019 as part of the Amazon development.

Figure 2: Existing Network Traffic Volumes



Boundary Road/Thunder Road

None of the collisions caused an injury and there were no fatalities. One collision occurred in clear conditions and one in snow conditions.

Boundary Road/Mitch Owens Road

Three of the collisions caused an injury and there were no fatalities. Twelve collisions occurred in clear conditions, one in rain conditions, two in snow conditions, and three in fog conditions.

Of the seven angle impacts, five involved an eastbound vehicle and a southbound vehicle, and two involved an eastbound vehicle and a northbound vehicle. None of the angle collisions caused an injury and one of the seven impacts occurred in poor driving conditions (snow).

Of the eight single vehicle impacts, two were northbound, three were southbound, and three were eastbound. None of the single vehicle collisions caused an injury and three of the eight impacts occurred in poor driving conditions (1 rain, 1 snow, and 1 fog).

This intersection is included in the City's 2019 Development Charges By-Law for signalization.

4.2 Planned Conditions

There are other developments within the area including the following.

A Transportation Impact Study (TIS) was prepared in 2014 for the development of the Capital Region Resource Recovery Centre (CRRRC) on about 192 hectares, at 5471 Boundary Road. The TIS estimated that the site would generate 86 two-way vehicle trips during each of the AM and PM peak hours. Two addenda were prepared to respond to comments and identified the need for a left turn lane on Boundary Road at the site access (opposite the north access for the subject site). A Roadway Modification Approval (RMA) application has been prepared for this work.

A Long Combination Vehicle (LCV) Transportation Assessment was prepared by Dillon Consulting Limited in November 2012 in support of the former East Gateway Subdivision. This LCV assessment provided a functional design of the roadway modifications required to accommodate a B-Train LCV truck at the Highway 417 north and south ramp terminals. The former East Gateway Subdivision is now the Amazon site. The Amazon site does not require and is not licensed for LCVs.

Road modification plans were prepared (2019) along Boundary Road for the Amazon site. These plans included signalization of the Boundary Road intersections with the Hwy 417 south ramps and Thunder Road/Amazon Way as well as geometric modifications that included additional turn lanes at the intersections and a right turn channel for right turns from the EB 417 to the south on Boundary Road. Construction of these modifications has been completed.

4.3 Study Area and Time Periods

A boundary street review will be conducted for Boundary Road. The study area intersections include the proposed accesses and the existing intersections of:

- Boundary Road at Hwy 417 WB Ramps;
- Boundary Road at Hwy 417 EB Ramps;
- Boundary Road at Thunder Road;
- Boundary Road at Mitch Owens Road.

The selected time periods for the analysis are the weekday AM and PM peak hours, as they represent the ‘worst case’ combination of site generated traffic and adjacent street traffic. This TIA will perform analysis for the weekday AM and PM peak periods in the buildout year (2021), and the 2026 and 2031 horizon years.

4.4 Exemptions Review

This module reviews possible exemptions from the final Transportation Impact Assessment, as outlined in the City’s TIA guidelines. The applicable exemptions for this site are shown in **Table 2**.

Table 2: TIA Exemptions

Module	Element	Exemption Criteria	Exemption Status
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	• Only required for site plans	Exempt
	4.1.3 New Street Networks	• Only required for plans of subdivision	Exempt
4.2 Parking	4.2.1 Parking Supply	• Only required for site plans	Exempt
	4.2.2 Spillover Parking	• Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	<i>All elements</i>	• Not required for non-residential site plans expected to have fewer than 60 employees and/or students on location at any given time	Not Exempt
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	• Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Exempt
4.8 Network Concept	<i>All elements</i>	• Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by the established zoning	Exempt

The TIA report will include the following modules:

- Module 4.1: Development Design
- Module 4.2: Parking
- Module 4.3: Boundary Streets
- Module 4.4: Access Design
- Module 4.5: Transportation Demand Management
- Module 4.7: Transit
- Module 4.9: Intersection Design

5.0 FORECASTING

5.1 Development-Generated Traffic

5.1.1 Trip Generation

The proposed development consists of an approximately 5,593 m² freight dock and warehouse. The site will accommodate long combination vehicles and provide surface parking for approximately 141 cars, 55 tractors and 134 trailers. The facility will operate with day, evening, and night shifts and employ approximately 120 employees. Two accesses are proposed along Boundary Road, one opposite the future CRRRC site access and one to the south.

Trips generated by the site were determined using first principles. The owner provided hourly volumes for both employee and truck movements to and from the facility. The facility will operate with three shifts, day (8:00am to 5:00pm), evening (4:00pm to 12:00am), and night (1:00am to 8:00am).

Consistent with the traffic studies for the Amazon Distribution Centre and the truck facility at 9460 Mitch Owens Road, no reduction in vehicle trips have been assumed for pedestrian, cyclist, and transit modes, given the lack of facilities for these modes. Additionally, no ridesharing has been assumed. These assumptions represent the 'worst case' scenario, and therefore, the results shown in this TIA are conservative.

The peak hour of site traffic is generally expected to coincide with the weekday PM peak hour of the adjacent road traffic. While the AM peak hour of the adjacent street (6:30am to 7:30am) was found to occur just before the anticipated peak hour site traffic, the site trips have been overlaid onto the peak hour of adjacent street. This assumption is conservative. The following table indicates the number of employee vehicles and delivery trucks accessing the site during each weekday peak hour.

Table 3: Site Generated Vehicle Trips

Trip Type	AM Peak			PM Peak		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Employee	79	18	97	12	79	91
Truck	2	4	6	6	2	8
Total	81	22	103	18	81	99

5.1.2 Trip Distribution

The distribution of employee trips generated by the proposed development is anticipated to be consistent with the observed traffic patterns at the Amazon driveway, as well as the AM inbound/PM outbound trips at the ramp terminals and on Boundary Road (as shown in **Figure 2**). The distribution of truck trips is based on information provided by the owner. Site trips have been assigned to the study area, with distribution for the trips generated by the site described as follows:

Employee

- 20% to/from the east via Hwy 417;
- 45% to/from the west via Hwy 417;
- 20% to/from the north via Boundary Road;
- 15% to/from the south via Boundary Road.

Truck

- 75% to/from the west via Hwy 417;
- 25% to/from the east via Hwy 417.

5.1.3 Trip Assignment

The proposed development includes one full-movement access near the northerly limit of the subject site and one right-out egress approximately 90m south of the full-movement access. All trips to/from Highway 417 and Boundary Road to the north and all trips arriving from the south via Boundary Road have been assigned to the full-movement access, as this is the only access that can accommodate arrivals, as well as departures to the north. Trips departing to the south via Boundary Road have been split among the full-movement access and the right-out access.

Site trips generated by employees and trucks have been assigned to the proposed accesses as follows:

Full-Movement Access

- 100% of employees arriving from and destined to the north (Hwy 417 and Boundary Road);
- 100% of employees arriving from the south (Boundary Road);
- 20% of employees destined to the south (Boundary Road);
- 100% of truck traffic arriving from and destined to the north (Highway 417).

Right-Out Egress

- 80% of employees destined to the south (Boundary Road).

The site-generated traffic within the study area is shown in **Figure 3**.

5.2 Background Traffic

5.2.1 General Background Traffic Growth Rate

Consistent with the addendum to the Dillon TIS prepared in support of the development at 5371 Boundary Road, an annual 2% background growth rate was applied to the existing traffic volumes.

5.2.2 Background Developments

The 5471 Boundary Road development is assumed to be operational by 2021. Trips estimated to be generated by this development have been distributed and assigned to the boundary road network based on the assumptions of that development's traffic study, and the estimated trips have been added to the 2021, 2026, and 2031 background traffic projections. Relevant excerpts from this study are included in **Appendix F**.

5.2.3 Future Background and Total Traffic Volume Projections

Future background traffic volumes have been projected for the 2021, 2026, and 2031 (see **Figures 4, 5, and 6**, respectively) and include the annual background growth and background development trips. Total traffic volumes have been projected for the study area intersections for the weekday AM and PM peak hours in 2021, 2026, and 2031 (**Figures 7, 8, and 9**, respectively), and include future background traffic and site generated trips.

Figure 3: Site Generated Trips

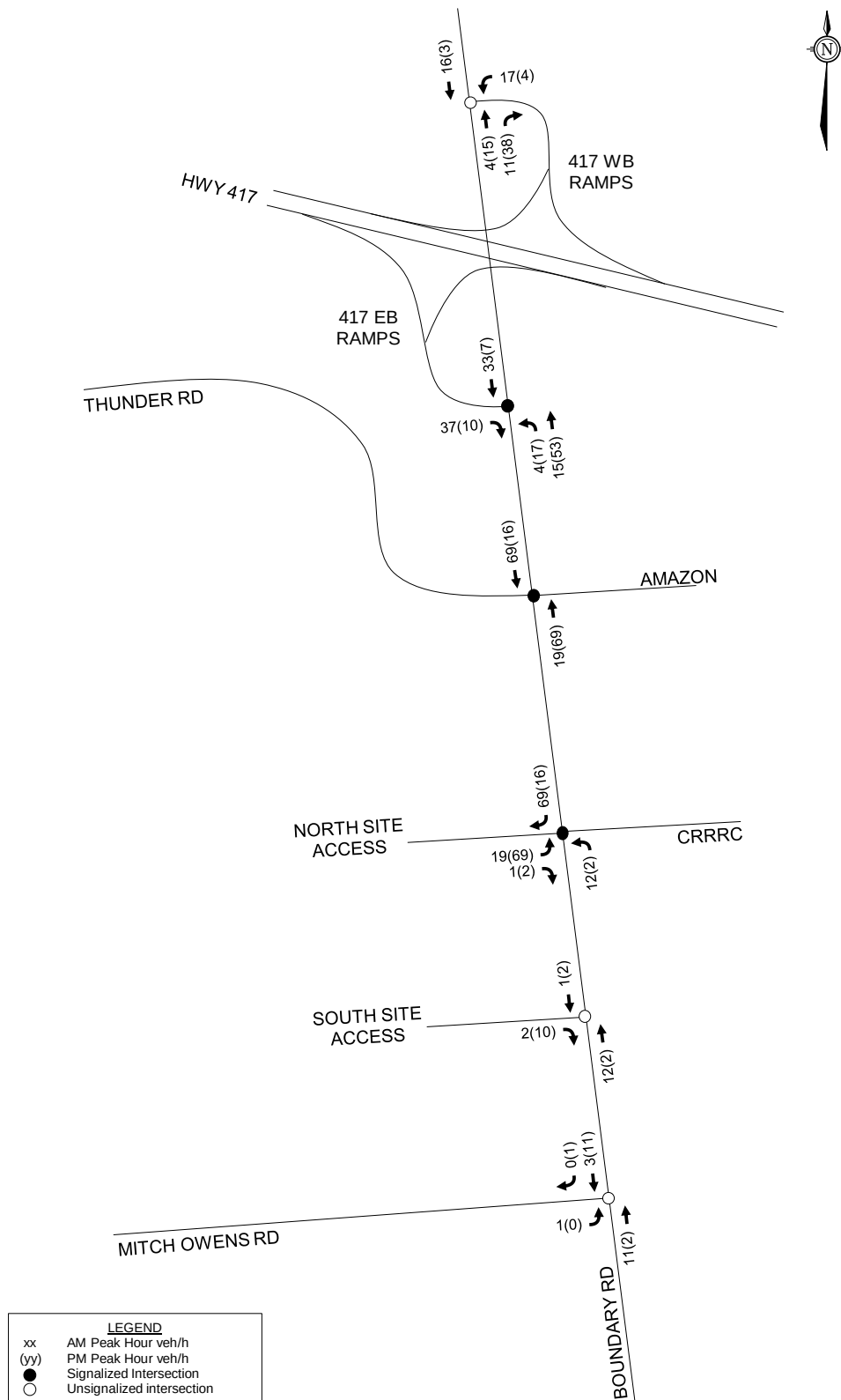


Figure 4: 2021 Future Background Traffic Volumes

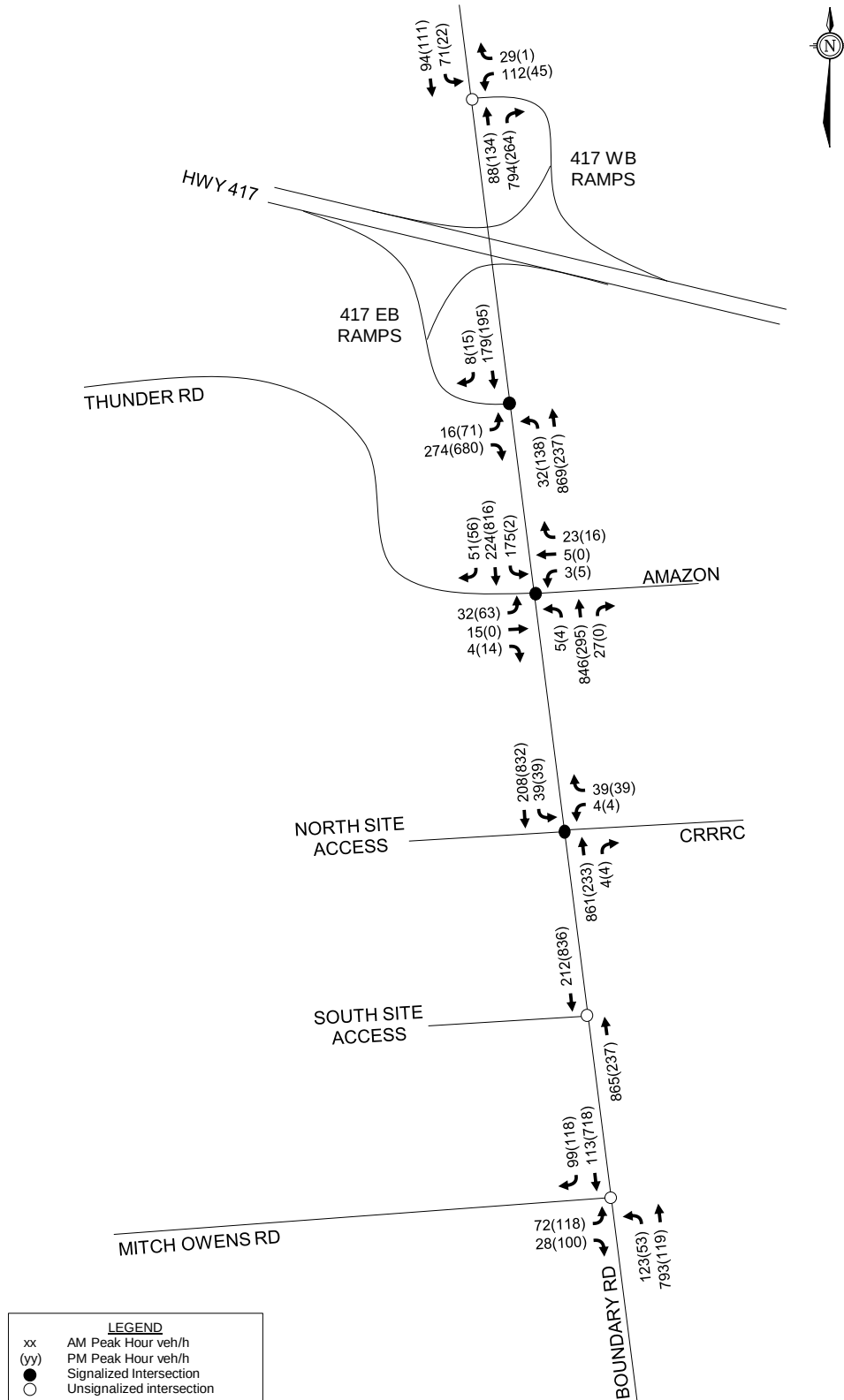


Figure 5: 2026 Future Background Traffic Volumes

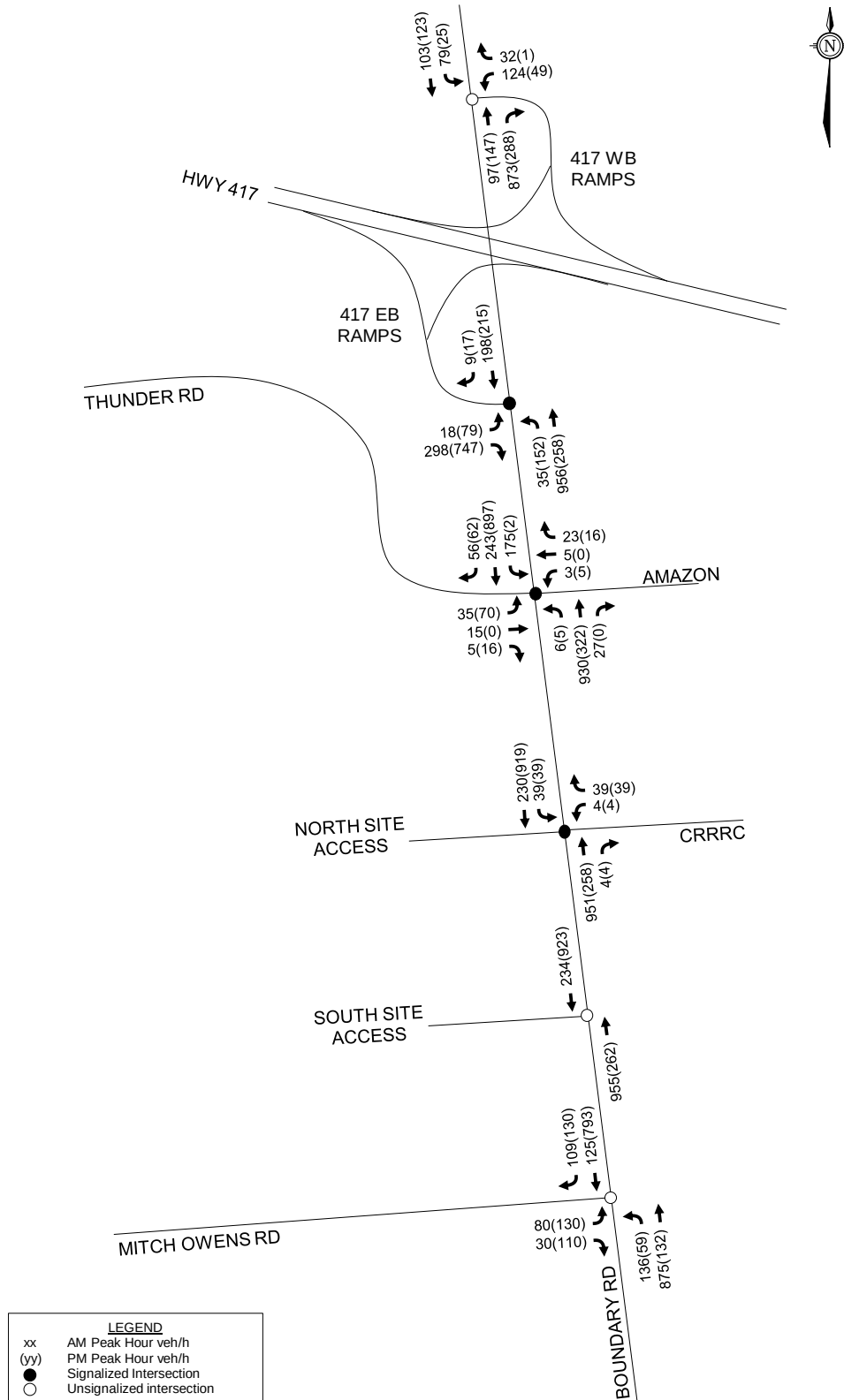


Figure 6: 2031 Future Background Traffic Volumes

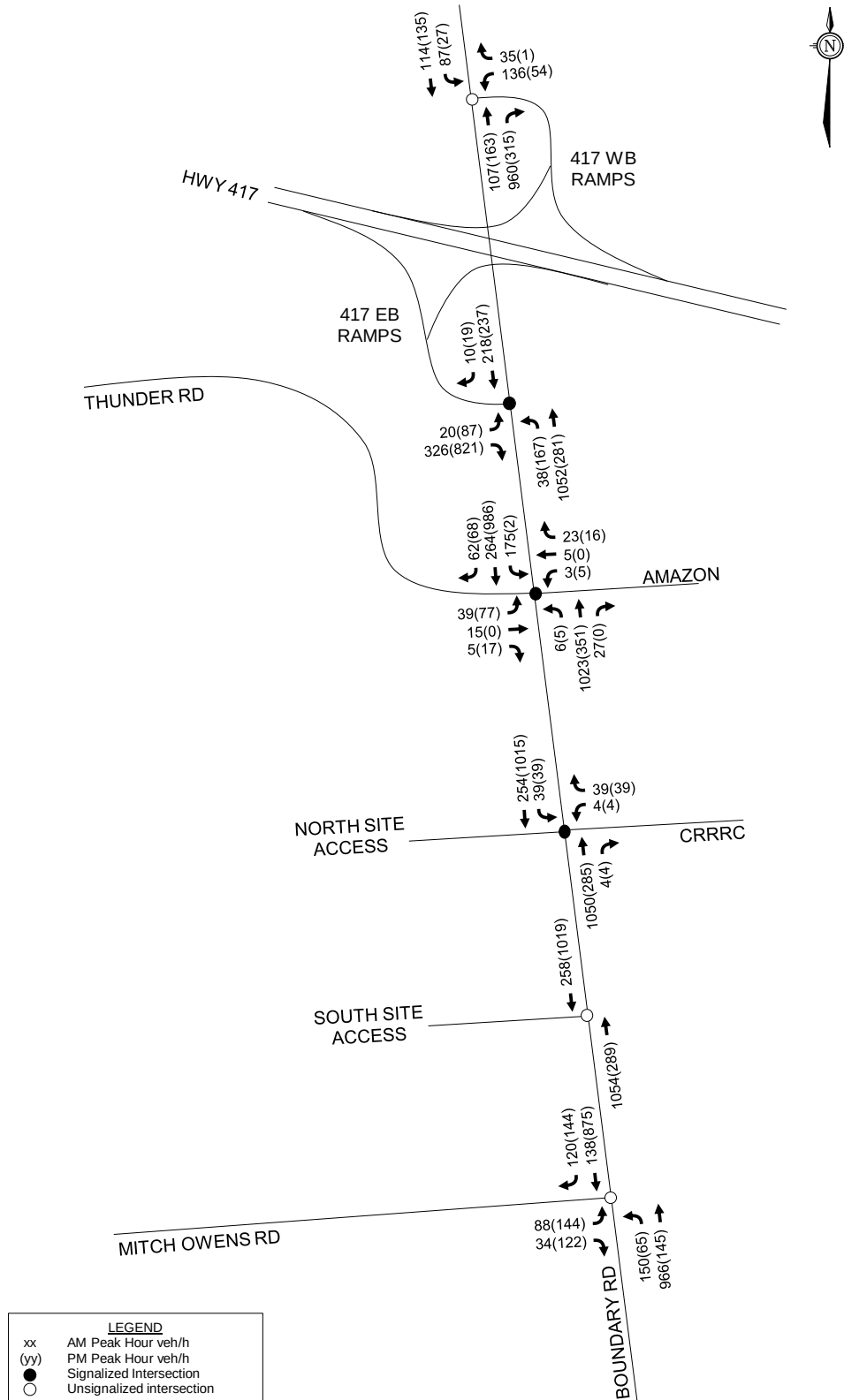


Figure 7: 2021 Total Traffic Volumes with Site Generated Trips

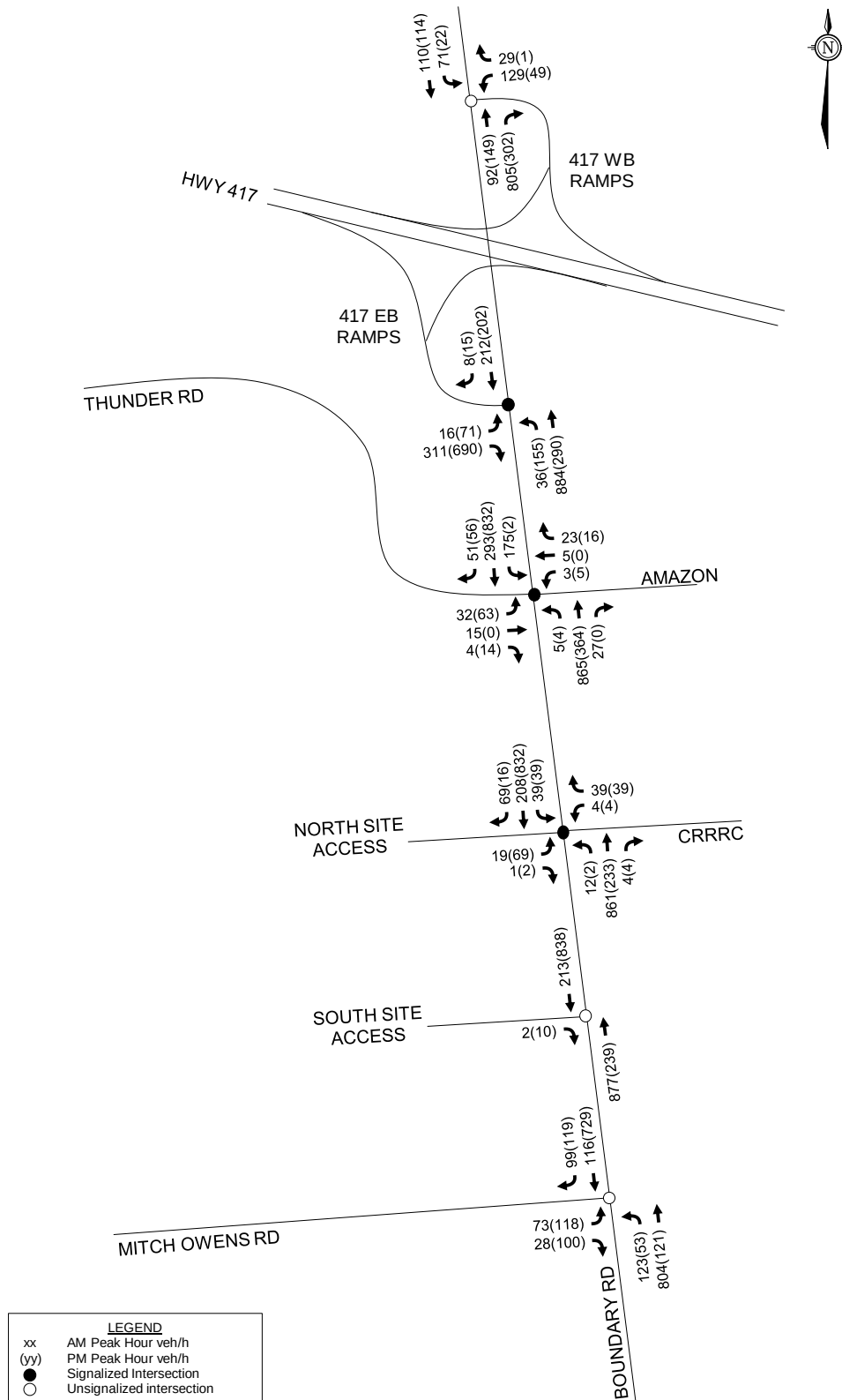


Figure 8: 2026 Total Traffic Volumes with Site Generated Trips

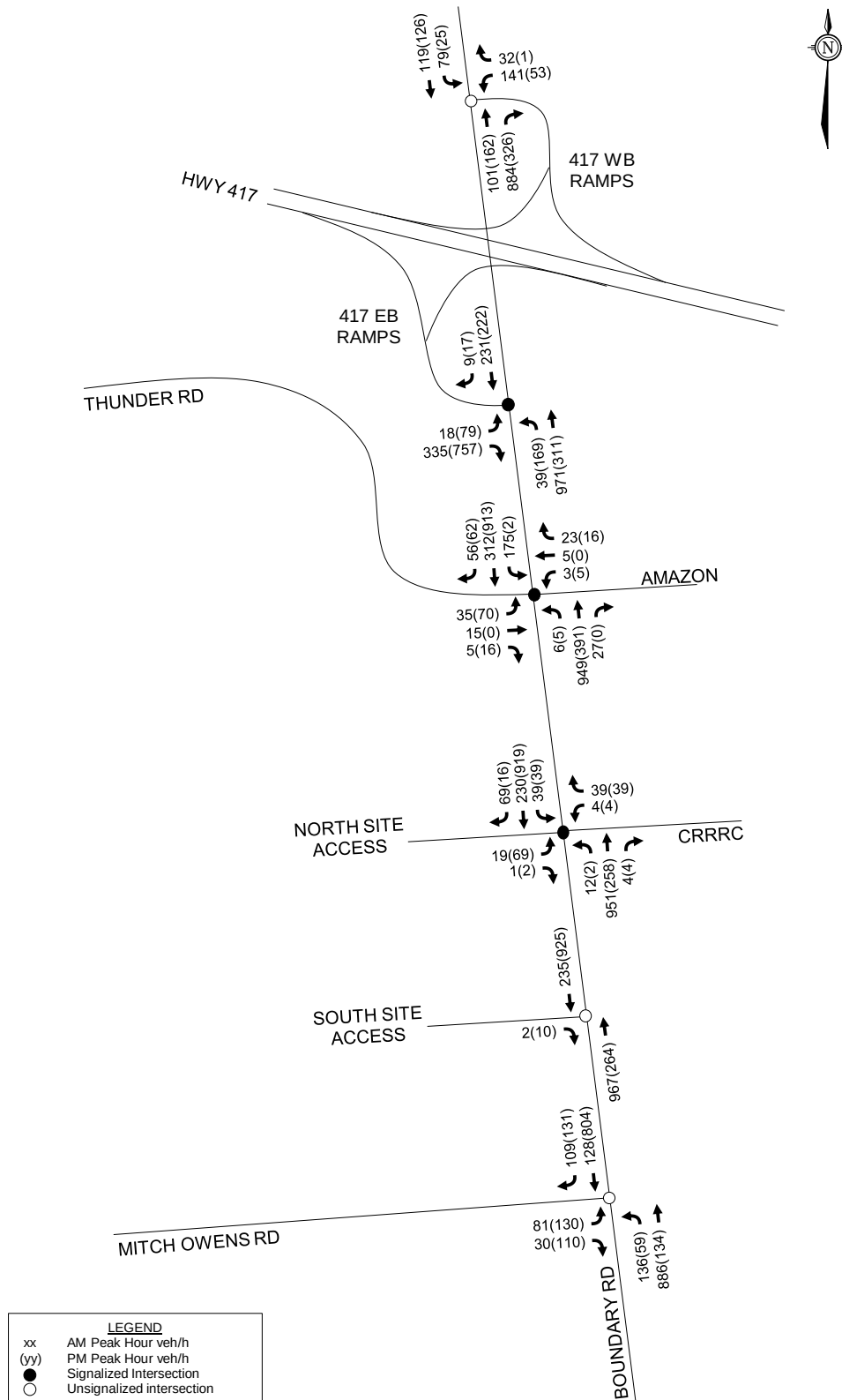
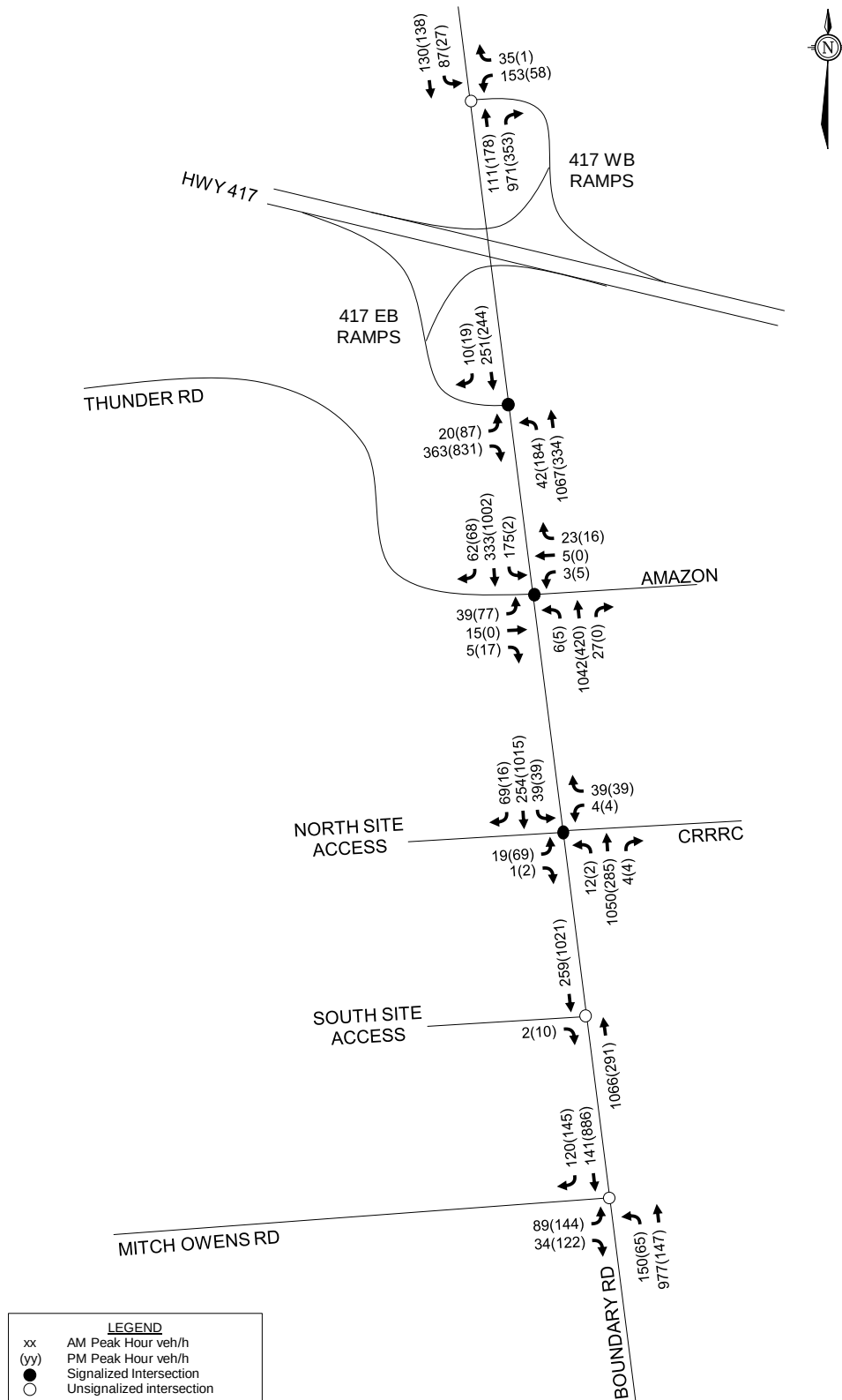


Figure 9: 2031 Total Traffic Volumes with Site Generated Trips



6.0 ANALYSIS

6.1 Development Design

6.1.1 Design for Sustainable Modes

Pedestrian facilities will be provided on-site around the building. Connectivity for pedestrians is not provided to Boundary Road, as there are no sidewalks on Boundary Road.

A review of the Transportation Demand Management (TDM) – *Supportive Development Design and Infrastructure Checklist* has been conducted. A copy of the TDM checklist is included in **Appendix G**. Among the relevant measures, it is anticipated that all required TDM-supportive design and infrastructure measures in the TDM checklist will be met. This will be confirmed at the Site Plan Control stage.

6.1.2 Circulation and Access

The proposed development will be served by two driveways (see **Section 6.4**). The north driveway is two-way, aligned with the future CRRRC driveway and the installation of traffic signals is proposed. The south driveway is right-out only.

The conceptual site plan is included in **Appendix A**. Fire routes, as well as circulation and access for waste collection and other services, will be reviewed as part of the Site Plan Control application. Turning movements of LCVs and WB-20s are also included in **Appendix A**. A full LCV assessment will be submitted under separate cover.

6.2 Parking

The subject site is located in Area D on Schedule 1 and 1A of the City of Ottawa's ZBL. Minimum vehicular parking and loading space rates for the proposed uses are identified in the ZBL, and minimum accessible parking rates are identified in the City's *Accessibility Design Standards*.

A summary of these requirements are included in **Table 4**. As the subject site is located in Area D but not located within a village boundary, the ZBL does not identify a requirement for any bicycle parking spaces.

Table 4: Minimum Parking Requirements

Land Use	Rate	GFA/Units	Required
<i>Vehicle Parking</i>			
Truck Transport Terminal	0.80 per 100 m ² of GFA	5,593 m ²	45
<i>Accessible Parking</i>			
6 spaces when total is between 134 to 166		141 spaces	6
<i>Loading Spaces</i>			
Truck Transport Terminal	1 for first 10,000 m ² of GFA	5,593 m ²	1

The minimum vehicle parking and loading space requirements as outlined in the ZBL, and the minimum accessible parking space requirements as outlined in the *Accessibility Design Standards*, will be confirmed as part of the Site Plan Control application.

6.3 Boundary Streets

The subject site is designated as 'Rural Natural Features Area' in Schedule A of the City of Ottawa's Official Plan. Much of Boundary Road in this area is within the 'General Rural Area' or 'Rural Employment Area' designations. Since the targets for the 'Employment Area' designation are more stringent than the 'General Rural Area' targets, Boundary Road has been evaluated based on the targets associated with the 'Employment Area' designation. Targets for pedestrian level of service (PLOS), bicycle level of service (BLOS) and truck level of service (TkLOS) for Boundary Road reflect an arterial roadway located within an Employment Area in Exhibit 22 of the MMLOS guidelines.

6.3.1 Pedestrian Level of Service (PLOS)

Exhibit 22 of the MMLOS guidelines indicates a target PLOS C for all roadways within an Employment Area. Exhibit 4 of the MMLOS guidelines has been used to evaluate the segment PLOS (see Table 5).

Table 5: PLOS Segment Analysis

Sidewalk Width	Boulevard Width	Avg. Daily Curb Lane Traffic Volume	Presence of On-Street Parking	Operating Speed ⁽¹⁾	PLOS
Boundary Road (north side)					
No sidewalk		> 3,000 vpd	No	90 km/h	F
Boundary Road (south side)					
No sidewalk		> 3,000 vpd	No	90 km/h	F

1. Operating speed taken as the posted speed limit plus 10 km/h

6.3.2 Bicycle Level of Service (BLOS)

Exhibit 22 of the MMLOS guidelines indicates a target BLOS E for arterial roadways with no cycling designation. Exhibit 11 of the MMLOS guidelines has been used to evaluate the segment BLOS (see Table 6).

Table 6: BLOS Segment Analysis

Road Class	Bike Route	Type of Bikeway	Travel Lanes	Posted Speed	BLOS
Boundary Road (Thunder Road to Mitch Owens Road)					
Arterial	No Class	Mixed Traffic ⁽¹⁾	2	80 km/h	F

1. Majority of this section of Boundary Road has unpaved shoulders; therefore, cyclists are assumed to travel in the general travel lanes

6.3.3 Truck Level of Service (TkLOS)

Exhibit 22 of the MMLOS guidelines suggest a target TkLOS B for arterial truck routes within an Employment Area. Exhibit 20 of the MMLOS guidelines has been used to evaluate the segment TkLOS (see Table 7).

Table 7: TkLOS Segment Analysis

Curb Lane Width	Travel Lanes	TkLOS
Boundary Road (Thunder Road to Mitch Owens Road)		
≤ 3.5m	Two travel lanes (one per direction)	C

6.3.4 Segment MMLOS Summary

Based on the foregoing, Boundary Road does not meet the target PLOS C, BLOS E, or TkLOS B.

Boundary Road currently operates at a PLOS F, as no sidewalks are provided. To achieve the target PLOS C, sidewalks would have to be provided with a minimum width of 2.0m and a minimum boulevard width of 2.0m. This is not considered an appropriate measure, given the rural context of the site. The MMLOS Guidelines suggest that paved shoulders may be appropriate pedestrian facilities in rural settings, where pedestrian volumes are low. In recognition of this, paved shoulders may be evaluated based on the existing methodology as if they are sidewalks, with the resulting score adjusted down one grade to recognize their differences (maintenance, lack of physical separation, potential blockage, accessibility, etc.). Boundary Road currently has paved shoulders between the eastbound ramp terminal of Highway 417 to approximately 280m south of Thunder Road. Paved shoulders are proposed as part of road modifications on Boundary Road at the north site access.

Boundary Road currently operates at a BLOS F. The inclusion of paved shoulders (as first mentioned in the PLOS discussion) would improve this segment to the target BLOS E.

Boundary Road currently operates at a TkLOS C. To achieve the target TkLOS B, a minimum lane width of 3.7m must be provided. This target will be met at the site access, as lane widths of 3.75m are proposed as part of recommended road modifications to Boundary Road.

6.4 Access Intersections

The proposed development will be served by two driveways. The south driveway is a right-out egress, and is approximately 6.1m in width at the ROW. The north driveway is a full-movement access, and is approximately 14.2m in width at the ROW before narrowing to a width of 12m. This driveway is aligned with the future CRRRC driveway, and the installation of traffic signals is proposed. A functional design of the proposed roadway modifications associated with the proposed driveways is included in **Appendix H**, and discussed further in Section 6.7.3.

Each site access has been evaluated for compliance with the City's Private Approach and Zoning By-Laws, and appropriate design guidelines, based on the conceptual site plan included in **Appendix A**.

Private Approach By-Law

Section 25 (a) of the City's *Private Approach By-Law* identifies the maximum number of private approaches that can serve a development, based on the amount of frontage. For sites with 46m to 150m of frontage, a maximum of one two-way approach plus two one-way approaches or a maximum of two two-way approaches can be provided. For every additional 90m of frontage in excess of 150m, another two-way approach is permitted. The subject site has approximately 200m of frontage to Boundary Road. Therefore, the number of proposed approaches meets this requirement.

Section 25 (c) of the *Private Approach By-Law* identifies a maximum width requirement of 9.0m for any two-way private approach, as measured at the street line. An exception for wider accesses is permitted under Section 25 (e) for transport loading areas. Given the nature of the proposed development as a truck transport terminal, it is requested that the two-way approach, with a width of 19m at the street line, be permitted to exceed the maximum width requirement, per Section 25 (e).

Section 25 (d) of the *Private Approach By-Law* identifies a maximum width requirement of 7.5m for any one-way private approach, as measured at the street line. The right-out egress meets this requirement, as it has a width of approximately 6.3m at the street line.

Section 25 (k) of the *Private Approach By-Law* stipulates that all one-way private approaches shall be designated with suitable and visible signage to indicate the direction of traffic. Signage will be provided at the right-out egress to the satisfaction of the General Manager of the City's Department of Transportation, Utilities and Public Works.

Section 25 (m)(ii) of the *Private Approach By-Law* identifies a minimum separation distance of 30m for industrial developments that abut or are within 46m of an arterial roadway and include a total of 100 to 199 parking spaces. This minimum distance applies to the distance between every private approach and the nearest intersecting street line, and the distance between a two-way private approach and any other private approach. The proposed location of the private approaches are separated by 90m and meet these requirements.

Section 25 (p) of the *Private Approach By-Law* identifies a minimum separation distance of 3m between a private approach and the nearest property line, measured from the street line. The full-movement access will be approximately 23.5m south of the northerly property line, and the right-out egress will be approximately 58.5m north of the southerly property line. Therefore, this requirement is met.

Zoning By-Law

Section 107 (1)(a)(ii) of the ZBL identifies a minimum drive aisle width of 6.7m for the passenger vehicle parking area. This requirement will be confirmed as part of the Site Plan Control application for this development.

Clear Throat and Corner Clearance

Section 8.9.10 and Table 8.9.3 of the Transportation Association of Canada's (TAC) *Geometric Design Guide for Canadian Roads* includes minimum clear throat length requirements for major driveways, based on land use, size of development, and the classification of roadway (collector or arterial). The land use most representative of the proposed truck transport terminal is the 'Light Industrial' land use. For light industrial development that are less than 10,000 m² GFA, the *Geometric Design Guide* identifies a minimum clear throat length of 15m. Measuring from the near edge of the passenger vehicle parking area to the property line, the full-movement access provides approximately 30m of clear throat length. Therefore, this requirement is met.

Section 8.8 and Figure 8.8.2 of the *Geometric Design Guide* includes minimum suggested corner clearances between accesses and major intersections. Different corner clearance requirements are outlined for different locations and types of accesses (i.e. accesses can be upstream or downstream of intersections, and accesses may or may not accommodate all movements). The corner clearance requirement for a restricted access downstream of a signalized intersection is 70m, measuring nearest edge to nearest edge. As the distance between the two proposed accesses is approximately 90m, this requirement is met.

Detailed analysis of the accesses in the buildout year 2021, the five-year horizon 2026, and the ten-year horizon 2031 are included in Sections 6.7.2 through 6.7.7.

6.5 Transportation Demand Management

A review of the Transportation Demand Management (TDM) – *Measures Checklist* has been conducted, and is included in **Appendix G**. Given the location of the proposed development, as well as the development's function as a truck transport terminal, no TDM measures have been proposed.

6.6 Transit

The proposed development is not anticipated to generate any transit trips, and the nearest transit stops are located 1.8km north of the subject site.

6.7 Intersection Analysis

6.7.1 Intersection MMLOS

This section provides a review of the study area intersections using complete streets principles. The City's MMLOS Guidelines produced by IBI Group in October 2015 were used to evaluate the multi-modal levels of service for the signalized City intersection of Boundary Road/Thunder Road. Only the vehicular level of service has been evaluated for the unsignalized and/or MTO intersections within the study area.

The lands contained within the study area are designated in the Official Plan as 'Rural Employment Area,' 'Rural Natural Features Area,' and 'General Rural Area.' The MMLOS targets used for analysis of the study area intersections are based on the 'Employment Area' designation, as they are the most stringent targets among the relevant designations. The transit level of service (TLOS) has not been evaluated, as no transit is provided within the study area.

A summary of the intersection MMLOS analysis is included in **Table 8**. The full intersection MMLOS analysis is included in **Appendix I**.

Table 8: Intersection MMLOS Analysis

Intersection	PLOS		BLOS		TkLOS		Auto LOS	
	Actual	Target	Actual	Target	Actual	Target	Actual	Target
Boundary Road/ Hwy 417 WB Ramps ⁽¹⁾	-	-	-	-	-	-	C	D
Boundary Road/ Hwy 417 EB Ramps ⁽²⁾	-	-	-	-	-	-	D	D
Boundary Road/ Thunder Road ⁽²⁾	E	C	F	E	F	B	C	D
Boundary Road/ Mitch Owens Road ⁽¹⁾	-	-	-	-	-	-	E	D

1. Unsignalized intersection

2. Signalized intersection

The results of the intersection MMLOS analysis can be summarized as follows:

- Boundary Road/Thunder Road does not meet the target PLOS C;
- Boundary Road/Thunder Road does not meet the target BLOS E;
- Boundary Road/Thunder Road does not meet the target TkLOS B;
- Boundary Road/Highway 417 WB Ramps, Boundary Road/Highway 417 EB Ramps, and Boundary Road/Thunder Road meet the target Auto LOS D, while Boundary Road/Mitch Owens Road does not.

The following sections outline a further discussion for Boundary Road/Thunder Road and Boundary Road/Mitch Owens Road.

Boundary Road/Thunder Road

This intersection does not meet the target PLOS C, BLOS E, or TkLOS B.

All approaches do not meet the target PLOS, and cannot achieve the target PLOS without significantly reducing the number of lanes and restricting turning movements. Given the rural context of the study area, no modifications are recommended.

The east approach does not meet the target BLOS, based on right turn characteristics. Per Exhibit 12 of the MMLOS guidelines, providing a right turn lane greater than 50m when cyclists are in mixed traffic results in a BLOS F. As this is a private approach to the Amazon Distribution Centre, no modifications are recommended.

All approaches do not meet the target TkLOS. Per Exhibit 21 of the MMLOS guidelines, a TkLOS C is the best possible level of service when only one receiving lane is provided. The eastern approach of this intersection is the employee access to the Amazon Distribution Centre, and a truck access is provided to the south.

Boundary Road/Mitch Owens Road

This intersection does not meet the target Auto LOS D.

The eastbound left turn movement does not meet the target Auto LOS based on delay. The maximum delay allowable to maintain an Auto LOS D is 35 seconds, and is exceeded in the AM peak hour by nine seconds (44 second delay), and in the PM peak hour by one second (36 second delay). As stated in Section 4.1.8, this intersection is included in the City's 2019 Development Charges By-Law for signalization.

Based on the signalization warrant justifications outlined in the *Ontario Traffic Manual (OTM) – Book 12*, signalization is 68% warranted based on the Minimum Vehicular Volume justification and 95% warranted based on Delay to Cross Traffic. Based on the Minimum Four-Hour Vehicular Volume justification, signalization is warranted for Boundary Road/Mitch Owens Road, and is therefore recommended. The signal warrants for this intersection are included in **Appendix J**.

Review of the MTO left turn lane warrants for two-lane highways indicates that, based on existing volumes, a northbound left turn lane is warranted at Boundary Road/Mitch Owens Road. The left turn lane warrants for this intersection are included in **Appendix J**.

For analysis of the future conditions, the intersection is modelled with and without signalization and a northbound left turn lane in the buildout year 2021. It should be noted that the Synchro analysis does not identify a need for a northbound left turn lane at Boundary Road/Mitch Owens Road, based on 2021 background or total traffic volumes (i.e. a shared northbound left turn/through lane operates at an Auto LOS C with a traffic signal implemented). Starting in the 2026 background traffic conditions however, the analysis does identify this need, and a 2026 background traffic scenario where a northbound left turn lane is not provided is included in **Appendix L**. Therefore, both a traffic signal and northbound left turn lane is assumed for analysis of this intersection in the horizon years 2026 and 2031.

