TRANSPORTATION IMPACT ASSESSMENT (TIA)

THUNDER ROAD & BOUNDARY ROAD
PROPOSED INDUSTRIAL DEVELOPMENT
CITY OF OTTAWA

PREPARED FOR:
THUNDER ROAD DEVELOPMENTS (2019) INC.

PREPARED BY:

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ORIGINAL: APRIL 2021
UPDATED: SEPTEMBER 2021

CFCA FILE NO. 1909-5772

CROZIER
CONSULTING ENGINEERS

Certification Form for TIA Study PM

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

☑ 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;

☑ 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;

☑ 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

☑ I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise

- ☑ 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.

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Stamp

Executive Summary

Background

C.F. Crozier & Associates Inc. (Crozier) was retained by Thunder Road Developments (2019) Inc. to prepare a Transportation Impact Assessment in support of the Official Plan Amendment (OPA), Zoning By-Law Amendment (ZBA) and Site Plan Approval (SPA) applications for the proposed industrial development located at Thunder Road and Boundary Road in the City of Ottawa.

An original TIA (dated April 2021) was previously submitted assessing the site specific requirements and impacts of the proposed industrial development on the boundary road network and recommended required mitigation measures, as warranted. This Updated TIA Study addresses the City and MTO comments regarding the first submission TIA. A comments response letter highlighting how each comment was addressed is provided separately as part of this resubmission to ease the review process.

The proposed development has an anticipated buildout by 2025 and includes 5 industrial buildings with a total Gross Floor Area (GFA) of 41,625 sq. m. This current proposal is a reduction from the original site plan with a 58,771 sq. m GFA used for the previous submission.

- Industrial Buildings A,B,C and D consists of a combined 37,165 sq. m of GFA, 288 auto parking spaces and two full-moves accesses to Thunder Road. The previous site plan had a single building with 55,799 sq. m of GFA.
- Industrial Building E: consists of 4,460 sq. m of GFA, 36 auto parking spaces and a full-moves access to Boundary Road opposite the South Amazon access.

Industrial Building 2 is outside of this site plan; however, the building was maintained as part of analysis herein as done in the original study. The site consists of 3,850.8 sq. m of GFA, 33 auto parking spaces and a separate full-moves access to Thunder Road.

The proposed industrial development (including site 2) is projected to generate a total of 134 and 143 two-way auto trips during the weekday a.m. and p.m. peak hours, respectively.

Existing Traffic Operations

Under 2020 existing traffic conditions, the study intersections are projected to operate at the Level of Services (LOS) below.

- The stop-controlled Highway 417 Westbound Ramp Terminal at Boundary Road is operating below capacity at a LOS "C" or better during the a.m. and p.m. peak hours.

- The signalized intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way are operating at a LOS "D" or better during the a.m. and p.m. peak hours.

- The stop-controlled South Amazon Access at Boundary Road is operating below capacity at a LOS "D" or better during the a.m. and p.m. peak hours.

- The stop-controlled Mitch Owens Road connection to Boundary Road is operating below capacity at a LOS "E" for the eastbound left turn during the a.m. and p.m. peak hours. All other movements at the intersection are at a LOS "A".

Future Background Traffic Operations

Under the 2025, 2030 and 2035 future background conditions:

- The stop-controlled Highway 417 Westbound Ramp Terminal at Boundary Road is forecast to operate at a LOS "F" during the a.m. peak hour of 2035 and LOS "E" or better under remaining study horizons. The intersection is forecast to operate at a LOS" B" or better during the p.m. peak hour.

- The signalized intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way are both forecast to operate at a LOS "E" or better during the a.m. and p.m. peak hours. Both intersections are forecast to have at least one turning movement near or at capacity.

- The stop-controlled South Amazon Access at Boundary Road is projected to operate at a LOS "E" and "F" during the a.m. and p.m. peak hours, respectively.

- The stop-controlled Mitch Owens Road connection to Boundary Road is expected to operate at a LOS "F" during the a.m. and p.m. peak hours. However, similar to Novatech's recommendation, adding a northbound left turn lane (2025 horizon) and implementing traffic signals (2035 horizon) is expected to result in a forecasted LOS "D" and average traffic delays less than 18 seconds during the a.m. and p.m. peak hours.

Future Total Traffic Operations

For the 2025, 2030 and 2035 total traffic conditions (includes site generated trips), the study intersections are projected to operate similarly to their respective future background conditions as follows:

- The stop-controlled Highway 417 Westbound Ramp Terminal at Boundary Road is forecast to operate at a LOS "F" or better during the a.m. peak hour and a LOS "B" or better during the p.m. peak hour.

- The signalized intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way are both forecast to operate at a LOS "E" or better during the a.m. and p.m. peak hours, similar to the future background conditions.

- The stop-controlled Mitch Owens Road connection to Boundary Road is expected to operate at a LOS "F" during the a.m. and p.m. peak hours under the ultimate 2035 horizon. Similar to the future background conditions, adding the northbound left turn lane (2025 horizon) and implementing traffic signals (2035 horizon) is expected to result in a forecasted LOS "D" or better during the a.m. and p.m. peak hours.

- The stop-controlled South Amazon Access at Boundary Road is projected to operate at a LOS "F" during the a.m. and p.m. peak hours under the ultimate 2035 horizon. This is a future background issue and is attributable to an increase in through volumes on Boundary Road and associated future delays to traffic from the Amazon access.

- The proposed three stop-controlled site access connections to Thunder Road are projected to operate below capacity at a LOS "B" or better during the a.m. and p.m. peak hours, under all study horizons.

A signal warrant assessment based on the ultimate 2035 traffic volumes indicates that traffic signals are not warranted at the intersections of Boundary Road and South Amazon Access / Site Access and Thunder Road with the proposed three Site Accesses. Additionally, no left or right turn auxiliary lanes are warranted on Thunder Road or Boundary Road at the site access connections.

The proposed site accesses are projected to operate efficiently and safely without any issues related to sight-lines, corner clearance, access conflicts, truck movements and transit operational conflicts.

The vehicle parking supply of for each of the three buildings exceeds the City's Zoning By-Law minimum parking requirements.

Recommendations and Conclusion

Given the analysis herein, the recommendations presented in the Table E-1 should be considered to support the proposed development.

Table E-1: Summary of Recommendations for Development Full build-Out

Category	Improvement	Responsibility	Timeline
Parking	Provide bicycle parking spaces for each building per City of Ottawa Zoning By-Law 2008-250 requirements	Developer	Full build-out (2025)
Roadway Improvements	**Boundary Road and Site Access / South Amazon Access:** Repurpose existing runout lane at south approach to provide auxiliary northbound left-turn with 15 metres of storage	Developer	Full build-out (2025)
TDM Measures	Provide cycling provisions such as secure bicycle parking, lockers, and showers	Developer	Full build-out (2025)
	Provide preferred carpool parking spaces to promote carpooling	Developer	Full build-out (2025)
	Co-ordinate with City to list development on the City's ride-matching portal and/or implement an internal ride-matching service to help employees find carpool partners	Tenant	Full build-out (2025)
	Implement an Emergency Ride Home program to guarantee employees a ride home in the case of an emergency	Tenant	Full build-out (2025)
	Provide information on available TDM opportunities through promotion and education	Tenant	Full build-out (2025)
	Establish a TDM program to monitor implementation and effectiveness of TDM measures	Tenant	Full build-out (2025)

Further, given the future background traffic operations, we recommend that the City and MTO consider the following in future:

- Similar to the Novatech's recommendation, we recommend adding a northbound left turn lane (in 2025 horizon) and implementing traffic signals (in 2035 horizon) at the intersection of Boundary Road and Mitch Owens Road.

- Signals are not warranted at Boundary Road intersections with Highway 417 Westbound Ramp Terminal and the South Amazon Access; however, signals may be considered in future if the City and MTO identify safety issues from extended delays to the minor street.

- Signal optimization to redistribute intersection capacity (effective green time) may be required in the future (i.e., 2030 onwards) to maintain the target LOS "D" at the intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way.

- Boundary Road and Highway 417 Eastbound Ramp Terminal: The EBR movement is expected to experience v/c ratios greater than 0.75, largely due to limited capacity for the yield EBR movement created by through traffic on Boundary Road. The MTO and City may consider optimizing the existing signal timing plan in future to create more capacity for the yield controlled EBR movement.

- The southbound traffic queues on Boundary Road at the Thunder Road intersection are forecast to occasionally extend beyond the Highway 417 Ramp in the 2035 horizon during the p.m. peak hours. However, this is a future background condition and not attributable to the proposed development. This issue is a long-term forecast and should be monitored by the City and reviewed as part of the City's ongoing Transportation Master Plan Update.

- It is noted the City is currently completing its Official Plan Update, as well as undertaking a Transportation Master Plan and Infrastructure Master Plan updates. Any potential widening of Boundary Road and major road improvements should be monitored and may be reviewed as part of the ongoing Plan updates.

- In addition to the City's existing road network volume monitoring program to assess capacity constrained zones, given the potential long term impact of the Covid-19 pandemic on home-work trips, the forecasted future volumes herein may be overstated, it is important to monitor intersection volumes in future to confirm if any roadway improvements and or traffic signal modifications are needed for optimal performance of the relevant surrounding intersections.

Based on this study findings, it is our conclusion that the traffic generated by the proposed industrial development at Thunder Road and Boundary Road can be accommodated by the boundary road network. The Official Plan Amendment (OPA), Zoning By-Law Amendment (ZBA) and Site Plan Approval (SPA) applications can be supported from a traffic operations perspective as the boundary road system is forecast to adequately accommodate the increase in traffic volumes attributable to the proposed development.

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1.0 Introduction

1.1 Background

Crozier & Associates Inc. (Crozier) was retained by Thunder Road Developments (2019) Inc. to prepare a Transportation Impact Assessment in support of the Official Plan Amendment (OPA), Zoning By-Law Amendment (ZBA) and Site Plan Approval (SPA) applications for the proposed industrial development located at 6150 Thunder Road and 5368 Boundary Road in the City of Ottawa.

Based on the City of Ottawa's "Transportation Impact Assessment Guidelines (2017)" requirements a Transportation Impact Assessment (TIA) Screening and Scoping Report, a Forecasting Report and a Strategy Report were all submitted and confirmed by the City of Ottawa as part of the first four steps of the TIA submission process.

As required by the City's TIA Guidelines, a TIA report fulfilling the final step of the TIA submission by compiling the TIA Screening and Scoping, Forecasting and Strategy Reports into a single document to support the proposed development application was made in April 2021.

The subject property is within the Ministry of Transportation of Ontario (MTO) Permit Controlled Area and therefore subject to MTO review and approval, including conformance to the MTO's "Traffic Impact Study Guideline" (September 2014). Thus, the scope of work presented in the original TIA report conforms to both the City and MTO's guidelines.

This Updated TIA Study addresses the City and MTO comments regarding the first submission TIA. A comments response letter highlighting how each comment was addressed is provided separately as part of this resubmission to ease the review process. This updated TIA further incorporates the additional Industrial background development located at 5494, 5500, and 5510 Boundary Road as requested by the City and MTO via email dated July 29, 2021.

1.2 Subject Property

The subject property covers an area of approximately 43.15 acres and is located in a rural area east of the urban core of Ottawa. The subject property is located south of Highway 417 and near the Amazon Facility east of Boundary Road that was constructed in 2019. Highway 417 functions as the transportation link between Ottawa and Quebec.

The subject property is designated as "General Rural Area" per the City's Official Plan which permits farms, rural housing, wood lots and forests, small industries, golf courses and existing clusters of residential subdivisions and severances and commercial development. It is noted that the east side of Boundary Road is identified as "Employment Area" per the City's Official Plan.

The subject property is currently zoned as "Rural Countryside Zone" (RU) per the City's Zoning By-Law 2008-250. The purpose of the RU zone is to "accommodate agricultural, forestry, country residential lots created by severance and other land uses characteristic of Ottawa's countryside, in areas designated as General Rural Area, Rural Natural Features and Greenbelt Rural in the Official Plan…"

The subject property is bound by Thunder Road to the north, treed areas to the south and west, and Boundary Road to the east. With the exception of two residences at Boundary Road and a residential dwelling on Thunder Road, the subject property is primarily vacant. **Figure 1** contains the Site Location Plan.

1.3 Development Proposal

Per the Conceptual Site Plan prepared by Ware Malcomb dated July 21, 2021 (see **Appendix A**), the development proposes 5 industrial buildings with a total Gross Floor Area (GFA) of 41,625 sq. m (400,004 sq. ft). This current proposal is a reduction from the original site plan with a 58,771 sq. m GFA used for the previous submission.

- Industrial Buildings A,B,C and D consists of a combined 37,165 sq. m of GFA, 288 auto parking spaces and two full-moves accesses to Thunder Road. The previous site plan had a single building with 55,799 sq. m of GFA.
- Industrial Building E: consists of 4,460 sq. m of GFA, 36 auto parking spaces and a full-moves access to Boundary Road opposite the South Amazon access.

Industrial Building 2 is outside of this site plan; however, the building was maintained as part of analysis herein as done in the original study. The site consists of 3,850.8 sq. m of GFA, 33 auto parking spaces and a separate full-moves access to Thunder Road.

The development is expected to be built-out and occupied within a five-year horizon (i.e., 2025).

2.0 Screening

The City's TIA Guidelines contain a screening form that must be reviewed and completed to determine if a TIA is required for the proposed development. There are three triggers as part of the screening analysis: trip generation trigger, location trigger and safety trigger.

The **trip generation trigger** is satisfied as the proposed industrial development exceeds the 5,000 sq. m threshold.

The **location trigger** is not satisfied as the subject property is not located in a Design Priority Area (DPA), Transit-Oriented Development (TOD) zone, nor fronting a roadway that is part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks.

The **safety trigger** is satisfied as the posted speed limit on Boundary Road is 80 km/h and three of the proposed site accesses are within 300 metres of the signalized intersection of Thunder Road and Boundary Road. Additionally, City staff identified concerns per the pre-application notes dated December 23, 2019, regarding the location of the proposed site accesses to Thunder Road particularly near the horizontal curve.

Therefore, a TIA is required to support the proposed development leading into the next step of scoping the work. The completed screening form is included as **Appendix B.**

3.0 Scoping

3.1 Existing Conditions

3.1.1. Roadways

The boundary road network is described in **Table 3-1.**

Table 3-1: Boundary Road Network – Roadways

Feature	Roadway				
	Highway 417	**Thunder Road**	**Boundary Road**	**Mitch Owens Road**	**Amazon Way**
Direction	Two-way (East-West)	Two-way (East-West)	Two-way (North-South)	Two-way (East-West)	Two-way (East-West)
Jurisdiction	MTO	Ottawa	Ottawa	Ottawa	Private
Classification	Highway	Collector	Arterial (Regional Road 41)	Arterial (Regional Road 8)	Private Road
Speed Limit	110 km/h posted [1] 40 km/h advised for ramps	60 km/h posted	80 km/h posted	80 km/h posted	15 km/h posted
Span	Highway 17 to Quebec	Ramsayville Road to Boundary Road	Russel Road to Craig Street	Regional Road 49 to Boundary Road	Boundary Road to within the site
Alignment in Study Area	Straight and Flat	45m radius curve west of Boundary Road, straight westerly Flat	Straight and Flat	Straight and Flat	Straight and Flat
Existing Developments in Study Area	None	Residential dwellings on south side, gas-station at southwest corner of intersection with Boundary Road	Distribution centre and other commercial uses, gas-station at southwest corner of intersection with Thunder Road	None	Distribution centre (Amazon)
Number of travel lanes	Four	Two	Two	Two	Two
Divided?	Yes	No	No	No	No
Intersection Control	Signal control at East Terminal and stop control at West Terminal	Signal control at Boundary Road	Signal control at Thunder Road and Amazon Way	Stop control at Boundary Road	Signal control at Boundary Road

Note 1: The posted speed limit of 110 km/h is a part of an MTO Pilot Project for 110 km/h speed limits within Ontario.

Figure 2 illustrates the existing boundary road network lane configurations and intersection control.

3.1.2. Intersections

Table 3-2 outlines the existing traffic control, configurations, and pedestrian crossing provisions at the intersections on the boundary road network.

Table 3-2: Boundary Road Network – Intersections

Intersection	Control	Approaches	Major Street	Lane Configurations	Pedestrian Crossing
Boundary Road and Highway 417 Westbound Terminal	Stop (Minor Street)	3	Boundary Road	NBTR SBLT WBLR	None
Boundary Road and Highway 417 Eastbound Terminal	Signal	3	Boundary Road	NBL NBT SBTR EBL EBR – channelized	South and West Approaches
Boundary Road and Thunder Road / Amazon Way	Signal	4	Boundary Road	SBL SBTR NBL NBT NBR WBTL WBR EBTLR	All Approaches
Boundary Road and South Amazon Access	Stop (Minor Street)	3	Boundary Road	NBTR SBL SBT WBLR	East Approach
Boundary Road and Mitch Owens Road	Stop (Minor Road)	3	Boundary Road	EBR EBL NBTL SBR SBT	None

The Amazon Facility Y0W1 has recently been constructed in the study area. A review of the supporting "Transportation Impact Study Addendum #1" prepared by Novatech (dated April 2018, herein referred to as the Novatech study) indicates that roadway improvements were recommended along Boundary Road at the Amazon site accesses, and the Highway 417 south ramp terminal. The intersection improvements were implemented in 2019 including auxiliary turn lanes at the intersections, as well as traffic signal control at the intersections of Boundary Road and Thunder Road / Amazon Access, and Boundary Road and Highway 417 south ramp terminal.

3.1.3. Adjacent Driveways

There are several existing driveways on the boundary road network within 200 metres of the proposed site accesses as described below:

- Four driveways to residential dwellings on the south side of Thunder Road, west of the proposed site access to Building 2;
- One driveway to a residential dwelling on the south side of Thunder Road, between the proposed site accesses to Buildings A, B, C, D and 2. This driveway will be removed as part of the development proposal;
- One driveway to a gas station on the south side of Thunder Road, at the southwest corner of Thunder Road and Boundary Road;
- One driveway to a gas station on the west side of Boundary Road, at the southwest corner of Thunder Road and Boundary Road;

- One driveway to a restaurant on the west side of Boundary Road, north of the proposed site access to Building E;
- Two driveways to residential dwellings on the west side of Boundary Road, south of the proposed site access to Building E (these dwelling units are within the development boundary and thus would be replaced by the development build-out);
- One driveway to a commercial use on the west side of Boundary Road, south of the proposed site access to Building E;
- One driveway to a residential dwelling on the east side of Boundary Road at the southeast corner of Thunder Road and Amazon Way;
- Two driveways to a commercial use on the east side of Boundary Road, north of the proposed site access to Building E;
- One driveway to the Amazon Facility on the east side of Boundary Road, opposite the proposed site access to Building E;
- Two driveways to commercial properties on the east side of Boundary Road, south of the proposed site access to Building E; and
- One driveway to a residential dwelling on the east side of Boundary Road, south of the proposed site access to Building E.

3.1.4. Existing Transit Services

OC Transpo operates one transit route within the study area. **Table 3-3** outlines the existing transit route, direction, days of operation, peak hour headways, and the location of bus stops in the study area.

Table 3-3: Existing Transit Services

Route	Direction	Span	Days of Operation	Peak Hour Headways (min)	Bus Stops in Study Area
Route 222 (OC Transpo)	West (AM Peak) East (PM Peak)	Rockdale Road to Blair Station	Monday to Friday (6:00AM - 9:00AM and 3:00PM – 6:00PM)	60	None (Bus stop 1.25 km north of site on Boundary Road at GreyHawk Golf Club

As outlined above, one bus route operates within the study area but does not actually service the immediate site frontage nor the nearby distribution centre. As there are no pedestrian facilities on Boundary Road between the site and the existing bus stop at GreyHawk Golf Club, there is a lack of convenient transit accessibility to and from the immediate study area. Additionally, the route only operates westbound (from Rockdale Road to Blair Station) during the weekday a.m. peak period and vice versa during the weekday p.m. peak period.

3.1.5. Existing Active Transportation Facilities

The existing active transportation facilities on the boundary road network are described in **Table 3-4**.

Table 3-4: Existing Active Transportation Network

Roadway	Pedestrian Facilities	Separation from Roadway	Cycling Facilities	Separation from Roadway
Highway 417	None	N/A	None	N/A
Thunder Road	None	N/A	None	N/A
Boundary Road	None	N/A	Paved Shoulders – Highway 417 Eastbound Terminal to South Amazon Access	None
Mitch Owens Road	None	N/A	None	N/A

As outlined above, the only existing pedestrian or cycling facilities in the study area are paved shoulders on Boundary Road between Highway 417 Eastbound Terminal to the South Amazon Access.

3.1.6. Area Traffic Management

There are no Area Traffic Management measures in the study area nor are there any Area Traffic Management studies in progress.

3.1.7. Existing Traffic Volumes

Commissioned traffic counts were provided by the proponent and collected during the weekday peak periods (6:00 a.m. – 10:00 a.m. and 3:00 p.m. – 7:00 p.m.) on January 7, 2020. The existing traffic volumes are illustrated in **Figure 3** and the traffic count data is included as **Appendix C.**

The recorded volumes on the boundary road network were auto traffic including heavy trucks. No pedestrian volumes were observed during the weekday a.m. and p.m. count periods.

3.1.8. Collision History

Historical collision data was provided by the proponent from January 1, 2014, to December 31, 2018. A collision analysis was conducted to identify any existing collision trends in the area, with the critical threshold per the City's guidelines being more than six collisions within a five-year time frame for any collision type. The collision data is included as **Appendix D**.

Table 3-5 outlines the collision frequency by type, severity, and weather conditions in the area.

Table 3-5: Collision History

Intersection	Collision Type	Severity	Weather Conditions
Boundary Road and Highway 417 Westbound Ramp Terminal	Angle – 2 Rear-End – 5 Sideswipe – 1 Single Manned Vehicle (SMV)/Other – 1 **Total - 9**	Fatal – 1 Property Damage (PD) Only - 8	Rain – 1 Clear - 8
Boundary Road and Highway 417 Eastbound Ramp Terminal	Rear-End – 3 SMV/Other – 1 **Total - 4**	Injury – 1 PD Only - 3	Rain – 2 Clear – 2
Boundary Road and Thunder Road	Turning Movement – 2 **Total - 2**	PD Only - 2	Snow – 1 Clear – 1
Boundary Road and Mitch Owens Road	Angle – 7 Rear-End – 3 SMV/Other – 8 **Total - 18**	Injury – 3 PD Only – 15	Rain – 1 Snow – 2 Fog – 3 Clear - 12

As outlined above, the only collision patterns in the area that exceeds the City's threshold of six collisions within five years are angle collisions and SMV / other collisions at the intersection of Boundary Road and Mitch Owens Road, with seven and eight collisions (respectively) in the five-year time period.

Therefore, the TIA will include a safety analysis of the intersection of Boundary Road and Mitch Owens Road to identify existing conditions at the intersection and opportunities to address the pattern of angle collisions and SMV / other collisions, particularly under future conditions with the inclusion of development generated traffic.

3.2 Future Planned Conditions

3.2.1. Roadway Improvements

No future roadway capacity improvements nor alternative transportation infrastructure plans have been identified on Thunder Road nor Boundary Road in the study area per the City's Transportation Master Plan (2013). Further, several roadway improvements have recently been implemented on Boundary Road to support the Amazon Facility build-out.

However, the City is currently updating their Transportation Master Plan which may include improvements to Thunder Road or Boundary Road. The City can confirm if any future improvements are planned in the study area.

3.2.2. Background Developments

A review of the City's development applications map indicates a background development located on the properties at 5471-5613 Boundary Road and 5508-5800 Frontier Road. The development application is for Site Plan Control and is for a future waste management facility for the Capital Region Resource Recovery Centre (CRRRC). Thus, this development will be accounted for in the TIA. In the absence of current anticipated development build-out timing, build-out of the development will be accounted for under all future horizon years.

Additionally, as requested by the City and MTO, the background development located at 5494, 5500

& 5510 Boundary Road was included in our analysis. Per the TIA dated April 2021 (prepared by Novatech), the background development proposes a freight dock and warehouse facility of approximately 5,593 m^2 and 120 employees. The TIA was in support of an Official Plan Amendment and Zoning By-Law Amendment applications with an anticipated buildout year of 2021. As such, the development is accounted for within the TIA under all future horizon years.

3.3 Study Area

The study area for the TIA will consist of the following study intersections:

- Highway 417 and Westbound Terminal
- Highway 417 and Eastbound Terminal
- Thunder Road and Boundary Road / Amazon Way
- Boundary Road and South Amazon Access / future site access
- Boundary Road and Mitch Owens Road

3.4 Time Periods

The employment nature of the proposed development will result in additional traffic on the boundary road network during the critical weekday commuter peak hours. Per typical TIS practice for employment developments, the TIA will analyze the weekday a.m. and p.m. peak periods.

3.5 Horizon Years

Per the City's guidelines, the year of full build-out and the five-year horizon must be analyzed. However, the MTO requires analysis of the year of full build-out, the five-year horizon and ten-year horizon. It can reasonably be assumed that the development will be built-out by 2025. Therefore, the TIA will analyze the 2025, 2030 and 2035 horizon years.

3.6 Exemptions Review

This section reviews possible exemptions in the scope of work elements of the TIA study per the City's guidelines. **Table 3-6** summarizes the City's possible exemptions and the developments status in meeting the exemption.

Table 3-6: Possible Exemptions

Module	Element	Exemption Condition	Development Status
Design Review Component			
Development Design	Circulation and Access	Only required for Site Plans	Not exempt
	New Street Networks	**Only required for Plans of Subdivision**	**Exempt**
Parking	Parking Supply	Only required for Site Plans	Not exempt
	Spillover Parking	**Only required for Site Plans where parking supply is 15% below unconstrained demand**	**Exempt**
Transportation Demand Management	All elements	Not required for Site Plans expected to have fewer than 60 employees and/or students on location at any given time	Not exempt
Neighbourhood Traffic Management	**Adjacent Neighbourhoods**	**Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds**	**Exempt**
Network Concept	---	Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning	Not exempt

Therefore, the TIA will contain analysis of circulation and access, parking supply and demand, Transportation Demand management, and Network Concept (changes to Transportation Master Plan concepts for auto and transit use).

4.0 Forecasting

4.1 Trip Generation Forecasts

Trip generation for the proposed development was forecasted using the latest published data from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. The ITE Trip Generation Manual is a compendium of industry collected trip generation data across North America for a variety of land uses and is used industry wide as a source for trip generation forecasts.

4.1.1. Auto Trip Generation

The trip generation rates for Land Use Category (LUC) 150 "Warehousing" were applied to the proposed industrial buildings to forecast auto trips generated by the buildings. The fitted curve equation was applied to the proposed building GFAs from which a trip generation rate (trips generated per 1,000 sq. ft) was reverse calculated to determine non-auto trip generation rates.

The total trip generation for the proposed industrial buildings was categorized into passenger cars and heavy truck traffic. Per the ITE Trip Generation Handbook (3rd Edition), Table I.1, approximately 20% of site traffic generated by LUC 150 "Warehousing" on a weekday is heavy truck traffic. Site traffic generated by similar land use LUC 130 "Industrial Park" consists of between 1-31% of heavy truck traffic during the weekday peak hours with an average of 13%, and site traffic generated by similar land use LUC 152 "High-Cube Warehouse/Distribution Centre" consists of between 9-29% of heavy truck traffic during the weekday peak hours. Therefore, an estimate of 20% for heavy truck traffic is considered

reasonable.

Table 4-1 outlines the auto trip generation for the proposed development.

Table 4-1: Auto Trip Generation

Building	GFA	Land use	Trips Generated – A.M. Peak			Trips Generated – P.M. Peak		
			In	Out	Total	In	Out	Total
Total Auto Trip Generation								
A, B, C, D	400,041 sq. ft	Industrial	**56** *(77%)*	**17** *(23%)*	**73** *(0.17)*	**20** *(27%)*	**56** *(73%)*	**76** *(0.17)*
2	41,449 sq. ft	Industrial	**23** *(77%)*	**7** *(23%)*	**30** *(0.72)*	**9** *(27%)*	**24** *(73%)*	**33** *(0.80)*
E	48,007 sq. ft	Industrial	**24** *(77%)*	**7** *(23%)*	**31** *(0.91)*	**9** *(27%)*	**25** *(73%)*	**34** *(1.00)*
DEVELOPMENT TOTAL:			**103**	**31**	**134**	**38**	**105**	**143**
Passenger Car Trip Generation (80%)								
A, B, C, D	400,041 sq. ft	Industrial	**45**	**14**	**59**	**16**	**45**	**61**
2	41,449 sq. ft	Industrial	**18**	**6**	**24**	**7**	**19**	**26**
E	48,007 sq. ft	Industrial	**19**	**6**	**25**	**7**	**20**	**27**
DEVELOPMENT TOTAL:			**82**	**26**	**108**	**30**	**84**	**114**
Heavy Truck Trip Generation (20%)								
A, B, C, D	400,041 sq. ft	Industrial	**11**	**3**	**14**	**4**	**11**	**15**
2	41,449 sq. ft	Industrial	**5**	**1**	**6**	**2**	**5**	**7**
E	48,007 sq. ft	Industrial	**5**	**1**	**6**	**2**	**5**	**7**
DEVELOPMENT TOTAL:			**21**	**5**	**26**	**8**	**21**	**29**

The full build-out of the proposed development is expected to generate approximately 108 and 114 total two-way passenger car trips during the weekday a.m. and p.m. peak hour, respectively, and approximately 26 and 29 total two-way heavy truck trips during the weekday a.m. and p.m. peak hour, respectively.

Given that the proposed development is solely industrial use, no trip synergy is expected between the buildings and no pass-by trips are expected to be generated by the development. Therefore, no internal trip synergy reductions or pass-by trip reductions were applied.

4.1.2. Non-Auto Trip Generation

The City's TIA Guidelines provide methodology for forecasting non-auto trips using the ITE Trip Generation Rates, as follows:

- Assume a 10% non-auto mode share for trips generated by the proposed development for low-density areas with low transit mode shares; and
- Assume an average vehicle occupancy of 1.15 for the purposes of translating auto trips to person trips.

The methodology outlined above equates to a factor of 1.28 to be applied to the ITE auto trip rates outlined in **Table 1** to forecast person trips. **Table 4-2** outlines the non-auto trip generation for the proposed development.

Table 4-2: Non-Auto Trip Generation

Building	GFA	Land use	Trips Generated – A.M. Peak			Trips Generated – P.M. Peak		
			In	Out	Total	In	Out	Total
Total Person Trip Generation								
A, B, C, D	400,041 sq. ft	Industrial	**72** *(77%)*	**22** *(23%)*	**94** *(0.21)*	**26** *(27%)*	**72** *(73%)*	**98** *(0.21)*
2	41,449 sq. ft	Industrial	**29** *(77%)*	**9** *(23%)*	**38** *(0.93)*	**11** *(27%)*	**31** *(73%)*	**42** *(1.02)*
E	48,007 sq. ft	Industrial	**31** *(77%)*	**9** *(23%)*	**40** *(1.16)*	**12** *(27%)*	**32** *(73%)*	**44** *(1.28)*
DEVELOPMENT TOTAL:			**132**	**40**	**172**	**49**	**135**	**184**
Non-Auto Trip Generation (10%)								
A, B, C, D	400,041 sq. ft	Industrial	**7**	**2**	**9**	**3**	**7**	**10**
2	41,449 sq. ft	Industrial	**3**	**1**	**4**	**1**	**3**	**4**
E	48,007 sq. ft	Industrial	**3**	**1**	**4**	**1**	**3**	**4**
DEVELOPMENT TOTAL:			**13**	**4**	**17**	**5**	**13**	**18**

The full build-out of the proposed development is expected to generate approximately 172 and 184 total person trips during the weekday a.m. and p.m. peak hour, respectively, and approximately 17 and 18 total non-auto trips during the weekday a.m. and p.m. peak hour, respectively.

4.2 Mode Shares

4.2.1. Existing Mode Shares

The National Capital Region (NCR) Origin-Destination survey was reviewed to identify existing mode shares in the study area for transit, walking, cycling, auto passengers and auto trips for the Traffic Assessment Zone (TAZ) that contains the proposed development.

The subject property is located in the Rural Southeast TAZ. Thus, the latest census data (2011) was analyzed for the Rural Southeast TAZ. Specifically, the mode shares for trips entering and exiting the Rural Southeast TAZ during the weekday a.m. and p.m. peak periods (6:30 a.m. – 9:00 a.m., and 3:30 p.m. – 6:00 p.m.) were analyzed and are outlined in **Table 4-3.**

Appendix E contains the NCR survey data.

Table 4-3: Existing Mode Share

Travel Mode	Weekday A.M. Peak Period		Weekday P.M. Peak Period		Average	Assumed Existing for Study Area
	Inbound	Outbound	Inbound	Outbound		
Auto Driver	69%	68%	73%	64%	69%	77%
Auto Passenger	9%	14%	18%	30%	18%	20%
Transit	0%	6%	5%	3%	3%	3%
Cycling	0%	0%	0%	0%	0%	0%
Walking	2%	0%	0%	0%	0%	0%
Other [1]	20%	12%	4%	3%	10%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Note 1: Per the NCR survey methodology, "other" refers to trips made by school bus, paratransit, taxi, motorcycle/scooter, intercity/chartered bus, ferry, rail transit or air.

As outlined above, the average auto mode share is approximately 87% and the average non-auto mode share is approximately 13%. It is noted that the mode share for "other" is significantly higher during the weekday a.m. peak hour compared to the weekday p.m. peak hour. This could be attributed to school bus activity during the morning school hours which overlap with the weekday a.m. commuter peak hours, whereas afternoon school hours do not typically overlap with weekday p.m. commuter peak hours.

It is further noted that the Rural Southeast TAZ consists of suburban areas such as Greely and Metcafe which may act as the origin or destination points for walking and other trips such as school bus and taxi. The subject lands are located in a rural area with no nearby suburban areas that would act as origin or destination points for walking trips and other trips made by school bus, ferry, rail, or air.

Therefore, the existing "other" mode share for the immediate study area would realistically be expected to be none or negligible at best. Thus, the mode share for auto driver and auto passenger would be expected to be higher than the average from the census data. The transit mode share assumption of 3% is also considered conservative as the nearest transit facility in the study area is the Route 222 (OC Transpo) bus stop at the GreyHawk Golf Club located 1.25 kilometres north of the subject property and there are no existing pedestrian facilities on Boundary Road in the area. Additionally, the route only operates westbound (from Rockdale Road to Blair Station) during the weekday a.m. peak period and vice versa during the weekday p.m. peak period, further limiting transit service availability for employees of the proposed future development.

Based on these assumptions, the existing non-auto mode share in the study area is only 3% which is less than the City's standard base assumption of 10% for low-density areas. This means that the person and non-auto trip generation forecasts outlined in **Table 4-2** may be overstated.

4.2.2. Future Mode Shares Targets

Future mode share targets have been established for the proposed development considering the context of the development proposal, the assumed horizon year of 2025 for build-out, planned future roadway capacity and alternative transportation infrastructure improvements in the study area, and non-auto trip generation opportunities of the proposed development.

Table 4-4 outlines the future mode share targets for the proposed development.

Table 4-4: Future Mode Share Targets

Travel Mode	Assumed Existing Mode Share for Study Area	Target Mode Share (2025)	Rationale
Auto Driver	77%	70% (-7%)	Potential to increase auto passenger and transit mode shares may result in reductions in single-occupant vehicle (SOV) trips
Auto Passenger	20%	27% (+7%)	Potential for development to promote carpooling (e.g., provide preferred carpool parking spaces) to reduce SOV trips
Transit	3%	3%	Nearest transit stop is 1.25 kilometres north of site with no pedestrian facilities on Boundary Road, and weekday peak hour transit services are limited to westbound only in a.m. peak hour and eastbound only in p.m. peak hour
Cycling	0%	0%	Rural area with no nearby origin/destination points for cycling or walking trips, no planned cycling or walking infrastructure improvements in the study area, warehouse distribution nature of development typically not associated with cycling or walking trips
Walking	0%	0%	
Total	**100%**	**100%**	**--**

As outlined above, a heavy reliance on auto travel is still expected in the future given the warehouse distribution nature of the proposed development, the rural context of the study area with no nearby origin or destination points for walking or cycling trips, and the absence of planned alternative transportation infrastructure improvements in the study area.

However, there are potential opportunities for the proposed development to reduce single-occupant vehicle (SOV) trips by promoting carpooling (e.g., provide preferred carpool parking spaces and incentives for employees to travel together), thus reducing the SOV trips generated by the proposed development. Co-ordination with City staff should also occur to list the proposed future development on the City's ride-matching portal to increase and encourage carpooling opportunities for employees.

4.3 Trip Distribution and Assignment

4.3.1. Employee Trip Distribution

The employee trips generated by the proposed development will be distributed to the road network based on origin and destination data from the NCR survey (2011) for the Rural Southeast and Rural East TAZ, given that the subject property is adjacent to the Rural East TAZ. The percentage of trips from origin points outside of the study area entering the study area during the weekday a.m. peak hour were analyzed, and the following trip distribution was derived:

- 35% to and from the south via Boundary Road
- 5% to and from the south/west via Mitch Owens Road
- 20% to and from the north via Boundary Road
- 25% to and from the west via Highway 417
- 15% to and from the east via Highway 417

Appendix E contains the NCR survey data and **Appendix F** contains the trip distribution analysis based on percentage of trips from various origin points.

It is noted that this trip distribution is similar to the trip distribution that was applied to the "Transportation Impact Study Addendum #1" prepared by Novatech for the Amazon Warehouse and Distribution Facility (Y0W1) that was recently constructed in the study area. The study was prepared in April 2018 and is herein referred to as the Novatech study.

Employee trip distribution was derived in the Novatech study based on:

- origin and destination data provided by the proponent;
- origin and destination data from the NCR survey (2011) for the Rural Southeast and Rural East TAZ; and
- the population of surrounding communities per Statistics Canada.

The rationale listed above are accepted justification for trip distribution assumptions per the City's TIA Guidelines. Additionally, the 2011 NCR survey data used in the Novatech study still reflects the latest NCR survey data that is currently available.

The assumed trip distribution for employees in the Novatech study is as follows:

- 30% to and from the south via Boundary Road
- 5% to and from the south/west via Mitch Owens Road
- 20% to and from the north via Boundary Road
- 25% to and from the west via Highway 417
- 20% to and from the east via Highway 417

The study was approved by the City in 2018 and the proposed development will operate similarly to this warehouse and distribution facility. Therefore, given the similar land use and the similar trip distributions, the employee trip distribution in the Novatech study will be applied to this TIA for consistency.

4.3.2. Heavy Truck Trip Distribution

The heavy truck trips generated by the proposed development will be distributed to the road network based on expected catchment areas for heavy trucks. The City of Ottawa and surrounding areas, as well as the Gatineau areas of Quebec are considered to be the major truck origin and destination points to the west, and the Montreal and surrounding areas are considered to be the major truck origin and destination point to the east. Therefore, a reasonable truck distribution is as follows:

- 60% to and from the west via Highway 417
- 40% to and from the east via Highway 417

Heavy truck trip distribution was derived in the Novatech study based on logical routing assumptions (given Ottawa to the west and Quebec to the east via Highway 417), as follows:

- 65% to and from the west via Highway 417
- 35% to and from the east via Highway 417

Given the similar land use and the similar assumed trip distributions, the heavy truck trip distribution in the Novatech study will be applied to this TIA for consistency.

4.3.3. Trip Assignment

Employee and truck trips generated by the proposed development will be assigned to the road network based on the trip distribution outlined in subsequent Sections. Trips are assumed to travel to and from their origin and destination points based on the most convenient route available and the route with the shortest travel time.

For Building 1, employees are expected to enter and exit the site via the easterly access to Thunder Road (located at the horizontal curve) and the proposed access to Boundary Road. Heavy trucks are expected to enter and exit the site via the westerly access to Thunder Road. The westerly access extends within the site as a drive aisle solely connecting to the truck loading area while employee parking connects solely to the drive aisle extending from the easterly access.

For Building 2, all employees and heavy trucks will enter and exit the site via the sole proposed access to Thunder Road.

For Building 3, all employees and heavy trucks are expected to enter the site via the proposed access to Boundary Road. Most employees and heavy trucks are expected to exit the site via the proposed easterly access to Thunder Road to turn left onto Boundary Road at the signalized intersection.

Figures 8 and 9 outline the employee and heavy truck trip assignment, respectively.

4.4 Background Network Travel Demands

4.4.1. Background Transportation Network Plans

No future roadway capacity improvements nor alternative transportation infrastructure plans have been identified on Thunder Road nor Boundary Road in the study area per the City's Transportation Master Plan (2013). Further, several roadway improvements have recently been implemented on Boundary Road to support the Amazon Facility build-out.

As mentioned in the Screening and Scoping Report, the City is currently updating their Transportation Master Plan which may include improvements to Thunder Road or Boundary Road. The City can confirm if any future improvements are planned in the study area. However, for the purposes of this study, no background roadway improvements are assumed to occur.

The Novatech study that was prepared for the Amazon Facility recommended that the City consider implementing traffic signal control and an auxiliary northbound left-turn lane at the intersection of Boundary Road and Mitch Owens Road. The study found that under 2017 existing conditions, traffic signals and an auxiliary left-turn lane were warranted at the intersection, and that under future total conditions, the forecasted operations at the intersection were poor and indicated the need for traffic signal control. While this improvement has not been implemented as have the Novatech recommended improvements on Boundary Road at Highway 417 Eastbound Ramp Terminal and at Thunder Road / Amazon Way, this TIA will consider this recommendation. Therefore, the TIA will analyze the intersection of Boundary Road and Mitch Owens Road with and without the recommended improvements to compare operations and validate the Novatech recommendation.

4.4.2. Background Growth

Historical growth rates were derived from Annual Average Daily Traffic (AADT) and Summer Average Daily Traffic (SADT) trends on Highway 417 at the Boundary Road Interchange. The latest AADT and SADT data available are for 2016; thus, growth rates from 2012 to 2016 were analyzed. **Appendix G** contains the growth rate analysis.

A compounded growth rate of 0.19% compounded annually was determined from the AADT for Highway 417 between 2012 and 2016, and a compounded growth rate of 0.66% compounded annually was determined from the SADT for Highway 417 between 2012 and 2016. These low growth rates indicate low traffic growth in the study area.

The Novatech study applied a conservative growth rate of 2% compounded annually to existing traffic volumes to forecast future background traffic volumes. This growth rate is exclusive of background development generated traffic in the study area. Additionally, the "Traffic Impact Study – Addendum 2" prepared by Taggart Group of Companies for the future Capital Region Resource Recovery Centre (CRRRC) in the study area also applied a growth rate of 2% compounded annually.

Therefore, given the calculated growth rates in the study area and the growth rate applied in background studies, the 2% growth rate compounded annually will be applied in this TIA for consistency.

4.4.3. Background Developments

As discussed in section 3.2.2, two background developments were considered in this TIA study. The background developments are the Capital Region Resource Recovery Centre (CRRRC)waste facility at 5471-5613 Boundary Road &5508-5800 Frontier Road; and the industrial warehouse development proposed at 5494, 5500, and 5510 Boundary Road.

Per Figure 3.1 from the "Traffic Impact Study – Addendum 2" prepared by Taggart Group of Companies for the CRRRC, the development is expected to add site traffic to the study intersections herein. The weekday peak hour volumes outlined in Figure 3.1 of the CRRC were added to the boundary road network under 2025, 2030 and 2035 future background conditions. **Appendix H.1** contains excerpts from the CRRRC TIS. **Figure 4.1** outlines the CRRC background site traffic.

Per Figure 3 of the 5494, 5500, and 5510 Boundary Road Transportation Impact Assessment (prepared by Novatech), the background development is expected to add traffic to the study intersections herein. The weekday peak hour volumes outlined in Figure 3 of the 5494, 5500, and 5510 Boundary Road TIA were added to the boundary road network under 2025, 2030, and 2035 future background conditions. **Appendix H.2** contains excerpts from the Novatech TIS. **Figure 4.2** outlines the background development site traffic.

4.5 Demand Rationalization

Preliminary capacity analysis was conducted for this forecasting report to determine if there are any locations or movements under future analysis scenarios where the forecasted demand exceeds capacity. Per the City's TIA guidelines, if the forecasted demand for a location or movement is expected to exceed capacity (i.e., volume-to-capacity ratio exceeding 1.00), then future travel demands must be rationalized to account for capacity limitations on the transportation network.

For the purposes of this analysis, the ultimate build-out scenario (2035 future total conditions) was analyzed. The analysis methodology follows the City's TIA guidelines for Synchro 9.2 inputs and modelling parameters and will be detailed in the TIA Strategy Report as part of the next step in the TIA process.

Figures 5, 6 and 7 outline the 2025, 2030 and 2035 future background traffic volumes, respectively, on the road network (with the growth rate outlined in Section 4.4.2 applied to the existing volumes plus the CRRC and Novatech background site traffic outlined in **Figures 4.1 and 4.2**). **Figures 10, 11 and 12** outline the 2025, 2030 and 2035 future total traffic volumes, respectively (with the site trip assignment outlined in **Figures 8 and 9** added to the future background traffic volumes).

Preliminary modelling of 2035 future total conditions indicates that the only movement expected to operate with a volume-to-capacity ratio exceeding 1.00 is the eastbound left-turn movement at Boundary Road and Mitch Owens Road during the weekday p.m. peak hour, with a ratio of 1.01. These operations are attributed to the reduced available capacity for the eastbound left-turn movement given the stop-controlled approach and the heavy through volumes on Boundary Road, as evidenced by the high forecasted average delay of 85 seconds.

However, these results are consistent with the findings of the Novatech study and as discussed earlier, the Novatech study recommended that the City implement traffic signal control and an auxiliary northbound left-turn lane at the intersection to improve traffic operations. If traffic signals are implemented, then the intersection is expected to operate with an average delay less than 20 seconds and a maximum volume-to-capacity ratio less than 0.80, thus resulting in no movements on the road network under 2035 future total conditions expected to exceed capacity.

Therefore, the TIA will analyze the intersection of Boundary Road and Mitch Owens Road with and without the recommended improvements to rationalize the future forecasted demand at the intersection.

5.0 Analysis

5.1 Development Design

5.1.1. Design for Sustainable Modes

As detailed in the Forecasting Report (March 2021), there is a heavy reliance on auto travel in the study area given the rural industrial nature of the area and the lack of existing dedicated pedestrian, cycling, and transit facilities. However, there are opportunities for the proposed development to promote non-auto mode of travel as detailed further in Section 5.5.

5.1.2. Circulation and Access

For Building 1, employees are expected to enter and exit the site via the easterly access to Thunder Road (located at the horizontal curve) and the proposed access to Boundary Road. Heavy trucks are expected to enter and exit the site via the westerly access to Thunder Road. The westerly access extends within the site as a drive aisle solely connecting to the truck loading area while employee parking connects solely to the drive aisle extending from the easterly access.

For Building 2, all employees and heavy trucks will enter and exit the site via the sole proposed access to Thunder Road.

For Building 3, all employees and heavy trucks are expected to enter the site via the proposed access to Boundary Road. Most employees and heavy trucks are expected to exit the site via the proposed easterly access to Thunder Road to turn left onto Boundary Road at the signalized intersection.

Vehicle turning analysis was conducted at the site accesses and within the sites for the most constrained vehicle profiles expected to navigate within the site. The purpose of this analysis is to determine if there are any expected vehicle maneuverability issues within the site.

Analysis was conducted for the following vehicle profiles:

- a passenger car (per TAC GDGCR standards) navigating the passenger car parking areas;
- a WB-20 tractor semi-trailer (per TAC GDGCR standards) navigating the heavy truck areas; and
- a pumper firetruck navigating around the industrial buildings.

Vehicle turning analysis indicates that there are generally no expected maneuverability constraints within the site. Internal site geometrics and details will be finalized at a later stage in the project.

Appendix I contains the vehicle turning diagrams for each vehicle profile.

5.2 Parking Analysis

The proposed parking supply for the industrial buildings is outlined in **Table 5-1.**

Table 5-1: Proposed Passenger Car Parking Supply

Building	GFA (sq. m)	Proposed Passenger Car Parking Supply
A	8,920	83 spaces + 2 accessible spaces
B	8,920	59 spaces + 2 accessible spaces
C	8,920	62 spaces + 2 accessible spaces
D	10,405	76 spaces + 2 accessible spaces
E	4,460	34 spaces + 2 accessible spaces
2	3,850	31 spaces + 2 accessible spaces

5.2.1. Auto Parking

The minimum parking requirements for warehouse land uses in Area D "Rural" per the City of Ottawa Zoning By-Law 2008-250 (consolidated) is:

- 0.8 spaces per 100 sq. m for the first 5,000 sq. m of GFA, and
- 0.4 spaces per 100 sq. m for GFA greater than 5,000 sq. m.

Table 5-2 outlines the minimum auto parking required for each building compared to the proposed supply for each building.

Table 5-2: City of Ottawa Zoning By-Law Minimum Auto Parking Requirements

Building	GFA (sq. m)	Zoning Land Use	Minimum Spaces Required	Proposed Supply	Surplus or Deficiency
A	8,920	Warehouse	56 spaces	85 spaces	+29
B	8,920	Warehouse	56 spaces	61 spaces	+5
C	8,920	Warehouse	56 spaces	64 spaces	+8
D	10,405	Warehouse	62 spaces	78 spaces	+16
E	4,460	Warehouse	36 spaces	36 spaces	0
2	3,850	Warehouse	31 spaces	33 spaces	+2

As outlined above, the proposed parking supply for each building exceeds or meets the minimum requirements per the City's Zoning By-Law. Therefore, the proposed auto parking supply is sufficient.

5.2.2. Bicycle Parking

The minimum bicycle parking requirements for the proposed warehouse development per the City's Zoning By-Law are calculated as: 1 space per 2,000 sq. m of GFA. **Table 5-3** outlines the minimum bicycle parking required for each building.

Table 5-3: City of Ottawa Zoning By-Law Minimum Bicycle Parking Requirements

Building	GFA (sq. m)	Zoning Land Use	Minimum Bicycle Parking Spaces Required
A	8,920	Warehouse	5
B	8,920	Warehouse	5
C	8,920	Warehouse	5
D	10,405	Warehouse	6
E	4,460	Warehouse	3
2	3,850	Warehouse	2

Bicycle parking spaces should be provided for each building in conformance with the City's Zoning By-law to encourage cycling as a viable mode of transportation to and from the site.

5.3 Boundary Streets

5.3.1. Multi-modal Level of Service

A multi-modal level of service (MMLOS) assessment was conducted for non-auto modes of transportation in the study area following the City's MMLOS guidelines. **Table 5-4** outlines the MMLOS for pedestrian, cycling, transit and truck modes.

Table 5-4: Boundary Street Multi-Modal Levels of Service

Intersection	Approach / Direction	Pedestrian LOS	Cycling LOS	Transit LOS	Truck LOS
Boundary Road between Highway 417 Eastbound Ramp Terminal	Northbound	F	F	E	C
	Southbound	F	F	E	C
Boundary Road and Thunder Road / Amazon Way	East Approach	C	F	N/A[2]	E
	West Approach	B	D	N/A[2]	E
	North Approach	E	F	N/A[2]	E
	South Approach	E	F	N/A[2]	E
Thunder Road west of Boundary Road	Eastbound	F	F	E	C
	Westbound	F	F	E	C
Boundary Road between Thunder Road and South Amazon Access	Northbound	F	F	E	C
	Southbound	F	F	E	C
Boundary Road and Thunder Road / South Amazon Access	East Approach	N/A[1]	D	N/A[2]	C
	West Approach	N/A[1]	N/A[3]	N/A[2]	N/A[3]
	North Approach	N/A[1]	D	N/A[2]	N/A[3]
	South Approach	N/A[1]	N/A[3]	N/A[2]	C
Boundary Road between South Amazon Access and Mitch Owens Road	Northbound	F	F	E	C
	Southbound	F	F	E	C

Note 1: Analysis not completed due to intersection constraints with unsignalized intersection while calculations require a signalized intersection per the City of Ottawa's "The Multimodal Level of Service (MMLOS) Guidelines".

Note 2: Transit Level of Service at intersections not required for Rural areas per City of Ottawa's "The Multimodal Level of Service (MMLOS) Guidelines".

Note 3: Leg of intersection required to complete analysis is not constructed (i.e., no leg for cyclists to turn left onto or from, or no leg for trucks to turn right onto or from).

The multi-modal level of service analysis results reflects the existing rural industrial nature of the area and the lack of existing dedicated pedestrian, cycling, and transit facilities on the road network. Additionally, no future multi-modal improvements are currently identified in the study area.

5.3.2. Road Safety Analysis

As identified in the Screening and Scoping Report, safety analysis was conducted for the intersection of Boundary Road and Mitch Owens Road to address the existing pattern of angle collisions and SMV / other collisions.

The dominant trend in the reported angle collisions is driver right-of-way conflicts with drivers turning left from the stop-controlled approach of Mitch Owens Road onto Boundary Road and colliding with northbound or southbound through traffic during clear weather and road surface conditions. There was no dominant trend in the reported SMV / other collisions, as they were observed to be relatively evenly distributed by direction, weather and road surface condition, time of day and driver action. These types of collisions are not uncommon on high-speed rural roadways.

A desktop review of the existing intersection indicates that the intersection is illuminated, the pavement markings and signage at the intersection appear to be in good condition, and there appears to be proper warning signs of the intersection at each intersection approach (stop ahead sign on Mitch Owens Road, and intersection ahead signs on Boundary Road). There is also a

checkerboard sign at the east leg of the intersection facing eastbound traffic approaching from Mitch Owens Road. The intersection also features an overhead flashing beacon (flashing amber on Boundary Road and flashing red on Mitch Owens Road) to further emphasize the three-legged intersection and provide caution to approaching drivers. These measures appear to have been in place since 2012 (per desktop historical imagery), suggesting that these reported collisions are more attributed to driver error and inclement weather conditions (e.g., snow and ice) as opposed to insufficient traffic control at the intersection.

However, as discussed in the Forecasting Report, the Novatech study recommended the implementation of traffic signals and an auxiliary northbound left-turn lane at the intersection of Boundary Road and Mitch Owens Road (warranted as a "background" improvement without the Amazon Facility build-out). If these improvements were to be implemented by the City (as recommended in this TIA), then the traffic signal control would evenly distribute right-of-way at the intersection and address the angle collision trend observed at the intersection. The traffic signal control implementation would "interrupt flow" on Boundary Road and thus force drivers to stop on the red indication, thus potentially addressing the SMV / other collisions occurring from drivers along Boundary Road. The implementation of the proper traffic control signage and pavement markings at the signalized intersection per OTM standards will further reduce the potential of SMV / other collisions occurring at the intersection.

5.4 Access Intersections Analysis and Design

5.4.1. Access Location

5.4.1.1 Adjacent Driveways

As detailed in the Screening & Scoping Report (March 2021), there are several existing driveways on the boundary road network within 200 metres of the proposed site accesses as described below:

- Four driveways to residential dwellings on the south side of Thunder Road, west of the proposed site access to Building 2;
- One driveway to a residential dwelling on the south side of Thunder Road, between the proposed site accesses to Buildings 1 and 2. This driveway will be removed as part of the development proposal;
- One driveway to a gas station on the south side of Thunder Road, at the southwest corner of Thunder Road and Boundary Road;
- One driveway to a gas station on the west side of Boundary Road, at the southwest corner of Thunder Road and Boundary Road;
- One driveway to a restaurant on the west side of Boundary Road, north of the proposed site access to Building 3;
- Two driveways to residential dwellings on the west side of Boundary Road, south of the proposed site access to Building 3 (these dwelling units are within the development boundary and thus would be replaced by the development build-out);
- One driveway to a commercial use on the west side of Boundary Road, south of the proposed site access to Building 3;
- One driveway to a residential dwelling on the east side of Boundary Road at the southeast corner of Thunder Road and Amazon Way;
- Two driveways to a commercial use on the east side of Boundary Road, north of the proposed site access to Building 3;
- One driveway to the Amazon Facility on the east side of Boundary Road, opposite the

proposed site access to Building 3;
- Two driveways to commercial properties on the east side of Boundary Road, south of the proposed site access to Building 3; and
- One driveway to a residential dwelling on the east side of Boundary Road, south of the proposed site access to Building 3.

The existing private driveways not located within the subject property limits are spaced more than 15 metres from the proposed Building 2 and 3 site accesses to Thunder Road and Boundary Road and spaced more than 60 metres from the proposed Building 1 site accesses to Thunder Road (per the City's Private Approach By-law No. 2003-477, Section 25.1.m.ii).

5.4.1.2 Number of Proposed Accesses

Per the City's Private Approach By-law No. 2003-477, Section 25.1.a., the maximum number of private approaches permitted to a property is:

- One two-way access with frontage less than 35 metres;
- Two two-way accesses with frontage between 35 – 150 metres; and
- An additional two-way access for every 90 metres of frontage exceeding 150 metres.

The property frontage to Building 1 along Thunder Road is approximately 300 metres; thus, technically permitting four two-way accesses to Thunder Road. The development proposes two two-way accesses to Thunder Road, thus satisfying the City's By-law.

The property frontage to Building 2 along Thunder Road is approximately 135 metres; thus, technically permitting two two-way accesses to Thunder Road. The development proposes one two-way access to Thunder Road, thus satisfying the City's By-law.

The property frontage to Building 3 along Boundary Road is approximately 85 metres; thus, technically permitting two two-way accesses to Boundary Road. The development proposes one two-way access to Boundary Road, thus satisfying the City's By-law.

5.4.1.3 Sight Distance Analysis

The available sightlines at the proposed accesses were assessed for conformance with the minimum sight distance requirements set out in the TAC GDGCR. The design speed of a collector roadway in a rural environment is typically 10-20 km/h greater than the posted speed limit. The posted speed limit on Thunder Road is 60 km/h.

However, the sharp horizontal curve on Thunder Road approaching Boundary Road currently has a curve advisory speed of 30 km/h which would lower design speeds as a result. Thus, a conservative design speed of 50 km/h was applied to Site Access C facing east.

There is another horizontal curve on Thunder Road west of the subject property which, while not as tight as the horizontal curve approaching Boundary Road, would reduce operating speeds along Thunder Road approaching the curve and within the straight segment between the two curves. Therefore, a design speed of 70 km/h was applied to the site accesses west of Site Access C.

A design speed of 100 km/h was assumed for Boundary Road given the 80 km/h posted speed limit. **Table 5-5** outlines the required sight distance at the site accesses.

Table 5-5: Sight Distance Requirements

Parameter	Thunder Road and Site Access A	Thunder Road and Site Access B	Thunder Road and Site Access C	Boundary Road and Site Access / South Amazon Access
Design Vehicle	WB-20 Tractor Semi-Trailer	WB-20 Tractor Semi-Trailer	WB-20 Tractor Semi-Trailer	WB-20 Tractor Semi-Trailer
Posted Speed Limit of Roadway	60 km/h	60 km/h	60 km/h	80 km/h
Assumed Design Speed	70 km/h	70 km/h	70 km/h facing west) 50 km/h (facing east)	100 km/h
Base Time Gap	11.5 s [1]	11.5 s [1]	11.5 s [1]	11.5 s [1]
Additional Time Gap	None	None	None	None
Vertical Alignment of Roadway	Relatively flat	Relatively flat	Relatively flat	Relatively flat
Horizontal Alignment of Roadway	Curves east and west of subject property	Curves east and west of subject property	Curves east and west of subject property	Straight
Sight Distance Required	225 m [2]	225 m [2]	225 m [2] (facing west) 160 m [2] (facing east)	320 m [2]
Sight Distance Available	>250 m (facing west) To Boundary Road / Thunder Road intersection (facing east)	>250 m (facing east and west)	>250 m ((facing east and west)	>350 m (facing north and south)

Note 1: Time gap for left-turning WB-20 trucks from a stop onto a two-lane highway with no median and with a grade less than 3%. Value from Table 9.9.3 in the GDGCR.
Note 2: Sight distance values calculated from Intersection Sight Distance equation 9.9.1 in the GDGCR.

The proposed site access locations satisfy minimum sight distance requirements, as demonstrated in the Sight Distance assessment drawings included in **Appendix O**. Further, the sight distance requirements herein are conservative as speed is expected to be lower than the design speed given the curvature on Thunder Road and the higher driver eye height of the design vehicle may further improve available sightlines.

5.4.2. Access Width

Per the City's Private Approach By-law No. 2003-477, the maximum width of a private approach cannot exceed 9.0 metres, but a higher width may be permitted for transport loading areas.

The proposed accesses to Thunder Road and Boundary Road range in width from 8.0 – 9.4 metres, thus exceeding 9.0 metres. However, these accesses will be utilized by heavy trucks to access the trucking areas for each building, thus justifying the excess width of 0.4 metres.

Access alignment and geometrics can be confirmed at a later stage in the project.

5.4.3. Traffic Control and Turn Lane Warrant Assessment

5.4.3.1 Signal Warrant Analysis

A signal warrant analysis was conducted for the proposed site accesses to Thunder Road and proposed site access to Boundary Road under the ultimate 2035 horizon year. The TAC signal warrant analysis was applied per the City's TIA Guidelines.

Given the rural nature of the study area and the higher speed limits, a "free flow" type was applied to this warrant. **Table 5-6** outlines the results of the signal warrant analysis.

Table 5-6: Signal Warrant Analysis Results

Location	Flow Type	Horizon Year	Number of lanes on major road	Traffic Signals Warranted?
Thunder Road and Site Access A	Free Flow	2035	Two	**No**
Thunder Road and Site Access B	Free Flow	2035	Two	**No**
Thunder Road and Site Access C	Free Flow	2035	Two	**No**
Boundary Road and South Amazon Access / Site Access	Free Flow	2035	Two	**No**
Boundary Road and Highway 417 Westbound Ramp	Free Flow	2035	Two	**No**

The results of the signal warrant analysis indicate that traffic signals are not warranted at the proposed site accesses to Thunder Road and proposed site access to Boundary Road opposite the South Amazon access. These results are attributed to the low forecasted minor-street volumes at the site accesses not triggering the minimum thresholds for traffic signal justification.

Appendix J contains the signal warrant sheets.

5.4.3.2 Left-Turn Lane Warrant Analysis

Auxiliary left-turn lane warrant analysis was conducted for the proposed site accesses to Thunder Road and proposed site access to Boundary Road under 2035 future total conditions. The analysis was conducted using the Ministry of Transportation (MTO)'s "Design Supplement for TAC Geometric Design Guide for Canadian Roads – April 2020."

Consistent with the sight distance analysis, a design speed of 70 km/h and 100 km/h was assumed for Thunder Road and Boundary Road, respectively. **Table 5-7** outlines the results of the left-turn lane warrant analysis.

Table 5-7: Left-Turn Lane Warrant Analysis Results

Location	Movement	Design Speed	Horizon Year	Number of lanes on major road	Left-Turn Lane Storage Requirement?
Thunder Road and Site Access A	Westbound left-turn movement	70 km/h	2035	Two	None
Thunder Road and Site Access B	Westbound left-turn movement	70 km/h	2035	Two	None
Thunder Road and Site Access C	Westbound left-turn movement	70 km/h	2035	Two	None
Boundary Road and South Amazon Access / Site Access	Northbound left-turn movement	100 km/h	2035	Two	None

The results of the left-turn lane analysis indicate that auxiliary westbound left-turn lanes are not required on Thunder Road at the site accesses given the low forecasted approaching and opposing volumes along Thunder Road.

An auxiliary northbound left-turn lane is also not warranted on Boundary Road at the site access opposite the South Amazon access given the low forecasted northbound left-turn volumes not triggering the minimum thresholds for the left-turn lane warrant. However, there is an existing runout lane and taper at the south approach from the existing southbound left-turn lane on Boundary Road entering the South Amazon access that could be repurposed to provide a northbound left-turn lane into the site access. Left-turn lanes should be provided on opposing approaches at an intersection even if a left-turn lane is only warranted or existing at one approach, as to maintain geometric alignment along the roadway through the intersection. **Appendix K** contains the left-turn lane warrant analysis worksheets.

Therefore, it is recommended that the existing runout lane at the south approach of Boundary Road and South Amazon Access / Site Access be repurposed to provide an auxiliary northbound left-turn lane with a minimum storage length of 15 metres for passenger cars (as heavy trucks are not expected to arrive from the south).

5.4.3.3 Right-Turn Lane Warrant Analysis

Auxiliary right-turn lane warrant analysis was conducted for the proposed site accesses to Thunder Road and proposed site access to Boundary Road under 2035 future total conditions. Per the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GFGCR), June 2017, a right-turn auxiliary lane on an urban or rural road should be implemented at unsignalized intersections when the volume of decelerating or accelerating vehicles compared with the through traffic volume causes undue hazard.

It is a common convention in traffic engineering that an auxiliary right-turn lane should be considered where the right-turn volume exceeds 60 vehicles per hour. Therefore, this threshold was applied to the proposed site accesses to gauge right-turn lane requirements.

Table5- 8 outlines the results of the right-turn lane warrant analysis.

Table 5-8: Right-Turn Lane Warrant Analysis Results

Location	Movement	Design Speed	Horizon Year	Forecasted Critical Right-Turn Volume [1]	Right-Turn Lane Storage Requirement?
Thunder Road and Site Access A	Eastbound right-turn movement	70 km/h	2035	0 veh/hr	None
Thunder Road and Site Access B	Eastbound right-turn movement	70 km/h	2035	0 veh/hr	None
Thunder Road and Site Access C	Eastbound right-turn movement	70 km/h	2035	0 veh/hr	None
Boundary Road and South Amazon Access / Site Access	Southbound right-turn movement	100 km/h	2035	17 veh/hr (13 passenger cars, 4 heavy trucks)	None

Note 1: Volumes forecasted for 2035 future total conditions.

The results of the right-turn lane analysis indicate that auxiliary right-turn lanes are not required at the proposed site accesses given the low forecasted right-turning volumes at the site accesses.

5.4.3.4 Access Operations

The traffic operations at the proposed site accesses are detailed in Section 5.7.7 of this report.

5.5 Transportation Demand Management (TDM) Analysis

As detailed in the Forecasting Report (March 2021), there is a heavy reliance on auto travel in the study area given the rural industrial nature of the area and the lack of existing dedicated pedestrian, cycling, and transit facilities. The existing auto modal split is assumed to be 97% and the non-auto modal split is assumed to be 3% (per the Forecasting Report).

A heavy reliance on auto travel is still expected in the future given the warehouse distribution nature of the proposed development, the rural context of the study area with no nearby origin or destination points for walking or cycling trips, and the absence of planned alternative transportation infrastructure improvements in the study area. Given the warehousing and distribution focus of the proposed development, employees would be required to physically work at the site during set hours, thus further restricting TDM opportunities such as flexible working hours and telework.

However, there are potential opportunities for the proposed development to reduce single-occupant vehicle (SOV) trips as described in this section.

5.5.1. Active Transportation

The development could encourage cycling to and from the proposed development via the provision of bicycle parking spaces in conformance with the City's Zoning By-Law requirements. Additionally, further cycling provisions such as secure bicycle parking, lockers and showers could be implemented to encourage employees to bike to and from work.

5.5.2. Carpooling

The development could promote carpooling by providing preferred carpool parking spaces and

incentives for employees to travel together. The provision of carpool parking spaces will encourage carpooling as an alternate mode of transportation with benefits such as cost savings, reduced environmental pollution, and reduced commuting stress. Encouraging carpooling would contribute to a reduction in SOV trips and a reduction in peak hour auto trip generation and peak auto parking demand on site.

Co-ordination with City staff should occur to list the proposed future development on the City's ride-matching portal to help employees find carpool partners and increase and encourage carpooling opportunities for employees.

An internal ride-matching service to employees could also be implemented to maximize carpooling opportunities for employees, as carpooling with coworkers may be more appealing to employees compared to carpooling with strangers.

5.5.3. Emergency Ride Home

The employer could set up an Emergency Ride Home program that guarantees non-driving commuters that they will be taken home immediately and in a convenient manner in the case of unplanned circumstances which require employees to get home immediately. This program would provide reimbursements to employees for taxi, carshare or rental car usage to facilitate this Emergency Ride Home incentive, which may encourage employees to carpool.

5.5.4. Promotion and Education

There are opportunities for the implementation of other "soft" TDM measures. For example, the employer could provide information on available TDM opportunities such as preferred carpool parking, ride-matching opportunities, and programs such as Emergency Ride Home to educate employees of alternate modes of transportation. This promoted awareness of TDM opportunities can encourage the use of alternate modes of transportation, reduce SOV trip to and from the site, and reduce peak parking demand at the site.

5.5.5. TDM Program Management

A TDM program could be established by the employer (tenant) to monitor the implementation and effectiveness of proposed TDM measures. This could include an internal or external program co-ordinator to oversee performance monitoring (e.g., in the form of employee feedback surveys or parking utilization surveys to determine if the TDM measures are effective in reducing auto demand), and to co-ordinate with the City on available TDM opportunities.

5.5.6. Summary of Potential TDM Measures

Table 5-9 outlines the recommended TDM measures to reduce single-occupant vehicle (SOV) trips.

Table 5-9: Summary of Potential TDM Measures and Implementation

Measure	Implementation
Bicycle Storage and Amenities	Full build-out (2025)
Preferential parking for Carpooling	Full build-out (2025)
Ride-Matching Service (co-ordination with City and/or internal service)	Full build-out (2025)
Emergency Ride Home	Full build-out (2025)
Promotion and Education	Full build-out (2025)
TDM Program Management	Full build-out (2025)

Appendix N highlights the TDM measures that may be applied to the proposed development to further capitalize on the existing and future TDM opportunities in the area.

5.6 Review of Network Concept

As detailed in the Forecasting Report and Screening & Scoping Reports, no future roadway capacity improvements nor alternative transportation infrastructure plans have been identified on Thunder Road nor Boundary Road in the study area per the City's Transportation Master Plan (2013) and proposed 2031 network concept. Further, several roadway improvements have recently been implemented on Boundary Road to support the Amazon Facility build-out.

The City is currently updating their Transportation Master Plan which may include improvements to Thunder Road or Boundary Road. The City can confirm if any future improvements are planned in the study area. However, for the purposes of this study, no background roadway improvements are assumed to occur.

However, forecasts of 2025, 2030 and 2035 future background traffic volumes indicate heavy through volumes along Boundary Road that exceed the typical capacity of 900 vehicles per hour per lane during the weekday a.m. and p.m. peak hours.

Table 5-10 outlines the forecasted 2030 future background traffic volumes on Boundary Road by direction and time period, in line with the horizon year for the network concept. Volumes exceeding 900 veh/hr are highlighted.

Table 5-10: 2030 Future Background – Boundary Road Through Volumes Forecasts

Segment	Weekday A.M. Peak Hour Volume (veh/hr)		Weekday P.M. Peak Hour Volume (veh/hr)	
	Northbound	Southbound	Northbound	Southbound
Boundary Road north of Highway 417 Westbound Ramp Terminal	139	197	160	160
Boundary Road between Highway 417 Westbound Ramp Terminal and Highway 417 Eastbound Ramp Terminal	1052	224	361	250
Boundary Road between Highway 417 Eastbound Ramp Terminal	1069	534	441	1037
Boundary Road between Thunder Road and South Amazon Access	1043	268	349	991
Boundary Road between South Amazon Access and Mitch Owens Road	1033	253	283	999
Boundary Road south of Mitch Owens Road	1094	168	205	977

These volumes suggest that Boundary Road is expected to operate beyond capacity during the weekday a.m. and p.m. peak hours from the Highway 417 Eastbound Ramp Terminal southerly in both directions, and that the northbound segment between the ramp terminals is expected to operate beyond capacity during the weekday a.m. peak hour.

Based on this network concept review, it is recommended that the City monitor future traffic growth and demand on Boundary Road (south of the Highway 417 Westbound Ramp Terminal) to identify any future potential network concept changes to accommodate the forecasted volumes from a capacity perspective (e.g., road widening to add additional through lanes).

5.7 Intersection Analysis and Design

The methodology outlined in the Screening & Scoping Reports, and Forecasting Reports was applied to this analysis to forecast future traffic volumes and analyze traffic operations on the road network to determine required improvements to the road network, if required.

5.7.1. Traffic Modelling

The boundary road network was modelled in Synchro 11.0 using January 2020 weekday a.m. and p.m. peak hour traffic data in the study area (outlined in **Figure 2**), existing signal timing plans obtained from the City in January 2021, existing roadway geometric conditions and per the Synchro modelling guidelines outlined in the City's TIA guidelines.

The synchro assessment of auto intersection operations is based on the "Highway Capacity Manual (HCM)" methodology. Intersections are assessed using a Level of Service (LOS) metric with ranges of delay assigned a letter from "A" to "F"; "A" representing low delays and "F" representing heavy delays. As required by the City of Ottawa, the LOS for signalized intersection were based on the intersection volume to capacity ratio as per the City of Ottawa Multi-Modal Levels of Service (MMLOS) Guidelines. The LOS of an unsignalized intersection is based on the worst average approach delay. The LOS definitions for signalized and unsignalized intersections are included in **Appendix L.** The 95th percentile queue lengths were derived from Synchro.

A critical volume-to-capacity threshold of 0.90 was applied to all movements (representing a target

LOS "D") on the road network to flag any movements nearing capacity, except for the off-ramp movements at the ramp terminals for which a threshold of 0.75 was applied per the MTO's TIS guidelines.

5.7.2. Existing Auto Operations

The existing auto intersection operations at the study intersections were analyzed using the existing traffic volumes illustrated in **Figure 3.** Detailed capacity analysis worksheets are included in **Appendix M**.

Table 5-11 outlines the 2020 existing traffic operations.

Table 5-11: 2020 Existing Traffic Operations

Intersection	Control	Peak Hour	Intersection v/c Ratio	Level of Service	Control Delay	Critical v/c ratio	95th Percentile Queue Length > Storage Length
Boundary Road and Highway 417 Westbound Ramp Terminal	Stop (Minor)	A.M.	0.80	C	22.2s (WBLR)	0.39 (WBLR)	None
		P.M.	0.36	B	12.3s (WBLR)	0.09 (WBLR)	None
Boundary Road and Highway 417 Eastbound Ramp Terminal	Signal	A.M.	0.62	B	13.5 s	0.80 (NBT)	None
		P.M.	0.82	D	14.3 s	0.88 (EBR)	66.1 m > 25 m (EBR)
Boundary Road and Thunder Road/Amazon Way	Signal	A.M.	0.79	C	18.9 s	0.83 (NBT)	243.6m (NBT)
		P.M.	0.67	B	9.7 s	0.72 (SBTR)	None
Boundary Road and South Amazon Access	Stop (Minor)	A.M.	0.56	D	27.7s (WBLR)	0.05 (WBLR)	None
		P.M.	0.52	C	20.0s (WBLR)	0.07 (WBLR)	None
Boundary Road and Mitch Owens Road	Stop (Minor)	A.M.	0.68	E	45.1s (EBL)	0.47 (EBL)	None
		P.M.	0.65	E	38.6s (EBL)	0.55 (EBL)	None

Notes:
[1] Level of Service – The Level of Service (LOS) of a signalized intersection is based on the intersection volume to capacity ratio as per the City of Ottawa Multi-Modal Levels of Service (MMLOS) Guidelines. The LOS of an unsignalized intersection is based on the worst average approach delay.
[2] Critical V/C Ratio – illustrates the maximum and other lane volume to capacity ratios greater than 0.90.

The road network is currently operating at overall acceptable levels of service with minor control delays.

The Novatech study that was prepared for the Amazon Facility recommended that the City consider implementing traffic signal control and an auxiliary northbound left-turn lane at the intersection of Boundary Road and Mitch Owens Road. The study found that under 2017 existing conditions, traffic signals and an auxiliary left-turn lane were warranted at the intersection, and that under future total conditions, the forecasted operations at the intersection were poor and indicated the need for traffic

signal control. While this improvement has not been implemented as have the Novatech recommended improvements on Boundary Road at Highway 417 Eastbound Ramp Terminal and at Thunder Road / Amazon Way, this improvement has been accounted for under future background and future total conditions in this analysis and is found to significantly improve traffic operations.

No movements on the existing road network are operating over capacity, albeit the eastbound right-turn movement at the Highway 417 Eastbound Ramp Terminal (which currently experiences a peak hour volume of 631 vehicles per hour during the weekday p.m. peak period). The existing traffic operations on the road network are acceptable.

5.7.3. Future Background Volumes Forecasting

As detailed in the Forecasting Report, growth rate of 2% compounded annually has been applied to all movements on the road network (as consistent with background studies in the area) to forecast 2025, 2030 and 2035 future background traffic volumes. This analysis also accounts for background traffic generated by the future Capital Region Resource Recovery Centre (CRRC) waste management facility south of the Amazon Facility and from the proposed industrial development located at 5494, 5500 and 5510 Boundary Road.

Figure 4.1 and 4.2 outlines the CRRC and Novatech industrial background development's generated traffic. **Figures 5, 6 and 7** outline the 2025, 2030 and 2035 future background traffic volumes, respectively, on the road network (with the growth rate outlined in Section 4.4.2 applied to the existing volumes plus the CRRC and Novatech industrial background site traffic outlined in **Figures 4.1 and 4.2**).

5.7.4. Future Background Auto Operations

The future background auto intersection operations at the study intersections were analyzed using the 2025, 2030 and 2035 future background traffic volumes illustrated in **Figures 5, 6 and 7,** respectively, and optimized signal timings. Detailed capacity analysis worksheets are included in **Appendix M**.

It is noted that the existing cycle length at the intersection of Boundary Road and Highway 417 Eastbound Ramp Terminal is 80 seconds, which is typically reflective of low-medium volume intersections and not typically reflective of high-volume arterial intersections. Additionally, the existing cycle length at the intersection of Boundary Road and Thunder Road / Amazon Way is 100 seconds. For consistency with the existing cycle length at Boundary Road and Thunder Road / Amazon Way (which is ideal for corridor progression between signalized intersections), the Highway 417 Eastbound Ramp Terminal was modelled with a cycle length of 100 seconds under all future background and total scenarios.

The intersection of Boundary Road and Mitch Owens Road was analyzed under 2035 future background and total conditions under two scenarios: with the recommended Novatech improvements, and with the existing side-street stop control.

Tables 5-12, 5-13 and 5-14 outline the 2025, 2030 and 2035 future background traffic operations, respectively.

Table 5-12: 2025 Future Background Traffic Operations

Intersection	Control	Peak Hour	Intersection V/C Ratio	Level of Service	Control Delay	Critical v/c ratio	95th Percentile Queue Length > Storage Length
Boundary Road and Highway 417 Westbound Ramp Terminal	Stop (Minor)	A.M.	**0.93**	C	26.1s (WBLR)	0.50 (WBLR)	None
		P.M.	0.40	B	13.1 s (WBLR)	0.11 (WBLR)	None
Boundary Road and Highway 417 Eastbound Ramp Terminal	Signal	A.M.	0.69	B	14.5 s	0.83 (NBT)	None
		P.M.	0.88	D	19.8 s	0.92 (EBR)	84.2m > 25 m (EBR)
Boundary Road and Thunder Road/Amazon Way	Signal	A.M.	0.88	D	20.1 s	0.88 (NBT)	245.8m (NBT)
		P.M.	0.75	C	9.8 s	0.74 (SBTR)	None
Boundary Road and South Amazon Access	Stop (Minor)	A.M.	0.64	D	33.8s (WBLR)	0.07 (WBLR)	None
		P.M.	0.60	C	26.5s (WBLR)	0.10 (WBLR)	None
Boundary Road and Mitch Owens Road	Stop (Minor)	A.M.	0.78	E	47.5s (EBL)	0.49 (EBL)	None
		P.M.	0.72	E	39.8s (EBL)	0.57 (EBL)	None

Notes:
[1] Level of Service – The Level of Service (LOS) of a signalized intersection is based on the intersection volume to capacity ratio as per the City of Ottawa Multi-Modal Levels of Service (MMLOS) Guidelines. The LOS of an unsignalized intersection is based on the worst average approach delay.
[2] Critical V/C Ratio – illustrates the maximum and other lane volume to capacity ratios greater than 0.90.

Table 5-13: 2030 Future Background Traffic Operations

Intersection	Control	Peak Hour	Intersection V/C Ratio	Level of Service	Control Delay	Critical v/c ratio	95th Percentile Queue Length > Storage Length
Boundary Road and Highway 417 Westbound Ramp Terminal	Stop (Minor)	A.M.	**1.01**	D	35.6s (WBLR)	0.63 (WBLR)	None
		P.M.	0.42	B	13.8 s (WBLR)	0.12 (WBLR)	None
Boundary Road and Highway 417 Eastbound Ramp Terminal	Signal	A.M.	0.75	C	16.5 s	0.88 (NBT)	29.2m > 25m (EBR)
		P.M.	**0.94**	**E**	25.6 s	0.96 (EBR)	151.0 m > 25 m (EBR)
Boundary Road and Thunder Road/Amazon Way	Signal	A.M.	**0.94**	**E**	30.0 s	0.95 (NBT)	286.9m (NBT)
		P.M.	0.81	D	10.4 s	0.78 (SBTR)	None
Boundary Road and South Amazon Access	Stop (Minor)	A.M.	0.69	D	39.2s (WBLR)	0.09 (WBLR)	None
		P.M.	0.65	D	35.5s (WBLR)	0.14 (WBLR)	None
Boundary Road and Mitch Owens Road	Stop (Minor)	A.M.	0.85	F	73.8s (EBL)	0.66 (EBL)	28.4m > 25m (EBL)
		P.M.	0.78	F	63.1s (EBL)	0.74 (EBL)	38.1m > 25m (EBL)

Notes:
[1] Level of Service – The Level of Service (LOS) of a signalized intersection is based on the intersection volume to capacity ratio as per the City of Ottawa Multi-Modal Levels of Service (MMLOS) Guidelines. The LOS of an unsignalized intersection is based on the worst average approach delay.
[2] Critical V/C Ratio – illustrates the maximum and other lane volume to capacity ratios greater than 0.90.

Table 5-14: 2035 Future Background Traffic Operations

Intersection	Control	Peak Hour	Intersection V/C Ratio	Level of Service	Control Delay	Critical v/c ratio	95th Percentile Queue Length > Storage Length
Boundary Road and Highway 417 Westbound Ramp Terminal	Stop (Minor)	A.M.	**1.10**	**F**	47.5s (WBLR)	0.79 (WBLR)	None
		P.M.	0.46	B	14.7 s (WBLR)	0.15 (WBLR)	None
Boundary Road and Highway 417 Eastbound Ramp Terminal	Signal	A.M.	0.81	D	20.1 s	0.93 (NBT) 0.77 (EBR)	32.0m > 25m (EBR)
		P.M.	**0.99**	**E**	36.0 s	1.02 (EBR)	195.8m > 25m (EBR)
Boundary Road and Thunder Road/Amazon Way	Signal	A.M.	**1.02**	**F**	48.7 s	1.05 (NBT) 0.97 (SBL)	332.7m (NBT)
		P.M.	0.88	D	12.6 s	0.83 (SBTR)	284.0m (SBTR)
Boundary Road and South Amazon Access	Stop (Minor)	A.M.	0.75	E	49.8s (WBLR)	0.12 (WBLR)	None
		P.M.	0.71	F	208.7s (WBLR)	0.62 (WBLR)	None
Boundary Road and Mitch Owens Road	Stop (Minor)	A.M.	**0.92**	**F**	138.6s (EBL)	0.91 (EBL)	43.5m > 25m (EBL)
		P.M.	0.85	F	122.8s (EBL)	0.98 (EBL)	59.3m > 25m (EBL)
	Signal	A.M.	0.81	D	13.9s	0.80 (NBT)	33.5m > 25m (EBL)
		P.M.	0.82	D	18.0 s	0.85 (SBT)	50.8m > 25m (EBL)

Notes:
[1] Level of Service – The Level of Service (LOS) of a signalized intersection is based on the intersection volume to capacity ratio as per the City of Ottawa Multi-Modal Levels of Service (MMLOS) Guidelines. The LOS of an unsignalized intersection is based on the worst average approach delay.
[2] Critical V/C Ratio – illustrates the maximum and other lane volume to capacity ratios greater than 0.90.

The intersections of Boundary Road and Highway 417 Westbound Ramp Terminal, Boundary Road and Thunder Road / Amazon Way, and Boundary Road and South Amazon Access are expected to operate near or at capacity under 2035 future background conditions. Several movements on the road network are expected to operate near capacity and with 95th percentile queue lengths exceeding available storage lengths. These results are mainly attributed to fifteen years of steady traffic growth in the study area, and heavy forecasted volumes on Boundary Road exceeding typical arterial roadway capacity.

Network concept changes such as identifying improvements to Boundary Road (e.g., road widening) would be expected to significantly improve traffic operations on the road network and increase capacity for individual movements. Additionally, the implementation of the recommended Novatech improvements at the intersection of Boundary Road and Mitch Owens Road is expected to improve the LOS from "F" to "B."

5.7.5. Target Auto Operations

Given the subject site's classification as a "General Rural Area" and surrounding are east oof Boundary Road classified as "Employment Area" per the City's Official Plan; the target auto LOS for the study intersections is a LOS "D" per Exhibit 22 of the MMLOS guidelines (see **Appendix L** for MMLOS excerpts). As presented in Tables 5-12 to 5-14, a couple improvements listed below may be required in future to maintain the required target LOS "D".

- Boundary Road and Highway 417 Westbound Ramp Terminal: As presented in Table 5-6, signals are not warranted and delays to the minor westbound are typical of a high left turn volume minor approach. However, signals may be considered in future if safety issues exist.
- Boundary Road intersections with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way: Signal optimization may be required in the future to maintain the target LOS.
- Boundary Road and Mitch Owens Road: Implementation of a traffic signal control and an auxiliary northbound left-turn lane as recommended by the Novatech study is expected to meet target LOS in future.
- As presented in Table 5-6, signals are not warranted at Boundary Road and South Amazon Access under all study horizons. The intersection should however be monitored in future to ensure no safety issues by the delays to the minor street traffic.
- Boundary Road and Highway 417 Eastbound Ramp Terminal: The EBR movement is expected to experience v/c ratios greater than 0.75, largely due to limited capacity for the yield EBR movement created by through traffic on Boundary Road. The MTO and City may consider optimizing the existing signal timing plan in future to create more capacity for the yield controlled EBR movement.
- The southbound traffic queues on Boundary Road at the Thunder Road intersection are forecast to occasionally extend beyond the Highway 417 Ramp in the 2035 horizon during the p.m. peak hours. However, this is a future background condition and not attributable to the proposed development. This issue is a long-term forecast and should be monitored by the City and reviewed as part of the City's ongoing Transportation Master Plan Update.

It is recommended the City and the MTO monitor traffic volumes at the subject intersections in future to confirm if the noted improvements are optimal.

5.7.6. Site Traffic

As presented in Table 4-2 herein, the full build-out of the proposed development (including site 2) is expected to generate approximately 172 and 184 total person trips during the weekday a.m. and p.m. peak hours, respectively, of which approximately 17 and 18 total non-auto trips during the weekday a.m. and p.m. peak hours, respectively. The current trip forecast is a reduction compared to the previous submission's total of 199 and 211 total person trips.

Employee trips generated by the proposed development were distributed to the road network based on origin-destination data from the National Capital Region (NCR) survey (2011) and the population of surrounding communities per Statistics Canada. Heavy truck trips generated by the proposed development were distributed to the road network based on expected catchment areas and logical routing assumptions for heavy trucks.

Figures 8 and 9 outline the employee and heavy truck trip assignment, respectively.

5.7.7. Basis of Future Total Assessment

The site generated traffic volumes illustrated in **Figures 8 and 9** were added to the 2025, 2030 and 2035 future background traffic volumes in . **Figures 5, 6 and 7**, respectively, to determine the 2025, 2030 and 2035 future total traffic volumes. **Figures 10, 11 and 12** outline the 2025, 2030 and 2035 future total traffic volumes, respectively.

5.7.8. Future Total Auto Operations

The future total auto intersection operations at the study intersections were analyzed using the 2025, 2030 and 2035 future total traffic volumes illustrated in **Figures 10, 11 and 12,** respectively, and optimized signal timings. Detailed capacity analysis worksheets are included in **Appendix M**.

Given that a significant portion of site traffic entering and exiting the site accesses is heavy truck traffic, heavy truck percentages were calculated and modelled for all movements on the road network to reflect the increase in heavy truck percentages under future total conditions.

Tables 5-15, 5-16 and 5-17 outline the 2025, 2030 and 2035 future total traffic operations, respectively.

Table 5-15: 2025 Future Total Traffic Operations

Intersection	Control	Peak Hour	Intersection V/C Ratio	Level of Service	Control Delay	Critical v/c ratio	95th Percentile Queue Length > Storage Length
Boundary Road and Highway 417 Westbound Ramp Terminal	Stop (Minor)	A.M.	**0.97**	D	33.3s (WBLR)	0.62 (WBLR)	None
		P.M.	0.43	B	13.9s (WBLR)	0.13 (WBLR)	None
Boundary Road and Highway 417 Eastbound Ramp Terminal	Signal	A.M.	0.71	C	14.5 s	0.83 (NBT)	32.3m > 25 m (EBR)
		P.M.	0.90	D	22.0 s	0.94 (EBR)	122.7 m > 25 m (EBR)
Boundary Road and Thunder Road/Amazon Way	Signal	A.M.	0.90	D	22.6 s	0.90 (NBT)	261.7m(NBT)
		P.M.	0.82	D	18.1 s	0.88 (SBT)	None
Boundary Road and South Amazon Access / Site Access	Stop (Minor)	A.M.	0.65	E	44.6s (WBLR)	0.09 (WBLR)	None
		P.M.	0.62	D	38.0s (WBLTR)	0.14 (WBLTR)	None
Boundary Road and Mitch Owens Road	Stop (Minor)	A.M.	0.79	F	53.0s (EBL)	0.54 (EBL)	None
		P.M.	0.74	E	44.2s (EBL)	0.60 (EBL)	27.4m > 25m (EBL)
Site Access A and Thunder Road	Stop (Minor)	A.M.	0.25	A	8.7s (NBLR)	0.02 (NBLR)	None
		P.M.	0.22	A	9.2s (NBLR)	0.07 (NBLR)	None
Site Access B and Thunder Road	Stop (Minor)	A.M.	0.22	A	9.6s (NBLR)	0.01 (NBLR)	None
		P.M.	0.18	A	10.0s (NBLR)	0.04 (NBLR)	None
Site Access C and Thunder Road	Stop (Minor)	A.M.	0.22	A	8.7s (NBLR)	0.01 (NBLR)	None
		P.M.	0.21	A	9.0s (NBLR)	0.03 (NBLR)	None

Notes:
[1] Level of Service – The Level of Service (LOS) of a signalized intersection is based on the intersection volume to capacity ratio as per the City of Ottawa Multi-Modal Levels of Service (MMLOS) Guidelines. The LOS of an unsignalized intersection is based on the worst average approach delay.
[2] Critical V/C Ratio – illustrates the maximum and other lane volume to capacity ratios greater than 0.90.

Table 5-16: 2030 Future Total Traffic Operations

Intersection	Control	Peak Hour	Intersection V/C Ratio	Level of Service	Control Delay	Critical v/c ratio	95th Percentile Queue Length > Storage Length
Boundary Road and Highway 417 Westbound Ramp Terminal	Stop (Minor)	A.M.	**1.05**	E	49.5s (WBLR)	0.76 (WBLR)	None
		P.M.	0.46	B	14.7s (WBLR)	0.15 (WBLR)	None
Boundary Road and Highway 417 Eastbound Ramp Terminal	Signal	A.M.	0.76	C	17.2 s	0.89 (NBT) 0.77 (EBR)	35.3m > 25 m (EBR)
		P.M.	**0.94**	**E**	27.9 s	0.97 (EBR)	163.6 m > 25 m (EBR)
Boundary Road and Thunder Road/Amazon Way	Signal	A.M.	**0.97**	**E**	34.0 s	0.97 (NBT)	304.8m(NBT)
		P.M.	0.88	D	21.3 s	0.91 (SBT)	291.1m (SBT)
Boundary Road and South Amazon Access / Site Access	Stop (Minor)	A.M.	0.70	F	52.8s (WBLR)	0.12 (WBLR)	None
		P.M.	0.66	E	65.0s (WBLTR)	0.24 (WBLTR)	None
Boundary Road and Mitch Owens Road	Stop (Minor)	A.M.	0.87	F	85.3s (EBL)	0.72 (EBL)	32.3m > 25m (EBL)
		P.M.	0.80	F	72.4.s (EBL)	0.78 (EBL)	41.8m > 25m (EBL)
Site Access A and Thunder Road	Stop (Minor)	A.M.	0.25	A	8.7s (NBLR)	0.02 (NBLR)	None
		P.M.	0.26	A	9.2s (NBLR)	0.06 (NBLR)	None
Site Access B and Thunder Road	Stop (Minor)	A.M.	0.23	A	9.6s (NBLR)	0.01 (NBLR)	None
		P.M.	0.18	B	10.0s (NBLR)	0.02 (NBLR)	None
Site Access C and Thunder Road	Stop (Minor)	A.M.	0.22	A	8.7s (NBLR)	0.01 (NBLR)	None
		P.M.	0.21	A	9.0s (NBLR)	0.06 (NBLR)	None

Notes:
[1] Level of Service – The Level of Service (LOS) of a signalized intersection is based on the intersection volume to capacity ratio as per the City of Ottawa Multi-Modal Levels of Service (MMLOS) Guidelines. The LOS of an unsignalized intersection is based on the worst average approach delay.
[2] Critical V/C Ratio – illustrates the maximum and other lane volume to capacity ratios greater than 0.90.

Table 5-17: 2035 Future Total Traffic Operations

Intersection	Control	Peak Hour	Intersection V/C Ratio	Level of Service	Control Delay	Critical v/c ratio	95th Percentile Queue Length > Storage Length
Boundary Road and Highway 417 Westbound Ramp Terminal	Stop (Minor)	A.M.	**1.14**	F	88.3s (WBLR)	0.94 (WBLR)	None
		P.M.	0.49	B	15.8s (WBLR)	0.18 (WBLR)	None
Boundary Road and Highway 417 Eastbound Ramp Terminal	Signal	A.M.	0.82	D	20.7 s	0.94 (NBT) 0.80 (EBR)	42.6m > 25 m (EBR)
		P.M.	**1.00**	**E**	41.8 s	1.06 (EBR)	208.2 m > 25 m (EBR)
Boundary Road and Thunder Road/Amazon Way	Signal	A.M.	**1.03**	**F**	53.1 s	1.07 (NBT) 1.00 (SBL)	352.5 m (NBT)
		P.M.	**0.94**	**E**	29.2 s	0.95 (SBT)	337.6m (SBT)
Boundary Road and South Amazon Access / Site Access	Stop (Minor)	A.M.	0.76	F	71.9s (WBLR)	0.17 (WBLR)	None
		P.M.	0.72	F	387.0s (WBLTR)	0.92 (WBLTR)	None
Boundary Road and Mitch Owens Road	Stop (Minor)	A.M.	**0.94**	**F**	164.1s (EBL)	0.99 (EBL)	48.4m > 25m (EBL)
		P.M.	0.87	F	143.8.s (EBL)	1.04 (EBL)	64.1m > 25m (EBL)
	Signal	A.M.	0.81	D	14.6s	0.81 (NBT)	34.3m > 25m (EBL) 18.5m > 15m (NBL)
		P.M.	0.82	D	18.9s	0.87 (SBT)	51.1m > 25m (EBL)
Site Access A and Thunder Road	Stop (Minor)	A.M.	0.25	A	8.8s (NBLR)	0.04 (NBLR)	None
		P.M.	0.27	A	9.3s (NBLR)	0.06 (NBLR)	None
Site Access B and Thunder Road	Stop (Minor)	A.M.	0.23	A	9.7s (NBLR)	0.01 (NBLR)	None
		P.M.	0.18	B	10.1s (NBLR)	0.04 (NBLR)	None
Site Access C and Thunder Road	Stop (Minor)	A.M.	0.23	A	8.8s (NBLR)	0.01 (NBLR)	None
		P.M.	0.22	A	9.1s (NBLR)	0.03 (NBLR)	None

Notes:
[1] Level of Service – The Level of Service (LOS) of a signalized intersection is based on the intersection volume to capacity ratio as per the City of Ottawa Multi-Modal Levels of Service (MMLOS) Guidelines. The LOS of an unsignalized intersection is based on the worst average approach delay.
[2] Critical V/C Ratio – illustrates the maximum and other lane volume to capacity ratios greater than 0.90.

The intersections of Boundary Road and Highway 417 Westbound Ramp Terminal, Boundary Road and Thunder Road / Amazon Way, and Boundary Road and South Amazon Access / Site Access are expected to operate beyond capacity under 2035 future total conditions. Several movements on the road network are expected to operate near capacity and with 95th percentile queue lengths exceeding available storage lengths. These results are mainly attributed to fifteen years of steady

traffic growth in the study area, and heavy forecasted volumes on Boundary Road exceeding typical arterial roadway capacity and are overall consistent with 2035 future background conditions.

When intersections are operating near or beyond capacity under future background conditions, the addition of even a minor amount of site traffic to the intersection can exponentially increase control delays. Therefore, even with the forecasted 2035 future total operations, the addition of site traffic to the road network is not expected to significantly impact traffic operations.

Network concept changes such as identifying future background improvements to Boundary Road (e.g., road widening) would be expected to significantly improve traffic operations on the road network and increase capacity for individual movements. Additionally, the implementation of the recommended Novatech improvements at the intersection of Boundary Road and Mitch Owens Road is expected to improve the LOS from "F" to "D."

The proposed site accesses to Thunder Road are expected to operate at LOS "B" or better with minor control delays and no critical movements nor 95th percentile queue lengths.

As presented in Tables 5-15 to 5-17, improvements may be required in future to ensure the required target LOS "D" is met at some of the study intersections. However, these issues are future background related as noted in section 5.7.5, and it is recommended that the City and the MTO monitor traffic volumes at the subject intersections in future to confirm if the noted improvements under section 5.7.5 are optimal.

6.0 Conclusions and Recommendations

This Transportation Impact Assessment (TIA) has assessed the transportation impacts of the proposed industrial development at the Thunder Road and Boundary Road site in the City of Ottawa. The analysis contained within this report has resulted in the following key findings:

- The proposed industrial development is projected to generate a total of 134 and 143 two-way auto trips during the weekday a.m. and p.m. peak hours, respectively.

- Under 2020 existing traffic conditions, the study intersections are projected to operate at the Level of Services (LOS) below.

    - The stop-controlled Highway 417 Westbound Ramp Terminal at Boundary Road is operating below capacity at a LOS "C" or better during the a.m. and p.m. peak hours.

    - The signalized intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way are operating at a LOS "D" or better during the a.m. and p.m. peak hours.

    - The stop-controlled South Amazon Access at Boundary Road is operating below capacity at a LOS "D" or better during the a.m. and p.m. peak hours.

    - The stop-controlled Mitch Owens Road connection to Boundary Road is operating below capacity at a LOS "E" for the eastbound left turn during the a.m. and p.m. peak hours. All other movements at the intersection are at a LOS "A".

- Under the 2025, 2030 and 2035 future background conditions:
    - The stop-controlled Highway 417 Westbound Ramp Terminal at Boundary Road is forecast to operate at a LOS "F" during the a.m. peak hour of 2035 and LOS "E" or better under remaining study horizons. The intersection is forecast to operate at a LOS" B" or better during the p.m. peak hour.
    - The signalized intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way are both forecast to operate at a LOS "E" or better during the a.m. and p.m. peak hours. Both intersections are forecast to have at least one turning movement near or at capacity.
    - The stop-controlled South Amazon Access at Boundary Road is projected to operate at a LOS "E" and "F" during the a.m. and p.m. peak hours, respectively.
    - The stop-controlled Mitch Owens Road connection to Boundary Road is expected to operate at a LOS "F" during the a.m. and p.m. peak hours. However, similar to Novatech's recommendation, adding a northbound left turn lane (2025 horizon) and implementing traffic signals (2035 horizon) is expected to result in a forecasted LOS "D" and average traffic delays less than 18 seconds during the a.m. and p.m. peak hours.
- For the 2025, 2030 and 2035 total traffic conditions (includes site generated trips), the study intersections are projected to operate similarly to their respective future background conditions as follows:
    - The stop-controlled Highway 417 Westbound Ramp Terminal at Boundary Road is forecast to operate at a LOS "F" or better during the a.m. peak hour and a LOS "B" or better during the p.m. peak hour.
    - The signalized intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way are both forecast to operate at a LOS "E" or better during the a.m. and p.m. peak hours, similar to the future background conditions.
    - The stop-controlled Mitch Owens Road connection to Boundary Road is expected to operate at a LOS "F" during the a.m. and p.m. peak hours under the ultimate 2035 horizon. Similar to the future background conditions, adding the northbound left turn lane (2025 horizon) and implementing traffic signals (2035 horizon) is expected to result in a forecasted LOS "D" or better during the a.m. and p.m. peak hours.
    - The stop-controlled South Amazon Access at Boundary Road is projected to operate at a LOS "F" during the a.m. and p.m. peak hours under the ultimate 2035 horizon. This is a future background issue and is attributable to an increase in through volumes on Boundary Road and associated future delays to traffic from the Amazon access.
    - The proposed three stop-controlled site access connections to Thunder Road are projected to operate below capacity at a LOS "B" or better during the a.m. and p.m. peak hours, under all study horizons.