6.7.2 2021 Background Intersection Operations

Intersection capacity analysis has been conducted for the 2021 background traffic conditions. The intersection parameters used in the analysis are consistent with the 2017 TIA Guidelines (Saturation Flow Rate: 1,800 vphpl, Peak Hour Factor: 1.0 for future conditions). The results of the Synchro analysis for the AM and PM peak hours are summarized in **Table 9**. Signal timing plans are included in **Appendix K**, and detailed Synchro reports are included in **Appendix L**.

Table 9: 2021 Background Traffic – Intersection Operations

Intersection	AM Peak			PM Peak		
	Max v/c or Delay	LOS	Mvmt	Max v/c or Delay	LOS	Mvmt
Boundary Road/ Highway 417 WB Ramps ⁽¹⁾	20 sec	C	WBL/R	12 sec	B	WBL/R
Boundary Road/ Highway 417 EB Ramps ⁽²⁾	0.68	B	EBR	0.84	D	EBR
Boundary Road/ Thunder Road ⁽²⁾	0.75	C	NBT	0.60	A	SBT
Boundary Road/ Mitch Owens Road ⁽¹⁾	35 sec	D	EBL	29 sec	D	EBL
Boundary Road/ CRRRC ⁽¹⁾	18 sec	C	WBL/R	11 sec	B	WBL/R

1. Unsignalized intersection

2. Signalized intersection

Based on the previous table, no operational concerns are identified in the study area in the 2021 background conditions, although it should be noted that the eastbound left turn movement at Boundary Road/Mitch Owens Road is at the threshold of an unacceptable Auto LOS E during the AM peak hour. The improved traffic operations when compared to the existing traffic operations are due to differences in the Peak Hour Factor parameter (0.9 in existing conditions versus 1.0 in future conditions). The maximum 2021 background queue lengths on Boundary Road are noted at the following locations:

Northbound Queues (AM Peak Hour)

- Boundary Road/Highway 417 EB Ramps: approximately 30m (approximately 230m from blocking Boundary Road/Thunder Road).

Southbound Queues (PM Peak Hour)

- Boundary Road/Thunder Road: approximately 100m (approximately 120m from blocking Boundary Road/Highway 417 EB Ramps).

As stated in the previous section, signalization at the intersection of Boundary Road/Mitch Owens Road and a dedicated northbound left turn lane are warranted, based on existing volumes. A mitigated scenario where a signal and northbound left turn lane is provided at this intersection is included in **Appendix L**. In this scenario, the level of service is anticipated to improve to an Auto LOS A for both the AM and PM peak hours (with max v/c ratios of 0.57 in the AM peak hour and 0.55 in the PM peak hour).

Consistent with the other signals in the study area, signalization of Boundary Road/Mitch Owens Road was assumed to be actuated and coordinated, with a cycle length of 100 seconds.

6.7.3 2021 Total Intersection Operations

A Road Modification Approval (RMA) package for the proposed signalized access to Boundary Road has been submitted concurrently with this TIA. The functional design of the proposed roadway modifications (at 1:500 scale) is included in **Appendix H**. The proposed roadway modifications incorporate the previously approved RMA associated with the CRRRC access, which included a new southbound left turn lane and northbound direct right turn taper. The previously approved modifications are also included in **Appendix H**.

In addition, a northbound left turn lane and a southbound right turn lane are warranted, and are therefore proposed to accommodate vehicles entering the full-movement signalized access. These lanes are included in the analysis below. The results of the MTO left turn lane warrant for the proposed northbound left turn lane is included in **Appendix J**. Per TAC's *Geometric Design Guide*, a right turn lane is warranted 'when the volume of right turning traffic is 10% to 20% of the total approaching volume,' which is anticipated during the AM peak hour.

As shown in the functional design of the proposed roadway modifications, the auxiliary turn lanes into the CRRRC site and the proposed development can be summarized as follows:

- Northbound Left Turn Lane (into subject site): 70m parallel and 145m taper;
- Northbound Right Turn Taper (into CRRRC): 84m taper;
- Southbound Left Turn Lane (into CRRRC): 50m storage, 60m parallel, and 145m taper;
- Southbound Right Turn Lane (into subject site): 70m parallel and 75m taper.

Intersection capacity analysis has been conducted for the 2021 total traffic conditions. The intersection parameters used in the analysis are consistent with the 2017 TIA Guidelines (Saturation Flow Rate: 1,800 vphpl, Peak Hour Factor: 1.0 for future conditions). The results of the Synchro analysis for the AM and PM peak hours are summarized in **Table 10**. Signal timing plans are included in **Appendix K**, and detailed Synchro reports are included in **Appendix L**.

Table 10: 2021 Total Traffic – Intersection Operations

Intersection	AM Peak			PM Peak		
	Max v/c or Delay	LOS	Mvmt	Max v/c or Delay	LOS	Mvmt
Boundary Road/ Highway 417 WB Ramps ⁽¹⁾	29 sec	D	WBL/R	13 sec	B	WBL/R
Boundary Road/ Highway 417 EB Ramps ⁽²⁾	0.75	C	EBR	0.85	D	EBR
Boundary Road/ Thunder Road ⁽²⁾	0.87	D	NBT	0.61	B	SBT
Boundary Road/ Mitch Owens Road ⁽¹⁾	52 sec	F	EBL	29 sec	D	EBL
Boundary Road/ North Site Access/CRRRC ⁽¹⁾	35 sec	D	EBL/R	46 sec	E	EBL/R
Boundary Road/ South Site Access ⁽¹⁾	10 sec	A	EBR	17 sec	C	EBR

1. Unsignalized intersection

2. Signalized intersection

Compared to the 2021 background traffic conditions, increases to the vehicle-to-capacity (v/c) ratios and delays at the study area intersections are anticipated as a result of site-generated traffic. The maximum 2021 total queue lengths on Boundary Road are noted at the following locations:

Northbound Queues (AM Peak Hour)

- Boundary Road/Highway 417 EB Ramps: approximately 35m (approximately 225m from blocking Boundary Road/Thunder Road).

Southbound Queues (PM Peak Hour)

- Boundary Road/Thunder Road: approximately 110m (approximately 110m from blocking Boundary Road/Highway 417 EB Ramps).

Operational concerns are identified at Boundary Road/Mitch Owens Road during the AM peak hour and Boundary Road/North Site Access/CRRRC during the PM peak hour. Signalization of both intersections has been previously discussed and continue to be recommended, based on delays. Based on the signalization warrant justifications outlined in *OTM Book 12*, signalization of Boundary Road/North Site Access/CRRRC is 48% warranted based on 2021 total traffic conditions, and therefore recommending a signal at this proposed access is from a delay and safety perspective. The signal warrants for this intersection are included in **Appendix J**.

A mitigated scenario where signals at both intersections are implemented is included in **Appendix L**. In this scenario, the max v/c ratios and critical levels of service can be summarized as follows:

Boundary Road/Mitch Owens Road

- AM Peak Hour: max v/c of 0.64 (Auto LOS B) for the northbound through movement;
- PM Peak Hour: max v/c of 0.55 (Auto LOS A) for the southbound through movement.

Boundary Road/North Site Access/CRRRC

- AM Peak Hour: max v/c of 0.58 (Auto LOS A) for the northbound through movement;
- PM Peak Hour: max v/c of 0.57 (Auto LOS A) for the southbound through movement.

Consistent with the other signals in the study area, signalization of Boundary Road/North Site Access/CRRRC is assumed to be actuated and coordinated, with a cycle length of 100 seconds.

6.7.4 2026 Background Intersection Operations

Intersection capacity analysis has been conducted for the 2026 background traffic conditions. The intersection parameters used in the analysis are consistent with the 2017 TIA Guidelines (Saturation Flow Rate: 1,800 vphpl, Peak Hour Factor: 1.0 for future conditions). The results of the Synchro analysis for the AM and PM peak hours are summarized in **Table 11**. Signal timing plans are included in **Appendix K**, and detailed Synchro reports are included in **Appendix L**.

Table 11: 2026 Background Traffic – Intersection Operations

Intersection	AM Peak			PM Peak		
	Max v/c or Delay	LOS	Mvmt	Max v/c or Delay	LOS	Mvmt
Boundary Road/ Highway 417 WB Ramps ⁽¹⁾	33 sec	D	WBL/R	13 sec	B	WBL/R
Boundary Road/ Highway 417 EB Ramps ⁽²⁾	0.78	C	NBT	0.87	D	EBR
Boundary Road/ Thunder Road ⁽²⁾	0.93	E	NBT	0.67	B	SBT
Boundary Road/ Mitch Owens Road ⁽²⁾	0.70	B	NBT	0.61	B	SBT
Boundary Road/ CRRRC ⁽¹⁾	20 sec	C	WBL/R	12 sec	B	WBL/R

1. Unsignalized intersection

2. Signalized intersection

Compared to the 2021 background conditions, increases to the v/c ratios and delays at the study area intersections are anticipated as a result of background traffic growth. The maximum 2026 background queue lengths on Boundary Road are noted at the following locations:

Northbound Queues (AM Peak Hour)

- Boundary Road/Highway 417 EB Ramps: approximately 50m (approximately 210m from blocking Boundary Road/Thunder Road).

Southbound Queues (PM Peak Hour)

- Boundary Road/Thunder Road: approximately 120m (approximately 100m from blocking Boundary Road/Highway 417 EB Ramps).

Synchro identifies that the northbound through movement at Boundary Road/Thunder Road operates at an Auto LOS E during the AM peak hour. Optimization of the signal timing in Synchro identifies that the critical northbound through movement at this intersection can operate at an Auto LOS D, with the v/c ratio improving to 0.86. A mitigated optimized AM peak hour scenario is included in **Appendix L**.

Synchro also identifies that the eastbound right turn movement at Boundary Road/Highway 417 EB Ramps exceeds MTO's critical v/c ratio of 0.85 for mitigation during the PM peak hour. As the maximum queue for the eastbound right turn movement is approximately 40m, no recommendations are identified.

6.7.5 2026 Total Intersection Operations

Intersection capacity analysis has been conducted for the 2026 total traffic conditions. The intersection parameters used in the analysis are consistent with the 2017 TIA Guidelines (Saturation Flow Rate: 1,800 vphpl, Peak Hour Factor: 1.0 for future conditions). The results of the Synchro analysis for the AM and PM peak hours are summarized in **Table 12**. Signal timing plans are included in **Appendix K**, and detailed Synchro reports are included in **Appendix L**.

Table 12: 2026 Total Traffic – Intersection Operations

Intersection	AM Peak			PM Peak		
	Max v/c or Delay	LOS	Mvmt	Max v/c or Delay	LOS	Mvmt
Boundary Road/ Highway 417 WB Ramps ⁽¹⁾	42 sec	E	WBL/R	13 sec	B	WBL/R
Boundary Road/ Highway 417 EB Ramps ⁽²⁾	0.80	C	NBT	0.87	D	EBR
Boundary Road/ Thunder Road ⁽²⁾	0.95	E	NBT	0.68	B	SBT
Boundary Road/ Mitch Owens Road ⁽²⁾	0.71	C	NBT	0.61	B	SBT
Boundary Road/ North Site Access/CRRRC ⁽²⁾	0.64	B	NBT	0.63	B	SBT
Boundary Road/ South Site Access ⁽¹⁾	10 sec	A	EBR	19 sec	C	EBR

1. Unsignalized intersection

2. Signalized intersection

Compared to the 2026 background traffic conditions, increases to the v/c ratios and delays at the study area intersections are anticipated as a result of site-generated traffic. The maximum 2026 total queue lengths on Boundary Road are noted at the following locations:

Northbound Queues (AM Peak Hour)

- Boundary Road/Highway 417 EB Ramps: approximately 40m (approximately 220m from blocking Boundary Road/Thunder Road);
- Boundary Road/North Site Access/CRRRC: approximately 50m (approximately 190m from blocking Boundary Road/Indcum Road).

Southbound Queues (PM Peak Hour)

- Boundary Road/Thunder Road: approximately 110m (approximately 110m from blocking Boundary Road/Highway 417 EB Ramps);
- Boundary Road/North Site Access/CRRRC: approximately 160m (approximately 220m from blocking Boundary Road/Amazon Truck Access).

Synchro identifies that the westbound approach at Boundary Road/Highway 417 WB Ramps and the northbound through movement at Boundary Road/Thunder Road operate at an Auto LOS E during the AM peak hour.

The delay for westbound vehicles at Boundary Road/Highway 417 WB Ramps exceeds the 35-second threshold to achieve an Auto LOS D. Based on the signalization warrant justifications outlined in *OTM Book 12*, signalization of this intersection is 95% warranted based on the 2026 total traffic conditions. Since the warrant is not met and the maximum queue during the AM peak hour is approximately 35m, it is recommended that MTO monitor these ramps to determine if or when signals should be considered.

Optimization of the signal timing in Synchro identifies that the critical northbound through movement at Boundary Road/Thunder Road can operate at an Auto LOS D, with the v/c ratio improving to 0.87. A mitigated optimized AM peak hour scenario is included in **Appendix L**.

Synchro also identifies that the eastbound right turn movement at Boundary Road/Highway 417 EB Ramps exceeds MTO's critical v/c ratio of 0.85 for mitigation during the PM peak hour. As the maximum queue for the eastbound right turn movement is approximately 40m, no recommendations are identified.

6.7.6 2031 Background Intersection Operations

Intersection capacity analysis has been conducted for the 2031 background traffic conditions, for intersections within MTO jurisdiction per MTO's 2014 TIS Guidelines. The intersection parameters used in the analysis are consistent with the TIS Guidelines. The results of the Synchro analysis for the AM and PM peak hours are summarized in **Table 13**. Signal timing plans are included in **Appendix K**, and detailed Synchro reports are included in **Appendix L**.

Table 13: 2031 Background Traffic – Intersection Operations

Intersection	AM Peak			PM Peak		
	Max v/c or Delay	LOS	Mvmt	Max v/c or Delay	LOS	Mvmt
Boundary Road/ Highway 417 WB Ramps ⁽¹⁾	52 sec	F	WBL/R	13 sec	B	WBL/R
Boundary Road/ Highway 417 EB Ramps ⁽²⁾	0.87	D	NBT	0.86	D	EBR
Boundary Road/ Thunder Road ⁽²⁾	1.03	F	NBT	0.73	C	SBT

1. Unsignalized intersection

2. Signalized intersection

From the previous table, the critical movements at Boundary Road/Highway 417 WB Ramps and Boundary Road/Thunder Road do not meet the target Auto LOS D during the AM peak hour, and the critical movements at Boundary Road/Highway 417 EB Ramps do not meet the target v/c ratio of 0.85 during both peak hours, as a result of background traffic growth. The maximum 2031 background queue lengths on Boundary Road are noted at the following locations:

Northbound Queues (AM Peak Hour)

- Boundary Road/Highway 417 EB Ramps: approximately 40m (approximately 220m from blocking Boundary Road/Thunder Road).

Southbound Queues (PM Peak Hour)

- Boundary Road/Thunder Road: approximately 145m (approximately 75m from blocking Boundary Road/Highway 417 EB Ramps).

Based on the signalization warrant justifications outlined in *OTM Book 12*, signalization of Boundary Road/Highway 417 WB Ramps is 98% warranted based on the 2031 background traffic conditions. Since the warrant is not met and the maximum queue during the AM peak hour is approximately 40m, it is recommended that MTO monitor these ramps to determine if or when signals should be considered.

A mitigated scenario including optimized signal timings is included in **Appendix L**. In the mitigated AM peak hour scenario, the max v/c ratio at Boundary Road/Highway 417 EB Ramps can be improved to 0.86, while Boundary Road/Thunder Road can be improved to an Auto LOS E. In the mitigated PM peak hour scenario, the max v/c ratio at Boundary Road/Highway 417 EB Ramps can be improved to 0.83.

A second mitigated scenario, which includes the implementation of additional northbound and southbound lanes on Boundary Road at the Thunder Road intersection, is included in **Appendix L**. In this mitigated scenario, the critical movements at Boundary Road/Thunder Road achieve an Auto LOS C or better during the peak hours.

The above scenario is identified for MTO's and the City's planning purposes, and is recommended by 2031. Based on the ROW limits shown on GeoOttawa, it is anticipated that ROW acquisition may be required to accommodate a widening of Boundary Road and the Boundary Road/Thunder Road intersection.

6.7.7 2031 Total Intersection Operations

Intersection capacity analysis has been conducted for the 2031 total traffic conditions, for intersections within MTO jurisdiction per MTO's 2014 TIS Guidelines. The intersection parameters used in the analysis are consistent with the TIS Guidelines. The results of the Synchro analysis for the AM and PM peak hours are summarized in **Table 14**. Signal timing plans are included in **Appendix K**, and detailed Synchro reports are included in **Appendix L**.

Table 14: 2031 Total Traffic – Intersection Operations

Intersection	AM Peak			PM Peak		
	Max v/c or Delay	LOS	Mvmt	Max v/c or Delay	LOS	Mvmt
Boundary Road/ Highway 417 WB Ramps ⁽¹⁾	71 sec	F	WBL/R	14 sec	B	WBL/R
Boundary Road/ Highway 417 EB Ramps ⁽²⁾	0.88	D	NBT	0.85	D	EBR
Boundary Road/ Thunder Road ⁽²⁾	1.05	F	NBT	0.74	C	SBT

1. Unsignalized intersection

2. Signalized intersection

Compared to the 2031 background traffic conditions, marginal changes to the v/c ratios and delays at the study area intersections are anticipated. The maximum 2031 total queue lengths on Boundary Road are noted at the following locations:

Northbound Queues (AM Peak Hour)

- Boundary Road/Highway 417 EB Ramps: approximately 40m (approximately 220m from blocking Boundary Road/Thunder Road);
- Boundary Road/North Site Access/CRRRC: approximately 160m (approximately 80m from blocking Boundary Road/Indcum Road).

Southbound Queues (PM Peak Hour)

- Boundary Road/Thunder Road: approximately 160m (approximately 60m from blocking Boundary Road/Highway 417 EB Ramps).

Based on the signalization warrant justifications outlined in *OTM Book 12*, signalization of Boundary Road/Highway 417 WB Ramps is 104% warranted based on the 2031 total traffic conditions. Per *OTM Book 12*, signalization is recommended when the warrant is 120% met using projected volumes at existing intersections, and provisional underground traffic signal plant should be installed when signals are 100% warranted. Therefore, provisional underground plant at Boundary Road/Highway 417 WB Ramps is identified for MTO's long-term planning purposes.

A mitigated scenario including optimized signal timings is included in **Appendix L**. In the mitigated AM peak hour scenario, the max v/c ratios at both Highway 417 ramp terminals can be improved to an Auto LOS D (with critical v/c ratios marginally greater than 0.85), while Boundary Road/Thunder Road remains at an Auto LOS F. In the mitigated PM peak hour scenario, Boundary Road/Highway 417 EB Ramps can be improved to an Auto LOS D, including a v/c ratio below 0.85.

A second mitigated scenario, which includes the implementation of additional northbound and southbound lanes on Boundary Road at the Thunder Road intersection, is included in **Appendix L**. In this mitigated scenario, the critical movements at Boundary Road/Thunder Road achieve an Auto LOS C or better during the peak hours. As stated in the 2031 background conditions, this scenario is identified for MTO's and the City's planning purposes, and is recommended by 2031.

6.7.8 Summary of Mitigation Measures

The modifications to the existing road network listed below are recommended by the following years:

- Signals and auxiliary northbound left turn and southbound right turn lanes at Boundary Road/North Site Access/CRRRC (starting in 2021);
- Signalization of Boundary Road/Mitch Owens Road, complete with NBL lane (starting in 2021);
- Optimization of signals in study area (starting in 2026);
- Provisional underground plant at Boundary Road/Highway 417 WB Ramps (starting in 2031);
- Additional northbound/southbound lanes on Boundary Road at Thunder Road (starting in 2031).

7.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations of this TIA can be summarized as follows:

Development Design and Parking

- Pedestrian facilities will be provided on-site around the building. Connectivity for pedestrians is not provided to Boundary Road, as there are no sidewalks on Boundary Road.
- All relevant required TDM-supportive design and infrastructure measures in the TDM checklist are met. This will be confirmed at part of the Site Plan Control application.
- The minimum vehicle parking and loading space requirements as outlined in the ZBL, and the minimum accessible parking space requirements as outlined in the *Accessibility Design Standards*, will be confirmed as part of the Site Plan Control application.

Boundary Streets

- Boundary Road currently operates at a PLOS F, as no sidewalks are provided. To achieve the target PLOS C, sidewalks would have to be provided with a minimum width of 2.0m and a minimum boulevard width of 2.0m. This is not considered an appropriate measure, given the rural context of the site. Boundary Road currently has paved shoulders between the westbound ramp terminal of Highway 417 to approximately 280m south of Thunder Road. Paved shoulders are proposed as part of road modifications on Boundary Road at the north site access.
- Boundary Road currently operates at a BLOS F. The extension of paved shoulders further south would improve this segment to the target BLOS E. Paved shoulders are proposed as part of road modifications on Boundary Road at the north site access.
- Boundary Road currently operates at a TkLOS C. To achieve the target TkLOS B, a minimum lane width of 3.7m must be provided. This target will be met, as lane widths of 3.75m are proposed as part of recommended road modifications to Boundary Road.

Access Design

- The proposed development will be served by two driveways. The south driveway is a right-out egress, and is approximately 6.1m in width at the ROW. The north driveway is a full-movement access, and is approximately 14.2m in width at the ROW before narrowing to a width of 12m. This driveway is aligned with the future CRRRC driveway, and the installation of traffic signals is planned. The proposed roadway modifications associated with the proposed signalized access includes a southbound left turn lane and northbound direct right turn taper to the CRRRC development, and a southbound right turn lane and northbound left turn lane to the proposed development.

- The proposed accesses will meet all relevant requirements of the City's *Private Approach and Zoning By-Laws*, except the maximum width requirement of 9m for any two-way private approach. An exception for wider accesses is permitted for transport loading areas, and is therefore requested for the north site access. The minimum clear throat length and corner clearance requirements outlined in TAC's *Geometric Design Guide for Canadian Roads* will be met. All relevant requirements will be confirmed as part of the Site Plan Control application.

Transportation Demand Management

- Given the location of the proposed development, as well as the development's function as a truck transport terminal, no TDM measures have been proposed.

Transit

- The proposed development is not anticipated to generate any transit trips, and the nearest transit stops are located 1.8km north of the subject site.

Intersection MMLOS

- The results of the intersection MMLOS analysis can be summarized as follows:
 - Boundary Road/Thunder Road does not meet the target PLOS C;
 - Boundary Road/Thunder Road does not meet the target BLOS E;
 - Boundary Road/Thunder Road does not meet the target TkLOS B;
 - Boundary Road/Highway 417 WB Ramps, Boundary Road/Highway 417 EB Ramps, and Boundary Road/Thunder Road meet the target Auto LOS D, while Boundary Road/Mitch Owens Road does not.
- At Boundary Road/Thunder Road, all approaches do not meet the target PLOS, and cannot achieve the target without significantly reducing the number of lanes and restricting turning movements. Given the rural context of the study area, no modifications are recommended.
- At Boundary Road/Thunder Road, the east approach does not meet the target BLOS, based on right turn characteristics. Per Exhibit 12 of the MMLOS guidelines, providing a right turn lane greater than 50m when cyclists are in mixed traffic results in a BLOS F. As this is a private approach to the Amazon Distribution Centre, no modifications are recommended.
- At Boundary Road/Thunder Road, all approaches do not meet the target TkLOS. Per Exhibit 21 of the MMLOS guidelines, a TkLOS C is the best possible level of service when only one receiving lane is provided. The east approach of this intersection is the visitor access to the Amazon Distribution Centre, and a truck access is provided to the south.
- At Boundary Road/Mitch Owens Road, the eastbound left turn movement does not meet the target Auto LOS based on delay during both peak hours, with a delay of 46 seconds in the AM peak and 39 seconds in the PM peak. This intersection is included in the City's 2019 Development Charges By-Law for signalization, and warrants for signalization and a northbound left turn lane are met based on existing volumes.

Intersection Analysis

- Signalization of Boundary Road/North Site Access/CRRRC is 48% warranted based on 2021 total traffic conditions, but is recommended from a delay and safety perspective.
- Starting in 2026, delays for the westbound left turn/right turn movement at Boundary Road/Highway 417 WB Ramps exceed the 35-second threshold to achieve an Auto LOS D during the AM peak hour. Based on the signalization warrant justifications included in OTM Book 12, the intersection will not meet warrants by the 2031 total traffic conditions. It is recommended that MTO monitor these ramps to determine if or when signals should be considered.
- The modifications to the existing road network listed below are identified for consideration by the following years:
 - Signals and auxiliary northbound left turn and southbound right turn lanes at Boundary Road/North Site Access/CRRRC (starting in 2021);
 - Signalization of Boundary Road/Mitch Owens Road, complete with northbound left turn lane (starting in 2021);
 - Optimization of signals in study area (starting in 2026);
 - Provisional underground plant at Boundary Road/Highway 417 WB Ramps (starting in 2031);
 - Additional northbound/southbound lanes on Boundary Road at Thunder Road (starting in 2031).
- The recommended signals and turn lanes at the proposed site access are identified as the developer's responsibility.
- The recommended modifications at the other study area intersections are identified for the City's/MTO's consideration.

NOVATECH

Prepared by:



Joshua Audia, B.Sc.
E.I.T. | Transportation/Traffic

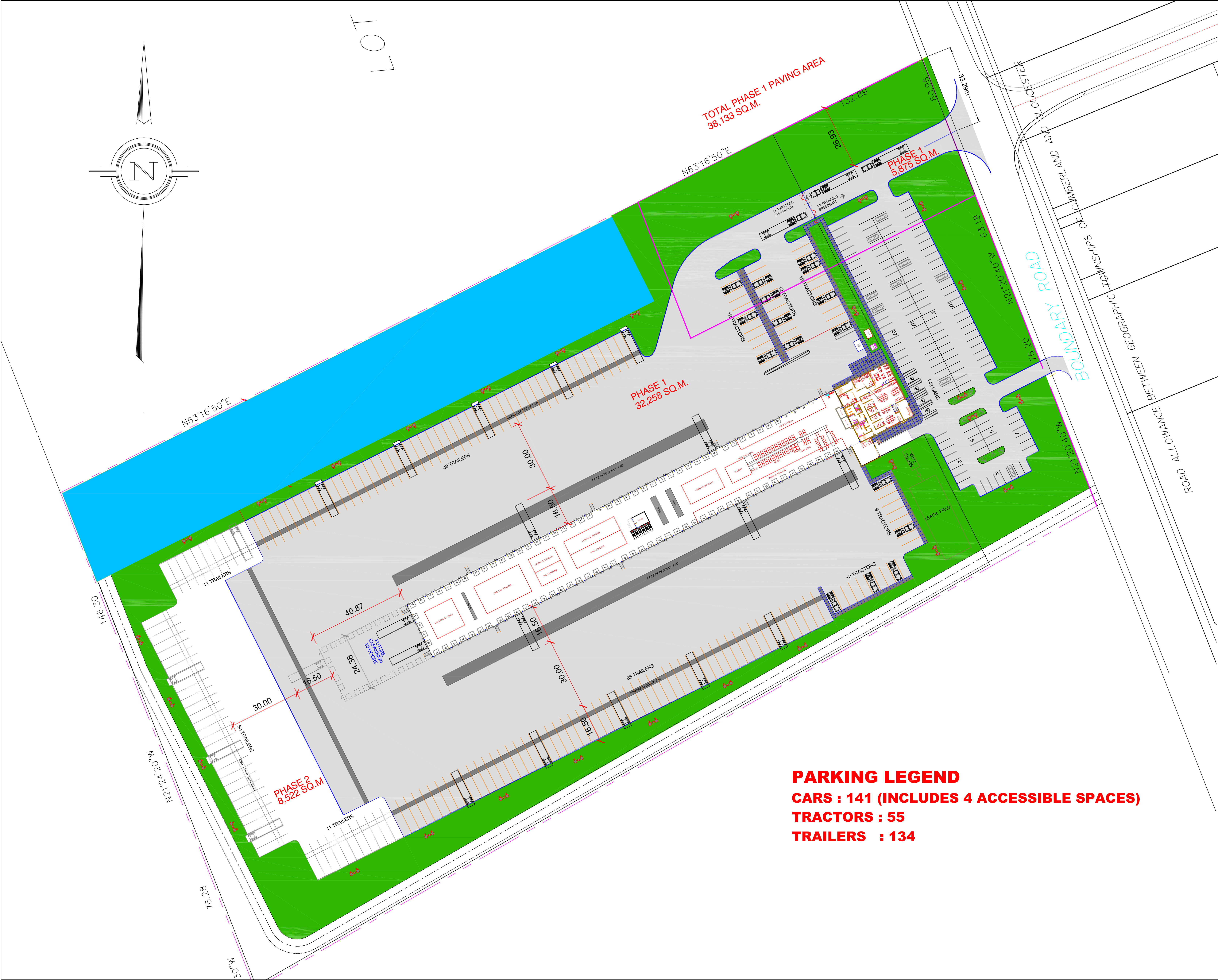
Reviewed by:



Jennifer Luong, P.Eng.
Senior Project Manager | Transportation/Traffic

APPENDIX A

Conceptual Site Plan



PARKING LEGEND
CARS : 141 (INCLUDES 4 ACCESSIBLE SPACES)
TRACTORS : 55
TRAILERS : 134

Consultant

Expert-conseil

H

HATCHARD

ENGINEERING

728 Perth Main Street, Suite B Perth-Andover, N.B. E7H 2W7
Phone: 506-273-6640 Fax: 506-273-4305
Email: bhatchard@hatchard.ca www.hatchardgoguen.ca

General notes

Notes g n rales

A

B

C

REFERENCE
A - DETAIL NUMBER
B - DETAIL LOCATION
C - SHEET NUMBER - WHERE DETAILED

THIS DRAWING IS THE PROPERTY OF HATCHARD ENGINEERING LTD. AND HAS BEEN PREPARED SOLELY FOR THIS PROJECT. THIS DRAWING IS NOT TO BE USED BY ANY PARTIES ON OTHER PROJECTS OR EXTENSIONS TO THIS PROJECT EXCEPT BY AGREEMENT AND APPROPRIATE COMPENSATION TO HATCHARD ENGINEERING LTD.

Issued for l'entente de l'appel d'offres

Revisions / R�visions	No/N�	Date

Project Title

Titre du projet

DAY AND ROSS

OTTAWA, ON

Sheet Title

Titre de la feuille

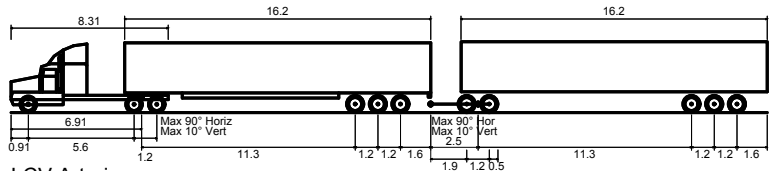
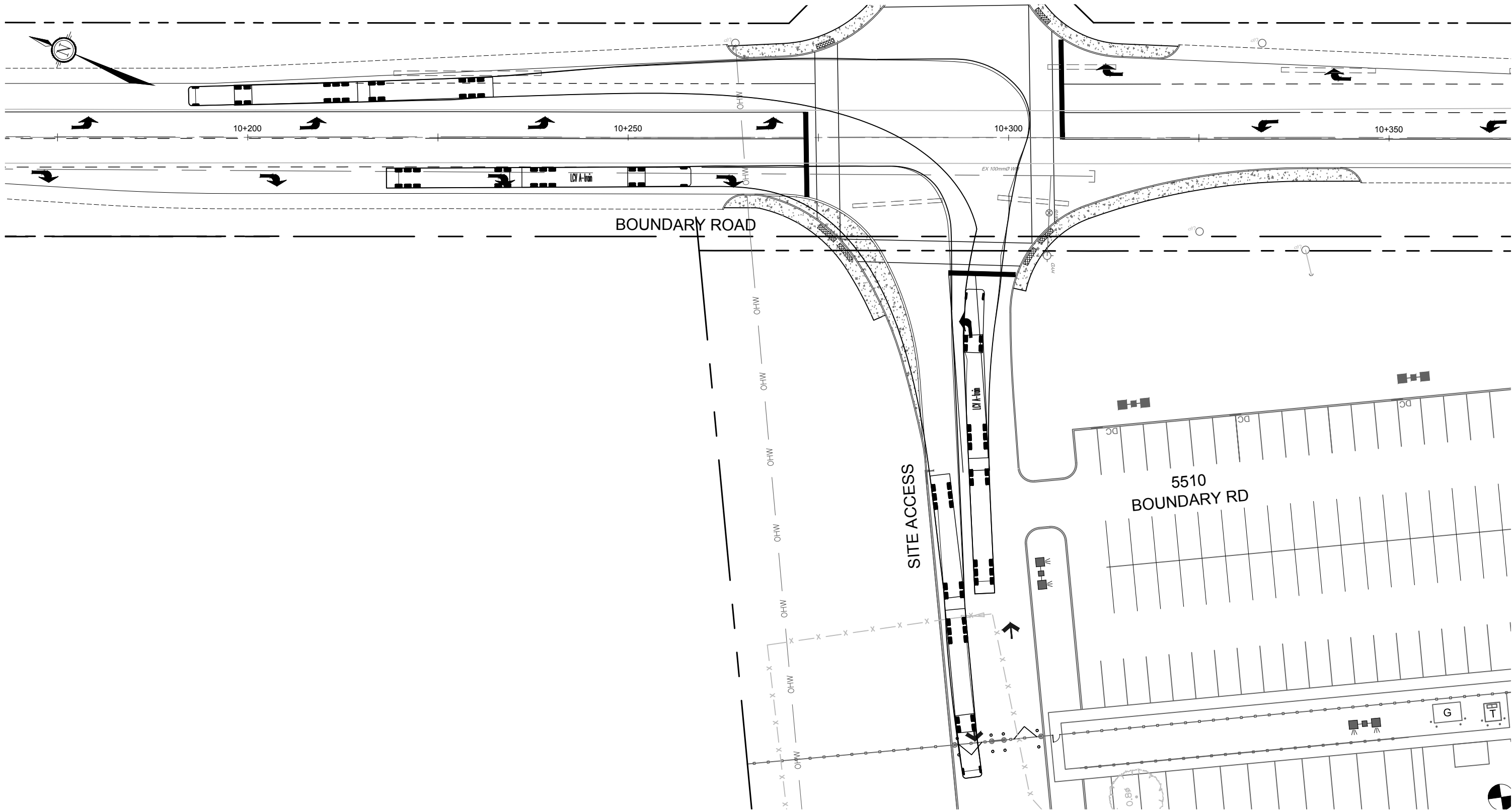
SITE PLAN

ENTRANCE OPTION 2

Date	19 DEC. 2019	Date		Stamp	Sceau
Scale	1:600	�chelle			
Drawn by	BAP	Desin� par			
Approved by		Approuv� par			

Project No.	N� du projet	Sheet No.	N� de la feuille
HE-000358		C1	

C:\temp\AcPublish_17400118168 - Turning Movements.dwg, TM-3, Mar 10, 2021 - 4:34pm, rhiller



LCV A-train
Overall Length 40.01m
Overall Width 2.60m
Overall Body Height 3.755m
Min Body Ground Clearance 0.418m
Max Track Width 2.60m
Lock-to-lock time 6.00s
Max Steering Angle (Virtual) 40.00°

NOVATECH

Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

5510 BOUNDARY ROAD

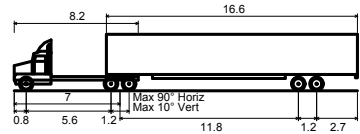
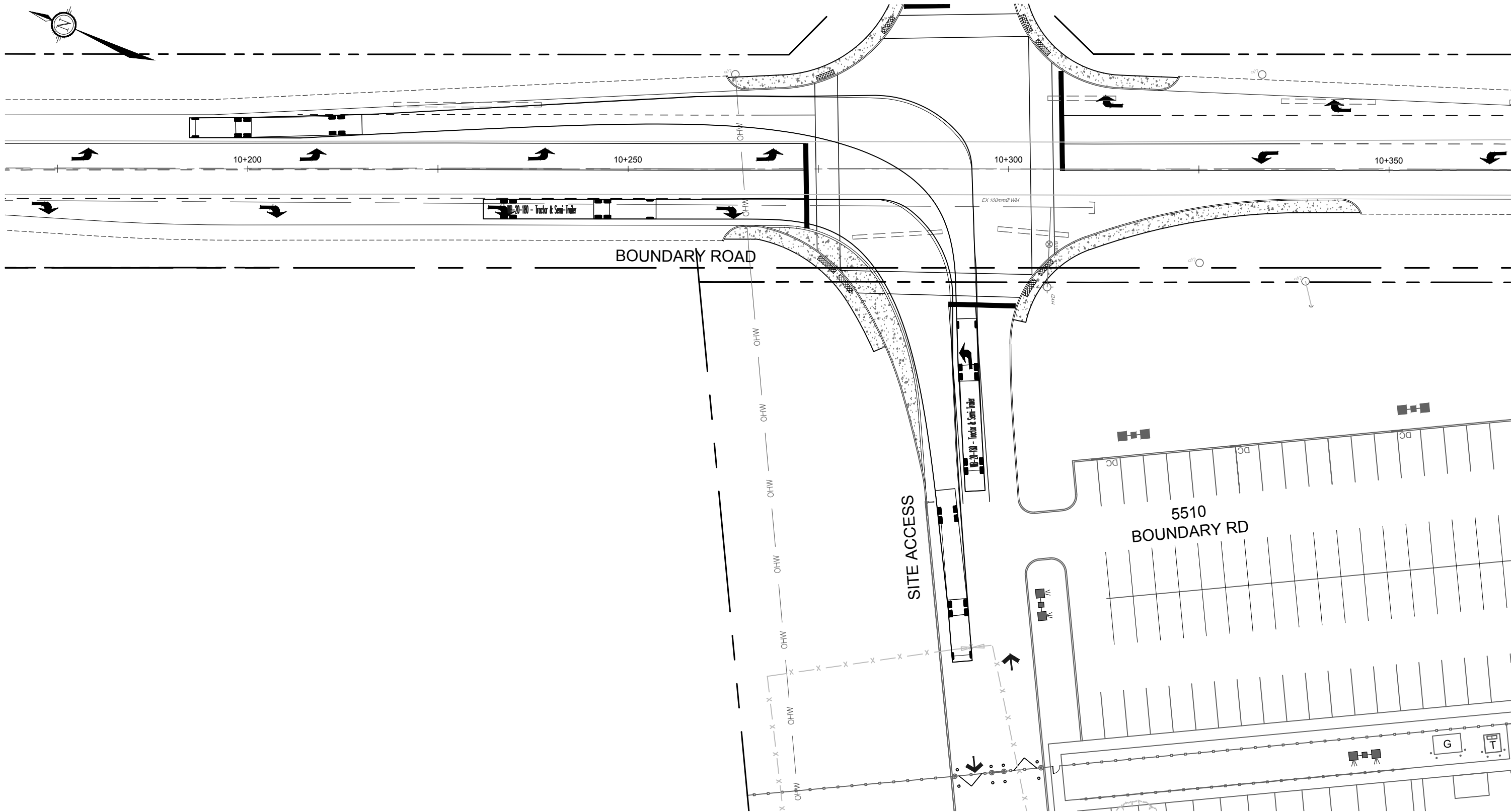
LCV TURNING MOVEMENT

SCALE 1 : 500 0 5m 10m 20m

DATE MAR 2021 JOB 118168 FIGURE TM-3

CUT11V17 DWG 270mm x 122mm

C:\temp\AcPublish_17400118168 - Turning Movements.dwg, TM-4, Mar 10, 2021 - 4:34pm, rhiller



WB-20 - Tractor & Semi-Trailer	
Overall Length	22.700m
Overall Width	2.600m
Overall Body Height	3.730m
Min Body Ground Clearance	0.435m
Track Width	2.600m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	14.300m



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

5510 BOUNDARY ROAD

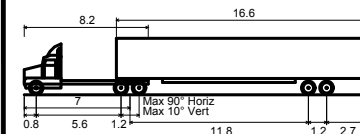
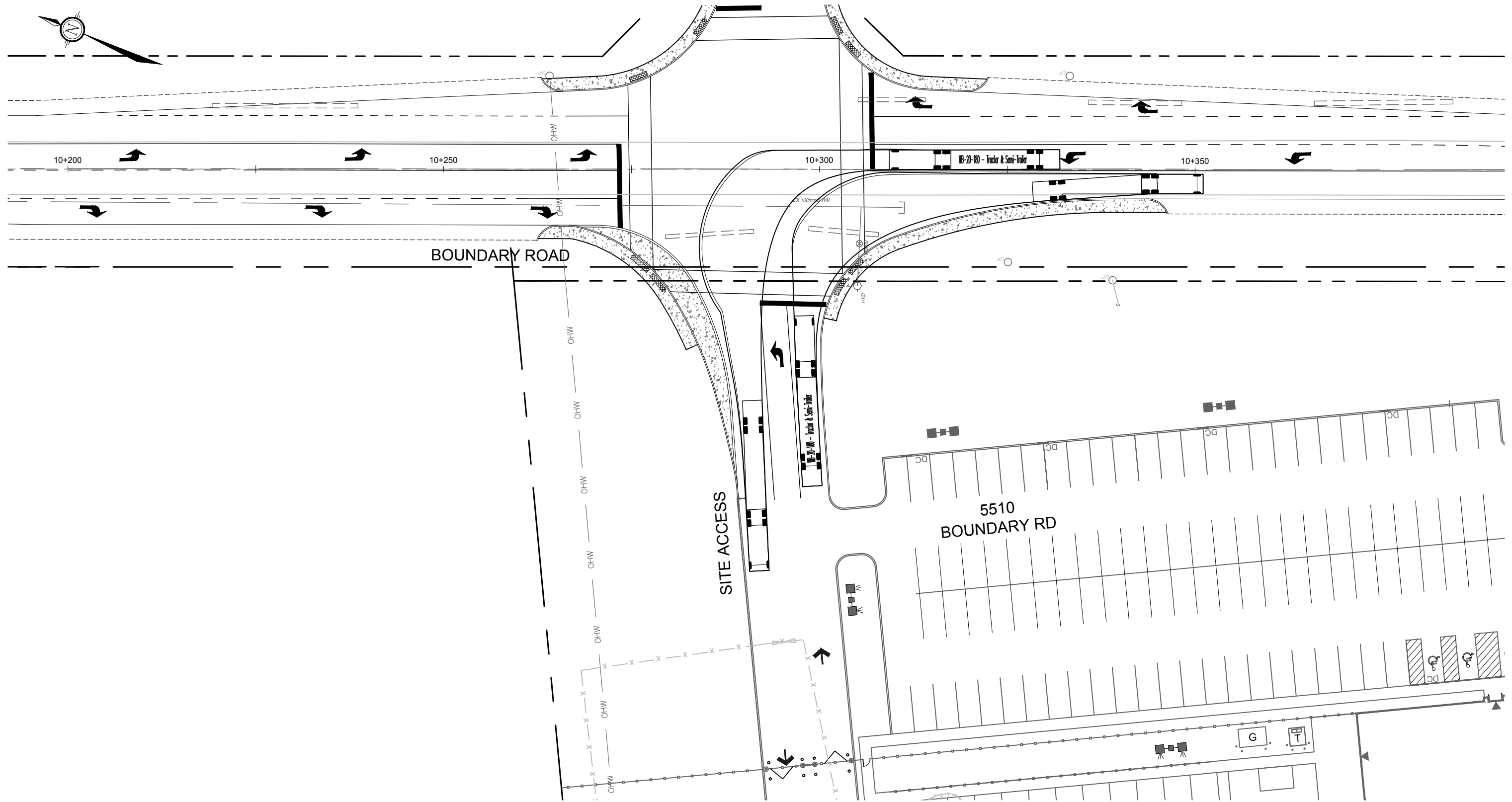
WB-20 TURNING MOVEMENT

SCALE 1 : 500 0 5m 10m 20m

DATE MAR 2021 JOB 118168 FIGURE TM-4

CUT11V17 DWG 270mm X 122mm

C:\temp\AcPublish_17400118168 - Turning Movements.dwg, TM-5, Mar 10, 2021 - 4:34pm, rhiller



WB-20 - Tractor & Semi-Trailer	
Overall Length	22.700m
Overall Width	2.600m
Overall Body Height	3.730m
Min Body Ground Clearance	0.435m
Track Width	2.600m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	14.300m

NOVATECH

Engineers, Planners & Landscape Architects

Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

5510 BOUNDARY ROAD

WB-20 TURNING MOVEMENT

SCALE 1 : 500 0 5m 10m 20m

DATE MAR 2021 JOB 118168 FIGURE TM-5

CUT11V17 DWG 270mm X 122mm

APPENDIX B

TIA Screening Form

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	5510 Boundary Road
Description of Location	Approximately 8.5-hectare lot, located west of Boundary Road and north of Mitch Owens Road
Land Use Classification	Rural Industrial
Development Size (units)	
Development Size (m ²)	5,593 m²
Number of Accesses and Locations	Two proposed accesses to Boundary Road
Phase of Development	
Buildout Year	2021

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m ²
Industrial	5,000 m ²
Fast-food restaurant or coffee shop	100 m ²
Destination retail	1,000 m ²
Gas station or convenience market	75 m ²

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		✓
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		✓

*DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?	✓	
Are there any horizontal/vertical curvatures on a boundary street limiting sight lines at a proposed driveway?		✓
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/suburban conditions)?		✓
Is the proposed driveway within auxiliary lanes of an intersection?		✓
Does the proposed driveway make use of an existing median break that serves an existing site?		✓
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		✓
Does the development include a drive-thru facility?		✓

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?	✓	
Does the development satisfy the Location Trigger?		✓
Does the development satisfy the Safety Trigger?	✓	

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

APPENDIX C

OC Transpo System Information

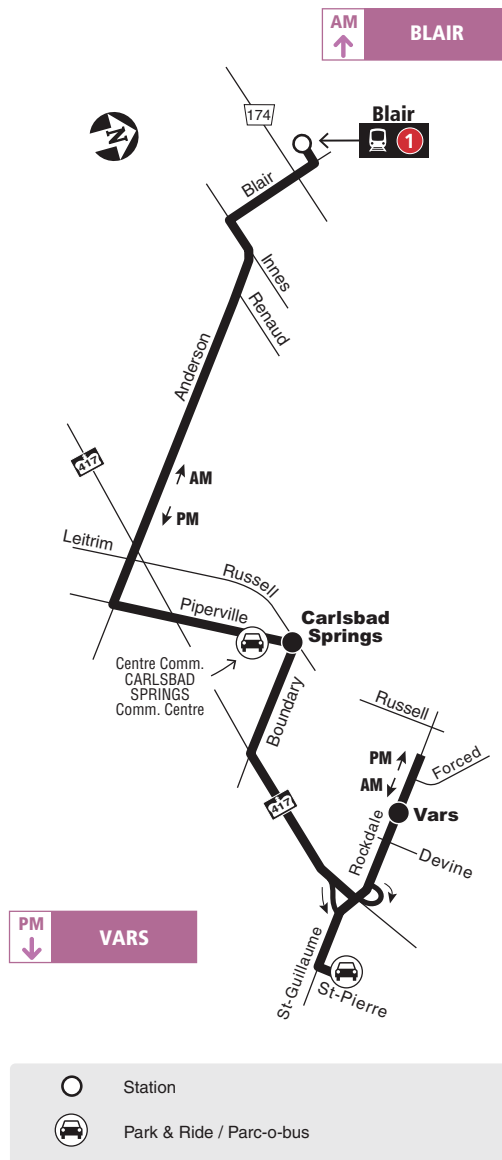
222

VARs
BLAIR

Connexion

Monday to Friday / Lundi au vendredi

Peak periods only
Périodes de pointe seulement



2019.07



1



Future route after O-Train Line 1 is open
Trajet du circuit après l'ouverture
de la Ligne 1 de l'O-Train

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité **613-741-2478**

OC Transpo

INFO 613-741-4390
octranspo.com

APPENDIX D

Traffic Count Data



Turning Movement Count Summary, AM and PM Peak Hour Flow Diagrams

Automobiles, Taxis, Light
Trucks, Vans, SUV's,
Motorcycles, Heavy Trucks,
Buses, and School Buses

Boundary Road & Highway 417 North Ramps

Carlsbad Springs, ON

All Vehicles

(Except Bicycles & Electric Scooters)

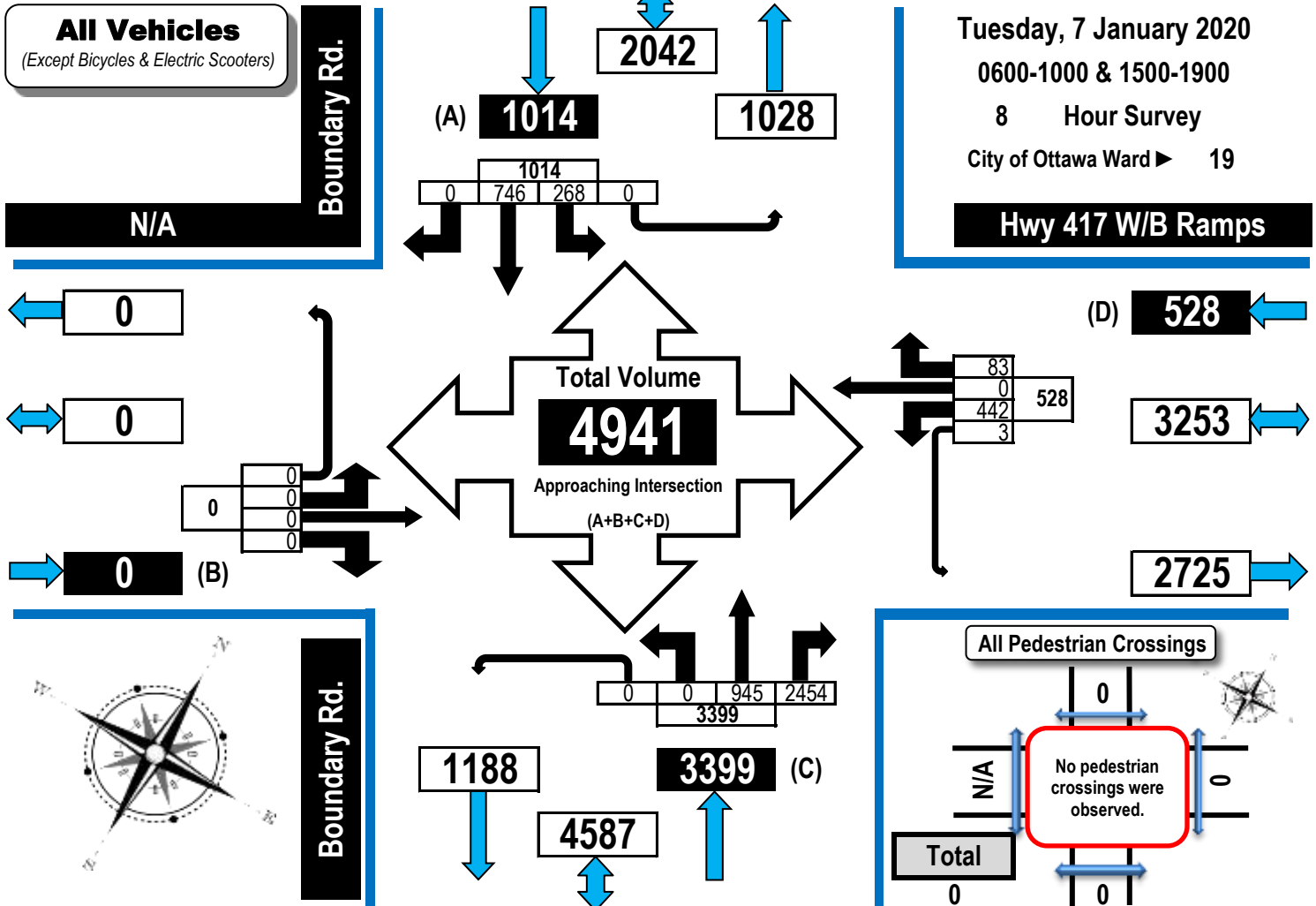
Tuesday, 7 January 2020

0600-1000 & 1500-1900

8 Hour Survey

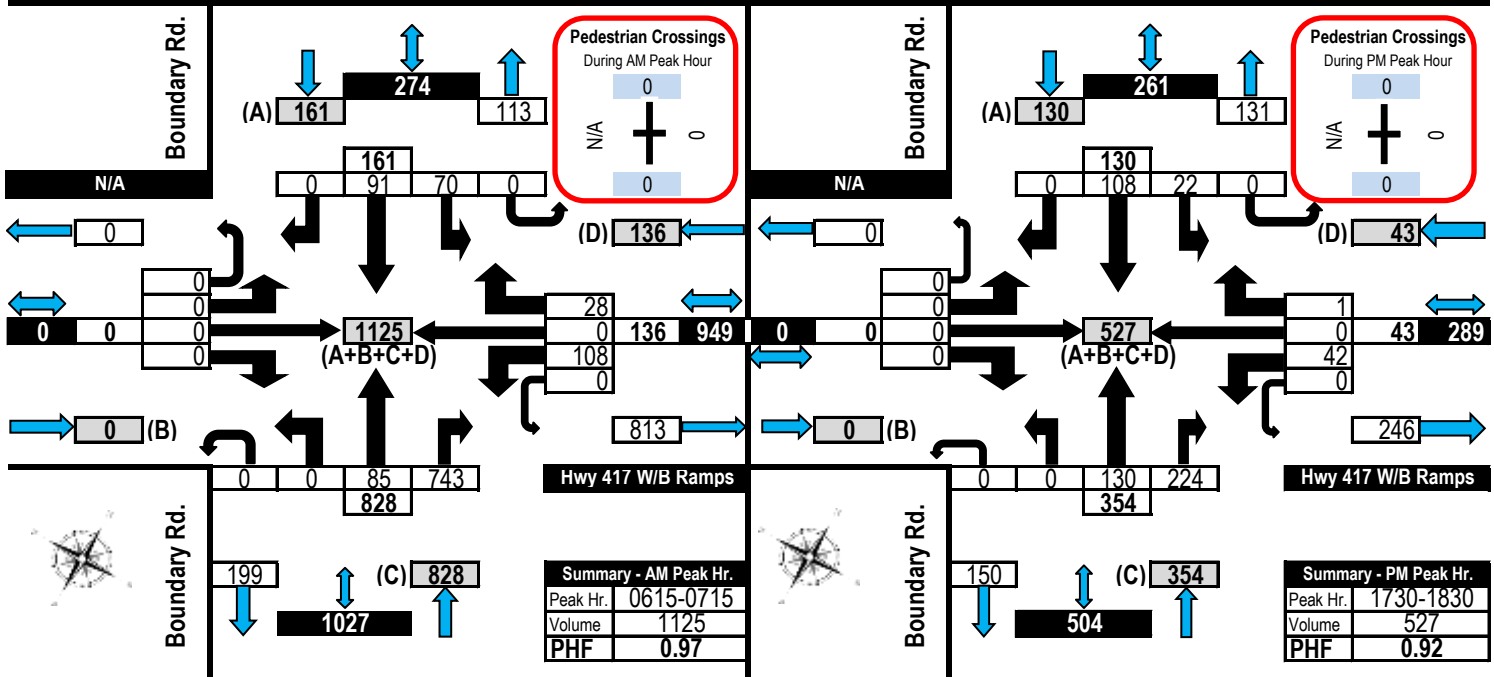
City of Ottawa Ward 19

Hwy 417 W/B Ramps



AM Peak Hour Flow Diagram

PM Peak Hour Flow Diagram





Turning Movement Count Summary, AM and PM Peak Hour Flow Diagrams

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

Boundary Road & Amazon Way/Thunder Road

Carlsbad Springs, ON

All Vehicles

(Except Bicycles & Electric Scooters)

Tuesday, 7 January 2020

0600-1000 & 1500-1900

8 Hour Survey

City of Ottawa Ward 19

Thunder Rd.

Boundary Rd.

Amazon Way

Total Volume

7336

Approaching Intersection

(A+B+C+D)

(D) 405

832

427

2855

5974

3119 (C)

All Pedestrian Crossings

Total

1

AM Peak Hour Flow Diagram

PM Peak Hour Flow Diagram

Boundary Rd.

(A) 406

1251

845

406

50

181

175

0

60

110

50

31

15

4

1310

(A+B+C+D)

23

5

31

248

135

76

62

0

14

1171

(A+B+C+D)

16

0

21

23

Boundary Rd.

188

1011

823

823

(C)

1011

217

Amazon Way

Summary - AM Peak Hr.	
Peak Hr.	0630-0730
Volume	1310
PHF	0.96

Boundary Rd.

(A) 819

1148

329

819

55

762

2

0

59

135

76

62

0

14

1171

(A+B+C+D)

16

0

21

23

781

1036

255

255

(C)

255

Amazon Way

Summary - PM Peak Hr.	
Peak Hr.	1615-1715
Volume	1171
PHF	0.92



Turning Movement Count Summary Report AADT and Expansion Factors

Automobiles, Taxis,
Light Trucks, Vans,
SUV's, Motorcycles,
Heavy Trucks, Buses,
and School Buses

Boundary Road & Mitch Owens Road

Carlsbad Springs, ON

Survey Date: Tuesday, 17 December 2019

Start Time: 0700

AADT Factor: 1.3

Weather AM: Overcast - 4°C

Survey Duration: 8 Hrs.

Survey Hours: 0700-1000, 1130-1330 & 1500-1800

Weather PM: Light snow/Rain - 4°C

Surveyor(s): Mousseau

Mitch Owens Rd.

N/A

Boundary Rd.

Boundary Rd.

Time Period	Eastbound					Westbound					Street Total	Northbound					Southbound					Street Total	Grand Total
	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot		LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot		
0700-0800	90	0	32	0	122	0	0	0	0	0	122	105	605	0	0	710	0	129	89	0	218	928	1050
0800-0900	81	0	36	0	117	0	0	0	0	0	117	56	443	0	0	499	0	107	82	0	189	688	805
0900-1000	64	0	21	0	85	0	0	0	0	0	85	48	275	0	0	323	0	89	48	0	137	460	545
1130-1230	46	0	36	0	82	0	0	0	0	0	82	32	187	0	0	219	0	171	43	0	214	433	515
1230-1330	39	0	25	0	64	0	0	0	0	0	64	26	178	0	0	204	0	175	44	0	219	423	487
1500-1600	91	0	73	0	164	0	0	0	0	0	164	55	134	0	0	189	0	473	120	0	593	782	946
1600-1700	121	0	97	0	218	0	0	0	0	0	218	50	172	0	0	222	0	551	114	0	665	887	1105
1700-1800	120	0	89	0	209	0	0	0	0	0	209	42	130	0	0	172	0	552	104	0	656	828	1037
Totals	652	0	409	0	1061	0	0	0	0	0	1061	414	2124	0	0	2538	0	2247	644	0	2891	5429	6490

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor

Applicable to the Day and Month of the Turning Movement Count

Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 → 12 expansion factor of 1.39																							
Equ. 12 Hr	906	0	569	0	1475	0	0	0	0	0	1475	575	2952	0	0	3528	0	3123	895	0	4018	7546	9021

Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 1.3																							
AADT 12-hr	1178	0	739	0	1917	0	0	0	0	0	1917	748	3838	0	0	4586	0	4060	1164	0	5224	9810	11727

24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 → 24 expansion factor of 1.31																							
AADT 24 Hr	1543	0	968	0	2512	0	0	0	0	0	2512	980	5028	0	0	6008	0	5319	1524	0	6843	12851	15363

AADT and expansion factors provided by the City of Ottawa

AM Peak Hour Factor ➡ 0.89												Highest Hourly Vehicle Volume Between 0700h & 1000h											
AM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
0700-0800	90	0	32	0	122	0	0	0	0	0	122	105	605	0	0	710	0	129	89	0	218	928	1050
OFF Peak Hour Factor ➡ 0.93												Highest Hourly Vehicle Volume Between 1130h & 1330h											
OFF Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
1130-1230	46	0	36	0	82	0	0	0	0	0	82	32	187	0	0	219	0	171	43	0	214	433	515
PM Peak Hour Factor ➡ 0.95												Highest Hourly Vehicle Volume Between 1500h & 1800h											
PM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
1630-1730	133	0	101	0	234	0	0	0	0	0	234	42	161	0	0	203	0	590	115	0	705	908	1142

Comments:

Large heavy vehicles cannot complete their turns without driving into adjacent lanes. The lack of a northbound left-turn lane results in some northbound drivers using the shoulder to pass vehicles waiting to turn. Some southbound drivers pass southbound heavy vehicles turning right onto Mitch Owens Road as the heavy vehicle turns from the southbound through lane.

Notes:

1. Includes all vehicle types except bicycles, electric bicycles, and electric scooters.
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

Carlsbad Springs, ON

Summary - PM Peak Hr.	
Peak Hr.	1630-1730
Volume	1142
PHF	0.95



Turning Movement Count Heavy Vehicle Summary Flow Diagram



Boundary Road & Mitch Owens Road Carlsbad Springs, ON

Heavy Vehicles

(Construction Vehicles, Heavy Trucks, Buses & School Buses).
Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.

Mitch Owens Rd.

Boundary Rd.

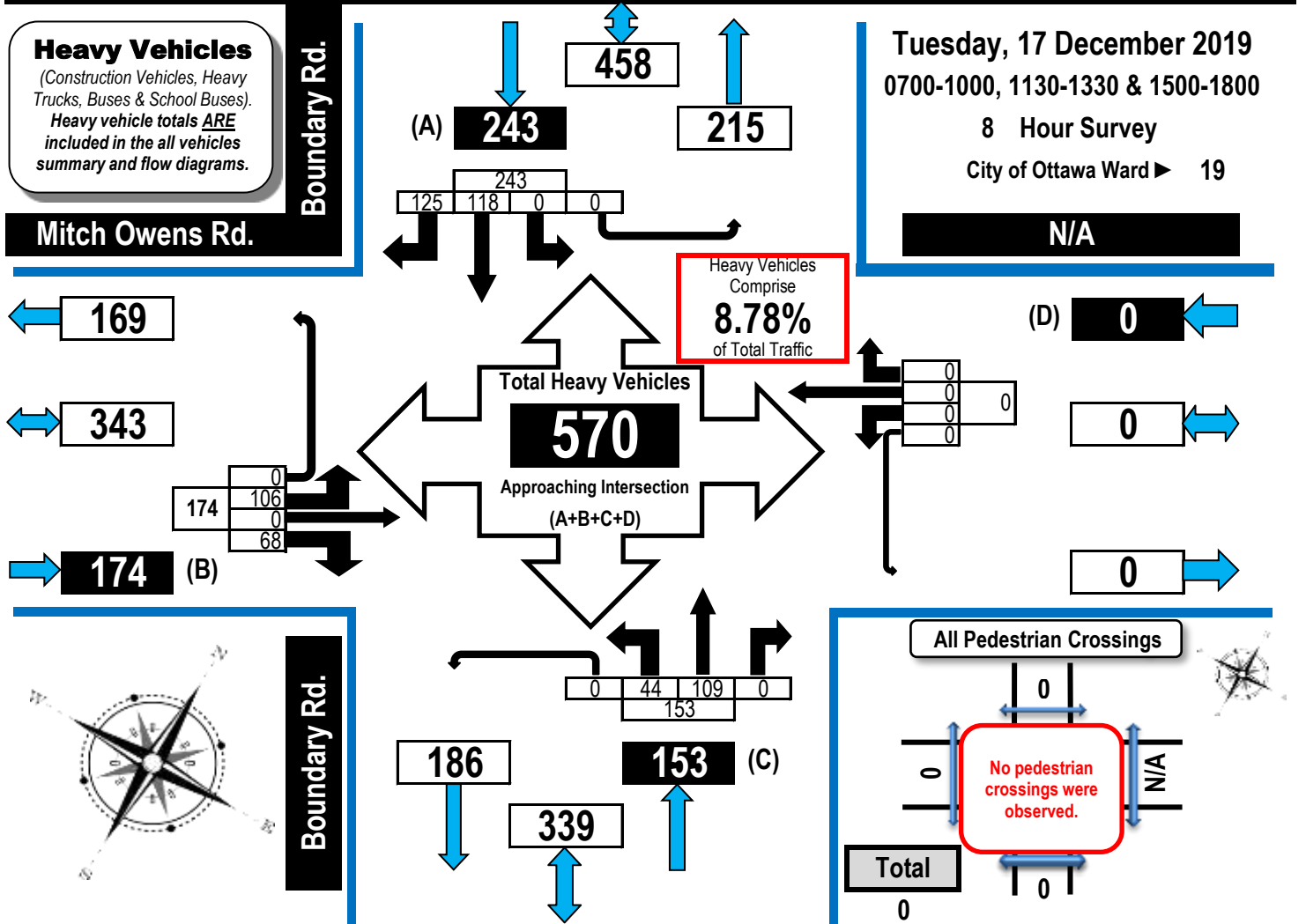
Tuesday, 17 December 2019

0700-1000, 1130-1330 & 1500-1800

8 Hour Survey

City of Ottawa Ward ► 19

N/A



Mitch Owens Rd.

N/A

Boundary Rd.

Boundary Rd.

Eastbound

Westbound

Northbound

Southbound

Time Period	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	G.Tot.
0700-0800	16	0	10	0	26	0	0	0	0	0	12	14	0	0	26	0	15	29	0	44	96
0800-0900	14	0	9	0	23	0	0	0	0	0	4	21	0	0	25	0	10	23	0	33	81
0900-1000	11	0	7	0	18	0	0	0	0	0	2	15	0	0	17	0	17	15	0	32	67
1130-1230	6	0	8	0	14	0	0	0	0	0	5	17	0	0	22	0	18	10	0	28	64
1230-1330	7	0	4	0	11	0	0	0	0	0	1	18	0	0	19	0	20	11	0	31	61
1500-1600	12	0	10	0	22	0	0	0	0	0	10	9	0	0	19	0	17	15	0	32	73
1600-1700	18	0	11	0	29	0	0	0	0	0	9	12	0	0	21	0	13	12	0	25	75
1700-1800	22	0	9	0	31	0	0	0	0	0	1	3	0	0	4	0	8	10	0	18	53
Totals	106	0	68	0	174	0	0	0	0	0	44	109	0	0	153	0	118	125	0	243	570

Comments:

Large heavy vehicles cannot complete their turns without driving into adjacent lanes. The lack of a northbound left-turn lane results in some northbound drivers using the shoulder to pass vehicles waiting to turn. Some southbound drivers pass southbound heavy vehicles turning right onto Mitch Owens Road as the heavy vehicle turns from the southbound through lane.



Turning Movement Count Bicycle Summary Flow Diagram



Boundary Road & Mitch Owens Road

Carlsbad Springs, ON

Bicycles

(Including electric bicycles and electric scooters)

Note:

Bicycle volumes are **NOT** included in vehicle totals.

Mitch Owens Rd.

Boundary Rd.

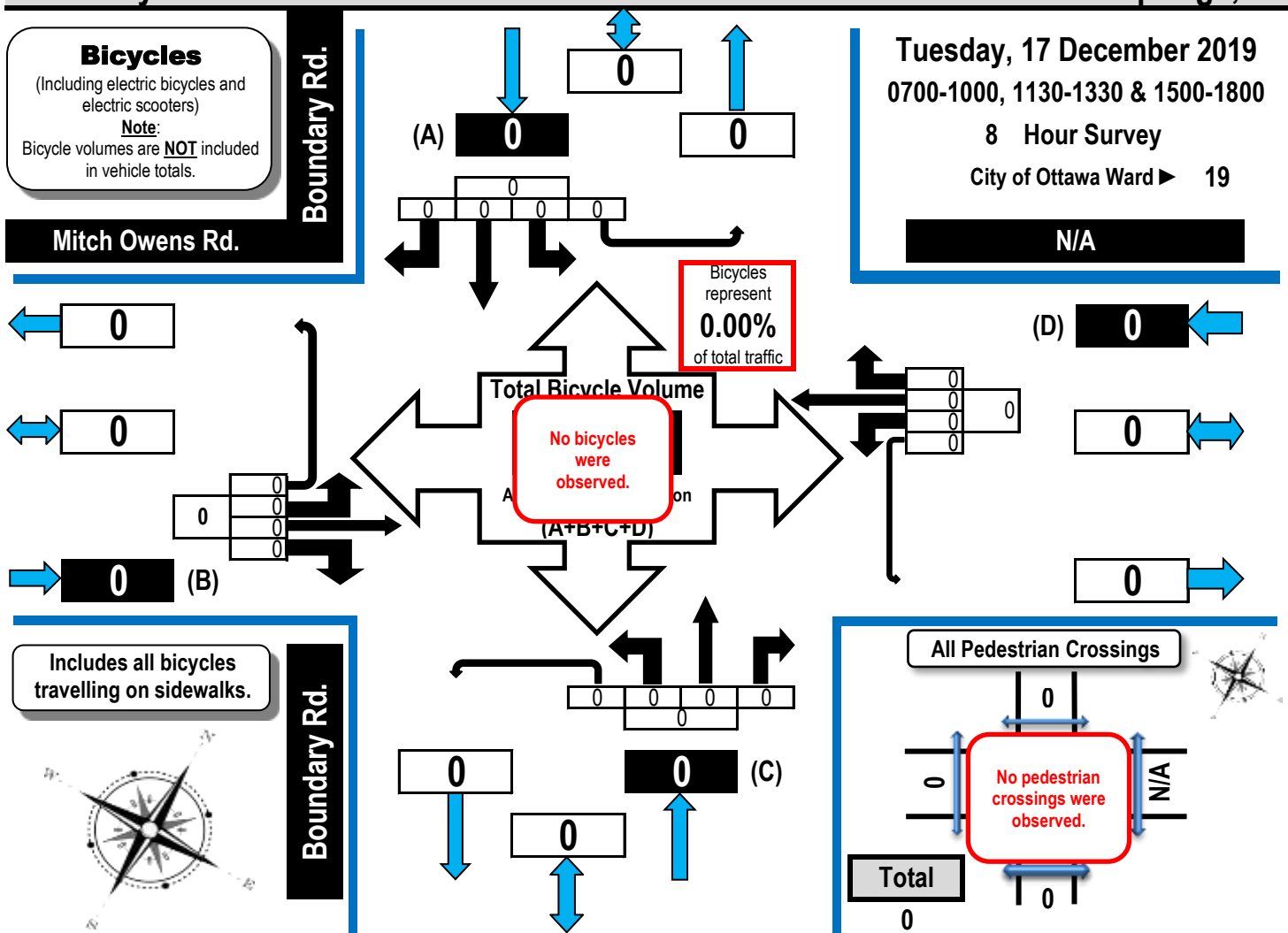
Tuesday, 17 December 2019

0700-1000, 1130-1330 & 1500-1800

8 Hour Survey

City of Ottawa Ward ► 19

N/A



Mitch Owens Rd.

Eastbound

N/A

Westbound

Boundary Rd.

Northbound

Boundary Rd.

Southbound

Time Period	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	G.Tot.
0700-0800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0800-0900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0900-1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1130-1230	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1230-1330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1500-1600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

No bicycles were observed.

Comments:

Large heavy vehicles cannot complete their turns without driving into adjacent lanes. The lack of a northbound left-turn lane results in some northbound drivers using the shoulder to pass vehicles waiting to turn. Some southbound drivers pass southbound heavy vehicles turning right onto Mitch Owens Road as the heavy vehicle turns from the southbound through lane.

Turning Movement Count Pedestrian Crossings Summary and Flow Diagram



Boundary Road & Mitch Owens Road

Carlsbad Springs, ON

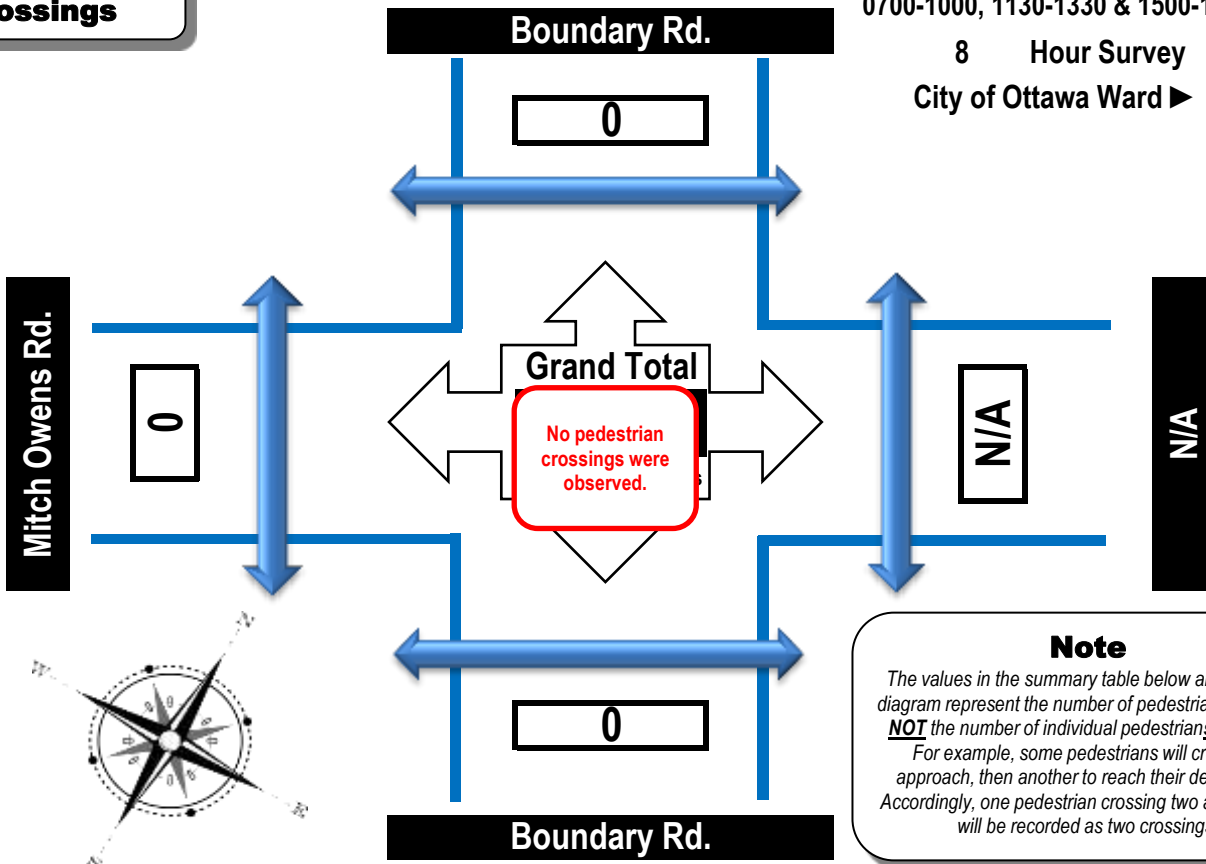
Pedestrian Crossings

Tuesday, 17 December 2019

0700-1000, 1130-1330 & 1500-1800

8 Hour Survey

City of Ottawa Ward ► 19



Time Period	West Side Crossing Mitch Owens Rd.	East Side Crossing N/A	Street Total	South Side Crossing Boundary Rd.	North Side Crossing Boundary Rd.	Street Total	Grand Total
0700-0800	0	0	0	0	0	0	0
0800-0900	0	0	0	0	0	0	0
0900-1000	0	0	0	0	0	0	0
1130-1230	0	0	0	0	0	0	0
1230-1330	0	0	0	0	0	0	0
1500-1600	0	0	0	0	0	0	0
1600-1700	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	0

No pedestrian crossings were observed.

Comments:

Large heavy vehicles cannot complete their turns without driving into adjacent lanes. The lack of a northbound left-turn lane results in some northbound drivers using the shoulder to pass vehicles waiting to turn. Some southbound drivers pass southbound heavy vehicles turning right onto Mitch Owens Road as the heavy vehicle turns from the southbound through lane.

APPENDIX E

Collision Records



City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** December 31, 2018

Location: BOUNDARY RD @ HWY 417 BOUNDARY IC96R15

Traffic Control: No control

Total Collisions: 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2016-May-01, Sun,22:14	Rain	SMV other	P.D. only	Wet	North	Turning left	Automobile, station wagon	Ran off road	
2016-Nov-13, Sun,11:05	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Mar-22, Thu,14:00	Clear	Rear end	Non-fatal injury	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Turning left	Automobile, station wagon	Other motor vehicle	

Location: BOUNDARY RD @ HWY 417 BOUNDARY IC96R16

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-Sep-12, Sat,11:19	Rain	Rear end	P.D. only	Wet	North	Going ahead	Pick-up truck	Other motor vehicle	
					North	Turning right	Pick-up truck	Other motor vehicle	

Location: BOUNDARY RD @ HWY 417 BOUNDARY IC96R51

Traffic Control: Stop sign

Total Collisions: 7

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped

2014-Jun-21, Sat,23:06	Clear	Rear end	P.D. only	Dry	North	Going ahead	Unknown	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Aug-22, Fri,16:15	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2015-May-27, Wed,18:10	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2017-Oct-04, Wed,00:19	Rain	Angle	Fatal injury	Wet	East	Turning right	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Nov-08, Wed,10:30	Clear	Sideswipe	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle
					East	Turning right	Truck and trailer	Other motor vehicle
2018-Sep-06, Thu,15:10	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Apr-11, Wed,17:10	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle

Location: BOUNDARY RD @ HWY 417 BOUNDARY IC96R61

Traffic Control: Stop sign

Total Collisions: 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-May-02, Sat,02:58	Clear	SMV other	P.D. only	Dry	South	Going ahead	Pick-up truck	Pole (sign, parking meter)	
2015-Feb-15, Sun,15:20	Clear	Rear end	P.D. only	Dry	West	Going ahead	Pick-up truck	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	

Location: BOUNDARY RD @ MITCH OWENS RD

Traffic Control: Stop sign

Total Collisions: 18

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Feb-03, Mon,21:45	Clear	SMV other	P.D. only	Dry	North	Going ahead	Pick-up truck	Animal - wild	
2014-Mar-29, Sat,10:14	Clear	SMV other	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Ran off road	
2014-Nov-08, Sat,02:00	Clear	SMV other	P.D. only	Dry	East	Turning right	Pick-up truck	Ran off road	
2014-Sep-27, Sat,08:57	Clear	SMV other	P.D. only	Dry	East	Going ahead	Pick-up truck	Fence/noice barrier	
2015-Feb-25, Wed,16:28	Clear	Angle	P.D. only	Dry	East	Going ahead	Delivery van	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jun-18, Sat,14:34	Clear	Angle	P.D. only	Dry	East	Turning left	Passenger van	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

2015-Oct-30, Fri,17:16	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Delivery van	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle
2015-Oct-13, Tue,11:34	Rain	SMV other	P.D. only	Wet	North	Overtaking	Automobile, station wagon	Skidding/sliding
2015-Oct-19, Mon,07:35	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle
2016-Jan-17, Sun,17:07	Snow	SMV other	P.D. only	Loose snow	South	Going ahead	Automobile, station wagon	Ditch
2016-Jan-01, Fri,12:28	Snow	Angle	P.D. only	Wet	East	Turning left	Delivery van	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Aug-18, Thu,17:57	Clear	Angle	P.D. only	Dry	East	Turning left	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Nov-08, Tue,17:42	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Nov-25, Fri,16:38	Fog, mist, smoke, Rear end dust		Non-fatal injury	Wet	North	Going ahead	Pick-up truck	Other motor vehicle

					North	Turning left	Automobile, station wagon	Other motor vehicle
2017-Jun-01, Thu,17:20	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Jun-09, Fri,09:25	Clear	SMV other	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Skidding/sliding
2018-Dec-02, Sun,22:30	Fog, mist, smoke, Rear end dust		Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2018-Dec-21, Fri,19:00	Fog, mist, smoke, SMV other dust		P.D. only	Ice	South	Going ahead	Automobile, station wagon	Skidding/sliding

Location: BOUNDARY RD @ NINTH LINE RD

Traffic Control: Stop sign

Total Collisions: 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Sep-06, Wed,15:07	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2017-Feb-13, Mon,15:44	Snow	Turning movement	P.D. only	Loose snow	North	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	

APPENDIX F

Relevant Excerpts from Previous Traffic Studies

The Site will operate six days a week (Monday through Saturday), and will be open between 7:00 AM and 6:00 PM.

There are no material agricultural land uses along Boundary Road between Highway 417 and the Site access location. As such, the CRRRC Site-related traffic along this section of Boundary Road will not affect the use of agricultural Site entrances or farm vehicle movements. The low usage of Frontier Road associated with the proposed secondary Site access onto the north end of Frontier Road is unlikely to adversely affect the usage of this road or Devine Road by agricultural traffic.

3.1 Trip Generation

The number of expected Site generated trips was determined by considering the amount and types of recyclable material/waste expected to be received at the Site, the anticipated diversion, and other Site activities. The Site generated trips would consist of loaded trucks entering the Site hauling waste material and surplus and impacted soils, and loaded trucks exiting the Site hauling pre-processed and composted organics and other diverted materials. The analysis examined the impact of the Site trips during the peak AM and PM hours of traffic along the adjacent roads. The calculations have assumed that the facility is operating at a maximum annual capacity of 450,000 tonnes per year of incoming material/waste. Assuming the Site operates about 300 days per year, on a typical day the Site would receive an average of 1,500 tonnes per day of various materials/waste.

It was however recognized that on some days there could be receipt of surplus or contaminated soil from excavation and/or remediation projects in addition to typical IC&I and C&D materials/waste received, as such projects are by definition episodic and event-driven. In order to account for this event-related soil traffic, for purposes of traffic analysis it was assumed that the Site might on a peak day receive 1,300 tonnes of IC&I and C&D wastes, and in addition 1,700 tonnes of soil. Therefore, to ensure potential traffic impacts were fully considered, the traffic analysis assumed a maximum 3,000 tonnes per day of materials at the CRRRC (but within the overall assumed maximum of 450,000 tonnes per year of incoming material). The analysis has assumed that employees of the facility arrive and depart outside the peak hours of the adjacent roads. The facility may operate about 300 days per year with estimated daily truck trips as follows:

- Waste Trips (IC&I and Organics) – 290,000 t per year/300 days per year @ 10 t per truck = 97 Trucks
- Waste C&D Trips – 100,000 t per year/300 days per year @ 3 t per truck = 111 Trucks
- Soil Trips – 60,000 t per year. Assume event-related 1,700 t per day @ 34 t per truck = 50 Trucks
- Diversion – Organics Diversion – 10,000 t per year/300 days @ 30 t per truck = 1 Trucks
 - C&D Wood – 30,000 t per year/300 days @ 20 t per truck = 5 Trucks
 - C&D Other – 5,000 t per year/300 days @ 30 t per truck = 1 Trucks
 - IC&I Diversion – 35,000 t per year/300 days @ 21 t per truck = 6 Trucks

The total assumed maximum daily number of trucks per day is 271 trucks entering and exiting the Site. Assuming a 10 hour day, and applying a 1.45 peaking factor to all trips entering and exiting the Site to account for random arrivals, the total assumed number of peak hour trips are:

- 271 trips per day/10 hours per day x 1.45 Peaking Factor = **40 Trips per hour** entering and exiting

In addition, the Site will generate landfill leachate that will require treatment, with the preferred option being off-Site treatment at the City of Ottawa Robert O Pickard Environmental Centre (ROPEC). The quantity of leachate would be small during the first few years of operation of the facility, but will increase to a maximum of approximately 230,000 m³/year when the Site is fully developed. The estimated maximum material for treatment would be 230,000 m³/year of landfill leachate and 35,000 m³/year of digested organics processing liquor, for a total of 265,000 m³/year. It is assumed this would be transported 250 days per year and would enter and leave the Site at regular intervals. For this reason a random arrival peaking factor was not applied. The trips related to the leachate treatment are:

- ROPEC Trips – 265,000 m³ per year/250 days per year @ 40 m³ per truck = 26 Trips per day

For a 10 hour day the expected trips relating to leachate treatment are:

- 26 Trips per day/10 hours per day = **3 Trips per hour** entering and exiting

The total peak hour trips would be **43 Truck Trips per hour** entering and exiting the Site.

Table 3.1 shows the corresponding peak hour number of truck trips entering and exiting the Site, which was used in the traffic analysis for both the peak AM and PM hours.

Table 3.1: Peak Hour Site Trips Generated

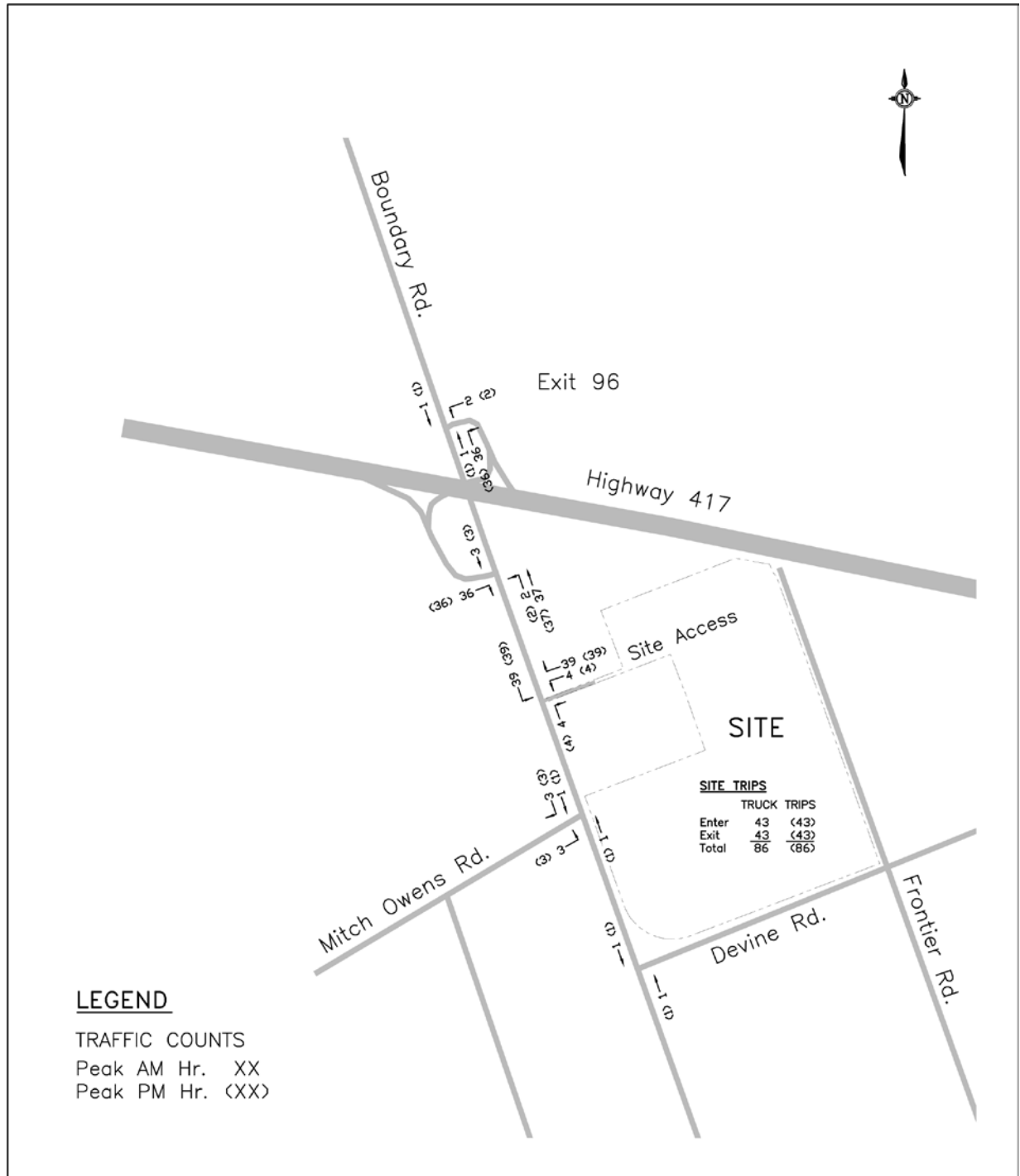
TRIPS	WEEKDAY PEAK AM HOUR			WEEKDAY PEAK PM HOUR		
	Total	Enter	Exit	Total	Enter	Exit
Truck Trips	86	43	43	86	43	43

3.2 Trip Distribution

The distribution of Site generated trips was assigned to the adjacent roads by examination of the most convenient and efficient route(s) to and from major developed and populated areas. The vast majority of the trips will utilize the Highway 417 interchange and Boundary Road, which is the direct route to/from Highway 417. The study has allocated the trips as per the following distribution:

- To/From the North (along Boundary Road) 2 percent
- To/From the West (along Highway 417) 83 percent
- To/From the East (along Highway 417) 5 percent
- To/From the West (along Mitch Owens Road) 7 percent
- To/From the South (along Boundary Road) 3 percent

The Site generated trips shown in Table 3.1 were distributed to the adjacent roads at the above proportions. Figure 3.1 shows the expected weekday peak AM and PM hour Site generated trips.



NOT TO SCALE

Figure 3.1: Weekday Peak AM and PM Hour Site Generated Trips

APPENDIX G

TDM Checklists

TDM-Supportive Development Design and Infrastructure Checklist: Non-Residential Developments (office, institutional, retail or industrial)

Legend	
REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
1. WALKING & CYCLING: ROUTES		
1.1 Building location & access points		
BASIC	1.1.1 Locate building close to the street, and do not locate parking areas between the street and building entrances	☐
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☐
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☒
1.2 Facilities for walking & cycling		
REQUIRED	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see <i>Official Plan policy 4.3.3</i>)	☐ - N/A
REQUIRED	1.2.2 Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible (see <i>Official Plan policy 4.3.12</i>)	☒ on-site connectivity provided; no public sidewalks on Boundary Road

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3 Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (<i>see Official Plan policy 4.3.10</i>)	☒
REQUIRED	1.2.4 Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (<i>see Official Plan policy 4.3.10</i>)	☒
REQUIRED	1.2.5 Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (<i>see Official Plan policy 4.3.11</i>)	☐ - N/A; no pedestrian or cycling facilities on Boundary Road
BASIC	1.2.6 Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☐
BASIC	1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☐
BASIC	1.2.8 Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☒
1.3 Amenities for walking & cycling		
BASIC	1.3.1 Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☒
BASIC	1.3.2 Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☐

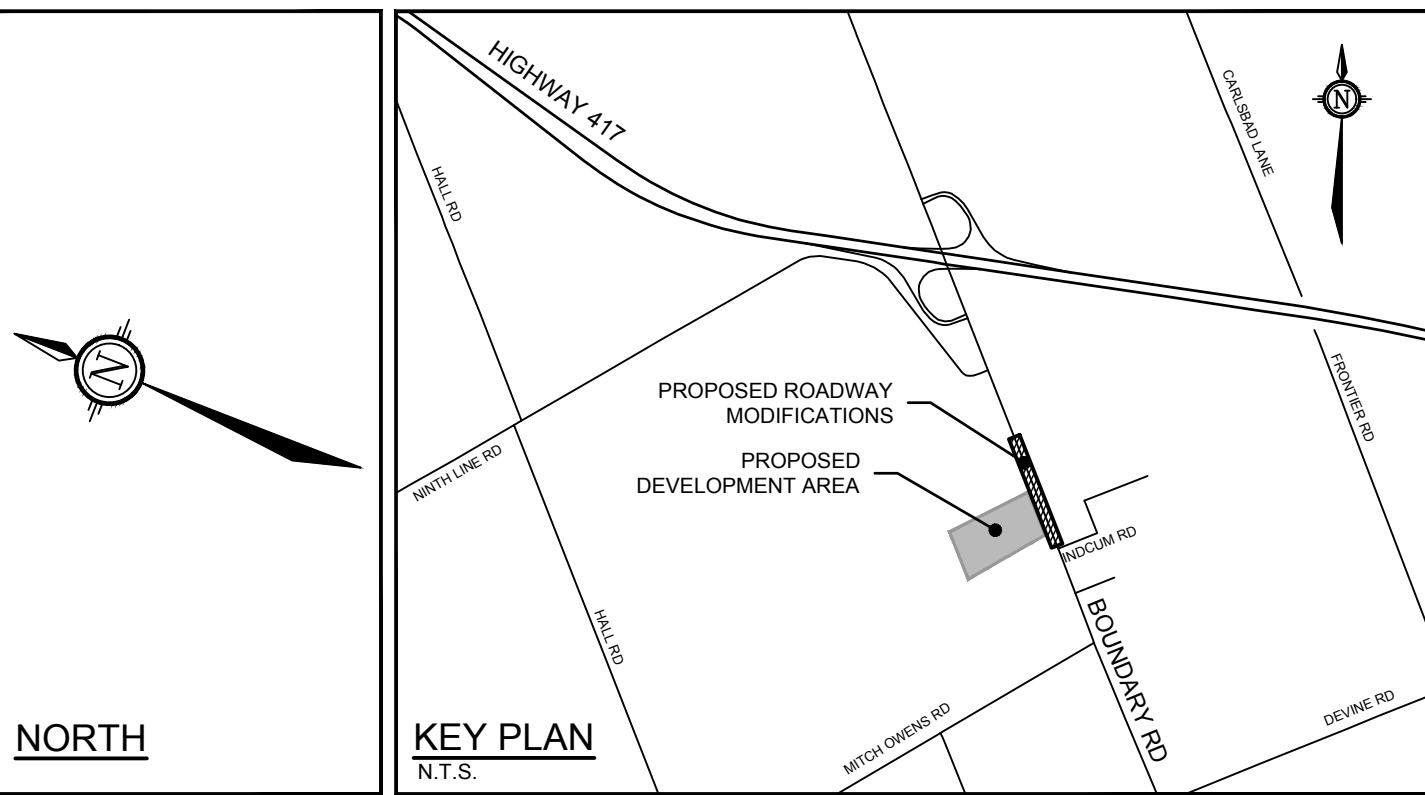
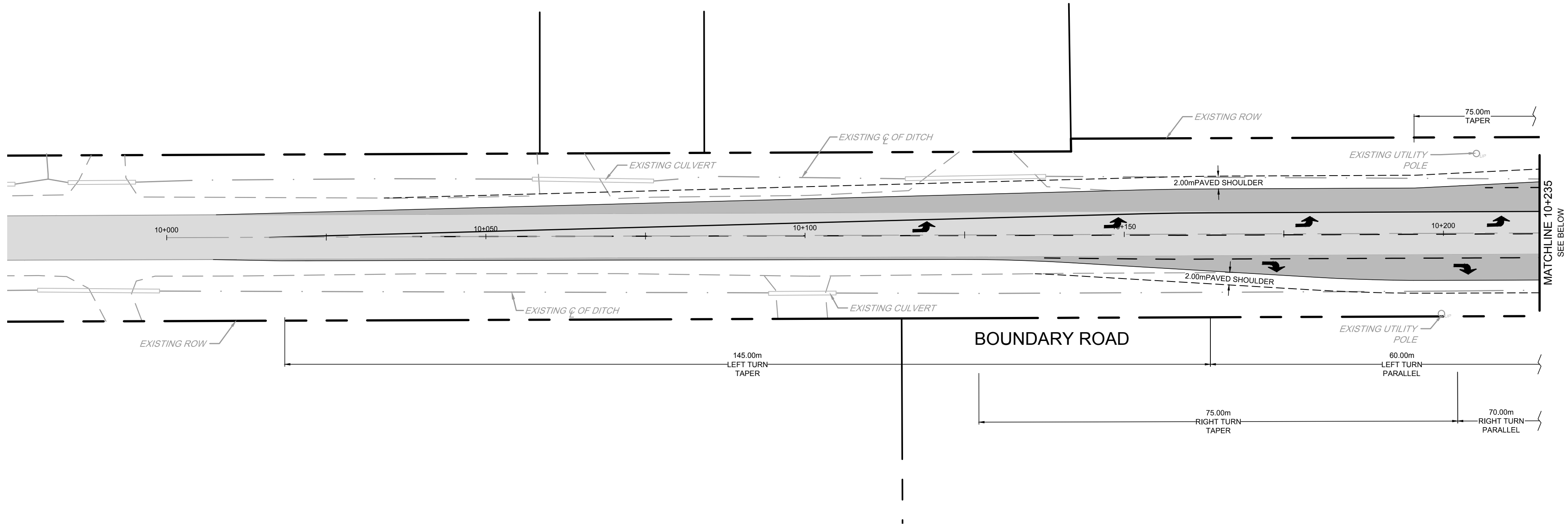
TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
2. WALKING & CYCLING: END-OF-TRIP FACILITIES		
2.1 Bicycle parking		
REQUIRED	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see <i>Official Plan policy 4.3.6</i>)	☐ - no bicycle parking required
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (see <i>Zoning By-law Section 111</i>)	☐ - no bicycle parking required
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored (see <i>Zoning By-law Section 111</i>)	☐ - N/A
BASIC	2.1.4 Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☐
BETTER	2.1.5 Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐
2.2 Secure bicycle parking		
REQUIRED	2.2.1 Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see <i>Zoning By-law Section 111</i>)	☐ - N/A
BETTER	2.2.2 Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☐
2.3 Shower & change facilities		
BASIC	2.3.1 Provide shower and change facilities for the use of active commuters	☐
BETTER	2.3.2 In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☐
2.4 Bicycle repair station		
BETTER	2.4.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
3. TRANSIT		
3.1 Customer amenities		
BASIC	3.1.1 Provide shelters, lighting and benches at any on-site transit stops	☐
BASIC	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐
4. RIDESHARING		
4.1 Pick-up & drop-off facilities		
BASIC	4.1.1 Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☐
4.2 Carpool parking		
BASIC	4.2.1 Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐
BETTER	4.2.2 At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐
5. CARSHARING & BIKESHARING		
5.1 Carshare parking spaces		
BETTER	5.1.1 Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces (<i>see Zoning By-law Section 94</i>)	☐
5.2 Bikeshare station location		
BETTER	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
6. PARKING		
6.1 Number of parking spaces		
REQUIRED	6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☒
BASIC	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (<i>see Zoning By-law Section 104</i>)	☐
BETTER	6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking (<i>see Zoning By-law Section 111</i>)	☐
6.2 Separate long-term & short-term parking areas		
BETTER	6.2.1 Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	☐
7. OTHER		
7.1 On-site amenities to minimize off-site trips		
BETTER	7.1.1 Provide on-site amenities to minimize mid-day or mid-commute errands	☐

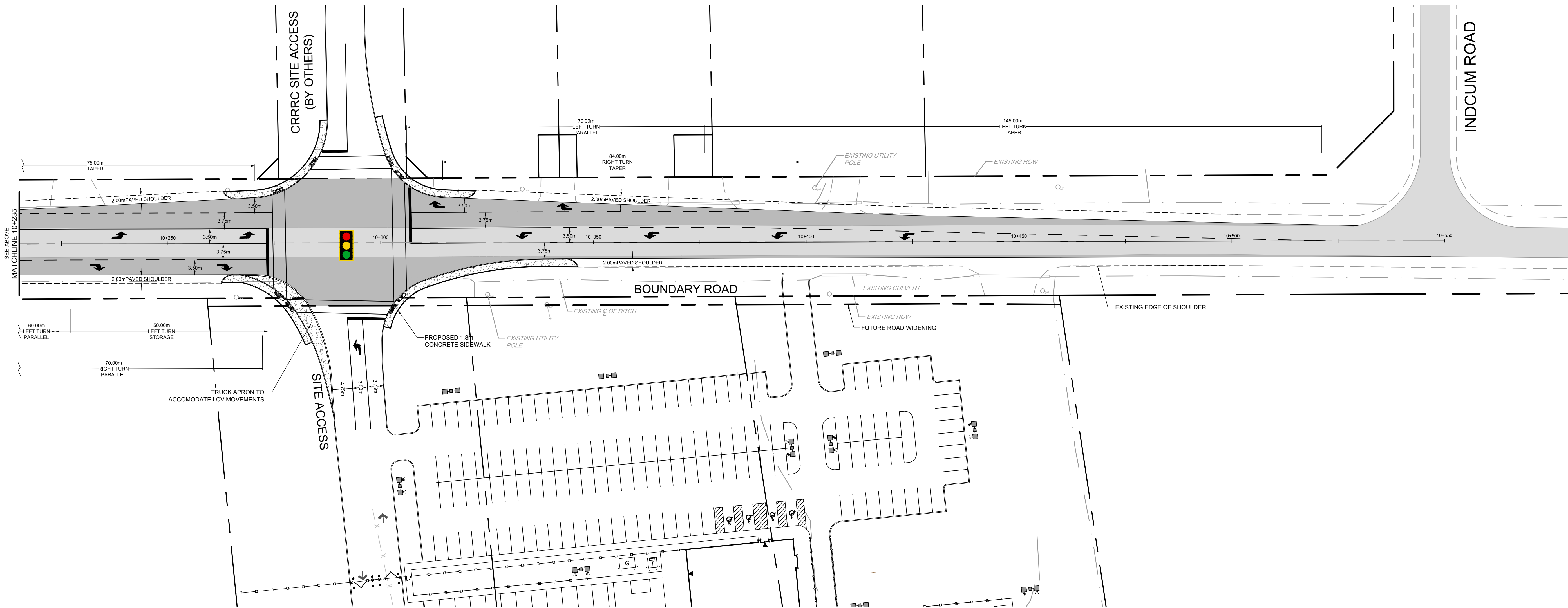
APPENDIX H

Roadway Modification Functional Design



LEGEND

- EXISTING ASPHALT ROADWAY
- PROPOSED ASPHALT ROADWAY MODIFICATION

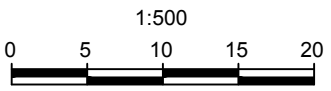


NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS,
WATERMANS, SEWERS AND OTHER
UNDERGROUND AND OVERGROUND UTILITIES AND
STRUCTURES IS NOT NECESSARILY SHOWN ON
THE CONTRACT DRAWINGS, AND WHERE SHOWN,
THE ACCURACY OF THE POSITION OF SUCH
UTILITIES AND STRUCTURES IS NOT GUARANTEED.
BEFORE STARTING WORK, DETERMINE THE EXACT
LOCATION OF ALL SUCH UTILITIES AND
STRUCTURES AND ASSUME ALL LIABILITY FOR
DAMAGE TO THEM.