- A signal warrant assessment based on the ultimate 2035 traffic volumes indicates that traffic signals are not warranted at the intersections of Boundary Road and South Amazon Access / Site Access and Thunder Road with the proposed three Site Accesses. Additionally, no left or right turn auxiliary lanes are warranted on the major roads at the site access connections.

- The proposed site accesses are projected to operate efficiently and safely without any issues related to sight-lines, corner clearance, access conflicts, truck movements and transit operational conflicts. The vehicle parking supply of for each of the three buildings exceeds the City's Zoning By-Law minimum parking requirements.

- It is recommended that the following be considered to support the proposed development:

    - Though not warranted, consideration should be given to repurposing the existing runout lane at the south approach of the intersection of Boundary Road and Site Access / South Amazon Access to provide an auxiliary 15-metre northbound left-turn storage lane. The NBL lane addition along with a potential traffic signalization in the 2035 horizon is expected to improve the intersection performance in the long-term.

    - To support sustainable transportation, the owner may consider TDM measures such as provision of a good internal connection of pedestrian sidewalks and to municipal sidewalks where available, provision of bicycle parking/amenity, carpooling and liaise with the City to implement TDM promotion/ education programs. These TDM measures are expected to encourage employees and visitors to be less dependent on single occupant auto trips.

- Further, based on the future background traffic operations, we recommend that the City and MTO consider the following in future:

    - Similar to the Novatech's recommendation, we recommend adding a northbound left turn lane (in 2025 horizon) and implementing traffic signals (in 2035 horizon) at the intersection of Boundary Road and Mitch Owens Road.

    - Signals are not warranted at Boundary Road intersections with Highway 417 Westbound Ramp Terminal and the South Amazon Access; however, signals may be considered in future if the City and MTO identify safety issues from extended delays to the minor street.

    - Signal optimization to redistribute intersection capacity (effective green time) may be required in the future (i.e., 2030 onwards) to maintain the target LOS "D" at the intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way.

    - Boundary Road and Highway 417 Eastbound Ramp Terminal: The EBR movement is expected to experience v/c ratios greater than 0.75, largely due to limited capacity for the yield EBR movement created by through traffic on Boundary Road. The MTO and City may consider optimizing the existing signal timing plan in future to create more capacity for the yield controlled EBR movement.

    - The southbound traffic queues on Boundary Road at the Thunder Road intersection are forecast to occasionally extend beyond the Highway 417 Ramp in the 2035 horizon during the p.m. peak hours. However, this is a future background condition and not

attributable to the proposed development. This issue is a long-term forecast and should be monitored by the City and reviewed as part of the City's ongoing Transportation Master Plan Update.

- In addition to the City's existing road network volume monitoring program to assess capacity constrained zones, given the potential long term impact of the Covid-19 pandemic on home-work trips, the forecasted future volumes herein may be overstated, it is important to monitor intersection volumes in future to confirm if any roadway improvements and or traffic signal modifications are needed for optimal performance of the relevant surrounding intersections.

In conclusion, the traffic generated by the proposed industrial development at Thunder Road and Boundary Road can be accommodated by the boundary road network. The Official Plan Amendment (OPA), Zoning By-Law Amendment (ZBA) and Site Plan Approval (SPA) applications can be supported from a traffic operations perspective as the boundary road system is forecast to adequately accommodate the increase in traffic volumes attributable to the proposed development.

Minor changes to the site plan will not materially affect the conclusions contained within this Study. Should you have any questions or require further information, please contact the undersigned.

Respectfully submitted by,

C.F. CROZIER & ASSOCIATES INC.

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Alexander Fleming, MBA, P. Eng.
Associate

/sk/ah

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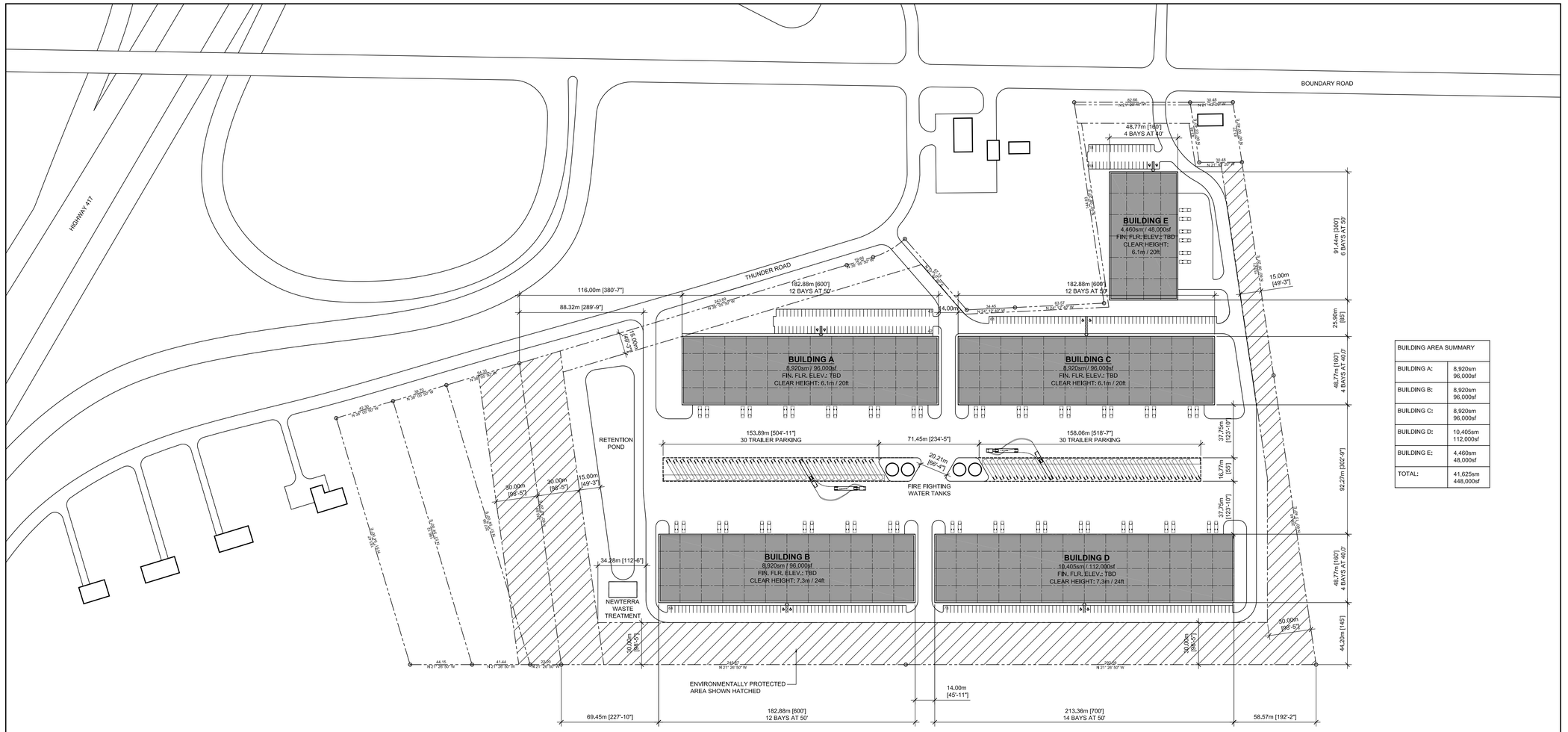
APPENDIX A

Conceptual Site Plan


BUILDING E
Area: 4,460 m²
Height: 6.1 m
BUILDING A
Area: 8,920 m²
Height: 6.1 m
BUILDING C
Area: 8,920 m²
Height: 6.1 m
WASTE TREATMENT
30m
SWM POND
WATERCOURSE
SITE 2
FIRE FIGHTING WATER TANKS
OPEN STORAGE
OPEN STORAGE
BUILDING B
Area: 8,920 m²
Height: 7.3 m
BUILDING D
Area: 10,405 m²
Height: 7.3 m
15m
30m
30m



BUILDING AREA SUMMARY	
BUILDING A:	8,920sm 96,000sf
BUILDING B:	8,920sm 96,000sf
BUILDING C:	8,920sm 96,000sf
BUILDING D:	10,405sm 112,000sf
BUILDING E:	4,460sm 48,000sf
TOTAL:	41,625sm 448,000sf

03 SITE PLAN - OPTION B2r8
SPA-01 SCALE: 1:1500

ZONING MECHANISM: ZONING BY-LAW 2008-250 CONSOLIDATION		REQUIRED	PROVIDED
ZONING: RG RURAL GENERAL INDUSTRIAL ZONE		LIGHT INDUSTRIAL LIMITED COMMERCIAL	LIGHT INDUSTRIAL USE WAREHOUSE (N95)
MINIMUM LOT AREA		0.4HA	15.35HA / 37.93 ACRES AREAS 1 & 3 ONLY
MINIMUM LOT WIDTH		30m	425m THUNDER ROAD 82m BOUNDARY ROAD
MAXIMUM LOT COVERAGE		50.0%	27.1% (4.16HA)
MINIMUM FRONT YARD		15m	COMPLIANT WITH ZONING
MINIMUM CORNER SIDE YARD		12m	COMPLIANT WITH ZONING
MINIMUM INTERIOR YARD SETBACK	ABUTTING A RG, RH OR RC ZONE	3m	COMPLIANT WITH ZONING
	ALL OTHER CASES	8m	COMPLIANT WITH ZONING
MINIMUM REAR YARD		15m	COMPLIANT WITH ZONING
MAXIMUM FLOOR SPACE INDEX		2	COMPLIANT WITH ZONING
MAXIMUM BUILDING HEIGHT		15m	TO BE DETERMINED
OUTDOOR STORAGE	NOT PERMITTED WITHIN ANY REQUIRED FRONT OR CORNER YARD		COMPLIANT WITH ZONING
	STORAGE MUST BE SCREEN WHEN ABUTTING RESIDENTIAL ZONES AND PUBLIC STREETS		COMPLIANT WITH ZONING

ZONING MECHANISM: ZONING BY-LAW 2008-250 CONSOLIDATION		REQUIRED	PROVIDED
MINIMUM WIDTH OF LANDSCAPING		NO MINIMUM SPECIFIED	TO BE DETERMINED
PARKING - TYPICAL SECTION 101 0.8 SPACES PER 100m2 FOR FIRST 5,000m2 0.4 SPACES PER 100m2 AFTER FIRST 5,000m2 LIGHT INDUSTRIAL USE WAREHOUSE (N95) PARKING - BARRIER FREE SECTION 111 BYLAW 2017-301 1 PER 99 SPACES	BUILDING A: 8920sm	55 TYPICAL 1 BARRIER-FREE	83 TYPICAL 2 BARRIER-FREE
	BUILDING B: 9820sm	55 TYPICAL 1 BARRIER-FREE	59 TYPICAL 2 BARRIER-FREE
	BUILDING C: 8920sm	55 TYPICAL 1 BARRIER-FREE	62 TYPICAL 2 BARRIER-FREE
	BUILDING D: 10405sm	61 TYPICAL 1 BARRIER-FREE	76 TYPICAL 2 BARRIER-FREE
	BUILDING E: 4460sm	35 TYPICAL 1 BARRIER-FREE	34 TYPICAL 2 BARRIER-FREE
	TOTAL	261 TYPICAL 5 BARRIER-FREE	314 TYPICAL 10 BARRIER-FREE
BICYCLE PARKING SECTION 111 WAREHOUSE 1 SPACE PER 2000m2 BY-LAW 2015-190	BUILDING A: 8920sm	4 SPACES	TO BE DETERMINED
	BUILDING B: 9820sm	4 SPACES	TO BE DETERMINED
	BUILDING C: 8920sm	4 SPACES	TO BE DETERMINED
	BUILDING D: 10405sm	5 SPACES	TO BE DETERMINED
	BUILDING E: 4460sm	2 SPACES	TO BE DETERMINED

ZONING MECHANISM: ZONING BY-LAW 2008-250 CONSOLIDATION		REQUIRED	PROVIDED
LOADING SPACE SECTION 113 LIGHT INDUSTRIAL USE	BUILDING A	2 OVERSIZED (4.3m X 13m)	12 OVERSIZED (1 PER 8000sf)
	BUILDING B	2 OVERSIZED (4.3m X 13m)	12 OVERSIZED (1 PER 8000sf)
	BUILDING C	2 OVERSIZED (4.3m X 13m)	12 OVERSIZED (1 PER 8000sf)
	BUILDING D	2 OVERSIZED (4.3m X 13m)	14 OVERSIZED (1 PER 8000sf)
	BUILDING E	2 OVERSIZED (4.3m X 13m)	4 OVERSIZED (1 PER 12,000sf)

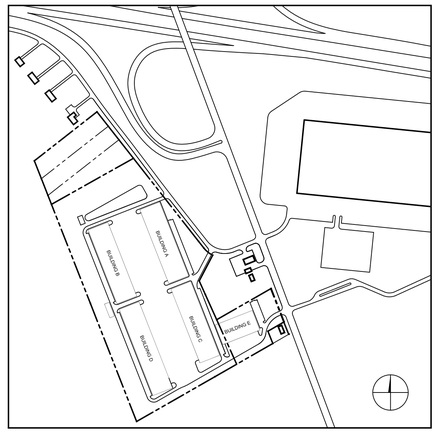
BUILDING CLASSIFICATION:

3.2.2.67: GROUP F, DIVISION 2, ANY HEIGHT, ANY AREA SPRINKLERED
- NON-COMBUSTIBLE CONSTRUCTION
- FLOOR ASSEMBLIES SHALL HAVE A MIN 2HR FIRE RESISTANCE RATING
- MEZZANINES SHALL HAVE A MIN 1HR FIRE RESISTANCE RATING
- LOAD BEARING WALLS AND COLUMNS SHALL HAVE A FIRE RESISTANCE RATING NOT LESS THAN SUPPORTED ASSEMBLIES

3.2.3.1: SPATIAL SEPARATION - TABLE 3.2.3.1.E
- 15m MINIMUM SPATIAL SEPARATION FOR 100% AREA OF UNPROTECTED OPENING (EBF > 200m2)

3.4.2.5: LOCATION OF EXITS
- 45m MAXIMUM TRAVEL DISTANCE

02 SITE DATA AND ZONING INFORMATION
SP-A01 SCALE:



01 LOCATION PLAN
SP-A01 SCALE: NTS

MCROBIE
ARCHITECTS + INTERIOR DESIGNERS

Avenue31

North

Revisions

No.	By	Description	Date
03	ERM	REVISED FOR REVIEW	2021-05-12
04	ERM	REVISED FOR REVIEW	2021-05-19
05	ERM	REVISED FOR REVIEW	2021-06-01
06	ERM	REVISED FOR REVIEW	2021-06-03
07	ERM	REVISED FOR REVIEW	2021-06-14
08	ERM	REVISED FOR REVIEW	2021-06-15
09	ERM	REVISED FOR REVIEW	2021-06-23

Project
THUNDER ROAD INDUSTRIAL PARK

6150 THUNDER ROAD, OTTAWA

Drawing
LOCATION PLAN, ZONING REVIEW AND SITE PLAN B2 r8

Scale: AS NOTED
Stamp
Drawn: ERM
Checked: JAS

Project No.: 21-135
Drawing No.: SPA-01
Date: APRIL 2021

24 X 36 – PLOT ARCH D

APPENDIX B

Screening Form

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	6150 Thunder Road, Ottawa, ON K0A 1K0
Description of Location	Bound by Thunder Road, forested areas and Boundary Road
Land Use Classification	ZBL - Rural Countryside Zone (RU), OP - General Rural Area
Development Size (units)	
Development Size (m^2)	Industrial Buildings = 45,476 sq. m
Number of Accesses and Locations	Three full-moves accesses to Thunder Road, one full-moves access to Boundary Road
Phase of Development	TBD
Buildout Year	TBD (2025 assumed)

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 EXCEEDS 5,000 sq. m
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?		X
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		X

**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?	X	
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		X
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)?	X	
Is the proposed driveway within auxiliary lanes of an intersection?		X
Does the proposed driveway make use of an existing median break that serves an existing site?		X
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		X
Does the development include a drive-thru facility?		X

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?	X	
Does the development satisfy the Location Trigger?		X
Does the development satisfy the Safety Trigger?	X	

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

Traffic Data

ACCURATE TRUSTED TRAFFIC DATA

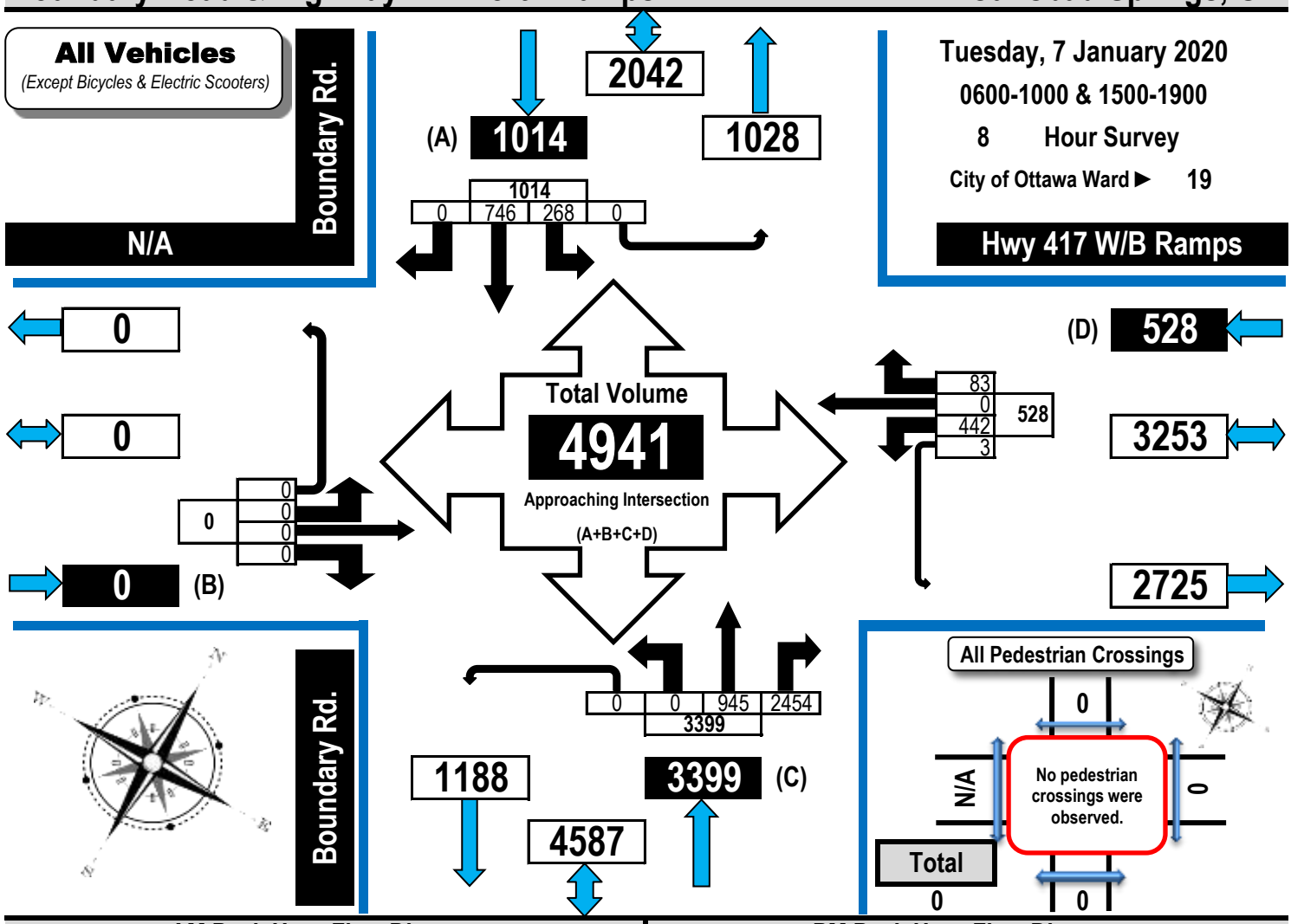
Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams

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

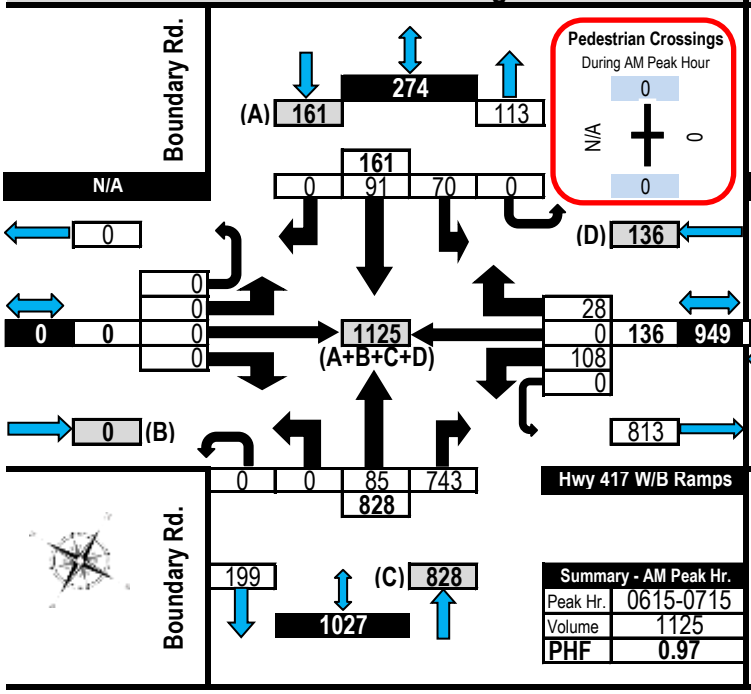
Boundary Road & Highway 417 North Ramps — Carlsbad Springs, ON

All Vehicles
(Except Bicycles & Electric Scooters)

Tuesday, 7 January 2020
0600-1000 & 1500-1900
8 Hour Survey
City of Ottawa Ward ► 19

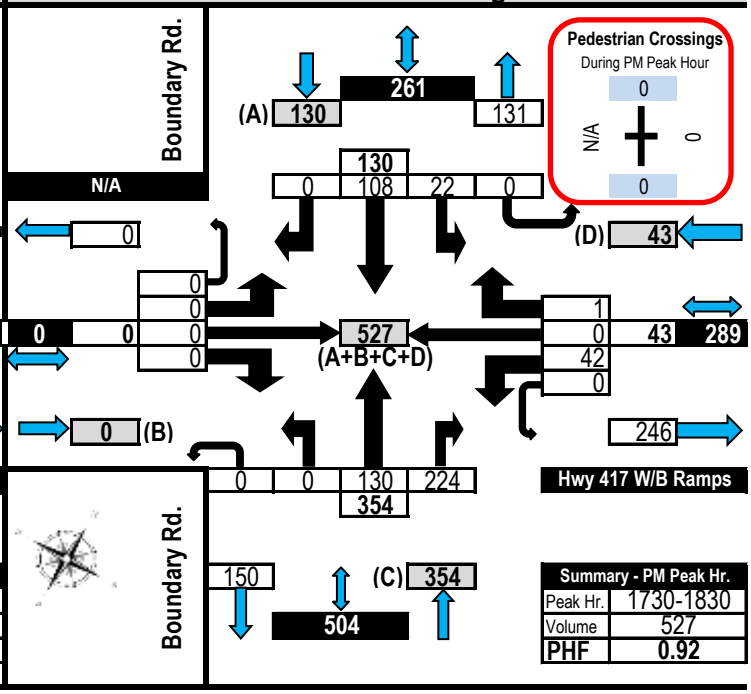


AM Peak Hour Flow Diagram



Summary - AM Peak Hr.	
Peak Hr.	0615-0715
Volume	1125
PHF	0.97

PM Peak Hour Flow Diagram



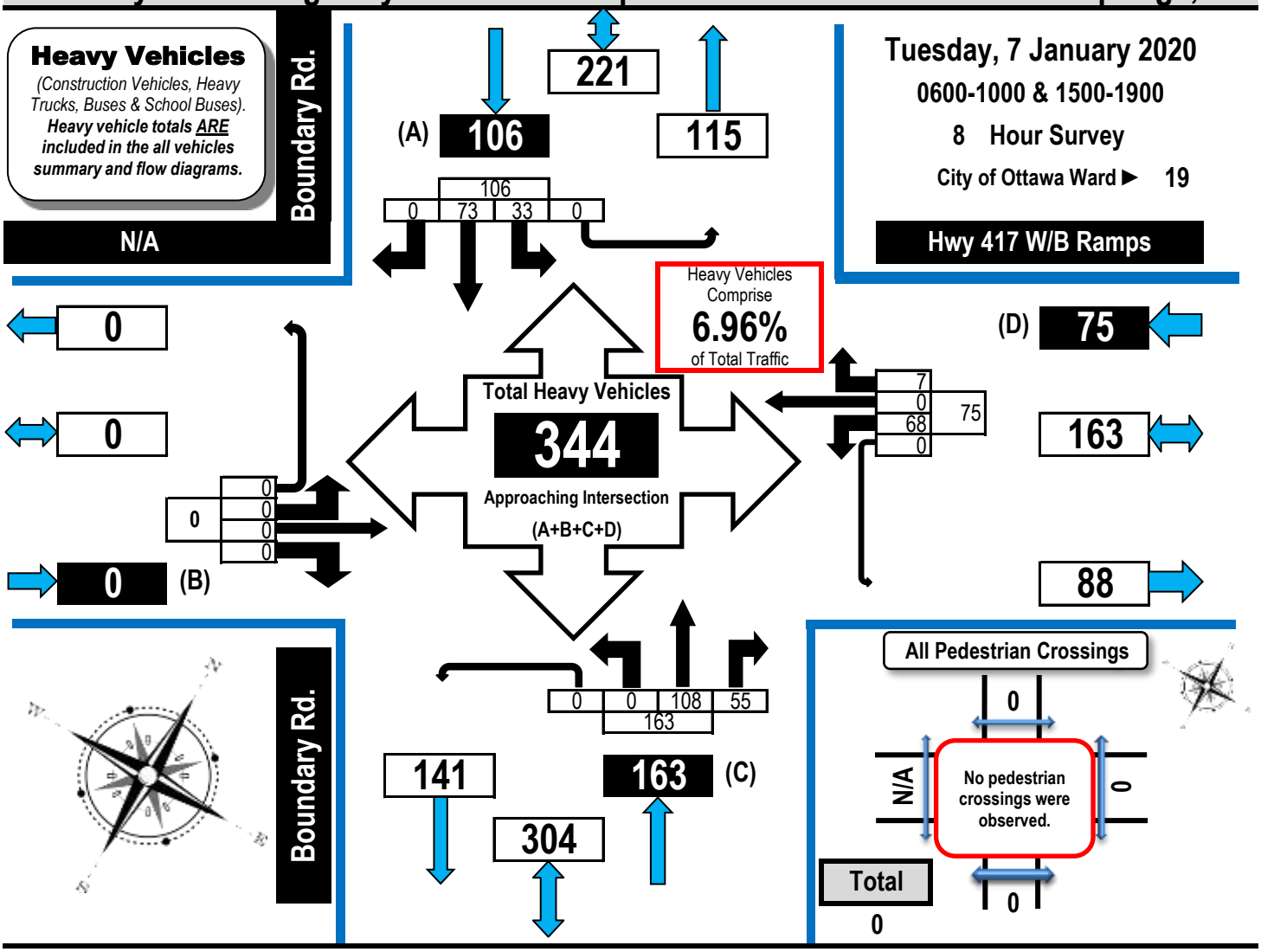
Summary - PM Peak Hr.	
Peak Hr.	1730-1830
Volume	527
PHF	0.92

Turning Movement Count
Heavy Vehicle Summary
Flow Diagram

Boundary Road & Highway 417 North Ramps — 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.

Tuesday, 7 January 2020
0600-1000 & 1500-1900
8 Hour Survey
City of Ottawa Ward ► 19



	N/A Eastbound					Hwy 417 W/B Ramps 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.
0600-0700	0	0	0	0	0	4	0	4	0	8	0	12	8	0	20	6	10	0	0	16	44
0700-0800	0	0	0	0	0	10	0	2	0	12	0	9	12	0	21	4	10	0	0	14	47
0800-0900	0	0	0	0	0	8	0	0	0	8	0	25	8	0	33	11	19	0	0	30	71
0900-1000	0	0	0	0	0	8	0	1	0	9	0	25	10	0	35	5	9	0	0	14	58
1500-1600	0	0	0	0	0	12	0	0	0	12	0	11	3	0	14	0	6	0	0	6	32
1600-1700	0	0	0	0	0	16	0	0	0	16	0	14	5	0	19	4	6	0	0	10	45
1700-1800	0	0	0	0	0	8	0	0	0	8	0	8	6	0	14	1	10	0	0	11	33
1800-1900	0	0	0	0	0	2	0	0	0	2	0	4	3	0	7	2	3	0	0	5	14
Totals	0	0	0	0	0	68	0	7	0	75	0	108	55	0	163	33	73	0	0	106	344

ACCURATE TRUSTED TRAFFIC DATA

Turning Movement Count
Summary Report Including AM, OFF Peak, PM, Evening Peak Hours, and PHF

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

Boundary Road & Highway 417 North Ramps — Carlsbad Springs, ON

Survey Date: Tuesday, 7 January 2020 **Start Time:** 0600 **AADT Factor:** 1.1

Weather AM: Overcast -4° C **Survey Duration:** 8 Hrs. **Survey Hours:** 0600-1000 & 1500-1900

Weather PM: Cloudy -1° C **Surveyor(s):** Carmody

	N/A					Hwy 417 W/B Ramps						Boundary Rd.					Boundary Rd.						
	Eastbound					Westbound						Northbound					Southbound						
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0600-0700	0	0	0	0	**0**	100	0	19	1	**120**	**120**	0	87	685	0	**772**	72	85	0	0	**157**	**929**	**1049**
0700-0800	0	0	0	0	**0**	79	0	31	0	**110**	**110**	0	112	632	0	**744**	48	81	0	0	**129**	**873**	**983**
0800-0900	0	0	0	0	**0**	57	0	9	0	**66**	**66**	0	108	360	0	**468**	54	84	0	0	**138**	**606**	**672**
0900-1000	0	0	0	0	**0**	32	0	5	1	**38**	**38**	0	89	223	0	**312**	29	52	0	0	**81**	**393**	**431**
1500-1600	0	0	0	0	**0**	44	0	10	1	**55**	**55**	0	155	122	0	**277**	18	95	0	0	**113**	**390**	**445**
1600-1700	0	0	0	0	**0**	57	0	5	0	**62**	**62**	0	148	106	0	**254**	15	131	0	0	**146**	**400**	**462**
1700-1800	0	0	0	0	**0**	44	0	1	0	**45**	**45**	0	156	156	0	**312**	18	138	0	0	**156**	**468**	**513**
1800-1900	0	0	0	0	**0**	29	0	3	0	**32**	**32**	0	90	170	0	**260**	14	80	0	0	**94**	**354**	**386**
Totals	**0**	**0**	**0**	**0**	**0**	**442**	**0**	**83**	**3**	**528**	**528**	**0**	**945**	**2454**	**0**	**3399**	**268**	**746**	**0**	**0**	**1014**	**4413**	**4941**

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

AM Peak Hour Factor ➡ 0.97 — Highest Hourly Vehicle Volume Between 0500h & 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
0615-0715	0	0	0	0	**0**	108	0	28	0	**136**	**136**	0	85	743	0	**828**	70	91	0	0	**161**	**989**	**1125**

OFF Peak Hour Factor ➡ N/A — Highest Hourly Vehicle Volume Between 1000h & 1500h

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
N/A	0	0	0	0	**0**	0	0	0	0	**0**	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**0**

PM Peak Hour Factor ➡ 0.92 — Highest Hourly Vehicle Volume Between 1500h & 1900h

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
1730-1830	0	0	0	0	**0**	42	0	1	0	**43**	**43**	0	130	224	0	**354**	22	108	0	0	**130**	**484**	**527**

EVNG Peak Hour Factor ➡ N/A — Highest Hourly Vehicle Volume Between 1900h & 0000h

EVNG Pk 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
N/A	0	0	0	0	**0**	0	0	0	0	**0**	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**0**

Comments:

No pedestrian crossings or bicycles were observed. Street lights are not present at this intersection.

Notes:

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

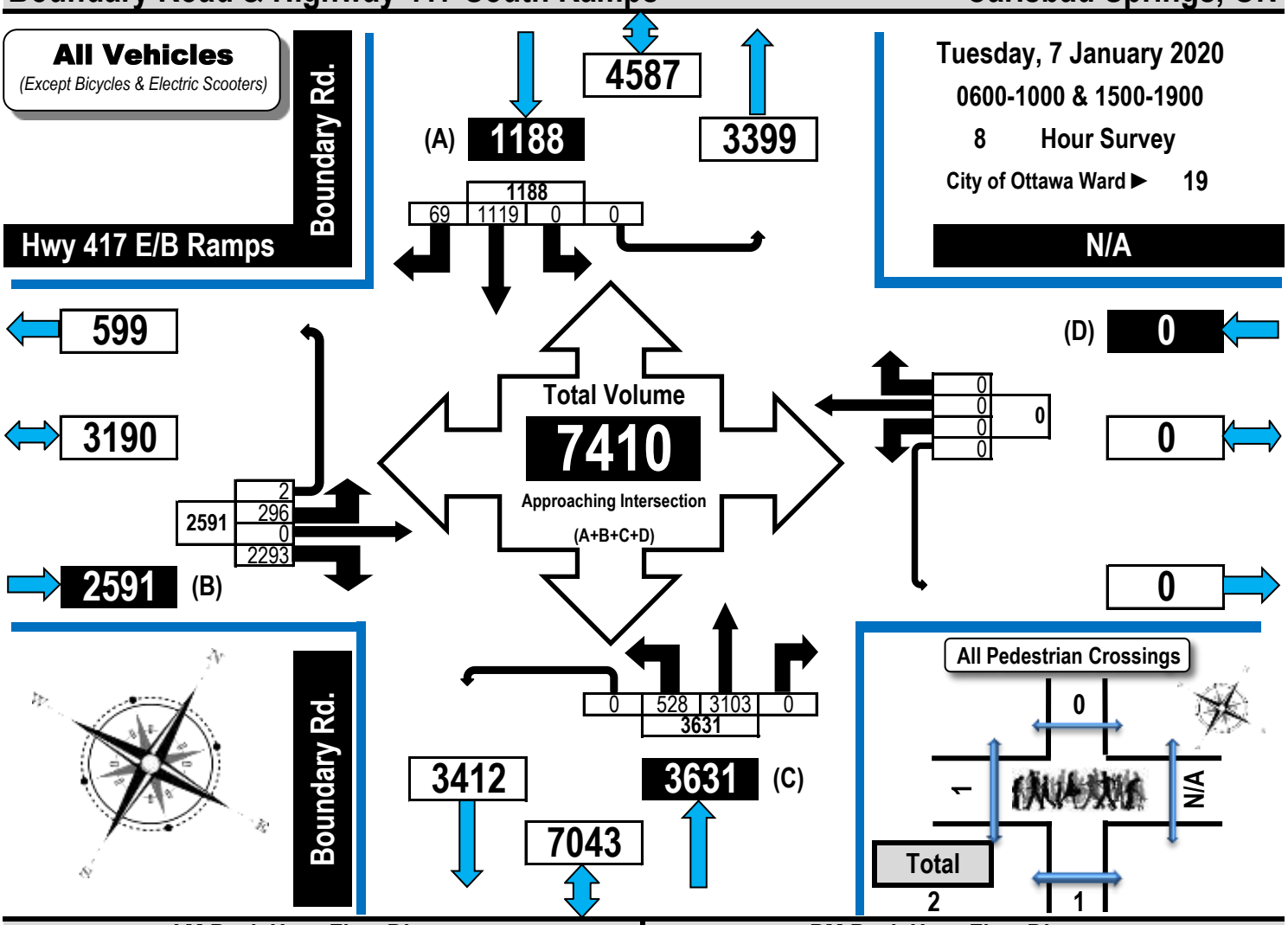
Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams

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

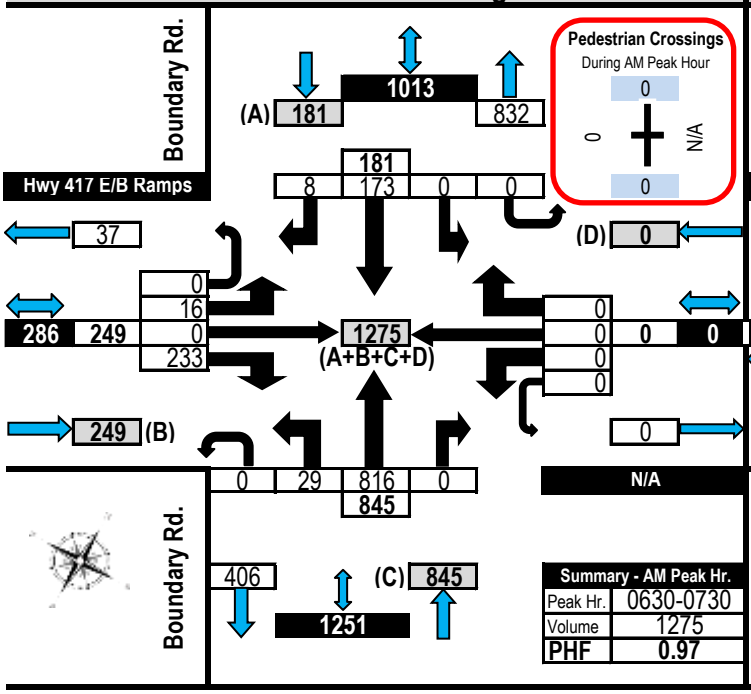
Boundary Road & Highway 417 South Ramps — Carlsbad Springs, ON

All Vehicles *(Except Bicycles & Electric Scooters)*

Tuesday, 7 January 2020
0600-1000 & 1500-1900
8 Hour Survey
City of Ottawa Ward ▶ 19

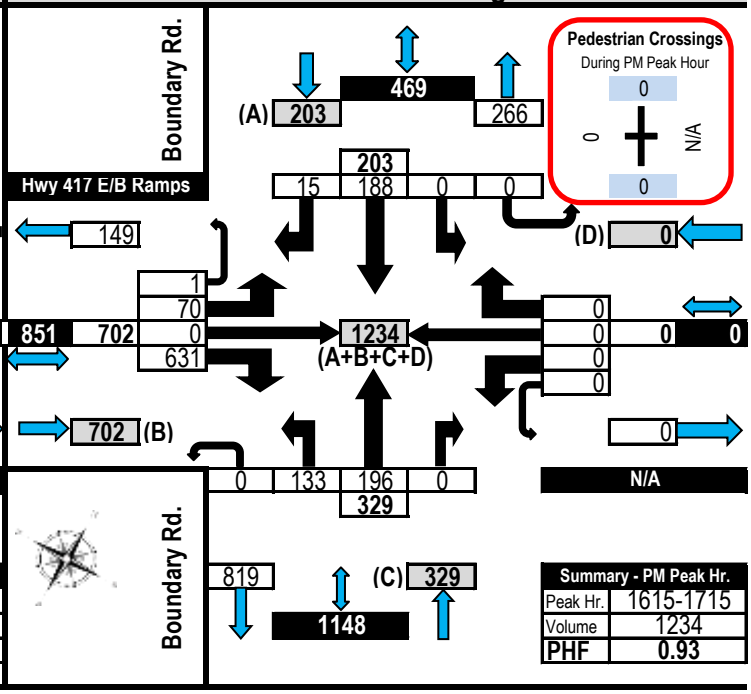


AM Peak Hour Flow Diagram



Summary - AM Peak Hr.	
Peak Hr.	0630-0730
Volume	1275
PHF	0.97

PM Peak Hour Flow Diagram



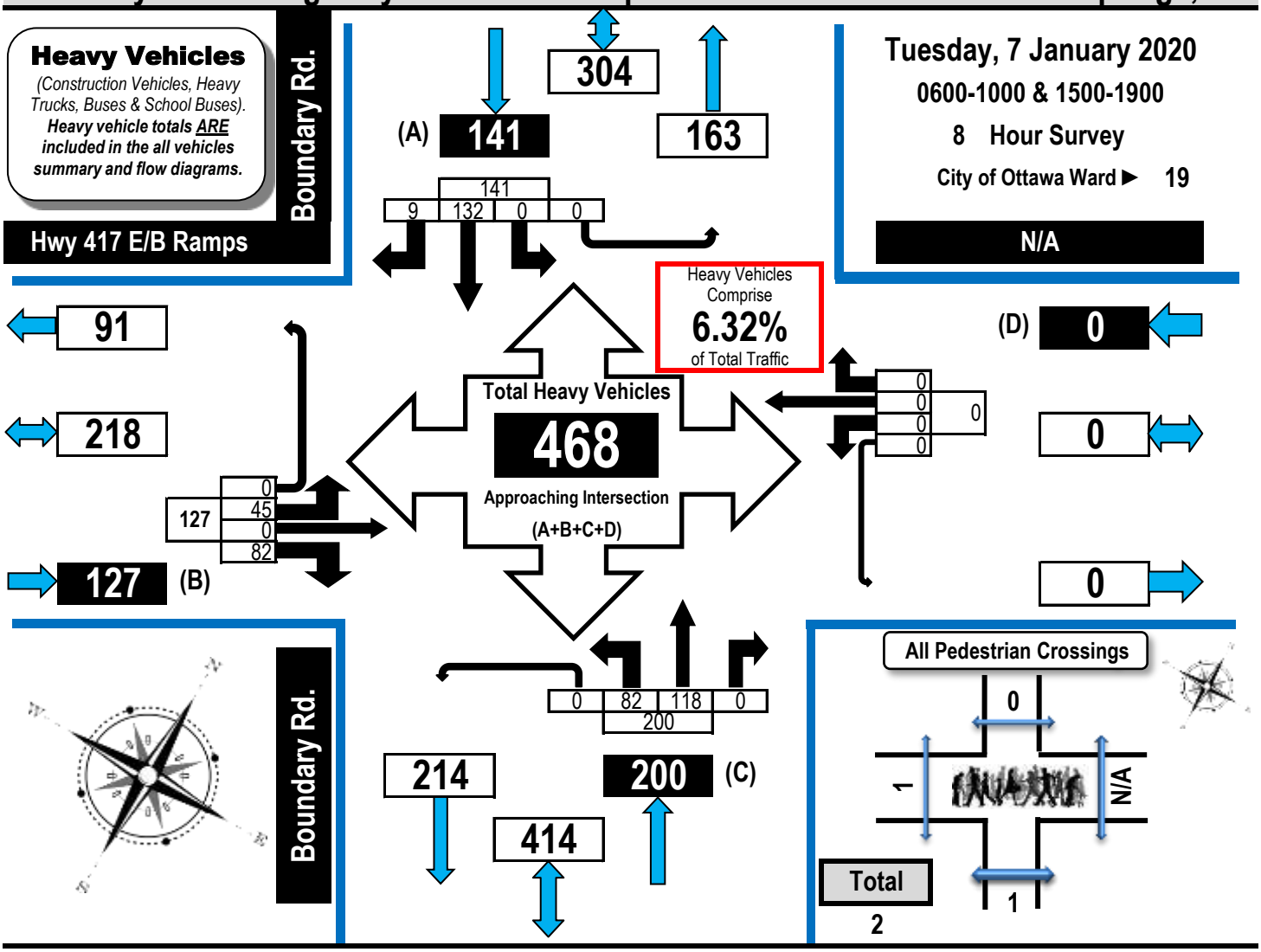
Summary - PM Peak Hr.	
Peak Hr.	1615-1715
Volume	1234
PHF	0.93

Turning Movement Count
Heavy Vehicle Summary
Flow Diagram

Boundary Road & Highway 417 South Ramps — **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.

Tuesday, 7 January 2020
0600-1000 & 1500-1900
8 Hour Survey
City of Ottawa Ward ► 19



	Hwy 417 E/B Ramps 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.
0600-0700	5	0	9	0	14	0	0	0	0	0	4	16	0	0	20	0	14	0	0	14	48
0700-0800	5	0	14	0	19	0	0	0	0	0	9	16	0	0	25	0	19	1	0	20	64
0800-0900	8	0	11	0	19	0	0	0	0	0	13	25	0	0	38	0	27	1	0	28	85
0900-1000	9	0	6	0	15	0	0	0	0	0	13	26	0	0	39	0	15	2	0	17	71
1500-1600	7	0	12	0	19	0	0	0	0	0	10	6	0	0	16	0	18	1	0	19	54
1600-1700	6	0	16	0	22	0	0	0	0	0	13	13	0	0	26	0	20	1	0	21	69
1700-1800	4	0	6	0	10	0	0	0	0	0	15	10	0	0	25	0	15	2	0	17	52
1800-1900	1	0	8	0	9	0	0	0	0	0	5	6	0	0	11	0	4	1	0	5	25
Totals	45	0	82	0	127	0	0	0	0	0	82	118	0	0	200	0	132	9	0	141	468

ACCURATE TRUSTED TRAFFIC DATA

Turning Movement Count
Summary Report Including AM, OFF Peak, PM, Evening Peak Hours, and PHF

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

Boundary Road & Highway 417 South Ramps — Carlsbad Springs, ON

Survey Date: Tuesday, 7 January 2020 **Start Time:** 0600 **AADT Factor:** 1.1

Weather AM: Overcast -4° C **Survey Duration:** 8 Hrs. **Survey Hours:** 0600-1000 & 1500-1900

Weather PM: Cloudy -1° C **Surveyor(s):** Carmody

	Hwy 417 E/B Ramps					N/A						Boundary Rd.					Boundary Rd.						
	Eastbound					Westbound						Northbound					Southbound						
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0600-0700	16	0	172	0	188	0	0	0	0	0	188	21	756	0	0	777	0	178	7	0	185	962	1150
0700-0800	15	0	171	0	186	0	0	0	0	0	186	39	729	0	0	768	0	151	9	0	160	928	1114
0800-0900	18	0	86	1	105	0	0	0	0	0	105	55	450	0	0	505	0	135	6	0	141	646	751
0900-1000	21	0	60	0	81	0	0	0	0	0	81	44	291	0	0	335	0	80	4	0	84	419	500
1500-1600	75	0	489	0	564	0	0	0	0	0	564	79	202	0	0	281	0	134	5	0	139	420	984
1600-1700	70	0	641	1	712	0	0	0	0	0	712	126	184	0	0	310	0	171	17	0	188	498	1210
1700-1800	51	0	406	0	457	0	0	0	0	0	457	116	261	0	0	377	0	168	14	0	182	559	1016
1800-1900	30	0	268	0	298	0	0	0	0	0	298	48	230	0	0	278	0	102	7	0	109	387	685
Totals	296	0	2293	2	2591	0	0	0	0	0	2591	528	3103	0	0	3631	0	1119	69	0	1188	4819	7410

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

AM Peak Hour Factor ➡ 0.97													Highest Hourly Vehicle Volume Between 0500h & 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
0630-0730	16	0	233	0	249	0	0	0	0	0	249	29	816	0	0	845	0	173	8	0	181	1026	1275
OFF Peak Hour Factor ➡ N/A													Highest Hourly Vehicle Volume Between 1000h & 1500h										
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
N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM Peak Hour Factor ➡ 0.93													Highest Hourly Vehicle Volume Between 1500h & 1900h										
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
1615-1715	70	0	631	1	702	0	0	0	0	0	702	133	196	0	0	329	0	188	15	0	203	532	1234
EVNG Peak Hour Factor ➡ N/A													Highest Hourly Vehicle Volume Between 1900h & 0000h										
EVNG Pk 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
N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Comments:

No bicycles were observed.

Notes:

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

ACCURATE TRUSTED TRAFFIC DATA

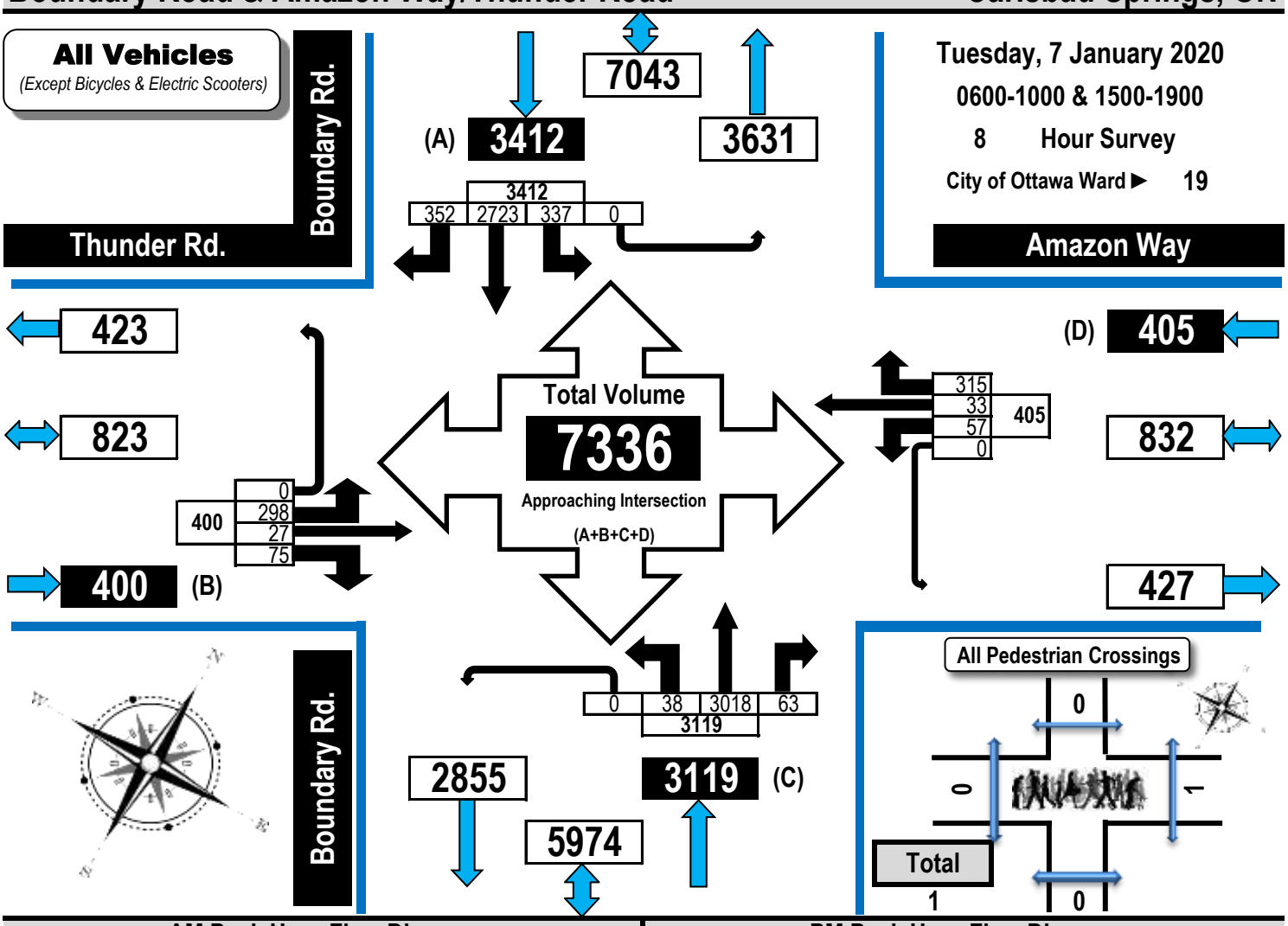
Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams

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

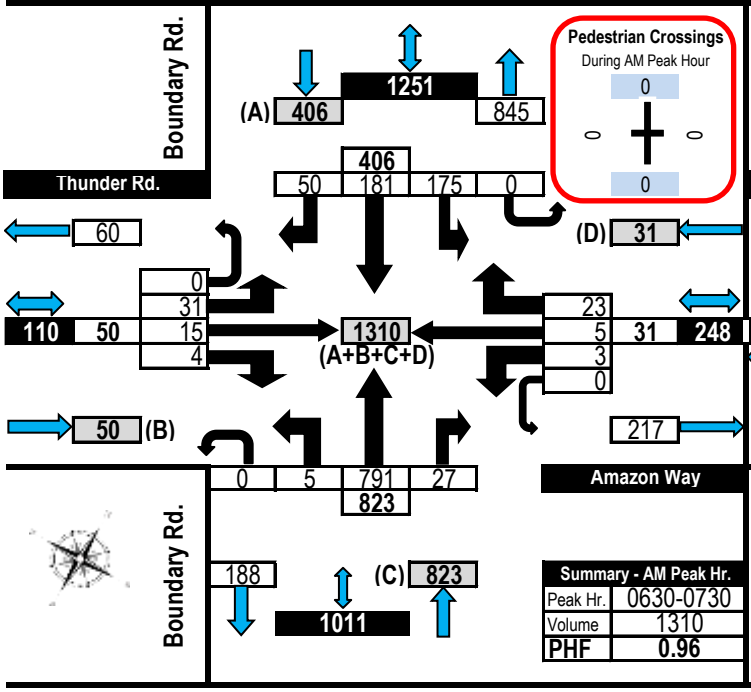
Boundary Road & Amazon Way/Thunder Road — Carlsbad Springs, ON

All Vehicles
(Except Bicycles & Electric Scooters)

Tuesday, 7 January 2020
0600-1000 & 1500-1900
8 Hour Survey
City of Ottawa Ward ▶ 19

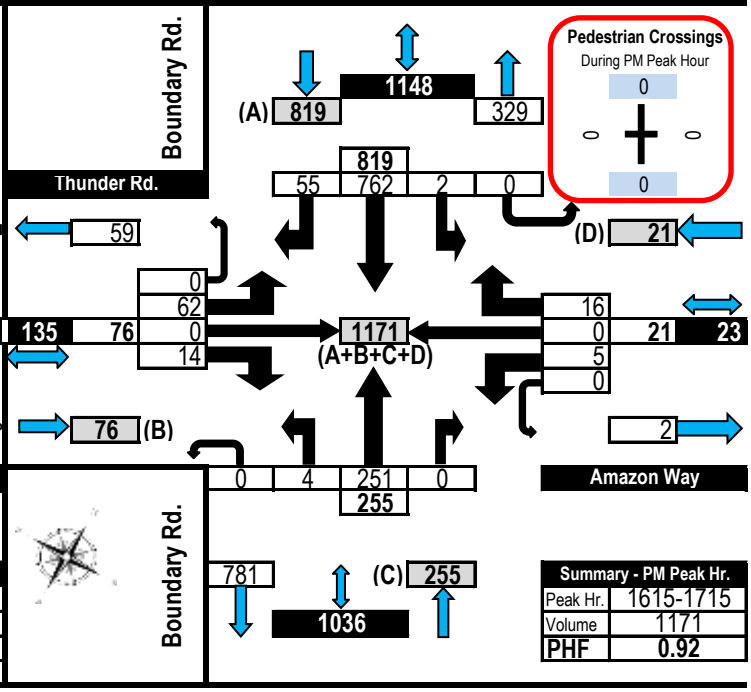


AM Peak Hour Flow Diagram



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

PM Peak Hour Flow Diagram



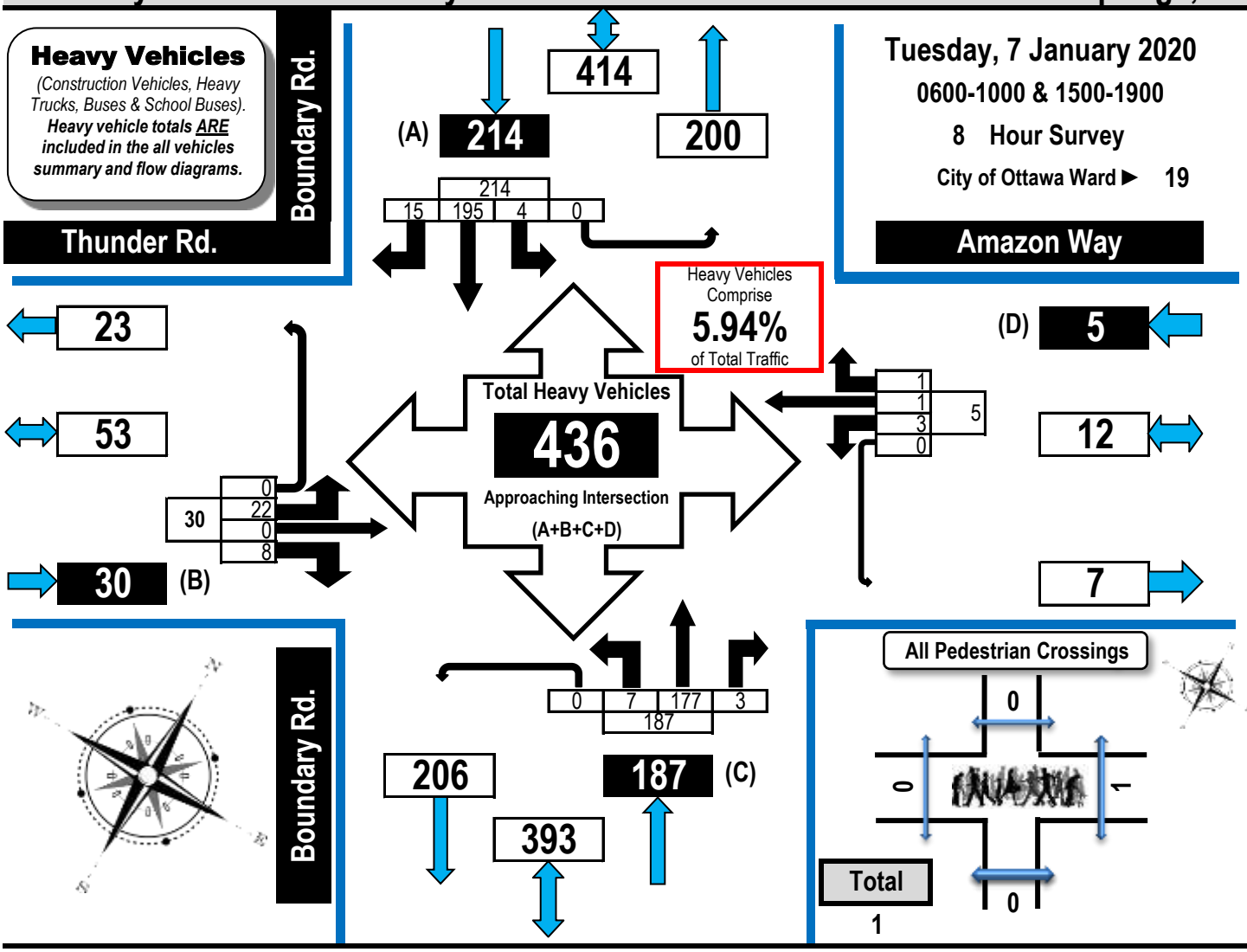
Summary - PM Peak Hr.	
Peak Hr.	1615-1715
Volume	1171
PHF	0.92

Turning Movement Count
Heavy Vehicle Summary
Flow Diagram

Boundary Road & Amazon Way/Thunder 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.

Tuesday, 7 January 2020
0600-1000 & 1500-1900
8 Hour Survey
City of Ottawa Ward ► 19



	Thunder Rd. Eastbound					Amazon Way 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.
0600-0700	1	0	0	0	1	0	0	0	0	0	1	19	0	0	20	0	23	0	0	23	44
0700-0800	2	0	1	0	3	0	0	0	0	0	1	22	0	0	23	0	28	4	0	32	58
0800-0900	8	0	2	0	10	0	0	1	0	1	3	30	1	0	34	1	33	5	0	39	84
0900-1000	2	0	1	0	3	0	1	0	0	1	1	37	0	0	38	1	19	2	0	22	64
1500-1600	2	0	3	0	5	1	0	0	0	1	0	14	2	0	16	1	27	2	0	30	52
1600-1700	4	0	0	0	4	2	0	0	0	2	1	22	0	0	23	1	34	0	0	35	64
1700-1800	2	0	1	0	3	0	0	0	0	0	0	23	0	0	23	0	20	1	0	21	47
1800-1900	1	0	0	0	1	0	0	0	0	0	0	10	0	0	10	0	11	1	0	12	23
Totals	22	0	8	0	30	3	1	1	0	5	7	177	3	0	187	4	195	15	0	214	436

ACCURATE TRUSTED TRAFFIC DATA

Turning Movement Count
Summary Report Including AM, OFF Peak, PM, Evening Peak Hours, and PHF

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

Boundary Road & Amazon Way/Thunder Road — Carlsbad Springs, ON

Survey Date: Tuesday, 7 January 2020 **Start Time:** 0600 **AADT Factor:** 1.1

Weather AM: Overcast - 4° C **Survey Duration:** 8 Hrs. **Survey Hours:** 0600-1000 & 1500-1900

Weather PM: Cloudy - 1° C **Surveyor(s):** Carmody

	Thunder Rd. (Eastbound)					Amazon Way (Westbound)						Boundary Rd. (Northbound)					Boundary Rd. (Southbound)						
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0600-0700	29	5	3	0	**37**	10	4	78	0	**92**	**129**	7	670	18	0	**695**	131	163	56	0	**350**	**1045**	**1174**
0700-0800	30	10	3	0	**43**	1	3	14	0	**18**	**61**	3	724	15	0	**742**	87	193	42	0	**322**	**1064**	**1125**
0800-0900	33	5	4	0	**42**	1	1	3	0	**5**	**47**	7	469	6	0	**482**	18	170	33	0	**221**	**703**	**750**
0900-1000	24	0	6	0	**30**	0	2	5	0	**7**	**37**	4	306	2	0	**312**	3	122	15	0	**140**	**452**	**489**
1500-1600	49	0	11	0	**60**	5	4	15	0	**24**	**84**	4	217	6	0	**227**	8	557	58	0	**623**	**850**	**934**
1600-1700	59	0	19	0	**78**	6	0	14	0	**20**	**98**	9	237	0	0	**246**	2	745	65	0	**812**	**1058**	**1156**
1700-1800	55	1	15	0	**71**	11	4	67	0	**82**	**153**	1	255	5	0	**261**	16	509	49	0	**574**	**835**	**988**
1800-1900	19	6	14	0	**39**	23	15	119	0	**157**	**196**	3	140	11	0	**154**	72	264	34	0	**370**	**524**	**720**
Totals	298	27	75	0	400	57	33	315	0	405	805	38	3018	63	0	3119	337	2723	352	0	3412	6531	7336

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

AM Peak Hour Factor ➡ 0.96 — Highest Hourly Vehicle Volume Between 0500h & 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
0630-0730	31	15	4	0	**50**	3	5	23	0	**31**	**81**	5	791	27	0	**823**	175	181	50	0	**406**	**1229**	**1310**

OFF Peak Hour Factor ➡ N/A — Highest Hourly Vehicle Volume Between 1000h & 1500h

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
N/A	0	0	0	0	**0**	0	0	0	0	**0**	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**0**

PM Peak Hour Factor ➡ 0.92 — Highest Hourly Vehicle Volume Between 1500h & 1900h

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
1615-1715	62	0	14	0	**76**	5	0	16	0	**21**	**97**	4	251	0	0	**255**	2	762	55	0	**819**	**1074**	**1171**

EVNG Peak Hour Factor ➡ N/A — Highest Hourly Vehicle Volume Between 1900h & 0000h

EVNG Pk 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
N/A	0	0	0	0	**0**	0	0	0	0	**0**	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**0**

Comments:

Much of the traffic, including the majority of the heavy vehicles, to and from Thunder Road is associated with the Petro Canada gas station on the southwest corner. The heavy vehicle total includes 29 school buses and 7 private buses. There were no bicycles observed during this traffic count.

Notes:

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

ACCURATE TRUSTED TRAFFIC DATA

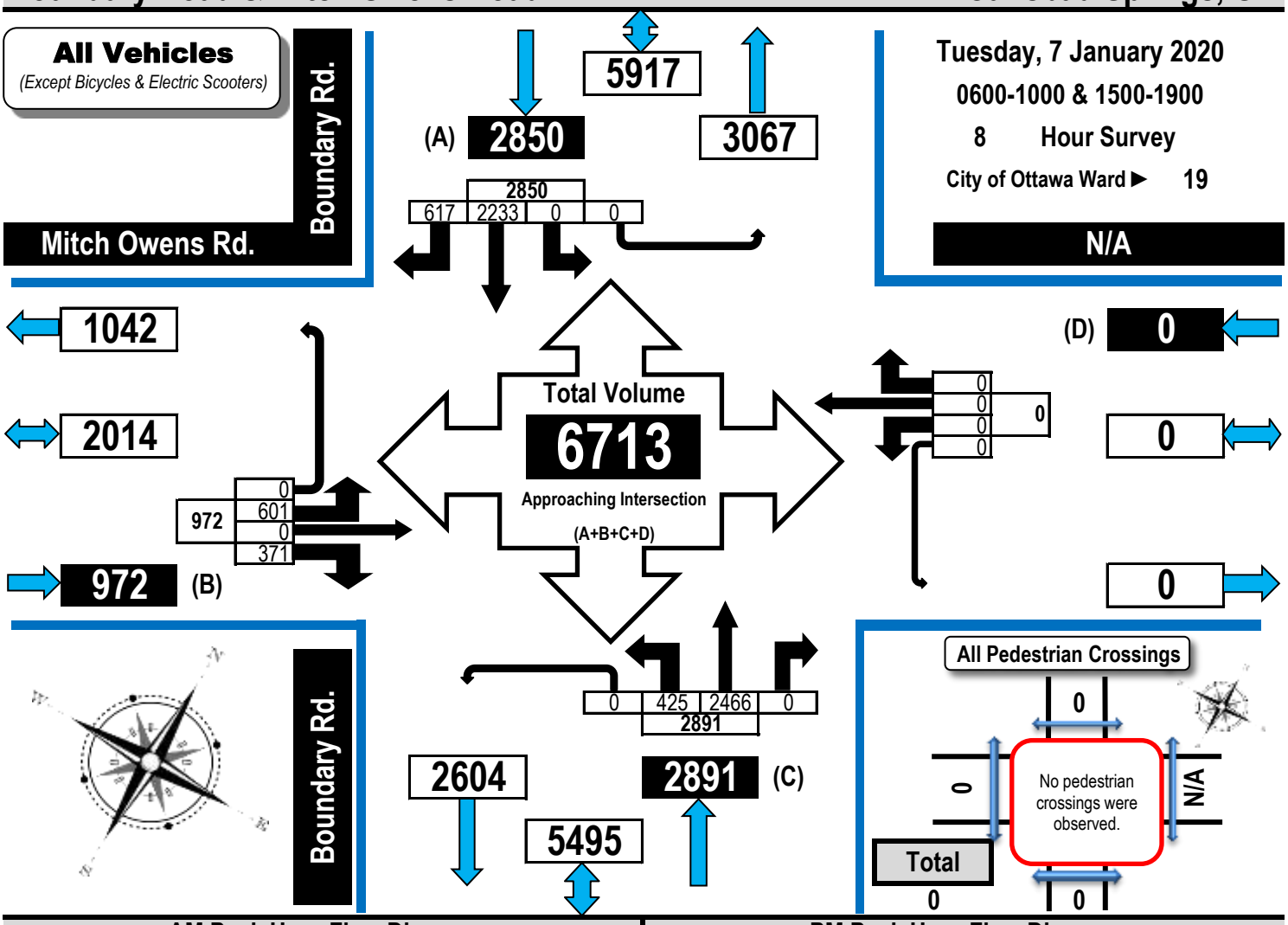
Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams

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

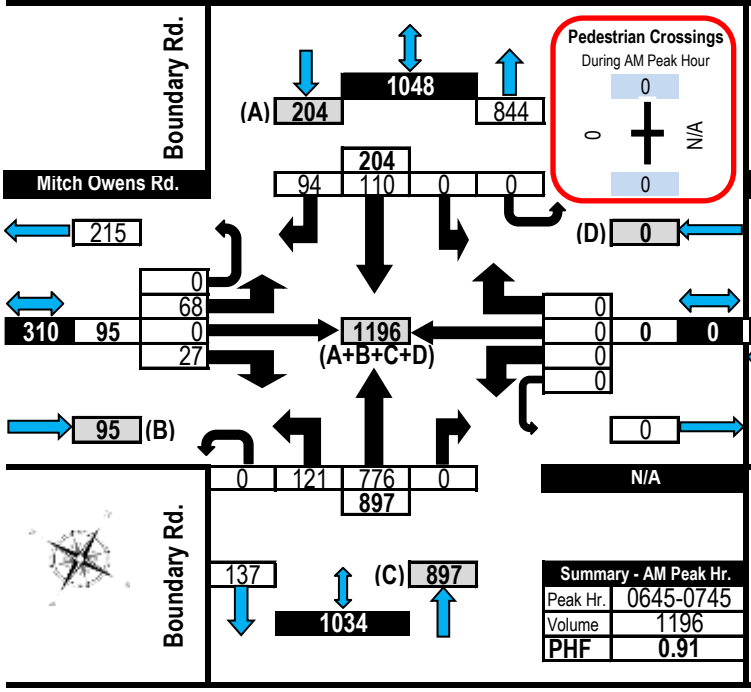
Boundary Road & Mitch Owens Road — Carlsbad Springs, ON

All Vehicles
(Except Bicycles & Electric Scooters)

Tuesday, 7 January 2020
0600-1000 & 1500-1900
8 Hour Survey
City of Ottawa Ward ▶ 19

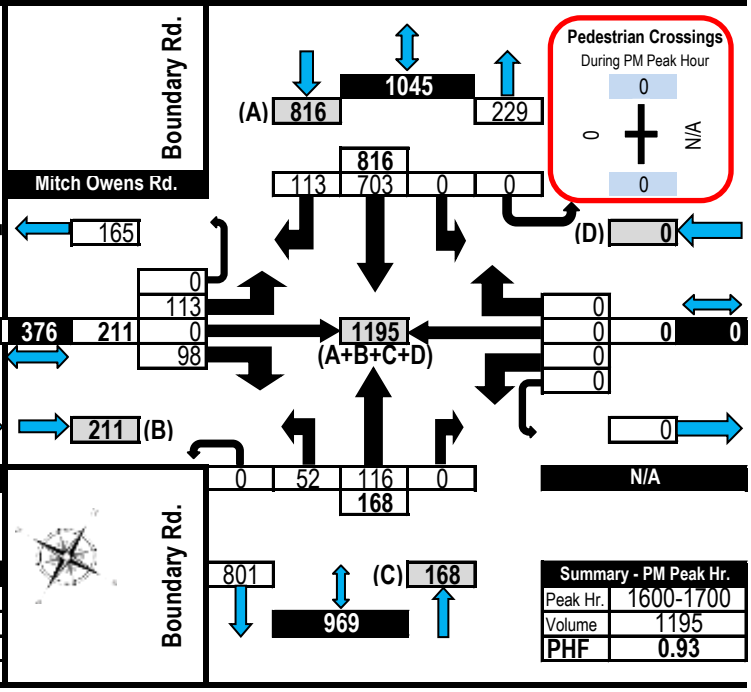


AM Peak Hour Flow Diagram



Summary - AM Peak Hr.	
Peak Hr.	0645-0745
Volume	1196
PHF	0.91

PM Peak Hour Flow Diagram



Summary - PM Peak Hr.	
Peak Hr.	1600-1700
Volume	1195
PHF	0.93

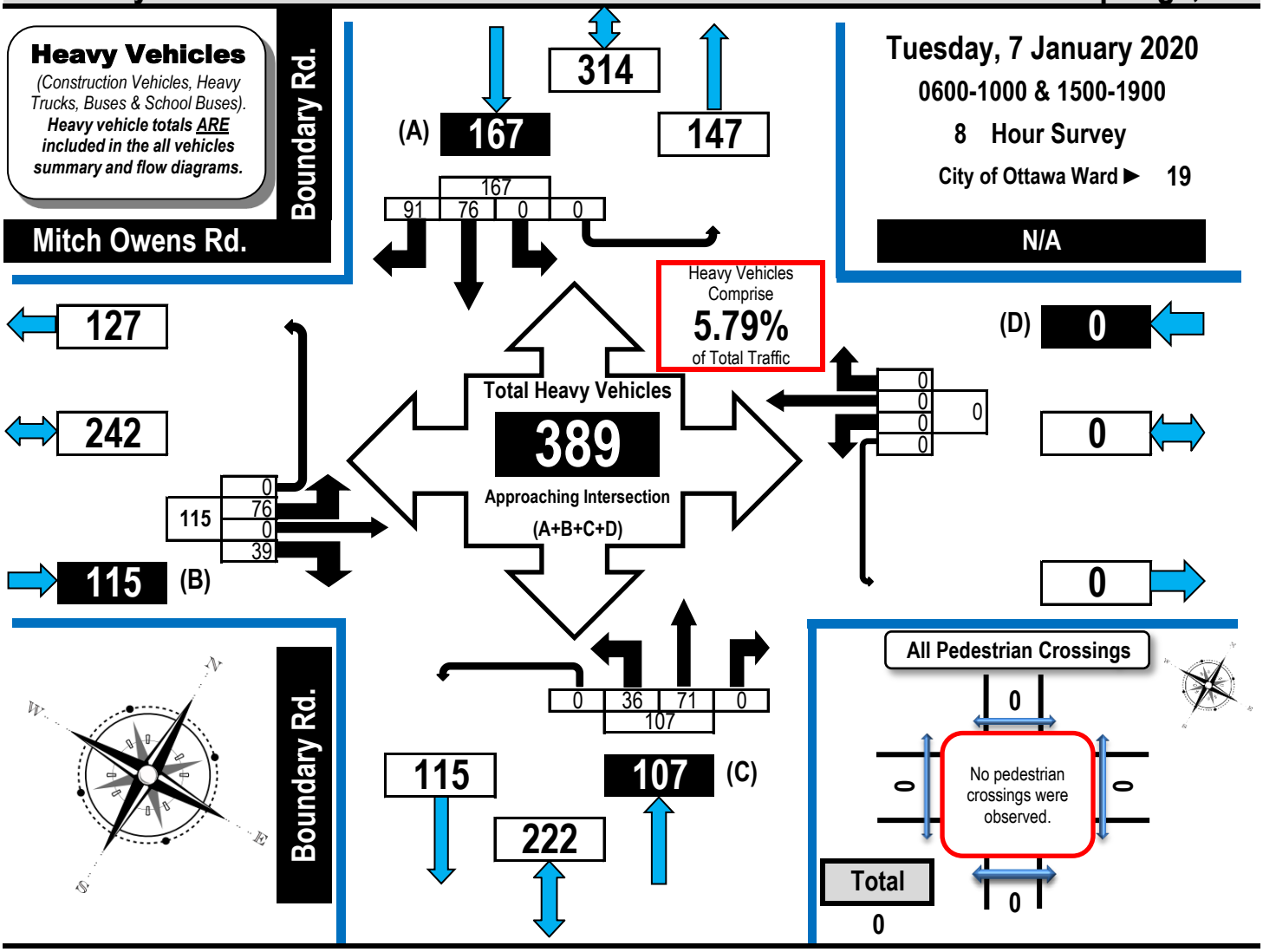
ACCURATE TRUSTED TRAFFIC DATA

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.

Tuesday, 7 January 2020
0600-1000 & 1500-1900
8 Hour Survey
City of Ottawa Ward ► 19



	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.
0600-0700	6	0	6	0	12	0	0	0	0	0	4	12	0	0	16	0	4	6	0	10	38
0700-0800	8	0	4	0	12	0	0	0	0	0	10	10	0	0	20	0	15	16	0	31	63
0800-0900	12	0	6	0	18	0	0	0	0	0	7	18	0	0	25	0	8	17	0	25	68
0900-1000	21	0	4	0	25	0	0	0	0	0	3	10	0	0	13	0	9	14	0	23	61
1500-1600	4	0	11	0	15	0	0	0	0	0	5	5	0	0	10	0	18	12	0	30	55
1600-1700	15	0	6	0	21	0	0	0	0	0	4	5	0	0	9	0	10	14	0	24	54
1700-1800	5	0	2	0	7	0	0	0	0	0	2	7	0	0	9	0	10	10	0	20	36
1800-1900	5	0	0	0	5	0	0	0	0	0	1	4	0	0	5	0	2	2	0	4	14
Totals	76	0	39	0	115	0	0	0	0	0	36	71	0	0	107	0	76	91	0	167	389

ACCURATE TRUSTED TRAFFIC DATA

Turning Movement Count
Summary Report Including AM, OFF Peak, PM, Evening Peak Hours, and PHF

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, 7 January 2020 **Start Time:** 0600 **AADT Factor:** 1.1

Weather AM: Overcast - 4° C **Survey Duration:** 8 Hrs. **Survey Hours:** 0600-1000 & 1500-1900

Weather PM: Cloudy - 1° C **Surveyor(s):** Carmody

	Mitch Owens Rd.					N/A						Boundary Rd.					Boundary Rd.						
	Eastbound					Westbound						Northbound					Southbound						
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0600-0700	51	0	28	0	**79**	0	0	0	0	**0**	**79**	81	670	0	0	**751**	0	57	88	0	**145**	**896**	**975**
0700-0800	63	0	19	0	**82**	0	0	0	0	**0**	**82**	118	681	0	0	**799**	0	115	95	0	**210**	**1009**	**1091**
0800-0900	80	0	30	0	**110**	0	0	0	0	**0**	**110**	52	412	0	0	**464**	0	92	75	0	**167**	**631**	**741**
0900-1000	58	0	16	0	**74**	0	0	0	0	**0**	**74**	29	239	0	0	**268**	0	67	48	0	**115**	**383**	**457**
1500-1600	75	0	74	0	**149**	0	0	0	0	**0**	**149**	45	125	0	0	**170**	0	488	66	0	**554**	**724**	**873**
1600-1700	113	0	98	0	**211**	0	0	0	0	**0**	**211**	52	116	0	0	**168**	0	703	113	0	**816**	**984**	**1195**
1700-1800	113	0	74	0	**187**	0	0	0	0	**0**	**187**	30	128	0	0	**158**	0	459	75	0	**534**	**692**	**879**
1800-1900	48	0	32	0	**80**	0	0	0	0	**0**	**80**	18	95	0	0	**113**	0	252	57	0	**309**	**422**	**502**
Totals	**601**	**0**	**371**	**0**	**972**	**0**	**0**	**0**	**0**	**0**	**972**	**425**	**2466**	**0**	**0**	**2891**	**0**	**2233**	**617**	**0**	**2850**	**5741**	**6713**

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

AM Peak Hour Factor ➡ 0.91 — Highest Hourly Vehicle Volume Between 0500h & 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
0645-0745	68	0	27	0	**95**	0	0	0	0	**0**	**95**	121	776	0	0	**897**	0	110	94	0	**204**	**1101**	**1196**

OFF Peak Hour Factor ➡ N/A — Highest Hourly Vehicle Volume Between 1000h & 1500h

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
N/A	0	0	0	0	**0**	0	0	0	0	**0**	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**0**

PM Peak Hour Factor ➡ 0.93 — Highest Hourly Vehicle Volume Between 1500h & 1900h

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
1600-1700	113	0	98	0	**211**	0	0	0	0	**0**	**211**	52	116	0	0	**168**	0	703	113	0	**816**	**984**	**1195**

EVNG Peak Hour Factor ➡ N/A — Highest Hourly Vehicle Volume Between 1900h & 0000h

EVNG Pk 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
N/A	0	0	0	0	**0**	0	0	0	0	**0**	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**0**

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 and electric scooters.
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

APPENDIX D

Collision Data

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 Manoeuver	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 Manoeuver	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 Manoeuver	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 Manoeuver	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 Manoeuver	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, dust	Rear end	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, dust	Rear end	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, dust	SMV other	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 E

NCR Survey Data

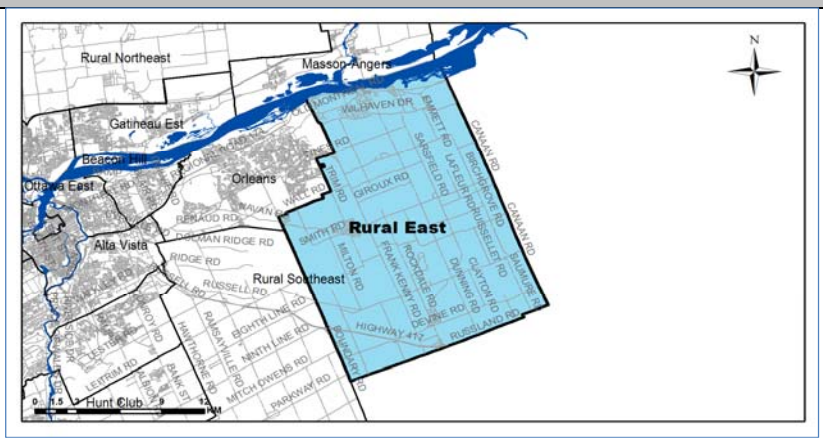
Rural East

Demographic Characteristics

Population	11,420	Actively Travelled	9,090
Employed Population	5,480	Number of Vehicles	9,320
Households	4,090	Area (km^2)	287.5

Occupation Status (age 5+)	Male	Female	Total
Full Time Employed	2,850	2,180	5,040
Part Time Employed	90	360	450
Student	1,280	1,320	2,600
Retiree	1,010	1,020	2,030
Unemployed	130	100	240
Homemaker	0	400	400
Other	50	90	150
Total:	5,410	5,480	10,900

Traveller Characteristics	Male	Female	Total
Transit Pass Holders	500	490	990
Licensed Drivers	4,450	4,410	8,850
Telecommuters	0	80	80
Trips made by residents	13,710	14,700	28,410



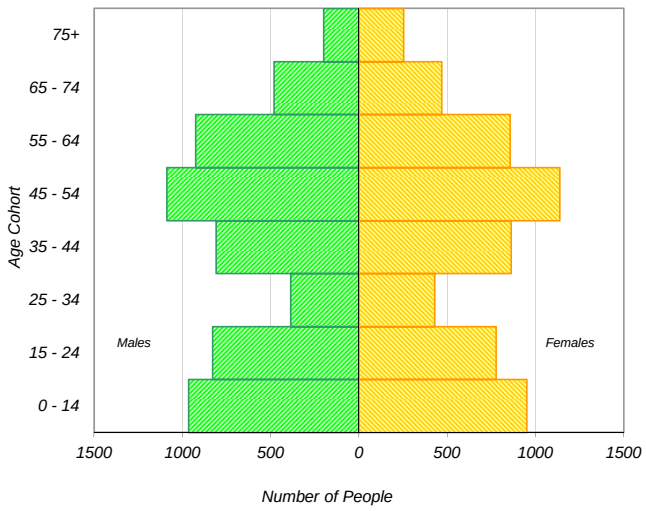
Household Size		
1 person	580	14%
2 persons	1,280	31%
3 persons	780	19%
4 persons	990	24%
5+ persons	460	11%
Total:	4,090	100%

Households by Vehicle Availability		
0 vehicles	60	1%
1 vehicle	810	20%
2 vehicles	1,820	44%
3 vehicles	910	22%
4+ vehicles	490	12%
Total:	4,090	100%

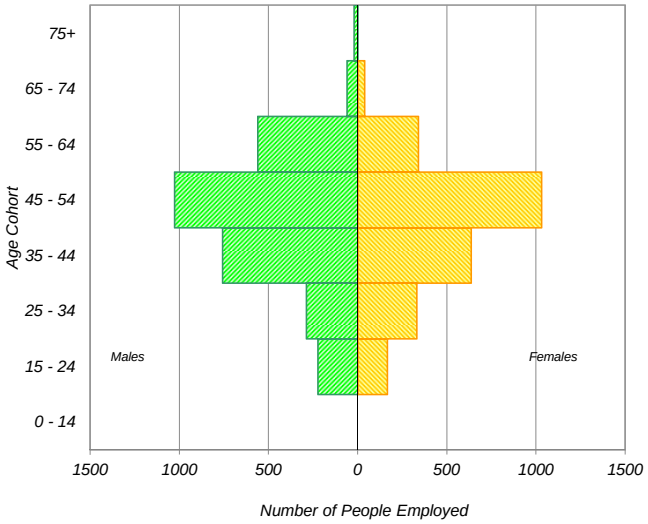
Selected Indicators	
Daily Trips per Person (age 5+)	2.61
Vehicles per Person	0.82
Number of Persons per Household	2.79
Daily Trips per Household	6.95
Vehicles per Household	2.28
Workers per Household	1.34
Population Density (Pop/km2)	40

Households by Dwelling Type		
Single-detached	3,270	80%
Semi-detached	270	7%
Townhouse	220	5%
Apartment/Condo	330	8%
Total:	4,090	100%

Population



Employed Population

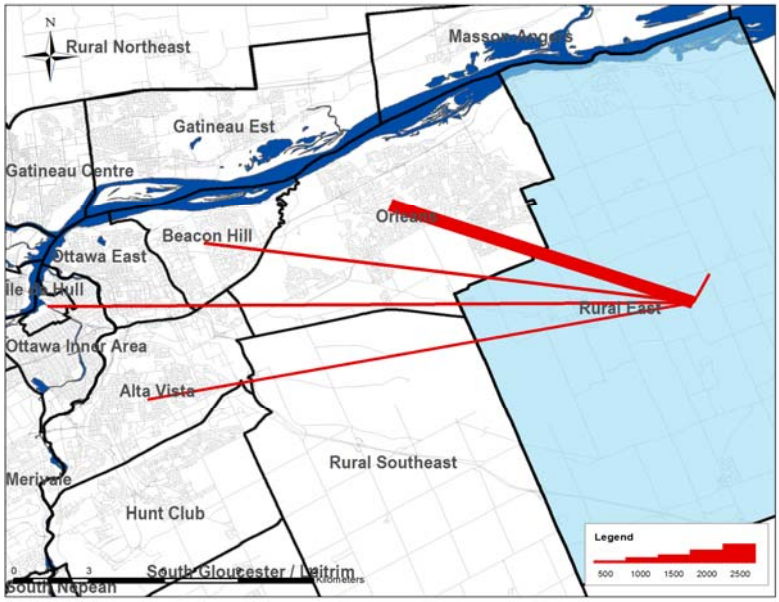


* In 2005 data was only collected for household members aged 11+ therefore these results cannot be compared to the 2011 data.

Travel Patterns

Top Five Destinations of Trips from Rural East

AM Peak Period



Summary of Trips to and from Rural East

AM Peak Period (6:30 - 8:59)

Districts	Destinations of Trips From District	% Total	Origins of Trips To District	% Total
Ottawa Centre	450	8%	0	0%
Ottawa Inner Area	250	5%	70	3%
Ottawa East	160	3%	70	3%
Beacon Hill	350	7%	60	2%
Alta Vista	430	8%	110	4%
Hunt Club	140	3%	50	2%
Merivale	340	6%	10	0%
Ottawa West	60	1%	40	2%
Bayshore / Cedarview	50	1%	20	1%
Orléans	1,970	37%	1,000	38%
Rural East	820	15%	820	31%
Rural Southeast	30	1%	170	6%
South Gloucester / Leitrim	10	0%	0	0%
South Nepean	60	1%	20	1%
Rural Southwest	20	0%	0	0%
Kanata / Stittsvile	30	1%	100	4%
Rural West	0	0%	0	0%
Île de Hull	70	1%	10	0%
Hull Périphérie	30	1%	10	0%
Plateau	0	0%	0	0%
Aylmer	0	0%	30	1%
Rural Northwest	0	0%	0	0%
Pointe Gatineau	0	0%	30	1%
Gatineau Est	0	0%	20	1%
Rural Northeast	40	1%	0	0%
Buckingham / Masson-Angers	0	0%	0	0%
Ontario Sub-Total:	5,170	97%	2,540	96%
Québec Sub-Total:	140	3%	100	4%
Total:	5,310	100%	2,640	100%

Trips by Trip Purpose

24 Hours	From District		To District		Within District	
Work or related	3,600	27%	1,100	8%	710	19%
School	1,590	12%	790	6%	320	9%
Shopping	1,460	11%	300	2%	90	2%
Leisure	1,290	10%	1,160	9%	410	11%
Medical	480	4%	90	1%	0	0%
Pick-up / drive passenger	1,150	9%	580	4%	350	9%
Return Home	3,120	23%	8,900	67%	1,620	43%
Other	670	5%	460	3%	250	7%
Total:	13,360	100%	13,380	100%	3,750	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Work or related	2,280	51%	660	36%	270	33%
School	1,370	30%	740	41%	310	38%
Shopping	70	2%	0	0%	0	0%
Leisure	70	2%	100	5%	10	1%
Medical	120	3%	40	2%	0	0%
Pick-up / drive passenger	380	8%	50	3%	120	15%
Return Home	30	1%	130	7%	70	9%
Other	180	4%	100	5%	40	5%
Total:	4,500	100%	1,820	100%	820	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Work or related	60	3%	90	2%	60	9%
School	10	0%	0	0%	0	0%
Shopping	180	8%	20	0%	30	5%
Leisure	250	11%	340	8%	110	17%
Medical	120	5%	30	1%	0	0%
Pick-up / drive passenger	250	11%	150	4%	40	6%
Return Home	1,290	58%	3,510	85%	400	61%
Other	60	3%	10	0%	20	3%
Total:	2,220	100%	4,150	100%	660	100%

Peak Period (%)	Total:	% of 24 Hours	Within District (%)
24 Hours	30,490		12%
AM Peak Period	7,140	23%	11%
PM Peak Period	7,030	23%	9%

Trips by Primary Travel Mode

24 Hours	From District		To District		Within District	
Auto Driver	8,560	64%	8,540	64%	2,210	59%
Auto Passenger	2,530	19%	2,660	20%	650	17%
Transit	1,210	9%	1,220	9%	20	1%
Bicycle	30	0%	30	0%	100	3%
Walk	20	0%	20	0%	440	12%
Other	1,000	7%	920	7%	330	9%
Total:	13,350	100%	13,390	100%	3,750	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Auto Driver	2,510	56%	830	46%	400	49%
Auto Passenger	750	17%	240	13%	170	21%
Transit	420	9%	550	30%	10	1%
Bicycle	0	0%	20	1%	10	1%
Walk	0	0%	20	1%	70	9%
Other	810	18%	150	8%	160	20%
Total:	4,490	100%	1,810	100%	820	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Auto Driver	1,280	58%	2,770	67%	360	55%
Auto Passenger	390	18%	730	18%	150	23%
Transit	420	19%	440	11%	10	2%
Bicycle	10	0%	10	0%	10	2%
Walk	20	1%	0	0%	60	9%
Other	100	5%	210	5%	70	11%
Total:	2,220	100%	4,160	100%	660	100%

Avg Vehicle Occupancy	From District	To District	Within District
24 Hours	1.30	1.31	1.29
AM Peak Period	1.30	1.29	1.43
PM Peak Period	1.30	1.26	1.42

Transit Modal Split	From District	To District	Within District
24 Hours	10%	10%	1%
AM Peak Period	11%	34%	2%
PM Peak Period	20%	11%	2%

Rural Southeast

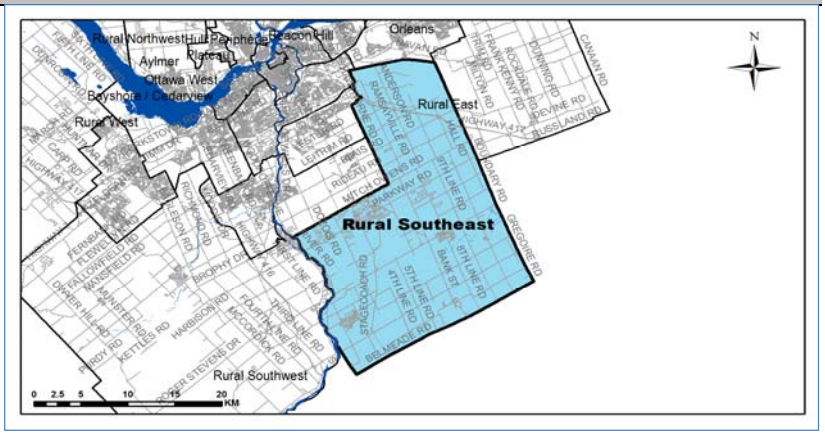
Demographic Characteristics

Population	26,840	Actively Travelled	21,350
Employed Population	13,620	Number of Vehicles	19,650
Households	9,320	Area (km^2)	508.6

Occupation Status (age 5+)	Male	Female	Total
Full Time Employed	6,760	5,460	12,230
Part Time Employed	310	1,080	1,390
Student	3,300	2,860	6,160
Retiree	2,000	2,150	4,150
Unemployed	230	190	420
Homemaker	10	610	630
Other	200	290	490
Total:	12,820	12,640	25,460

Traveller Characteristics	Male	Female	Total
Transit Pass Holders	590	700	1,290
Licensed Drivers	10,120	10,110	20,230
Telecommuters	10	80	100
Trips made by residents	32,130	35,050	67,170

Selected Indicators	
Daily Trips per Person (age 5+)	2.64
Vehicles per Person	0.73
Number of Persons per Household	2.88
Daily Trips per Household	7.21
Vehicles per Household	2.11
Workers per Household	1.46
Population Density (Pop/km2)	50

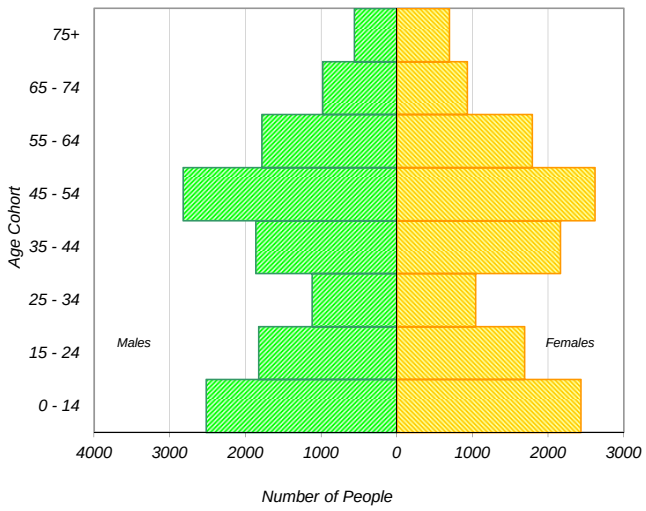


Household Size		
1 person	1,210	13%
2 persons	3,390	36%
3 persons	1,730	19%
4 persons	2,120	23%
5+ persons	880	9%
Total:	9,320	100%

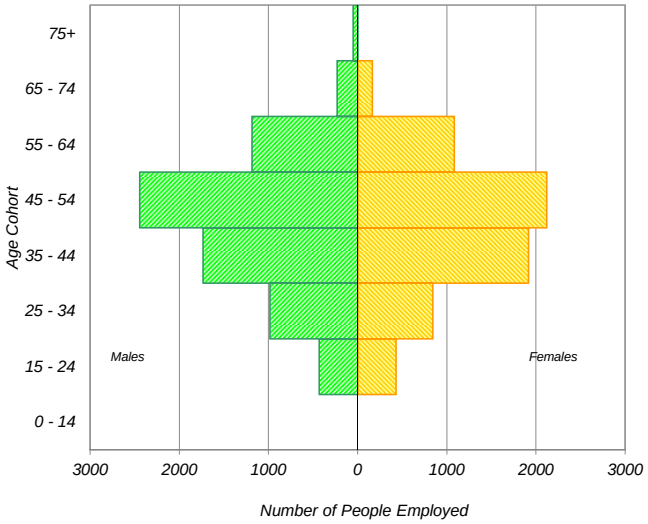
Households by Vehicle Availability		
0 vehicles	200	2%
1 vehicle	1,760	19%
2 vehicles	5,180	56%
3 vehicles	1,470	16%
4+ vehicles	710	8%
Total:	9,320	100%

Households by Dwelling Type		
Single-detached	9,020	97%
Semi-detached	70	1%
Townhouse	140	2%
Apartment/Condo	90	1%
Total:	9,320	100%

Population



Employed Population

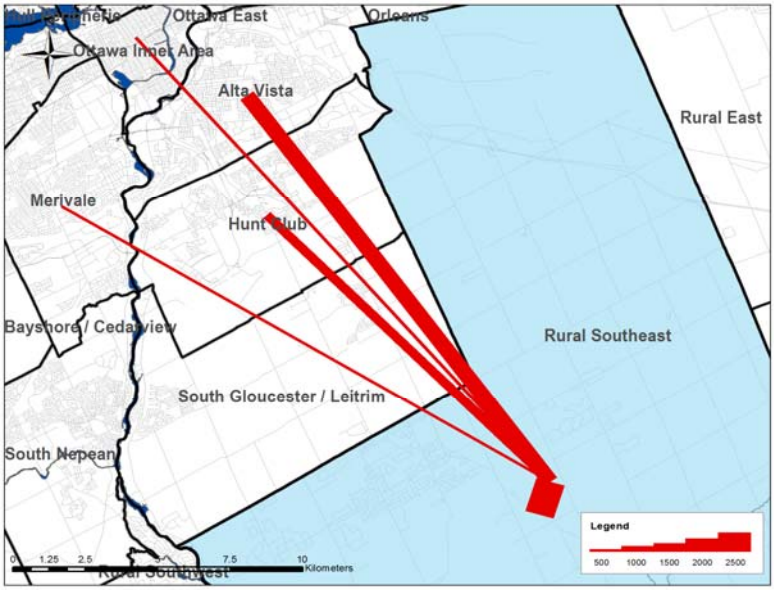


* In 2005 data was only collected for household members aged 11$^+$ therefore these results cannot be compared to the 2011 data.