No.	REVISION	DATE	BY
2.	WORK IN PROGRESS	MAR /21	JLL
1.	ISSUED FOR REVIEW	OCT 22/20	JLL

SCALE

1:500



DESIGN	RCH
CHECKED	JLL
DRAWN	RCH
CHECKED	JLS
APPROVED	JLL

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1Y6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY of OTTAWA
5510 BOUNDARY ROAD

DRAWING NAME
FUNCTIONAL DESIGN

PROJECT No.	118168-0
REV	REV #2
DRAWING No.	118168-FD

APPENDIX I

Intersection MMLOS

Intersection MMLOS Analysis

The following is a review of the multi-modal levels of service (MMLOS) of the City's study area intersections per their MMLOS Guidelines, using complete streets principles. The City's MMLOS Guidelines were used to evaluate the MMLOS for the City's signalized intersection in the study area. Additionally, the vehicular level of service (Auto LOS) has been evaluated for all signalized and unsignalized intersections in the study area. The study area intersections have been evaluated based on the targets for 'Employment Area' shown in Exhibit 22 of the MMLOS guidelines.

Exhibit 5 of the Addendum to the MMLOS guidelines has been used to evaluate the existing pedestrian level of service (PLOS) at the signalized intersection within the study area. Exhibit 22 of the MMLOS guidelines suggests a target PLOS C for all roadways within an Employment Area (Boundary Road, Thunder Road). The results of the intersection PLOS analysis are summarized in **Table 1**.

Exhibit 12 of the MMLOS guidelines has been used to evaluate the existing bicycle level of service (BLOS) at the signalized intersection within the study area. Exhibit 22 of the MMLOS guidelines suggests a target BLOS E for arterial and collector roadways with no cycling designation with an Employment Area (Boundary Road, Thunder Road). The results of the intersection BLOS analysis are summarized in **Table 2**.

Since no study area roadways are included in the City's Rapid Transit or Transit Priority networks, the transit level of service (TLOS) of the study area intersection has not been evaluated.

Exhibit 21 of the MMLOS guidelines has been used to evaluate the existing truck level of service (TkLOS) at the signalized intersection within the study area. Exhibit 22 of the MMLOS guidelines suggest a target TkLOS B for arterial truck routes within the Employment Area (Boundary Road), and a target TkLOS D for collector roadways with no truck route designation within the Employment Area (Thunder Road). The results of the intersection TkLOS analysis are summarized in **Table 3**.

Intersection capacity analysis has been conducted for the existing traffic conditions. The intersection parameters used in the analysis are consistent with the 2017 TIA Guidelines (Saturation Flow Rate: 1,800 vphpl, Peak Hour Factor: 0.9 for existing conditions). For intersections in an Employment Area, the MMLOS Guidelines identifies a target Auto LOS D, which corresponds to a vehicle-to-capacity (v/c) ratio of 0.90. MTO identifies a v/c ratio threshold of 0.85 for mitigation in its 2014 TIS Guidelines.

The results of the Synchro analysis for the AM and PM peak hours are summarized in **Table 4**. Signal timing plans are included in **Appendix K**, and detailed Synchro reports are included in **Appendix L**.

Table 1: PLOS Intersection Analysis – Boundary Road/Thunder Road

CRITERIA	North Approach		South Approach		East Approach		West Approach	
PETSI SCORE								
CROSSING DISTANCE CONDITIONS								
Median > 2.4m in Width	No	88	No	72	No	88	No	72
Lanes Crossed (3.5m Lane Width)	4		5		4		5	
SIGNAL PHASING AND TIMING								
Left Turn Conflict	Permissive	-8	Permissive	-8	Perm + Prot	-8	Permissive	-8
Right Turn Conflict	Permissive or Yield	-5	Permissive or Yield	-5	Permissive or Yield	-5	Permissive or Yield	-5
Right Turn on Red	RTOR Allowed	-3	RTOR Allowed	-3	RTOR Allowed	-3	RTOR Allowed	-3
Leading Pedestrian Interval	No	-2	No	-2	No	-2	No	-2
CORNER RADIUS								
Parallel Radius	> 5m to 10m	-5	> 10m to 15m	-6	> 5m to 10m	-5	> 10m to 15m	-6
Parallel Right Turn Channel	No Right Turn Channel	-4	No Right Turn Channel	-4	No Right Turn Channel	-4	No Right Turn Channel	-4
Perpendicular Radius	N/A	0	N/A	0	N/A	0	N/A	0
Perpendicular Right Turn Channel	N/A	0	N/A	0	N/A	0	N/A	0
CROSSING TREATMENT								
Treatment	Standard	-7	Standard	-7	Standard	-7	Standard	-7
PETSI SCORE		54	PETSI SCORE		37	PETSI SCORE		37
LOS		D	LOS		E	LOS		D
DELAY SCORE								
Cycle Length	100		100		100		100	
Pedestrian Walk Time	7.2		7.2		38.8		58.8	
DELAY SCORE		43.1	DELAY SCORE		43.1	DELAY SCORE		18.7
LOS		E	LOS		E	LOS		B
OVERALL		E	OVERALL		E	OVERALL		D
OVERALL		E	OVERALL		E	OVERALL		E

Table 2: BLOS Intersection Analysis

Approach	Facility Type ⁽¹⁾	Criteria	Travel Lanes and/or Speed	BLOS
Boundary Road/Thunder Road				
North Approach	Paved Shoulder	Right Turn Lane Characteristics	Right turn lane remains to the left of cyclists	A
		Left Turn Accommodation	One lane crossed; ≥ 60 km/h	E
South Approach	Paved Shoulder	Right Turn Lane Characteristics	Right turn lane remains to the left of cyclists	A
		Left Turn Accommodation	One lane crossed; ≥ 60 km/h	E
East Approach	Mixed Traffic	Right Turn Lane Characteristics	Right turn lane > 50 m	F
		Left Turn Accommodation	No lanes crossed; ≤ 50 km/h	B
West Approach	Mixed Traffic	Right Turn Lane Characteristics	Shared left turn/through/right turn lane	A
		Left Turn Accommodation	No lanes crossed; ≥ 60 km/h	D

1. Paved shoulder facilities are considered bike lanes for the purposes of analysis

Table 3: TkLOS Intersection Analysis

Approach	Effective Corner Radius	Number of Receiving Lanes on Departure from Intersection	TkLOS
Boundary Road/Thunder Road			
North Approach	10m to 15m	1	E
South Approach	< 10 m	1	F
East Approach	< 10 m	1	F
West Approach	10m to 15m	1	E

Table 4: Existing Traffic – Intersection Operations

Intersection	AM Peak			PM Peak		
	Max v/c or Delay	LOS	Mvmt	Max v/c or Delay	LOS	Mvmt
Boundary Road/ Highway 417 WB Ramps ⁽¹⁾	22 sec	C	WBL/R	12 sec	B	WBL/R
Boundary Road/ Highway 417 EB Ramps ⁽²⁾	0.67	B	NBT/EBR	0.85	D	EBR
Boundary Road/ Thunder Road ⁽²⁾	0.79	C	NBT	0.63	B	SBT
Boundary Road/ Mitch Owens Road ⁽¹⁾	44 sec	E	EBL	36 sec	E	EBL

1. Unsignalized intersection

2. Signalized intersection

APPENDIX J

Traffic Signal and Turn Lane Warrants

B. TRAFFIC CROSSING MAJOR STREET	50	75	50	75	90	81	64	46	39	91	121	120	TOTAL ACROSS
	(40)	(60)	(40)	(60)									
	100% FULFILLED				✓	✓	✓		✓	✓	✓	600	
	80% FULFILLED							✓				80	
	ACTUAL % IF BELOW 80% VALUE								78%			78	
									TOTAL DOWN:				758
								AVERAGE (TOTAL/8):				95%	

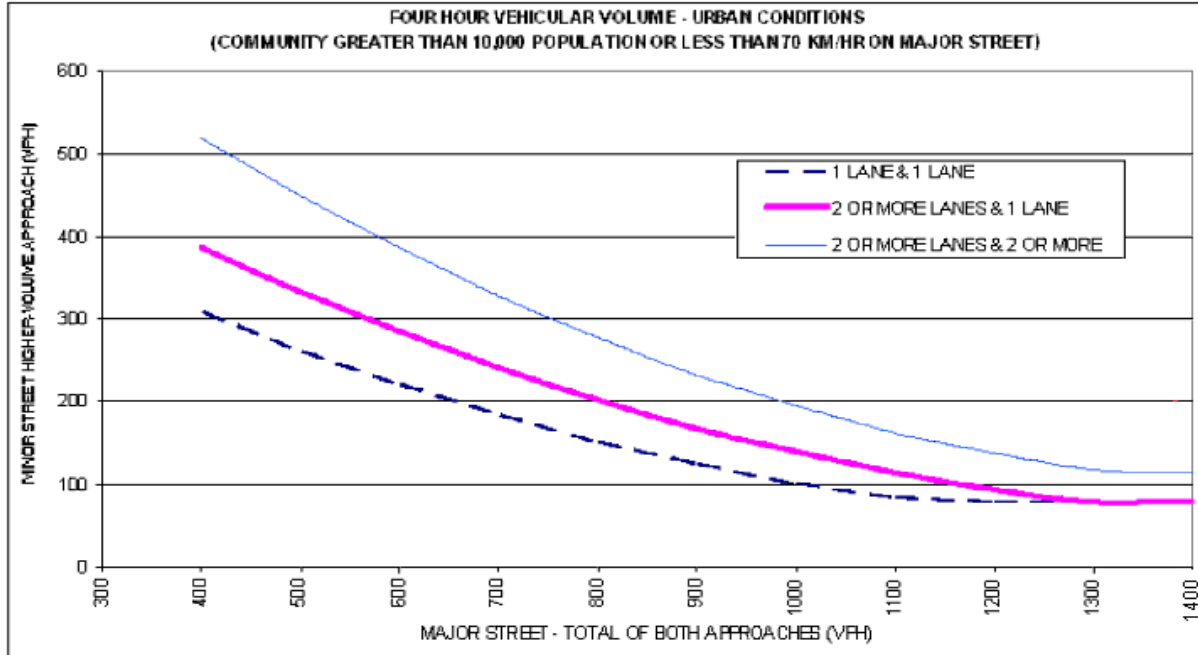
TRAFFIC SIGNAL JUSTIFICATION (EXISTING)

LOCATION: Boundary Road at Mitch Owens Road

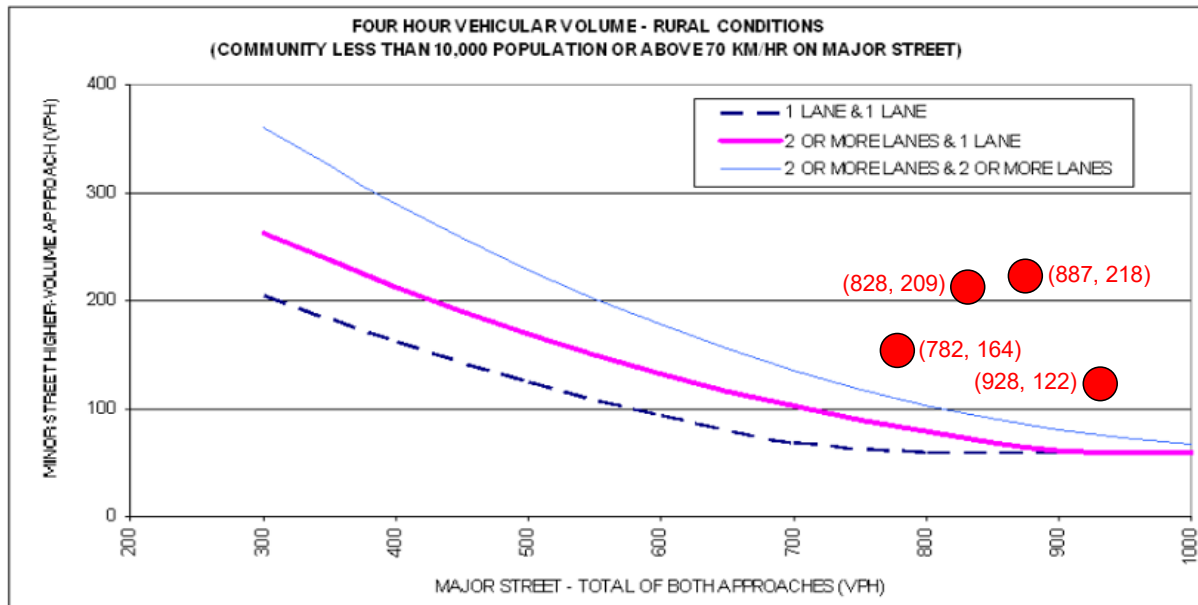
DATE: 2020 Existing Traffic

JUSTIFICATION 4 – Minimum Four-Hour Vehicle Volume

A. Restricted Flow



B. Free Flow

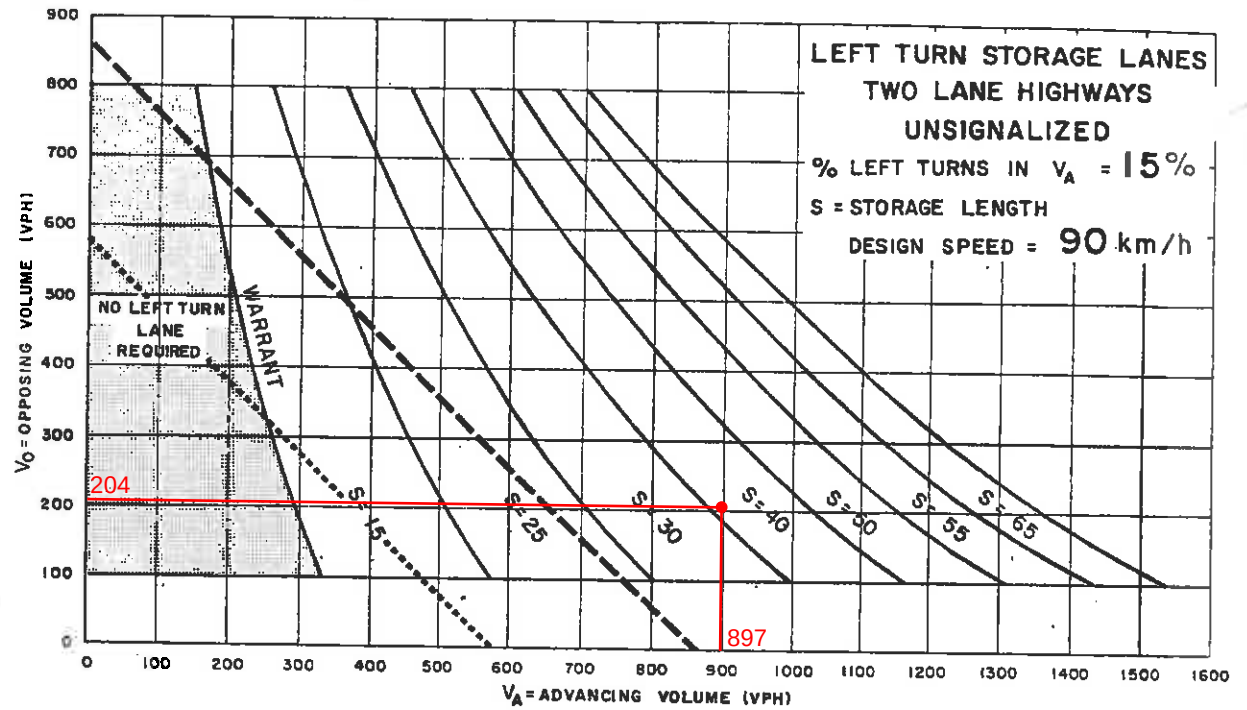


TRAFFIC SIGNAL JUSTIFICATION (EXISTING)

LOCATION: Boundary Road at Mitch Owens Road

DATE: 2020 Existing Traffic

JUSTIFICATION	DESCRIPTION	Minimum Requirement		Compliance	
		Free Flow	Restricted Flow	Sectional %	Entire % ⁽²⁾
		Operating Speed ≥ 70km/h	Operating Speed < 70 km/h		
1. MINIMUM VEHICULAR WARRANT	A. Vehicle volume, all approaches for each of the heaviest 8 hours of an average day, and	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	100%	68%
	B. Vehicle volume, along minor street, for each of the same 8 hours.	120 180 (tee intersection)	170 255 (tee intersection)	68%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume, along major street for each for the heaviest 8 hours of an average day, and	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	93%	93%
	B ⁽¹⁾ . Combined vehicle and pedestrian volume <u>crossing</u> the major street for each of the same 8 hours	50	75	95%	
3. VOLUME/DELAY COMBINATION	The above Justifications (1 and 2) both satisfied to the extent of 80% or more	No			
4. MINIMUM FOUR HOUR VEHICLE VOLUME	Plotted point representing hourly volume for minor approach vs. major approach for four highest hours of an average day fall above the applicable curve	Yes			
5. COLLISION EXPERIENCE	A. Total reported accidents of types susceptible to correction by a traffic signal, per 12 month period averaged over a 36 month period, and	2			
	B. Adequate trial of less restrictive remedies, where satisfactory observance and enforcement have failed to reduce the number of accidents	No			
6. PEDESTRIAN VOLUME AND DELAY	A. Plotted point representing 8 hour pedestrian volume vs. 8 hour vehicular volume fall in justified zone, and	No			
	B. Plotted point representing 8 hour volume of pedestrian experiencing delays of 10 s or more vs. 8 hour pedestrian volume fall in justified zone	No			



--- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

-- AM Peak Hour

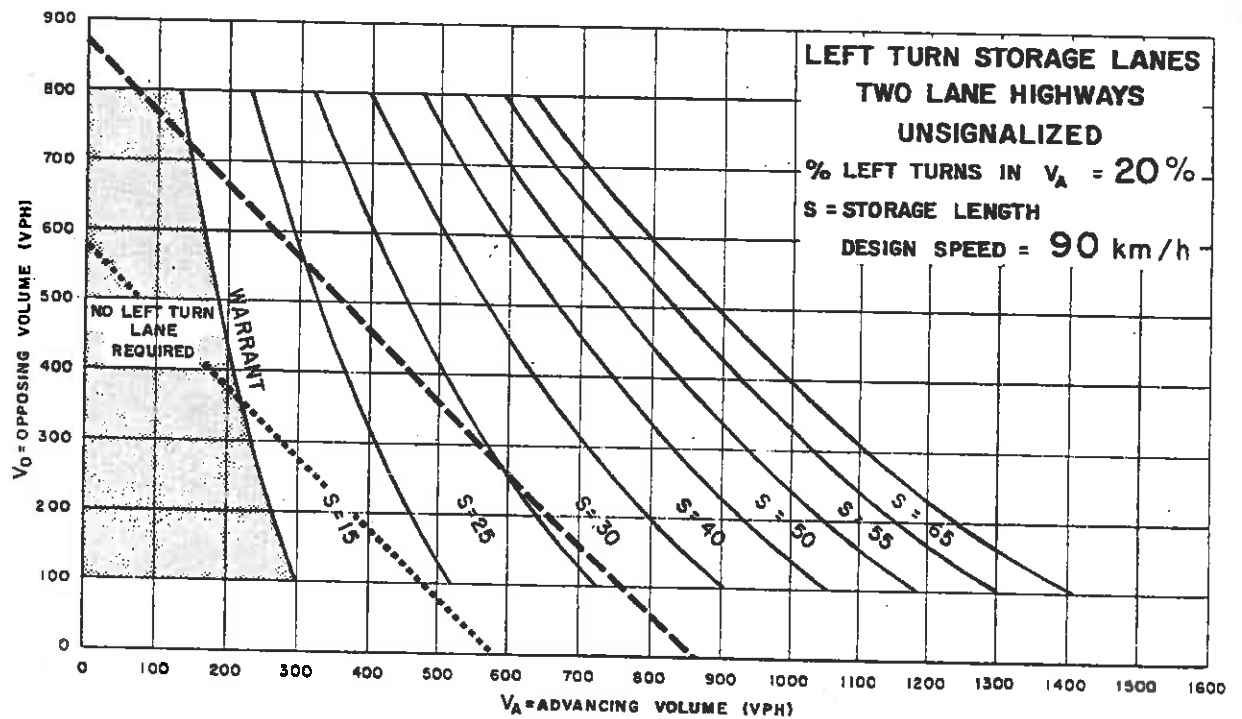
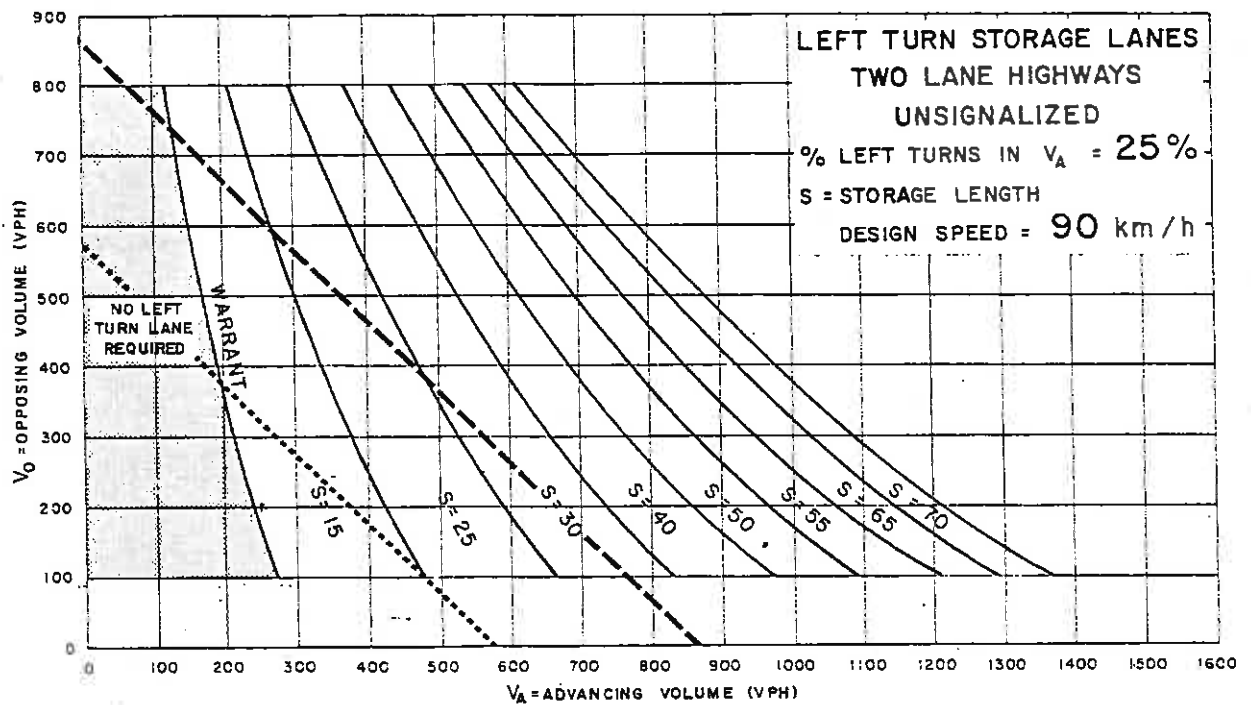


Figure EA-19

Boundary Road/Mitch Owens Road



--- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL
AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN
"FREE FLOW" URBAN AREAS

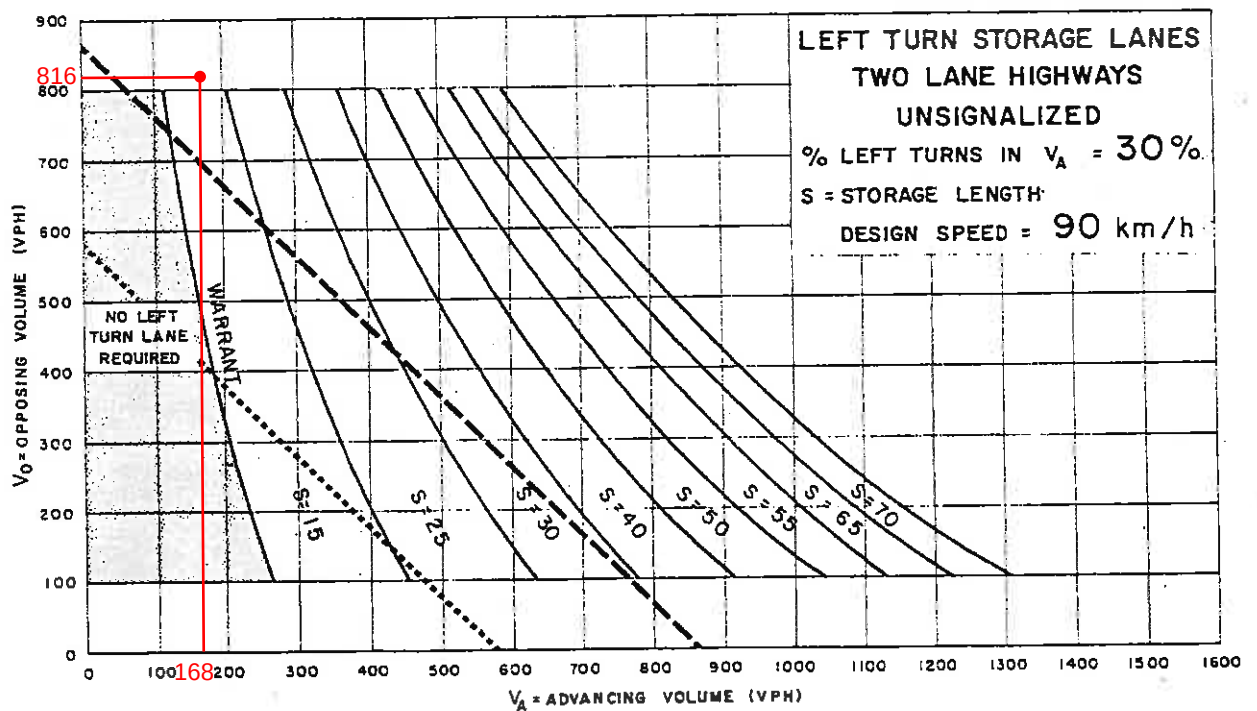


Figure EA-20

-- PM Peak Hour

TRAFFIC SIGNAL JUSTIFICATION USING PROJECTED VOLUMES

LOCATION: Boundary Road at Hwy 417 WB Ramps

YEAR: 2021 Total Traffic

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL		ENTIRE % ⁽²⁾
		OPERATING SPEED ≥ 70KM/H	OPERATING SPEED < 70 KM/H	NUMERICAL	PERCENT	
1. MINIMUM VEHICULAR WARRANT	A. Vehicle volume, all approaches (average hour)	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	624	130%	37%
	B. Vehicle volume along minor street (average hour)	120 180 (tee intersection)	170 255 (tee intersection)	44	37%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume along major street (average hour)	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	580	121%	48%
	B ⁽¹⁾ . Combined vehicle and pedestrian volume <u>crossing</u> the major street (average hour)	50	75	24	48%	

NOTES

- 1) For definition of crossing volume refer to the Ontario Traffic Manual Book 12, Section 4.5 (Nov. 2007).
- 2) The lowest sectional percentage governs the entire Justification.
- 3) Average hourly volumes estimated from peak hour volumes, $AHV = PM / 2$ or $AHV = (AM + PM) / 4$.

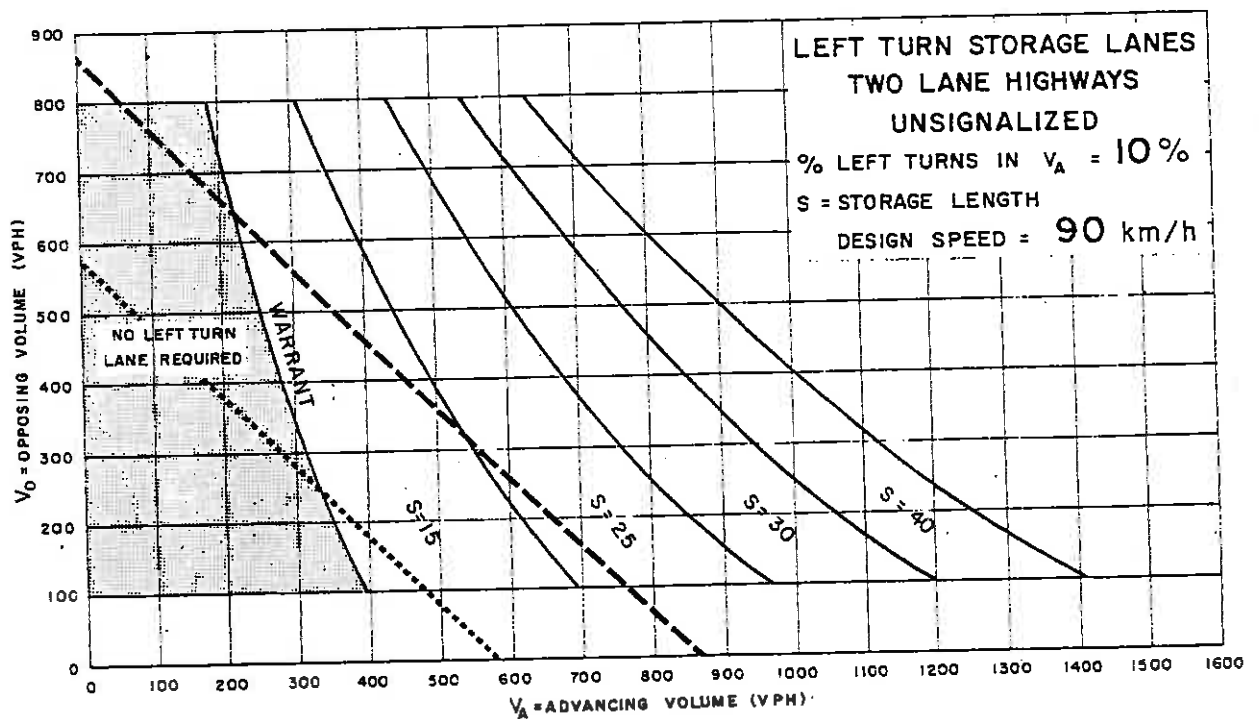
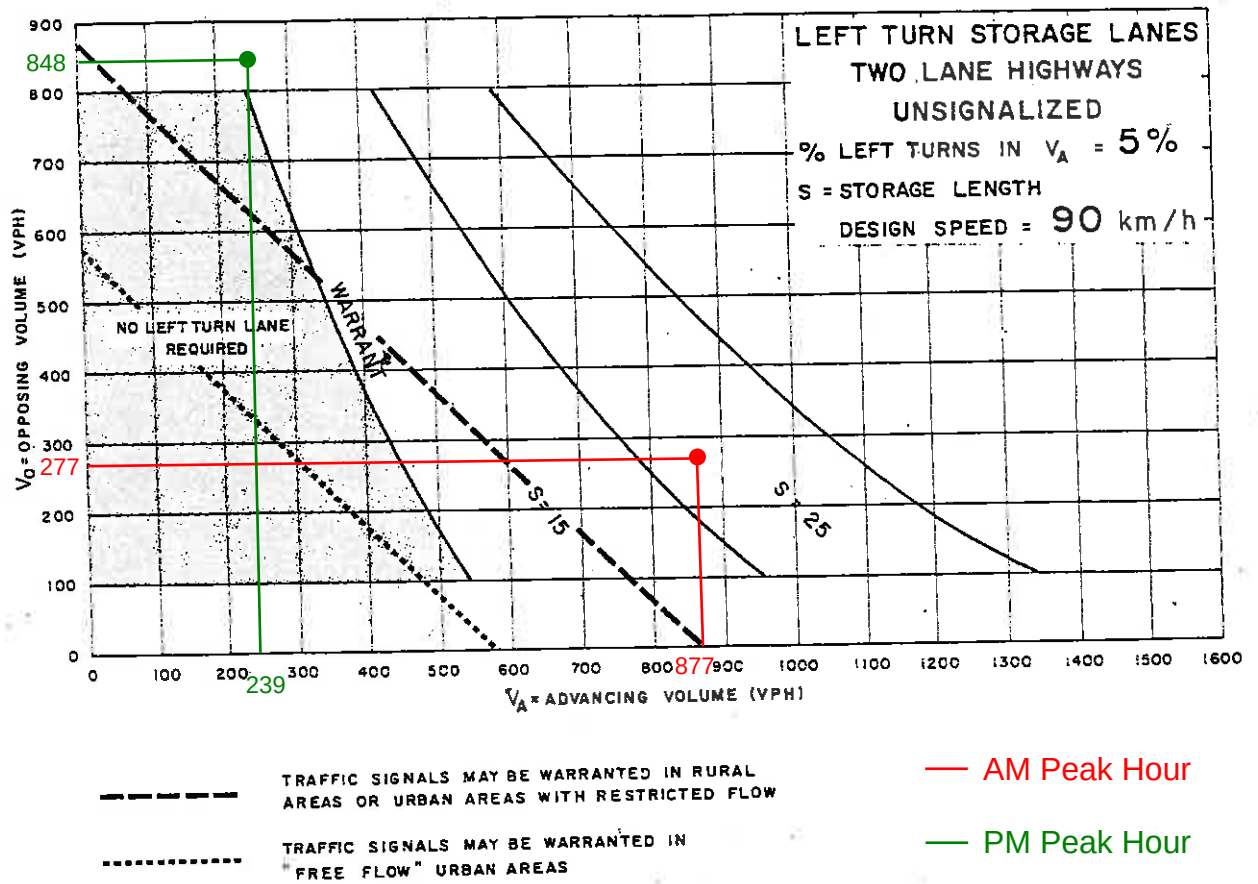


Figure EA-18

TRAFFIC SIGNAL JUSTIFICATION USING PROJECTED VOLUMES

LOCATION: Boundary Road at Hwy 417 WB Ramps

YEAR: 2026 Total Traffic

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL		ENTIRE % ⁽²⁾
		OPERATING SPEED ≥ 70KM/H	OPERATING SPEED < 70 KM/H	NUMERICAL	PERCENT	
1. MINIMUM VEHICULAR WARRANT	A. Vehicle volume, all approaches (average hour)	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	680	142%	37%
	B. Vehicle volume along minor street (average hour)	120 180 (tee intersection)	170 255 (tee intersection)	44	37%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume along major street (average hour)	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	636	133%	48%
	B ⁽¹⁾ . Combined vehicle and pedestrian volume <u>crossing</u> the major street (average hour)	50	75	24	48%	

NOTES

- 1) For definition of crossing volume refer to the Ontario Traffic Manual Book 12, Section 4.5 (Nov. 2007).
- 2) The lowest sectional percentage governs the entire Justification.
- 3) Average hourly volumes estimated from peak hour volumes, $AHV = PM / 2$ or $AHV = (AM + PM) / 4$.

TRAFFIC SIGNAL JUSTIFICATION USING PROJECTED VOLUMES

LOCATION: Boundary Road at Hwy 417 WB Ramps

YEAR: 2031 Total Traffic

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL		ENTIRE % ⁽²⁾
		OPERATING SPEED ≥ 70KM/H	OPERATING SPEED < 70 KM/H	NUMERICAL	PERCENT	
1. MINIMUM VEHICULAR WARRANT	A. Vehicle volume, all approaches (average hour)	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	742	155%	37%
	B. Vehicle volume along minor street (average hour)	120 180 (tee intersection)	170 255 (tee intersection)	44	37%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume along major street (average hour)	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	636	133%	48%
	B ⁽¹⁾ . Combined vehicle and pedestrian volume <u>crossing</u> the major street (average hour)	50	75	24	48%	

NOTES

- 1) For definition of crossing volume refer to the Ontario Traffic Manual Book 12, Section 4.5 (Nov. 2007).
- 2) The lowest sectional percentage governs the entire Justification.
- 3) Average hourly volumes estimated from peak hour volumes, $AHV = PM / 2$ or $AHV = (AM + PM) / 4$.

TRAFFIC SIGNAL JUSTIFICATION USING PROJECTED VOLUMES

LOCATION: Boundary Road at Hwy 417 WB Ramps

YEAR: 2026 Total Traffic

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL		ENTIRE % ⁽²⁾
		OPERATING SPEED ≥ 70KM/H	OPERATING SPEED < 70 KM/H	NUMERICAL	PERCENT	
1. MINIMUM VEHICULAR WARRANT	A. Vehicle volume, all approaches (average hour)	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	512	107%	32%
	B. Vehicle volume along minor street (average hour)	120 180 (tee intersection)	170 255 (tee intersection)	57	32%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume along major street (average hour)	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	456	95%	95%
	B ⁽¹⁾ . Combined vehicle and pedestrian volume <u>crossing</u> the major street (average hour)	50	75	49	98%	

NOTES

- 1) For definition of crossing volume refer to the Ontario Traffic Manual Book 12, Section 4.5 (Nov. 2007).
- 2) The lowest sectional percentage governs the entire Justification.
- 3) Average hourly volumes estimated from peak hour volumes, $AHV = PM / 2$ or $AHV = (AM + PM) / 4$.

TRAFFIC SIGNAL JUSTIFICATION USING PROJECTED VOLUMES

LOCATION: Boundary Road at Hwy 417 WB Ramps

YEAR: 2031 Background Traffic

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL		ENTIRE % ⁽²⁾
		OPERATING SPEED ≥ 70KM/H	OPERATING SPEED < 70 KM/H	NUMERICAL	PERCENT	
1. MINIMUM VEHICULAR WARRANT	A. Vehicle volume, all approaches (average hour)	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	534	111%	32%
	B. Vehicle volume along minor street (average hour)	120 180 (tee intersection)	170 255 (tee intersection)	57	32%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume along major street (average hour)	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	477	99%	96%
	B ⁽¹⁾ . Combined vehicle and pedestrian volume <u>crossing</u> the major street (average hour)	50	75	48	96%	

NOTES

- 1) For definition of crossing volume refer to the Ontario Traffic Manual Book 12, Section 4.5 (Nov. 2007).
- 2) The lowest sectional percentage governs the entire Justification.
- 3) Average hourly volumes estimated from peak hour volumes, $AHV = PM / 2$ or $AHV = (AM + PM) / 4$.

TRAFFIC SIGNAL JUSTIFICATION USING PROJECTED VOLUMES

LOCATION: Boundary Road at Hwy 417 WB Ramps

YEAR: 2031 Total Traffic

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL		ENTIRE % ⁽²⁾
		OPERATING SPEED ≥ 70KM/H	OPERATING SPEED < 70 KM/H	NUMERICAL	PERCENT	
1. MINIMUM VEHICULAR WARRANT	A. Vehicle volume, all approaches (average hour)	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	561	117%	35%
	B. Vehicle volume along minor street (average hour)	120 180 (tee intersection)	170 255 (tee intersection)	62	34%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume along major street (average hour)	480 600 (2 or more lane approach)	720 900 (2 or more lane approach)	499	104%	104%
	B ⁽¹⁾ . Combined vehicle and pedestrian volume <u>crossing</u> the major street (average hour)	50	75	53	106%	

NOTES

- 1) For definition of crossing volume refer to the Ontario Traffic Manual Book 12, Section 4.5 (Nov. 2007).
- 2) The lowest sectional percentage governs the entire Justification.
- 3) Average hourly volumes estimated from peak hour volumes, $AHV = PM / 2$ or $AHV = (AM + PM) / 4$.