Travel Patterns

Top Five Destinations of Trips from Rural Southeast

AM Peak Period



Summary of Trips to and from Rural Southeast

AM Peak Period (6:30 - 8:59) Districts	Destinations of Trips From District	% Total	Origins of Trips To District	% Total
Ottawa Centre	690	5%	20	0%
Ottawa Inner Area	830	6%	60	1%
Ottawa East	260	2%	40	1%
Beacon Hill	480	4%	10	0%
Alta Vista	1,550	12%	140	2%
Hunt Club	1,210	9%	190	3%
Merivale	960	7%	10	0%
Ottawa West	190	1%	50	1%
Bayshore / Cedarview	180	1%	40	1%
Orléans	290	2%	70	1%
Rural East	170	1%	30	0%
Rural Southeast	4,440	33%	4,440	73%
South Gloucester / Leitrim	570	4%	210	3%
South Nepean	580	4%	250	4%
Rural Southwest	520	4%	390	6%
Kanata / Stittsvile	260	2%	50	1%
Rural West	0	0%	20	0%
Île de Hull	110	1%	0	0%
Hull Périphérie	0	0%	30	0%
Plateau	0	0%	0	0%
Aylmer	0	0%	0	0%
Rural Northwest	0	0%	0	0%
Pointe Gatineau	0	0%	0	0%
Gatineau Est	0	0%	0	0%
Rural Northeast	0	0%	70	1%
Buckingham / Masson-Angers	0	0%	0	0%
Ontario Sub-Total:	13,180	99%	6,020	98%
Québec Sub-Total:	110	1%	100	2%
Total:	13,290	100%	6,120	100%

Trips by Trip Purpose

24 Hours	From District		To District		Within District	
Work or related	7,950	34%	1,470	6%	2,180	13%
School	2,360	10%	440	2%	2,570	16%
Shopping	2,600	11%	490	2%	620	4%
Leisure	2,230	9%	1,950	8%	1,270	8%
Medical	850	4%	300	1%	130	1%
Pick-up / drive passenger	2,180	9%	810	3%	1,170	7%
Return Home	3,780	16%	17,300	74%	7,300	45%
Other	1,580	7%	670	3%	1,110	7%
Total:	23,530	100%	23,430	100%	16,350	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Work or related	4,930	56%	710	42%	1,000	23%
School	1,870	21%	380	22%	2,280	51%
Shopping	270	3%	30	2%	30	1%
Leisure	140	2%	130	8%	130	3%
Medical	260	3%	20	1%	10	0%
Pick-up / drive passenger	800	9%	140	8%	380	9%
Return Home	160	2%	170	10%	230	5%
Other	440	5%	120	7%	370	8%
Total:	8,870	100%	1,700	100%	4,430	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Work or related	220	8%	60	1%	170	5%
School	50	2%	20	0%	0	0%
Shopping	450	16%	160	2%	110	3%
Leisure	530	19%	590	7%	240	7%
Medical	70	2%	70	1%	0	0%
Pick-up / drive passenger	390	14%	350	4%	210	6%
Return Home	830	29%	6,970	84%	2,670	75%
Other	320	11%	120	1%	150	4%
Total:	2,860	100%	8,340	100%	3,550	100%

Peak Period (%)	Total:	% of 24 Hours	Within District (%)
24 Hours	63,310		26%
AM Peak Period	15,000	24%	30%
PM Peak Period	14,750	23%	24%

Trips by Primary Travel Mode

24 Hours	From District		To District		Within District	
Auto Driver	16,890	72%	16,830	72%	7,750	47%
Auto Passenger	4,160	18%	4,250	18%	2,670	16%
Transit	970	4%	960	4%	40	0%
Bicycle	50	0%	20	0%	0	0%
Walk	30	0%	40	0%	1,630	10%
Other	1,460	6%	1,320	6%	4,260	26%
Total:	23,560	100%	23,420	100%	16,350	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Auto Driver	5,960	67%	1,170	69%	1,550	35%
Auto Passenger	1,270	14%	150	9%	530	12%
Transit	530	6%	0	0%	20	0%
Bicycle	20	0%	0	0%	0	0%
Walk	0	0%	30	2%	400	9%
Other	1,070	12%	350	21%	1,940	44%
Total:	8,850	100%	1,700	100%	4,440	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Auto Driver	1,830	64%	6,110	73%	1,530	43%
Auto Passenger	860	30%	1,450	17%	640	18%
Transit	90	3%	430	5%	20	1%
Bicycle	0	0%	0	0%	0	0%
Walk	0	0%	0	0%	310	9%
Other	100	3%	340	4%	1,040	29%
Total:	2,880	100%	8,330	100%	3,540	100%

Avg Vehicle Occupancy	From District	To District	Within District
24 Hours	1.25	1.25	1.34
AM Peak Period	1.21	1.13	1.34
PM Peak Period	1.47	1.24	1.42

Transit Modal Split	From District	To District	Within District
24 Hours	4%	4%	0%
AM Peak Period	7%	0%	1%
PM Peak Period	3%	5%	1%

APPENDIX F

Trip Distribution Analysis

EMPLOYEE TRIP DISTRIBUTION ANALYSIS

District	Trips entering district (am)	% Total
Ottawa Inner Area	130	1%
Ottawa East	110	1%
Beacon Hill	60	1%
Alta Vista	250	3%
Hunt Club	240	3%
Ottawa West	90	1%
Bayshore / Cedarview	60	1%
Orleans	1070	12%
Rural East	820	9%
Rural Southeast	4570	52%
South Gloucester / Leitrim	210	2%
South Nepean	270	3%
Rural Southwest	390	4%
Kanata / Stittsvile	150	2%
Ile de Hull	10	0%
Hull Periphere	10	0%
Alymer	30	0%
Pointe Gatineau	30	0%
Gatineau Est	20	0%
Rural Northeast	70	1%
Quebec	200	2%
	8790	100%

Arriving From:	Route	Total %	Rounded %
Highway 417 (West)			
Highway 417 (West)	Highway 417 (West)	24%	25%
Highway 417 (West)	Highway 417 (East)	17%	15%
Highway 417 (West)	Boundary Road (North)	18%	20%
Highway 417 (West)	Mitch Owens Road (West)	5%	5%
Highway 417 (West)	Boundary Road (South)	36%	35%
Highway 417 (West)			
Boundary Road (North)			
Highway 417 (East)			
10% Highway 417 (West), 5% Highway 417 (East), 5% Boundary Road (North), 32% Boundary Road (South)			
Mitch Owens Road (West)			
Mitch Owens Road (West)			
Boundary Road (South)			
Highway 417 (West)			
Highway 417 (West)			
Highway 417 (West)			
Highway 417 (West)			
Highway 417 (West)			
Highway 417 (West)			
Boundary Road (North)			
Highway 417 (East)			

APPENDIX G

Growth Rate Analysis

Highway 417 and Boundary Road Interchange *MTO Data*

Year	AADT	Year-to-Year Increase	Average Increase
2012	44200	-6.56%	0.19%
2013	41300	2.66%	
2014	42400	2.36%	
2015	43400	2.30%	
2016	44400		

Year	SADT	Year-to-Year Increase	Average Increase
2012	65,000	-4.62%	0.66%
2013	62,000	2.42%	
2014	63,500	2.52%	
2015	65,100	2.30%	
2016	66,600		

APPENDIX H.1

CRRRC TIS Excerpts

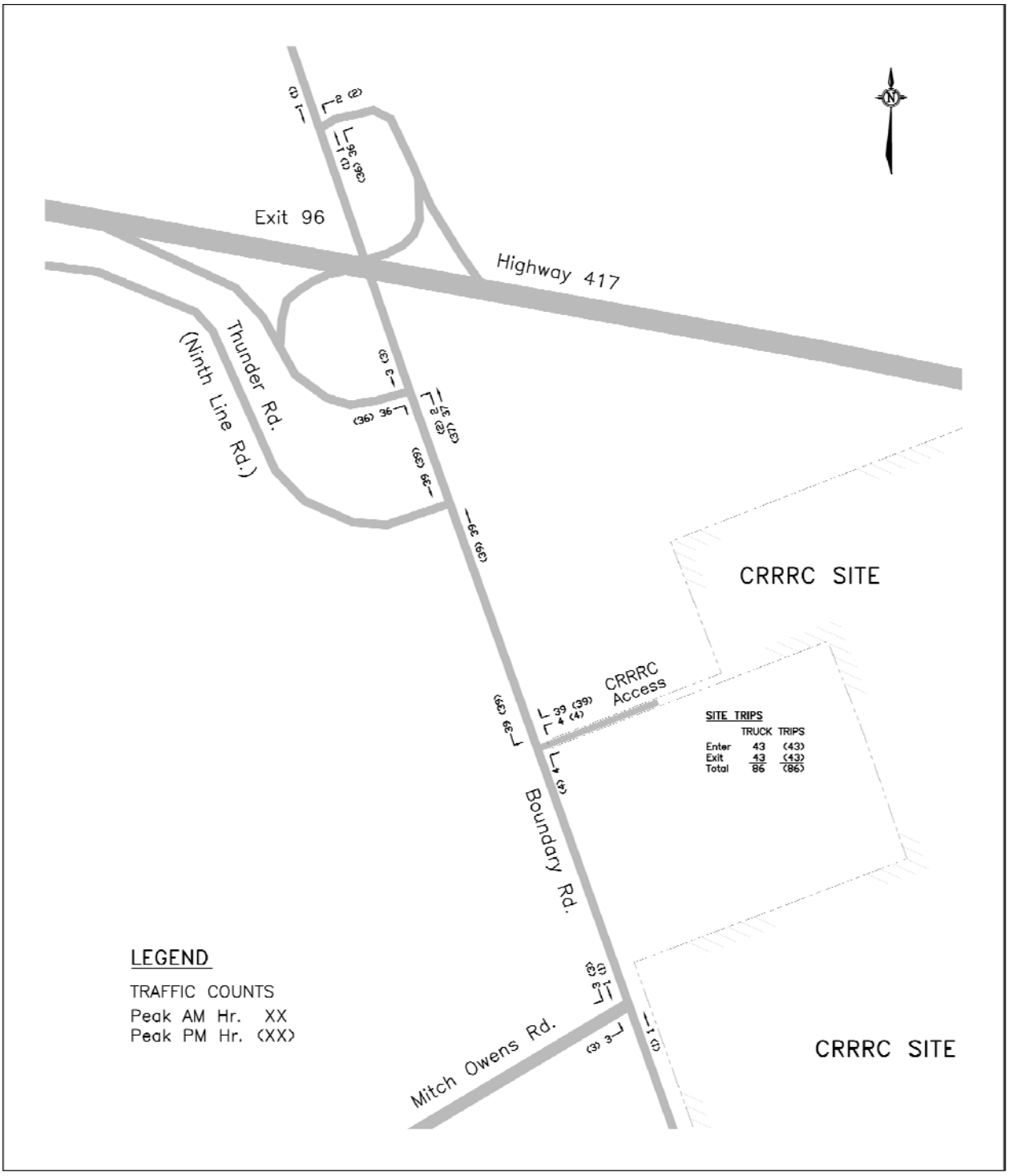


Figure 3.1: Weekday Peak AM and PM Hour Site Generated Trips

4.0 FUTURE TRAFFIC VOLUMES

This Addendum has assumed an annual compounded growth rate of 2 percent as discussed in the TIS. The growth rate was applied to all lane movements shown in the traffic counts presented in Figure 2.1 for the weekday peak AM and PM hour. Figure 4.1 shows the expected 2022 background traffic, which would represent traffic five years beyond build out from growth outside the immediate area.

The East Gateway Properties truck transfer terminal is proposed to be located on the east side of Boundary Road north of the CRRRC Site. The truck transfer terminal will have an access that will form the east access to the intersection of Boundary Road and Thunder Road. It is understood that the terminal facility expects build out by the year 2026. For the expected background traffic at the year 2027, which represents ten years beyond opening of the CRRRC Site, this Addendum has increased the existing traffic (Figure 2.1) at a 2 percent compounded rate to the year 2027, and added the expected traffic from the truck transfer terminal. The volume and distribution of trips from the proposed terminal were determined from the Transportation Impact Study report dated October 2014 for 5341 Boundary Road Transport prepared by Dillon Consulting Limited (Dillon). The Dillon TIS examined both a “Low Building Coverage” and a “High Building Coverage” scenario. As discussed at the meeting of April 22, 2015, this Addendum has utilized the traffic associated with the average of both scenarios and added the expected terminal trips to the 2027 background traffic, which is shown in Figure 4.2.

The expected total traffic volumes at the year 2022, which are shown in Figure 4.3, were determined by the addition of the expected background traffic of Figure 4.1 and the expected Site generated trips of Figure 3.1. For the expected 2027 total traffic shown in Figure 4.4, the 2027 background traffic (Figure 4.2) was added to the Site generated trips (Figure 3.1).

4.1 Traffic Analysis

The following are the results of the intersection analysis at the year 2022 (5 years beyond CRRRC Site opening), and at the year 2027 (10 years beyond opening), including the East Gateway Properties truck transfer terminal trips.

Boundary Road and CRRRC Site Access

A left turn lane warrant analysis was conducted at the Site access using the procedure documented in the MTO publication, *Geometric Design Standards for Ontario Highways*. The analysis utilized the expected 2027 traffic and a design speed of 90 km/h. (80 km./h. posted speed) at the access. The warrant analysis, which is presented in the Appendix as Exhibit 5, determined that a southbound left turn lane with 25 m for passenger car storage was required during the both the peak AM and PM hour. Utilizing a passenger car equivalent for heavy vehicles of 2.0 as documented in the MTO publication, the required length of the southbound left turn lane at the CRRRC truck access would therefore be 50 m. The following is the recommended lane configuration:

APPENDIX H.2

Novatech TIS Excerpts

NOVATECH
Engineers, Planners & Landscape Architects

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

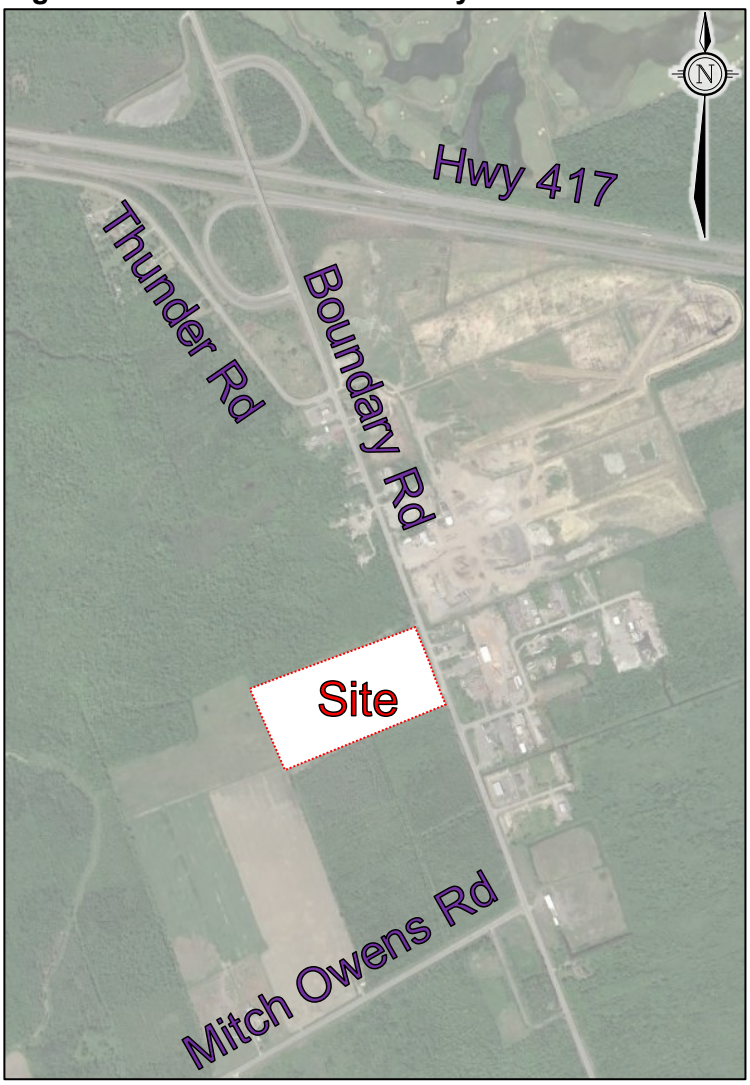
Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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 m^2 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.

5.0 FORECASTING

5.1 Development-Generated Traffic

5.1.1 Trip Generation

The proposed development consists of an approximately 5,593 m^2 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.

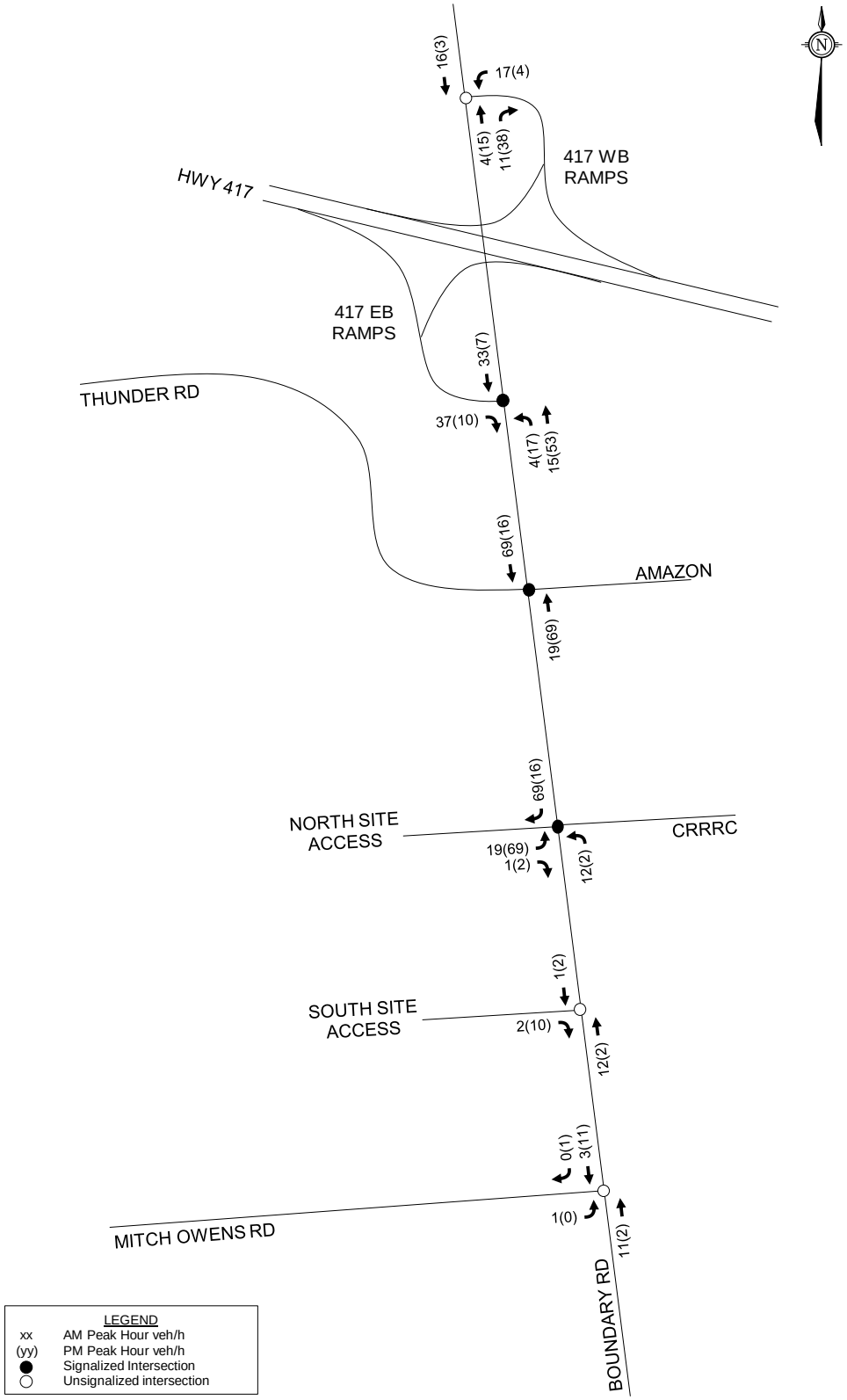
5.2.2 Background Developments

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



APPENDIX I

Vehicle Turning Analysis

STORAGE YARD

NG C

96,000sf

EV.: TBD

T: 6.1m / 20ft

N

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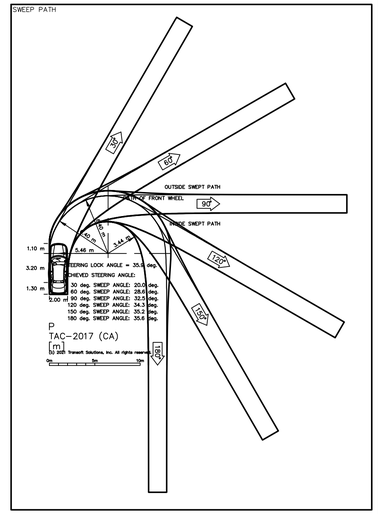
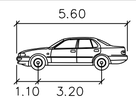
SWEEP PATH



VEHICLE PROFILE



P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

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THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

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PASSENGER CAR TURNING ANALYSIS
BUILDING C

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5 0m 5 10 15
SCALE: 1:200

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THUNDER ROAD

19.66
N 38° 05' 50" W

50" W

N 27° 32' 50" E
67.15

50

BUILDING A

GFA: 8,920sm / 96,000sf

FIN. FL. ELEV.: TBD

CLEAR HEIGHT: 6.1m / 20ft

SCALE: 1:250

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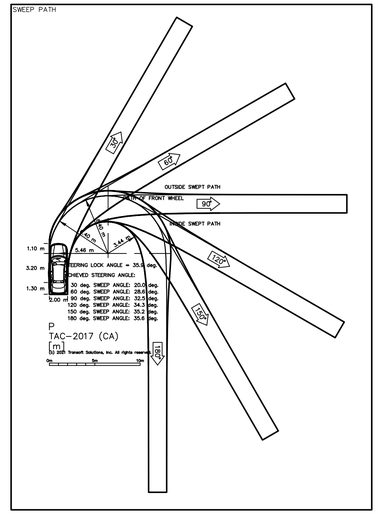

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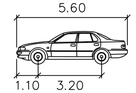

P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

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BUILDING A

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THUNDER ROAD

243.69
N 38° 05' 50" W

WB-20
TAC-2017 (CA)

WB-20
TAC-2017 (CA)

B

GFA:

FIN

CLEAR

5 0m 5 10 15
SCALE: 1:200

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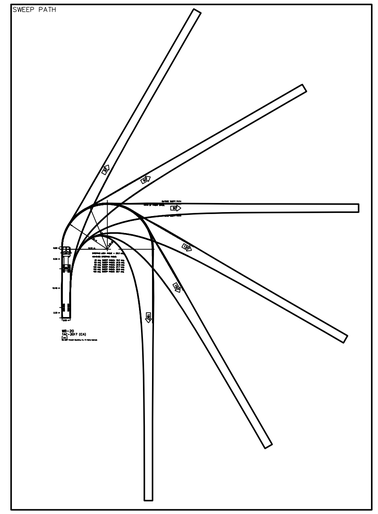
SWEEP PATH



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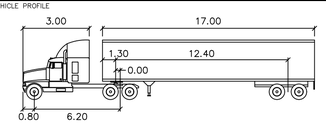

WB-20

meters

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 28.2
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

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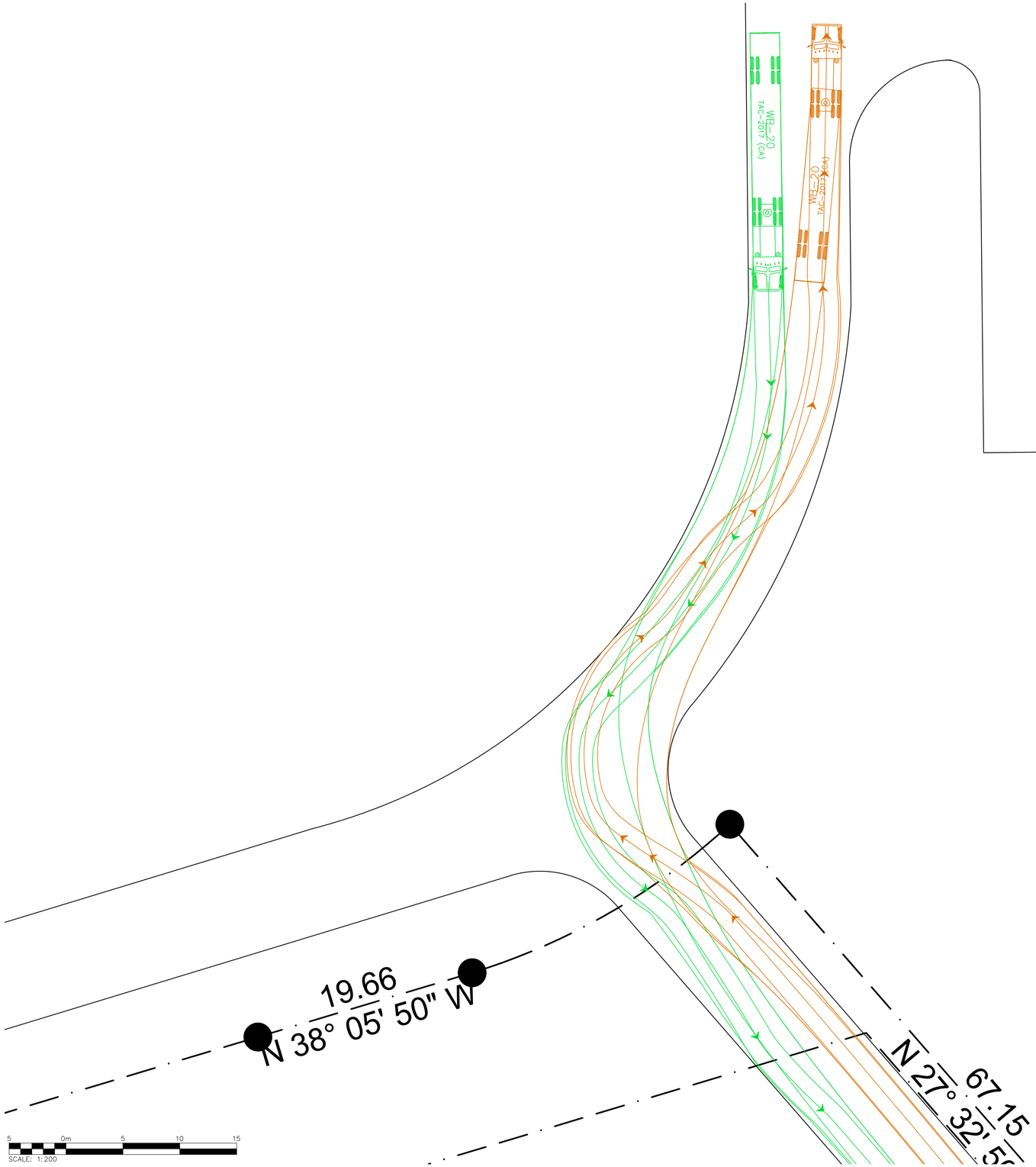

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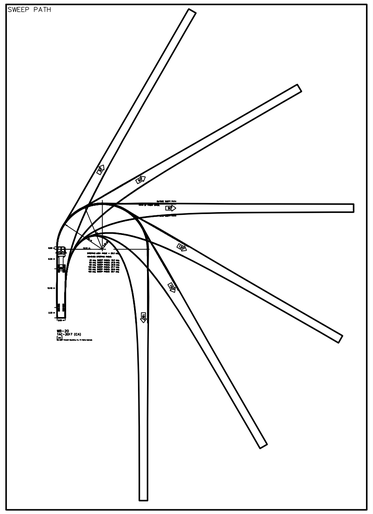
SWEEP PATH



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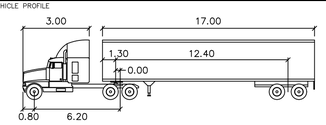

WB-20

meters

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 28.2
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

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Check By: P.A.	Check By:	Scale: 1:200	Drawing: TT 02.2

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WB-20
TAC-2017 (CA)

WB-20
TAC-2017 (CA)

82.66
N 21° 20' 40" W

30.48
N 21° 42' 20" W

43.46
N 60° 03' 40" E

43.27
N 60° 00' 45" E

30.48
N 21° 42' 20" W

16

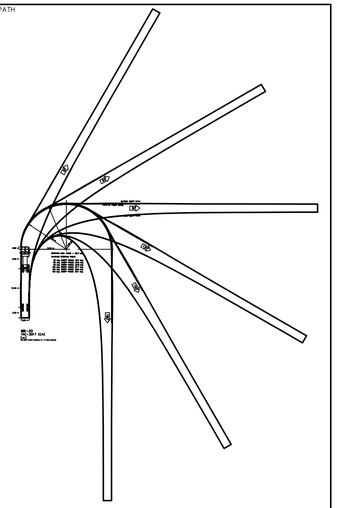
15

BUILDING E
36,000sf

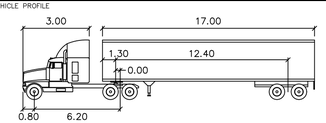
WB-20
TAC-2017 (CA)

SCALE: 1:200

SWEEP PATH



VEHICLE PROFILE



WB-20

meters

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 28.2
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

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THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

Drawing
WB-20 TURNING ANALYSIS
BUILDING E

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P.A.		1:200	TT 02.3

BOUN

THUNDER ROAD

19.66
N 38° 05' 50" W

243.69
N 38° 05' 50" W

87.15
N 27° 12' 50" E

82.66
N 21° 20' 40" W

30.48
N 24° 42' 20" W

43.46
N 60° 03' 40" E

43.27
N 60° 00' 45" E

30.48
N 21° 42' 20" W

144.83
N 60° 08' 20" E

153.71
N 60° 08' 20" E

208.40
N 60° 13' 40" E

16

15

50

61

BUILDING E
3,345sm / 36,000sf
FIN. FLR. ELEV.: TBD
CLEAR HEIGHT:
6.1m / 20ft

STORAGE YARD

34.45
N 24° 12' 40" W

63.57
N 24° 12' 40" W

BUILDING A
GFA: 8,920sm / 96,000sf
FIN. FL. ELEV.: TBD
CLEAR HEIGHT: 6.1m / 20ft

BUILDING C
8,920sm / 96,000sf
FIN. FL. ELEV.: TBD
CLEAR HEIGHT: 6.1m / 20ft

RETENTION POND

BUILDING B
GFA: 8,920sm / 96,000sf
FIN. FL. ELEV.: TBD
CLEAR HEIGHT: 7.3m / 24ft

BUILDING D
10,405sm / 112,000sf
FIN. FLR. ELEV.: TBD
CLEAR HEIGHT: 7.3m / 24ft

15 0m 15 30 45 60
SCALE: 1:750

NEWTERRA

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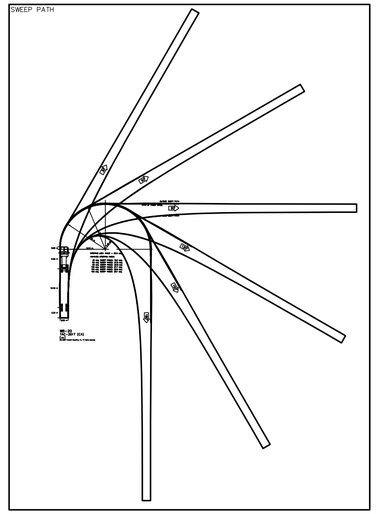
SWEEP PATH



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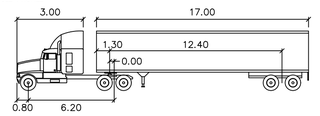

WB–20

meters

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 28.2
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

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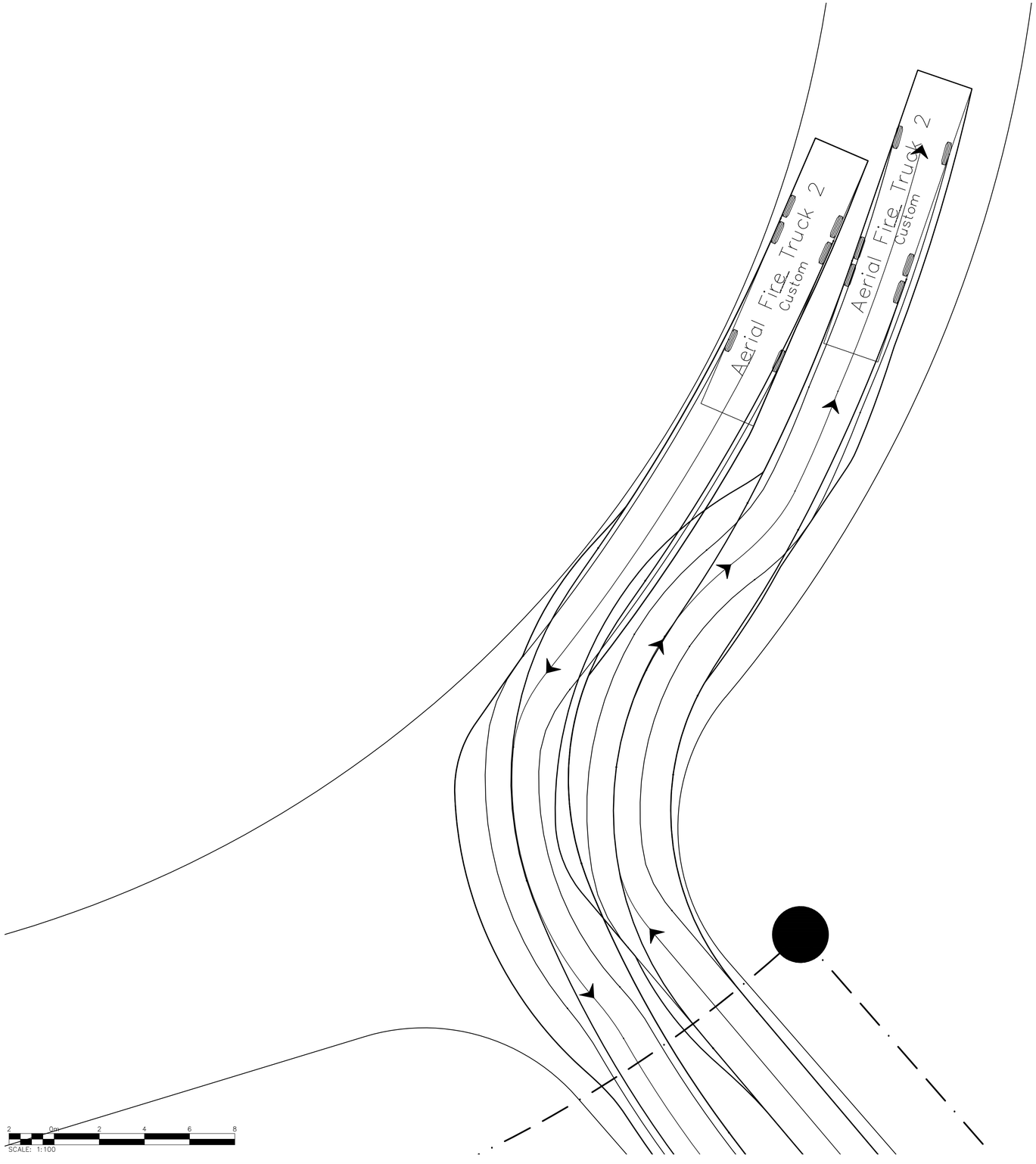

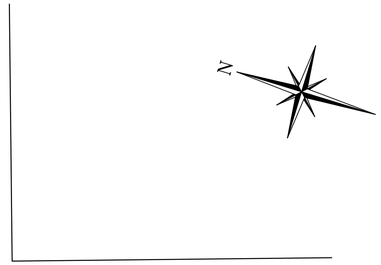

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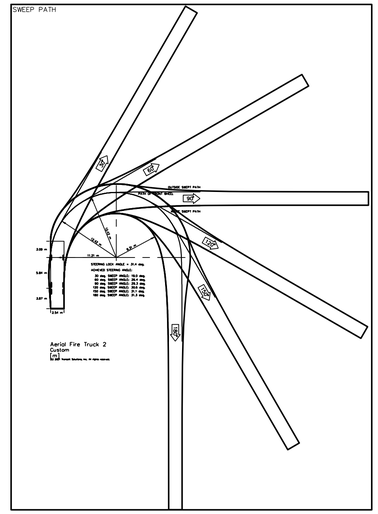
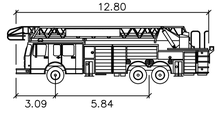
SWEEP PATH



VEHICLE PROFILE



Aerial Fire Truck 2

	meters
Width	: 2.54
Track	: 2.54
Lock to Lock Time	: 6.0
Steering Angle	: 31.4

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FIRE TRUCK TURNING ANALYSIS
BUILDING A, B, C, D

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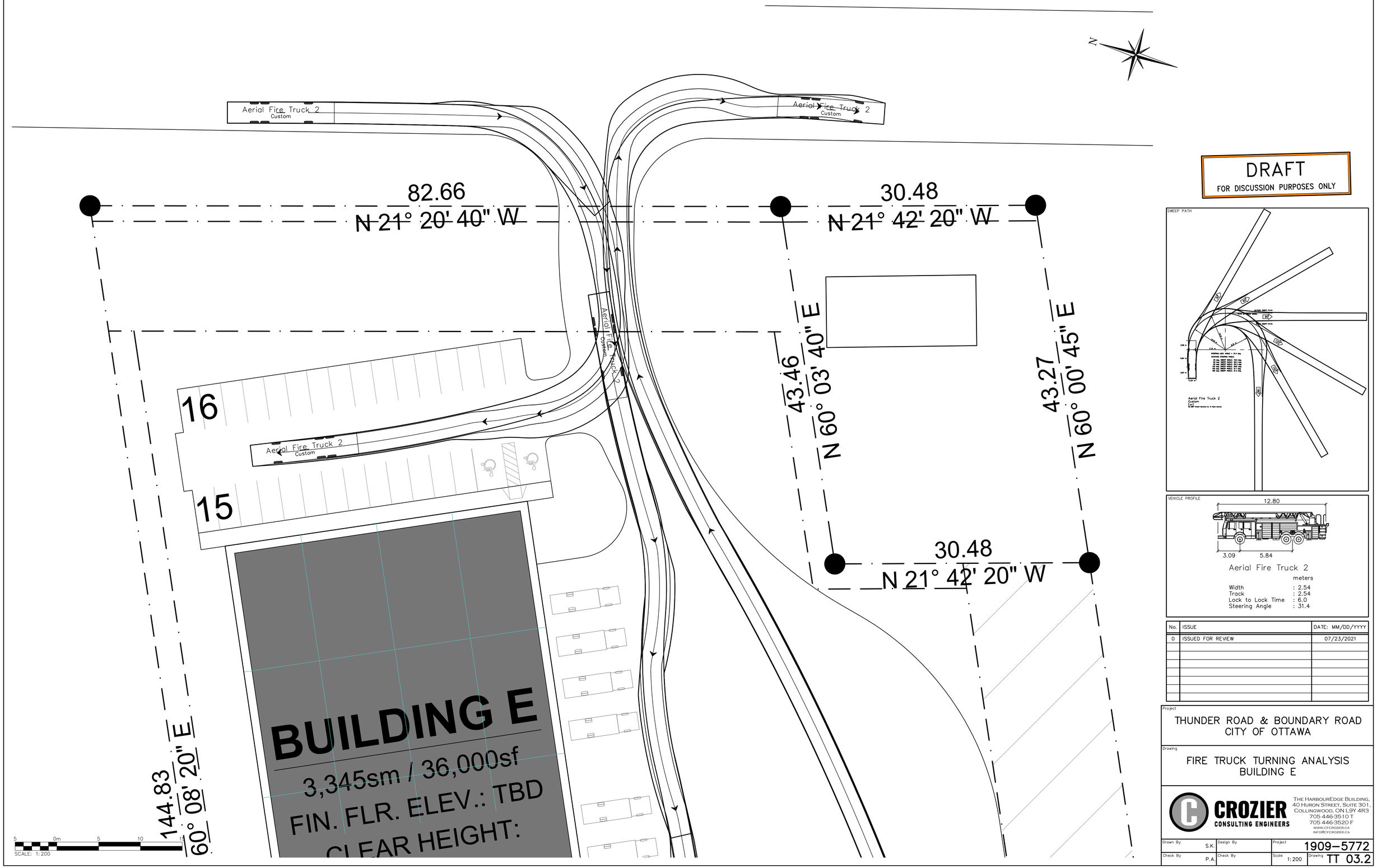

DRAFT

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SWEEP PATH

VEHICLE PROFILE

Aerial Fire Truck 2

	meters
Width	: 2.54
Track	: 2.54
Lock to Lock Time	: 6.0
Steering Angle	: 31.4

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CITY OF OTTAWA

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BUILDING E

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Check By	Check By	Scale	Drawing
P.A.		1:200	TT 03.2

THUNDER ROAD

243.69
N 38° 05' 50" W

Aerial Fire Truck 2
Custom

Aerial Fire Truck 2
Custom

Aerial Fire Truck 2
Custom

Aerial Fire Truck 2
Custom

BUILDING A

GFA: 8,920sm / 96,000sf
FIN. FL. ELEV.: TBD
CLEAR HEIGHT: 6.1m / 20f

10 0m 10 20
SCALE: 1:300

DRAFT
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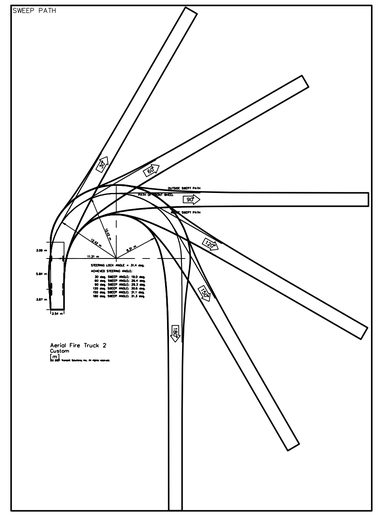
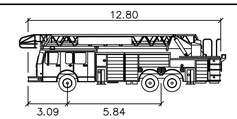
SWEEP PATH



Aerial Fire Truck 2
Custom

VEHICLE PROFILE



Aerial Fire Truck 2

	meters
Width	: 2.54
Track	: 2.54
Lock to Lock Time	: 6.0
Steering Angle	: 31.4

No.	ISSUE	DATE: MM/DD/YYYY
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Project
THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

Drawing
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BUILDING A

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Check By	Check By	Scale	Drawing
P.A.		1:300	TT 03.3

N

BOUNDARY ROAD

THUNDER ROAD

82.66
N 21° 29' 40" W

30.48
N 21° 42' 20" W

43.45
N 60° 03' 40" E

43.27
N 60° 00' 45" E

30.48
N 21° 42' 20" W

144.83
N 60° 08' 20" E

153.71
N 60° 08' 20" E

208.40
N 60° 13' 40" E

19.66
N 38° 05' 50" W

243.69
N 38° 05' 50" W

97.15
N 27° 32' 50" E

34.45
N 24° 12' 40" W

63.57
N 24° 12' 40" W

16

15

50

61

BUILDING E
3,345sm / 36,000sf
FIN. FLR. ELEV.: TBD
CLEAR HEIGHT:
6.1m / 20ft

STORAGE YARD

BUILDING A
GFA: 8,920sm / 96,000sf
FIN. FL. ELEV.: TBD
CLEAR HEIGHT: 6.1m / 20ft

BUILDING C
8,920sm / 96,000sf
FIN. FL. ELEV.: TBD
CLEAR HEIGHT: 6.1m / 20ft

BUILDING B
GFA: 8,920sm / 96,000sf
FIN. FL. ELEV.: TBD
CLEAR HEIGHT: 7.3m / 24ft

BUILDING D
10,405sm / 112,000sf
FIN. FLR. ELEV.: TBD
CLEAR HEIGHT: 7.3m / 24ft

ON

15 0m 15 30 45 60
SCALE: 1:750

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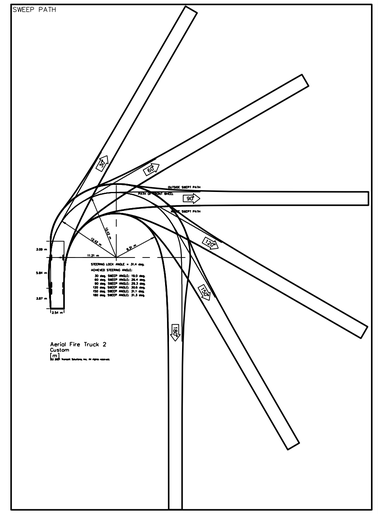
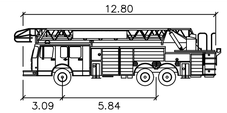
SWEEP PATH



VEHICLE PROFILE



Aerial Fire Truck 2

	meters
Width	: 2.54
Track	: 2.54
Lock to Lock Time	: 6.0
Steering Angle	: 31.4

No.	ISSUE	DATE: MM/DD/YYYY
0	ISSUED FOR REVIEW	07/23/2021

Project
THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

Drawing
FIRE TRUCK TURNING ANALYSIS
BUILDING 1

CROZIER CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
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Drawn By	Design By	Project	
S.K.			1909–5772
Check By	Check By	Scale	Drawing
P.A.		1:750	TT 03

APPENDIX J

Signal Warrant Analysis Worksheets

Canadian Traffic Signal Warrant Analysis

Main Street — **Boundary Road**

Side Street — **South Amazon Access / Site Access**

Date: September 17, 2021

City: City of Ottawa

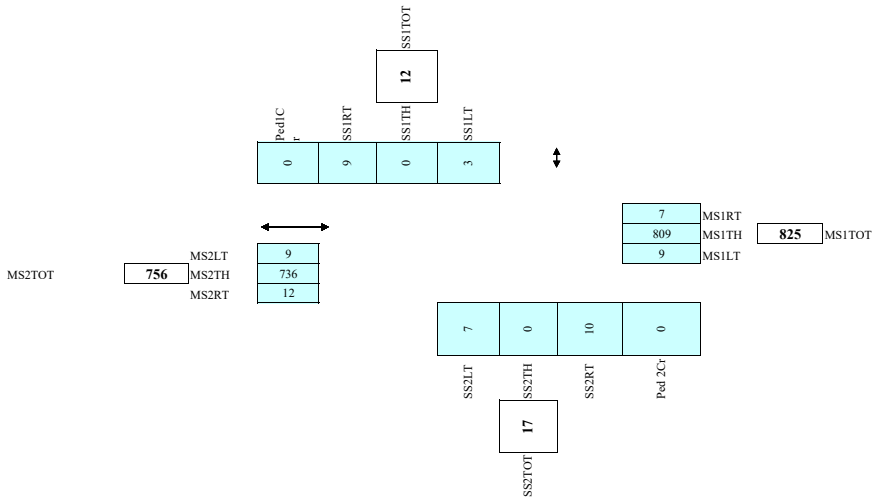
MainStreet1Lanes	(#)	1	Distance to next signal	(m)	165
MainStreet2Lanes	(#)	1	Elementary School	(y/n)	n
MainStreet LT Lanes	(#)	1	Senior's Complex	(y/n)	n
SideStreet1Lanes	(#)	1	Pathway to School	(y/n)	n
SideStreet2Lanes	(#)	1	Metro Area Population	(#)	994,837
MainStreetSpeedLimit	(km/h)	80	Side Street Bus Route	(y/n)	n
MainStreetTrucks/Buses	(%)	30.0%	Side Street Trucks	(%)	40.0%
Refuge Width on Median	(m)	0.0	T or 1-Way Intersection	(y/n)	n
			Central Business District	(y/n)	n

Vm =	**1,581**	(MainSt Vol Total)	Cs =	**0.900**	(Int SpacingFactor)
Vs =	**17**	(SideSt Vol Highest)	Cmt =	**1.150**	(MainStTruckFactor)
Pc =	**0**	Peds Crossing Main	Cv =	**1.100**	(SpeedFactor)
K1 =	**1,400**	veh/veh const	Cp =	**1.000**	(PopDemoFactor)
K2 =	**5,000**	veh/ped const	Csb =	**1.000**	(SideStBusFactor)
L =	**3.0**	TotalMainStLanes	Cst =	**1.050**	(SideStTruckFactor)
F =	**1.000**	(PedDemoFactor)	Vmx =	**825**	(MainStHighest)
Vm1 =	**1,581**	(MainStVeh-Veh#)	Vm2 =	**1,581**	(MainStVeh-Ped#)
Cvp =	**1.139**	(product of Cs,Cmt,Cv,Cp)	Cbt =	**1.050**	(maximum of Csb,Cst)
Ct1 =	**1.000**	T Int / one way Factor			

	MS1LT	MS1TH	MS1RT	MS2LT	MS2TH	MS2RT	SS1LT	SS1TH	SS1RT	SS2LT	SS2TH	SS2RT	PedC1	PedC2
7:00 - 8:00	14	1177	7	1	365	17	1	0	4	7	0	4	0	0
8:00 - 9:00	14	1177	7	1	365	17	1	0	4	7	0	4	0	0
11:00 - 12:00	14	1177	7	1	365	17	1	0	4	7	0	4	0	0
12:00 - 13:00	4	441	7	16	1106	7	4	0	14	7	0	15	0	0
16:00 - 17:00	4	441	7	16	1106	7	4	0	14	7	0	15	0	0
17:00 - 18:00	4	441	7	16	1106	7	4	0	14	7	0	15	0	0
Average	9	809	7	9	736	12	3	0	9	7	0	10	0	0

***** Enter the hourly turning movement counts averaged over the peak six hours of a typical week day**

***** Enter the peak pedestrian volume crossing the main street averaged over the same hours**



W = [Ct1xCbt(Vm1 x Vs)/K1 + (F(Vm2 x Pc)L)/K2] x Cvp

W = **22** **22** **0**

Not Warranted - Vs<75 ***Veh*** ***Ped***

Roadway, Vehicle and Pedestrian Factors			Range			
			Min	@	Max	@
Cs =	(Int SpacingFactor)		0.90	<200 m	1.10	isolated
Cmt =	(MainStTruckFactor)		1.00	<5%	1.15	>20%
Cv =	(SpeedFactor)		1.00	<60 km/h	1.10	>80 km/h
Cp =	(PopDemoFactor)		1.00	>250,000	1.20	<10,000
Csb =	(SideStBusFactor)		1.00	no	1.05	yes
Cst =	(SideStTruckFactor)		1.00	<10%	1.05	>10%
F =	(Ped DemoFactor)					
	(max of)	Elementary School	1.20			
		Seniors Complex	1.10			
		Path to School	1.10			

Explanation of Factors:

Cbt = 1.05 if the side street either is a bus route, or has more than 10% trucks, otherwise = 1.00.
(it is assumed that these two factors only affect the side street vehicles trying to cross the main street, not the pedestrians)

Ci = the product of the other 4 geographic factors
(Cs = intersection spacing, Cmt = main street truck, Cv = Speed, Cp = Population)

Vm1 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=10.0 metres) (averaged over 6 peak hours)

Vm2 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=6.0 metres) (averaged over 6 peak hours)

Vs = the highest side street approach volume (averaged over 6 peak hours)
*** note: it has been determined that Vs must be > 75 for signals to be considered ***

F = Pedestrian demographic factor - the maximum of the 3 individual pedestrian demographic factors

Pc = the total pedestrian volume crossing the mainstreet
(averaged over 6 peak hours)

L = number of lanes that the pedestrians have to cross
(only half the street if the median is >=5.0 metres)

Kv = Vehicle - Vehicle denominator constant
(Kv = 1,100 if L<=3, Kv = 1,400 if L >3)

Kp = Vehicle - Pedestrian denominator constant
(Kp = 2,000 if L<=3, Kp = 5,000 if L >3)

Canadian Traffic Signal Warrant Analysis

Main Street
Side Street

Thunder Raod
Site Access A

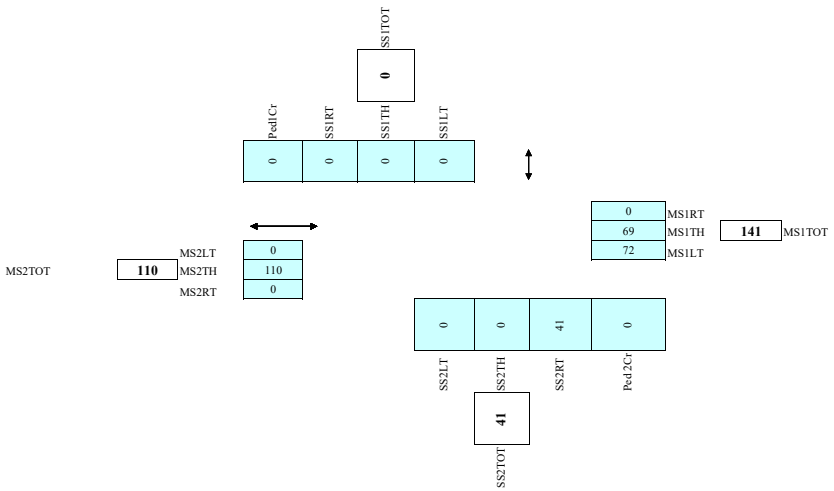
Date: July 22, 2021
City: City of Ottawa

MainStreet1Lanes	(#)	1	Distance to next signal	(m)	100	Vm =	**251**	(MainSt Vol Total)	Cs =	**0.900**	(Int SpacingFactor)
MainStreet2Lanes	(#)	1	Elementary School	(y/n)	n	Vs =	**41**	(SideSt Vol Highest)	Cmt =	**1.150**	(MainStTruckFactor)
MainStreet LT Lanes	(#)	0	Senior's Complex	(y/n)	n	Pc =	**0**	Peds Crossing Main	Cv =	**1.000**	(SpeedFactor)
SideStreet1Lanes	(#)	0	Pathway to School	(y/n)	n	K1 =	**1,100**	veh/veh const	Cp =	**1.000**	(PopDemoFactor)
SideStreet2Lanes	(#)	1	Metro Area Population	(#)	994,837	K2 =	**2,000**	veh/ped const	Csb =	**1.000**	(SideStBusFactor)
MainStreetSpeedLimit	(km/h)	60	Side Street Bus Route	(y/n)	n	L =	**2.0**	TotalMainStLanes	Cst =	**1.050**	(SideStTruckFactor)
MainStreetTrucks/Buses	(%)	30.0%	Side Street Trucks	(%)	40.0%	F =	**1.000**	(PedDemoFactor)	Vmx =	**141**	(MainStHighest)
Refuge Width on Median	(m)	0.0	T or 1-Way Intersection	(y/n)	y	Vm1 =	**251**	(MainStVeh-Veh#)	Vm2 =	**251**	(MainStVeh-Ped#)
			Central Business District	(y/n)	n	Cvp =	**1.035**	(product of Cs,Cmt,Cv,Cp)	Cbt =	**1.050**	(maximum of Csb,Cst)
						Ct1 =	**0.667**	T Int / one way Factor			

	MS1LT	MS1TH	MS1RT	MS2LT	MS2TH	MS2RT	SS1LT	SS1TH	SS1RT	SS2LT	SS2TH	SS2RT	PedC1	PedC2
7:00 - 8:00	51	119	0	0	78	0	0	0	0	0	0	19	0	0
8:00 - 9:00	51	119	0	0	78	0	0	0	0	0	0	19	0	0
11:00 - 12:00	51	119	0	0	78	0	0	0	0	0	0	19	0	0
12:00 - 13:00	93	19	0	0	141	0	0	0	0	0	0	62	0	0
16:00 - 17:00	93	19	0	0	141	0	0	0	0	0	0	62	0	0
17:00 - 18:00	93	19	0	0	141	0	0	0	0	0	0	62	0	0
Average	72	69	0	0	110	0	0	0	0	0	0	41	0	0

***** Enter the hourly turning movement counts averaged over the peak six hours of a typical week day**

***** Enter the peak pedestrian volume crossing the main street averaged over the same hours**



W = [Ct1xCbt(Vm1 x Vs)/K1 + (F(Vm2 x Pc)L)/K2] x Cvp

W = 7 7 0

Not Warranted - Vs<75 *Veh* *Ped*

Roadway, Vehicle and Pedestrian Factors			Range			
			Min	@	Max	@
Cs =	(Int SpacingFactor)		0.90	<200 m	1.10	isolated
Cmt =	(MainStTruckFactor)		1.00	<5%	1.15	>20%
Cv =	(SpeedFactor)		1.00	<60 km/h	1.10	>80 km/h
Cp =	(PopDemoFactor)		1.00	>250,000	1.20	<10,000
Csb =	(SideStBusFactor)		1.00	no	1.05	yes
Cst =	(SideStTruckFactor)		1.00	<10%	1.05	>10%
F =	(Ped DemoFactor)					
	(max of)	Elementary School	1.20			
		Seniors Complex	1.10			
		Path to School	1.10			

Explanation of Factors:

Cbt = 1.05 if the side street either is a bus route, or has more than 10% trucks, otherwise = 1.00.
(it is assumed that these two factors only affect the side street vehicles trying to cross the main street, not the pedestrians)

Ci = the product of the other 4 geographic factors
(Cs = intersection spacing, Cmt = main street truck, Cv = Speed, Cp = Population)

Vm1 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=10.0 metres) (averaged over 6 peak hours)

Vm2 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=6.0 metres) (averaged over 6 peak hours)

Vs = the highest side street approach volume (averaged over 6 peak hours)
*** note: it has been determined that Vs must be > 75 for signals to be considered ***

F = Pedestrian demographic factor - the maximum of the 3 individual pedestrian demographic factors

Pc = the total pedestrian volume crossing the mainstreet
(averaged over 6 peak hours)

L = number of lanes that the pedestrians have to cross
(only half the street if the median is >=5.0 metres)

Kv = Vehicle - Vehicle denominator constant
(Kv = 1,100 if L<=3, Kv = 1,400 if L >3)

Kp = Vehicle - Pedestrian denominator constant
(Kp = 2,000 if L<=3, Kp = 5,000 if L >3)

Canadian Traffic Signal Warrant Analysis

Main Street
Side Street

Thunder Raod
Site Access B

Date: July 22, 2021
City: City of Ottawa

MainStreet1Lanes	(#)	1
MainStreet2Lanes	(#)	1
MainStreet LT Lanes	(#)	0
SideStreet1Lanes	(#)	0
SideStreet2Lanes	(#)	1
MainStreetSpeedLimit	(km/h)	60
MainStreetTrucks/Buses	(%)	30.0%
Refuge Width on Median	(m)	0.0

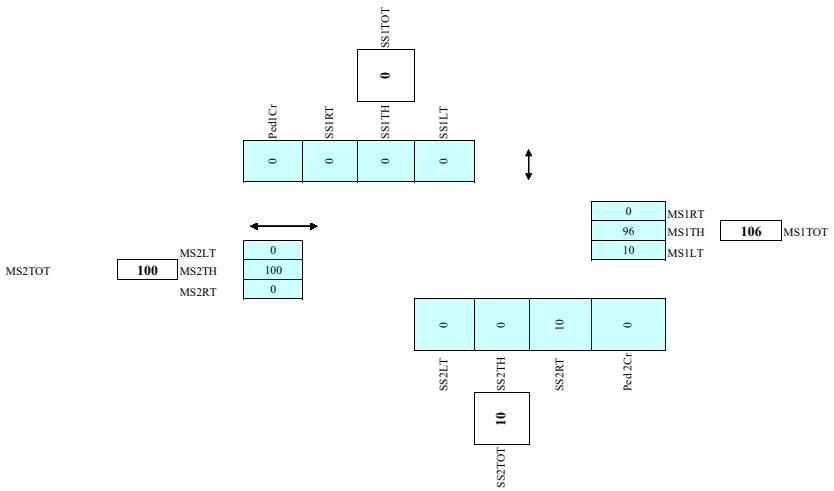
Distance to next signal	(m)	100
Elementary School	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	994,837
Side Street Bus Route	(y/n)	n
Side Street Trucks	(%)	40.0%
T or 1-Way Intersection	(y/n)	y
Central Business District	(y/n)	n

Vm =	**206**	(MainSt Vol Total)	Cs =	**0.900**	(Int SpacingFactor)
Vs =	**10**	(SideSt Vol Highest)	Cmt =	**1.150**	(MainStTruckFactor)
Pc =	**0**	Peds Crossing Main	Cv =	**1.000**	(SpeedFactor)
K1 =	**1,100**	veh/veh const	Cp =	**1.000**	(PopDemoFactor)
K2 =	**2,000**	veh/ped const	Csb =	**1.000**	(SideStBusFactor)
L =	**2.0**	TotalMainStLanes	Cst =	**1.050**	(SideStTruckFactor)
F =	**1.000**	(PedDemoFactor)	Vmx =	**106**	(MainStHighest)
Vm1 =	**206**	(MainStVeh-Veh#)	Vm2 =	**206**	(MainStVeh-Ped#)
Cvp =	**1.035**	(product of Cs,Cmt,Cv,Cp)	Cbt =	**1.050**	(maximum of Csb,Cst)
Ct1 =	**0.667**	T Int / one way Factor			

	MS1LT	MS1TH ←	MS1RT	MS2LT	MS2TH →	MS2RT	SS1LT	SS1TH ↓	SS1RT	SS2LT	SS2TH ↑	SS2RT	PedC1	PedC2
7:00 - 8:00	15	104	0	0	74	0	0	0	0	0	0	4	0	0
8:00 - 9:00	15	104	0	0	74	0	0	0	0	0	0	4	0	0
11:00 - 12:00	15	104	0	0	74	0	0	0	0	0	0	4	0	0
12:00 - 13:00	5	88	0	0	126	0	0	0	0	0	0	15	0	0
16:00 - 17:00	5	88	0	0	126	0	0	0	0	0	0	15	0	0
17:00 - 18:00	5	88	0	0	126	0	0	0	0	0	0	15	0	0
Average	10	96	0	0	100	0	0	0	0	0	0	10	0	0

***** Enter the hourly turning movement counts averaged over the peak six hours of a typical week day**

***** Enter the peak pedestrian volume crossing the main street averaged over the same hours**



W = [Ct1xCbt(Vm1 x Vs)/K1 + (F(Vm2 x Pc)L)/K2] x Cvp

W = 1 1 0

Not Warranted - Vs<75 *Veh* *Ped*

Roadway, Vehicle and Pedestrian Factors			Range			
			Min	@	Max	@
Cs =	(Int SpacingFactor)		0.90	<200 m	1.10	isolated
Cmt =	(MainStTruckFactor)		1.00	<5%	1.15	>20%
Cv =	(SpeedFactor)		1.00	<60 km/h	1.10	>80 km/h
Cp =	(PopDemoFactor)		1.00	>250,000	1.20	<10,000
Csb =	(SideStBusFactor)		1.00	no	1.05	yes
Cst =	(SideStTruckFactor)		1.00	<10%	1.05	>10%
F =	(Ped DemoFactor)					
	(max of)	Elementary School	1.20			
		Seniors Complex	1.10			
		Path to School	1.10			

Explanation of Factors:

Cbt = 1.05 if the side street either is a bus route, or has more than 10% trucks, otherwise = 1.00.
(it is assumed that these two factors only affect the side street vehicles trying to cross the main street, not the pedestrians)

Ci = the product of the other 4 geographic factors
(Cs = intersection spacing, Cmt = main street truck, Cv = Speed, Cp = Population)

Vm1 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=10.0 metres) (averaged over 6 peak hours)

Vm2 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=6.0 metres) (averaged over 6 peak hours)

Vs = the highest side street approach volume (averaged over 6 peak hours)
*** note: it has been determined that Vs must be > 75 for signals to be considered ***

F = Pedestrian demographic factor - the maximum of the 3 individual pedestrian demographic factors

Pc = the total pedestrian volume crossing the mainstreet
(averaged over 6 peak hours)

L = number of lanes that the pedestrians have to cross
(only half the street if the median is >=5.0 metres)

Kv = Vehicle - Vehicle denominator constant
(Kv = 1,100 if L<=3, Kv = 1,400 if L >3)

Kp = Vehicle - Pedestrian denominator constant
(Kp = 2,000 if L<=3, Kp = 5,000 if L >3)

Canadian Traffic Signal Warrant Analysis

Main Street | **Thunder Raod**

Side Street | **Site Access C**

Date: July 22, 2021

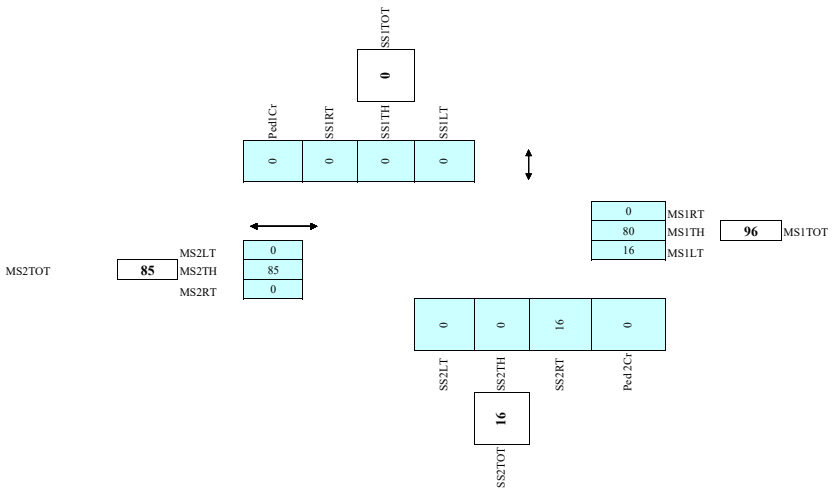
City: City of Ottawa

MainStreet1Lanes	(#)	1	Distance to next signal	(m)	100	Vm =	**181**	(MainSt Vol Total)	Cs =	**0.900**	(Int SpacingFactor)
MainStreet2Lanes	(#)	1	Elementary School	(y/n)	n	Vs =	**16**	(SideSt Vol Highest)	Cmt =	**1.150**	(MainStTruckFactor)
MainStreet LT Lanes	(#)	0	Senior's Complex	(y/n)	n	Pc =	**0**	Peds Crossing Main	Cv =	**1.000**	(SpeedFactor)
SideStreet1Lanes	(#)	0	Pathway to School	(y/n)	n	K1 =	**1,100**	veh/veh const	Cp =	**1.000**	(PopDemoFactor)
SideStreet2Lanes	(#)	1	Metro Area Population	(#)	994,837	K2 =	**2,000**	veh/ped const	Csb =	**1.000**	(SideStBusFactor)
MainStreetSpeedLimit	(km/h)	60	Side Street Bus Route	(y/n)	n	L =	**2.0**	TotalMainStLanes	Cst =	**1.050**	(SideStTruckFactor)
MainStreetTrucks/Buses	(%)	30.0%	Side Street Trucks	(%)	40.0%	F =	**1.000**	(PedDemoFactor)	Vmx =	**96**	(MainStHighest)
Refuge Width on Median	(m)	0.0	T or 1-Way Intersection	(y/n)	y	Vm1 =	**181**	(MainStVeh-Veh#)	Vm2 =	**181**	(MainStVeh-Ped#)
			Central Business District	(y/n)	n	Cvp =	**1.035**	(product of Cs,Cmt,Cv,Cp)	Cbt =	**1.050**	(maximum of Csb,Cst)
						Ct1 =	**0.667**	T Int / one way Factor			

	MS1LT	MS1TH	MS1RT	MS2LT	MS2TH	MS2RT	SS1LT	SS1TH	SS1RT	SS2LT	SS2TH	SS2RT	PedC1	PedC2
7:00 - 8:00	23	81	0	0	67	0	0	0	0	0	0	7	0	0
8:00 - 9:00	23	81	0	0	67	0	0	0	0	0	0	7	0	0
11:00 - 12:00	23	81	0	0	67	0	0	0	0	0	0	7	0	0
12:00 - 13:00	9	79	0	0	102	0	0	0	0	0	0	24	0	0
16:00 - 17:00	9	79	0	0	102	0	0	0	0	0	0	24	0	0
17:00 - 18:00	9	79	0	0	102	0	0	0	0	0	0	24	0	0
Average	16	80	0	0	85	0	0	0	0	0	0	16	0	0

***** Enter the hourly turning movement counts averaged over the peak six hours of a typical week day**

***** Enter the peak pedestrian volume crossing the main street averaged over the same hours**



W = [Ct1xCbt(Vm1 x Vs)/K1 + (F(Vm2 x Pc)L)/K2] x Cvp

W = **2** **2** **0**

Not Warranted - Vs<75 ***Veh*** ***Ped***

Roadway, Vehicle and Pedestrian Factors			Range			
			Min	@	Max	@
Cs =	(Int SpacingFactor)		0.90	<200 m	1.10	isolated
Cmt =	(MainStTruckFactor)		1.00	<5%	1.15	>20%
Cv =	(SpeedFactor)		1.00	<60 km/h	1.10	>80 km/h
Cp =	(PopDemoFactor)		1.00	>250,000	1.20	<10,000
Csb =	(SideStBusFactor)		1.00	no	1.05	yes
Cst =	(SideStTruckFactor)		1.00	<10%	1.05	>10%
F =	(Ped DemoFactor)					
	(max of)	Elementary School	1.20			
		Seniors Complex	1.10			
		Path to School	1.10			

Explanation of Factors:

Cbt = 1.05 if the side street either is a bus route, or has more than 10% trucks, otherwise = 1.00.
(it is assumed that these two factors only affect the side street vehicles trying to cross the main street, not the pedestrians)

Ci = the product of the other 4 geographic factors
(Cs = intersection spacing, Cmt = main street truck, Cv = Speed, Cp = Population)

Vm1 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=10.0 metres) (averaged over 6 peak hours)

Vm2 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=6.0 metres) (averaged over 6 peak hours)

Vs = the highest side street approach volume (averaged over 6 peak hours)
*** note: it has been determined that Vs must be > 75 for signals to be considered ***

F = Pedestrian demographic factor - the maximum of the 3 individual pedestrian demographic factors

Pc = the total pedestrian volume crossing the mainstreet
(averaged over 6 peak hours)

L = number of lanes that the pedestrians have to cross
(only half the street if the median is >=5.0 metres)

Kv = Vehicle - Vehicle denominator constant
(Kv = 1,100 if L<=3, Kv = 1,400 if L >3)

Kp = Vehicle - Pedestrian denominator constant
(Kp = 2,000 if L<=3, Kp = 5,000 if L >3)

Canadian Traffic Signal Warrant Analysis

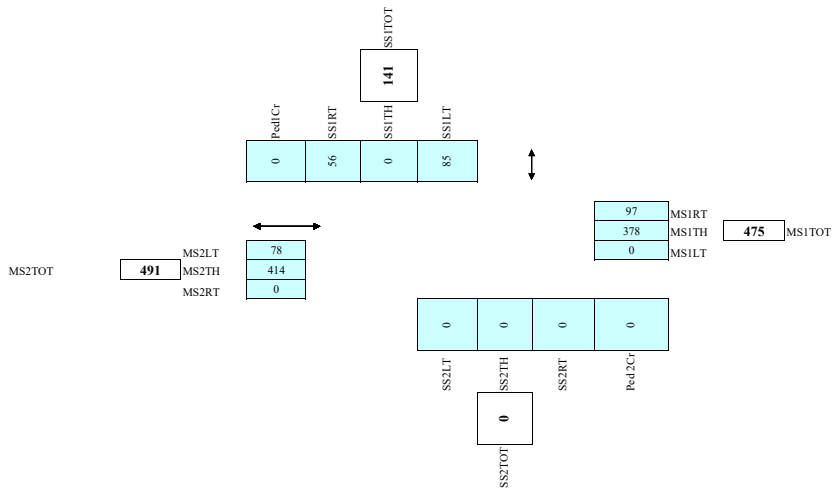
Main Street	**Thunder Road**	**Date:** July 22, 2021
Side Street	**Mitchel Owens**	**City:** City of Ottawa

MainStreet1Lanes	(#)	1	Distance to next signal	(m)	1,000	Vm =	**966**	(MainSt Vol Total)	Cs = **1.041** (Int SpacingFactor)
MainStreet2Lanes	(#)	1	Elementary School	(y/n)	n	Vs =	**141**	(SideSt Vol Highest)	Cmt = **1.150** (MainStTruckFactor)
MainStreet LT Lanes	(#)	0	Senior's Complex	(y/n)	n	Pc =	**0**	Peds Crossing Main	Cv = **1.100** (SpeedFactor)
SideStreet1Lanes	(#)	1	Pathway to School	(y/n)	n	K1 =	**1,100**	veh/veh const	Cp = **1.000** (PopDemoFactor)
SideStreet2Lanes	(#)	0	Metro Area Population	(#)	994,837	K2 =	**2,000**	veh/ped const	Csb = **1.000** (SideStBusFactor)
MainStreetSpeedLimit	(km/h)	80	Side Street Bus Route	(y/n)	n	L =	**2.0**	TotalMainStLanes	Cst = **1.050** (SideStTruckFactor)
MainStreetTrucks/Buses	(%)	40.0%	Side Street Trucks	(%)	25.0%	F =	**1.000**	(PedDemoFactor)	Vmx = **491** (MainStHighest)
Refuge Width on Median	(m)	0.0	T or 1-Way Intersection	(y/n)	y	Vm1 =	**966**	(MainStVeh-Veh#)	Vm2 = **966** (MainStVeh-Ped#)
			Central Business District	(y/n)	n	Cvp =	**1.316**	(product of Cs,Cmt,Cv,Cp)	Cbt = **1.050** (maximum of Csb,Cst)
						Ct1 =	**0.667**	T Int / one way Factor	

	MS1LT	MS1TH	MS1RT	MS2LT	MS2TH	MS2RT	SS1LT	SS1TH	SS1RT	SS2LT	SS2TH	SS2RT	PedC1	PedC2
7:00 - 8:00	0	158	131	163	1073	0	100	0	36	0	0	0	0	0
8:00 - 9:00	0	283	73	58	310	0	64	0	42	0	0	0	0	0
11:00 - 12:00	0	283	73	58	310	0	64	0	42	0	0	0	0	0
12:00 - 13:00	0	283	73	58	310	0	64	0	42	0	0	0	0	0
16:00 - 17:00	0	283	73	58	310	0	64	0	42	0	0	0	0	0
17:00 - 18:00	0	975	160	70	168	0	156	0	132	0	0	0	0	0
Average	0	378	97	78	414	0	85	0	56	0	0	0	0	0

***** Enter the hourly turning movement counts averaged over the peak six hours of a typical week day**

***** Enter the peak pedestrian volume crossing the main street averaged over the same hours**



W = [Ct1xCbt(Vm1 x Vs)/K1 + (F(Vm2 x Pc)L)/K2] x Cvp

W =	**114**	**114**	**0**
	Warranted	***Veh***	***Ped***

Roadway, Vehicle and Pedestrian Factors			**Range**			
			Min	**@**	**Max**	**@**
Cs =	(Int SpacingFactor)		0.90	<200 m	1.10	isolated
Cmt =	(MainStTruckFactor)		1.00	<5%	1.15	>20%
Cv =	(SpeedFactor)		1.00	<60 km/h	1.10	>80 km/h
Cp =	(PopDemoFactor)		1.00	>250,000	1.20	<10,000
Csb =	(SideStBusFactor)		1.00	no	1.05	yes
Cst =	(SideStTruckFactor)		1.00	<10%	1.05	>10%
F =	(Ped DemoFactor)					
	(max of)	Elementary School	1.20			
		Seniors Complex	1.10			
		Path to School	1.10			

Explanation of Factors:

Cbt = 1.05 if the side street either is a bus route, or has more than 10% trucks, otherwise = 1.00.
(it is assumed that these two factors only affect the side street vehicles trying to cross the main street, not the pedestrians)

Ci = the product of the other 4 geographic factors
(Cs = intersection spacing, Cmt = main street truck, Cv = Speed, Cp = Population)

Vm1 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=10.0 metres) (averaged over 6 peak hours)

Vm2 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=6.0 metres) (averaged over 6 peak hours)

Vs = the highest side street approach volume (averaged over 6 peak hours)
*** note: it has been determined that Vs must be > 75 for signals to be considered ***

F = Pedestrian demographic factor - the maximum of the 3 individual pedestrian demographic factors

Pc = the total pedestrian volume crossing the mainstreet
(averaged over 6 peak hours)

L = number of lanes that the pedestrians have to cross
(only half the street if the median is >=5.0 metres)

Kv = Vehicle - Vehicle denominator constant
(Kv = 1,100 if L<=3, Kv = 1,400 if L >3)

Kp = Vehicle - Pedestrian denominator constant
(Kp = 2,000 if L<=3, Kp = 5,000 if L >3)

Canadian Traffic Signal Warrant Analysis

		Thunder Road			
Main Street					
Side Street		**Highway 417 WB Ramp**			
MainStreet1Lanes	(#)	1	Distance to next signal	(m)	550
MainStreet2Lanes	(#)	1	Elementary School	(y/n)	n
MainStreet LT Lanes	(#)	0	Senior's Complex	(y/n)	n
SideStreet1Lanes	(#)	0	Pathway to School	(y/n)	n
SideStreet2Lanes	(#)	1	Metro Area Population	(#)	994,837
MainStreetSpeedLimit	(km/h)	80	Side Street Bus Route	(y/n)	n
MainStreetTrucks/Buses	(%)	13.0%	Side Street Trucks	(%)	20.0%
Refuge Width on Median	(m)	0.0	T or 1-Way Intersection	(y/n)	y
			Central Business District	(y/n)	n

Date: September 17, 2021

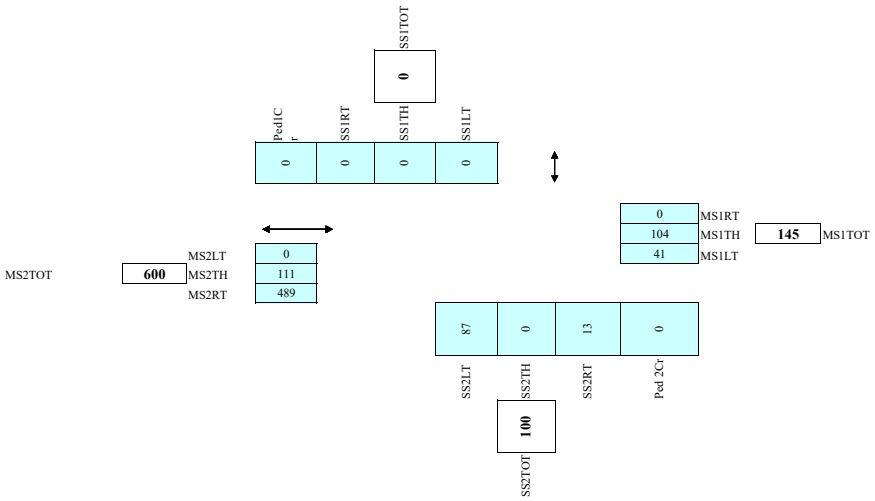
City: City of Ottawa

Vm =	**745**	(MainSt Vol Total)	Cs =	**1.005**	(Int SpacingFactor)
Vs =	**100**	(SideSt Vol Highest)	Cmt =	**1.080**	(MainStTruckFactor)
Pc =	**0**	Peds Crossing Main	Cv =	**1.100**	(SpeedFactor)
K1 =	**1,100**	veh/veh const	Cp =	**1.000**	(PopDemoFactor)
K2 =	**2,000**	veh/ped const	Csb =	**1.000**	(SideStBusFactor)
L =	**2.0**	TotalMainStLanes	Cst =	**1.050**	(SideStTruckFactor)
F =	**1.000**	(PedDemoFactor)	Vmx =	**600**	(MainStHighest)
Vm1 =	**745**	(MainStVeh-Veh#)	Vm2 =	**745**	(MainStVeh-Ped#)
Cvp =	**1.194**	(product of Cs,Cmt,Cv,Cp)	Cbt =	**1.050**	(maximum of Csb,Cst)
Ct1 =	**0.667**	T Int / one way Factor			

	MS1LT	MS1TH	MS1RT	MS2LT	MS2TH	MS2RT	SS1LT	SS1TH	SS1RT	SS2LT	SS2TH	SS2RT	PedC1	PedC2
7:00 - 8:00	94	156	0	0	124	1059	0	0	0	189	0	38	0	0
8:00 - 9:00	31	78	0	0	83	367	0	0	0	65	0	10	0	0
11:00 - 12:00	31	78	0	0	83	367	0	0	0	65	0	10	0	0
12:00 - 13:00	31	78	0	0	83	367	0	0	0	65	0	10	0	0
16:00 - 17:00	31	78	0	0	83	367	0	0	0	65	0	10	0	0
17:00 - 18:00	30	154	0	0	208	409	0	0	0	71	0	1	0	0
Average	41	104	0	0	111	489	0	0	0	87	0	13	0	0

***** Enter the hourly turning movement counts averaged over the peak six hours of a typical week day**

***** Enter the peak pedestrian volume crossing the main street averaged over the same hours**



W = [Ct1xCbt(Vm1 x Vs)/K1 + (F(Vm2 x Pc)L)/K2] x Cvp

W = **57** **57** **0**

NOT Warranted ***Veh*** ***Ped***

Roadway, Vehicle and Pedestrian Factors			**Range**			
			Min	**@**	**Max**	**@**
Cs =	(Int SpacingFactor)		0.90	<200 m	1.10	isolated
Cmt =	(MainStTruckFactor)		1.00	<5%	1.15	>20%
Cv =	(SpeedFactor)		1.00	<60 km/h	1.10	>80 km/h
Cp =	(PopDemoFactor)		1.00	>250,000	1.20	<10,000
Csb =	(SideStBusFactor)		1.00	no	1.05	yes
Cst =	(SideStTruckFactor)		1.00	<10%	1.05	>10%
F =	(Ped DemoFactor)					
	(max of)	Elementary School	1.20			
		Seniors Complex	1.10			
		Path to School	1.10			

Explanation of Factors:

Cbt = 1.05 if the side street either is a bus route, or has more than 10% trucks, otherwise = 1.00.
(it is assumed that these two factors only affect the side street vehicles trying to cross the main street, not the pedestrians)

Ci = the product of the other 4 geographic factors
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Vm2 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=6.0 metres) (averaged over 6 peak hours)

Vs = the highest side street approach volume (averaged over 6 peak hours)
*** note: it has been determined that Vs must be > 75 for signals to be considered ***

F = Pedestrian demographic factor - the maximum of the 3 individual pedestrian demographic factors

Pc = the total pedestrian volume crossing the mainstreet
(averaged over 6 peak hours)

L = number of lanes that the pedestrians have to cross
(only half the street if the median is >=5.0 metres)

Kv = Vehicle - Vehicle denominator constant
(Kv = 1,100 if L<=3, Kv = 1,400 if L >3)

Kp = Vehicle - Pedestrian denominator constant
(Kp = 2,000 if L<=3, Kp = 5,000 if L >3)

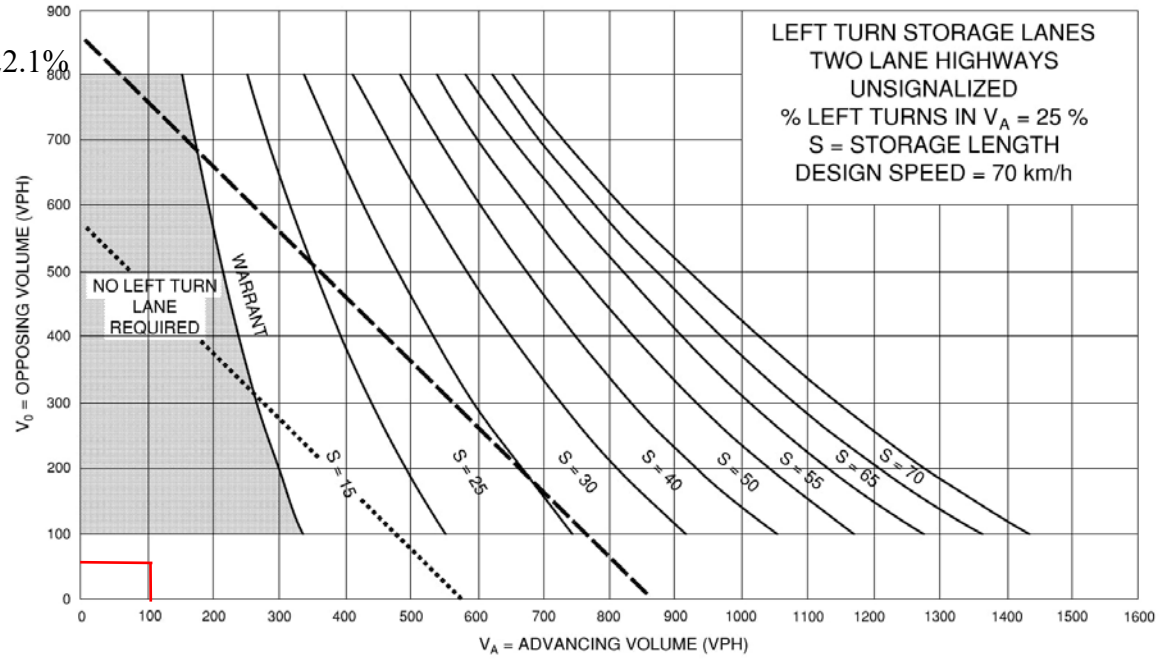
APPENDIX K

Left-Turn Lane Warrant Analysis Worksheets

AM PEAK - Site Access C:

Exhibit 9A-13

VA = 104 veh/hr
VL = 23 veh/hr
% LT in VA = 22.1%
VO = 67 veh/hr
REQ = 0 metres



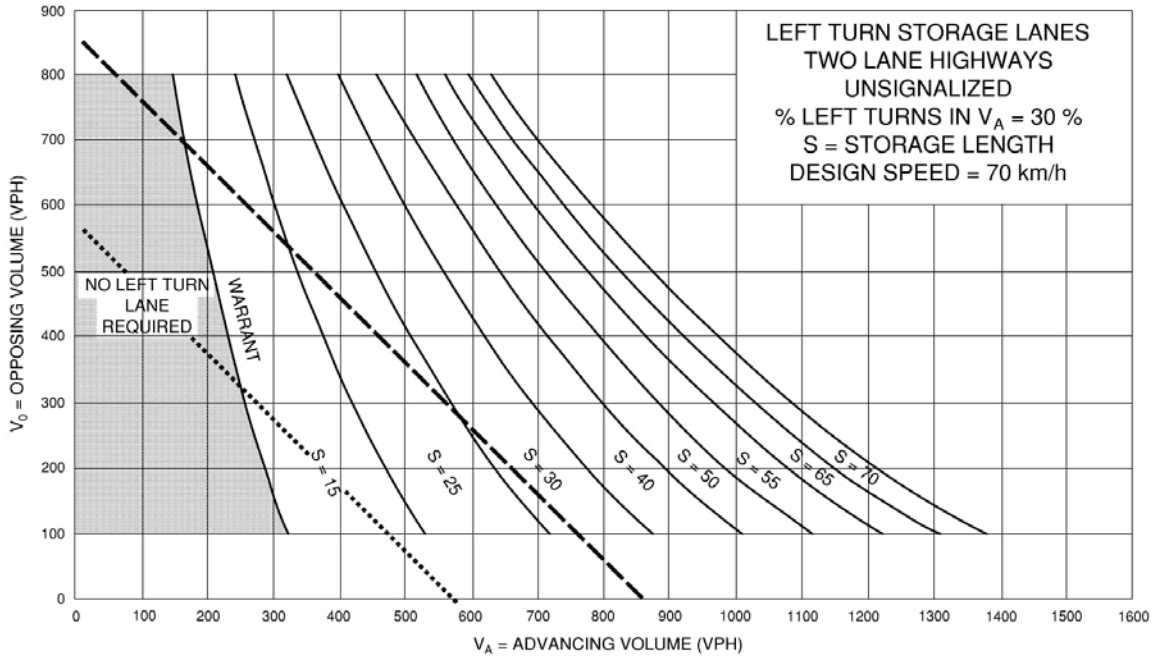
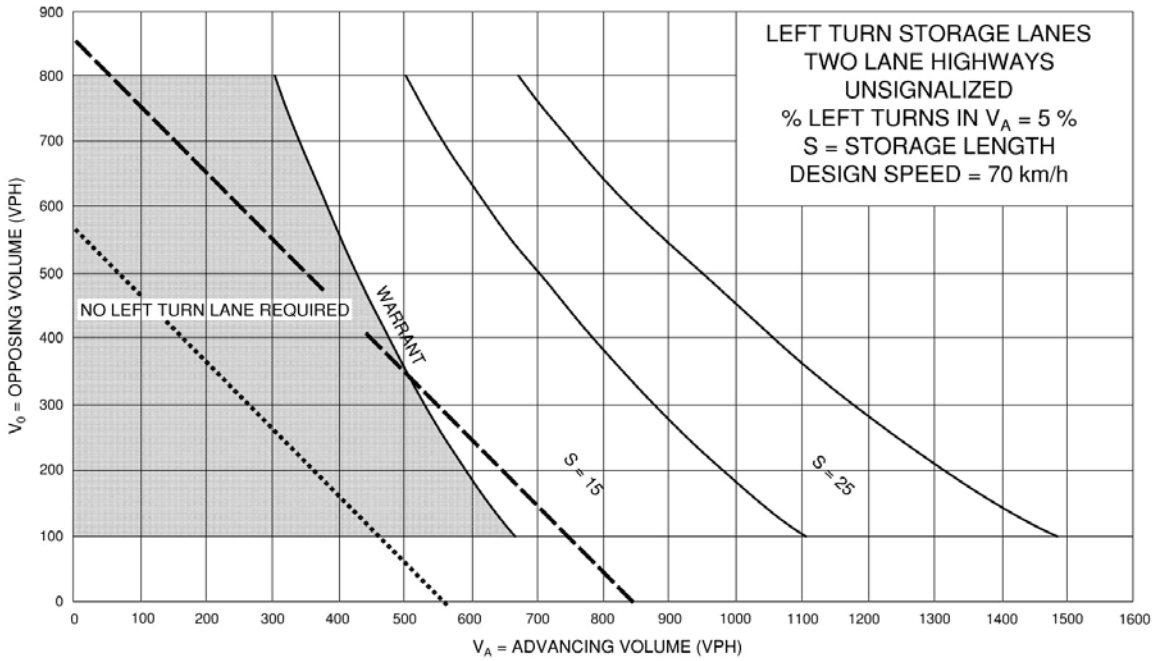
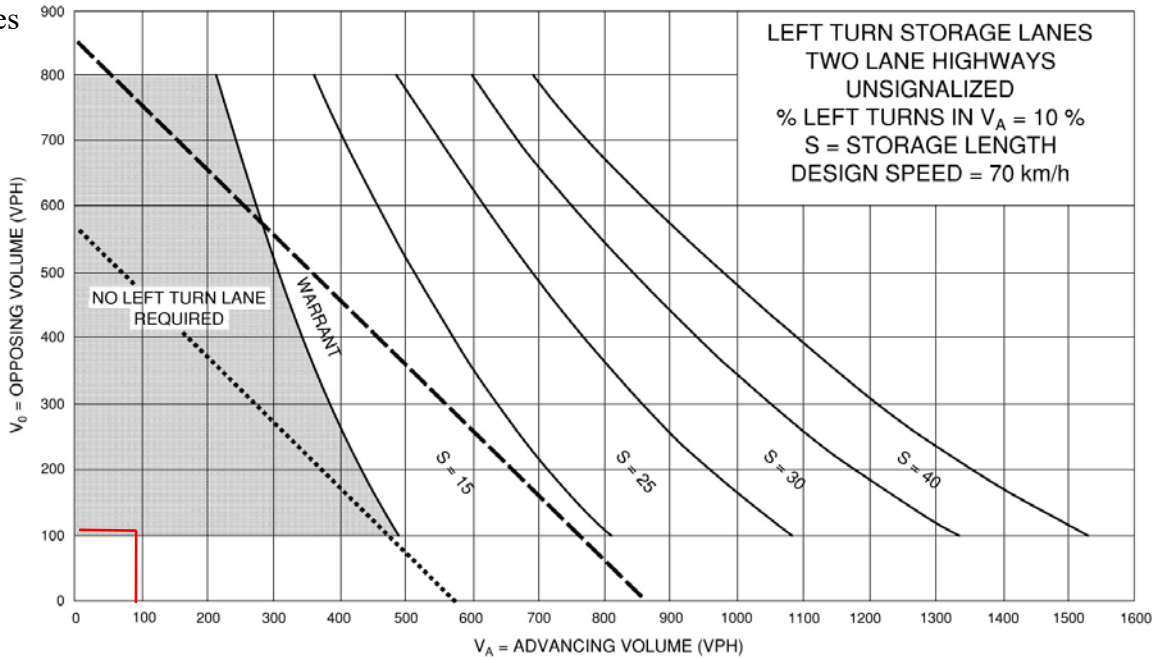


Exhibit 9A-11



PM PEAK - Site Access C:

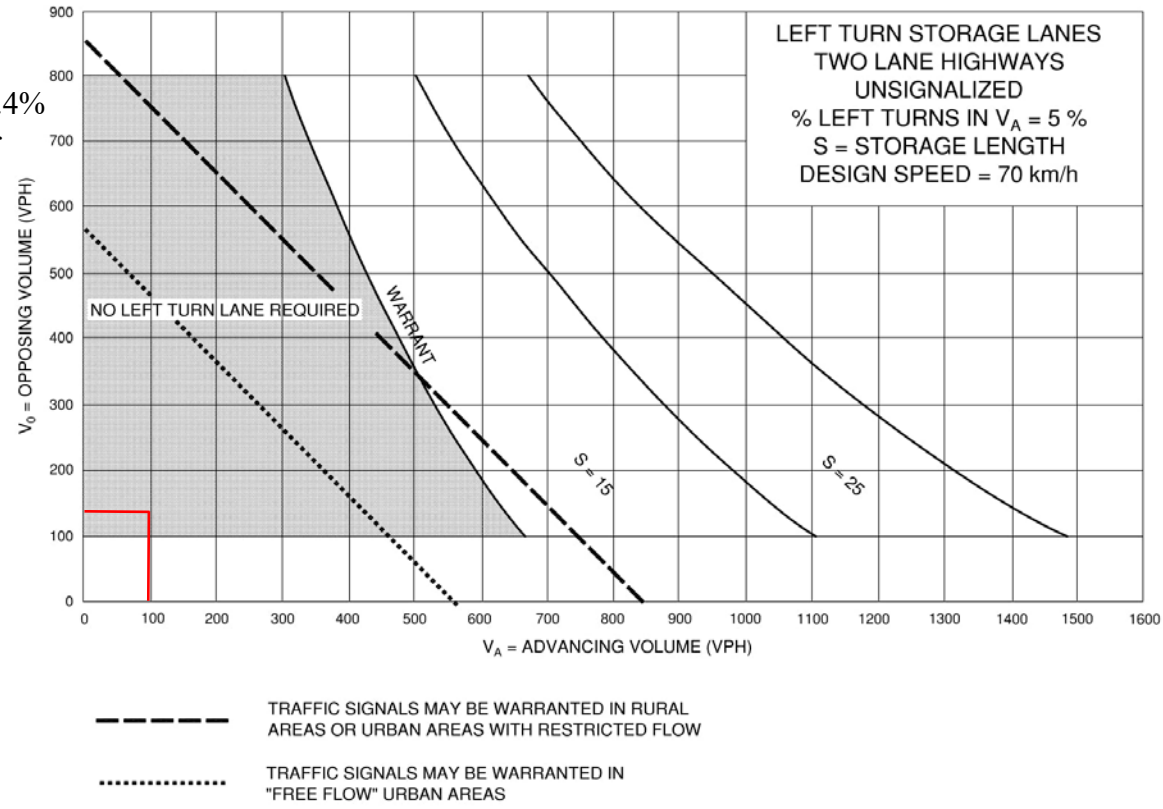
VA = 88 veh/hr
VL = 9 veh/hr
% LT in VA = 10.23%
VO = 102 veh/hr
REQ = 0 metres



PM PEAK - Site Access B:

Exhibit 9A-11

VA = 93 veh/hr
VL = 5 veh/hr
% LT in VA = 5.4%
VO = 126 veh/hr
REQ = 0 metres



AM PEAK - Site Access B:

VA = 119 veh/hr
VL = 159 veh/hr
% LT in VA = 12.6%
VO = 74 veh/hr
REQ = 0 metres

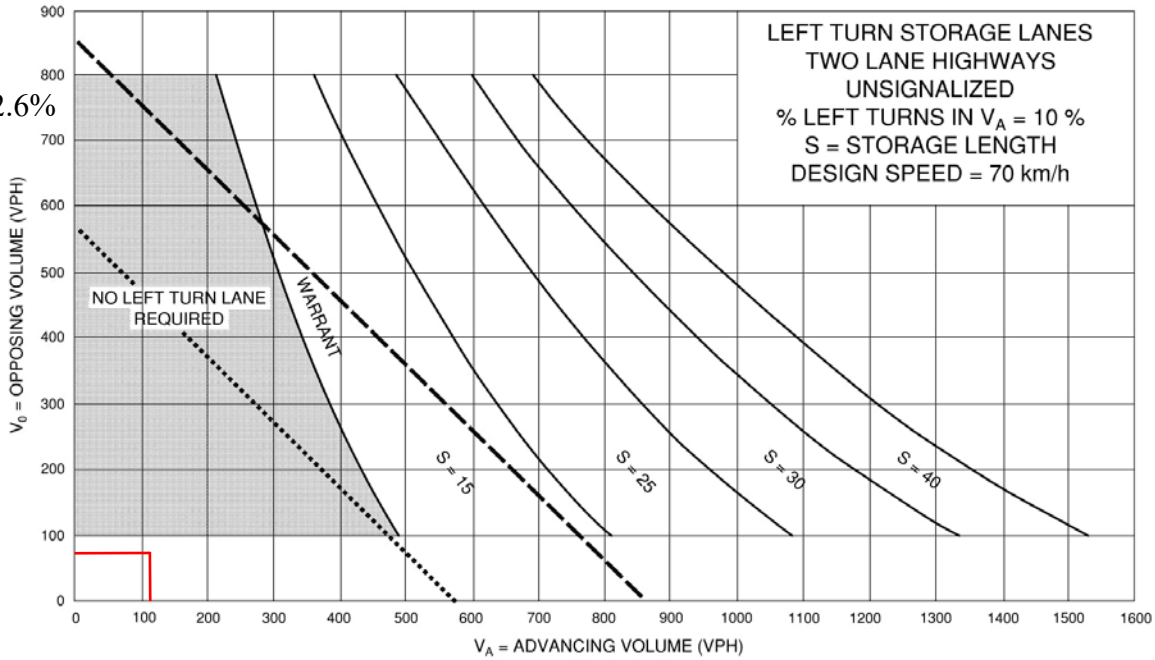
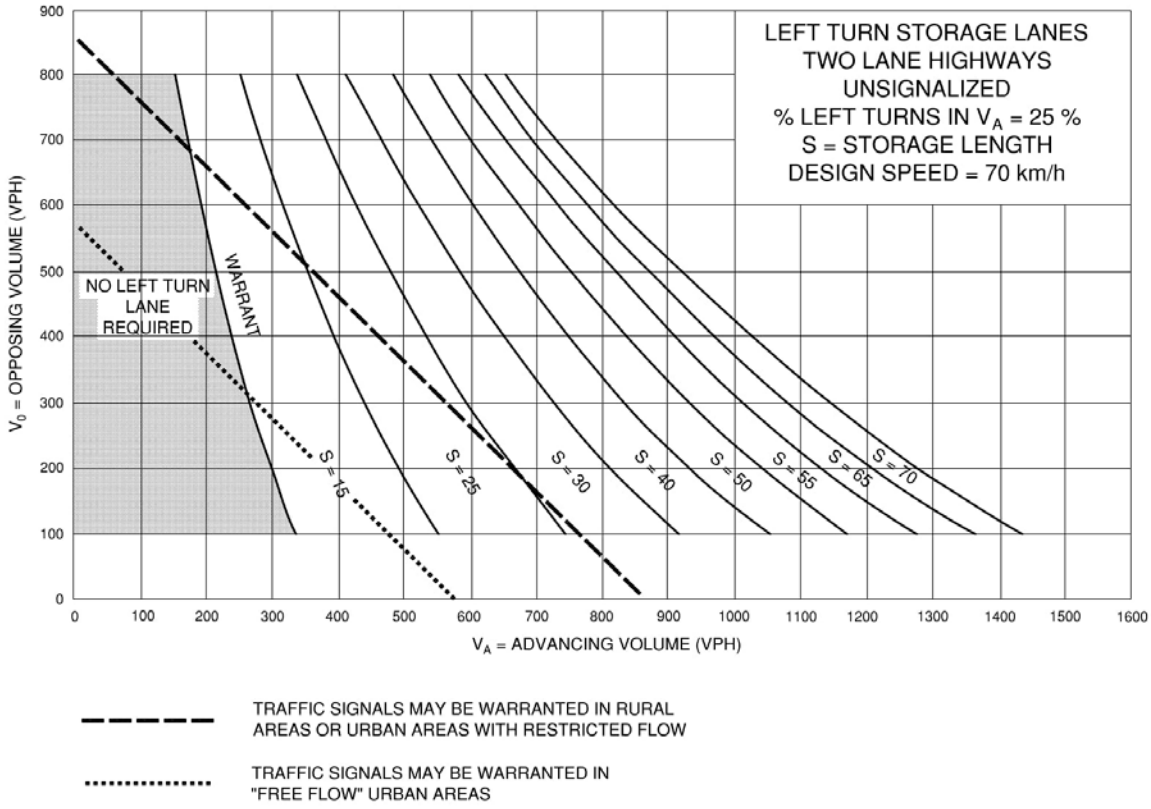
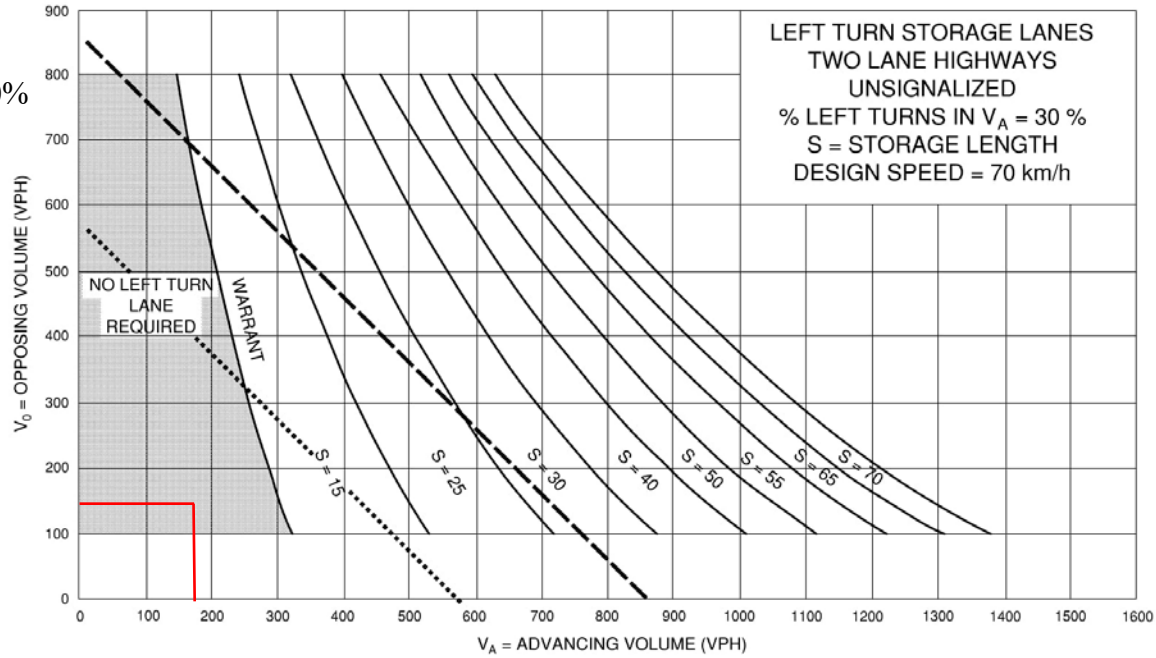


Exhibit 9A-13



AM PEAK - Site Access A:

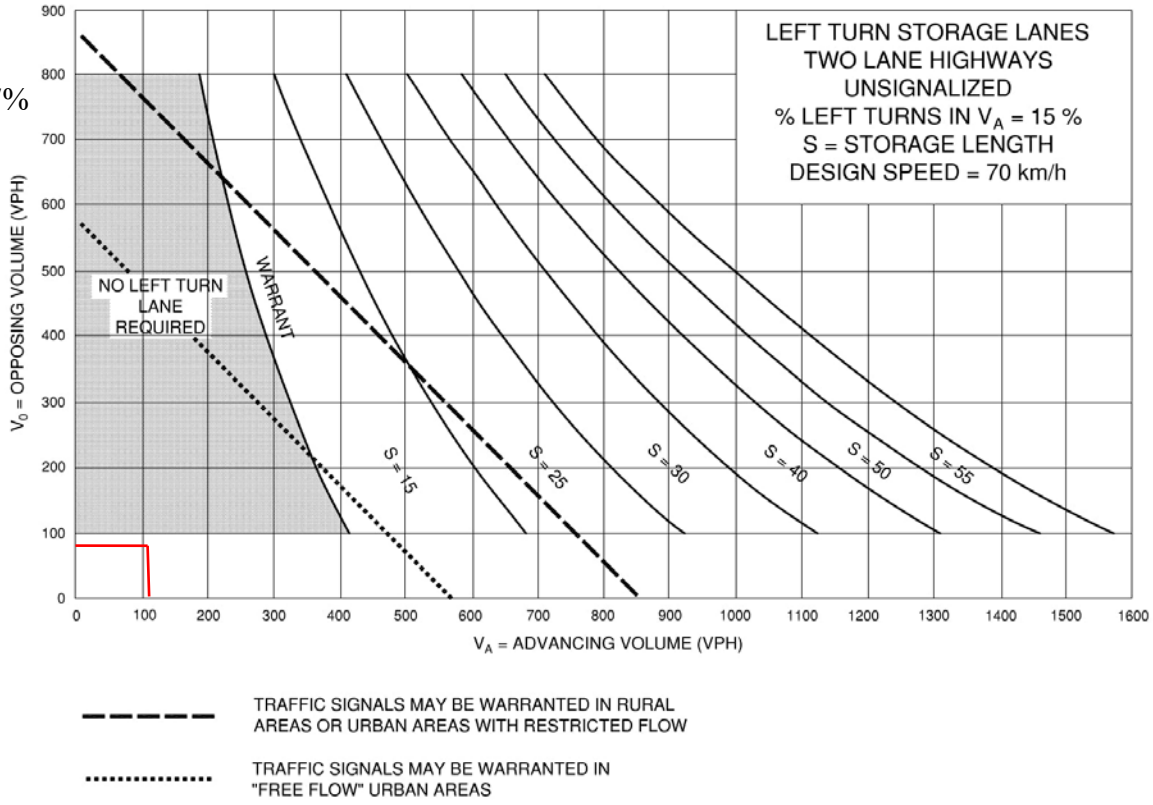
VA = 170 veh/hr
VL = 51 veh/hr
% LT in VA = 30%
VO = 141 veh/hr
REQ = 0 metres

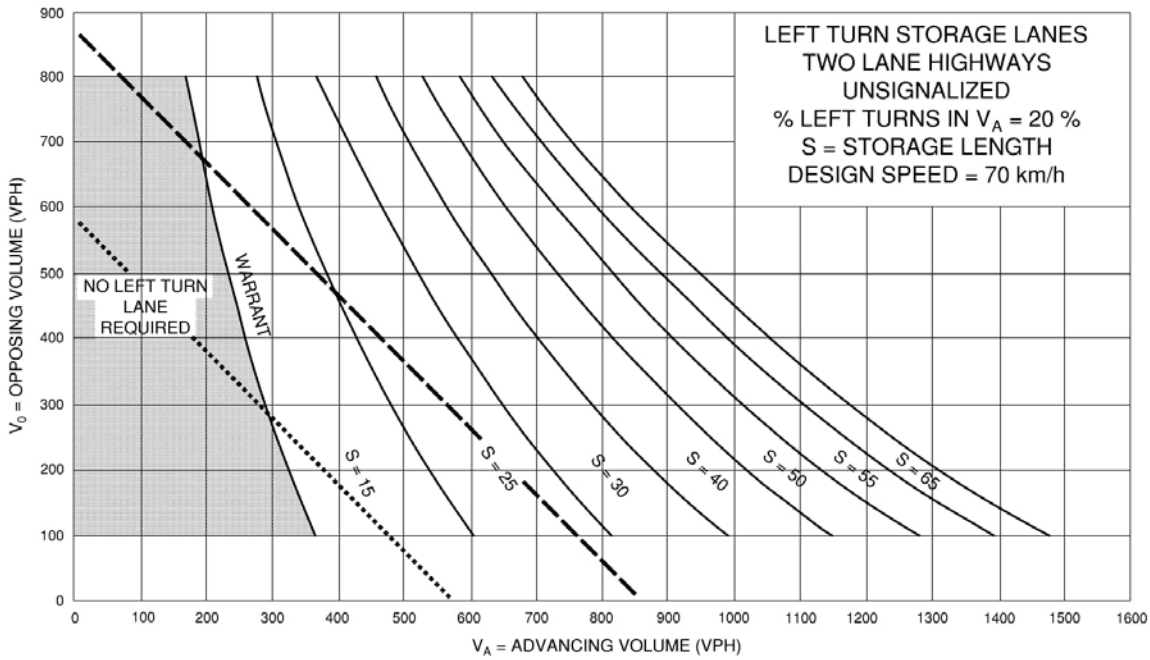


PM PEAK - Site Access A:

Exhibit 9A-12

VA = 112 veh/hr
VL = 19 veh/hr
% LT in VA = 17%
VO = 78 veh/hr
REQ = 0 metres





APPENDIX L

Level of Service Definitions

DRAFT REPORT

Multi-Modal Level of Service (MMLOS) Guidelines

Supplement to the TIA Guidelines

Prepared for City of Ottawa
by IBI Group
September 15, 2015

6 Vehicular Level of Service (LOS)

The following details outlining the evaluation of Vehicular Level of Service are extracted from the 2009 Transportation Impact Assessment Guidelines. As the TIA update is carried out, these parameters may be updated.