APPENDIX K

Signal Timing Plans

Traffic Signal Timing

City of Ottawa, Transportation Services Department

Traffic Signal Operations Unit

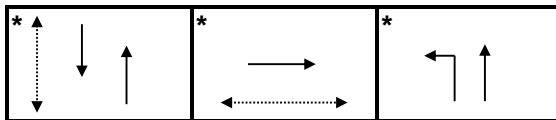
Intersection:	<i>Main:</i> Boundary	<i>Side:</i> Hwy 417 EB Ramps
Controller:	ATC 3	TSD: 5861
Author:	Matthew Anderson	Date: 08-Feb-2021

Existing Timing Plans[†]

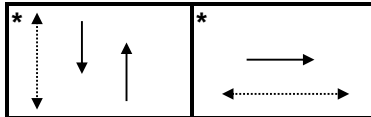
	Plan						Ped Minimum Time		
	AM Peak 1	Off Peak 2	PM Peak 3	Night 4	Weekend 5	Early AM 6	Walk	DW	A+R
Cycle	100	Free	100	Free	Free	Free			
Offset	11	X	19	X	X	X			
NB Thru	80	max = 46.6	75	max = 46.6	max = 46.6	max = 46.6	-	-	4.6+2.0
SB Thru	68	max = 46.6	63	max = 46.6	max = 46.6	max = 46.6	7	21	4.6+2.0
EB Thru	20	max = 31.8	25	max = 31.8	max = 31.8	max = 31.8	7	5	3.0+3.8
NB Left	12	-	12	-	-	-	-	-	4.6+1.4

Phasing Sequence[‡]

Plan: 1 & 3



2, 4, 5 & 6



Notes: 1) The NB and SB movements have a min recall of 35 seconds green for all plans

Schedule

Weekday

Time	Plan
0:15	4
5:30	6
6:30	1
8:30	2
15:30	3
18:30	2
21:00	4

Saturday

Time	Plan
0:15	4
8:30	5
21:00	4

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄.....► Pedestrian signal

Cost is \$59.96 (\$53.06 + HST)

Traffic Signal Timing

City of Ottawa, Transportation Services Department

Traffic Signal Operations Unit

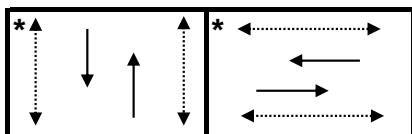
Intersection:	<i>Main:</i> Boundary	<i>Side:</i> Thunder
Controller:	ATC 3	TSD: 5856
Author:	Matthew Anderson	Date: 11-Sep-2020

Existing Timing Plans[†]

	Plan						Ped Minimum Time		
	AM Peak 1	Off Peak 2	PM Peak 3	Night 4	Weekend 5	Early AM 6	Walk	DW	A+R
Cycle	100	Free	100	Free	Free	Free			
Offset	0	X	0	X	X	X			
NB Thru	55	max 46.2	55	max 36.2	max 46.2	max 46.2	7	10	4.6+1.6
SB Thru	75	max 46.2	75	max 36.2	max 46.2	max 46.2	7	10	4.6+1.6
EB Thru	25	max 30.8	25	max 30.8	max 30.8	max 25.8	7	12	3.7+2.1
WB Thru	25	max 30.8	25	max 30.8	max 30.8	max 45.8	7	12	3.7+2.1
SB Left	20	max 26.0	20	max 36.2	max 46.2	max 46.2	-	-	4.6+1.4

Phasing Sequence[‡]

Plan: All



Note: All plans have a minimum recall on the NS movement of 20 seconds green

Schedule

Weekday

Time	Plan
0:15	4
5:30	6
6:30	1
8:30	2
15:30	3
18:30	2
21:00	4

Weekend

Time	Plan
0:15	4
8:30	5
21:00	4

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◀.....▶ Pedestrian signal

Cost is \$58.78 (\$52.02 + HST)

APPENDIX L

Synchro Analysis

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
Existing Traffic

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	108	28	85	743	70	91
Future Volume (vph)	108	28	85	743	70	91
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.972		0.879			
Flt Protected	0.962					0.979
Satd. Flow (prot)	1605	0	1548	0	0	1620
Flt Permitted	0.962					0.979
Satd. Flow (perm)	1605	0	1548	0	0	1620
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	120	31	94	826	78	101
Shared Lane Traffic (%)						
Lane Group Flow (vph)	151	0	920	0	0	179
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	80.4%			ICU Level of Service D		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
Existing Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	16	233	29	816	173	8
Future Volume (vph)	16	233	29	816	173	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.994	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1645	0
Flt Permitted	0.950		0.579			
Satd. Flow (perm)	1383	1438	957	1784	1645	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		259			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	18	259	32	907	192	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	259	32	907	201	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
Existing Traffic



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	11.1	11.1	76.1	75.5	68.1	
Actuated g/C Ratio	0.11	0.11	0.76	0.76	0.68	
v/c Ratio	0.12	0.67	0.04	0.67	0.18	
Control Delay	40.7	14.2	2.1	6.4	7.5	
Queue Delay	0.0	0.0	0.0	0.1	0.0	
Total Delay	40.7	14.2	2.1	6.5	7.5	
LOS	D	B	A	A	A	
Approach Delay	15.9			6.4	7.5	
Approach LOS	B			A	A	
Queue Length 50th (m)	3.0	0.0	0.8	30.9	12.8	
Queue Length 95th (m)	8.6	20.1	m0.4	22.9	25.9	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	189	420	766	1355	1132	
Starvation Cap Reductn	0	0	0	30	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.10	0.62	0.04	0.68	0.18	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 8.4

Intersection LOS: A

Intersection Capacity Utilization 64.9%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
Existing Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	15	4	3	5	23	5	791	27	175	181	50
Future Volume (vph)	31	15	4	3	5	23	5	791	27	175	181	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.990				0.850			0.850		0.967	
Flt Protected		0.970			0.984		0.950			0.950		
Satd. Flow (prot)	0	1683	0	0	1756	1517	1441	1767	1517	1695	1569	0
Flt Permitted		0.806			0.890		0.600			0.156		
Satd. Flow (perm)	0	1398	0	0	1588	1517	910	1767	1482	278	1569	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				100			96		32	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			1291.5			254.7	
Travel Time (s)		7.0			13.9			58.1			11.5	
Confl. Peds. (#/hr)									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%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	34	17	4	3	6	26	6	879	30	194	201	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	55	0	0	9	26	6	879	30	194	257	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
Existing Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.7			10.7	10.7	62.9	62.9	62.9	80.7	81.7	
Actuated g/C Ratio		0.11			0.11	0.11	0.63	0.63	0.63	0.81	0.82	
v/c Ratio		0.36			0.05	0.10	0.01	0.79	0.03	0.50	0.20	
Control Delay		46.5			40.2	0.8	10.8	23.6	0.1	10.6	2.4	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		46.5			40.2	0.8	10.8	23.6	0.1	10.6	2.4	
LOS		D			D	A	B	C	A	B	A	
Approach Delay		46.5			11.0			22.8			6.0	
Approach LOS		D			B			C			A	
Queue Length 50th (m)		8.8			1.5	0.0	0.4	113.4	0.0	5.2	6.0	
Queue Length 95th (m)		19.2			5.7	0.0	2.3	#225.1	0.0	18.8	12.1	
Internal Link Dist (m)		93.2			130.3			1267.5			230.7	
Turn Bay Length (m)							30.0		10.0	70.0		
Base Capacity (vph)		270			304	372	572	1111	967	433	1288	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.20			0.03	0.07	0.01	0.79	0.03	0.45	0.20	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 18.2

Intersection LOS: B

Intersection Capacity Utilization 78.7%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
Existing Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	68	27	121	776	110	94
Future Volume (vph)	68	27	121	776	110	94
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	0.0			25.0
Storage Lanes	1	1	0			1
Taper Length (m)	45.0		50.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950			0.993		
Satd. Flow (prot)	1572	1289	0	1721	1733	1432
Flt Permitted	0.950			0.993		
Satd. Flow (perm)	1572	1289	0	1721	1733	1432
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	1291.5	
Travel Time (s)	18.4			29.3	58.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	76	30	134	862	122	104
Shared Lane Traffic (%)						
Lane Group Flow (vph)	76	30	0	996	122	104
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 67.5%	ICU Level of Service C					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
Existing Traffic

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	42	1	130	224	22	108
Future Volume (vph)	42	1	130	224	22	108
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997		0.914			
Flt Protected	0.953					0.992
Satd. Flow (prot)	1506	0	1585	0	0	1706
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1506	0	1585	0	0	1706
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	15%	5%	10%	2%	10%	5%
Adj. Flow (vph)	47	1	144	249	24	120
Shared Lane Traffic (%)						
Lane Group Flow (vph)	48	0	393	0	0	144
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	35.9%			ICU Level of Service A		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
Existing Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	70	631	133	196	188	15
Future Volume (vph)	70	631	133	196	188	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1572	1733	1698	0
Flt Permitted	0.950		0.557			
Satd. Flow (perm)	1647	1480	921	1733	1698	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		701			7	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	2%	10%	5%	5%	20%
Adj. Flow (vph)	78	701	148	218	209	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	78	701	148	218	226	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
Existing Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	25.0	25.0	12.0	75.0	63.0	
Total Split (%)	25.0%	25.0%	12.0%	75.0%	63.0%	
Maximum Green (s)	18.2	18.2	6.0	68.4	56.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	16.0	16.0	71.2	70.6	55.7	
Actuated g/C Ratio	0.16	0.16	0.71	0.71	0.56	
v/c Ratio	0.30	0.85	0.21	0.18	0.24	
Control Delay	37.1	13.4	9.0	9.4	14.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	37.1	13.4	9.0	9.4	14.5	
LOS	D	B	A	A	B	
Approach Delay	15.8			9.2	14.5	
Approach LOS	B			A	B	
Queue Length 50th (m)	13.2	0.0	9.6	16.1	15.8	
Queue Length 95th (m)	20.2	29.5	24.6	35.6	45.7	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	341	862	713	1267	1029	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.23	0.81	0.21	0.17	0.22	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 13.8

Intersection LOS: B

Intersection Capacity Utilization 81.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
Existing Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	0	14	5	0	16	4	251	0	2	762	55
Future Volume (vph)	62	0	14	5	0	16	4	251	0	2	762	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.975				0.850						0.990
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1610	0	0	1695	1517	1695	1655	1784	1695	1749	0
Flt Permitted		0.762			0.770		0.297			0.543		
Satd. Flow (perm)	0	1276	0	0	1374	1517	530	1655	1784	969	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100						8
Link Speed (k/h)		60			40			80				80
Link Distance (m)		117.2			154.3			1291.5				254.7
Travel Time (s)		7.0			13.9			58.1				11.5
Confl. Peds. (#/hr)									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%	2%	10%	2%	2%	2%	2%	10%	2%	2%	3%	3%
Adj. Flow (vph)	69	0	16	6	0	18	4	279	0	2	847	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	6	18	4	279	0	2	908	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
Existing Traffic

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.0			10.0	10.0	80.1	80.1		81.3	82.4	
Actuated g/C Ratio		0.10			0.10	0.10	0.80	0.80		0.81	0.82	
v/c Ratio		0.39			0.04	0.07	0.01	0.21		0.00	0.63	
Control Delay		12.2			41.6	0.6	4.5	4.3		3.0	7.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.1	
Total Delay		12.2			41.6	0.6	4.5	4.3		3.0	7.7	
LOS		B			D	A	A	A		A	A	
Approach Delay		12.2			10.9			4.3			7.7	
Approach LOS		B			B			A			A	
Queue Length 50th (m)		0.0			1.0	0.0	0.1	10.5		0.1	58.3	
Queue Length 95th (m)		9.9			4.5	0.0	1.2	28.4		m0.2	116.3	
Internal Link Dist (m)		93.2			130.3			1267.5			230.7	
Turn Bay Length (m)							30.0			70.0		
Base Capacity (vph)		325			263	372	424	1324		889	1442	
Starvation Cap Reductn		0			0	0	0	0		0	53	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.26			0.02	0.05	0.01	0.21		0.00	0.65	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 7.3

Intersection LOS: A

Intersection Capacity Utilization 67.0%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	113	98	52	116	703	113
Future Volume (vph)	113	98	52	116	703	113
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	0.0			25.0
Storage Lanes	1	1	0			1
Taper Length (m)	45.0		50.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950			0.985		
Satd. Flow (prot)	1647	1517	0	1674	1784	1406
Flt Permitted	0.950			0.985		
Satd. Flow (perm)	1647	1517	0	1674	1784	1406
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	1291.5	
Travel Time (s)	18.4			29.3	58.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	2%	5%	8%	2%	10%
Adj. Flow (vph)	126	109	58	129	781	126
Shared Lane Traffic (%)						
Lane Group Flow (vph)	126	109	0	187	781	126
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 65.1%	ICU Level of Service C					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	112	29	88	794	71	94
Future Volume (vph)	112	29	88	794	71	94
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.972		0.878			
Flt Protected	0.962					0.979
Satd. Flow (prot)	1605	0	1547	0	0	1620
Flt Permitted	0.962					0.979
Satd. Flow (perm)	1605	0	1547	0	0	1620
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	112	29	88	794	71	94
Shared Lane Traffic (%)						
Lane Group Flow (vph)	141	0	882	0	0	165
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	84.4%			ICU Level of Service E		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	16	274	32	869	179	8
Future Volume (vph)	16	274	32	869	179	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.994	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1645	0
Flt Permitted	0.950		0.586			
Satd. Flow (perm)	1383	1438	968	1784	1645	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		274			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	16	274	32	869	179	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	274	32	869	187	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	11.2	11.2	76.0	75.4	68.0	
Actuated g/C Ratio	0.11	0.11	0.76	0.75	0.68	
v/c Ratio	0.10	0.68	0.04	0.65	0.17	
Control Delay	40.2	14.1	1.6	5.3	7.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	40.2	14.1	1.6	5.3	7.5	
LOS	D	B	A	A	A	
Approach Delay	15.6			5.2	7.5	
Approach LOS	B			A	A	
Queue Length 50th (m)	2.7	0.0	0.8	29.2	11.7	
Queue Length 95th (m)	7.9	20.5	m0.4	19.7	24.5	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	190	434	773	1355	1132	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.08	0.63	0.04	0.64	0.17	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 7.7

Intersection LOS: A

Intersection Capacity Utilization 67.8%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	15	4	3	5	23	5	846	27	175	224	51
Future Volume (vph)	32	15	4	3	5	23	5	846	27	175	224	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.989				0.850			0.850		0.972	
Flt Protected		0.970			0.982		0.950			0.950		
Satd. Flow (prot)	0	1681	0	0	1752	1517	1441	1767	1517	1695	1571	0
Flt Permitted		0.805			0.877		0.590			0.182		
Satd. Flow (perm)	0	1395	0	0	1565	1517	895	1767	1482	325	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				100			96		26	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			590.7			254.7	
Travel Time (s)		7.0			13.9			26.6			11.5	
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	32	15	4	3	5	23	5	846	27	175	224	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	51	0	0	8	23	5	846	27	175	275	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.5			10.5	10.5	63.8	63.8	63.8	80.9	81.9	
Actuated g/C Ratio		0.10			0.10	0.10	0.64	0.64	0.64	0.81	0.82	
v/c Ratio		0.34			0.05	0.09	0.01	0.75	0.03	0.43	0.21	
Control Delay		45.3			40.4	0.7	10.0	20.9	0.0	7.0	2.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		45.3			40.4	0.7	10.0	20.9	0.0	7.0	2.6	
LOS		D			D	A	A	C	A	A	A	
Approach Delay		45.3			11.0			20.2			4.3	
Approach LOS		D			B			C			A	
Queue Length 50th (m)		7.9			1.3	0.0	0.3	101.6	0.0	4.7	6.9	
Queue Length 95th (m)		18.0			5.2	0.0	2.0	#206.1	0.0	11.1	13.0	
Internal Link Dist (m)		93.2			130.3			566.7			230.7	
Turn Bay Length (m)							30.0		10.0	70.0		
Base Capacity (vph)		271			300	372	571	1128	980	461	1291	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.19			0.03	0.06	0.01	0.75	0.03	0.38	0.21	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 15.8

Intersection LOS: B

Intersection Capacity Utilization 81.9%

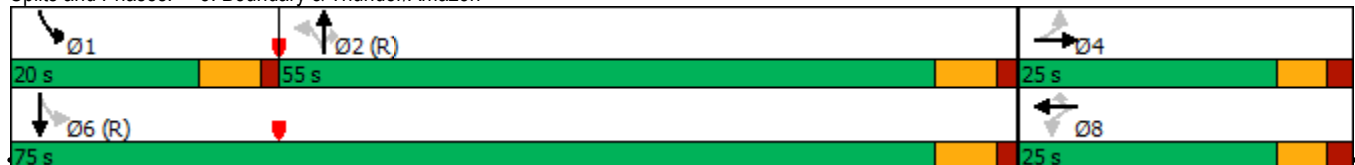
ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Boundary & Thunder/Amazon



						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	72	28	123	793	113	99
Future Volume (vph)	72	28	123	793	113	99
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	0.0			25.0
Storage Lanes	1	1	0			1
Taper Length (m)	45.0		50.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950			0.993		
Satd. Flow (prot)	1572	1289	0	1721	1733	1432
Flt Permitted	0.950			0.993		
Satd. Flow (perm)	1572	1289	0	1721	1733	1432
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	700.7	
Travel Time (s)	18.4			29.3	31.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	72	28	123	793	113	99
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	28	0	916	113	99
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 68.8%	ICU Level of Service C					
Analysis Period (min) 15						

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	39	861	4	39	208
Future Volume (vph)	4	39	861	4	39	208
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	10.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.878		0.999			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1514	0	1732	0	1647	1733
Flt Permitted	0.995				0.950	
Satd. Flow (perm)	1514	0	1732	0	1647	1733
Link Speed (k/h)	50		80			80
Link Distance (m)	197.6		700.7			590.7
Travel Time (s)	14.2		31.5			26.6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	39	861	4	39	208
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	865	0	39	208
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 58.1%	ICU Level of Service B					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	112	29	88	794	71	94
Future Volume (vph)	112	29	88	794	71	94
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.972		0.878			
Flt Protected	0.962					0.979
Satd. Flow (prot)	1605	0	1547	0	0	1620
Flt Permitted	0.962					0.979
Satd. Flow (perm)	1605	0	1547	0	0	1620
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	112	29	88	794	71	94
Shared Lane Traffic (%)						
Lane Group Flow (vph)	141	0	882	0	0	165
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	84.4%			ICU Level of Service E		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	16	274	32	869	179	8
Future Volume (vph)	16	274	32	869	179	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.994	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1645	0
Flt Permitted	0.950		0.586			
Satd. Flow (perm)	1383	1438	968	1784	1645	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		274			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	16	274	32	869	179	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	274	32	869	187	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	11.2	11.2	76.0	75.4	68.0	
Actuated g/C Ratio	0.11	0.11	0.76	0.75	0.68	
v/c Ratio	0.10	0.68	0.04	0.65	0.17	
Control Delay	40.2	14.1	1.6	5.3	7.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	40.2	14.1	1.6	5.3	7.5	
LOS	D	B	A	A	A	
Approach Delay	15.6			5.2	7.5	
Approach LOS	B			A	A	
Queue Length 50th (m)	2.7	0.0	0.8	27.3	11.7	
Queue Length 95th (m)	7.9	20.5	m0.4	19.7	24.5	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	190	434	773	1355	1132	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.08	0.63	0.04	0.64	0.17	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 7.7

Intersection LOS: A

Intersection Capacity Utilization 67.8%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	15	4	3	5	23	5	846	27	175	224	51
Future Volume (vph)	32	15	4	3	5	23	5	846	27	175	224	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.989				0.850			0.850		0.972	
Flt Protected		0.970			0.982		0.950			0.950		
Satd. Flow (prot)	0	1681	0	0	1752	1517	1441	1767	1517	1695	1571	0
Flt Permitted		0.805			0.877		0.590			0.182		
Satd. Flow (perm)	0	1395	0	0	1565	1517	895	1767	1482	325	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				100			96		26	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			590.7			254.7	
Travel Time (s)		7.0			13.9			26.6			11.5	
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	32	15	4	3	5	23	5	846	27	175	224	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	51	0	0	8	23	5	846	27	175	275	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.5			10.5	10.5	63.8	63.8	63.8	80.9	81.9	
Actuated g/C Ratio		0.10			0.10	0.10	0.64	0.64	0.64	0.81	0.82	
v/c Ratio		0.34			0.05	0.09	0.01	0.75	0.03	0.43	0.21	
Control Delay		45.3			40.4	0.7	8.8	16.8	0.0	7.0	2.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		45.3			40.4	0.7	8.8	16.8	0.0	7.0	2.6	
LOS		D			D	A	A	B	A	A	A	
Approach Delay		45.3			11.0			16.3			4.3	
Approach LOS		D			B			B			A	
Queue Length 50th (m)		7.9			1.3	0.0	0.2	111.1	0.0	4.7	6.9	
Queue Length 95th (m)		18.0			5.2	0.0	m0.7	#203.2	m0.0	11.1	13.0	
Internal Link Dist (m)		93.2			130.3			566.7			230.7	
Turn Bay Length (m)							30.0		10.0	70.0		
Base Capacity (vph)		271			300	372	571	1128	980	461	1291	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.19			0.03	0.06	0.01	0.75	0.03	0.38	0.21	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 13.4

Intersection LOS: B

Intersection Capacity Utilization 81.9%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



0.0000, 0.0000

Dynamic Traffic Report

4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	72	28	123	793	113	99
Future Volume (vph)	72	28	123	793	113	99
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1572	1289	1647	1733	1733	1432
Flt Permitted	0.950		0.684			
Satd. Flow (perm)	1572	1289	1186	1733	1733	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		28				99
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	700.7	
Travel Time (s)	18.4			29.3	31.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	72	28	123	793	113	99
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	28	123	793	113	99
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	26.0	26.0	54.0	54.0	54.0	54.0

4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	26.0	26.0	74.0	74.0	74.0	74.0
Total Split (%)	26.0%	26.0%	74.0%	74.0%	74.0%	74.0%
Maximum Green (s)	19.2	19.2	67.8	67.8	67.8	67.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	11.1	11.1	80.5	80.5	80.5	80.5
Actuated g/C Ratio	0.11	0.11	0.80	0.80	0.80	0.80
v/c Ratio	0.41	0.17	0.13	0.57	0.08	0.08
Control Delay	48.4	16.8	3.7	7.0	3.8	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	16.8	3.7	7.0	3.8	2.4
LOS	D	B	A	A	A	A
Approach Delay	39.5			6.6	3.1	
Approach LOS	D			A	A	
Queue Length 50th (m)	12.3	0.0	4.5	48.5	1.6	0.2
Queue Length 95th (m)	23.9	7.1	10.4	89.0	16.0	10.4
Internal Link Dist (m)	384.5			627.7	676.7	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	301	270	954	1394	1394	1172
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.10	0.13	0.57	0.08	0.08

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 76 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 8.7

Intersection LOS: A

Intersection Capacity Utilization 63.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	39	861	4	39	208
Future Volume (vph)	4	39	861	4	39	208
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	10.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.878		0.999			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1514	0	1732	0	1647	1733
Flt Permitted	0.995				0.950	
Satd. Flow (perm)	1514	0	1732	0	1647	1733
Link Speed (k/h)	50		80			80
Link Distance (m)	197.6		700.7			590.7
Travel Time (s)	14.2		31.5			26.6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	39	861	4	39	208
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	865	0	39	208
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 58.1%	ICU Level of Service B					
Analysis Period (min) 15						

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	45	1	134	264	22	111
Future Volume (vph)	45	1	134	264	22	111
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997		0.910			
Flt Protected	0.953					0.992
Satd. Flow (prot)	1507	0	1582	0	0	1706
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1507	0	1582	0	0	1706
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	5%	10%	2%	10%	5%
Adj. Flow (vph)	45	1	134	264	22	111
Shared Lane Traffic (%)						
Lane Group Flow (vph)	46	0	398	0	0	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	36.0%			ICU Level of Service A		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	71	680	138	237	195	15
Future Volume (vph)	71	680	138	237	195	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1572	1733	1699	0
Flt Permitted	0.950		0.566			
Satd. Flow (perm)	1647	1480	935	1733	1699	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		680			6	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	5%	5%	20%
Adj. Flow (vph)	71	680	138	237	195	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	680	138	237	210	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	25.0	25.0	12.0	75.0	63.0	
Total Split (%)	25.0%	25.0%	12.0%	75.0%	63.0%	
Maximum Green (s)	18.2	18.2	6.0	68.4	56.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	15.7	15.7	71.5	70.9	56.3	
Actuated g/C Ratio	0.16	0.16	0.72	0.71	0.56	
v/c Ratio	0.28	0.84	0.19	0.19	0.22	
Control Delay	36.9	13.4	8.6	9.3	13.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	36.9	13.4	8.6	9.3	13.9	
LOS	D	B	A	A	B	
Approach Delay	15.6			9.0	13.9	
Approach LOS	B			A	B	
Queue Length 50th (m)	12.0	0.0	9.0	17.8	14.3	
Queue Length 95th (m)	18.9	29.0	23.3	37.9	41.7	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	338	844	723	1269	1032	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.21	0.81	0.19	0.19	0.20	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 13.5

Intersection LOS: B

Intersection Capacity Utilization 84.9%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	0	14	5	0	16	4	295	0	2	816	56
Future Volume (vph)	63	0	14	5	0	16	4	295	0	2	816	56
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.975				0.850					0.990	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1610	0	0	1695	1517	1695	1655	1784	1695	1749	0
Flt Permitted		0.762			0.778		0.314			0.536		
Satd. Flow (perm)	0	1277	0	0	1388	1517	560	1655	1784	956	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100						8
Link Speed (k/h)		60			40			80				80
Link Distance (m)		117.2			154.3			587.5				254.7
Travel Time (s)		7.0			13.9			26.4				11.5
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	2%	2%	2%	2%	10%	2%	2%	3%	3%
Adj. Flow (vph)	63	0	14	5	0	16	4	295	0	2	816	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	77	0	0	5	16	4	295	0	2	872	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.0			10.0	10.0	80.1	80.1		81.4	82.4	
Actuated g/C Ratio		0.10			0.10	0.10	0.80	0.80		0.81	0.82	
v/c Ratio		0.35			0.04	0.07	0.01	0.22		0.00	0.60	
Control Delay		9.8			41.4	0.5	4.5	4.4		3.5	7.2	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		9.8			41.4	0.5	4.5	4.4		3.5	7.2	
LOS		A			D	A	A	A		A	A	
Approach Delay		9.8			10.2			4.4			7.2	
Approach LOS		A			B			A			A	
Queue Length 50th (m)		0.0			0.8	0.0	0.1	11.2		0.1	53.7	
Queue Length 95th (m)		8.2			4.0	0.0	1.2	30.1		m0.2	96.3	
Internal Link Dist (m)		93.2			130.3			563.5			230.7	
Turn Bay Length (m)							30.0			70.0		
Base Capacity (vph)		325			266	372	448	1325		881	1442	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.24			0.02	0.04	0.01	0.22		0.00	0.60	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 6.7

Intersection LOS: A

Intersection Capacity Utilization 70.2%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	118	100	53	119	718	118
Future Volume (vph)	118	100	53	119	718	118
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	0.0			25.0
Storage Lanes	1	1	0			1
Taper Length (m)	45.0		50.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950			0.985		
Satd. Flow (prot)	1647	1517	0	1674	1784	1406
Flt Permitted	0.950			0.985		
Satd. Flow (perm)	1647	1517	0	1674	1784	1406
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	703.9	
Travel Time (s)	18.4			29.3	31.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	5%	8%	2%	10%
Adj. Flow (vph)	118	100	53	119	718	118
Shared Lane Traffic (%)						
Lane Group Flow (vph)	118	100	0	172	718	118
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	66.5%			ICU Level of Service C		
Analysis Period (min)	15					

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	39	233	4	39	832
Future Volume (vph)	4	39	233	4	39	832
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.878		0.998			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1559	0	1781	0	1695	1784
Flt Permitted	0.995				0.950	
Satd. Flow (perm)	1559	0	1781	0	1695	1784
Link Speed (k/h)	50		80			80
Link Distance (m)	202.0		703.9			587.5
Travel Time (s)	14.5		31.7			26.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	4	39	233	4	39	832
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	237	0	39	832
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 56.2%	ICU Level of Service B					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	45	1	134	264	22	111
Future Volume (vph)	45	1	134	264	22	111
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997		0.910			
Flt Protected	0.953					0.992
Satd. Flow (prot)	1507	0	1582	0	0	1706
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1507	0	1582	0	0	1706
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	5%	10%	2%	10%	5%
Adj. Flow (vph)	45	1	134	264	22	111
Shared Lane Traffic (%)						
Lane Group Flow (vph)	46	0	398	0	0	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	36.0%			ICU Level of Service A		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	71	680	138	237	195	15
Future Volume (vph)	71	680	138	237	195	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1572	1733	1699	0
Flt Permitted	0.950		0.566			
Satd. Flow (perm)	1647	1480	935	1733	1699	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		680			6	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	5%	5%	20%
Adj. Flow (vph)	71	680	138	237	195	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	680	138	237	210	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	25.0	25.0	12.0	75.0	63.0	
Total Split (%)	25.0%	25.0%	12.0%	75.0%	63.0%	
Maximum Green (s)	18.2	18.2	6.0	68.4	56.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	15.7	15.7	71.5	70.9	56.3	
Actuated g/C Ratio	0.16	0.16	0.72	0.71	0.56	
v/c Ratio	0.28	0.84	0.19	0.19	0.22	
Control Delay	36.9	13.4	6.6	6.9	13.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	36.9	13.4	6.6	6.9	13.9	
LOS	D	B	A	A	B	
Approach Delay	15.6			6.8	13.9	
Approach LOS	B			A	B	
Queue Length 50th (m)	12.0	0.0	5.3	10.9	14.3	
Queue Length 95th (m)	18.9	29.0	18.3	29.1	41.7	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	338	844	723	1269	1032	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.21	0.81	0.19	0.19	0.20	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 12.9

Intersection LOS: B

Intersection Capacity Utilization 84.9%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	0	14	5	0	16	4	295	0	2	816	56
Future Volume (vph)	63	0	14	5	0	16	4	295	0	2	816	56
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.975				0.850						0.990
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1610	0	0	1695	1517	1695	1655	1784	1695	1749	0
Flt Permitted		0.762			0.778		0.314			0.536		
Satd. Flow (perm)	0	1277	0	0	1388	1517	560	1655	1784	956	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100						8
Link Speed (k/h)		60			40			80				80
Link Distance (m)		117.2			154.3			587.5				254.7
Travel Time (s)		7.0			13.9			26.4				11.5
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	2%	2%	2%	2%	10%	2%	2%	3%	3%
Adj. Flow (vph)	63	0	14	5	0	16	4	295	0	2	816	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	77	0	0	5	16	4	295	0	2	872	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.0			10.0	10.0	80.1	80.1		81.4	82.4	
Actuated g/C Ratio		0.10			0.10	0.10	0.80	0.80		0.81	0.82	
v/c Ratio		0.35			0.04	0.07	0.01	0.22		0.00	0.60	
Control Delay		9.8			41.4	0.5	4.2	3.7		3.5	7.2	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		9.8			41.4	0.5	4.2	3.7		3.5	7.2	
LOS		A			D	A	A	A		A	A	
Approach Delay		9.8			10.2			3.7			7.2	
Approach LOS		A			B			A			A	
Queue Length 50th (m)		0.0			0.8	0.0	0.1	6.4		0.1	53.7	
Queue Length 95th (m)		8.2			4.0	0.0	m1.0	25.1		m0.2	96.3	
Internal Link Dist (m)		93.2			130.3			563.5			230.7	
Turn Bay Length (m)							30.0			70.0		
Base Capacity (vph)		325			266	372	448	1325		881	1442	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.24			0.02	0.04	0.01	0.22		0.00	0.60	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 6.6

Intersection LOS: A

Intersection Capacity Utilization 70.2%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	118	100	53	119	718	118
Future Volume (vph)	118	100	53	119	718	118
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1647	1685	1784	1406
Flt Permitted	0.950		0.334			
Satd. Flow (perm)	1647	1517	579	1685	1784	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		100				79
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	703.9	
Travel Time (s)	18.4			29.3	31.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	5%	8%	2%	10%
Adj. Flow (vph)	118	100	53	119	718	118
Shared Lane Traffic (%)						
Lane Group Flow (vph)	118	100	53	119	718	118
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 8 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 10.3	Intersection LOS: B
Intersection Capacity Utilization 65.7%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

 Ø2 (R)	 Ø4
72 s	28 s
 Ø6 (R)	
72 s	

5: Boundary & CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Background Traffic (signal implemented)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	39	233	4	39	832
Future Volume (vph)	4	39	233	4	39	832
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.878		0.998			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1559	0	1781	0	1695	1784
Flt Permitted	0.995				0.950	
Satd. Flow (perm)	1559	0	1781	0	1695	1784
Link Speed (k/h)	50		80			80
Link Distance (m)	202.0		703.9			587.5
Travel Time (s)	14.5		31.7			26.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	4	39	233	4	39	832
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	237	0	39	832
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 56.2%	ICU Level of Service B					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	129	29	92	805	71	110
Future Volume (vph)	129	29	92	805	71	110
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.975		0.879			
Flt Protected	0.961					0.981
Satd. Flow (prot)	1610	0	1548	0	0	1623
Flt Permitted	0.961					0.981
Satd. Flow (perm)	1610	0	1548	0	0	1623
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	143	32	102	894	79	122
Shared Lane Traffic (%)						
Lane Group Flow (vph)	175	0	996	0	0	201
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	87.3%			ICU Level of Service E		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	16	311	36	884	212	8
Future Volume (vph)	16	311	36	884	212	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1646	0
Flt Permitted	0.950		0.556			
Satd. Flow (perm)	1383	1438	919	1784	1646	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		346			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	18	346	40	982	236	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	346	40	982	245	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	10.8	10.8	76.4	75.8	68.5	
Actuated g/C Ratio	0.11	0.11	0.76	0.76	0.68	
v/c Ratio	0.12	0.75	0.05	0.73	0.22	
Control Delay	41.6	15.5	1.9	7.1	7.4	
Queue Delay	0.0	0.0	0.0	0.2	0.0	
Total Delay	41.6	15.5	1.9	7.3	7.4	
LOS	D	B	A	A	A	
Approach Delay	16.8			7.1	7.4	
Approach LOS	B			A	A	
Queue Length 50th (m)	3.0	0.0	1.0	33.9	16.2	
Queue Length 95th (m)	8.8	24.8	m0.1	m34.6	28.8	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	182	490	741	1352	1129	
Starvation Cap Reductn	0	0	0	48	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.10	0.71	0.05	0.75	0.22	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 9.3

Intersection LOS: A

Intersection Capacity Utilization 68.7%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	15	4	3	5	23	5	865	27	175	293	51
Future Volume (vph)	32	15	4	3	5	23	5	865	27	175	293	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.991				0.850			0.850		0.978	
Flt Protected		0.969			0.984		0.950			0.950		
Satd. Flow (prot)	0	1682	0	0	1756	1517	1441	1767	1517	1695	1574	0
Flt Permitted		0.803			0.890		0.535			0.110		
Satd. Flow (perm)	0	1394	0	0	1588	1517	811	1767	1482	196	1574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				100			96		20	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			590.7			254.7	
Travel Time (s)		7.0			13.9			26.6			11.5	
Confl. Peds. (#/hr)									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%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	36	17	4	3	6	26	6	961	30	194	326	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	9	26	6	961	30	194	383	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.8			10.8	10.8	62.8	62.8	62.8	80.6	81.6	
Actuated g/C Ratio		0.11			0.11	0.11	0.63	0.63	0.63	0.81	0.82	
v/c Ratio		0.37			0.05	0.10	0.01	0.87	0.03	0.59	0.30	
Control Delay		46.7			40.0	0.8	11.0	28.8	0.1	20.2	3.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		46.7			40.0	0.8	11.0	28.8	0.1	20.2	3.0	
LOS		D			D	A	B	C	A	C	A	
Approach Delay		46.7			10.9			27.8			8.8	
Approach LOS		D			B			C			A	
Queue Length 50th (m)		9.2			1.5	0.0	0.4	136.7	0.0	10.7	10.6	
Queue Length 95th (m)		19.9			5.6	0.0	2.4	#258.2	0.0	m27.0	20.6	
Internal Link Dist (m)		93.2			130.3			566.7			230.7	
Turn Bay Length (m)							30.0		10.0	70.0		
Base Capacity (vph)		270			304	372	509	1109	966	380	1288	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.21			0.03	0.07	0.01	0.87	0.03	0.51	0.30	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 21.5

Intersection LOS: C

Intersection Capacity Utilization 82.9%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



0.0000, 0.0000

Dynamic Traffic Report

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	73	28	123	804	116	99
Future Volume (vph)	73	28	123	804	116	99
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	0.0			25.0
Storage Lanes	1	1	0			1
Taper Length (m)	45.0		50.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950			0.993		
Satd. Flow (prot)	1572	1289	0	1721	1733	1432
Flt Permitted	0.950			0.993		
Satd. Flow (perm)	1572	1289	0	1721	1733	1432
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	613.1	
Travel Time (s)	18.4			29.3	27.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	81	31	137	893	129	110
Shared Lane Traffic (%)						
Lane Group Flow (vph)	81	31	0	1030	129	110
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 69.4%	ICU Level of Service C					
Analysis Period (min) 15						

5: Boundary & North Site Access/CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	0	1	4	0	39	12	861	4	39	208	69
Future Volume (vph)	19	0	1	4	0	39	12	861	4	39	208	69
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	10.0			10.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.878			0.999				0.850
Flt Protected		0.955			0.995		0.950			0.950		
Satd. Flow (prot)	0	1644	0	0	1514	0	1647	1732	0	1647	1733	1473
Flt Permitted		0.955			0.995		0.950			0.950		
Satd. Flow (perm)	0	1644	0	0	1514	0	1647	1732	0	1647	1733	1473
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		264.4			197.6			87.6			590.7	
Travel Time (s)		19.0			14.2			3.9			26.6	
Peak Hour Factor	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. Flow (vph)	19	0	1	4	0	39	12	861	4	39	208	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	43	0	12	865	0	39	208	69
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 61.8%	ICU Level of Service B											
Analysis Period (min) 15												

6: Boundary & South Site Access
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	0	2	0	877	213	0
Future Volume (vph)	0	2	0	877	213	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	10.0			0.0
Storage Lanes	0	1	1			0
Taper Length (m)	10.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1499	0	3293	1733	0
Flt Permitted						
Satd. Flow (perm)	0	1499	0	3293	1733	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	139.4			613.1	87.6	
Travel Time (s)	10.0			27.6	3.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	2	0	877	213	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2	0	877	213	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			0.0	0.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 28.9%	ICU Level of Service A					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	129	29	92	805	71	110
Future Volume (vph)	129	29	92	805	71	110
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.975		0.879			
Flt Protected	0.961					0.981
Satd. Flow (prot)	1610	0	1548	0	0	1623
Flt Permitted	0.961					0.981
Satd. Flow (perm)	1610	0	1548	0	0	1623
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	143	32	102	894	79	122
Shared Lane Traffic (%)						
Lane Group Flow (vph)	175	0	996	0	0	201
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	87.3%			ICU Level of Service E		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	16	311	36	884	212	8
Future Volume (vph)	16	311	36	884	212	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1646	0
Flt Permitted	0.950		0.556			
Satd. Flow (perm)	1383	1438	919	1784	1646	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		346			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	18	346	40	982	236	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	346	40	982	245	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	10.8	10.8	76.4	75.8	68.5	
Actuated g/C Ratio	0.11	0.11	0.76	0.76	0.68	
v/c Ratio	0.12	0.75	0.05	0.73	0.22	
Control Delay	41.6	15.5	1.9	7.1	7.4	
Queue Delay	0.0	0.0	0.0	0.2	0.0	
Total Delay	41.6	15.5	1.9	7.3	7.4	
LOS	D	B	A	A	A	
Approach Delay	16.8			7.1	7.4	
Approach LOS	B			A	A	
Queue Length 50th (m)	3.0	0.0	1.0	34.0	16.2	
Queue Length 95th (m)	8.8	24.8	m0.1	m34.8	28.8	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	182	490	741	1352	1129	
Starvation Cap Reductn	0	0	0	48	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.10	0.71	0.05	0.75	0.22	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 9.3

Intersection LOS: A

Intersection Capacity Utilization 68.7%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	15	4	3	5	23	5	865	27	175	293	51
Future Volume (vph)	32	15	4	3	5	23	5	865	27	175	293	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.991				0.850			0.850		0.978	
Flt Protected		0.969			0.984		0.950			0.950		
Satd. Flow (prot)	0	1682	0	0	1756	1517	1441	1767	1517	1695	1574	0
Flt Permitted		0.803			0.890		0.535			0.110		
Satd. Flow (perm)	0	1394	0	0	1588	1517	811	1767	1482	196	1574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				100			96		20	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			590.7			254.7	
Travel Time (s)		7.0			13.9			26.6			11.5	
Confl. Peds. (#/hr)									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%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	36	17	4	3	6	26	6	961	30	194	326	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	9	26	6	961	30	194	383	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.8			10.8	10.8	62.8	62.8	62.8	80.6	81.6	
Actuated g/C Ratio		0.11			0.11	0.11	0.63	0.63	0.63	0.81	0.82	
v/c Ratio		0.37			0.05	0.10	0.01	0.87	0.03	0.59	0.30	
Control Delay		46.7			40.0	0.8	12.6	24.6	0.0	20.2	3.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		46.7			40.0	0.8	12.6	24.6	0.0	20.2	3.0	
LOS		D			D	A	B	C	A	C	A	
Approach Delay		46.7			10.9			23.8			8.8	
Approach LOS		D			B			C			A	
Queue Length 50th (m)		9.2			1.5	0.0	0.3	56.7	0.0	10.7	10.6	
Queue Length 95th (m)		19.9			5.6	0.0	m1.3	#257.8	m0.0	m27.0	20.6	
Internal Link Dist (m)		93.2			130.3			566.7			230.7	
Turn Bay Length (m)							30.0		10.0	70.0		
Base Capacity (vph)		270			304	372	509	1109	966	380	1288	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.21			0.03	0.07	0.01	0.87	0.03	0.51	0.30	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 19.1

Intersection LOS: B

Intersection Capacity Utilization 82.9%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



0.0000, 0.0000

Dynamic Report

4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	73	28	123	804	116	99
Future Volume (vph)	73	28	123	804	116	99
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1572	1289	1647	1733	1733	1432
Flt Permitted	0.950		0.674			
Satd. Flow (perm)	1572	1289	1168	1733	1733	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		31				110
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	613.1	
Travel Time (s)	18.4			29.3	27.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	81	31	137	893	129	110
Shared Lane Traffic (%)						
Lane Group Flow (vph)	81	31	137	893	129	110
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	26.0	26.0	74.0	74.0	74.0	74.0
Total Split (%)	26.0%	26.0%	74.0%	74.0%	74.0%	74.0%
Maximum Green (s)	19.2	19.2	67.8	67.8	67.8	67.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	11.5	11.5	80.1	80.1	80.1	80.1
Actuated g/C Ratio	0.12	0.12	0.80	0.80	0.80	0.80
v/c Ratio	0.45	0.18	0.15	0.64	0.09	0.09
Control Delay	49.0	16.1	3.9	8.7	3.2	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	16.1	3.9	8.7	3.2	1.6
LOS	D	B	A	A	A	A
Approach Delay	39.9			8.1	2.5	
Approach LOS	D			A	A	
Queue Length 50th (m)	13.9	0.0	5.3	62.8	1.8	0.0
Queue Length 95th (m)	26.1	7.4	12.0	118.4	11.6	3.4
Internal Link Dist (m)	384.5			627.7	589.1	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	301	272	935	1388	1388	1168
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.11	0.15	0.64	0.09	0.09

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 76 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 9.7

Intersection LOS: A

Intersection Capacity Utilization 63.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & North Site Access/CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	0	1	4	0	39	12	861	4	39	208	69
Future Volume (vph)	19	0	1	4	0	39	12	861	4	39	208	69
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	10.0			10.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.878			0.999				0.850
Flt Protected		0.955			0.995		0.950			0.950		
Satd. Flow (prot)	0	1644	0	0	1514	0	1647	1732	0	1647	1733	1473
Flt Permitted		0.705			0.964		0.628			0.298		
Satd. Flow (perm)	0	1213	0	0	1467	0	1089	1732	0	517	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			39			1				69
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		264.4			197.6			87.6			590.7	
Travel Time (s)		19.0			14.2			3.9			26.6	
Peak Hour Factor	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. Flow (vph)	19	0	1	4	0	39	12	861	4	39	208	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	43	0	12	865	0	39	208	69
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	24.8	24.8		24.8	24.8		26.2	26.2		26.2	26.2	26.2
Total Split (s)	25.0	25.0		25.0	25.0		75.0	75.0		75.0	75.0	75.0

5: Boundary & North Site Access/CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	75.0%
Maximum Green (s)	19.2	19.2		19.2	19.2		68.8	68.8		68.8	68.8	68.8
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	2.1	2.1		2.1	2.1		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.8			5.8		6.2	6.2		6.2	6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		10.0			10.0		86.8	86.8		86.8	86.8	86.8
Actuated g/C Ratio		0.10			0.10		0.87	0.87		0.87	0.87	0.87
v/c Ratio		0.13			0.24		0.01	0.58		0.09	0.14	0.05
Control Delay		8.7			18.7		1.1	3.6		1.6	1.4	0.1
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		8.7			18.7		1.1	3.6		1.6	1.4	0.1
LOS		A			B		A	A		A	A	A
Approach Delay		8.7			18.7			3.6			1.1	
Approach LOS		A			B			A			A	
Queue Length 50th (m)		0.0			0.7		0.2	80.4		1.3	7.3	0.0
Queue Length 95th (m)		3.8			9.9		m0.3	16.7		0.5	1.8	0.1
Internal Link Dist (m)		240.4			173.6			63.6			566.7	
Turn Bay Length (m)										110.0		70.0
Base Capacity (vph)		261			313		945	1503		449	1504	1288
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.08			0.14		0.01	0.58		0.09	0.14	0.05

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 23 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 3.6

Intersection LOS: A

Intersection Capacity Utilization 66.4%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Boundary & North Site Access/CRRRC



6: Boundary & South Site Access
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	0	2	0	877	213	0
Future Volume (vph)	0	2	0	877	213	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	10.0			0.0
Storage Lanes	0	1	1			0
Taper Length (m)	10.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt	0.865					
Flt Protected						
Satd. Flow (prot)	0	1499	0	3293	1733	0
Flt Permitted						
Satd. Flow (perm)	0	1499	0	3293	1733	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	139.4			613.1	87.6	
Travel Time (s)	10.0			27.6	3.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	2	0	877	213	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2	0	877	213	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			0.0	0.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 28.9%	ICU Level of Service A					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	49	1	149	302	22	114
Future Volume (vph)	49	1	149	302	22	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997		0.910			
Flt Protected	0.953					0.992
Satd. Flow (prot)	1506	0	1583	0	0	1706
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1506	0	1583	0	0	1706
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	5%	10%	2%	10%	5%
Adj. Flow (vph)	49	1	149	302	22	114
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	0	451	0	0	136
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	37.9%			ICU Level of Service A		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	71	690	155	290	202	15
Future Volume (vph)	71	690	155	290	202	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.991	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1572	1733	1701	0
Flt Permitted	0.950		0.562			
Satd. Flow (perm)	1647	1480	929	1733	1701	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		690			6	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	5%	5%	20%
Adj. Flow (vph)	71	690	155	290	202	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	690	155	290	217	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	25.0	25.0	12.0	75.0	63.0	
Total Split (%)	25.0%	25.0%	12.0%	75.0%	63.0%	
Maximum Green (s)	18.2	18.2	6.0	68.4	56.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	15.8	15.8	71.4	70.8	55.8	
Actuated g/C Ratio	0.16	0.16	0.71	0.71	0.56	
v/c Ratio	0.27	0.85	0.22	0.24	0.23	
Control Delay	36.7	13.4	8.7	9.7	14.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	36.7	13.4	8.7	9.7	14.4	
LOS	D	B	A	A	B	
Approach Delay	15.6			9.3	14.4	
Approach LOS	B			A	B	
Queue Length 50th (m)	12.0	0.0	10.8	23.4	15.0	
Queue Length 95th (m)	18.9	29.2	25.6	46.4	44.0	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	339	852	720	1268	1030	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.21	0.81	0.22	0.23	0.21	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 13.4

Intersection LOS: B

Intersection Capacity Utilization 85.5%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	0	14	5	0	16	4	364	0	2	832	56
Future Volume (vph)	63	0	14	5	0	16	4	364	0	2	832	56
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.975				0.850						0.991
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1610	0	0	1695	1517	1695	1655	1784	1695	1751	0
Flt Permitted		0.762			0.778		0.306			0.498		
Satd. Flow (perm)	0	1277	0	0	1388	1517	546	1655	1784	889	1751	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100						8
Link Speed (k/h)		60			40			80				80
Link Distance (m)		117.2			154.3			587.5				254.7
Travel Time (s)		7.0			13.9			26.4				11.5
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	2%	2%	2%	2%	10%	2%	2%	3%	3%
Adj. Flow (vph)	63	0	14	5	0	16	4	364	0	2	832	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	77	0	0	5	16	4	364	0	2	888	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.0			10.0	10.0	80.1	80.1		81.4	82.4	
Actuated g/C Ratio		0.10			0.10	0.10	0.80	0.80		0.81	0.82	
v/c Ratio		0.35			0.04	0.07	0.01	0.27		0.00	0.61	
Control Delay		9.8			41.4	0.5	4.5	4.7		3.5	7.5	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.1	
Total Delay		9.8			41.4	0.5	4.5	4.7		3.5	7.6	
LOS		A			D	A	A	A		A	A	
Approach Delay		9.8			10.2			4.7			7.6	
Approach LOS		A			B			A			A	
Queue Length 50th (m)		0.0			0.8	0.0	0.1	14.6		0.1	55.4	
Queue Length 95th (m)		8.2			4.0	0.0	1.2	38.2		m0.2	112.3	
Internal Link Dist (m)		93.2			130.3			563.5			230.7	
Turn Bay Length (m)							30.0			70.0		
Base Capacity (vph)		325			266	372	437	1325		836	1444	
Starvation Cap Reductn		0			0	0	0	0		0	67	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.24			0.02	0.04	0.01	0.27		0.00	0.64	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 7.0

Intersection LOS: A

Intersection Capacity Utilization 71.1%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	118	100	53	121	729	119
Future Volume (vph)	118	100	53	121	729	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	0.0			25.0
Storage Lanes	1	1	0			1
Taper Length (m)	45.0		50.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950			0.985		
Satd. Flow (prot)	1647	1517	0	1674	1784	1406
Flt Permitted	0.950			0.985		
Satd. Flow (perm)	1647	1517	0	1674	1784	1406
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	615.2	
Travel Time (s)	18.4			29.3	27.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	5%	8%	2%	10%
Adj. Flow (vph)	118	100	53	121	729	119
Shared Lane Traffic (%)						
Lane Group Flow (vph)	118	100	0	174	729	119
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 67.2%	ICU Level of Service C					
Analysis Period (min) 15						

5: Boundary & North Site Access/CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	0	2	4	0	39	2	233	4	39	832	16
Future Volume (vph)	69	0	2	4	0	39	2	233	4	39	832	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	2.5			2.5			2.5			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.878			0.997				0.850
Flt Protected		0.954			0.995		0.950			0.950		
Satd. Flow (prot)	0	1695	0	0	1559	0	1695	1779	0	1695	1784	1517
Flt Permitted		0.954			0.995		0.950			0.950		
Satd. Flow (perm)	0	1695	0	0	1559	0	1695	1779	0	1695	1784	1517
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		262.7			202.0			88.7			587.5	
Travel Time (s)		18.9			14.5			4.0			26.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	69	0	2	4	0	39	2	233	4	39	832	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	71	0	0	43	0	2	237	0	39	832	16
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 63.7%	ICU Level of Service B											
Analysis Period (min) 15												

6: Boundary & South Site Access
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	0	10	0	239	838	0
Future Volume (vph)	0	10	0	239	838	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	10.0			0.0
Storage Lanes	0	1	1			0
Taper Length (m)	2.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1543	0	3390	1784	0
Flt Permitted						
Satd. Flow (perm)	0	1543	0	3390	1784	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	142.8			615.2	88.7	
Travel Time (s)	10.3			27.7	4.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	0	10	0	239	838	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	10	0	239	838	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			0.0	0.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	56.6%			ICU Level of Service B		
Analysis Period (min)	15					

1: Boundary & WB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	49	1	149	302	22	114
Future Volume (vph)	49	1	149	302	22	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997		0.910			
Flt Protected	0.953					0.992
Satd. Flow (prot)	1506	0	1583	0	0	1706
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1506	0	1583	0	0	1706
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	5%	10%	2%	10%	5%
Adj. Flow (vph)	49	1	149	302	22	114
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	0	451	0	0	136
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 37.9%	ICU Level of Service A					
Analysis Period (min) 15						

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	71	690	155	290	202	15
Future Volume (vph)	71	690	155	290	202	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.991	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1572	1733	1701	0
Flt Permitted	0.950		0.562			
Satd. Flow (perm)	1647	1480	929	1733	1701	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		690			6	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	5%	5%	20%
Adj. Flow (vph)	71	690	155	290	202	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	690	155	290	217	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	25.0	25.0	12.0	75.0	63.0	
Total Split (%)	25.0%	25.0%	12.0%	75.0%	63.0%	
Maximum Green (s)	18.2	18.2	6.0	68.4	56.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	15.8	15.8	71.4	70.8	55.8	
Actuated g/C Ratio	0.16	0.16	0.71	0.71	0.56	
v/c Ratio	0.27	0.85	0.22	0.24	0.23	
Control Delay	36.7	13.4	5.9	6.5	14.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	36.7	13.4	5.9	6.5	14.4	
LOS	D	B	A	A	B	
Approach Delay	15.6			6.3	14.4	
Approach LOS	B			A	B	
Queue Length 50th (m)	12.0	0.0	6.1	13.4	15.0	
Queue Length 95th (m)	18.9	29.2	16.3	27.5	44.0	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	339	852	720	1268	1030	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.21	0.81	0.22	0.23	0.21	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 12.5

Intersection LOS: B

Intersection Capacity Utilization 85.5%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	0	14	5	0	16	4	364	0	2	832	56
Future Volume (vph)	63	0	14	5	0	16	4	364	0	2	832	56
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.975				0.850						0.991
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1610	0	0	1695	1517	1695	1655	1784	1695	1751	0
Flt Permitted		0.762			0.778		0.306			0.498		
Satd. Flow (perm)	0	1277	0	0	1388	1517	546	1655	1784	889	1751	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100						8
Link Speed (k/h)		60			40			80				80
Link Distance (m)		117.2			154.3			587.5				254.7
Travel Time (s)		7.0			13.9			26.4				11.5
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	2%	2%	2%	2%	10%	2%	2%	3%	3%
Adj. Flow (vph)	63	0	14	5	0	16	4	364	0	2	832	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	77	0	0	5	16	4	364	0	2	888	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.0			10.0	10.0	80.1	80.1		81.4	82.4	
Actuated g/C Ratio		0.10			0.10	0.10	0.80	0.80		0.81	0.82	
v/c Ratio		0.35			0.04	0.07	0.01	0.27		0.00	0.61	
Control Delay		9.8			41.4	0.5	3.8	3.3		3.5	7.5	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.1	
Total Delay		9.8			41.4	0.5	3.8	3.3		3.5	7.6	
LOS		A			D	A	A	A		A	A	
Approach Delay		9.8			10.2			3.3			7.6	
Approach LOS		A			B			A			A	
Queue Length 50th (m)		0.0			0.8	0.0	0.0	7.8		0.1	55.4	
Queue Length 95th (m)		8.2			4.0	0.0	m0.9	23.9		m0.2	112.3	
Internal Link Dist (m)		93.2			130.3			563.5			230.7	
Turn Bay Length (m)							30.0			70.0		
Base Capacity (vph)		325			266	372	437	1325		836	1444	
Starvation Cap Reductn		0			0	0	0	0		0	67	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.24			0.02	0.04	0.01	0.27		0.00	0.64	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 6.6