6.1 Intersection Capacity Analysis

An evaluation is required of any critical intersection within the study area that will potentially be affected by site generated traffic volumes during any or all of the relevant time periods and scenarios. Summaries are to be provided in tabular format clearly identifying intersection performance under existing and future traffic conditions. Where development is anticipated to proceed in phases or stages, projected performance for all intersections must be documented for the end of each phase.

Detailed output from analysis software is to be provided in an appendix to the report and copies of the electronic files should be provided on CD. Appendix B outlines parameters to be used in operational analysis of signalized intersections.

All volume to capacity (V/C) calculations relating to future conditions should be determined using signal timing optimized for the volume conditions being studied. The V/C ratio for an intersection is defined as the sum of equivalent volumes for all critical movements divided by the sum of capacities for all critical movements assuming that the V/C ratios for critical movements can be equalized. In cases where minimum pedestrian phase times prevent equalizing the level of service for critical movements, then the V/C ratio for the most heavily saturated critical movement should be considered as the V/C ratio for the intersection. Adjustment for the impact of pedestrian activated control is permitted provided detailed supporting analysis including projected pedestrian volumes is provided and discussed in advance with traffic engineering staff.

In the case of planning level or functional design projects, practitioners should undertake a two and a half hour peak period observation of volumes (typically 6:30 – 9:00 AM) to verify that the traffic volumes through the intersections reflect existing demands and to identify unusual operating conditions. For operational studies, peak hour observations are acceptable. Timing of observations and conditions observed should be documented in writing in the report.

LEVEL OF SERVICE	VOLUME TO CAPACITY RATIO
A	0 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.91 to 1.00
F	> 1.00

Intersection evaluations should identify:

- Signalized Intersections – V/C ratios for the overall intersection, as defined above, and individual movements; and
- Unsignalized Intersections - Level of service (LOS) where the LOS is between A and E; V/C where capacity is based on gap analysis if intersection LOS is F.

Existing signal timing information such as phasing, pedestrian minimums and clearance intervals must be used as a base to analyze the existing capacity of signalized intersections. This signal timing data should be obtained from the City of Ottawa Traffic Operations Division. Operational design of the signals analyzed should be in accordance with City of Ottawa signal operation practices.

Level of Service Definitions

Two-Way Stop Controlled Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Large and frequent gaps in traffic on the main roadway. Queuing on the minor street is rare.
B	> 10 and ≤ 15	VERY GOOD. Many gaps exist in traffic on the main roadway. Queuing on the minor street is minimal.
C	> 15 and ≤ 25	GOOD. Fewer gaps exist in traffic on the main roadway. Delay on minor approach becomes more noticeable.
D	> 25 and ≤ 35	FAIR. Infrequent and shorter gaps in traffic on the main roadway. Queue lengths develop on the minor street.
E	> 35 and ≤ 50	POOR. Very infrequent gaps in traffic on the main roadway. Queue lengths become noticeable.
F	> 50	UNSATISFACTORY. Very few gaps in traffic on the main roadway. Excessive delay with significant queue lengths on the minor street.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

Level of Service Definitions

Signalized Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Extremely favourable progression with most vehicles arriving during the green phase. Most vehicles do not stop and short cycle lengths may contribute to low delay.
B	> 10 and ≤ 20	VERY GOOD. Very good progression and/or short cycle lengths with slightly more vehicles stopping than LOS "A" causing slightly higher levels of average delay.
C	> 20 and ≤ 35	GOOD. Fair progression and longer cycle lengths lead to a greater number of vehicles stopping than LOS "B".
D	> 35 and ≤ 55	FAIR. Congestion becomes noticeable with higher average delays resulting from a combination of long cycle lengths, high volume-to-capacity ratios and unfavourable progression.
E	> 55 and ≤ 80	POOR. Lengthy delays values are indicative of poor progression, long cycle lengths and high volume-to-capacity ratios. Individual cycle failures are common with individual movement failures also common.
F	> 80	UNSATISFACTORY. Indicative of oversaturated conditions with vehicular demand greater than the capacity of the intersection.

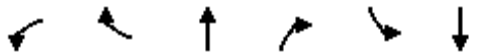
Adapted from Highway Capacity Manual 2000, Transportation Research Board

APPENDIX M

Detailed Capacity Analysis Worksheets

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 Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
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)	1746	0	1529	0	0	1582
Flt Permitted	0.962					0.979
Satd. Flow (perm)	1746	0	1529	0	0	1582
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	14%	14%	1%	9%	11%
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)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

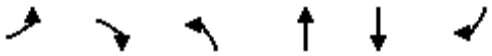
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 80.4%		ICU Level of Service D	
Analysis Period (min) 15			



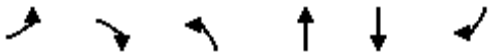
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	108	28	85	743	70	91
Future Volume (Veh/h)	108	28	85	743	70	91
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	120	31	94	826	78	101
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	764	507			920	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	764	507			920	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	63	94			89	
cM capacity (veh/h)	329	542			714	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	151	920	179
Volume Left	120	0	78
Volume Right	31	826	0
cSH	358	1700	714
Volume to Capacity	0.42	0.54	0.11
Queue Length 95th (m)	16.3	0.0	2.9
Control Delay (s)	22.2	0.0	5.3
Lane LOS	C		A
Approach Delay (s)	22.2	0.0	5.3
Approach LOS	C		

Intersection Summary			
Average Delay		3.5	
Intersection Capacity Utilization		80.4%	ICU Level of Service D
Analysis Period (min)		15	



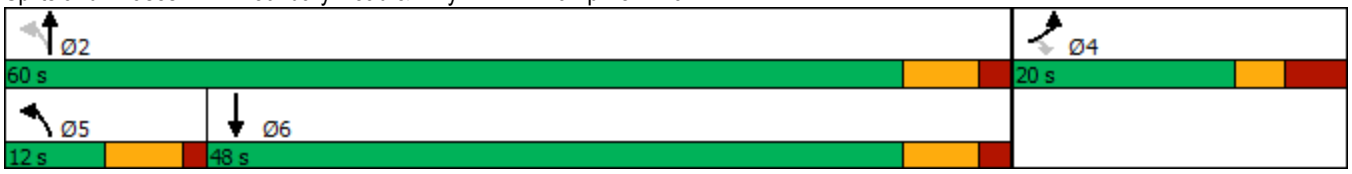
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	16	233	29	816	173	8
Future Volume (vph)	16	233	29	816	173	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.994	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1291	1395	1291	1745	1593	0
Flt Permitted	0.950		0.543			
Satd. Flow (perm)	1291	1395	738	1745	1593	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		259			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	31%	6%	31%	2%	11%	13%
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)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	

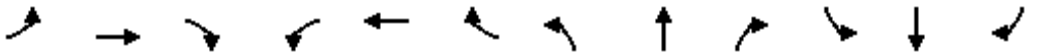


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	17.8	17.8	13.0	41.6	41.6	
Total Split (s)	20.0	20.0	12.0	60.0	48.0	
Total Split (%)	25.0%	25.0%	15.0%	75.0%	60.0%	
Maximum Green (s)	13.2	13.2	6.0	53.4	41.4	
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	Min	Min	
Walk Time (s)	5.0	5.0		0.0	7.0	
Flash Dont Walk (s)	6.0	6.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	8.5	8.5	41.5	40.9	36.8	
Actuated g/C Ratio	0.13	0.13	0.66	0.65	0.58	
v/c Ratio	0.10	0.63	0.06	0.80	0.22	
Control Delay	28.3	12.0	4.2	15.0	8.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.3	12.0	4.2	15.0	8.6	
LOS	C	B	A	B	A	
Approach Delay	13.0			14.6	8.6	
Approach LOS	B			B	A	
Queue Length 50th (m)	1.7	0.0	1.0	60.6	7.2	
Queue Length 95th (m)	8.4	20.5	4.1	141.6	28.7	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	276	502	539	1511	1071	
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	0.07	0.52	0.06	0.60	0.19	

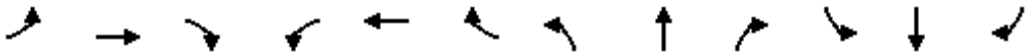
Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 63.1			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 62.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





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
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	35.0		7.5	100.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.990				0.850			0.850		0.967	
Flt Protected		0.970			0.984		0.950			0.950		
Satd. Flow (prot)	0	1620	0	0	1752	1513	1378	1728	1479	1653	1517	0
Flt Permitted		0.806			0.867		0.600			0.142		
Satd. Flow (perm)	0	1346	0	0	1543	1513	870	1728	1479	247	1517	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				100			96		32	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		642.8			170.6			174.7			243.1	
Travel Time (s)		38.6			30.7			7.9			10.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	6%	0%	25%	0%	0%	0%	20%	3%	0%	0%	15%	8%
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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

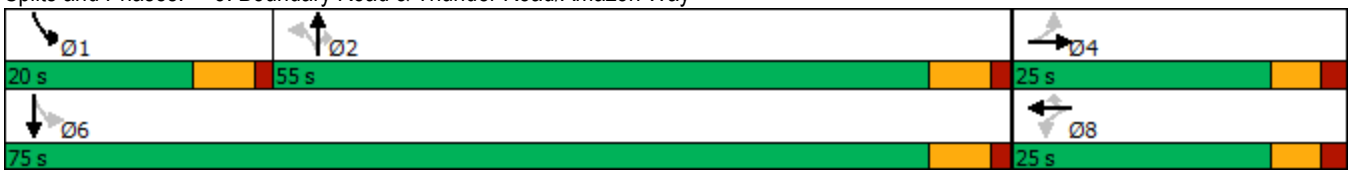


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	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	Min	Min	Min	None	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)		9.0			9.0	9.0	50.2	50.2	50.2	67.0	69.7	
Actuated g/C Ratio		0.11			0.11	0.11	0.61	0.61	0.61	0.82	0.85	
v/c Ratio		0.37			0.05	0.10	0.01	0.83	0.03	0.51	0.20	
Control Delay		42.0			36.4	0.8	10.2	25.2	0.1	9.5	2.8	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		42.0			36.4	0.8	10.2	25.2	0.1	9.5	2.8	
LOS		D			D	A	B	C	A	A	A	
Approach Delay		42.0			10.0			24.3			5.7	
Approach LOS		D			A			C			A	
Queue Length 50th (m)		8.6			1.4	0.0	0.4	125.1	0.0	7.1	8.6	
Queue Length 95th (m)		20.9			6.1	0.0	2.5	#243.6	0.0	23.4	18.6	
Internal Link Dist (m)		618.8			146.6			150.7			219.1	
Turn Bay Length (m)							35.0		7.5	100.0		
Base Capacity (vph)		322			367	436	532	1057	942	446	1298	
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		0.17			0.02	0.06	0.01	0.83	0.03	0.43	0.20	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 82			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 18.9		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 Road & Thunder Road/Amazon Way



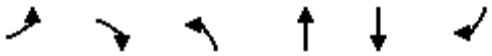
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	3	820	5	1	187
Future Volume (vph)	5	3	820	5	1	187
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.6	3.6	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	0.0		0.0	70.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				45.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.955		0.999			
Flt Protected	0.968				0.950	
Satd. Flow (prot)	832	0	1732	0	846	1561
Flt Permitted	0.968				0.950	
Satd. Flow (perm)	832	0	1732	0	846	1561
Link Speed (k/h)	20		80			80
Link Distance (m)	151.5		1150.2			174.7
Travel Time (s)	27.3		51.8			7.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	100%	100%	2%	100%	100%	14%
Adj. Flow (vph)	6	3	911	6	1	208
Shared Lane Traffic (%)						
Lane Group Flow (vph)	9	0	917	0	1	208
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 55.9%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	3	820	5	1	187
Future Volume (Veh/h)	5	3	820	5	1	187
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	3	911	6	1	208
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						175
pX, platoon unblocked						
vC, conflicting volume	1124	914			917	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1124	914			917	
tC, single (s)	7.4	7.2			5.1	
tC, 2 stage (s)						
tF (s)	4.4	4.2			3.1	
p0 queue free %	96	99			100	
cM capacity (veh/h)	149	224			458	

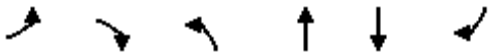
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	9	917	1	208
Volume Left	6	0	1	0
Volume Right	3	6	0	0
cSH	168	1700	458	1700
Volume to Capacity	0.05	0.54	0.00	0.12
Queue Length 95th (m)	1.3	0.0	0.1	0.0
Control Delay (s)	27.7	0.0	12.9	0.0
Lane LOS	D		B	
Approach Delay (s)	27.7	0.0	0.1	
Approach LOS	D			

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		



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
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
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)	1476	1286	0	1734	1561	1293
Flt Permitted	0.950			0.993		
Satd. Flow (perm)	1476	1286	0	1734	1561	1293
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	12%	15%	8%	1%	14%	17%
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)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
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			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	68	27	121	776	110	94
Future Volume (Veh/h)	68	27	121	776	110	94
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	76	30	134	862	122	104
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1252	122	226			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1252	122	226			
tC, single (s)	6.5	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	53	97	90			
cM capacity (veh/h)	163	895	1308			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	76	30	996	122	104
Volume Left	76	0	134	0	0
Volume Right	0	30	0	0	104
cSH	163	895	1308	1700	1700
Volume to Capacity	0.47	0.03	0.10	0.07	0.06
Queue Length 95th (m)	17.5	0.8	2.7	0.0	0.0
Control Delay (s)	45.1	9.2	2.5	0.0	0.0
Lane LOS	E	A	A		
Approach Delay (s)	34.9		2.5	0.0	
Approach LOS	D				

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

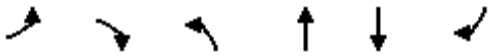
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	42	1	130	224	22	108
Future Volume (vph)	42	1	130	224	22	108
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
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)	1586	0	1563	0	0	1630
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1586	0	1563	0	0	1630
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	19%	0%	6%	3%	5%	9%
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)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
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			

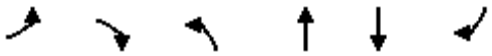
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	1	130	224	22	108
Future Volume (Veh/h)	42	1	130	224	22	108
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	47	1	144	249	24	120
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	436	268			393	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	436	268			393	
tC, single (s)	6.6	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.7	3.3			2.2	
p0 queue free %	91	100			98	
cM capacity (veh/h)	535	775			1149	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	48	393	144
Volume Left	47	0	24
Volume Right	1	249	0
cSH	539	1700	1149
Volume to Capacity	0.09	0.23	0.02
Queue Length 95th (m)	2.3	0.0	0.5
Control Delay (s)	12.3	0.0	1.5
Lane LOS	B		A
Approach Delay (s)	12.3	0.0	1.5
Approach LOS	B		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	35.9%	ICU Level of Service	A
Analysis Period (min)	15		



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
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1551	1436	1537	1664	1592	0
Flt Permitted	0.950		0.527			
Satd. Flow (perm)	1551	1436	853	1664	1592	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		674			7	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	9%	3%	10%	7%	11%	7%
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)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	

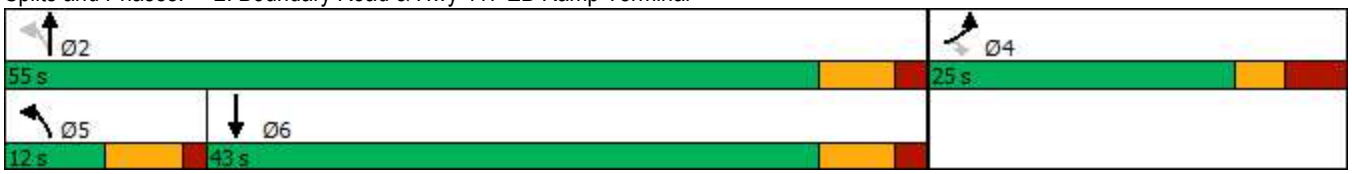


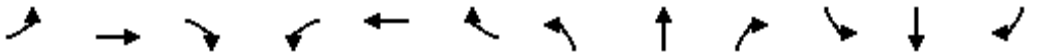
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	23.0	23.0	13.0	41.6	41.6	
Total Split (s)	25.0	25.0	12.0	55.0	43.0	
Total Split (%)	31.3%	31.3%	15.0%	68.8%	53.8%	
Maximum Green (s)	18.2	18.2	6.0	48.4	36.4	
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	Min	Min	
Walk Time (s)	7.0	7.0		0.0	7.0	
Flash Dont Walk (s)	5.0	5.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	12.1	12.1	47.8	47.2	35.2	
Actuated g/C Ratio	0.17	0.17	0.66	0.65	0.48	
v/c Ratio	0.30	0.88	0.24	0.20	0.29	
Control Delay	29.0	17.0	6.8	6.6	13.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	29.0	17.0	6.8	6.6	13.3	
LOS	C	B	A	A	B	
Approach Delay	18.2			6.7	13.3	
Approach LOS	B			A	B	
Queue Length 50th (m)	9.9	3.3	6.5	10.3	17.2	
Queue Length 95th (m)	21.3	#66.1	17.0	24.7	37.2	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	389	865	616	1111	803	
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	0.81	0.24	0.20	0.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 72.8			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 14.3		Intersection LOS: B	
Intersection Capacity Utilization 81.6%		ICU Level of Service D	
Analysis Period (min) 15			

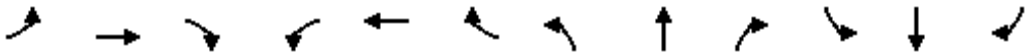
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





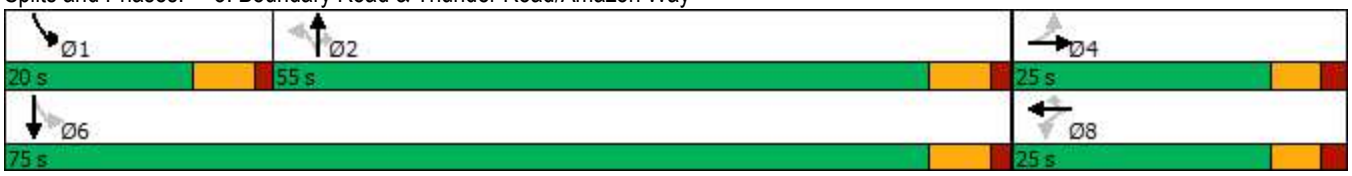
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	0	14	5	0	16	4	251	0	2	762	55
Future Volume (vph)	62	0	14	5	0	16	4	251	0	2	762	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	35.0		7.5	100.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.975				0.850					0.990	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1590	0	0	1208	1513	1322	1633	1740	1102	1699	0
Flt Permitted		0.762			0.856		0.287			0.509		
Satd. Flow (perm)	0	1261	0	0	1088	1513	400	1633	1740	590	1699	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100					8	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		642.8			170.6			174.7			243.1	
Travel Time (s)		38.6			30.7			7.9			10.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	6%	0%	0%	40%	0%	0%	25%	9%	0%	50%	4%	0%
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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	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	Min	Min	Min	None	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)		7.7			7.7	7.7	40.3	40.3		40.7	42.2	
Actuated g/C Ratio		0.13			0.13	0.13	0.70	0.70		0.71	0.74	
v/c Ratio		0.33			0.04	0.06	0.01	0.24		0.00	0.72	
Control Delay		9.6			27.0	0.4	6.2	6.3		3.0	10.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.3	
Total Delay		9.6			27.0	0.4	6.2	6.3		3.0	10.9	
LOS		A			C	A	A	A		A	B	
Approach Delay		9.6			7.1			6.3			10.8	
Approach LOS		A			A			A			B	
Queue Length 50th (m)		0.0			0.5	0.0	0.1	9.8		0.1	55.9	
Queue Length 95th (m)		10.2			4.3	0.0	1.6	36.0		0.6	114.0	
Internal Link Dist (m)		618.8			146.6			150.7			219.1	
Turn Bay Length (m)							35.0			100.0		
Base Capacity (vph)		507			382	596	342	1397		550	1658	
Starvation Cap Reductn		0			0	0	0	0		0	249	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.17			0.02	0.03	0.01	0.20		0.00	0.64	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 57.2			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 9.7		Intersection LOS: A	
Intersection Capacity Utilization 67.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



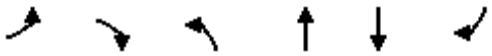
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	11	244	5	12	769
Future Volume (vph)	5	11	244	5	12	769
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.6	3.6	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	0.0		0.0	70.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				45.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.910		0.997			
Flt Protected	0.984				0.950	
Satd. Flow (prot)	806	0	1643	0	846	1745
Flt Permitted	0.984				0.950	
Satd. Flow (perm)	806	0	1643	0	846	1745
Link Speed (k/h)	20		80			80
Link Distance (m)	151.5		1150.2			174.7
Travel Time (s)	27.3		51.8			7.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	100%	100%	6%	100%	100%	2%
Adj. Flow (vph)	6	12	271	6	13	854
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	277	0	13	854
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 52.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	11	244	5	12	769
Future Volume (Veh/h)	5	11	244	5	12	769
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	12	271	6	13	854
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						175
pX, platoon unblocked	0.66					
vC, conflicting volume	1154	274			277	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	975	274			277	
tC, single (s)	7.4	7.2			5.1	
tC, 2 stage (s)						
tF (s)	4.4	4.2			3.1	
p0 queue free %	95	98			99	
cM capacity (veh/h)	123	579			882	

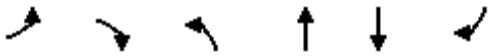
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	18	277	13	854
Volume Left	6	0	13	0
Volume Right	12	6	0	0
cSH	258	1700	882	1700
Volume to Capacity	0.07	0.16	0.01	0.50
Queue Length 95th (m)	1.8	0.0	0.4	0.0
Control Delay (s)	20.0	0.0	9.1	0.0
Lane LOS	C		A	
Approach Delay (s)	20.0	0.0	0.1	
Approach LOS	C			

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		



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
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
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)	1463	1395	0	1666	1762	1351
Flt Permitted	0.950			0.985		
Satd. Flow (perm)	1463	1395	0	1666	1762	1351
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	13%	6%	8%	4%	1%	12%
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)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
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			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	113	98	52	116	703	113
Future Volume (Veh/h)	113	98	52	116	703	113
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	126	109	58	129	781	126
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1026	781	907			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1026	781	907			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	45	72	92			
cM capacity (veh/h)	228	389	726			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	126	109	187	781	126
Volume Left	126	0	58	0	0
Volume Right	0	109	0	0	126
cSH	228	389	726	1700	1700
Volume to Capacity	0.55	0.28	0.08	0.46	0.07
Queue Length 95th (m)	24.0	9.1	2.1	0.0	0.0
Control Delay (s)	38.6	17.8	3.8	0.0	0.0
Lane LOS	E	C	A		
Approach Delay (s)	29.0		3.8	0.0	
Approach LOS	D				

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

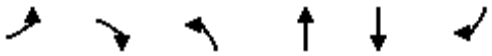
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	138	31	99	867	77	117
Future Volume (vph)	138	31	99	867	77	117
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
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)	1753	0	1529	0	0	1584
Flt Permitted	0.961					0.981
Satd. Flow (perm)	1753	0	1529	0	0	1584
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	14%	14%	1%	9%	11%
Adj. Flow (vph)	138	31	99	867	77	117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	169	0	966	0	0	194
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		

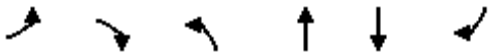
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	138	31	99	867	77	117
Future Volume (Veh/h)	138	31	99	867	77	117
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	138	31	99	867	77	117
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	804	532			966	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	804	532			966	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	56	94			89	
cM capacity (veh/h)	310	524			686	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	169	966	194
Volume Left	138	0	77
Volume Right	31	867	0
cSH	336	1700	686
Volume to Capacity	0.50	0.57	0.11
Queue Length 95th (m)	21.6	0.0	3.0
Control Delay (s)	26.1	0.0	5.1
Lane LOS	D		A
Approach Delay (s)	26.1	0.0	5.1
Approach LOS	D		

Intersection Summary			
Average Delay		4.1	
Intersection Capacity Utilization		93.1%	ICU Level of Service F
Analysis Period (min)		15	



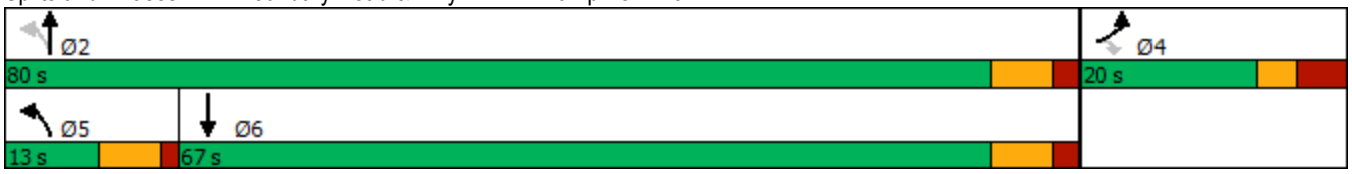
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	18	330	38	953	227	9
Future Volume (vph)	18	330	38	953	227	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1291	1395	1291	1745	1594	0
Flt Permitted	0.950		0.531			
Satd. Flow (perm)	1291	1395	722	1745	1594	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		330			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	31%	6%	31%	2%	11%	13%
Adj. Flow (vph)	18	330	38	953	227	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	330	38	953	236	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	

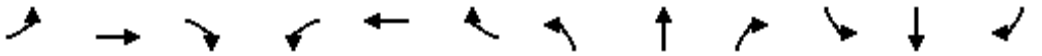


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	17.8	17.8	13.0	41.6	41.6	
Total Split (s)	20.0	20.0	13.0	80.0	67.0	
Total Split (%)	20.0%	20.0%	13.0%	80.0%	67.0%	
Maximum Green (s)	13.2	13.2	7.0	73.4	60.4	
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	Min	Min	
Walk Time (s)	5.0	5.0		0.0	7.0	
Flash Dont Walk (s)	6.0	6.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	8.6	8.6	44.6	44.0	39.7	
Actuated g/C Ratio	0.13	0.13	0.67	0.66	0.60	
v/c Ratio	0.11	0.71	0.07	0.83	0.25	
Control Delay	32.6	13.6	3.9	15.8	8.4	
Queue Delay	0.0	0.0	0.0	0.7	0.0	
Total Delay	32.6	13.6	3.9	16.5	8.4	
LOS	C	B	A	B	A	
Approach Delay	14.6			16.0	8.4	
Approach LOS	B			B	A	
Queue Length 50th (m)	1.7	0.0	1.2	67.5	8.7	
Queue Length 95th (m)	9.9	27.3	4.3	149.7	33.2	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	268	550	545	1662	1429	
Starvation Cap Reductn	0	0	0	357	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.07	0.60	0.07	0.73	0.17	

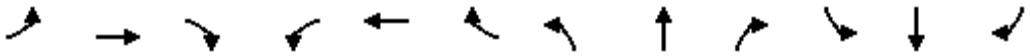
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 66.7			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 14.5		Intersection LOS: B	
Intersection Capacity Utilization 69.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	17	4	3	6	25	6	931	30	193	308	55
Future Volume (vph)	34	17	4	3	6	25	6	931	30	193	308	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	35.0		7.5	100.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.990				0.850			0.850		0.977	
Flt Protected		0.970			0.984		0.950			0.950		
Satd. Flow (prot)	0	1620	0	0	1752	1513	1378	1728	1479	1653	1526	0
Flt Permitted		0.806			0.875		0.545			0.122		
Satd. Flow (perm)	0	1346	0	0	1558	1513	790	1728	1479	212	1526	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				100			96		21	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		642.8			170.6			174.7			243.1	
Travel Time (s)		38.6			30.7			7.9			10.9	
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 (%)	6%	0%	25%	0%	0%	0%	20%	3%	0%	0%	15%	8%
Adj. Flow (vph)	34	17	4	3	6	25	6	931	30	193	308	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	55	0	0	9	25	6	931	30	193	363	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

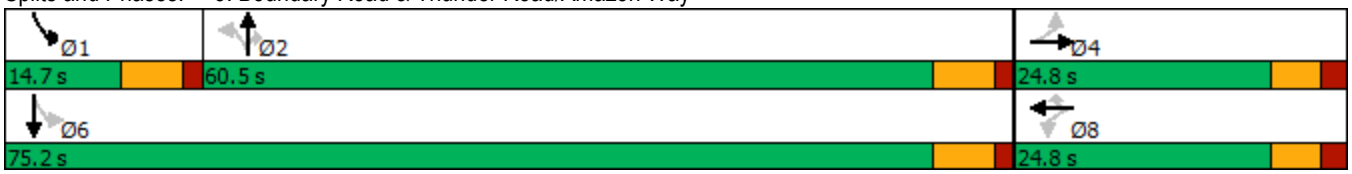


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	26.2	
Total Split (s)	24.8	24.8		24.8	24.8	24.8	60.5	60.5	60.5	14.7	75.2	
Total Split (%)	24.8%	24.8%		24.8%	24.8%	24.8%	60.5%	60.5%	60.5%	14.7%	75.2%	
Maximum Green (s)	19.0	19.0		19.0	19.0	19.0	54.3	54.3	54.3	8.7	69.0	
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	Min	Min	Min	None	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)		9.1			9.1	9.1	52.6	52.6	52.6	67.7	69.2	
Actuated g/C Ratio		0.11			0.11	0.11	0.62	0.62	0.62	0.79	0.81	
v/c Ratio		0.38			0.05	0.10	0.01	0.88	0.03	0.61	0.29	
Control Delay		43.7			36.8	0.8	8.0	26.8	0.1	16.6	3.8	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		43.7			36.8	0.8	8.0	26.8	0.1	16.6	3.8	
LOS		D			D	A	A	C	A	B	A	
Approach Delay		43.7			10.3			25.9			8.2	
Approach LOS		D			B			C			A	
Queue Length 50th (m)		9.0			1.5	0.0	0.4	132.1	0.0	7.1	14.4	
Queue Length 95th (m)		21.0			6.2	0.0	2.2	#245.8	0.0	#34.0	29.2	
Internal Link Dist (m)		618.8			146.6			150.7			219.1	
Turn Bay Length (m)							35.0		7.5	100.0		
Base Capacity (vph)		307			353	420	511	1118	991	317	1238	
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		0.18			0.03	0.06	0.01	0.83	0.03	0.61	0.29	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 85.5			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 20.1		Intersection LOS: C	
Intersection Capacity Utilization 87.9%		ICU Level of Service E	
Analysis Period (min) 15			

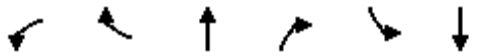
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	3	963	6	1	314
Future Volume (vph)	6	3	963	6	1	314
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.6	3.6	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	0.0		0.0	70.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				45.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.955		0.999			
Flt Protected	0.968				0.950	
Satd. Flow (prot)	832	0	1750	0	846	1589
Flt Permitted	0.968				0.950	
Satd. Flow (perm)	832	0	1750	0	846	1589
Link Speed (k/h)	20		80			80
Link Distance (m)	151.5		1150.2			174.7
Travel Time (s)	27.3		51.8			7.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	100%	1%	100%	100%	12%
Adj. Flow (vph)	6	3	963	6	1	314
Shared Lane Traffic (%)						
Lane Group Flow (vph)	9	0	969	0	1	314
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

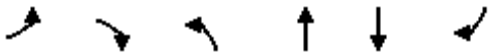
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 63.9%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	3	963	6	1	314
Future Volume (Veh/h)	6	3	963	6	1	314
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	3	963	6	1	314
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						175
pX, platoon unblocked	0.97					
vC, conflicting volume	1282	966			969	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1276	966			969	
tC, single (s)	7.4	7.2			5.1	
tC, 2 stage (s)						
tF (s)	4.4	4.2			3.1	
p0 queue free %	95	99			100	
cM capacity (veh/h)	114	207			434	

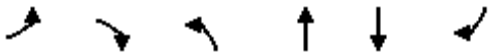
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	9	969	1	314
Volume Left	6	0	1	0
Volume Right	3	6	0	0
cSH	134	1700	434	1700
Volume to Capacity	0.07	0.57	0.00	0.18
Queue Length 95th (m)	1.7	0.0	0.1	0.0
Control Delay (s)	33.8	0.0	13.3	0.0
Lane LOS	D		B	
Approach Delay (s)	33.8	0.0	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	79	30	134	869	125	107
Future Volume (vph)	79	30	134	869	125	107
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
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)	1476	1286	0	1734	1561	1293
Flt Permitted	0.950			0.993		
Satd. Flow (perm)	1476	1286	0	1734	1561	1293
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	12%	15%	8%	1%	14%	17%
Adj. Flow (vph)	79	30	134	869	125	107
Shared Lane Traffic (%)						
Lane Group Flow (vph)	79	30	0	1003	125	107
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	79	30	134	869	125	107
Future Volume (Veh/h)	79	30	134	869	125	107
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	79	30	134	869	125	107
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1262	125	232			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1262	125	232			
tC, single (s)	6.5	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	51	97	90			
cM capacity (veh/h)	160	892	1301			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	79	30	1003	125	107
Volume Left	79	0	134	0	0
Volume Right	0	30	0	0	107
cSH	160	892	1301	1700	1700
Volume to Capacity	0.49	0.03	0.10	0.07	0.06
Queue Length 95th (m)	18.9	0.8	2.7	0.0	0.0
Control Delay (s)	47.5	9.2	2.6	0.0	0.0
Lane LOS	E	A	A		
Approach Delay (s)	36.9		2.6	0.0	
Approach LOS	E				

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

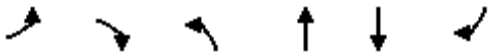
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	52	1	160	321	24	123
Future Volume (vph)	52	1	160	321	24	123
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
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)	1586	0	1558	0	0	1630
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1586	0	1558	0	0	1630
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	19%	0%	6%	3%	5%	9%
Adj. Flow (vph)	52	1	160	321	24	123
Shared Lane Traffic (%)						
Lane Group Flow (vph)	53	0	481	0	0	147
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.7%		ICU Level of Service A	
Analysis Period (min) 15			

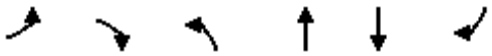
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	52	1	160	321	24	123
Future Volume (Veh/h)	52	1	160	321	24	123
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	52	1	160	321	24	123
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	492	320			481	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	492	320			481	
tC, single (s)	6.6	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.7	3.3			2.2	
p0 queue free %	90	100			98	
cM capacity (veh/h)	496	725			1066	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	53	481	147
Volume Left	52	0	24
Volume Right	1	321	0
cSH	499	1700	1066
Volume to Capacity	0.11	0.28	0.02
Queue Length 95th (m)	2.8	0.0	0.6
Control Delay (s)	13.1	0.0	1.6
Lane LOS	B		A
Approach Delay (s)	13.1	0.0	1.6
Approach LOS	B		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		



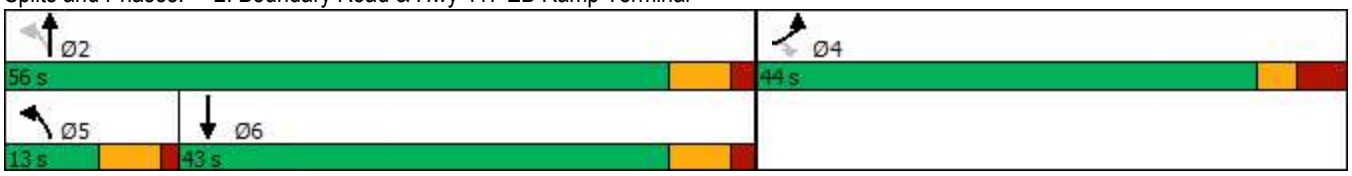
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	77	743	166	306	218	17
Future Volume (vph)	77	743	166	306	218	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1551	1436	1537	1664	1592	0
Flt Permitted	0.950		0.518			
Satd. Flow (perm)	1551	1436	838	1664	1592	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		600			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	9%	3%	10%	7%	11%	7%
Adj. Flow (vph)	77	743	166	306	218	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	77	743	166	306	235	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	

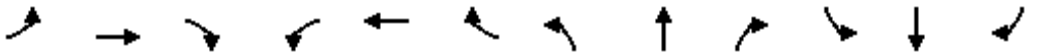


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	23.0	23.0	13.0	41.6	41.6	
Total Split (s)	44.0	44.0	13.0	56.0	43.0	
Total Split (%)	44.0%	44.0%	13.0%	56.0%	43.0%	
Maximum Green (s)	37.2	37.2	7.0	49.4	36.4	
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	Min	Min	
Walk Time (s)	7.0	7.0		0.0	7.0	
Flash Dont Walk (s)	5.0	5.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	20.6	20.6	49.5	48.9	35.7	
Actuated g/C Ratio	0.25	0.25	0.59	0.59	0.43	
v/c Ratio	0.20	0.92	0.30	0.31	0.34	
Control Delay	23.7	23.9	12.2	12.5	20.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	23.7	23.9	12.2	12.5	20.5	
LOS	C	C	B	B	C	
Approach Delay	23.9			12.4	20.5	
Approach LOS	C			B	C	
Queue Length 50th (m)	10.0	19.9	11.6	23.9	25.0	
Queue Length 95th (m)	20.2	84.2	31.4	57.9	56.2	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	706	980	558	1007	712	
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	0.11	0.76	0.30	0.30	0.33	

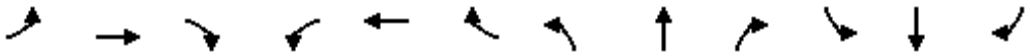
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 83.2			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 88.9%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





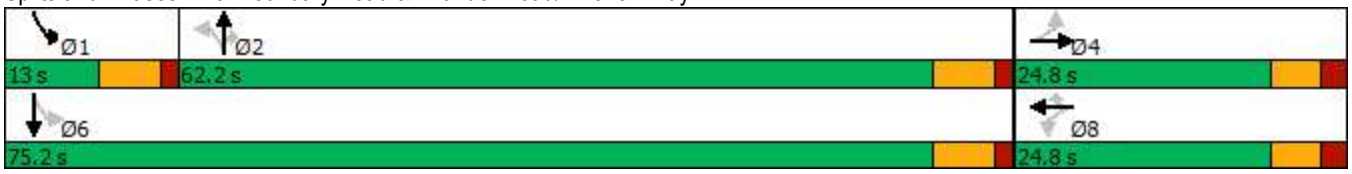
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	0	15	6	0	18	4	385	0	2	896	61
Future Volume (vph)	68	0	15	6	0	18	4	385	0	2	896	61
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	35.0		7.5	100.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.976				0.850					0.990	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1591	0	0	1208	1513	1322	1633	1740	1102	1699	0
Flt Permitted		0.761			0.849		0.263			0.462		
Satd. Flow (perm)	0	1260	0	0	1079	1513	366	1633	1740	536	1699	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100					8	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		642.8			170.6			174.7			243.1	
Travel Time (s)		38.6			30.7			7.9			10.9	
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 (%)	6%	0%	0%	40%	0%	0%	25%	9%	0%	50%	4%	0%
Adj. Flow (vph)	68	0	15	6	0	18	4	385	0	2	896	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	83	0	0	6	18	4	385	0	2	957	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	26.2	
Total Split (s)	24.8	24.8		24.8	24.8	24.8	62.2	62.2	62.2	13.0	75.2	
Total Split (%)	24.8%	24.8%		24.8%	24.8%	24.8%	62.2%	62.2%	62.2%	13.0%	75.2%	
Maximum Green (s)	19.0	19.0		19.0	19.0	19.0	56.0	56.0	56.0	7.0	69.0	
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	Min	Min	Min	None	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)		7.7			7.7	7.7	44.3	44.3		44.6	46.2	
Actuated g/C Ratio		0.13			0.13	0.13	0.73	0.73		0.73	0.76	
v/c Ratio		0.34			0.04	0.06	0.02	0.32		0.00	0.74	
Control Delay		9.9			30.2	0.4	5.5	6.3		3.0	10.7	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.5	
Total Delay		9.9			30.2	0.4	5.5	6.3		3.0	11.2	
LOS		A			C	A	A	A		A	B	
Approach Delay		9.9			7.9			6.3			11.2	
Approach LOS		A			A			A			B	
Queue Length 50th (m)		0.0			0.6	0.0	0.1	14.6		0.1	62.7	
Queue Length 95th (m)		10.1			4.6	0.0	1.6	50.4		0.5	124.2	
Internal Link Dist (m)		618.8			146.6			150.7			219.1	
Turn Bay Length (m)							35.0			100.0		
Base Capacity (vph)		481			355	565	325	1453		460	1635	
Starvation Cap Reductn		0			0	0	0	0		0	299	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.17			0.02	0.03	0.01	0.26		0.00	0.72	

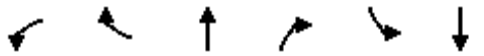
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 61			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 9.8		Intersection LOS: A	
Intersection Capacity Utilization 75.3%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	12	377	6	13	904
Future Volume (vph)	6	12	377	6	13	904
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.6	3.6	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	0.0		0.0	70.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				45.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.910		0.998			
Flt Protected	0.984				0.950	
Satd. Flow (prot)	806	0	1668	0	846	1745
Flt Permitted	0.984				0.950	
Satd. Flow (perm)	806	0	1668	0	846	1745
Link Speed (k/h)	20		80			80
Link Distance (m)	151.5		1150.2			174.7
Travel Time (s)	27.3		51.8			7.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	100%	5%	100%	100%	2%
Adj. Flow (vph)	6	12	377	6	13	904
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	383	0	13	904
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

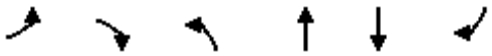
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 60.2%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	12	377	6	13	904
Future Volume (Veh/h)	6	12	377	6	13	904
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	12	377	6	13	904
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						175
pX, platoon unblocked	0.63					
vC, conflicting volume	1310	380			383	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1198	380			383	
tC, single (s)	7.4	7.2			5.1	
tC, 2 stage (s)						
tF (s)	4.4	4.2			3.1	
p0 queue free %	93	98			98	
cM capacity (veh/h)	82	496			792	

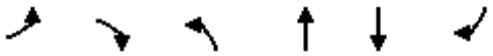
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	18	383	13	904
Volume Left	6	0	13	0
Volume Right	12	6	0	0
cSH	185	1700	792	1700
Volume to Capacity	0.10	0.23	0.02	0.53
Queue Length 95th (m)	2.5	0.0	0.4	0.0
Control Delay (s)	26.5	0.0	9.6	0.0
Lane LOS	D		A	
Approach Delay (s)	26.5	0.0	0.1	
Approach LOS	D			

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	128	108	57	131	788	129
Future Volume (vph)	128	108	57	131	788	129
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
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)	1463	1395	0	1666	1762	1351
Flt Permitted	0.950			0.985		
Satd. Flow (perm)	1463	1395	0	1666	1762	1351
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	6%	8%	4%	1%	12%
Adj. Flow (vph)	128	108	57	131	788	129
Shared Lane Traffic (%)						
Lane Group Flow (vph)	128	108	0	188	788	129
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 71.9%		ICU Level of Service C	
Analysis Period (min) 15			



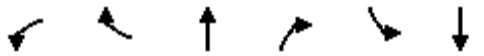
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	128	108	57	131	788	129
Future Volume (Veh/h)	128	108	57	131	788	129
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	128	108	57	131	788	129
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1033	788	917			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1033	788	917			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	43	72	92			
cM capacity (veh/h)	226	385	720			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	128	108	188	788	129
Volume Left	128	0	57	0	0
Volume Right	0	108	0	0	129
cSH	226	385	720	1700	1700
Volume to Capacity	0.57	0.28	0.08	0.46	0.08
Queue Length 95th (m)	25.0	9.1	2.1	0.0	0.0
Control Delay (s)	39.8	18.0	3.8	0.0	0.0
Lane LOS	E	C	A		
Approach Delay (s)	29.8		3.8	0.0	
Approach LOS	D				

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	151	34	109	953	85	128
Future Volume (vph)	151	34	109	953	85	128
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
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)	1753	0	1529	0	0	1583
Flt Permitted	0.961					0.980
Satd. Flow (perm)	1753	0	1529	0	0	1583
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	14%	14%	1%	9%	11%
Adj. Flow (vph)	151	34	109	953	85	128
Shared Lane Traffic (%)						
Lane Group Flow (vph)	185	0	1062	0	0	213
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

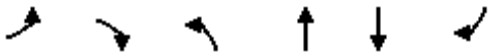
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 101.3%		ICU Level of Service G	
Analysis Period (min) 15			



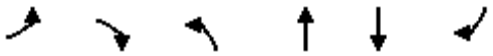
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	151	34	109	953	85	128
Future Volume (Veh/h)	151	34	109	953	85	128
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	151	34	109	953	85	128
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	884	586			1062	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	884	586			1062	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	44	93			87	
cM capacity (veh/h)	271	489			630	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	185	1062	213
Volume Left	151	0	85
Volume Right	34	953	0
cSH	295	1700	630
Volume to Capacity	0.63	0.62	0.13
Queue Length 95th (m)	31.3	0.0	3.7
Control Delay (s)	35.6	0.0	5.6
Lane LOS	E		A
Approach Delay (s)	35.6	0.0	5.6
Approach LOS	E		

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	101.3%	ICU Level of Service	G
Analysis Period (min)	15		



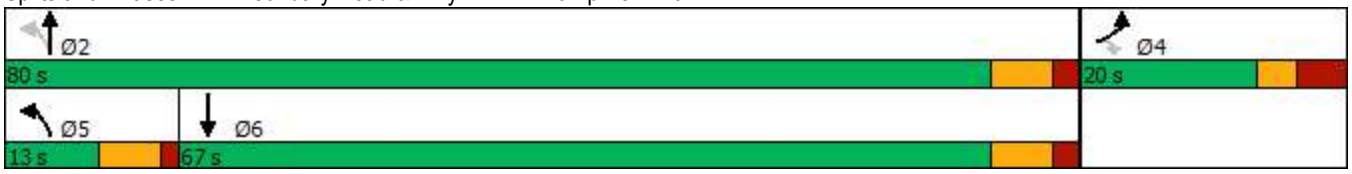
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	357	41	1047	247	10
Future Volume (vph)	20	357	41	1047	247	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1291	1395	1291	1745	1594	0
Flt Permitted	0.950		0.526			
Satd. Flow (perm)	1291	1395	715	1745	1594	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		357			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	31%	6%	31%	2%	11%	13%
Adj. Flow (vph)	20	357	41	1047	247	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	357	41	1047	257	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	