Intersection LOS: A

Intersection Capacity Utilization 71.1%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	118	100	53	121	729	119
Future Volume (vph)	118	100	53	121	729	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1647	1685	1784	1406
Flt Permitted	0.950		0.328			
Satd. Flow (perm)	1647	1517	569	1685	1784	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		100				79
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	615.2	
Travel Time (s)	18.4			29.3	27.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	5%	8%	2%	10%
Adj. Flow (vph)	118	100	53	121	729	119
Shared Lane Traffic (%)						
Lane Group Flow (vph)	118	100	53	121	729	119
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	28.0	28.0	72.0	72.0	72.0	72.0
Total Split (%)	28.0%	28.0%	72.0%	72.0%	72.0%	72.0%
Maximum Green (s)	21.2	21.2	65.8	65.8	65.8	65.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	13.0	13.0	74.0	74.0	74.0	74.0
Actuated g/C Ratio	0.13	0.13	0.74	0.74	0.74	0.74
v/c Ratio	0.55	0.35	0.13	0.10	0.55	0.11
Control Delay	50.3	11.3	5.2	4.3	6.5	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.3	11.3	5.2	4.3	6.5	1.9
LOS	D	B	A	A	A	A
Approach Delay	32.4			4.6	5.8	
Approach LOS	C			A	A	
Queue Length 50th (m)	20.1	0.0	2.2	5.0	43.2	0.6
Queue Length 95th (m)	34.5	12.4	6.7	11.2	63.4	6.7
Internal Link Dist (m)	384.5			627.7	591.2	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	349	400	421	1247	1320	1061
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.25	0.13	0.10	0.55	0.11

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 10.3

Intersection LOS: B

Intersection Capacity Utilization 65.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & North Site Access/CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	0	2	4	0	39	2	233	4	39	832	16
Future Volume (vph)	69	0	2	4	0	39	2	233	4	39	832	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	2.5			2.5			2.5			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.878			0.997				0.850
Flt Protected		0.954			0.995		0.950			0.950		
Satd. Flow (prot)	0	1695	0	0	1559	0	1695	1779	0	1695	1784	1517
Flt Permitted		0.700			0.968		0.301			0.611		
Satd. Flow (perm)	0	1244	0	0	1516	0	537	1779	0	1090	1784	1517
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			39			2				31
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		262.7			202.0			88.7			587.5	
Travel Time (s)		18.9			14.5			4.0			26.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	69	0	2	4	0	39	2	233	4	39	832	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	71	0	0	43	0	2	237	0	39	832	16
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	24.8	24.8		24.8	24.8		26.2	26.2		26.2	26.2	26.2

5: Boundary & North Site Access/CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	25.0	25.0		25.0	25.0		75.0	75.0		75.0	75.0	75.0
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	75.0%
Maximum Green (s)	19.2	19.2		19.2	19.2		68.8	68.8		68.8	68.8	68.8
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	2.1	2.1		2.1	2.1		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.8			5.8		6.2	6.2		6.2	6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		10.8			10.8		81.6	81.6		81.6	81.6	81.6
Actuated g/C Ratio		0.11			0.11		0.82	0.82		0.82	0.82	0.82
v/c Ratio		0.43			0.22		0.00	0.16		0.04	0.57	0.01
Control Delay		32.3			17.2		1.5	1.6		1.2	3.2	0.1
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		32.3			17.2		1.5	1.6		1.2	3.2	0.1
LOS		C			B		A	A		A	A	A
Approach Delay		32.3			17.2			1.6			3.0	
Approach LOS		C			B			A			A	
Queue Length 50th (m)		6.1			0.7		0.0	4.0		0.8	16.0	0.0
Queue Length 95th (m)		17.9			9.4		m0.2	7.4		m0.3	5.0	m0.1
Internal Link Dist (m)		238.7			178.0			64.7			563.5	
Turn Bay Length (m)										110.0		70.0
Base Capacity (vph)		267			322		438	1452		889	1455	1243
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.27			0.13		0.00	0.16		0.04	0.57	0.01

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 4.9

Intersection LOS: A

Intersection Capacity Utilization 67.1%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Boundary & North Site Access/CRRRC

75 s	25 s
75 s	25 s

6: Boundary & South Site Access
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2021 Total Traffic (signals implemented)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	10	0	239	838	0
Future Volume (vph)	0	10	0	239	838	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	10.0			0.0
Storage Lanes	0	1	1			0
Taper Length (m)	2.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1543	0	3390	1784	0
Flt Permitted						
Satd. Flow (perm)	0	1543	0	3390	1784	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	142.8			615.2	88.7	
Travel Time (s)	10.3			27.7	4.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	0	10	0	239	838	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	10	0	239	838	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			0.0	0.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	56.6%			ICU Level of Service B		
Analysis Period (min)	15					

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	124	32	97	873	79	103
Future Volume (vph)	124	32	97	873	79	103
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.972		0.879			
Flt Protected	0.962					0.979
Satd. Flow (prot)	1605	0	1549	0	0	1620
Flt Permitted	0.962					0.979
Satd. Flow (perm)	1605	0	1549	0	0	1620
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	138	36	108	970	88	114
Shared Lane Traffic (%)						
Lane Group Flow (vph)	174	0	1078	0	0	202
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	91.9%			ICU Level of Service F		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	18	298	35	956	198	9
Future Volume (vph)	18	298	35	956	198	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.994	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1645	0
Flt Permitted	0.950		0.564			
Satd. Flow (perm)	1383	1438	932	1784	1645	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		331			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	20	331	39	1062	220	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	331	39	1062	230	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	10.7	10.7	76.5	75.9	68.6	
Actuated g/C Ratio	0.11	0.11	0.76	0.76	0.69	
v/c Ratio	0.14	0.74	0.05	0.78	0.20	
Control Delay	42.1	15.4	1.3	8.8	7.3	
Queue Delay	0.0	0.0	0.0	0.3	0.0	
Total Delay	42.1	15.4	1.3	9.2	7.3	
LOS	D	B	A	A	A	
Approach Delay	16.9			8.9	7.3	
Approach LOS	B			A	A	
Queue Length 50th (m)	3.3	0.0	1.4	48.7	15.0	
Queue Length 95th (m)	9.5	24.2	m0.1	m37.7	27.1	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	182	477	751	1353	1129	
Starvation Cap Reductn	0	0	0	47	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.11	0.69	0.05	0.81	0.20	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 10.3

Intersection LOS: B

Intersection Capacity Utilization 72.7%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	15	5	3	5	23	6	930	27	175	243	56
Future Volume (vph)	35	15	5	3	5	23	6	930	27	175	243	56
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.987				0.850			0.850		0.972	
Flt Protected		0.970			0.984		0.950			0.950		
Satd. Flow (prot)	0	1677	0	0	1756	1517	1441	1767	1517	1695	1571	0
Flt Permitted		0.804			0.890		0.560			0.069		
Satd. Flow (perm)	0	1390	0	0	1588	1517	849	1767	1482	123	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				100			96		26	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			590.7			254.7	
Travel Time (s)		7.0			13.9			26.6			11.5	
Confl. Peds. (#/hr)									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%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	39	17	6	3	6	26	7	1033	30	194	270	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	62	0	0	9	26	7	1033	30	194	332	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.9			10.9	10.9	62.6	62.6	62.6	80.4	81.5	
Actuated g/C Ratio		0.11			0.11	0.11	0.63	0.63	0.63	0.80	0.82	
v/c Ratio		0.40			0.05	0.10	0.01	0.93	0.03	0.69	0.26	
Control Delay		46.1			39.6	0.8	13.5	33.4	0.0	33.8	2.8	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		46.1			39.6	0.8	13.5	33.4	0.0	33.8	2.8	
LOS		D			D	A	B	C	A	C	A	
Approach Delay		46.1			10.8			32.3			14.2	
Approach LOS		D			B			C			B	
Queue Length 50th (m)		9.7			1.5	0.0	0.4	146.7	0.0	19.3	8.6	
Queue Length 95th (m)		20.7			5.6	0.0	m1.4	#288.2	m0.0	m36.7	17.5	
Internal Link Dist (m)		93.2			130.3			566.7			230.7	
Turn Bay Length (m)							30.0		10.0	70.0		
Base Capacity (vph)		270			304	372	531	1105	963	332	1284	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.23			0.03	0.07	0.01	0.93	0.03	0.58	0.26	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 26.8

Intersection LOS: C

Intersection Capacity Utilization 86.8%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



0.0000, 0.0000

Dynamic Traffic Report

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	80	30	136	875	125	109
Future Volume (vph)	80	30	136	875	125	109
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1572	1289	1647	1733	1733	1432
Flt Permitted	0.950		0.668			
Satd. Flow (perm)	1572	1289	1158	1733	1733	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		33				121
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	700.7	
Travel Time (s)	18.4			29.3	31.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	89	33	151	972	139	121
Shared Lane Traffic (%)						
Lane Group Flow (vph)	89	33	151	972	139	121
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	26.0	26.0	74.0	74.0	74.0	74.0
Total Split (%)	26.0%	26.0%	74.0%	74.0%	74.0%	74.0%
Maximum Green (s)	19.2	19.2	67.8	67.8	67.8	67.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	11.9	11.9	79.7	79.7	79.7	79.7
Actuated g/C Ratio	0.12	0.12	0.80	0.80	0.80	0.80
v/c Ratio	0.48	0.18	0.16	0.70	0.10	0.10
Control Delay	49.5	15.4	4.1	10.6	4.2	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	15.4	4.1	10.6	4.2	2.1
LOS	D	B	A	B	A	A
Approach Delay	40.3			9.7	3.2	
Approach LOS	D			A	A	
Queue Length 50th (m)	15.2	0.0	6.1	77.6	5.8	0.0
Queue Length 95th (m)	28.0	7.6	13.6	150.7	12.6	3.8
Internal Link Dist (m)	384.5			627.7	676.7	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	301	274	923	1382	1382	1166
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.12	0.16	0.70	0.10	0.10

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 76 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 11.1

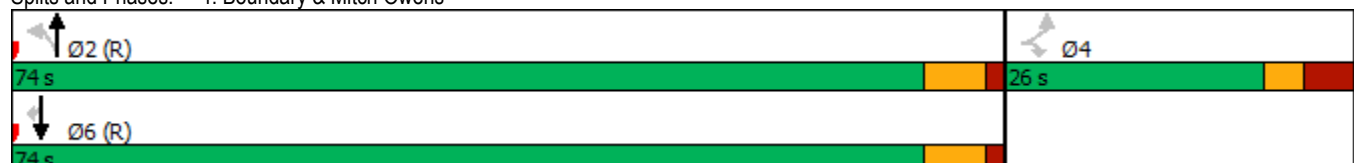
Intersection LOS: B

Intersection Capacity Utilization 67.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	39	951	4	39	230
Future Volume (vph)	4	39	951	4	39	230
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	10.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.878		0.999			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1514	0	1732	0	1647	1733
Flt Permitted	0.995				0.950	
Satd. Flow (perm)	1514	0	1732	0	1647	1733
Link Speed (k/h)	50		80			80
Link Distance (m)	197.6		700.7			590.7
Travel Time (s)	14.2		31.5			26.6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	39	951	4	39	230
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	955	0	39	230
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 63.1%	ICU Level of Service B					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic (optimized timings)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	124	32	97	873	79	103
Future Volume (vph)	124	32	97	873	79	103
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.972		0.879			
Flt Protected	0.962					0.979
Satd. Flow (prot)	1605	0	1549	0	0	1620
Flt Permitted	0.962					0.979
Satd. Flow (perm)	1605	0	1549	0	0	1620
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	138	36	108	970	88	114
Shared Lane Traffic (%)						
Lane Group Flow (vph)	174	0	1078	0	0	202
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	91.9%			ICU Level of Service F		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	18	298	35	956	198	9
Future Volume (vph)	18	298	35	956	198	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.994	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1645	0
Flt Permitted	0.950		0.564			
Satd. Flow (perm)	1383	1438	932	1784	1645	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		331			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	20	331	39	1062	220	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	331	39	1062	230	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic (optimized timings)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	10.7	10.7	76.5	75.9	68.6	
Actuated g/C Ratio	0.11	0.11	0.76	0.76	0.69	
v/c Ratio	0.14	0.74	0.05	0.78	0.20	
Control Delay	42.1	15.4	1.8	7.1	7.3	
Queue Delay	0.0	0.0	0.0	0.2	0.0	
Total Delay	42.1	15.4	1.8	7.2	7.3	
LOS	D	B	A	A	A	
Approach Delay	16.9			7.1	7.3	
Approach LOS	B			A	A	
Queue Length 50th (m)	3.3	0.0	1.5	50.9	15.0	
Queue Length 95th (m)	9.5	24.2	m0.3	m13.2	27.1	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	182	477	751	1353	1129	
Starvation Cap Reductn	0	0	0	29	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.11	0.69	0.05	0.80	0.20	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 9.1

Intersection LOS: A

Intersection Capacity Utilization 72.7%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic (optimized timings)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	15	5	3	5	23	6	930	27	175	243	56
Future Volume (vph)	35	15	5	3	5	23	6	930	27	175	243	56
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.987				0.850			0.850		0.972	
Flt Protected		0.970			0.984		0.950			0.950		
Satd. Flow (prot)	0	1677	0	0	1756	1517	1441	1767	1517	1695	1571	0
Flt Permitted		0.804			0.890		0.560			0.140		
Satd. Flow (perm)	0	1390	0	0	1588	1517	849	1767	1482	250	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				103			98		26	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			590.7			254.7	
Travel Time (s)		7.0			13.9			26.6			11.5	
Confl. Peds. (#/hr)									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%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	39	17	6	3	6	26	7	1033	30	194	270	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	62	0	0	9	26	7	1033	30	194	332	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic (optimized timings)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	63.0	63.0	63.0	12.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	63.0%	63.0%	63.0%	12.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	56.8	56.8	56.8	6.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lead	Lead	Lead	Lag		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.9			10.9	10.9	68.2	68.2	68.2	80.4	81.5	
Actuated g/C Ratio		0.11			0.11	0.11	0.68	0.68	0.68	0.80	0.82	
v/c Ratio		0.40			0.05	0.10	0.01	0.86	0.03	0.68	0.26	
Control Delay		46.1			39.6	0.8	8.0	20.2	0.0	27.3	3.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		46.1			39.6	0.8	8.0	20.2	0.0	27.3	3.0	
LOS		D			D	A	A	C	A	C	A	
Approach Delay		46.1			10.8			19.5			11.9	
Approach LOS		D			B			B			B	
Queue Length 50th (m)		9.7			1.5	0.0	0.3	72.1	0.0	3.9	6.1	
Queue Length 95th (m)		20.7			5.6	0.0	m1.0	#246.6	m0.0	m#23.8	19.6	
Internal Link Dist (m)		93.2			130.3			566.7			230.7	
Turn Bay Length (m)							30.0		10.0	70.0		
Base Capacity (vph)		270			304	374	579	1205	1042	287	1284	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.23			0.03	0.07	0.01	0.86	0.03	0.68	0.26	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 18.0

Intersection LOS: B

Intersection Capacity Utilization 86.8%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



0.0000, 11/04/2020

Dynamic Traffic Report

4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	80	30	136	875	125	109
Future Volume (vph)	80	30	136	875	125	109
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1572	1289	1647	1733	1733	1432
Flt Permitted	0.950		0.668			
Satd. Flow (perm)	1572	1289	1158	1733	1733	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		33				121
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	700.7	
Travel Time (s)	18.4			29.3	31.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	89	33	151	972	139	121
Shared Lane Traffic (%)						
Lane Group Flow (vph)	89	33	151	972	139	121
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic (optimized timings)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	26.0	26.0	74.0	74.0	74.0	74.0
Total Split (%)	26.0%	26.0%	74.0%	74.0%	74.0%	74.0%
Maximum Green (s)	19.2	19.2	67.8	67.8	67.8	67.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	11.9	11.9	79.7	79.7	79.7	79.7
Actuated g/C Ratio	0.12	0.12	0.80	0.80	0.80	0.80
v/c Ratio	0.48	0.18	0.16	0.70	0.10	0.10
Control Delay	49.5	15.4	4.1	10.6	3.5	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	15.4	4.1	10.6	3.5	1.9
LOS	D	B	A	B	A	A
Approach Delay	40.3			9.7	2.8	
Approach LOS	D			A	A	
Queue Length 50th (m)	15.2	0.0	6.1	77.6	2.3	0.0
Queue Length 95th (m)	28.0	7.6	13.6	150.7	17.6	8.1
Internal Link Dist (m)	384.5			627.7	676.7	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	301	274	923	1382	1382	1166
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.12	0.16	0.70	0.10	0.10

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 76 (76%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 11.0

Intersection LOS: B

Intersection Capacity Utilization 67.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic (optimized timings)

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	39	951	4	39	230
Future Volume (vph)	4	39	951	4	39	230
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	10.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.878		0.999			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1514	0	1732	0	1647	1733
Flt Permitted	0.995				0.950	
Satd. Flow (perm)	1514	0	1732	0	1647	1733
Link Speed (k/h)	50		80			80
Link Distance (m)	197.6		700.7			590.7
Travel Time (s)	14.2		31.5			26.6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	39	951	4	39	230
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	955	0	39	230
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 63.1%	ICU Level of Service B					
Analysis Period (min) 15						

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	49	1	147	288	25	123
Future Volume (vph)	49	1	147	288	25	123
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997		0.911			
Flt Protected	0.953					0.992
Satd. Flow (prot)	1506	0	1584	0	0	1706
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1506	0	1584	0	0	1706
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	5%	10%	2%	10%	5%
Adj. Flow (vph)	49	1	147	288	25	123
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	0	435	0	0	148
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	39.4%			ICU Level of Service A		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	79	747	152	258	215	17
Future Volume (vph)	79	747	152	258	215	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1572	1733	1698	0
Flt Permitted	0.950		0.548			
Satd. Flow (perm)	1647	1480	906	1733	1698	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		711			7	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	5%	5%	20%
Adj. Flow (vph)	79	747	152	258	215	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	79	747	152	258	232	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	25.0	25.0	12.0	75.0	63.0	
Total Split (%)	25.0%	25.0%	12.0%	75.0%	63.0%	
Maximum Green (s)	18.2	18.2	6.0	68.4	56.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	19.4	19.4	67.8	67.2	53.0	
Actuated g/C Ratio	0.19	0.19	0.68	0.67	0.53	
v/c Ratio	0.25	0.87	0.23	0.22	0.26	
Control Delay	32.2	15.0	8.5	8.7	16.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	32.2	15.0	8.5	8.7	16.5	
LOS	C	B	A	A	B	
Approach Delay	16.7			8.6	16.5	
Approach LOS	B			A	B	
Queue Length 50th (m)	12.8	5.7	9.2	17.6	18.5	
Queue Length 95th (m)	18.3	37.7	22.3	35.5	48.4	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	383	889	669	1253	1013	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.21	0.84	0.23	0.21	0.23	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 14.4

Intersection LOS: B

Intersection Capacity Utilization 89.3%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	0	16	5	0	16	5	322	0	2	897	62
Future Volume (vph)	70	0	16	5	0	16	5	322	0	2	897	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.975				0.850					0.990	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1610	0	0	1695	1517	1695	1655	1784	1695	1749	0
Flt Permitted		0.763			0.770		0.272			0.523		
Satd. Flow (perm)	0	1278	0	0	1374	1517	485	1655	1784	933	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100						8
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			587.5			254.7	
Travel Time (s)		7.0			13.9			26.4			11.5	
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	2%	2%	2%	2%	10%	2%	2%	3%	3%
Adj. Flow (vph)	70	0	16	5	0	16	5	322	0	2	897	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	86	0	0	5	16	5	322	0	2	959	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Background Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.0			10.0	10.0	80.0	80.0		81.3	82.4	
Actuated g/C Ratio		0.10			0.10	0.10	0.80	0.80		0.81	0.82	
v/c Ratio		0.39			0.04	0.07	0.01	0.24		0.00	0.67	
Control Delay		12.3			41.4	0.5	4.6	4.3		3.0	8.1	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.1	
Total Delay		12.3			41.4	0.5	4.6	4.3		3.0	8.1	
LOS		B			D	A	A	A		A	A	
Approach Delay		12.3			10.2			4.3			8.1	
Approach LOS		B			B			A			A	
Queue Length 50th (m)		0.0			0.8	0.0	0.2	13.7		0.0	60.6	
Queue Length 95th (m)		10.3			4.0	0.0	m1.1	28.0		m0.2	119.7	
Internal Link Dist (m)		93.2			130.3			563.5			230.7	
Turn Bay Length (m)							30.0			70.0		
Base Capacity (vph)		326			263	372	388	1324		865	1441	
Starvation Cap Reductn		0			0	0	0	0		0	27	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.26			0.02	0.04	0.01	0.24		0.00	0.68	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 7.5

Intersection LOS: A

Intersection Capacity Utilization 75.6%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	130	110	59	132	793	130
Future Volume (vph)	130	110	59	132	793	130
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1647	1685	1784	1406
Flt Permitted	0.950		0.292			
Satd. Flow (perm)	1647	1517	506	1685	1784	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		110				79
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	703.9	
Travel Time (s)	18.4			29.3	31.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	5%	8%	2%	10%
Adj. Flow (vph)	130	110	59	132	793	130
Shared Lane Traffic (%)						
Lane Group Flow (vph)	130	110	59	132	793	130
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	28.0	28.0	72.0	72.0	72.0	72.0
Total Split (%)	28.0%	28.0%	72.0%	72.0%	72.0%	72.0%
Maximum Green (s)	21.2	21.2	65.8	65.8	65.8	65.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	13.6	13.6	73.4	73.4	73.4	73.4
Actuated g/C Ratio	0.14	0.14	0.73	0.73	0.73	0.73
v/c Ratio	0.58	0.37	0.16	0.11	0.61	0.12
Control Delay	50.6	10.8	6.0	4.6	7.6	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	10.8	6.0	4.6	7.6	2.1
LOS	D	B	A	A	A	A
Approach Delay	32.4			5.0	6.8	
Approach LOS	C			A	A	
Queue Length 50th (m)	22.2	0.0	2.6	5.6	53.3	0.9
Queue Length 95th (m)	37.2	12.9	7.9	12.6	80.3	m5.9
Internal Link Dist (m)	384.5			627.7	679.9	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	349	408	371	1237	1309	1053
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.27	0.16	0.11	0.61	0.12

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 11.1

Intersection LOS: B

Intersection Capacity Utilization 70.9%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Boundary & Mitch Owens



						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	39	258	4	39	919
Future Volume (vph)	4	39	258	4	39	919
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.878		0.998			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1559	0	1781	0	1695	1784
Flt Permitted	0.995				0.950	
Satd. Flow (perm)	1559	0	1781	0	1695	1784
Link Speed (k/h)	50		80			80
Link Distance (m)	202.0		703.9			587.5
Travel Time (s)	14.5		31.7			26.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	4	39	258	4	39	919
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	262	0	39	919
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 61.1%	ICU Level of Service B					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	141	32	101	884	79	119
Future Volume (vph)	141	32	101	884	79	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.975		0.879			
Flt Protected	0.961					0.980
Satd. Flow (prot)	1610	0	1548	0	0	1621
Flt Permitted	0.961					0.980
Satd. Flow (perm)	1610	0	1548	0	0	1621
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	157	36	112	982	88	132
Shared Lane Traffic (%)						
Lane Group Flow (vph)	193	0	1094	0	0	220
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	94.8%			ICU Level of Service F		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	18	335	39	971	231	9
Future Volume (vph)	18	335	39	971	231	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1646	0
Flt Permitted	0.950		0.545			
Satd. Flow (perm)	1383	1438	901	1784	1646	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		372			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	20	372	43	1079	257	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	372	43	1079	267	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	10.9	10.9	76.3	75.7	68.4	
Actuated g/C Ratio	0.11	0.11	0.76	0.76	0.68	
v/c Ratio	0.13	0.76	0.06	0.80	0.24	
Control Delay	41.8	15.7	1.2	8.9	7.6	
Queue Delay	0.0	0.0	0.0	0.4	0.0	
Total Delay	41.8	15.7	1.2	9.2	7.6	
LOS	D	B	A	A	A	
Approach Delay	17.0			8.9	7.6	
Approach LOS	B			A	A	
Queue Length 50th (m)	3.3	0.0	1.6	48.6	18.0	
Queue Length 95th (m)	9.5	25.8	m0.1	m37.3	31.5	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	182	512	728	1350	1127	
Starvation Cap Reductn	0	0	0	47	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.11	0.73	0.06	0.83	0.24	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 10.5

Intersection LOS: B

Intersection Capacity Utilization 73.5%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	15	5	3	5	23	6	949	27	175	312	56
Future Volume (vph)	35	15	5	3	5	23	6	949	27	175	312	56
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.987				0.850			0.850		0.977	
Flt Protected		0.970			0.984		0.950			0.950		
Satd. Flow (prot)	0	1677	0	0	1756	1517	1441	1767	1517	1695	1573	0
Flt Permitted		0.804			0.890		0.522			0.059		
Satd. Flow (perm)	0	1390	0	0	1588	1517	792	1767	1482	105	1573	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				100			96		21	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			590.7			254.7	
Travel Time (s)		7.0			13.9			26.6			11.5	
Confl. Peds. (#/hr)									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%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	39	17	6	3	6	26	7	1054	30	194	347	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	62	0	0	9	26	7	1054	30	194	409	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.9			10.9	10.9	62.6	62.6	62.6	80.4	81.5	
Actuated g/C Ratio		0.11			0.11	0.11	0.63	0.63	0.63	0.80	0.82	
v/c Ratio		0.40			0.05	0.10	0.01	0.95	0.03	0.72	0.32	
Control Delay		46.1			39.6	0.8	14.7	36.4	0.2	38.1	3.2	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		46.1			39.6	0.8	14.7	36.4	0.2	38.1	3.2	
LOS		D			D	A	B	D	A	D	A	
Approach Delay		46.1			10.8			35.3			14.4	
Approach LOS		D			B			D			B	
Queue Length 50th (m)		9.7			1.5	0.0	0.4	71.4	0.0	21.8	12.1	
Queue Length 95th (m)		20.7			5.6	0.0	m1.7	#295.6	m0.0	m37.8	23.2	
Internal Link Dist (m)		93.2			130.3			566.7			230.7	
Turn Bay Length (m)							30.0		10.0	70.0		
Base Capacity (vph)		270			304	372	495	1105	963	320	1285	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.23			0.03	0.07	0.01	0.95	0.03	0.61	0.32	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 28.1

Intersection LOS: C

Intersection Capacity Utilization 87.8%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



0.0000, 0.0000

Dynamic Traffic Report

4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	81	30	136	886	128	109
Future Volume (vph)	81	30	136	886	128	109
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1572	1289	1647	1733	1733	1432
Flt Permitted	0.950		0.666			
Satd. Flow (perm)	1572	1289	1154	1733	1733	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		33				121
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	613.1	
Travel Time (s)	18.4			29.3	27.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	90	33	151	984	142	121
Shared Lane Traffic (%)						
Lane Group Flow (vph)	90	33	151	984	142	121
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	26.0	26.0	74.0	74.0	74.0	74.0
Total Split (%)	26.0%	26.0%	74.0%	74.0%	74.0%	74.0%
Maximum Green (s)	19.2	19.2	67.8	67.8	67.8	67.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	11.9	11.9	79.7	79.7	79.7	79.7
Actuated g/C Ratio	0.12	0.12	0.80	0.80	0.80	0.80
v/c Ratio	0.48	0.18	0.16	0.71	0.10	0.10
Control Delay	49.5	15.3	4.2	10.9	5.6	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	15.3	4.2	10.9	5.6	3.3
LOS	D	B	A	B	A	A
Approach Delay	40.4			10.0	4.5	
Approach LOS	D			B	A	
Queue Length 50th (m)	15.4	0.0	6.1	79.9	6.5	0.0
Queue Length 95th (m)	28.3	7.6	13.7	156.7	19.4	8.4
Internal Link Dist (m)	384.5			627.7	589.1	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	301	274	919	1381	1381	1166
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.12	0.16	0.71	0.10	0.10

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 76 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 11.5

Intersection LOS: B

Intersection Capacity Utilization 68.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & North Site Access/CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	0	1	4	0	39	12	951	4	39	230	69
Future Volume (vph)	19	0	1	4	0	39	12	951	4	39	230	69
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	10.0			10.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.878			0.999				0.850
Flt Protected		0.955			0.995		0.950			0.950		
Satd. Flow (prot)	0	1644	0	0	1514	0	1647	1732	0	1647	1733	1473
Flt Permitted		0.705			0.964		0.615			0.260		
Satd. Flow (perm)	0	1213	0	0	1467	0	1066	1732	0	451	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			39							69
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		264.4			197.6			87.6			590.7	
Travel Time (s)		19.0			14.2			3.9			26.6	
Peak Hour Factor	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. Flow (vph)	19	0	1	4	0	39	12	951	4	39	230	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	43	0	12	955	0	39	230	69
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	24.8	24.8		24.8	24.8		26.2	26.2		26.2	26.2	26.2
Total Split (s)	25.0	25.0		25.0	25.0		75.0	75.0		75.0	75.0	75.0

5: Boundary & North Site Access/CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	75.0%
Maximum Green (s)	19.2	19.2		19.2	19.2		68.8	68.8		68.8	68.8	68.8
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	2.1	2.1		2.1	2.1		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.8			5.8		6.2	6.2		6.2	6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		10.0			10.0		86.8	86.8		86.8	86.8	86.8
Actuated g/C Ratio		0.10			0.10		0.87	0.87		0.87	0.87	0.87
v/c Ratio		0.13			0.24		0.01	0.64		0.10	0.15	0.05
Control Delay		8.7			18.7		1.1	4.4		2.2	1.6	0.5
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		8.7			18.7		1.1	4.4		2.2	1.6	0.5
LOS		A			B		A	A		A	A	A
Approach Delay		8.7			18.7			4.3			1.4	
Approach LOS		A			B			A			A	
Queue Length 50th (m)		0.0			0.7		0.1	102.0		1.0	6.2	0.0
Queue Length 95th (m)		3.8			9.9		m0.1	46.1		3.4	12.2	2.0
Internal Link Dist (m)		240.4			173.6			63.6			566.7	
Turn Bay Length (m)										110.0		70.0
Base Capacity (vph)		261			313		925	1503		391	1504	1288
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.08			0.14		0.01	0.64		0.10	0.15	0.05

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 23 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 4.1

Intersection LOS: A

Intersection Capacity Utilization 71.4%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Boundary & North Site Access/CRRRC



6: Boundary & South Site Access
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	0	2	0	967	235	0
Future Volume (vph)	0	2	0	967	235	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	10.0			0.0
Storage Lanes	0	1	1			0
Taper Length (m)	10.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt	0.865					
Flt Protected						
Satd. Flow (prot)	0	1499	0	3293	1733	0
Flt Permitted						
Satd. Flow (perm)	0	1499	0	3293	1733	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	139.4			613.1	87.6	
Travel Time (s)	10.0			27.6	3.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	2	0	967	235	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2	0	967	235	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			0.0	0.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 31.5%	ICU Level of Service A					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic (optimized timings)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	141	32	101	884	79	119
Future Volume (vph)	141	32	101	884	79	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.975		0.879			
Flt Protected	0.961					0.980
Satd. Flow (prot)	1610	0	1548	0	0	1621
Flt Permitted	0.961					0.980
Satd. Flow (perm)	1610	0	1548	0	0	1621
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	157	36	112	982	88	132
Shared Lane Traffic (%)						
Lane Group Flow (vph)	193	0	1094	0	0	220
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	94.8%			ICU Level of Service F		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	18	335	39	971	231	9
Future Volume (vph)	18	335	39	971	231	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1646	0
Flt Permitted	0.950		0.545			
Satd. Flow (perm)	1383	1438	901	1784	1646	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		372			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	20	372	43	1079	257	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	372	43	1079	267	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic (optimized timings)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	10.9	10.9	76.3	75.7	68.4	
Actuated g/C Ratio	0.11	0.11	0.76	0.76	0.68	
v/c Ratio	0.13	0.76	0.06	0.80	0.24	
Control Delay	41.8	15.7	1.7	7.3	7.6	
Queue Delay	0.0	0.0	0.0	0.2	0.0	
Total Delay	41.8	15.7	1.7	7.5	7.6	
LOS	D	B	A	A	A	
Approach Delay	17.0			7.3	7.6	
Approach LOS	B			A	A	
Queue Length 50th (m)	3.3	0.0	2.0	56.6	18.0	
Queue Length 95th (m)	9.5	25.8	m0.3	m12.8	31.5	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	182	512	728	1350	1127	
Starvation Cap Reductn	0	0	0	30	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.11	0.73	0.06	0.82	0.24	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 9.5

Intersection LOS: A

Intersection Capacity Utilization 73.5%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic (optimized timings)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	15	5	3	5	23	6	949	27	175	312	56
Future Volume (vph)	35	15	5	3	5	23	6	949	27	175	312	56
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.987				0.850			0.850		0.977	
Flt Protected		0.970			0.984		0.950			0.950		
Satd. Flow (prot)	0	1677	0	0	1756	1517	1441	1767	1517	1695	1573	0
Flt Permitted		0.804			0.890		0.522			0.129		
Satd. Flow (perm)	0	1390	0	0	1588	1517	792	1767	1482	230	1573	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				103			98		21	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			590.7			254.7	
Travel Time (s)		7.0			13.9			26.6			11.5	
Confl. Peds. (#/hr)									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%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	39	17	6	3	6	26	7	1054	30	194	347	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	62	0	0	9	26	7	1054	30	194	409	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic (optimized timings)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	63.0	63.0	63.0	12.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	63.0%	63.0%	63.0%	12.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	56.8	56.8	56.8	6.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lead	Lead	Lead	Lag		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.9			10.9	10.9	68.2	68.2	68.2	80.4	81.5	
Actuated g/C Ratio		0.11			0.11	0.11	0.68	0.68	0.68	0.80	0.82	
v/c Ratio		0.40			0.05	0.10	0.01	0.87	0.03	0.71	0.32	
Control Delay		46.1			39.6	0.8	8.5	21.5	0.0	30.9	3.3	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		46.1			39.6	0.8	8.5	21.5	0.0	30.9	3.3	
LOS		D			D	A	A	C	A	C	A	
Approach Delay		46.1			10.8			20.8			12.2	
Approach LOS		D			B			C			B	
Queue Length 50th (m)		9.7			1.5	0.0	0.3	55.8	0.0	3.9	8.2	
Queue Length 95th (m)		20.7			5.6	0.0	m1.2	#254.0	m0.0	m#26.0	28.2	
Internal Link Dist (m)		93.2			130.3			566.7			230.7	
Turn Bay Length (m)							30.0		10.0	70.0		
Base Capacity (vph)		270			304	374	540	1205	1042	272	1285	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.23			0.03	0.07	0.01	0.87	0.03	0.71	0.32	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 18.6

Intersection LOS: B

Intersection Capacity Utilization 87.8%

ICU Level of Service E

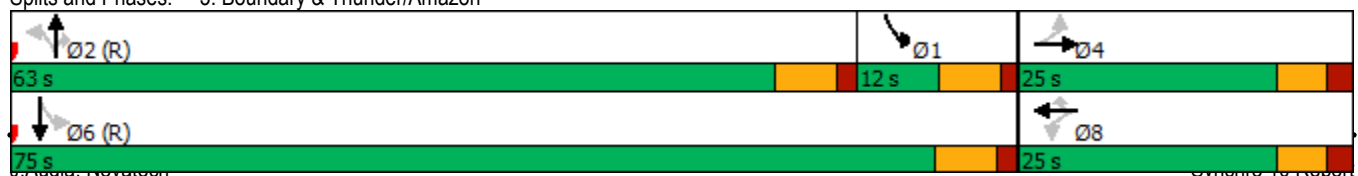
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



0.0000, 11/04/2020

Dynamic Traffic Report

4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	81	30	136	886	128	109
Future Volume (vph)	81	30	136	886	128	109
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1572	1289	1647	1733	1733	1432
Flt Permitted	0.950		0.666			
Satd. Flow (perm)	1572	1289	1154	1733	1733	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		33				121
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	613.1	
Travel Time (s)	18.4			29.3	27.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	90	33	151	984	142	121
Shared Lane Traffic (%)						
Lane Group Flow (vph)	90	33	151	984	142	121
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic (optimized timings)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	26.0	26.0	74.0	74.0	74.0	74.0
Total Split (%)	26.0%	26.0%	74.0%	74.0%	74.0%	74.0%
Maximum Green (s)	19.2	19.2	67.8	67.8	67.8	67.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	11.9	11.9	79.7	79.7	79.7	79.7
Actuated g/C Ratio	0.12	0.12	0.80	0.80	0.80	0.80
v/c Ratio	0.48	0.18	0.16	0.71	0.10	0.10
Control Delay	49.5	15.3	4.2	10.9	3.3	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	15.3	4.2	10.9	3.3	1.9
LOS	D	B	A	B	A	A
Approach Delay	40.4			10.0	2.6	
Approach LOS	D			B	A	
Queue Length 50th (m)	15.4	0.0	6.1	79.9	2.0	0.0
Queue Length 95th (m)	28.3	7.6	13.7	156.7	17.7	8.4
Internal Link Dist (m)	384.5			627.7	589.1	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	301	274	919	1381	1381	1166
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.12	0.16	0.71	0.10	0.10

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 76 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 11.2

Intersection LOS: B

Intersection Capacity Utilization 68.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & North Site Access/CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic (optimized timings)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	0	1	4	0	39	12	951	4	39	230	69
Future Volume (vph)	19	0	1	4	0	39	12	951	4	39	230	69
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	10.0			10.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.878			0.999				0.850
Flt Protected		0.955			0.995		0.950			0.950		
Satd. Flow (prot)	0	1644	0	0	1514	0	1647	1732	0	1647	1733	1473
Flt Permitted		0.705			0.964		0.615			0.260		
Satd. Flow (perm)	0	1213	0	0	1467	0	1066	1732	0	451	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			39							69
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		264.4			197.6			87.6			590.7	
Travel Time (s)		19.0			14.2			3.9			26.6	
Peak Hour Factor	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. Flow (vph)	19	0	1	4	0	39	12	951	4	39	230	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	43	0	12	955	0	39	230	69
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	24.8	24.8		24.8	24.8		26.2	26.2		26.2	26.2	26.2
Total Split (s)	25.0	25.0		25.0	25.0		75.0	75.0		75.0	75.0	75.0

5: Boundary & North Site Access/CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic (optimized timings)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	75.0%
Maximum Green (s)	19.2	19.2		19.2	19.2		68.8	68.8		68.8	68.8	68.8
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	2.1	2.1		2.1	2.1		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.8			5.8		6.2	6.2		6.2	6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		10.0			10.0		86.8	86.8		86.8	86.8	86.8
Actuated g/C Ratio		0.10			0.10		0.87	0.87		0.87	0.87	0.87
v/c Ratio		0.13			0.24		0.01	0.64		0.10	0.15	0.05
Control Delay		8.7			18.7		1.1	4.4		2.3	1.8	0.3
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		8.7			18.7		1.1	4.4		2.3	1.8	0.3
LOS		A			B		A	A		A	A	A
Approach Delay		8.7			18.7			4.3			1.5	
Approach LOS		A			B			A			A	
Queue Length 50th (m)		0.0			0.7		0.1	102.0		1.3	8.2	0.0
Queue Length 95th (m)		3.8			9.9		m0.1	46.1		1.4	5.0	0.2
Internal Link Dist (m)		240.4			173.6			63.6			566.7	
Turn Bay Length (m)										110.0		70.0
Base Capacity (vph)		261			313		925	1503		391	1504	1288
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.08			0.14		0.01	0.64		0.10	0.15	0.05

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 23 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 4.1

Intersection LOS: A

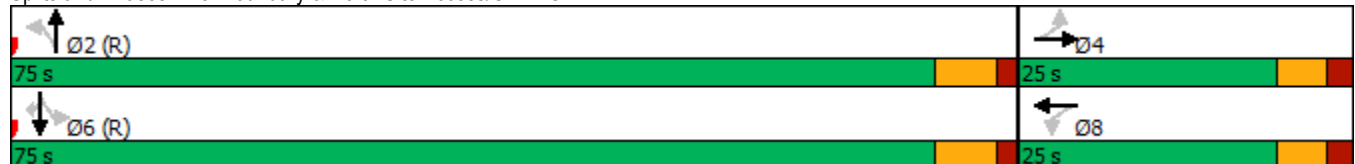
Intersection Capacity Utilization 71.4%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Boundary & North Site Access/CRRRC



6: Boundary & South Site Access
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	0	2	0	967	235	0
Future Volume (vph)	0	2	0	967	235	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	10.0			0.0
Storage Lanes	0	1	1			0
Taper Length (m)	10.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1499	0	3293	1733	0
Flt Permitted						
Satd. Flow (perm)	0	1499	0	3293	1733	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	139.4			613.1	87.6	
Travel Time (s)	10.0			27.6	3.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	2	0	967	235	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2	0	967	235	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			0.0	0.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 31.5%	ICU Level of Service A					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	53	1	162	326	25	126
Future Volume (vph)	53	1	162	326	25	126
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997		0.910			
Flt Protected	0.953					0.992
Satd. Flow (prot)	1506	0	1583	0	0	1706
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1506	0	1583	0	0	1706
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	5%	10%	2%	10%	5%
Adj. Flow (vph)	53	1	162	326	25	126
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	488	0	0	151
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.1%			ICU Level of Service A		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	79	757	169	311	222	17
Future Volume (vph)	79	757	169	311	222	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1572	1733	1699	0
Flt Permitted	0.950		0.536			
Satd. Flow (perm)	1647	1480	886	1733	1699	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		701			6	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	5%	5%	20%
Adj. Flow (vph)	79	757	169	311	222	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	79	757	169	311	239	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	25.0	25.0	12.0	75.0	63.0	
Total Split (%)	25.0%	25.0%	12.0%	75.0%	63.0%	
Maximum Green (s)	18.2	18.2	6.0	68.4	56.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	21.6	21.6	65.6	65.0	50.8	
Actuated g/C Ratio	0.22	0.22	0.66	0.65	0.51	
v/c Ratio	0.22	0.87	0.27	0.28	0.28	
Control Delay	29.7	15.4	9.8	10.2	18.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	29.7	15.4	9.8	10.2	18.0	
LOS	C	B	A	B	B	
Approach Delay	16.7			10.1	18.0	
Approach LOS	B			B	B	
Queue Length 50th (m)	12.1	8.5	10.8	22.4	21.8	
Queue Length 95th (m)	17.5	42.0	27.1	48.3	50.1	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	403	891	637	1236	1003	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.85	0.27	0.25	0.24	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 14.9

Intersection LOS: B

Intersection Capacity Utilization 89.9%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	0	16	5	0	16	5	391	0	2	913	62
Future Volume (vph)	70	0	16	5	0	16	5	391	0	2	913	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.975				0.850					0.990	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1610	0	0	1695	1517	1695	1655	1784	1695	1749	0
Flt Permitted		0.763			0.770		0.265			0.482		
Satd. Flow (perm)	0	1278	0	0	1374	1517	473	1655	1784	860	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100					8	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			587.5			254.7	
Travel Time (s)		7.0			13.9			26.4			11.5	
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	2%	2%	2%	2%	10%	2%	2%	3%	3%
Adj. Flow (vph)	70	0	16	5	0	16	5	391	0	2	913	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	86	0	0	5	16	5	391	0	2	975	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.0			10.0	10.0	80.0	80.0		81.3	82.4	
Actuated g/C Ratio		0.10			0.10	0.10	0.80	0.80		0.81	0.82	
v/c Ratio		0.39			0.04	0.07	0.01	0.30		0.00	0.68	
Control Delay		12.3			41.4	0.5	5.4	5.0		3.0	8.7	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.1	
Total Delay		12.3			41.4	0.5	5.4	5.0		3.0	8.8	
LOS		B			D	A	A	A		A	A	
Approach Delay		12.3			10.2			5.0			8.8	
Approach LOS		B			B			A			A	
Queue Length 50th (m)		0.0			0.8	0.0	0.1	15.1		0.0	78.4	
Queue Length 95th (m)		10.3			4.0	0.0	m1.4	36.2		m0.1	m108.9	
Internal Link Dist (m)		93.2			130.3			563.5			230.7	
Turn Bay Length (m)							30.0			70.0		
Base Capacity (vph)		326			263	372	378	1324		816	1441	
Starvation Cap Reductn		0			0	0	0	0		0	46	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.26			0.02	0.04	0.01	0.30		0.00	0.70	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 8.0

Intersection LOS: A

Intersection Capacity Utilization 76.5%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	130	110	59	134	804	131
Future Volume (vph)	130	110	59	134	804	131
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1647	1685	1784	1406
Flt Permitted	0.950		0.287			
Satd. Flow (perm)	1647	1517	497	1685	1784	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		110				78
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	615.2	
Travel Time (s)	18.4			29.3	27.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	5%	8%	2%	10%
Adj. Flow (vph)	130	110	59	134	804	131
Shared Lane Traffic (%)						
Lane Group Flow (vph)	130	110	59	134	804	131
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 8 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 13.9	Intersection LOS: B
Intersection Capacity Utilization 70.9%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

 Ø2 (R)	 Ø4
72 s	28 s
 Ø6 (R)	
72 s	

5: Boundary & North Site Access/CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	0	2	4	0	39	2	258	4	39	919	16
Future Volume (vph)	69	0	2	4	0	39	2	258	4	39	919	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	2.5			2.5			2.5			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.878			0.998				0.850
Flt Protected		0.954			0.995		0.950			0.950		
Satd. Flow (prot)	0	1695	0	0	1559	0	1695	1781	0	1695	1784	1517
Flt Permitted		0.700			0.968		0.261			0.597		
Satd. Flow (perm)	0	1244	0	0	1516	0	466	1781	0	1065	1784	1517
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			39			2				31
Link Speed (k/h)		50			50			80				80
Link Distance (m)		262.7			202.0			88.7				587.5
Travel Time (s)		18.9			14.5			4.0				26.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	69	0	2	4	0	39	2	258	4	39	919	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	71	0	0	43	0	2	262	0	39	919	16
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	24.8	24.8		24.8	24.8		26.2	26.2		26.2	26.2	26.2

5: Boundary & North Site Access/CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	25.0	25.0		25.0	25.0		75.0	75.0		75.0	75.0	75.0
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	75.0%
Maximum Green (s)	19.2	19.2		19.2	19.2		68.8	68.8		68.8	68.8	68.8
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	2.1	2.1		2.1	2.1		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.8			5.8		6.2	6.2		6.2	6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		10.8			10.8		81.6	81.6		81.6	81.6	81.6
Actuated g/C Ratio		0.11			0.11		0.82	0.82		0.82	0.82	0.82
v/c Ratio		0.43			0.22		0.01	0.18		0.04	0.63	0.01
Control Delay		32.3			17.2		2.0	3.5		1.6	7.6	0.6
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		32.3			17.2		2.0	3.5		1.6	7.6	0.6
LOS		C			B		A	A		A	A	A
Approach Delay		32.3			17.2			3.4			7.3	
Approach LOS		C			B			A			A	
Queue Length 50th (m)		6.1			0.7		0.0	1.8		0.8	108.8	0.0
Queue Length 95th (m)		17.9			9.4		m0.3	38.8		m1.8	157.1	m0.1
Internal Link Dist (m)		238.7			178.0			64.7			563.5	
Turn Bay Length (m)										110.0		70.0
Base Capacity (vph)		267			322		380	1453		868	1455	1243
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.27			0.13		0.01	0.18		0.04	0.63	0.01

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 23 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 8.2

Intersection LOS: A

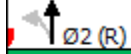
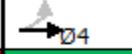
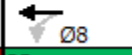
Intersection Capacity Utilization 71.9%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Boundary & North Site Access/CRRRC

 02 (R)	 04
75 s	25 s
 05 (R)	 08
75 s	25 s

6: Boundary & South Site Access
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2026 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	0	10	0	264	925	0
Future Volume (vph)	0	10	0	264	925	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	10.0			0.0
Storage Lanes	0	1	1			0
Taper Length (m)	2.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1543	0	3390	1784	0
Flt Permitted						
Satd. Flow (perm)	0	1543	0	3390	1784	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	142.8			615.2	88.7	
Travel Time (s)	10.3			27.7	4.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	0	10	0	264	925	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	10	0	264	925	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			0.0	0.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	61.4%			ICU Level of Service B		
Analysis Period (min)	15					

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	136	35	107	960	87	114
Future Volume (vph)	136	35	107	960	87	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.972		0.879			
Flt Protected	0.962					0.979
Satd. Flow (prot)	1605	0	1549	0	0	1620
Flt Permitted	0.962					0.979
Satd. Flow (perm)	1605	0	1549	0	0	1620
Link Speed (k/h)	80		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	5.9		24.7			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	151	39	119	1067	97	127
Shared Lane Traffic (%)						
Lane Group Flow (vph)	190	0	1186	0	0	224
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	100.1%			ICU Level of Service G		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	326	38	1052	218	10
Future Volume (vph)	20	326	38	1052	218	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.994	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1645	0
Flt Permitted	0.950		0.552			
Satd. Flow (perm)	1383	1438	912	1784	1645	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		362			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	22	362	42	1169	242	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	362	42	1169	253	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	10.8	10.8	76.4	75.8	68.5	
Actuated g/C Ratio	0.11	0.11	0.76	0.76	0.68	
v/c Ratio	0.15	0.76	0.06	0.87	0.22	
Control Delay	42.1	15.6	0.5	9.3	7.5	
Queue Delay	0.0	0.0	0.0	1.6	0.0	
Total Delay	42.1	15.6	0.5	11.0	7.5	
LOS	D	B	A	B	A	
Approach Delay	17.1			10.6	7.5	
Approach LOS	B			B	A	
Queue Length 50th (m)	3.7	0.0	0.3	8.9	16.8	
Queue Length 95th (m)	10.0	25.5	m0.1	m40.6	29.8	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	182	504	736	1351	1127	
Starvation Cap Reductn	0	0	0	73	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.12	0.72	0.06	0.91	0.22	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 11.5

Intersection LOS: B

Intersection Capacity Utilization 78.0%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	15	5	3	5	23	6	1023	27	175	264	62
Future Volume (vph)	39	15	5	3	5	23	6	1023	27	175	264	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.988				0.850			0.850		0.971	
Flt Protected		0.968			0.984		0.950			0.950		
Satd. Flow (prot)	0	1674	0	0	1756	1517	1441	1767	1517	1695	1571	0
Flt Permitted		0.798			0.890		0.545			0.059		
Satd. Flow (perm)	0	1380	0	0	1588	1517	827	1767	1482	105	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				100			96		27	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			590.7			254.7	
Travel Time (s)		7.0			13.9			26.6			11.5	
Confl. Peds. (#/hr)									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%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	43	17	6	3	6	26	7	1137	30	194	293	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	9	26	7	1137	30	194	362	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		11.1			11.1	11.1	62.4	62.4	62.4	80.2	81.3	
Actuated g/C Ratio		0.11			0.11	0.11	0.62	0.62	0.62	0.80	0.81	
v/c Ratio		0.42			0.05	0.10	0.01	1.03	0.03	0.72	0.28	
Control Delay		46.9			39.2	0.8	14.7	55.4	0.0	37.6	3.2	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		46.9			39.2	0.8	14.7	55.4	0.0	37.6	3.2	
LOS		D			D	A	B	E	A	D	A	
Approach Delay		46.9			10.7			53.7			15.2	
Approach LOS		D			B			D			B	
Queue Length 50th (m)		10.6			1.5	0.0	0.5	~221.6	0.0	21.1	13.3	
Queue Length 95th (m)		21.8			5.6	0.0	m1.3	#331.2	m0.0	m37.6	20.0	
Internal Link Dist (m)		93.2			130.3			566.7			230.7	
Turn Bay Length (m)							30.0		10.0	70.0		
Base Capacity (vph)		268			304	372	515	1102	960	320	1281	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.25			0.03	0.07	0.01	1.03	0.03	0.61	0.28	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 41.0

Intersection LOS: D

Intersection Capacity Utilization 92.2%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	88	34	150	966	138	120
Future Volume (vph)	88	34	150	966	138	120
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1572	1289	1647	1733	1733	1432
Flt Permitted	0.950		0.660			
Satd. Flow (perm)	1572	1289	1144	1733	1733	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		38				133
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	700.7	
Travel Time (s)	18.4			29.3	31.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	98	38	167	1073	153	133
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	38	167	1073	153	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	26.0	26.0	74.0	74.0	74.0	74.0
Total Split (%)	26.0%	26.0%	74.0%	74.0%	74.0%	74.0%
Maximum Green (s)	19.2	19.2	67.8	67.8	67.8	67.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	12.2	12.2	79.4	79.4	79.4	79.4
Actuated g/C Ratio	0.12	0.12	0.79	0.79	0.79	0.79
v/c Ratio	0.51	0.20	0.18	0.78	0.11	0.11
Control Delay	50.1	14.6	4.4	13.9	3.9	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	14.6	4.4	13.9	3.9	1.4
LOS	D	B	A	B	A	A
Approach Delay	40.2			12.7	2.7	
Approach LOS	D			B	A	
Queue Length 50th (m)	16.8	0.0	7.0	101.7	3.7	0.0
Queue Length 95th (m)	30.0	8.0	15.6	#240.0	13.5	3.7
Internal Link Dist (m)	384.5			627.7	676.7	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	301	278	907	1375	1375	1163
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.14	0.18	0.78	0.11	0.11

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 76 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 13.2

Intersection LOS: B

Intersection Capacity Utilization 72.8%

ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	39	1050	4	39	254
Future Volume (vph)	4	39	1050	4	39	254
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	10.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.878		0.999			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1514	0	1732	0	1647	1733
Flt Permitted	0.995				0.950	
Satd. Flow (perm)	1514	0	1732	0	1647	1733
Link Speed (k/h)	50		80			80
Link Distance (m)	197.6		700.7			590.7
Travel Time (s)	14.2		31.5			26.6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	39	1050	4	39	254
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	1054	0	39	254
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 68.6%	ICU Level of Service C					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	136	35	107	960	87	114
Future Volume (vph)	136	35	107	960	87	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.972		0.879			
Flt Protected	0.962					0.979
Satd. Flow (prot)	1605	0	1549	0	0	1620
Flt Permitted	0.962					0.979
Satd. Flow (perm)	1605	0	1549	0	0	1620
Link Speed (k/h)	80		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	5.9		24.7			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	151	39	119	1067	97	127
Shared Lane Traffic (%)						
Lane Group Flow (vph)	190	0	1186	0	0	224
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	100.1%			ICU Level of Service G		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	326	38	1052	218	10
Future Volume (vph)	20	326	38	1052	218	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.994	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1645	0
Flt Permitted	0.950		0.553			
Satd. Flow (perm)	1383	1438	914	1784	1645	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		362			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	22	362	42	1169	242	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	362	42	1169	253	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	19.0	19.0	11.0	81.0	69.0	
Total Split (%)	19.0%	19.0%	11.0%	81.0%	69.0%	
Maximum Green (s)	12.2	12.2	5.0	74.4	62.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	10.7	10.7	76.5	75.9	68.9	
Actuated g/C Ratio	0.11	0.11	0.76	0.76	0.69	
v/c Ratio	0.15	0.76	0.06	0.86	0.22	
Control Delay	42.6	15.9	0.8	7.7	7.2	
Queue Delay	0.0	0.0	0.0	0.7	0.0	
Total Delay	42.6	15.9	0.8	8.4	7.2	
LOS	D	B	A	A	A	
Approach Delay	17.4			8.2	7.2	
Approach LOS	B			A	A	
Queue Length 50th (m)	3.7	0.0	0.6	17.9	16.8	
Queue Length 95th (m)	10.1	#26.5	m0.3	m15.8	28.0	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	168	493	736	1354	1134	
Starvation Cap Reductn	0	0	0	40	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.13	0.73	0.06	0.89	0.22	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 10.0

Intersection LOS: A

Intersection Capacity Utilization 78.0%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



Dynamic Report

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	15	5	3	5	23	6	1023	27	175	264	62
Future Volume (vph)	39	15	5	3	5	23	6	1023	27	175	264	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.988				0.850			0.850		0.971	
Flt Protected		0.968			0.984		0.950			0.950		
Satd. Flow (prot)	0	1674	0	0	1756	1517	1441	1767	1517	1695	1571	0
Flt Permitted		0.798			0.890		0.545			0.090		
Satd. Flow (perm)	0	1380	0	0	1588	1517	827	1767	1482	161	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				103			98		27	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			590.7			254.7	
Travel Time (s)		7.0			13.9			26.6			11.5	
Confl. Peds. (#/hr)									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%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	43	17	6	3	6	26	7	1137	30	194	293	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	9	26	7	1137	30	194	362	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	64.0	64.0	64.0	11.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	64.0%	64.0%	64.0%	11.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	57.8	57.8	57.8	5.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lead	Lead	Lead	Lag		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		11.1			11.1	11.1	69.0	69.0	69.0	80.2	81.3	
Actuated g/C Ratio		0.11			0.11	0.11	0.69	0.69	0.69	0.80	0.81	
v/c Ratio		0.42			0.05	0.10	0.01	0.93	0.03	0.94	0.28	
Control Delay		46.9			39.2	0.8	8.5	27.6	0.0	71.3	3.1	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		46.9			39.2	0.8	8.5	27.6	0.0	71.3	3.1	
LOS		D			D	A	A	C	A	E	A	
Approach Delay		46.9			10.7			26.8			26.9	
Approach LOS		D			B			C			C	
Queue Length 50th (m)		10.6			1.5	0.0	0.4	103.3	0.0	12.7	8.9	
Queue Length 95th (m)		21.8			5.6	0.0	m0.9	#286.2	m0.0	m#46.3	m18.7	
Internal Link Dist (m)		93.2			130.3			566.7			230.7	
Turn Bay Length (m)							30.0		10.0	70.0		
Base Capacity (vph)		268			304	374	570	1219	1053	206	1281	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.25			0.03	0.07	0.01	0.93	0.03	0.94	0.28	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 99 (99%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 27.2

Intersection LOS: C

Intersection Capacity Utilization 92.2%

ICU Level of Service F

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



0.0000, 11/01/2020

Dynamic Traffic Report

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	88	34	150	966	138	120
Future Volume (vph)	88	34	150	966	138	120
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1572	1289	1647	1733	1733	1432
Flt Permitted	0.950		0.660			
Satd. Flow (perm)	1572	1289	1144	1733	1733	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		38				133
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	700.7	
Travel Time (s)	18.4			29.3	31.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	98	38	167	1073	153	133
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	38	167	1073	153	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	26.0	26.0	74.0	74.0	74.0	74.0
Total Split (%)	26.0%	26.0%	74.0%	74.0%	74.0%	74.0%
Maximum Green (s)	19.2	19.2	67.8	67.8	67.8	67.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	12.2	12.2	79.4	79.4	79.4	79.4
Actuated g/C Ratio	0.12	0.12	0.79	0.79	0.79	0.79
v/c Ratio	0.51	0.20	0.18	0.78	0.11	0.11
Control Delay	50.1	14.6	4.4	13.9	4.6	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	14.6	4.4	13.9	4.6	2.9
LOS	D	B	A	B	A	A
Approach Delay	40.2			12.7	3.8	
Approach LOS	D			B	A	
Queue Length 50th (m)	16.8	0.0	7.0	101.7	6.1	0.0
Queue Length 95th (m)	30.0	8.0	15.6	#240.0	19.5	9.3
Internal Link Dist (m)	384.5			627.7	676.7	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	301	278	907	1375	1375	1163
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.14	0.18	0.78	0.11	0.11

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 76 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 13.4

Intersection LOS: B

Intersection Capacity Utilization 72.8%

ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	39	1050	4	39	254
Future Volume (vph)	4	39	1050	4	39	254
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	10.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.878		0.999			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1514	0	1732	0	1647	1733
Flt Permitted	0.995				0.950	
Satd. Flow (perm)	1514	0	1732	0	1647	1733
Link Speed (k/h)	50		80			80
Link Distance (m)	197.6		700.7			590.7
Travel Time (s)	14.2		31.5			26.6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	39	1050	4	39	254
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	1054	0	39	254
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 68.6%	ICU Level of Service C					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	136	35	107	960	87	114
Future Volume (vph)	136	35	107	960	87	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.972		0.879			
Flt Protected	0.962					0.979
Satd. Flow (prot)	1605	0	1549	0	0	1620
Flt Permitted	0.962					0.979
Satd. Flow (perm)	1605	0	1549	0	0	1620
Link Speed (k/h)	80		80			80
Link Distance (m)	132.0		437.5			159.5
Travel Time (s)	5.9		19.7			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	151	39	119	1067	97	127
Shared Lane Traffic (%)						
Lane Group Flow (vph)	190	0	1186	0	0	224
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	100.1%			ICU Level of Service G		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	326	38	1052	218	10
Future Volume (vph)	20	326	38	1052	218	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	0.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99	1.00			
Frt		0.850			0.994	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1645	0
Flt Permitted	0.950		0.552			
Satd. Flow (perm)	1383	1452	912	1784	1645	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		362			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	112.0	
Travel Time (s)	11.4			11.5	5.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	22	362	42	1169	242	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	362	42	1169	253	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	10.8	10.8	76.4	75.8	68.5	
Actuated g/C Ratio	0.11	0.11	0.76	0.76	0.68	
v/c Ratio	0.15	0.75	0.06	0.87	0.22	
Control Delay	42.2	15.5	0.8	22.6	7.5	
Queue Delay	0.0	0.0	0.0	5.5	0.0	
Total Delay	42.2	15.5	0.8	28.1	7.5	
LOS	D	B	A	C	A	
Approach Delay	17.0			27.2	7.5	
Approach LOS	B			C	A	
Queue Length 50th (m)	3.7	0.0	0.6	218.7	16.8	
Queue Length 95th (m)	10.0	25.3	m0.1	#155.1	29.8	
Internal Link Dist (m)	103.2			230.7	88.0	
Turn Bay Length (m)		45.0				
Base Capacity (vph)	182	505	736	1351	1127	
Starvation Cap Reductn	0	0	0	138	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.12	0.72	0.06	0.96	0.22	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 22.4

Intersection LOS: C

Intersection Capacity Utilization 78.0%

ICU Level of Service D

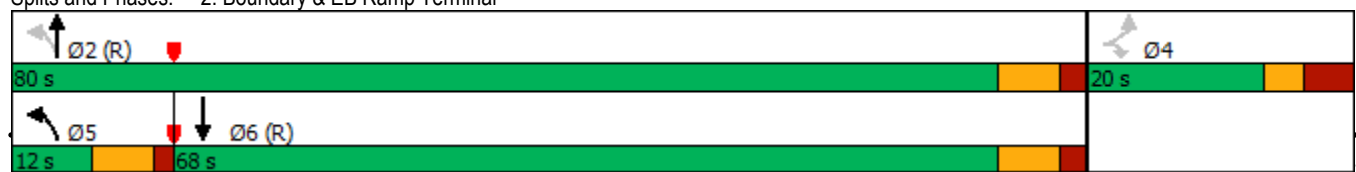
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



Dynamic Report

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	15	5	3	5	23	6	1023	27	175	264	62
Future Volume (vph)	39	15	5	3	5	23	6	1023	27	175	264	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	0.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.988				0.850			0.850		0.971	
Flt Protected		0.968			0.984		0.950			0.950		
Satd. Flow (prot)	0	1674	0	0	1756	1517	1441	3357	1517	1695	1571	0
Flt Permitted		0.798			0.890		0.545			0.184		
Satd. Flow (perm)	0	1380	0	0	1588	1517	827	3357	1482	328	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				100			96		27	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			347.9			254.7	
Travel Time (s)		7.0			13.9			15.7			11.5	
Confl. Peds. (#/hr)									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%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	43	17	6	3	6	26	7	1137	30	194	293	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	9	26	7	1137	30	194	362	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		11.1			11.1	11.1	64.2	64.2	64.2	80.2	81.3	
Actuated g/C Ratio		0.11			0.11	0.11	0.64	0.64	0.64	0.80	0.81	
v/c Ratio		0.42			0.05	0.10	0.01	0.53	0.03	0.49	0.28	
Control Delay		46.9			39.2	0.8	13.0	16.7	0.0	9.3	3.2	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		47.0			39.2	0.8	13.0	16.7	0.0	9.3	3.2	
LOS		D			D	A	B	B	A	A	A	
Approach Delay		47.0			10.7			16.3			5.4	
Approach LOS		D			B			B			A	
Queue Length 50th (m)		10.6			1.5	0.0	0.6	77.0	0.0	7.0	13.4	
Queue Length 95th (m)		21.8			5.6	0.0	m1.2	105.4	m0.0	m14.1	20.0	
Internal Link Dist (m)		93.2			130.3			323.9			230.7	
Turn Bay Length (m)							30.0		10.0			
Base Capacity (vph)		268			304	372	530	2154	985	454	1281	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		6			0	7	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.25			0.03	0.07	0.01	0.53	0.03	0.43	0.28	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 14.0

Intersection LOS: B

Intersection Capacity Utilization 65.2%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	88	34	150	966	138	120
Future Volume (vph)	88	34	150	966	138	120
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1572	1289	1647	1733	1733	1432
Flt Permitted	0.950		0.660			
Satd. Flow (perm)	1572	1289	1144	1733	1733	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		38				133
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	700.7	
Travel Time (s)	18.4			29.3	31.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	98	38	167	1073	153	133
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	38	167	1073	153	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	26.0	26.0	74.0	74.0	74.0	74.0
Total Split (%)	26.0%	26.0%	74.0%	74.0%	74.0%	74.0%
Maximum Green (s)	19.2	19.2	67.8	67.8	67.8	67.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	12.2	12.2	79.4	79.4	79.4	79.4
Actuated g/C Ratio	0.12	0.12	0.79	0.79	0.79	0.79
v/c Ratio	0.51	0.20	0.18	0.78	0.11	0.11
Control Delay	50.1	14.6	4.4	13.9	3.6	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	14.6	4.4	13.9	3.6	1.3
LOS	D	B	A	B	A	A
Approach Delay	40.2			12.7	2.5	
Approach LOS	D			B	A	
Queue Length 50th (m)	16.8	0.0	7.0	101.7	3.7	0.0
Queue Length 95th (m)	30.0	8.0	15.6	#240.0	13.6	3.8
Internal Link Dist (m)	384.5			627.7	676.7	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	301	278	907	1375	1375	1163
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.14	0.18	0.78	0.11	0.11

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 76 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 13.2

Intersection LOS: B

Intersection Capacity Utilization 72.8%

ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	39	1050	4	39	254
Future Volume (vph)	4	39	1050	4	39	254
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	10.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.878		0.999			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1514	0	1732	0	1647	1733
Flt Permitted	0.995				0.950	
Satd. Flow (perm)	1514	0	1732	0	1647	1733
Link Speed (k/h)	50		80			80
Link Distance (m)	197.6		700.7			242.9
Travel Time (s)	14.2		31.5			10.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	39	1050	4	39	254
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	1054	0	39	254
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 68.6%	ICU Level of Service C					
Analysis Period (min) 15						

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	54	1	163	315	27	135
Future Volume (vph)	54	1	163	315	27	135
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998		0.911			
Flt Protected	0.953					0.992
Satd. Flow (prot)	1508	0	1583	0	0	1706
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1508	0	1583	0	0	1706
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	5%	10%	2%	10%	5%
Adj. Flow (vph)	54	1	163	315	27	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	0	478	0	0	162
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	41.9%			ICU Level of Service A		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	87	821	167	281	237	19
Future Volume (vph)	87	821	167	281	237	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1572	1733	1698	0
Flt Permitted	0.950		0.469			
Satd. Flow (perm)	1647	1480	775	1733	1698	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		680			7	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	5%	5%	20%
Adj. Flow (vph)	87	821	167	281	237	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	821	167	281	256	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	25.0	25.0	12.0	75.0	63.0	
Total Split (%)	25.0%	25.0%	12.0%	75.0%	63.0%	
Maximum Green (s)	18.2	18.2	6.0	68.4	56.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	34.8	34.8	52.4	51.8	38.0	
Actuated g/C Ratio	0.35	0.35	0.52	0.52	0.38	
v/c Ratio	0.15	0.86	0.36	0.31	0.40	
Control Delay	21.8	15.4	16.4	16.0	25.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.8	15.4	16.4	16.0	25.3	
LOS	C	B	B	B	C	
Approach Delay	16.0			16.2	25.3	
Approach LOS	B			B	C	
Queue Length 50th (m)	10.5	18.5	15.4	27.2	33.5	
Queue Length 95th (m)	18.9	77.2	34.1	55.5	53.7	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	573	958	467	1185	960	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.15	0.86	0.36	0.24	0.27	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 17.5

Intersection LOS: B

Intersection Capacity Utilization 94.1%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	0	17	5	0	16	5	351	0	2	986	68
Future Volume (vph)	77	0	17	5	0	16	5	351	0	2	986	68
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.976				0.850					0.990	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1612	0	0	1695	1517	1695	1655	1784	1695	1749	0
Flt Permitted		0.761			0.767		0.226			0.506		
Satd. Flow (perm)	0	1276	0	0	1369	1517	403	1655	1784	903	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100						8
Link Speed (k/h)		60			40			80				80
Link Distance (m)		117.2			154.3			587.5			254.7	
Travel Time (s)		7.0			13.9			26.4			11.5	
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	2%	2%	2%	2%	10%	2%	2%	3%	3%
Adj. Flow (vph)	77	0	17	5	0	16	5	351	0	2	986	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	94	0	0	5	16	5	351	0	2	1054	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.2			10.2	10.2	79.8	79.8		81.1	82.2	
Actuated g/C Ratio		0.10			0.10	0.10	0.80	0.80		0.81	0.82	
v/c Ratio		0.43			0.04	0.07	0.02	0.27		0.00	0.73	
Control Delay		14.3			40.8	0.5	6.4	5.6		2.5	11.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.4	
Total Delay		14.3			40.8	0.5	6.4	5.6		2.5	11.4	
LOS		B			D	A	A	A		A	B	
Approach Delay		14.3			10.1			5.6			11.4	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		0.0			0.8	0.0	0.0	15.9		0.1	143.8	
Queue Length 95th (m)		12.1			3.9	0.0	m1.4	38.7		m0.1	m143.9	
Internal Link Dist (m)		93.2			130.3			563.5			230.7	
Turn Bay Length (m)							30.0			70.0		
Base Capacity (vph)		325			262	372	321	1321		843	1438	
Starvation Cap Reductn		0			0	0	0	0		0	86	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.29			0.02	0.04	0.02	0.27		0.00	0.78	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 10.2

Intersection LOS: B

Intersection Capacity Utilization 81.4%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	144	122	65	145	875	144
Future Volume (vph)	144	122	65	145	875	144
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1647	1685	1784	1406
Flt Permitted	0.950		0.247			
Satd. Flow (perm)	1647	1517	428	1685	1784	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		122				79
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	703.9	
Travel Time (s)	18.4			29.3	31.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	5%	8%	2%	10%
Adj. Flow (vph)	144	122	65	145	875	144
Shared Lane Traffic (%)						
Lane Group Flow (vph)	144	122	65	145	875	144
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	28.0	28.0	72.0	72.0	72.0	72.0
Total Split (%)	28.0%	28.0%	72.0%	72.0%	72.0%	72.0%
Maximum Green (s)	21.2	21.2	65.8	65.8	65.8	65.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	14.3	14.3	72.7	72.7	72.7	72.7
Actuated g/C Ratio	0.14	0.14	0.73	0.73	0.73	0.73
v/c Ratio	0.62	0.38	0.21	0.12	0.67	0.14
Control Delay	51.2	10.3	7.2	4.9	10.3	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.2	10.3	7.2	4.9	10.3	3.6
LOS	D	B	A	A	B	A
Approach Delay	32.4			5.6	9.3	
Approach LOS	C			A	A	
Queue Length 50th (m)	24.5	0.0	3.1	6.5	68.6	4.4
Queue Length 95th (m)	39.9	13.2	9.7	14.2	86.6	m9.5
Internal Link Dist (m)	384.5			627.7	679.9	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	349	417	311	1225	1297	1044
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.29	0.21	0.12	0.67	0.14

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 12.9

Intersection LOS: B

Intersection Capacity Utilization 76.3%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Boundary & Mitch Owens



						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	39	285	4	39	1015
Future Volume (vph)	4	39	285	4	39	1015
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.878		0.998			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1559	0	1781	0	1695	1784
Flt Permitted	0.995				0.950	
Satd. Flow (perm)	1559	0	1781	0	1695	1784
Link Speed (k/h)	50		80			80
Link Distance (m)	202.0		703.9			587.5
Travel Time (s)	14.5		31.7			26.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	4	39	285	4	39	1015
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	289	0	39	1015
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 66.4%	ICU Level of Service C					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized timings)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	54	1	163	315	27	135
Future Volume (vph)	54	1	163	315	27	135
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998		0.911			
Flt Protected	0.953					0.992
Satd. Flow (prot)	1508	0	1583	0	0	1706
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1508	0	1583	0	0	1706
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	5%	10%	2%	10%	5%
Adj. Flow (vph)	54	1	163	315	27	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	0	478	0	0	162
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	41.9%			ICU Level of Service A		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	87	821	167	281	237	19
Future Volume (vph)	87	821	167	281	237	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1572	1733	1698	0
Flt Permitted	0.950		0.549			
Satd. Flow (perm)	1647	1480	907	1733	1698	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		701			7	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	5%	5%	20%
Adj. Flow (vph)	87	821	167	281	237	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	821	167	281	256	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	37.1	37.1	50.1	49.5	37.3	
Actuated g/C Ratio	0.37	0.37	0.50	0.50	0.37	
v/c Ratio	0.14	0.83	0.34	0.33	0.40	
Control Delay	21.5	13.0	10.1	9.6	25.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.5	13.0	10.1	9.6	25.2	
LOS	C	B	B	A	C	
Approach Delay	13.8			9.8	25.2	
Approach LOS	B			A	C	
Queue Length 50th (m)	10.5	14.9	7.1	12.3	31.2	
Queue Length 95th (m)	19.2	70.9	8.0	12.6	53.7	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	611	990	496	1272	1045	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.83	0.34	0.22	0.24	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 14.5

Intersection LOS: B

Intersection Capacity Utilization 94.1%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized timings)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	0	17	5	0	16	5	351	0	2	986	68
Future Volume (vph)	77	0	17	5	0	16	5	351	0	2	986	68
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.976				0.850					0.990	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1612	0	0	1695	1517	1695	1655	1784	1695	1749	0
Flt Permitted		0.761			0.767		0.192			0.540		
Satd. Flow (perm)	0	1276	0	0	1369	1517	343	1655	1784	964	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		103				103						8
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			587.5			254.7	
Travel Time (s)		7.0			13.9			26.4			11.5	
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	2%	2%	2%	2%	10%	2%	2%	3%	3%
Adj. Flow (vph)	77	0	17	5	0	16	5	351	0	2	986	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	94	0	0	5	16	5	351	0	2	1054	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized timings)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	64.0	64.0	64.0	11.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	64.0%	64.0%	64.0%	11.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	57.8	57.8	57.8	5.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lead	Lead	Lead	Lag		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.2			10.2	10.2	75.5	75.5		81.2	82.2	
Actuated g/C Ratio		0.10			0.10	0.10	0.76	0.76		0.81	0.82	
v/c Ratio		0.42			0.04	0.06	0.02	0.28		0.00	0.73	
Control Delay		13.7			41.0	0.5	8.8	6.2		3.5	9.9	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.4	
Total Delay		13.7			41.0	0.5	8.8	6.2		3.5	10.3	
LOS		B			D	A	A	A		A	B	
Approach Delay		13.7			10.1			6.2			10.3	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		0.0			0.8	0.0	0.1	7.6		0.1	74.9	
Queue Length 95th (m)		11.6			4.0	0.0	m1.5	41.9		m0.2	176.1	
Internal Link Dist (m)		93.2			130.3			563.5			230.7	
Turn Bay Length (m)							30.0			70.0		
Base Capacity (vph)		328			262	374	268	1296		855	1439	
Starvation Cap Reductn		0			0	0	0	0		0	96	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.29			0.02	0.04	0.02	0.27		0.00	0.78	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 32 (32%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 9.6

Intersection LOS: A

Intersection Capacity Utilization 81.4%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	144	122	65	145	875	144
Future Volume (vph)	144	122	65	145	875	144
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1647	1685	1784	1406
Flt Permitted	0.950		0.247			
Satd. Flow (perm)	1647	1517	428	1685	1784	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		122				79
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	703.9	
Travel Time (s)	18.4			29.3	31.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	5%	8%	2%	10%
Adj. Flow (vph)	144	122	65	145	875	144
Shared Lane Traffic (%)						
Lane Group Flow (vph)	144	122	65	145	875	144
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized timings)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	28.0	28.0	72.0	72.0	72.0	72.0
Total Split (%)	28.0%	28.0%	72.0%	72.0%	72.0%	72.0%
Maximum Green (s)	21.2	21.2	65.8	65.8	65.8	65.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	14.3	14.3	72.7	72.7	72.7	72.7
Actuated g/C Ratio	0.14	0.14	0.73	0.73	0.73	0.73
v/c Ratio	0.62	0.38	0.21	0.12	0.67	0.14
Control Delay	51.2	10.3	7.2	4.9	9.3	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.2	10.3	7.2	4.9	9.3	1.7
LOS	D	B	A	A	A	A
Approach Delay	32.4			5.6	8.2	
Approach LOS	C			A	A	
Queue Length 50th (m)	24.5	0.0	3.1	6.5	65.5	1.4
Queue Length 95th (m)	39.9	13.2	9.7	14.2	195.8	m7.5
Internal Link Dist (m)	384.5			627.7	679.9	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	349	417	311	1225	1297	1044
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.29	0.21	0.12	0.67	0.14

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 12.2

Intersection LOS: B

Intersection Capacity Utilization 76.3%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Boundary & Mitch Owens

Ø2 (R) 72 s	Ø4 28 s
Ø5 (R) 72 s	

5: Boundary & CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (optimized timings)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	39	285	4	39	1015
Future Volume (vph)	4	39	285	4	39	1015
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.878		0.998			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1559	0	1781	0	1695	1784
Flt Permitted	0.995				0.950	
Satd. Flow (perm)	1559	0	1781	0	1695	1784
Link Speed (k/h)	50		80			80
Link Distance (m)	202.0		703.9			587.5
Travel Time (s)	14.5		31.7			26.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	4	39	285	4	39	1015
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	289	0	39	1015
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 66.4%	ICU Level of Service C					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	54	1	163	315	27	135
Future Volume (vph)	54	1	163	315	27	135
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998		0.911			
Flt Protected	0.953					0.992
Satd. Flow (prot)	1508	0	1583	0	0	1706
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1508	0	1583	0	0	1706
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		437.5			159.5
Travel Time (s)	11.9		19.7			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	5%	10%	2%	10%	5%
Adj. Flow (vph)	54	1	163	315	27	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	0	478	0	0	162
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	41.9%			ICU Level of Service A		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	87	821	167	281	237	19
Future Volume (vph)	87	821	167	281	237	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	0.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99	1.00			
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1572	1733	1698	0
Flt Permitted	0.950		0.474			
Satd. Flow (perm)	1647	1495	783	1733	1698	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		689			7	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	112.0	
Travel Time (s)	11.4			11.5	5.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	5%	5%	20%
Adj. Flow (vph)	87	821	167	281	237	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	821	167	281	256	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	25.0	25.0	12.0	75.0	68.0	
Total Split (%)	23.8%	23.8%	11.4%	71.4%	64.8%	
Maximum Green (s)	18.2	18.2	6.0	68.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	35.5	35.5	56.7	56.1	41.3	
Actuated g/C Ratio	0.34	0.34	0.54	0.53	0.39	
v/c Ratio	0.16	0.85	0.34	0.30	0.38	
Control Delay	23.0	14.8	16.6	16.3	25.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	23.0	14.8	16.6	16.3	25.9	
LOS	C	B	B	B	C	
Approach Delay	15.6			16.4	25.9	
Approach LOS	B			B	C	
Queue Length 50th (m)	11.5	18.9	15.1	27.6	33.7	
Queue Length 95th (m)	18.6	69.5	31.4	52.2	57.5	
Internal Link Dist (m)	103.2			230.7	88.0	
Turn Bay Length (m)		45.0				
Base Capacity (vph)	557	961	488	1211	995	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.16	0.85	0.34	0.23	0.26	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 105

Offset: 19 (18%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 17.5

Intersection LOS: B

Intersection Capacity Utilization 94.1%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	0	17	5	0	16	5	351	0	2	986	68
Future Volume (vph)	77	0	17	5	0	16	5	351	0	2	986	68
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	0.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.976				0.850					0.990	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1612	0	0	1695	1517	1695	3144	1784	1695	1749	0
Flt Permitted		0.761			0.767		0.226			0.500		
Satd. Flow (perm)	0	1276	0	0	1369	1517	403	3144	1784	892	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100						8
Link Speed (k/h)		60			40			80				80
Link Distance (m)		117.2			154.3			338.6				254.7
Travel Time (s)		7.0			13.9			15.2				11.5
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	2%	2%	2%	2%	10%	2%	2%	3%	3%
Adj. Flow (vph)	77	0	17	5	0	16	5	351	0	2	986	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	94	0	0	5	16	5	351	0	2	1054	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.2			10.2	10.2	79.8	79.8		81.1	82.2	
Actuated g/C Ratio		0.10			0.10	0.10	0.80	0.80		0.81	0.82	
v/c Ratio		0.43			0.04	0.07	0.02	0.14		0.00	0.73	
Control Delay		14.3			40.8	0.5	6.4	4.5		2.5	9.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.3	
Total Delay		14.3			40.8	0.5	6.4	4.5		2.5	9.9	
LOS		B			D	A	A	A		A	A	
Approach Delay		14.3			10.1			4.6			9.9	
Approach LOS		B			B			A			A	
Queue Length 50th (m)		0.0			0.8	0.0	0.0	7.8		0.1	82.0	
Queue Length 95th (m)		12.1			3.9	0.0	m1.4	18.5		0.5	140.5	
Internal Link Dist (m)		93.2			130.3			314.6			230.7	
Turn Bay Length (m)							30.0					
Base Capacity (vph)		325			262	372	321	2510		835	1438	
Starvation Cap Reductn		0			0	0	0	0		0	72	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.29			0.02	0.04	0.02	0.14		0.00	0.77	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 8.9

Intersection LOS: A

Intersection Capacity Utilization 81.4%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	144	122	65	145	875	144
Future Volume (vph)	144	122	65	145	875	144
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1647	1685	1784	1406
Flt Permitted	0.950		0.247			
Satd. Flow (perm)	1647	1517	428	1685	1784	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		122				79
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	703.9	
Travel Time (s)	18.4			29.3	31.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	5%	8%	2%	10%
Adj. Flow (vph)	144	122	65	145	875	144
Shared Lane Traffic (%)						
Lane Group Flow (vph)	144	122	65	145	875	144
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	28.0	28.0	72.0	72.0	72.0	72.0
Total Split (%)	28.0%	28.0%	72.0%	72.0%	72.0%	72.0%
Maximum Green (s)	21.2	21.2	65.8	65.8	65.8	65.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	14.3	14.3	72.7	72.7	72.7	72.7
Actuated g/C Ratio	0.14	0.14	0.73	0.73	0.73	0.73
v/c Ratio	0.62	0.38	0.21	0.12	0.67	0.14
Control Delay	51.2	10.3	7.2	4.9	10.5	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.2	10.3	7.2	4.9	10.5	3.5
LOS	D	B	A	A	B	A
Approach Delay	32.4			5.6	9.5	
Approach LOS	C			A	A	
Queue Length 50th (m)	24.5	0.0	3.1	6.5	70.3	2.8
Queue Length 95th (m)	39.9	13.2	9.7	14.2	86.5	m9.9
Internal Link Dist (m)	384.5			627.7	679.9	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	349	417	311	1225	1297	1044
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.29	0.21	0.12	0.67	0.14

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 13.0

Intersection LOS: B

Intersection Capacity Utilization 76.3%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Boundary & Mitch Owens

					
Ø2 (R)				Ø4	
72 s				28 s	
					
Ø6 (R)					
72 s					

5: Boundary & CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Background Traffic (additional lanes on Boundary)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	39	285	4	39	1015
Future Volume (vph)	4	39	285	4	39	1015
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	110.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.878		0.998			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1559	0	1781	0	1695	1784
Flt Permitted	0.995				0.950	
Satd. Flow (perm)	1559	0	1781	0	1695	1784
Link Speed (k/h)	50		80			80
Link Distance (m)	202.0		703.9			248.9
Travel Time (s)	14.5		31.7			11.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	4	39	285	4	39	1015
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	289	0	39	1015
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 66.4%	ICU Level of Service C					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	153	35	111	971	87	130
Future Volume (vph)	153	35	111	971	87	130
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.975		0.879			
Flt Protected	0.961					0.980
Satd. Flow (prot)	1610	0	1548	0	0	1621
Flt Permitted	0.961					0.980
Satd. Flow (perm)	1610	0	1548	0	0	1621
Link Speed (k/h)	80		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	5.9		24.7			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	170	39	123	1079	97	144
Shared Lane Traffic (%)						
Lane Group Flow (vph)	209	0	1202	0	0	241
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	103.0%			ICU Level of Service G		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	363	42	1067	251	10
Future Volume (vph)	20	363	42	1067	251	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1646	0
Flt Permitted	0.950		0.534			
Satd. Flow (perm)	1383	1438	883	1784	1646	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		403			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	22	403	47	1186	279	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	403	47	1186	290	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	11.0	11.0	76.2	75.6	68.2	
Actuated g/C Ratio	0.11	0.11	0.76	0.76	0.68	
v/c Ratio	0.14	0.78	0.07	0.88	0.26	
Control Delay	41.9	15.9	0.5	9.6	7.9	
Queue Delay	0.0	0.0	0.0	5.2	0.0	
Total Delay	41.9	15.9	0.5	14.9	7.9	
LOS	D	B	A	B	A	
Approach Delay	17.2			14.3	7.9	
Approach LOS	B			B	A	
Queue Length 50th (m)	3.7	0.0	0.2	9.6	19.9	
Queue Length 95th (m)	10.0	#27.7	m0.1	m39.9	34.4	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	182	539	715	1348	1124	
Starvation Cap Reductn	0	0	0	119	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.12	0.75	0.07	0.97	0.26	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 14.0

Intersection LOS: B

Intersection Capacity Utilization 78.8%

ICU Level of Service D

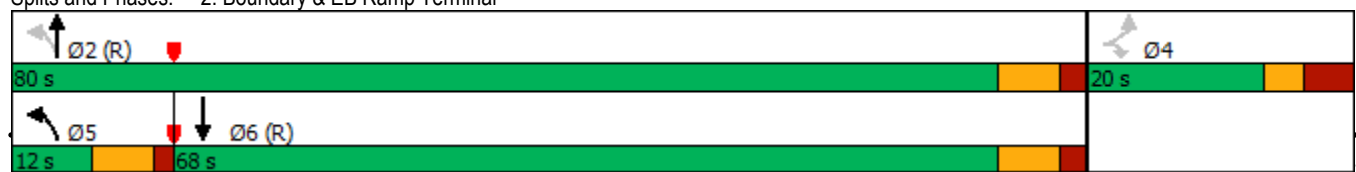
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



Dynamic Traffic Report

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	15	5	3	5	23	6	1042	27	175	333	62
Future Volume (vph)	39	15	5	3	5	23	6	1042	27	175	333	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.988				0.850			0.850		0.976	
Flt Protected		0.968			0.984		0.950			0.950		
Satd. Flow (prot)	0	1674	0	0	1756	1517	1441	1767	1517	1695	1573	0
Flt Permitted		0.798			0.890		0.508			0.059		
Satd. Flow (perm)	0	1380	0	0	1588	1517	770	1767	1482	105	1573	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				100			96		22	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			590.7			254.7	
Travel Time (s)		7.0			13.9			26.6			11.5	
Confl. Peds. (#/hr)									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%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	43	17	6	3	6	26	7	1158	30	194	370	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	9	26	7	1158	30	194	439	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		11.1			11.1	11.1	62.4	62.4	62.4	80.2	81.3	
Actuated g/C Ratio		0.11			0.11	0.11	0.62	0.62	0.62	0.80	0.81	
v/c Ratio		0.42			0.05	0.10	0.01	1.05	0.03	0.72	0.34	
Control Delay		46.9			39.2	0.8	15.5	63.3	0.0	36.6	3.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		46.9			39.2	0.8	15.5	63.3	0.0	36.6	3.6	
LOS		D			D	A	B	E	A	D	A	
Approach Delay		46.9			10.7			61.4			13.7	
Approach LOS		D			B			E			B	
Queue Length 50th (m)		10.6			1.5	0.0	0.6	~228.0	0.0	20.6	17.7	
Queue Length 95th (m)		21.8			5.6	0.0	m1.3	#339.5	m0.0	m36.9	26.7	
Internal Link Dist (m)		93.2			130.3			566.7			230.7	
Turn Bay Length (m)							30.0		10.0	70.0		
Base Capacity (vph)		268			304	372	480	1102	960	320	1282	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.25			0.03	0.07	0.01	1.05	0.03	0.61	0.34	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.05

Intersection Signal Delay: 44.3

Intersection LOS: D

Intersection Capacity Utilization 93.2%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	89	34	150	977	141	120
Future Volume (vph)	89	34	150	977	141	120
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	25.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		50.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1572	1289	1647	1733	1733	1432
Flt Permitted	0.950		0.657			
Satd. Flow (perm)	1572	1289	1139	1733	1733	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		38				133
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	613.1	
Travel Time (s)	18.4			29.3	27.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	99	38	167	1086	157	133
Shared Lane Traffic (%)						
Lane Group Flow (vph)	99	38	167	1086	157	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	26.0	26.0	74.0	74.0	74.0	74.0
Total Split (%)	26.0%	26.0%	74.0%	74.0%	74.0%	74.0%
Maximum Green (s)	19.2	19.2	67.8	67.8	67.8	67.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	12.3	12.3	79.3	79.3	79.3	79.3
Actuated g/C Ratio	0.12	0.12	0.79	0.79	0.79	0.79
v/c Ratio	0.51	0.20	0.18	0.79	0.11	0.11
Control Delay	50.1	14.5	4.5	14.5	7.0	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	14.5	4.5	14.5	7.0	4.3
LOS	D	B	A	B	A	A
Approach Delay	40.2			13.1	5.8	
Approach LOS	D			B	A	
Queue Length 50th (m)	16.9	0.0	7.1	105.5	3.9	0.0
Queue Length 95th (m)	30.1	8.0	15.8	#245.9	26.8	16.1
Internal Link Dist (m)	384.5			627.7	589.1	
Turn Bay Length (m)	25.0		25.0			25.0
Base Capacity (vph)	301	278	903	1374	1374	1163
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.14	0.18	0.79	0.11	0.11

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 76 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 14.1

Intersection LOS: B

Intersection Capacity Utilization 73.4%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & North Site Access/CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	0	1	4	0	39	12	1050	4	39	254	69
Future Volume (vph)	19	0	1	4	0	39	12	1050	4	39	254	69
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	10.0			10.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.878			0.999				0.850
Flt Protected		0.955			0.995		0.950			0.950		
Satd. Flow (prot)	0	1644	0	0	1514	0	1647	1732	0	1647	1733	1473
Flt Permitted		0.705			0.964		0.602			0.219		
Satd. Flow (perm)	0	1213	0	0	1467	0	1043	1732	0	380	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			39							69
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		264.4			197.6			87.6			590.7	
Travel Time (s)		19.0			14.2			3.9			26.6	
Peak Hour Factor	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. Flow (vph)	19	0	1	4	0	39	12	1050	4	39	254	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	43	0	12	1054	0	39	254	69
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	24.8	24.8		24.8	24.8		26.2	26.2		26.2	26.2	26.2
Total Split (s)	25.0	25.0		25.0	25.0		75.0	75.0		75.0	75.0	75.0

5: Boundary & North Site Access/CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	75.0%
Maximum Green (s)	19.2	19.2		19.2	19.2		68.8	68.8		68.8	68.8	68.8
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	2.1	2.1		2.1	2.1		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.8			5.8		6.2	6.2		6.2	6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		10.0			10.0		86.8	86.8		86.8	86.8	86.8
Actuated g/C Ratio		0.10			0.10		0.87	0.87		0.87	0.87	0.87
v/c Ratio		0.13			0.24		0.01	0.70		0.12	0.17	0.05
Control Delay		8.7			18.7		0.8	5.5		2.9	1.9	1.1
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		8.7			18.7		0.8	5.5		2.9	1.9	1.1
LOS		A			B		A	A		A	A	A
Approach Delay		8.7			18.7			5.5			1.9	
Approach LOS		A			B			A			A	
Queue Length 50th (m)		0.0			0.7		0.2	17.2		0.3	2.0	0.0
Queue Length 95th (m)		3.8			9.9		m0.2	158.4		5.5	21.9	3.7
Internal Link Dist (m)		240.4			173.6			63.6			566.7	
Turn Bay Length (m)										110.0		70.0
Base Capacity (vph)		261			313		905	1503		330	1504	1288
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.08			0.14		0.01	0.70		0.12	0.17	0.05

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 23 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 5.0

Intersection LOS: A

Intersection Capacity Utilization 76.9%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Boundary & North Site Access/CRRRC



6: Boundary & South Site Access
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	0	2	0	1066	259	0
Future Volume (vph)	0	2	0	1066	259	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	10.0			0.0
Storage Lanes	0	1	1			0
Taper Length (m)	10.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1499	0	3293	1733	0
Flt Permitted						
Satd. Flow (perm)	0	1499	0	3293	1733	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	139.4			613.1	87.6	
Travel Time (s)	10.0			27.6	3.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	2	0	1066	259	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2	0	1066	259	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			0.0	0.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 34.4%	ICU Level of Service A					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	153	35	111	971	87	130
Future Volume (vph)	153	35	111	971	87	130
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.975		0.879			
Flt Protected	0.961					0.980
Satd. Flow (prot)	1610	0	1548	0	0	1621
Flt Permitted	0.961					0.234
Satd. Flow (perm)	1610	0	1548	0	0	387
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	10		1079			
Link Speed (k/h)	80		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	5.9		24.7			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	170	39	123	1079	97	144
Shared Lane Traffic (%)						
Lane Group Flow (vph)	209	0	1202	0	0	241
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (m)	6.1		30.5		6.1	30.5
Trailing Detector (m)	0.0		0.0		0.0	0.0
Detector 1 Position(m)	0.0		0.0		0.0	0.0
Detector 1 Size(m)	6.1		1.8		6.1	1.8
Detector 1 Type	CI+Ex		CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	10.0		20.0		20.0	20.0
Minimum Split (s)	18.8		34.6		26.6	26.6
Total Split (s)	22.0		78.0		78.0	78.0
Total Split (%)	22.0%		78.0%		78.0%	78.0%
Maximum Green (s)	15.2		71.4		71.4	71.4

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group						
Yellow Time (s)	3.0		4.6		4.6	4.6
All-Red Time (s)	3.8		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.8		6.6			6.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Min		C-Min	C-Min
Walk Time (s)	7.0		7.0			
Flash Dont Walk (s)	5.0		21.0			
Pedestrian Calls (#/hr)	0		0			
Act Effct Green (s)	14.8		71.8			71.8
Actuated g/C Ratio	0.15		0.72			0.72
v/c Ratio	0.85		0.85			0.87
Control Delay	69.2		10.4			44.3
Queue Delay	0.0		0.0			0.0
Total Delay	69.2		10.4			44.3
LOS	E		B			D
Approach Delay	69.2		10.4			44.3
Approach LOS	E		B			D
Queue Length 50th (m)	34.9		188.9			28.1
Queue Length 95th (m)	#70.0		m235.8			#81.0
Internal Link Dist (m)	108.0		525.5			135.5
Turn Bay Length (m)						
Base Capacity (vph)	256		1416			278
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.82		0.85			0.87

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 38 (38%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 22.8

Intersection LOS: C

Intersection Capacity Utilization 111.3%

ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Boundary & WB Ramp Terminal



2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	363	42	1067	251	10
Future Volume (vph)	20	363	42	1067	251	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1646	0
Flt Permitted	0.950		0.534			
Satd. Flow (perm)	1383	1438	883	1784	1646	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		403			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	22	403	47	1186	279	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	403	47	1186	290	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	11.0	11.0	76.2	75.6	68.2	
Actuated g/C Ratio	0.11	0.11	0.76	0.76	0.68	
v/c Ratio	0.14	0.78	0.07	0.88	0.26	
Control Delay	41.9	15.9	0.7	8.4	4.9	
Queue Delay	0.0	0.0	0.0	0.5	0.0	
Total Delay	41.9	15.9	0.7	8.9	4.9	
LOS	D	B	A	A	A	
Approach Delay	17.2			8.5	4.9	
Approach LOS	B			A	A	
Queue Length 50th (m)	3.7	0.0	0.3	10.9	14.5	
Queue Length 95th (m)	10.0	#27.7	m0.3	m15.1	m16.6	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	182	539	715	1348	1124	
Starvation Cap Reductn	0	0	0	24	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.12	0.75	0.07	0.90	0.26	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 9.9

Intersection LOS: A

Intersection Capacity Utilization 78.8%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



Dynamic Report

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	15	5	3	5	23	6	1042	27	175	333	62
Future Volume (vph)	39	15	5	3	5	23	6	1042	27	175	333	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.988				0.850			0.850		0.976	
Flt Protected		0.968			0.984		0.950			0.950		
Satd. Flow (prot)	0	1674	0	0	1756	1517	1441	1767	1517	1695	1573	0
Flt Permitted		0.798			0.890		0.503			0.078		
Satd. Flow (perm)	0	1380	0	0	1588	1517	763	1767	1482	139	1573	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				103			98		22	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			590.7			254.7	
Travel Time (s)		7.0			13.9			26.6			11.5	
Confl. Peds. (#/hr)									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%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	43	17	6	3	6	26	7	1158	30	194	370	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	9	26	7	1158	30	194	439	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	64.0	64.0	64.0	11.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	64.0%	64.0%	64.0%	11.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	57.8	57.8	57.8	5.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lead	Lead	Lead	Lag		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		11.1			11.1	11.1	69.0	69.0	69.0	80.2	81.3	
Actuated g/C Ratio		0.11			0.11	0.11	0.69	0.69	0.69	0.80	0.81	
v/c Ratio		0.42			0.05	0.10	0.01	0.95	0.03	1.03	0.34	
Control Delay		46.9			39.2	0.8	9.0	31.8	0.0	92.4	2.8	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		46.9			39.2	0.8	9.0	31.8	0.0	92.4	2.8	
LOS		D			D	A	A	C	A	F	A	
Approach Delay		46.9			10.7			30.9			30.3	
Approach LOS		D			B			C			C	
Queue Length 50th (m)		10.6			1.5	0.0	0.4	101.1	0.0	~18.5	10.1	
Queue Length 95th (m)		21.8			5.6	0.0	m0.9	#294.5	m0.0	m#50.9	23.8	
Internal Link Dist (m)		93.2			130.3			566.7			230.7	
Turn Bay Length (m)							30.0		10.0	70.0		
Base Capacity (vph)		268			304	374	526	1219	1053	189	1282	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.25			0.03	0.07	0.01	0.95	0.03	1.03	0.34	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 30.9

Intersection LOS: C

Intersection Capacity Utilization 93.2%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	89	34	150	977	141	120
Future Volume (vph)	89	34	150	977	141	120
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	25.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		50.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1572	1289	1647	1733	1733	1432
Flt Permitted	0.950		0.657			
Satd. Flow (perm)	1572	1289	1139	1733	1733	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		38				133
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	613.1	
Travel Time (s)	18.4			29.3	27.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	99	38	167	1086	157	133
Shared Lane Traffic (%)						
Lane Group Flow (vph)	99	38	167	1086	157	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	26.0	26.0	74.0	74.0	74.0	74.0
Total Split (%)	26.0%	26.0%	74.0%	74.0%	74.0%	74.0%
Maximum Green (s)	19.2	19.2	67.8	67.8	67.8	67.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	12.3	12.3	79.3	79.3	79.3	79.3
Actuated g/C Ratio	0.12	0.12	0.79	0.79	0.79	0.79
v/c Ratio	0.51	0.20	0.18	0.79	0.11	0.11
Control Delay	50.1	14.5	4.5	14.5	4.6	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	14.5	4.5	14.5	4.6	2.5
LOS	D	B	A	B	A	A
Approach Delay	40.2			13.1	3.6	
Approach LOS	D			B	A	
Queue Length 50th (m)	16.9	0.0	7.1	105.5	6.4	0.0
Queue Length 95th (m)	30.1	8.0	15.8	#245.9	20.5	8.4
Internal Link Dist (m)	384.5			627.7	589.1	
Turn Bay Length (m)	25.0		25.0			25.0
Base Capacity (vph)	301	278	903	1374	1374	1163
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.14	0.18	0.79	0.11	0.11

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 76 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 13.7

Intersection LOS: B

Intersection Capacity Utilization 73.4%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & North Site Access/CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	0	1	4	0	39	12	1050	4	39	254	69
Future Volume (vph)	19	0	1	4	0	39	12	1050	4	39	254	69
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	10.0			10.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.878			0.999				0.850
Flt Protected		0.955			0.995		0.950			0.950		
Satd. Flow (prot)	0	1644	0	0	1514	0	1647	1732	0	1647	1733	1473
Flt Permitted		0.705			0.964		0.602			0.219		
Satd. Flow (perm)	0	1213	0	0	1467	0	1043	1732	0	380	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			39							69
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		264.4			197.6			87.6			590.7	
Travel Time (s)		19.0			14.2			3.9			26.6	
Peak Hour Factor	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. Flow (vph)	19	0	1	4	0	39	12	1050	4	39	254	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	43	0	12	1054	0	39	254	69
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	24.8	24.8		24.8	24.8		26.2	26.2		26.2	26.2	26.2
Total Split (s)	25.0	25.0		25.0	25.0		75.0	75.0		75.0	75.0	75.0

5: Boundary & North Site Access/CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	75.0%
Maximum Green (s)	19.2	19.2		19.2	19.2		68.8	68.8		68.8	68.8	68.8
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	2.1	2.1		2.1	2.1		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.8			5.8		6.2	6.2		6.2	6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		10.0			10.0		86.8	86.8		86.8	86.8	86.8
Actuated g/C Ratio		0.10			0.10		0.87	0.87		0.87	0.87	0.87
v/c Ratio		0.13			0.24		0.01	0.70		0.12	0.17	0.05
Control Delay		8.7			18.7		0.8	5.5		2.9	2.2	0.8
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		8.7			18.7		0.8	5.5		2.9	2.2	0.8
LOS		A			B		A	A		A	A	A
Approach Delay		8.7			18.7			5.5			2.0	
Approach LOS		A			B			A			A	
Queue Length 50th (m)		0.0			0.7		0.2	17.2		2.4	16.4	1.1
Queue Length 95th (m)		3.8			9.9		m0.2	158.4		1.2	4.6	0.0
Internal Link Dist (m)		240.4			173.6			63.6			566.7	
Turn Bay Length (m)										110.0		70.0
Base Capacity (vph)		261			313		905	1503		330	1504	1288
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.08			0.14		0.01	0.70		0.12	0.17	0.05

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 23 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 5.1

Intersection LOS: A

Intersection Capacity Utilization 76.9%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Boundary & North Site Access/CRRRC



6: Boundary & South Site Access
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	0	2	0	1066	259	0
Future Volume (vph)	0	2	0	1066	259	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	10.0			0.0
Storage Lanes	0	1	1			0
Taper Length (m)	10.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt	0.865					
Flt Protected						
Satd. Flow (prot)	0	1499	0	3293	1733	0
Flt Permitted						
Satd. Flow (perm)	0	1499	0	3293	1733	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	139.4			613.1	87.6	
Travel Time (s)	10.0			27.6	3.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	2	0	1066	259	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2	0	1066	259	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			0.0	0.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 34.4%	ICU Level of Service A					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	153	35	111	971	87	130
Future Volume (vph)	153	35	111	971	87	130
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.975		0.879			
Flt Protected	0.961					0.980
Satd. Flow (prot)	1610	0	1548	0	0	1621
Flt Permitted	0.961					0.980
Satd. Flow (perm)	1610	0	1548	0	0	1621
Link Speed (k/h)	80		80			80
Link Distance (m)	132.0		410.0			159.5
Travel Time (s)	5.9		18.5			7.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	10%	15%	2%	10%	10%
Adj. Flow (vph)	170	39	123	1079	97	144
Shared Lane Traffic (%)						
Lane Group Flow (vph)	209	0	1202	0	0	241
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	103.0%			ICU Level of Service G		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	363	42	1067	251	10
Future Volume (vph)	20	363	42	1067	251	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	0.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99	1.00			
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1383	1473	1572	1784	1646	0
Flt Permitted	0.950		0.534			
Satd. Flow (perm)	1383	1452	883	1784	1646	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		403			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	139.5	
Travel Time (s)	11.4			11.5	6.3	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	5%	10%	2%	10%	10%
Adj. Flow (vph)	22	403	47	1186	279	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	403	47	1186	290	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	80.0	68.0	
Total Split (%)	20.0%	20.0%	12.0%	80.0%	68.0%	
Maximum Green (s)	13.2	13.2	6.0	73.4	61.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	11.0	11.0	76.2	75.6	68.3	
Actuated g/C Ratio	0.11	0.11	0.76	0.76	0.68	
v/c Ratio	0.15	0.78	0.07	0.88	0.26	
Control Delay	42.0	15.8	1.0	25.4	7.9	
Queue Delay	0.0	0.0	0.0	12.4	0.0	
Total Delay	42.0	15.8	1.0	37.7	7.9	
LOS	D	B	A	D	A	
Approach Delay	17.1			36.3	7.9	
Approach LOS	B			D	A	
Queue Length 50th (m)	3.7	0.0	1.5	227.3	19.9	
Queue Length 95th (m)	10.0	27.1	m0.2	#146.0	34.4	
Internal Link Dist (m)	103.2			230.7	115.5	
Turn Bay Length (m)		45.0				
Base Capacity (vph)	182	541	715	1349	1124	
Starvation Cap Reductn	0	0	0	167	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.12	0.74	0.07	1.00	0.26	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 11 (11%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 27.9

Intersection LOS: C

Intersection Capacity Utilization 78.8%

ICU Level of Service D

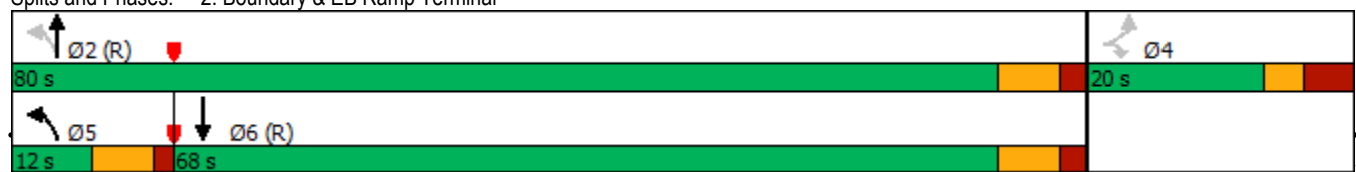
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Boundary & EB Ramp Terminal



Dynamic Report

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	15	5	3	5	23	6	1042	27	175	333	62
Future Volume (vph)	39	15	5	3	5	23	6	1042	27	175	333	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	0.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor									0.98			
Frt		0.988				0.850			0.850		0.976	
Flt Protected		0.968			0.984		0.950			0.950		
Satd. Flow (prot)	0	1674	0	0	1756	1517	1441	3357	1517	1695	1573	0
Flt Permitted		0.798			0.890		0.508			0.178		
Satd. Flow (perm)	0	1380	0	0	1588	1517	770	3357	1482	318	1573	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				100			96		22	
Link Speed (k/h)		60			40			80			80	
Link Distance (m)		117.2			154.3			343.6			254.7	
Travel Time (s)		7.0			13.9			15.5			11.5	
Confl. Peds. (#/hr)									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%	2%	2%	2%	2%	2%	20%	3%	2%	2%	15%	2%
Adj. Flow (vph)	43	17	6	3	6	26	7	1158	30	194	370	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	9	26	7	1158	30	194	439	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		11.1			11.1	11.1	63.9	63.9	63.9	80.2	81.3	
Actuated g/C Ratio		0.11			0.11	0.11	0.64	0.64	0.64	0.80	0.81	
v/c Ratio		0.42			0.05	0.10	0.01	0.54	0.03	0.49	0.34	
Control Delay		46.9			39.2	0.8	13.8	19.0	0.0	9.8	3.6	
Queue Delay		0.2			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		47.2			39.2	0.8	13.8	19.0	0.0	9.8	3.6	
LOS		D			D	A	B	B	A	A	A	
Approach Delay		47.2			10.7			18.5			5.5	
Approach LOS		D			B			B			A	
Queue Length 50th (m)		10.6			1.5	0.0	0.7	90.7	0.0	8.2	17.6	
Queue Length 95th (m)		21.8			5.6	0.0	m1.2	119.3	m0.0	m14.4	26.5	
Internal Link Dist (m)		93.2			130.3			319.6			230.7	
Turn Bay Length (m)							30.0		10.0			
Base Capacity (vph)		268			304	372	492	2146	982	448	1282	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		30			0	34	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.28			0.03	0.08	0.01	0.54	0.03	0.43	0.34	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 15.1

Intersection LOS: B

Intersection Capacity Utilization 65.7%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	89	34	150	977	141	120
Future Volume (vph)	89	34	150	977	141	120
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	25.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		50.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1572	1289	1647	1733	1733	1432
Flt Permitted	0.950		0.657			
Satd. Flow (perm)	1572	1289	1139	1733	1733	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		38				133
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	613.1	
Travel Time (s)	18.4			29.3	27.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	10%	20%	5%	5%	5%	8%
Adj. Flow (vph)	99	38	167	1086	157	133
Shared Lane Traffic (%)						
Lane Group Flow (vph)	99	38	167	1086	157	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

4: Boundary & Mitch Owens
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	26.0	26.0	74.0	74.0	74.0	74.0
Total Split (%)	26.0%	26.0%	74.0%	74.0%	74.0%	74.0%
Maximum Green (s)	19.2	19.2	67.8	67.8	67.8	67.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	12.3	12.3	79.3	79.3	79.3	79.3
Actuated g/C Ratio	0.12	0.12	0.79	0.79	0.79	0.79
v/c Ratio	0.51	0.20	0.18	0.79	0.11	0.11
Control Delay	50.1	14.5	4.5	14.5	7.1	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	14.5	4.5	14.5	7.1	4.6
LOS	D	B	A	B	A	A
Approach Delay	40.2			13.1	6.0	
Approach LOS	D			B	A	
Queue Length 50th (m)	16.9	0.0	7.1	105.5	3.9	0.0
Queue Length 95th (m)	30.1	8.0	15.8	#245.9	27.2	16.5
Internal Link Dist (m)	384.5			627.7	589.1	
Turn Bay Length (m)	25.0		25.0			25.0
Base Capacity (vph)	301	278	903	1374	1374	1163
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.14	0.18	0.79	0.11	0.11

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 76 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 14.1

Intersection LOS: B

Intersection Capacity Utilization 73.4%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & North Site Access/CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	0	1	4	0	39	12	1050	4	39	254	69
Future Volume (vph)	19	0	1	4	0	39	12	1050	4	39	254	69
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	10.0			10.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.878			0.999				0.850
Flt Protected		0.955			0.995		0.950			0.950		
Satd. Flow (prot)	0	1644	0	0	1514	0	1647	1732	0	1647	1733	1473
Flt Permitted		0.705			0.964		0.602			0.219		
Satd. Flow (perm)	0	1213	0	0	1467	0	1043	1732	0	380	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			39							69
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		264.4			197.6			87.6			247.2	
Travel Time (s)		19.0			14.2			3.9			11.1	
Peak Hour Factor	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. Flow (vph)	19	0	1	4	0	39	12	1050	4	39	254	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	43	0	12	1054	0	39	254	69
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	24.8	24.8		24.8	24.8		26.2	26.2		26.2	26.2	26.2
Total Split (s)	25.0	25.0		25.0	25.0		75.0	75.0		75.0	75.0	75.0

5: Boundary & North Site Access/CRRRC
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	75.0%
Maximum Green (s)	19.2	19.2		19.2	19.2		68.8	68.8		68.8	68.8	68.8
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	2.1	2.1		2.1	2.1		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.8			5.8		6.2	6.2		6.2	6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		10.0			10.0		86.8	86.8		86.8	86.8	86.8
Actuated g/C Ratio		0.10			0.10		0.87	0.87		0.87	0.87	0.87
v/c Ratio		0.13			0.24		0.01	0.70		0.12	0.17	0.05
Control Delay		8.7			18.7		0.8	5.5		5.2	4.1	2.5
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		8.7			18.7		0.8	5.5		5.2	4.1	2.5
LOS		A			B		A	A		A	A	A
Approach Delay		8.7			18.7			5.5			3.9	
Approach LOS		A			B			A			A	
Queue Length 50th (m)		0.0			0.7		0.2	17.2		2.7	18.7	2.7
Queue Length 95th (m)		3.8			9.9		m0.2	158.4		5.6	22.6	3.8
Internal Link Dist (m)		240.4			173.6			63.6			223.2	
Turn Bay Length (m)										110.0		70.0
Base Capacity (vph)		261			313		905	1503		330	1504	1288
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.08			0.14		0.01	0.70		0.12	0.17	0.05

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 23 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 5.5

Intersection LOS: A

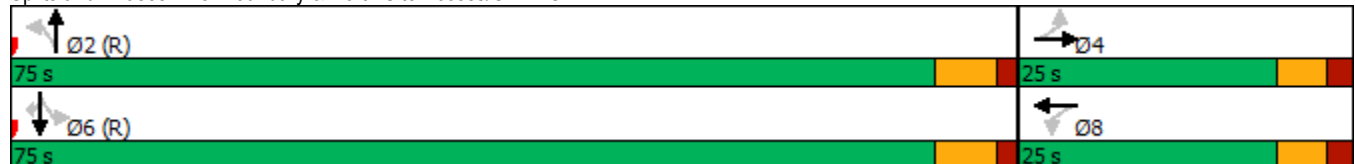
Intersection Capacity Utilization 76.9%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Boundary & North Site Access/CRRRC



6: Boundary & South Site Access
AM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	0	2	0	1066	259	0
Future Volume (vph)	0	2	0	1066	259	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	10.0			0.0
Storage Lanes	0	1	1			0
Taper Length (m)	10.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1499	0	3293	1733	0
Flt Permitted						
Satd. Flow (perm)	0	1499	0	3293	1733	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	139.4			613.1	87.6	
Travel Time (s)	10.0			27.6	3.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	2	0	1066	259	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2	0	1066	259	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			0.0	0.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 34.4%	ICU Level of Service A					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	1	178	353	27	138
Future Volume (vph)	58	1	178	353	27	138
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998		0.910			
Flt Protected	0.953					0.992
Satd. Flow (prot)	1507	0	1582	0	0	1706
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1507	0	1582	0	0	1706
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	5%	10%	2%	10%	5%
Adj. Flow (vph)	58	1	178	353	27	138
Shared Lane Traffic (%)						
Lane Group Flow (vph)	59	0	531	0	0	165
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	42.9%			ICU Level of Service A		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	87	831	184	334	244	19
Future Volume (vph)	87	831	184	334	244	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1572	1733	1698	0
Flt Permitted	0.950		0.445			
Satd. Flow (perm)	1647	1480	735	1733	1698	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		672			6	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	5%	5%	20%
Adj. Flow (vph)	87	831	184	334	244	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	831	184	334	263	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	25.0	25.0	12.0	75.0	63.0	
Total Split (%)	25.0%	25.0%	12.0%	75.0%	63.0%	
Maximum Green (s)	18.2	18.2	6.0	68.4	56.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	38.2	38.2	49.0	48.4	35.2	
Actuated g/C Ratio	0.38	0.38	0.49	0.48	0.35	
v/c Ratio	0.14	0.85	0.44	0.40	0.44	
Control Delay	20.5	15.1	16.9	16.4	27.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.5	15.1	16.9	16.4	27.1	
LOS	C	B	B	B	C	
Approach Delay	15.6			16.6	27.1	
Approach LOS	B			B	C	
Queue Length 50th (m)	9.8	21.0	16.6	31.1	34.8	
Queue Length 95th (m)	18.9	#92.2	31.6	54.6	55.4	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	628	980	421	1185	960	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.85	0.44	0.28	0.27	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 17.7

Intersection LOS: B

Intersection Capacity Utilization 94.8%

ICU Level of Service F

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	0	17	5	0	16	5	420	0	2	1002	68
Future Volume (vph)	77	0	17	5	0	16	5	420	0	2	1002	68
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.976				0.850					0.990	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1612	0	0	1695	1517	1695	1655	1784	1695	1749	0
Flt Permitted		0.761			0.767		0.219			0.464		
Satd. Flow (perm)	0	1276	0	0	1369	1517	391	1655	1784	828	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100						8
Link Speed (k/h)		60			40			80				80
Link Distance (m)		117.2			154.3			587.5				254.7
Travel Time (s)		7.0			13.9			26.4				11.5
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	2%	2%	2%	2%	10%	2%	2%	3%	3%
Adj. Flow (vph)	77	0	17	5	0	16	5	420	0	2	1002	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	94	0	0	5	16	5	420	0	2	1070	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.2			10.2	10.2	79.8	79.8		81.1	82.2	
Actuated g/C Ratio		0.10			0.10	0.10	0.80	0.80		0.81	0.82	
v/c Ratio		0.43			0.04	0.07	0.02	0.32		0.00	0.74	
Control Delay		14.3			40.8	0.5	5.2	4.6		2.5	11.2	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.4	
Total Delay		14.3			40.8	0.5	5.2	4.6		2.5	11.6	
LOS		B			D	A	A	A		A	B	
Approach Delay		14.3			10.1			4.6			11.6	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		0.0			0.8	0.0	0.1	13.8		0.1	146.6	
Queue Length 95th (m)		12.1			3.9	0.0	m1.3	37.2		m0.1	158.3	
Internal Link Dist (m)		93.2			130.3			563.5			230.7	
Turn Bay Length (m)							30.0			70.0		
Base Capacity (vph)		325			262	372	311	1321		792	1438	
Starvation Cap Reductn		0			0	0	0	0		0	82	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.29			0.02	0.04	0.02	0.32		0.00	0.79	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 9.9

Intersection LOS: A

Intersection Capacity Utilization 82.3%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	144	122	65	147	886	145
Future Volume (vph)	144	122	65	147	886	145
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1647	1685	1784	1406
Flt Permitted	0.950		0.242			
Satd. Flow (perm)	1647	1517	419	1685	1784	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		122				79
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	615.2	
Travel Time (s)	18.4			29.3	27.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	5%	8%	2%	10%
Adj. Flow (vph)	144	122	65	147	886	145
Shared Lane Traffic (%)						
Lane Group Flow (vph)	144	122	65	147	886	145
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	28.0	28.0	72.0	72.0	72.0	72.0
Total Split (%)	28.0%	28.0%	72.0%	72.0%	72.0%	72.0%
Maximum Green (s)	21.2	21.2	65.8	65.8	65.8	65.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	14.3	14.3	72.7	72.7	72.7	72.7
Actuated g/C Ratio	0.14	0.14	0.73	0.73	0.73	0.73
v/c Ratio	0.62	0.38	0.21	0.12	0.68	0.14
Control Delay	51.2	10.3	7.3	4.9	10.7	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.2	10.3	7.3	4.9	10.7	4.2
LOS	D	B	A	A	B	A
Approach Delay	32.4			5.6	9.8	
Approach LOS	C			A	A	
Queue Length 50th (m)	24.5	0.0	3.2	6.6	69.1	4.9
Queue Length 95th (m)	39.9	13.2	9.8	14.4	93.6	m12.3
Internal Link Dist (m)	384.5			627.7	591.2	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	349	417	304	1225	1297	1044
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.29	0.21	0.12	0.68	0.14

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 13.2

Intersection LOS: B

Intersection Capacity Utilization 76.3%

ICU Level of Service D

Analysis Period (min) 15

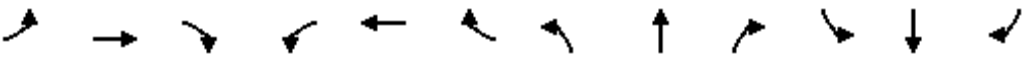
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Boundary & Mitch Owens

 Ø2 (R)	 Ø4
72 s	28 s
 Ø5 (R)	
72 s	

5: Boundary & North Site Access/CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	0	2	4	0	39	2	285	4	39	1015	16
Future Volume (vph)	69	0	2	4	0	39	2	285	4	39	1015	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	2.5			2.5			2.5			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.878			0.998				0.850
Flt Protected		0.954			0.995		0.950			0.950		
Satd. Flow (prot)	0	1695	0	0	1559	0	1695	1781	0	1695	1784	1517
Flt Permitted		0.700			0.968		0.219			0.583		
Satd. Flow (perm)	0	1244	0	0	1516	0	391	1781	0	1040	1784	1517
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			39			2				31
Link Speed (k/h)		50			50			80				80
Link Distance (m)		262.7			202.0			88.7				587.5
Travel Time (s)		18.9			14.5			4.0				26.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	69	0	2	4	0	39	2	285	4	39	1015	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	71	0	0	43	0	2	289	0	39	1015	16
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	24.8	24.8		24.8	24.8		26.2	26.2		26.2	26.2	26.2

5: Boundary & North Site Access/CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	25.0	25.0		25.0	25.0		75.0	75.0		75.0	75.0	75.0
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	75.0%
Maximum Green (s)	19.2	19.2		19.2	19.2		68.8	68.8		68.8	68.8	68.8
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	2.1	2.1		2.1	2.1		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.8			5.8		6.2	6.2		6.2	6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		10.8			10.8		81.6	81.6		81.6	81.6	81.6
Actuated g/C Ratio		0.11			0.11		0.82	0.82		0.82	0.82	0.82
v/c Ratio		0.43			0.22		0.01	0.20		0.05	0.70	0.01
Control Delay		32.3			17.2		1.5	1.7		1.3	3.9	0.1
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		32.3			17.2		1.5	1.7		1.3	3.9	0.1
LOS		C			B		A	A		A	A	A
Approach Delay		32.3			17.2			1.7			3.8	
Approach LOS		C			B			A			A	
Queue Length 50th (m)		6.1			0.7		0.0	5.0		0.4	11.4	0.0
Queue Length 95th (m)		17.9			9.4		m0.2	9.0		m0.2	13.1	m0.0
Internal Link Dist (m)		238.7			178.0			64.7			563.5	
Turn Bay Length (m)										110.0		70.0
Base Capacity (vph)		267			322		318	1453		848	1455	1243
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.27			0.13		0.01	0.20		0.05	0.70	0.01

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 5.1

Intersection LOS: A

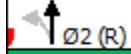
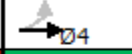
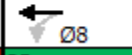
Intersection Capacity Utilization 77.2%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Boundary & North Site Access/CRRRC

 02 (R)	 04
75 s	25 s
 05 (R)	 08
75 s	25 s

6: Boundary & South Site Access
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	0	10	0	291	1021	0
Future Volume (vph)	0	10	0	291	1021	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	10.0			0.0
Storage Lanes	0	1	1			0
Taper Length (m)	2.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1543	0	3390	1784	0
Flt Permitted						
Satd. Flow (perm)	0	1543	0	3390	1784	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	142.8			615.2	88.7	
Travel Time (s)	10.3			27.7	4.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	0	10	0	291	1021	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	10	0	291	1021	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			0.0	0.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 66.7%	ICU Level of Service C					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	1	178	353	27	138
Future Volume (vph)	58	1	178	353	27	138
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998		0.910			
Flt Protected	0.953					0.992
Satd. Flow (prot)	1507	0	1582	0	0	1706
Flt Permitted	0.953					0.891
Satd. Flow (perm)	1507	0	1582	0	0	1532
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	1		219			
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		549.5			159.5
Travel Time (s)	11.9		24.7			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	5%	10%	2%	10%	5%
Adj. Flow (vph)	58	1	178	353	27	138
Shared Lane Traffic (%)						
Lane Group Flow (vph)	59	0	531	0	0	165
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (m)	6.1		30.5		6.1	30.5
Trailing Detector (m)	0.0		0.0		0.0	0.0
Detector 1 Position(m)	0.0		0.0		0.0	0.0
Detector 1 Size(m)	6.1		1.8		6.1	1.8
Detector 1 Type	CI+Ex		CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	10.0		20.0		20.0	20.0
Minimum Split (s)	18.8		34.6		26.6	26.6
Total Split (s)	26.0		74.0		74.0	74.0
Total Split (%)	26.0%		74.0%		74.0%	74.0%
Maximum Green (s)	19.2		67.4		67.4	67.4

1: Boundary & WB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Yellow Time (s)	3.0		4.6		4.6	4.6
All-Red Time (s)	3.8		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.8		6.6			6.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Min		C-Min	C-Min
Walk Time (s)	7.0		7.0			
Flash Dont Walk (s)	5.0		21.0			
Pedestrian Calls (#/hr)	0		0			
Act Effct Green (s)	10.8		80.5			80.5
Actuated g/C Ratio	0.11		0.80			0.80
v/c Ratio	0.36		0.40			0.13
Control Delay	47.2		1.4			3.5
Queue Delay	0.0		0.0			0.0
Total Delay	47.2		1.4			3.5
LOS	D		A			A
Approach Delay	47.2		1.4			3.5
Approach LOS	D		A			A
Queue Length 50th (m)	9.9		2.1			6.3
Queue Length 95th (m)	20.8		3.7			12.6
Internal Link Dist (m)	108.0		525.5			135.5
Turn Bay Length (m)						
Base Capacity (vph)	290		1316			1233
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.20		0.40			0.13

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 74 (74%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 5.5

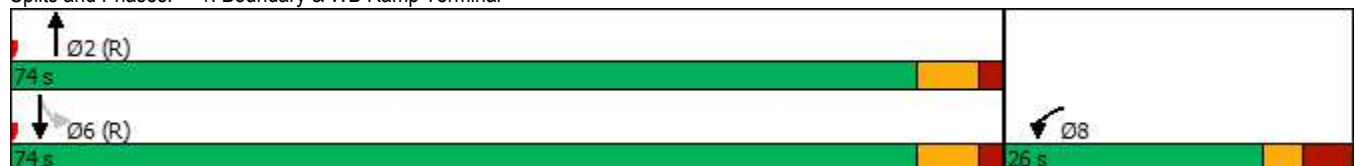
Intersection LOS: A

Intersection Capacity Utilization 52.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Boundary & WB Ramp Terminal



2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	87	831	184	334	244	19
Future Volume (vph)	87	831	184	334	244	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	45.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98	1.00			
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1572	1733	1698	0
Flt Permitted	0.950		0.445			
Satd. Flow (perm)	1647	1480	735	1733	1698	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		672			6	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	549.5	
Travel Time (s)	11.4			11.5	24.7	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	5%	5%	20%
Adj. Flow (vph)	87	831	184	334	244	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	831	184	334	263	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	25.0	25.0	12.0	75.0	63.0	
Total Split (%)	25.0%	25.0%	12.0%	75.0%	63.0%	
Maximum Green (s)	18.2	18.2	6.0	68.4	56.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	38.2	38.2	49.0	48.4	35.2	
Actuated g/C Ratio	0.38	0.38	0.49	0.48	0.35	
v/c Ratio	0.14	0.85	0.44	0.40	0.44	
Control Delay	20.5	15.1	16.0	15.3	21.5	
Queue Delay	0.0	0.2	0.0	0.0	0.0	
Total Delay	20.5	15.3	16.0	15.3	21.5	
LOS	C	B	B	B	C	
Approach Delay	15.8			15.5	21.5	
Approach LOS	B			B	C	
Queue Length 50th (m)	9.8	21.0	13.4	25.2	25.6	
Queue Length 95th (m)	18.9	#92.2	24.5	54.7	38.9	
Internal Link Dist (m)	103.2			230.7	525.5	
Turn Bay Length (m)		45.0	45.0			
Base Capacity (vph)	628	980	421	1185	960	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	7	0	0	19	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.85	0.44	0.28	0.28	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 16.6

Intersection LOS: B

Intersection Capacity Utilization 94.8%

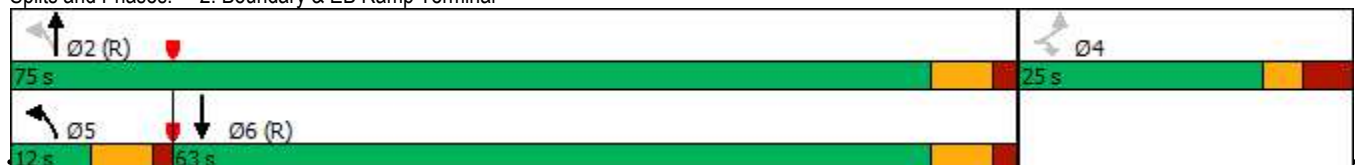
ICU Level of Service F

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	0	17	5	0	16	5	420	0	2	1002	68
Future Volume (vph)	77	0	17	5	0	16	5	420	0	2	1002	68
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	70.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.976				0.850					0.990	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1612	0	0	1695	1517	1695	1655	1784	1695	1749	0
Flt Permitted		0.761			0.767		0.219			0.464		
Satd. Flow (perm)	0	1276	0	0	1369	1517	391	1655	1784	828	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100						8
Link Speed (k/h)		60			40			80				80
Link Distance (m)		117.2			154.3			587.5				254.7
Travel Time (s)		7.0			13.9			26.4				11.5
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	2%	2%	2%	2%	10%	2%	2%	3%	3%
Adj. Flow (vph)	77	0	17	5	0	16	5	420	0	2	1002	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	94	0	0	5	16	5	420	0	2	1070	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	64.0	64.0	64.0	11.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	64.0%	64.0%	64.0%	11.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	57.8	57.8	57.8	5.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.2			10.2	10.2	79.8	79.8		81.1	82.2	
Actuated g/C Ratio		0.10			0.10	0.10	0.80	0.80		0.81	0.82	
v/c Ratio		0.43			0.04	0.07	0.02	0.32		0.00	0.74	
Control Delay		14.3			40.8	0.5	4.0	3.5		2.5	10.7	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.1	
Total Delay		14.3			40.8	0.5	4.0	3.5		2.5	10.8	
LOS		B			D	A	A	A		A	B	
Approach Delay		14.3			10.1			3.5			10.8	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		0.0			0.8	0.0	0.1	9.0		0.1	116.0	
Queue Length 95th (m)		12.1			3.9	0.0	m1.1	30.3		m0.2	149.9	
Internal Link Dist (m)		93.2			130.3			563.5			230.7	
Turn Bay Length (m)							30.0			70.0		
Base Capacity (vph)		325			262	372	311	1321		719	1438	
Starvation Cap Reductn		0			0	0	0	0		0	18	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.29			0.02	0.04	0.02	0.32		0.00	0.75	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 9.1

Intersection LOS: A

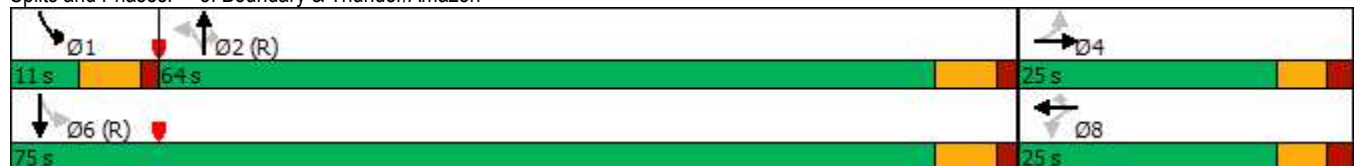
Intersection Capacity Utilization 82.3%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	144	122	65	147	886	145
Future Volume (vph)	144	122	65	147	886	145
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1647	1685	1784	1406
Flt Permitted	0.950		0.242			
Satd. Flow (perm)	1647	1517	419	1685	1784	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		122				79
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	615.2	
Travel Time (s)	18.4			29.3	27.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	5%	8%	2%	10%
Adj. Flow (vph)	144	122	65	147	886	145
Shared Lane Traffic (%)						
Lane Group Flow (vph)	144	122	65	147	886	145
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	28.0	28.0	72.0	72.0	72.0	72.0
Total Split (%)	28.0%	28.0%	72.0%	72.0%	72.0%	72.0%
Maximum Green (s)	21.2	21.2	65.8	65.8	65.8	65.8
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.2	6.2	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	14.3	14.3	72.7	72.7	72.7	72.7
Actuated g/C Ratio	0.14	0.14	0.73	0.73	0.73	0.73
v/c Ratio	0.62	0.38	0.21	0.12	0.68	0.14
Control Delay	51.2	10.3	7.3	4.9	11.4	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.2	10.3	7.3	4.9	11.4	4.3
LOS	D	B	A	A	B	A
Approach Delay	32.4			5.6	10.4	
Approach LOS	C			A	B	
Queue Length 50th (m)	24.5	0.0	3.2	6.6	69.2	4.9
Queue Length 95th (m)	39.9	13.2	9.8	14.4	95.7	m11.4
Internal Link Dist (m)	384.5			627.7	591.2	
Turn Bay Length (m)	25.0		40.0			25.0
Base Capacity (vph)	349	417	304	1225	1297	1044
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.29	0.21	0.12	0.68	0.14

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 13.6

Intersection LOS: B

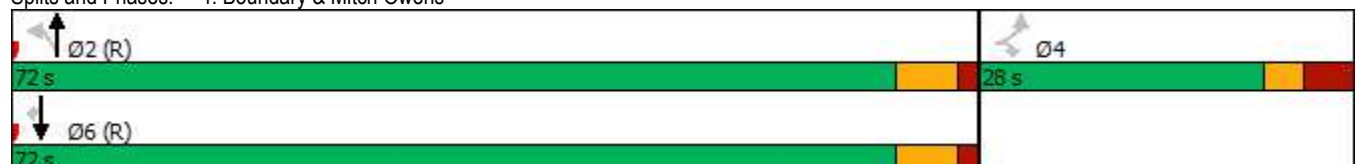
Intersection Capacity Utilization 76.3%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Boundary & Mitch Owens



5: Boundary & North Site Access/CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	0	2	4	0	39	2	285	4	39	1015	16
Future Volume (vph)	69	0	2	4	0	39	2	285	4	39	1015	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	2.5			2.5			2.5			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.878			0.998				0.850
Flt Protected		0.954			0.995		0.950			0.950		
Satd. Flow (prot)	0	1695	0	0	1559	0	1695	1781	0	1695	1784	1517
Flt Permitted		0.700			0.968		0.219			0.583		
Satd. Flow (perm)	0	1244	0	0	1516	0	391	1781	0	1040	1784	1517
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			39			2				31
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		262.7			202.0			88.7			587.5	
Travel Time (s)		18.9			14.5			4.0			26.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	69	0	2	4	0	39	2	285	4	39	1015	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	71	0	0	43	0	2	289	0	39	1015	16
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	24.8	24.8		24.8	24.8		26.2	26.2		26.2	26.2	26.2

5: Boundary & North Site Access/CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	25.0	25.0		25.0	25.0		75.0	75.0		75.0	75.0	75.0
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	75.0%
Maximum Green (s)	19.2	19.2		19.2	19.2		68.8	68.8		68.8	68.8	68.8
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	2.1	2.1		2.1	2.1		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.8			5.8		6.2	6.2		6.2	6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		10.8			10.8		81.6	81.6		81.6	81.6	81.6
Actuated g/C Ratio		0.11			0.11		0.82	0.82		0.82	0.82	0.82
v/c Ratio		0.43			0.22		0.01	0.20		0.05	0.70	0.01
Control Delay		32.3			17.2		1.5	1.7		2.5	4.8	0.3
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		32.3			17.2		1.5	1.7		2.5	4.8	0.3
LOS		C			B		A	A		A	A	A
Approach Delay		32.3			17.2			1.7			4.7	
Approach LOS		C			B			A			A	
Queue Length 50th (m)		6.1			0.7		0.0	5.0		1.5	39.6	0.0
Queue Length 95th (m)		17.9			9.4		m0.2	9.0		m0.9	20.0	m0.0
Internal Link Dist (m)		238.7			178.0			64.7			563.5	
Turn Bay Length (m)										110.0		70.0
Base Capacity (vph)		267			322		318	1453		848	1455	1243
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.27			0.13		0.01	0.20		0.05	0.70	0.01

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 5.8

Intersection LOS: A

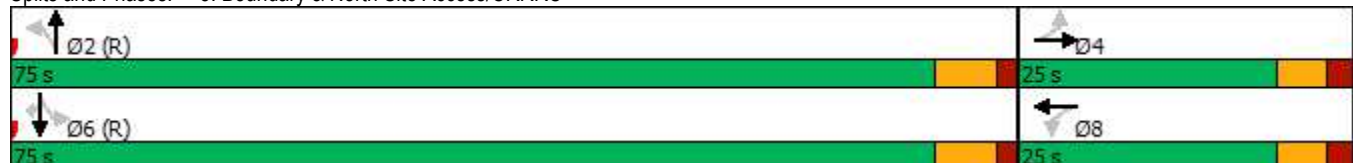
Intersection Capacity Utilization 77.2%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Boundary & North Site Access/CRRRC



6: Boundary & South Site Access
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (optimized timings)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	10	0	291	1021	0
Future Volume (vph)	0	10	0	291	1021	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	10.0			0.0
Storage Lanes	0	1	1			0
Taper Length (m)	2.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1543	0	3390	1784	0
Flt Permitted						
Satd. Flow (perm)	0	1543	0	3390	1784	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	142.8			615.2	88.7	
Travel Time (s)	10.3			27.7	4.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	0	10	0	291	1021	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	10	0	291	1021	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			0.0	0.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 66.7%	ICU Level of Service C					
Analysis Period (min) 15						

1: Boundary & WB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	1	178	353	27	138
Future Volume (vph)	58	1	178	353	27	138
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998		0.910			
Flt Protected	0.953					0.992
Satd. Flow (prot)	1507	0	1582	0	0	1706
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1507	0	1582	0	0	1706
Link Speed (k/h)	40		80			80
Link Distance (m)	132.0		410.0			159.5
Travel Time (s)	11.9		18.5			7.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	5%	10%	2%	10%	5%
Adj. Flow (vph)	58	1	178	353	27	138
Shared Lane Traffic (%)						
Lane Group Flow (vph)	59	0	531	0	0	165
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	5.0		5.0			5.0
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	42.9%			ICU Level of Service A		
Analysis Period (min)	15					

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	87	831	184	334	244	19
Future Volume (vph)	87	831	184	334	244	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	45.0	0.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99	1.00			
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1572	1733	1698	0
Flt Permitted	0.950		0.447			
Satd. Flow (perm)	1647	1495	739	1733	1698	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		672			6	
Link Speed (k/h)	40			80	80	
Link Distance (m)	127.2			254.7	139.5	
Travel Time (s)	11.4			11.5	6.3	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	5%	5%	20%
Adj. Flow (vph)	87	831	184	334	244	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	831	184	334	263	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						

2: Boundary & EB Ramp Terminal
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	18.8	18.8	11.0	41.6	41.6	
Total Split (s)	25.0	25.0	12.0	75.0	63.0	
Total Split (%)	25.0%	25.0%	12.0%	75.0%	63.0%	
Maximum Green (s)	18.2	18.2	6.0	68.4	56.4	
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	
All-Red Time (s)	3.8	3.8	1.4	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	C-Min	C-Min	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	5.0	5.0			21.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	37.5	37.5	49.7	49.1	35.6	
Actuated g/C Ratio	0.38	0.38	0.50	0.49	0.36	
v/c Ratio	0.14	0.85	0.43	0.39	0.43	
Control Delay	20.7	15.1	16.9	16.3	26.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.7	15.1	16.9	16.3	26.9	
LOS	C	B	B	B	C	
Approach Delay	15.6			16.6	26.9	
Approach LOS	B			B	C	
Queue Length 50th (m)	10.0	21.3	16.3	30.6	34.8	
Queue Length 95th (m)	18.9	#86.7	31.6	54.6	55.4	
Internal Link Dist (m)	103.2			230.7	115.5	
Turn Bay Length (m)		45.0				
Base Capacity (vph)	617	980	429	1185	960	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.85	0.43	0.28	0.27	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 17.6

Intersection LOS: B

Intersection Capacity Utilization 94.8%

ICU Level of Service F

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary & EB Ramp Terminal



3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	0	17	5	0	16	5	420	0	2	1002	68
Future Volume (vph)	77	0	17	5	0	16	5	420	0	2	1002	68
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		10.0	0.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	2.5			30.0			60.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.976				0.850					0.990	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1612	0	0	1695	1517	1695	3144	1784	1695	1749	0
Flt Permitted		0.761			0.767		0.219			0.468		
Satd. Flow (perm)	0	1276	0	0	1369	1517	391	3144	1784	835	1749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100						8
Link Speed (k/h)		60			40			80				80
Link Distance (m)		117.2			154.3			348.1			254.7	
Travel Time (s)		7.0			13.9			15.7			11.5	
Confl. Peds. (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	10%	2%	2%	2%	2%	10%	2%	2%	3%	3%
Adj. Flow (vph)	77	0	17	5	0	16	5	420	0	2	1002	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	94	0	0	5	16	5	420	0	2	1070	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												

3: Boundary & Thunder/Amazon
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	11.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	55.0	55.0	55.0	20.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	55.0%	55.0%	55.0%	20.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	48.8	48.8	48.8	14.0	68.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.6	1.6	1.6	1.4	1.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.8			5.8	5.8	6.2	6.2	6.2	6.0	6.2	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	C-Min	C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0	12.0	10.0	10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0		0	
Act Effct Green (s)		10.2			10.2	10.2	79.8	79.8		81.1	82.2	
Actuated g/C Ratio		0.10			0.10	0.10	0.80	0.80		0.81	0.82	
v/c Ratio		0.43			0.04	0.07	0.02	0.17		0.00	0.74	
Control Delay		14.3			40.8	0.5	5.2	3.6		2.5	11.3	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.4	
Total Delay		14.3			40.8	0.5	5.2	3.6		2.5	11.6	
LOS		B			D	A	A	A		A	B	
Approach Delay		14.3			10.1			3.6			11.6	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		0.0			0.8	0.0	0.1	6.7		0.1	147.0	
Queue Length 95th (m)		12.1			3.9	0.0	m1.3	17.9		m0.1	158.6	
Internal Link Dist (m)		93.2			130.3			324.1			230.7	
Turn Bay Length (m)							30.0					
Base Capacity (vph)		325			262	372	311	2510		797	1438	
Starvation Cap Reductn		0			0	0	0	0		0	82	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.29			0.02	0.04	0.02	0.17		0.00	0.79	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 9.7

Intersection LOS: A

Intersection Capacity Utilization 82.3%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Boundary & Thunder/Amazon



4: Boundary & Mitch Owens
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	144	122	65	147	886	145
Future Volume (vph)	144	122	65	147	886	145
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	40.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	45.0		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1647	1517	1647	1685	1784	1406
Flt Permitted	0.950		0.242			
Satd. Flow (perm)	1647	1517	419	1685	1784	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		122				79
Link Speed (k/h)	80			80	80	
Link Distance (m)	408.5			651.7	615.2	
Travel Time (s)	18.4			29.3	27.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	2%	5%	8%	2%	10%
Adj. Flow (vph)	144	122	65	147	886	145
Shared Lane Traffic (%)						
Lane Group Flow (vph)	144	122	65	147	886	145
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			5.0	5.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.8	25.8	26.2	26.2	26.2	26.2

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 8 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 13.2	Intersection LOS: B
Intersection Capacity Utilization 76.3%	ICU Level of Service D
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

 Ø2 (R)	 Ø4
72 s	28 s
 Ø6 (R)	
72 s	

5: Boundary & North Site Access/CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	0	2	4	0	39	2	285	4	39	1015	16
Future Volume (vph)	69	0	2	4	0	39	2	285	4	39	1015	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	110.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	2.5			2.5			2.5			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.878			0.998				0.850
Flt Protected		0.954			0.995		0.950			0.950		
Satd. Flow (prot)	0	1695	0	0	1559	0	1695	1781	0	1695	1784	1517
Flt Permitted		0.700			0.968		0.219			0.583		
Satd. Flow (perm)	0	1244	0	0	1516	0	391	1781	0	1040	1784	1517
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			39			2				31
Link Speed (k/h)		50			50			80				80
Link Distance (m)		262.7			202.0			88.7				239.4
Travel Time (s)		18.9			14.5			4.0				10.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	69	0	2	4	0	39	2	285	4	39	1015	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	71	0	0	43	0	2	289	0	39	1015	16
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		5.0			5.0			5.0			5.0	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	24.8	24.8		24.8	24.8		26.2	26.2		26.2	26.2	26.2

5: Boundary & North Site Access/CRRRC
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	25.0	25.0		25.0	25.0		75.0	75.0		75.0	75.0	75.0
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	75.0%
Maximum Green (s)	19.2	19.2		19.2	19.2		68.8	68.8		68.8	68.8	68.8
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	2.1	2.1		2.1	2.1		1.6	1.6		1.6	1.6	1.6
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.8			5.8		6.2	6.2		6.2	6.2	6.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)		10.8			10.8		81.6	81.6		81.6	81.6	81.6
Actuated g/C Ratio		0.11			0.11		0.82	0.82		0.82	0.82	0.82
v/c Ratio		0.43			0.22		0.01	0.20		0.05	0.70	0.01
Control Delay		32.3			17.2		1.5	1.7		1.3	3.9	0.1
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		32.3			17.2		1.5	1.7		1.3	3.9	0.1
LOS		C			B		A	A		A	A	A
Approach Delay		32.3			17.2			1.7			3.8	
Approach LOS		C			B			A			A	
Queue Length 50th (m)		6.1			0.7		0.0	5.0		0.4	11.5	0.0
Queue Length 95th (m)		17.9			9.4		m0.2	9.0		m0.2	11.0	m0.0
Internal Link Dist (m)		238.7			178.0			64.7			215.4	
Turn Bay Length (m)										110.0		70.0
Base Capacity (vph)		267			322		318	1453		848	1455	1243
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.27			0.13		0.01	0.20		0.05	0.70	0.01

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 5.1

Intersection LOS: A

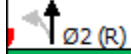
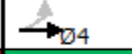
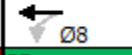
Intersection Capacity Utilization 77.2%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Boundary & North Site Access/CRRRC

 02 (R)	 04
75 s	25 s
 06 (R)	 08
75 s	25 s

6: Boundary & South Site Access
PM Peak Hour

5494, 5500, and 5510 Boundary Road
2031 Total Traffic (additional lanes on Boundary)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (vph)	0	10	0	291	1021	0
Future Volume (vph)	0	10	0	291	1021	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	10.0			0.0
Storage Lanes	0	1	1			0
Taper Length (m)	2.5		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt		0.865				
Flt Protected						
Satd. Flow (prot)	0	1543	0	3390	1784	0
Flt Permitted						
Satd. Flow (perm)	0	1543	0	3390	1784	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	142.8			615.2	88.7	
Travel Time (s)	10.3			27.7	4.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	0	10	0	291	1021	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	10	0	291	1021	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	5.0			0.0	0.0	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	66.7%			ICU Level of Service C		
Analysis Period (min)	15					