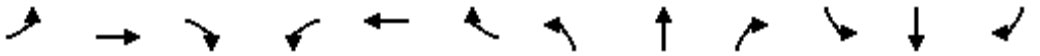


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	17.8	17.8	13.0	41.6	41.6	
Total Split (s)	20.0	20.0	13.0	80.0	67.0	
Total Split (%)	20.0%	20.0%	13.0%	80.0%	67.0%	
Maximum Green (s)	13.2	13.2	7.0	73.4	60.4	
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	Min	Min	
Walk Time (s)	5.0	5.0		0.0	7.0	
Flash Dont Walk (s)	6.0	6.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	8.9	8.9	50.3	49.6	42.7	
Actuated g/C Ratio	0.12	0.12	0.69	0.68	0.59	
v/c Ratio	0.13	0.74	0.07	0.88	0.27	
Control Delay	36.7	14.7	3.7	19.0	9.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	36.7	14.7	3.7	19.0	9.3	
LOS	D	B	A	B	A	
Approach Delay	15.9			18.5	9.3	
Approach LOS	B			B	A	
Queue Length 50th (m)	2.5	0.0	1.3	84.1	18.4	
Queue Length 95th (m)	10.9	29.2	4.5	190.8	36.1	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	247	556	553	1607	1341	
Starvation Cap Reductn	0	0	0	26	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.08	0.64	0.07	0.66	0.19	

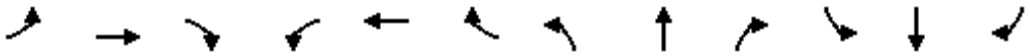
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 72.7			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 16.5		Intersection LOS: B	
Intersection Capacity Utilization 75.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	18	5	4	6	28	6	1022	33	213	329	61
Future Volume (vph)	38	18	5	4	6	28	6	1022	33	213	329	61
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	35.0		7.5	100.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.989				0.850			0.850		0.977	
Flt Protected		0.970			0.980		0.950			0.950		
Satd. Flow (prot)	0	1614	0	0	1744	1513	1378	1728	1479	1653	1527	0
Flt Permitted		0.805			0.854		0.531			0.075		
Satd. Flow (perm)	0	1340	0	0	1520	1513	770	1728	1479	130	1527	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				100			96		22	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		642.8			170.6			174.7			243.1	
Travel Time (s)		38.6			30.7			7.9			10.9	
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 (%)	6%	0%	25%	0%	0%	0%	20%	3%	0%	0%	15%	8%
Adj. Flow (vph)	38	18	5	4	6	28	6	1022	33	213	329	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	61	0	0	10	28	6	1022	33	213	390	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

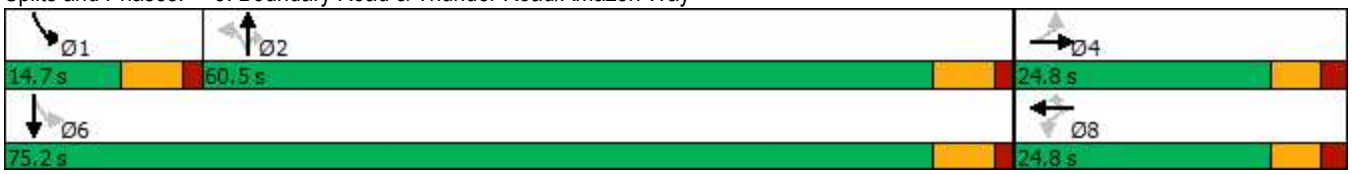


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	26.2	
Total Split (s)	24.8	24.8		24.8	24.8	24.8	60.5	60.5	60.5	14.7	75.2	
Total Split (%)	24.8%	24.8%		24.8%	24.8%	24.8%	60.5%	60.5%	60.5%	14.7%	75.2%	
Maximum Green (s)	19.0	19.0		19.0	19.0	19.0	54.3	54.3	54.3	8.7	69.0	
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	Min	Min	Min	None	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)		9.4			9.4	9.4	54.7	54.7	54.7	69.7	70.9	
Actuated g/C Ratio		0.11			0.11	0.11	0.62	0.62	0.62	0.79	0.81	
v/c Ratio		0.41			0.06	0.11	0.01	0.95	0.03	0.84	0.32	
Control Delay		44.6			36.7	0.9	8.3	37.1	0.1	48.2	4.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		44.6			36.7	0.9	8.3	37.1	0.1	48.2	4.0	
LOS		D			D	A	A	D	A	D	A	
Approach Delay		44.6			10.3			35.8			19.6	
Approach LOS		D			B			D			B	
Queue Length 50th (m)		9.9			1.7	0.0	0.4	165.9	0.0	20.9	16.3	
Queue Length 95th (m)		22.4			6.5	0.0	2.2	#286.9	0.0	#66.4	33.1	
Internal Link Dist (m)		618.8			146.6			150.7			219.1	
Turn Bay Length (m)							35.0		7.5	100.0		
Base Capacity (vph)		294			330	407	478	1073	955	254	1235	
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	0.95	0.03	0.84	0.32	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 88			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 30.0		Intersection LOS: C	
Intersection Capacity Utilization 94.4%		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: 3: Boundary Road & Thunder Road/Amazon Way



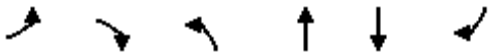
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	4	1058	6	1	336
Future Volume (vph)	6	4	1058	6	1	336
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.6	3.6	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	0.0		0.0	70.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				45.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.946		0.999			
Flt Protected	0.971				0.950	
Satd. Flow (prot)	827	0	1751	0	846	1589
Flt Permitted	0.971				0.950	
Satd. Flow (perm)	827	0	1751	0	846	1589
Link Speed (k/h)	20		80			80
Link Distance (m)	151.5		1150.2			174.7
Travel Time (s)	27.3		51.8			7.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	100%	1%	100%	100%	12%
Adj. Flow (vph)	6	4	1058	6	1	336
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	0	1064	0	1	336
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 69.2%		ICU Level of Service C	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	4	1058	6	1	336
Future Volume (Veh/h)	6	4	1058	6	1	336
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	4	1058	6	1	336
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						175
pX, platoon unblocked	0.96					
vC, conflicting volume	1399	1061			1064	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1395	1061			1064	
tC, single (s)	7.4	7.2			5.1	
tC, 2 stage (s)						
tF (s)	4.4	4.2			3.1	
p0 queue free %	94	98			100	
cM capacity (veh/h)	93	179			393	

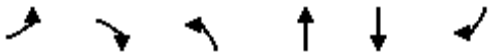
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	10	1064	1	336
Volume Left	6	0	1	0
Volume Right	4	6	0	0
cSH	115	1700	393	1700
Volume to Capacity	0.09	0.63	0.00	0.20
Queue Length 95th (m)	2.2	0.0	0.1	0.0
Control Delay (s)	39.2	0.0	14.2	0.0
Lane LOS	E		B	
Approach Delay (s)	39.2	0.0	0.0	
Approach LOS	E			

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	87	33	147	958	138	118
Future Volume (vph)	87	33	147	958	138	118
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
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)	1476	1286	0	1734	1561	1293
Flt Permitted	0.950			0.993		
Satd. Flow (perm)	1476	1286	0	1734	1561	1293
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	12%	15%	8%	1%	14%	17%
Adj. Flow (vph)	87	33	147	958	138	118
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	33	0	1105	138	118
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 84.6%		ICU Level of Service E	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	87	33	147	958	138	118
Future Volume (Veh/h)	87	33	147	958	138	118
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	87	33	147	958	138	118
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1390	138	256			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1390	138	256			
tC, single (s)	6.5	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	34	96	88			
cM capacity (veh/h)	132	877	1275			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	87	33	1105	138	118
Volume Left	87	0	147	0	0
Volume Right	0	33	0	0	118
cSH	132	877	1275	1700	1700
Volume to Capacity	0.66	0.04	0.12	0.08	0.07
Queue Length 95th (m)	28.4	0.9	3.1	0.0	0.0
Control Delay (s)	73.8	9.3	3.0	0.0	0.0
Lane LOS	F	A	A		
Approach Delay (s)	56.1		3.0	0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	6.8		
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

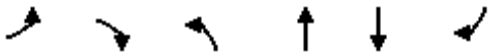
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	57	1	174	347	27	136
Future Volume (vph)	57	1	174	347	27	136
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
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)	1587	0	1557	0	0	1630
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1587	0	1557	0	0	1630
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	19%	0%	6%	3%	5%	9%
Adj. Flow (vph)	57	1	174	347	27	136
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	0	521	0	0	163
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

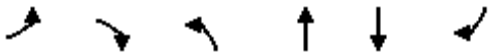
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	57	1	174	347	27	136
Future Volume (Veh/h)	57	1	174	347	27	136
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	57	1	174	347	27	136
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	538	348			521	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	538	348			521	
tC, single (s)	6.6	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.7	3.3			2.2	
p0 queue free %	88	100			97	
cM capacity (veh/h)	464	700			1030	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	58	521	163
Volume Left	57	0	27
Volume Right	1	347	0
cSH	466	1700	1030
Volume to Capacity	0.12	0.31	0.03
Queue Length 95th (m)	3.4	0.0	0.6
Control Delay (s)	13.8	0.0	1.6
Lane LOS	B		A
Approach Delay (s)	13.8	0.0	1.6
Approach LOS	B		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	85	815	181	329	239	18
Future Volume (vph)	85	815	181	329	239	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.991	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1551	1436	1537	1664	1593	0
Flt Permitted	0.950		0.472			
Satd. Flow (perm)	1551	1436	764	1664	1593	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		568			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	9%	3%	10%	7%	11%	7%
Adj. Flow (vph)	85	815	181	329	239	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	85	815	181	329	257	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	

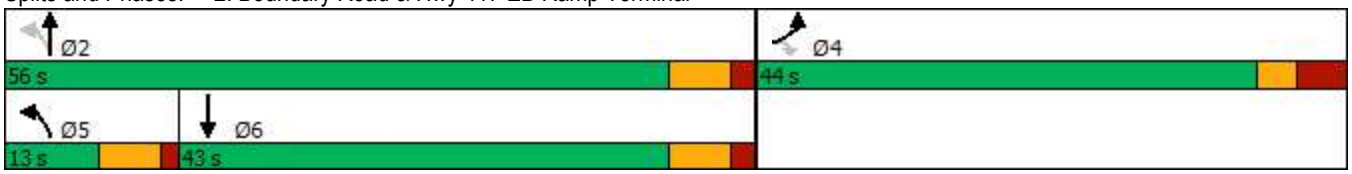


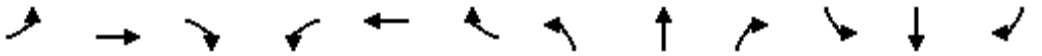
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	23.0	23.0	13.0	41.6	41.6	
Total Split (s)	44.0	44.0	13.0	56.0	43.0	
Total Split (%)	44.0%	44.0%	13.0%	56.0%	43.0%	
Maximum Green (s)	37.2	37.2	7.0	49.4	36.4	
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	Min	Min	
Walk Time (s)	7.0	7.0		0.0	7.0	
Flash Dont Walk (s)	5.0	5.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	30.0	30.0	49.1	48.5	35.4	
Actuated g/C Ratio	0.33	0.33	0.53	0.53	0.38	
v/c Ratio	0.17	0.96	0.39	0.38	0.42	
Control Delay	21.7	32.1	16.2	16.2	25.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.7	32.1	16.2	16.2	25.1	
LOS	C	C	B	B	C	
Approach Delay	31.1			16.2	25.1	
Approach LOS	C			B	C	
Queue Length 50th (m)	11.1	53.0	20.1	40.6	38.6	
Queue Length 95th (m)	21.8	#151.0	34.1	62.7	61.9	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	633	922	467	902	639	
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	0.13	0.88	0.39	0.36	0.40	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 92.1			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 25.6		Intersection LOS: C	
Intersection Capacity Utilization 93.6%		ICU Level of Service F	
Analysis Period (min) 15			

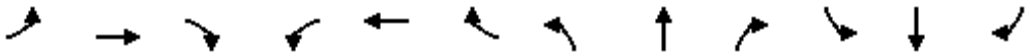
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





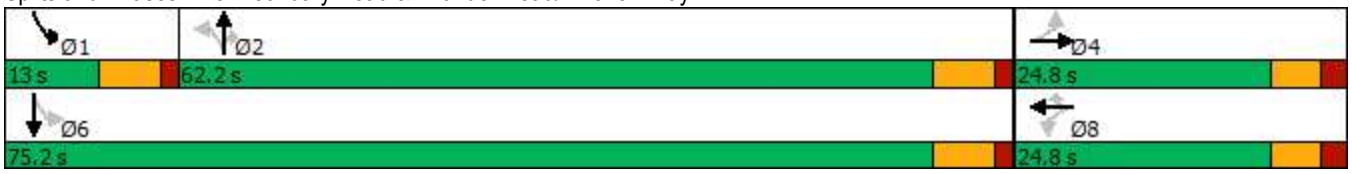
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	0	17	6	0	20	5	414	0	2	984	67
Future Volume (vph)	76	0	17	6	0	20	5	414	0	2	984	67
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	35.0		7.5	100.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.975				0.850					0.990	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1590	0	0	1208	1513	1322	1633	1740	1102	1699	0
Flt Permitted		0.761			0.808		0.221			0.453		
Satd. Flow (perm)	0	1259	0	0	1027	1513	308	1633	1740	525	1699	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100					8	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		642.8			170.6			174.7			243.1	
Travel Time (s)		38.6			30.7			7.9			10.9	
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 (%)	6%	0%	0%	40%	0%	0%	25%	9%	0%	50%	4%	0%
Adj. Flow (vph)	76	0	17	6	0	20	5	414	0	2	984	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	93	0	0	6	20	5	414	0	2	1051	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	26.2	
Total Split (s)	24.8	24.8		24.8	24.8	24.8	62.2	62.2	62.2	13.0	75.2	
Total Split (%)	24.8%	24.8%		24.8%	24.8%	24.8%	62.2%	62.2%	62.2%	13.0%	75.2%	
Maximum Green (s)	19.0	19.0		19.0	19.0	19.0	56.0	56.0	56.0	7.0	69.0	
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	Min	Min	Min	None	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)		8.1			8.1	8.1	52.1	52.1		52.2	54.1	
Actuated g/C Ratio		0.12			0.12	0.12	0.76	0.76		0.76	0.79	
v/c Ratio		0.39			0.05	0.08	0.02	0.33		0.00	0.78	
Control Delay		12.9			34.8	0.6	5.4	6.0		2.5	12.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		12.9			34.8	0.6	5.4	6.0		2.5	12.1	
LOS		B			C	A	A	A		A	B	
Approach Delay		12.9			8.5			6.0			12.1	
Approach LOS		B			A			A			B	
Queue Length 50th (m)		0.0			0.7	0.0	0.1	16.1		0.1	79.0	
Queue Length 95th (m)		12.9			4.8	0.0	1.8	56.4		0.6	171.8	
Internal Link Dist (m)		618.8			146.6			150.7			219.1	
Turn Bay Length (m)							35.0			100.0		
Base Capacity (vph)		444			304	519	249	1322		462	1578	
Starvation Cap Reductn		0			0	0	0	0		0	16	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.21			0.02	0.04	0.02	0.31		0.00	0.67	

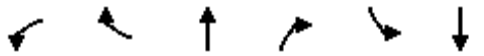
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 68.7			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 10.4		Intersection LOS: B	
Intersection Capacity Utilization 81.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	13	405	6	15	992
Future Volume (vph)	6	13	405	6	15	992
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.6	3.6	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	0.0		0.0	70.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				45.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.908		0.998			
Flt Protected	0.984				0.950	
Satd. Flow (prot)	804	0	1670	0	846	1745
Flt Permitted	0.984				0.950	
Satd. Flow (perm)	804	0	1670	0	846	1745
Link Speed (k/h)	20		80			80
Link Distance (m)	151.5		1150.2			174.7
Travel Time (s)	27.3		51.8			7.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	100%	5%	100%	100%	2%
Adj. Flow (vph)	6	13	405	6	15	992
Shared Lane Traffic (%)						
Lane Group Flow (vph)	19	0	411	0	15	992
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

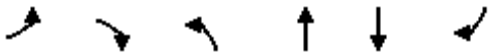
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 65.1%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	13	405	6	15	992
Future Volume (Veh/h)	6	13	405	6	15	992
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	13	405	6	15	992
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						175
pX, platoon unblocked	0.55					
vC, conflicting volume	1430	408			411	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1372	408			411	
tC, single (s)	7.4	7.2			5.1	
tC, 2 stage (s)						
tF (s)	4.4	4.2			3.1	
p0 queue free %	89	97			98	
cM capacity (veh/h)	54	476			770	

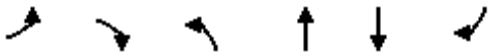
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	19	411	15	992
Volume Left	6	0	15	0
Volume Right	13	6	0	0
cSH	137	1700	770	1700
Volume to Capacity	0.14	0.24	0.02	0.58
Queue Length 95th (m)	3.7	0.0	0.5	0.0
Control Delay (s)	35.5	0.0	9.8	0.0
Lane LOS	E		A	
Approach Delay (s)	35.5	0.0	0.1	
Approach LOS	E			

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	141	119	63	144	869	142
Future Volume (vph)	141	119	63	144	869	142
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
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)	1463	1395	0	1666	1762	1351
Flt Permitted	0.950			0.985		
Satd. Flow (perm)	1463	1395	0	1666	1762	1351
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	6%	8%	4%	1%	12%
Adj. Flow (vph)	141	119	63	144	869	142
Shared Lane Traffic (%)						
Lane Group Flow (vph)	141	119	0	207	869	142
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 78.2%		ICU Level of Service D	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	141	119	63	144	869	142
Future Volume (Veh/h)	141	119	63	144	869	142
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	141	119	63	144	869	142
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1139	869	1011			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1139	869	1011			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	26	66	90			
cM capacity (veh/h)	192	346	663			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	141	119	207	869	142
Volume Left	141	0	63	0	0
Volume Right	0	119	0	0	142
cSH	192	346	663	1700	1700
Volume to Capacity	0.74	0.34	0.10	0.51	0.08
Queue Length 95th (m)	38.1	12.0	2.5	0.0	0.0
Control Delay (s)	63.1	20.8	4.1	0.0	0.0
Lane LOS	F	C	A		
Approach Delay (s)	43.8		4.1	0.0	
Approach LOS	E				

Intersection Summary				
Average Delay	8.3			
Intersection Capacity Utilization	78.2%	ICU Level of Service	D	
Analysis Period (min)	15			

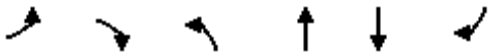
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	164	38	119	1047	94	139
Future Volume (vph)	164	38	119	1047	94	139
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
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)	1752	0	1529	0	0	1583
Flt Permitted	0.961					0.980
Satd. Flow (perm)	1752	0	1529	0	0	1583
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	14%	14%	1%	9%	11%
Adj. Flow (vph)	164	38	119	1047	94	139
Shared Lane Traffic (%)						
Lane Group Flow (vph)	202	0	1166	0	0	233
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 110.1%		ICU Level of Service H	
Analysis Period (min) 15			

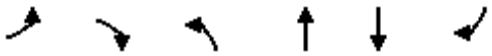
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	164	38	119	1047	94	139
Future Volume (Veh/h)	164	38	119	1047	94	139
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	164	38	119	1047	94	139
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	970	642			1166	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	970	642			1166	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	30	92			84	
cM capacity (veh/h)	233	453			575	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	202	1166	233
Volume Left	164	0	94
Volume Right	38	1047	0
cSH	257	1700	575
Volume to Capacity	0.79	0.69	0.16
Queue Length 95th (m)	47.5	0.0	4.6
Control Delay (s)	56.4	0.0	6.4
Lane LOS	F		A
Approach Delay (s)	56.4	0.0	6.4
Approach LOS	F		

Intersection Summary			
Average Delay	8.0		
Intersection Capacity Utilization	110.1%	ICU Level of Service	H
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	22	387	45	1150	269	11
Future Volume (vph)	22	387	45	1150	269	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1291	1395	1291	1745	1594	0
Flt Permitted	0.950		0.524			
Satd. Flow (perm)	1291	1395	712	1745	1594	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		387			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	31%	6%	31%	2%	11%	13%
Adj. Flow (vph)	22	387	45	1150	269	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	387	45	1150	280	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	

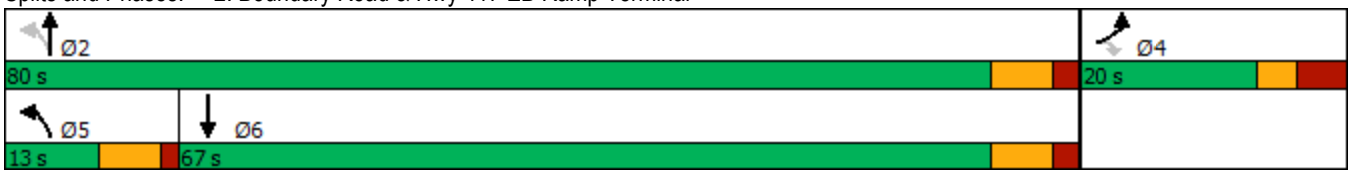


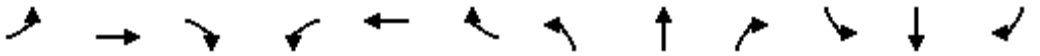
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	17.8	17.8	13.0	41.6	41.6	
Total Split (s)	20.0	20.0	13.0	80.0	67.0	
Total Split (%)	20.0%	20.0%	13.0%	80.0%	67.0%	
Maximum Green (s)	13.2	13.2	7.0	73.4	60.4	
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	Min	Min	
Walk Time (s)	5.0	5.0		0.0	7.0	
Flash Dont Walk (s)	6.0	6.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	9.1	9.1	57.2	56.6	49.7	
Actuated g/C Ratio	0.11	0.11	0.72	0.71	0.62	
v/c Ratio	0.15	0.77	0.08	0.93	0.28	
Control Delay	39.9	15.9	3.5	24.4	8.8	
Queue Delay	0.0	0.0	0.0	0.1	0.0	
Total Delay	39.9	15.9	3.5	24.5	8.8	
LOS	D	B	A	C	A	
Approach Delay	17.2			23.7	8.8	
Approach LOS	B			C	A	
Queue Length 50th (m)	3.2	0.0	1.4	108.2	20.4	
Queue Length 95th (m)	11.5	#32.0	4.8	#297.4	39.5	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	224	562	563	1541	1272	
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	0.69	0.08	0.76	0.22	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 79.8			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 20.1		Intersection LOS: C	
Intersection Capacity Utilization 80.9%		ICU Level of Service D	
Analysis Period (min) 15			

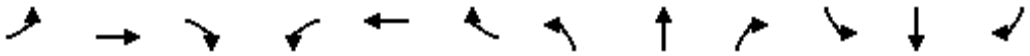
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	20	5	4	7	31	7	1123	36	236	352	67
Future Volume (vph)	42	20	5	4	7	31	7	1123	36	236	352	67
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	35.0		7.5	100.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.990				0.850			0.850		0.976	
Flt Protected		0.970			0.982		0.950			0.950		
Satd. Flow (prot)	0	1618	0	0	1748	1513	1378	1728	1479	1653	1526	0
Flt Permitted		0.803			0.868		0.517			0.066		
Satd. Flow (perm)	0	1340	0	0	1545	1513	750	1728	1479	115	1526	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				100			96		22	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		642.8			170.6			174.7			243.1	
Travel Time (s)		38.6			30.7			7.9			10.9	
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 (%)	6%	0%	25%	0%	0%	0%	20%	3%	0%	0%	15%	8%
Adj. Flow (vph)	42	20	5	4	7	31	7	1123	36	236	352	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	67	0	0	11	31	7	1123	36	236	419	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	



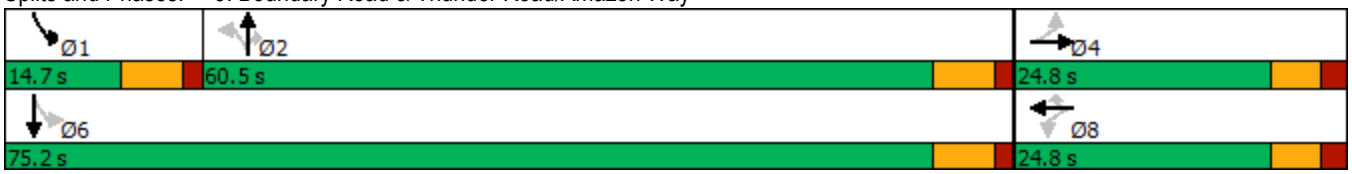
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	26.2	
Total Split (s)	24.8	24.8		24.8	24.8	24.8	60.5	60.5	60.5	14.7	75.2	
Total Split (%)	24.8%	24.8%		24.8%	24.8%	24.8%	60.5%	60.5%	60.5%	14.7%	75.2%	
Maximum Green (s)	19.0	19.0		19.0	19.0	19.0	54.3	54.3	54.3	8.7	69.0	
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	Min	Min	Min	None	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)		9.8			9.8	9.8	54.7	54.7	54.7	69.7	71.0	
Actuated g/C Ratio		0.11			0.11	0.11	0.62	0.62	0.62	0.79	0.80	
v/c Ratio		0.44			0.06	0.12	0.02	1.05	0.04	0.97	0.34	
Control Delay		45.3			36.5	1.0	8.6	62.6	0.1	77.2	4.3	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		45.3			36.5	1.0	8.6	62.6	0.1	77.2	4.3	
LOS		D			D	A	A	E	A	E	A	
Approach Delay		45.3			10.3			60.4			30.6	
Approach LOS		D			B			E			C	
Queue Length 50th (m)		11.0			1.9	0.0	0.5	~232.6	0.0	~28.4	18.6	
Queue Length 95th (m)		24.2			7.0	0.0	2.5	#332.7	0.0	#83.1	37.7	
Internal Link Dist (m)		618.8			146.6			150.7			219.1	
Turn Bay Length (m)							35.0		7.5	100.0		
Base Capacity (vph)		293			334	405	464	1068	951	243	1229	
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	0.08	0.02	1.05	0.04	0.97	0.34	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 88.4			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.05			
Intersection Signal Delay: 48.7		Intersection LOS: D	
Intersection Capacity Utilization 101.7%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

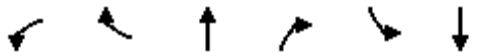
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	7	4	1162	7	1	360
Future Volume (vph)	7	4	1162	7	1	360
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.6	3.6	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	0.0		0.0	70.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				45.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.951		0.999			
Flt Protected	0.969				0.950	
Satd. Flow (prot)	829	0	1750	0	846	1589
Flt Permitted	0.969				0.950	
Satd. Flow (perm)	829	0	1750	0	846	1589
Link Speed (k/h)	20		80			80
Link Distance (m)	151.5		1150.2			174.7
Travel Time (s)	27.3		51.8			7.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	100%	1%	100%	100%	12%
Adj. Flow (vph)	7	4	1162	7	1	360
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	1169	0	1	360
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

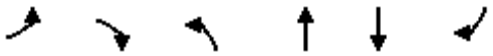
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 75.0%		ICU Level of Service D	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	4	1162	7	1	360
Future Volume (Veh/h)	7	4	1162	7	1	360
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	4	1162	7	1	360
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						175
pX, platoon unblocked	0.95					
vC, conflicting volume	1528	1166			1169	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1529	1166			1169	
tC, single (s)	7.4	7.2			5.1	
tC, 2 stage (s)						
tF (s)	4.4	4.2			3.1	
p0 queue free %	91	97			100	
cM capacity (veh/h)	74	152			352	

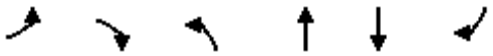
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	11	1169	1	360
Volume Left	7	0	1	0
Volume Right	4	7	0	0
cSH	91	1700	352	1700
Volume to Capacity	0.12	0.69	0.00	0.21
Queue Length 95th (m)	3.2	0.0	0.1	0.0
Control Delay (s)	49.8	0.0	15.3	0.0
Lane LOS	E		C	
Approach Delay (s)	49.8	0.0	0.0	
Approach LOS	E			

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	96	36	163	1056	152	130
Future Volume (vph)	96	36	163	1056	152	130
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
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)	1476	1286	0	1734	1561	1293
Flt Permitted	0.950			0.993		
Satd. Flow (perm)	1476	1286	0	1734	1561	1293
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	12%	15%	8%	1%	14%	17%
Adj. Flow (vph)	96	36	163	1056	152	130
Shared Lane Traffic (%)						
Lane Group Flow (vph)	96	36	0	1219	152	130
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

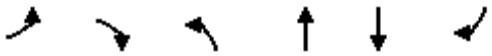
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 92.2%		ICU Level of Service F	
Analysis Period (min) 15			



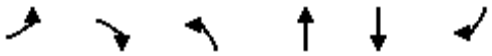
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	96	36	163	1056	152	130
Future Volume (Veh/h)	96	36	163	1056	152	130
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	96	36	163	1056	152	130
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1534	152	282			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1534	152	282			
tC, single (s)	6.5	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	9	96	87			
cM capacity (veh/h)	106	861	1247			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	96	36	1219	152	130
Volume Left	96	0	163	0	0
Volume Right	0	36	0	0	130
cSH	106	861	1247	1700	1700
Volume to Capacity	0.91	0.04	0.13	0.09	0.08
Queue Length 95th (m)	43.5	1.0	3.6	0.0	0.0
Control Delay (s)	138.6	9.4	3.6	0.0	0.0
Lane LOS	F	A	A		
Approach Delay (s)	103.4		3.6	0.0	
Approach LOS	F				

Intersection Summary				
Average Delay	11.0			
Intersection Capacity Utilization	92.2%	ICU Level of Service	F	
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	96	36	163	1056	152	130
Future Volume (vph)	96	36	163	1056	152	130
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	15.0			30.0
Storage Lanes	1	1	1			1
Taper Length (m)	47.5		100.0			
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)	1476	1286	1566	1762	1561	1293
Flt Permitted	0.950		0.660			
Satd. Flow (perm)	1476	1286	1088	1762	1561	1293
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		36				130
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	12%	15%	8%	1%	14%	17%
Adj. Flow (vph)	96	36	163	1056	152	130
Shared Lane Traffic (%)						
Lane Group Flow (vph)	96	36	163	1056	152	130
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
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)	2.0	2.0	2.0	0.6	0.6	2.0
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	Perm

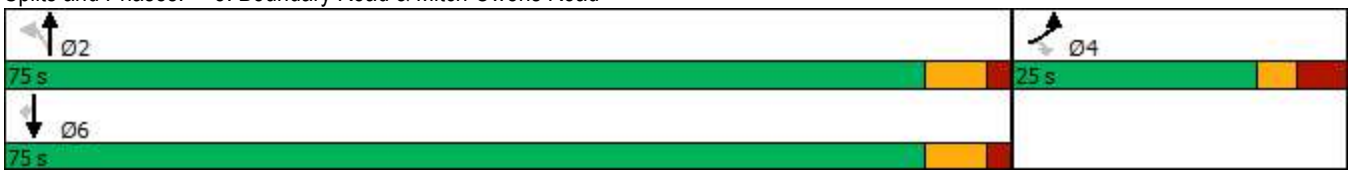


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	35.0	35.0	35.0	35.0
Minimum Split (s)	24.8	24.8	41.6	41.6	41.6	41.6
Total Split (s)	25.0	25.0	75.0	75.0	75.0	75.0
Total Split (%)	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Maximum Green (s)	18.2	18.2	68.4	68.4	68.4	68.4
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.6	6.6	6.6	6.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	11.1	11.1	58.4	58.4	58.4	58.4
Actuated g/C Ratio	0.14	0.14	0.75	0.75	0.75	0.75
v/c Ratio	0.46	0.17	0.20	0.80	0.13	0.13
Control Delay	42.0	14.3	5.4	15.5	4.7	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	14.3	5.4	15.5	4.7	1.2
LOS	D	B	A	B	A	A
Approach Delay	34.5			14.2	3.1	
Approach LOS	C			B	A	
Queue Length 50th (m)	13.7	0.0	7.8	107.6	6.9	0.0
Queue Length 95th (m)	33.5	8.8	18.3	#232.9	15.7	5.2
Internal Link Dist (m)	156.5			111.8	1126.2	
Turn Bay Length (m)	25.0		15.0			30.0
Base Capacity (vph)	362	342	936	1516	1343	1131
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	0.17	0.70	0.11	0.11

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 77.9			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 13.9		Intersection LOS: B	
Intersection Capacity Utilization 80.8%		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.

Splits and Phases: 5: Boundary Road & Mitch Owens Road



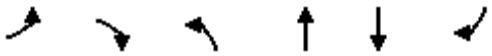
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	63	1	191	375	30	149
Future Volume (vph)	63	1	191	375	30	149
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
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)	1586	0	1559	0	0	1630
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1586	0	1559	0	0	1630
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	19%	0%	6%	3%	5%	9%
Adj. Flow (vph)	63	1	191	375	30	149
Shared Lane Traffic (%)						
Lane Group Flow (vph)	64	0	566	0	0	179
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

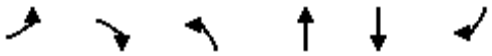
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	63	1	191	375	30	149
Future Volume (Veh/h)	63	1	191	375	30	149
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	63	1	191	375	30	149
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	588	378			566	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	588	378			566	
tC, single (s)	6.6	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.7	3.3			2.2	
p0 queue free %	85	100			97	
cM capacity (veh/h)	431	673			991	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	64	566	179
Volume Left	63	0	30
Volume Right	1	375	0
cSH	434	1700	991
Volume to Capacity	0.15	0.33	0.03
Queue Length 95th (m)	4.1	0.0	0.7
Control Delay (s)	14.7	0.0	1.7
Lane LOS	B		A
Approach Delay (s)	14.7	0.0	1.7
Approach LOS	B		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	94	895	198	354	263	20
Future Volume (vph)	94	895	198	354	263	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.990	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1551	1436	1537	1664	1592	0
Flt Permitted	0.950		0.425			
Satd. Flow (perm)	1551	1436	688	1664	1592	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		536			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	9%	3%	10%	7%	11%	7%
Adj. Flow (vph)	94	895	198	354	263	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	94	895	198	354	283	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	



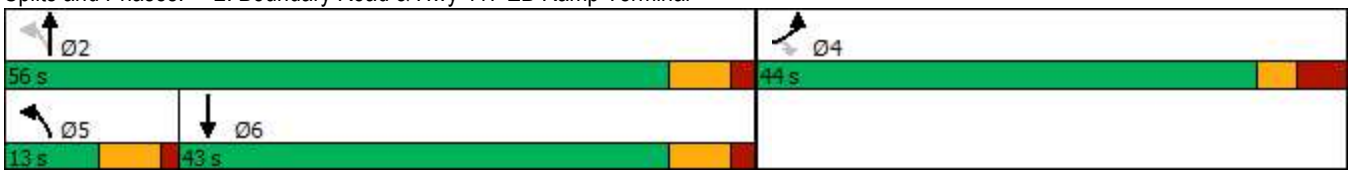
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	23.0	23.0	13.0	41.6	41.6	
Total Split (s)	44.0	44.0	13.0	56.0	43.0	
Total Split (%)	44.0%	44.0%	13.0%	56.0%	43.0%	
Maximum Green (s)	37.2	37.2	7.0	49.4	36.4	
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	Min	Min	
Walk Time (s)	7.0	7.0		0.0	7.0	
Flash Dont Walk (s)	5.0	5.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	37.2	37.2	48.6	48.0	35.0	
Actuated g/C Ratio	0.38	0.38	0.49	0.49	0.35	
v/c Ratio	0.16	1.02	0.50	0.44	0.50	
Control Delay	21.3	50.4	19.8	18.6	28.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.3	50.4	19.8	18.6	28.3	
LOS	C	D	B	B	C	
Approach Delay	47.6			19.0	28.3	
Approach LOS	D			B	C	
Queue Length 50th (m)	12.3	~119.4	22.3	44.6	43.4	
Queue Length 95th (m)	23.7	#195.8	37.1	68.2	68.8	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	585	875	399	833	590	
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	1.02	0.50	0.42	0.48	

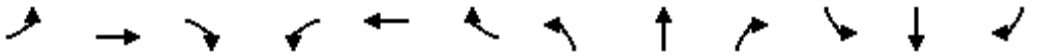
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 98.6			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 36.0		Intersection LOS: D	
Intersection Capacity Utilization 98.8%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

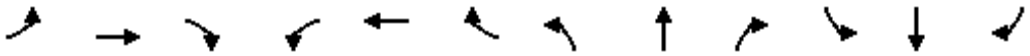
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	0	19	7	0	22	5	446	0	3	1081	74
Future Volume (vph)	83	0	19	7	0	22	5	446	0	3	1081	74
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		0.0	0.0		0.0	35.0		7.5	100.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.975				0.850					0.990	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1590	0	0	1208	1513	1322	1633	1740	1102	1699	0
Flt Permitted		0.761			0.785		0.183			0.446		
Satd. Flow (perm)	0	1259	0	0	998	1513	255	1633	1740	517	1699	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100					8	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		642.8			170.6			174.7			243.1	
Travel Time (s)		38.6			30.7			7.9			10.9	
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 (%)	6%	0%	0%	40%	0%	0%	25%	9%	0%	50%	4%	0%
Adj. Flow (vph)	83	0	19	7	0	22	5	446	0	3	1081	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	102	0	0	7	22	5	446	0	3	1155	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

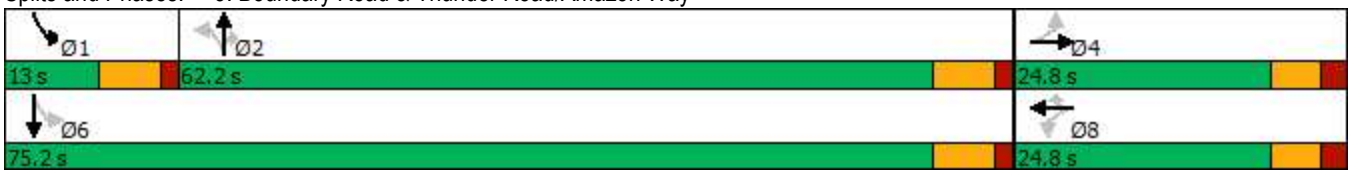


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	26.2	
Total Split (s)	24.8	24.8		24.8	24.8	24.8	62.2	62.2	62.2	13.0	75.2	
Total Split (%)	24.8%	24.8%		24.8%	24.8%	24.8%	62.2%	62.2%	62.2%	13.0%	75.2%	
Maximum Green (s)	19.0	19.0		19.0	19.0	19.0	56.0	56.0	56.0	7.0	69.0	
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	Min	Min	Min	None	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)		8.2			8.2	8.2	66.7	66.7		67.5	69.0	
Actuated g/C Ratio		0.10			0.10	0.10	0.79	0.79		0.80	0.82	
v/c Ratio		0.48			0.07	0.09	0.02	0.35		0.01	0.83	
Control Delay		16.9			38.3	0.8	5.8	5.8		2.7	14.3	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.7	
Total Delay		16.9			38.3	0.8	5.8	5.8		2.7	15.0	
LOS		B			D	A	A	A		A	B	
Approach Delay		16.9			9.8			5.8			14.9	
Approach LOS		B			A			A			B	
Queue Length 50th (m)		0.3			1.2	0.0	0.1	17.8		0.1	103.5	
Queue Length 95th (m)		15.2			5.3	0.0	1.9	64.0		0.8	#284.0	
Internal Link Dist (m)		618.8			146.6			150.7			219.1	
Turn Bay Length (m)							35.0			100.0		
Base Capacity (vph)		367			230	426	197	1263		463	1392	
Starvation Cap Reductn		0			0	0	0	0		0	60	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.28			0.03	0.05	0.03	0.35		0.01	0.87	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 84.3			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 12.6		Intersection LOS: B	
Intersection Capacity Utilization 87.5%		ICU Level of Service E	
Analysis Period (min) 15			

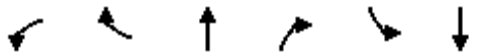
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	7	15	436	7	16	1090
Future Volume (vph)	7	15	436	7	16	1090
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.6	3.6	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	0.0		0.0	70.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				45.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.908		0.998			
Flt Protected	0.984				0.950	
Satd. Flow (prot)	804	0	1668	0	846	1745
Flt Permitted	0.984				0.950	
Satd. Flow (perm)	804	0	1668	0	846	1745
Link Speed (k/h)	20		80			80
Link Distance (m)	151.5		1150.2			174.7
Travel Time (s)	27.3		51.8			7.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	100%	5%	100%	100%	2%
Adj. Flow (vph)	7	15	436	7	16	1090
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	443	0	16	1090
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

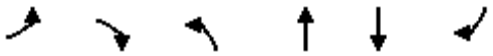
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 70.6%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	15	436	7	16	1090
Future Volume (Veh/h)	7	15	436	7	16	1090
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	15	436	7	16	1090
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						175
pX, platoon unblocked	0.23					
vC, conflicting volume	1562	440			443	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1766	440			443	
tC, single (s)	7.4	7.2			5.1	
tC, 2 stage (s)						
tF (s)	4.4	4.2			3.1	
p0 queue free %	41	97			98	
cM capacity (veh/h)	12	455			746	

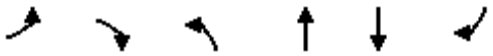
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	22	443	16	1090
Volume Left	7	0	16	0
Volume Right	15	7	0	0
cSH	36	1700	746	1700
Volume to Capacity	0.62	0.26	0.02	0.64
Queue Length 95th (m)	17.2	0.0	0.5	0.0
Control Delay (s)	208.7	0.0	9.9	0.0
Lane LOS	F		A	
Approach Delay (s)	208.7	0.0	0.1	
Approach LOS	F			

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	155	132	70	159	958	156
Future Volume (vph)	155	132	70	159	958	156
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
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)	1463	1395	0	1666	1762	1351
Flt Permitted	0.950			0.985		
Satd. Flow (perm)	1463	1395	0	1666	1762	1351
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	6%	8%	4%	1%	12%
Adj. Flow (vph)	155	132	70	159	958	156
Shared Lane Traffic (%)						
Lane Group Flow (vph)	155	132	0	229	958	156
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

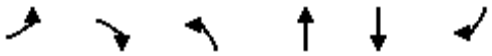
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 85.2%		ICU Level of Service E	
Analysis Period (min) 15			



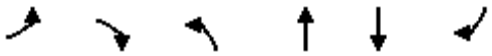
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	155	132	70	159	958	156
Future Volume (Veh/h)	155	132	70	159	958	156
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	155	132	70	159	958	156
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1257	958	1114			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1257	958	1114			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	2	57	88			
cM capacity (veh/h)	159	307	605			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	155	132	229	958	156
Volume Left	155	0	70	0	0
Volume Right	0	132	0	0	156
cSH	159	307	605	1700	1700
Volume to Capacity	0.98	0.43	0.12	0.56	0.09
Queue Length 95th (m)	59.3	16.6	3.1	0.0	0.0
Control Delay (s)	122.8	25.3	4.6	0.0	0.0
Lane LOS	F	D	A		
Approach Delay (s)	78.0		4.6	0.0	
Approach LOS	F				

Intersection Summary				
Average Delay	14.4			
Intersection Capacity Utilization	85.2%	ICU Level of Service	E	
Analysis Period (min)	15			



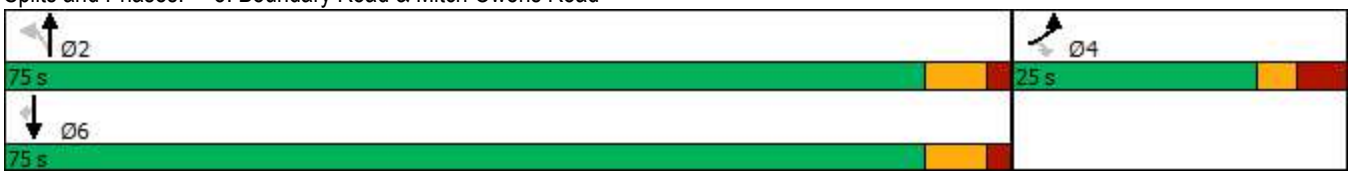
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	155	132	70	159	958	156
Future Volume (vph)	155	132	70	159	958	156
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	15.0			30.0
Storage Lanes	1	1	1			1
Taper Length (m)	47.5		100.0			
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)	1463	1395	1566	1712	1762	1351
Flt Permitted	0.950		0.160			
Satd. Flow (perm)	1463	1395	264	1712	1762	1351
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		132				88
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	784.0	
Travel Time (s)	8.1			6.1	35.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	6%	8%	4%	1%	12%
Adj. Flow (vph)	155	132	70	159	958	156
Shared Lane Traffic (%)						
Lane Group Flow (vph)	155	132	70	159	958	156
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
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)	2.0	2.0	2.0	0.6	0.6	2.0
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	Perm



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	35.0	35.0	35.0	35.0
Minimum Split (s)	24.8	24.8	41.6	41.6	41.6	41.6
Total Split (s)	25.0	25.0	75.0	75.0	75.0	75.0
Total Split (%)	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Maximum Green (s)	18.2	18.2	68.4	68.4	68.4	68.4
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.6	6.6	6.6	6.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	13.0	13.0	48.0	48.0	48.0	48.0
Actuated g/C Ratio	0.17	0.17	0.64	0.64	0.64	0.64
v/c Ratio	0.62	0.38	0.42	0.15	0.85	0.17
Control Delay	43.1	10.0	15.8	5.8	19.6	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.1	10.0	15.8	5.8	19.6	3.1
LOS	D	B	B	A	B	A
Approach Delay	27.9			8.9	17.3	
Approach LOS	C			A	B	
Queue Length 50th (m)	20.1	0.0	4.3	8.0	95.3	3.3
Queue Length 95th (m)	50.8	16.0	16.5	17.1	182.6	10.6
Internal Link Dist (m)	156.5			111.8	760.0	
Turn Bay Length (m)	25.0		15.0			30.0
Base Capacity (vph)	373	454	232	1509	1554	1202
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	0.42	0.29	0.30	0.11	0.62	0.13

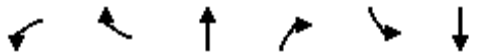
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 75.1			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 18.0		Intersection LOS: B	
Intersection Capacity Utilization 81.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Boundary Road & Mitch Owens Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	163	31	104	879	77	134
Future Volume (vph)	163	31	104	879	77	134
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.978		0.879			
Flt Protected	0.960					0.982
Satd. Flow (prot)	1696	0	1517	0	0	1604
Flt Permitted	0.960					0.982
Satd. Flow (perm)	1696	0	1517	0	0	1604
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	9%	13%	13%	2%	9%	9%
Adj. Flow (vph)	163	31	104	879	77	134
Shared Lane Traffic (%)						
Lane Group Flow (vph)	194	0	983	0	0	211
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

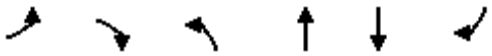
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 96.5%		ICU Level of Service F	
Analysis Period (min) 15			



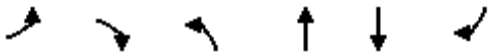
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	163	31	104	879	77	134
Future Volume (Veh/h)	163	31	104	879	77	134
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	163	31	104	879	77	134
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	832	544			983	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	832	544			983	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	44	94			89	
cM capacity (veh/h)	292	519			675	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	194	983	211
Volume Left	163	0	77
Volume Right	31	879	0
cSH	314	1700	675
Volume to Capacity	0.62	0.58	0.11
Queue Length 95th (m)	30.8	0.0	3.1
Control Delay (s)	33.3	0.0	4.9
Lane LOS	D		A
Approach Delay (s)	33.3	0.0	4.9
Approach LOS	D		

Intersection Summary			
Average Delay		5.4	
Intersection Capacity Utilization		96.5%	ICU Level of Service F
Analysis Period (min)		15	



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	18	364	44	969	268	9
Future Volume (vph)	18	364	44	969	268	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.996	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1271	1332	1311	1728	1583	0
Flt Permitted	0.950		0.514			
Satd. Flow (perm)	1271	1332	709	1728	1583	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		364			3	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	33%	11%	29%	3%	12%	11%
Adj. Flow (vph)	18	364	44	969	268	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	364	44	969	277	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	

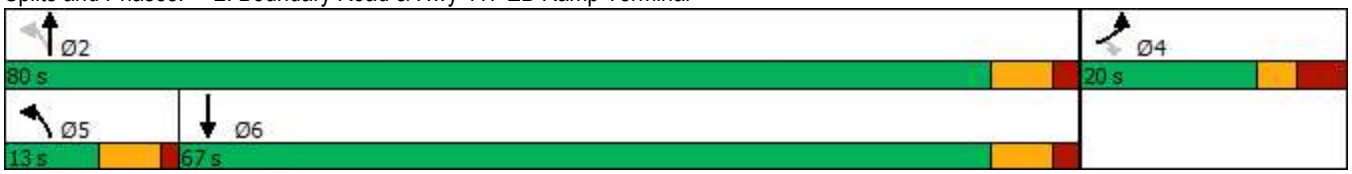


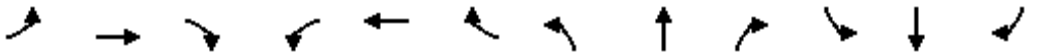
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	17.8	17.8	13.0	41.6	41.6	
Total Split (s)	20.0	20.0	13.0	80.0	67.0	
Total Split (%)	20.0%	20.0%	13.0%	80.0%	67.0%	
Maximum Green (s)	13.2	13.2	7.0	73.4	60.4	
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	Min	Min	
Walk Time (s)	5.0	5.0		0.0	7.0	
Flash Dont Walk (s)	6.0	6.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	8.9	8.9	48.8	48.1	41.2	
Actuated g/C Ratio	0.13	0.13	0.69	0.68	0.58	
v/c Ratio	0.11	0.75	0.08	0.83	0.30	
Control Delay	35.4	15.3	3.8	15.6	9.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	35.4	15.3	3.8	15.7	9.9	
LOS	D	B	A	B	A	
Approach Delay	16.2			15.2	9.9	
Approach LOS	B			B	A	
Queue Length 50th (m)	2.3	0.0	1.4	71.0	20.2	
Queue Length 95th (m)	10.1	#32.3	4.7	157.0	39.2	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	247	552	548	1623	1355	
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	0.07	0.66	0.08	0.61	0.20	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 71.1			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 14.5		Intersection LOS: B	
Intersection Capacity Utilization 70.8%		ICU Level of Service C	
Analysis Period (min) 15			

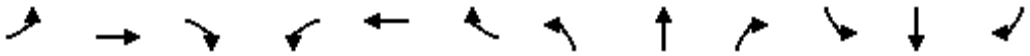
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	17	9	3	6	25	21	932	30	193	325	112
Future Volume (vph)	55	17	9	3	6	25	21	932	30	193	325	112
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		15.0	0.0		0.0	35.0		7.5	100.0		35.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.985				0.850			0.850		0.962	
Flt Protected		0.967			0.984		0.950			0.950		
Satd. Flow (prot)	0	1533	0	0	1752	1513	1589	1728	1479	1653	1466	0
Flt Permitted		0.791			0.886		0.509			0.110		
Satd. Flow (perm)	0	1254	0	0	1577	1513	852	1728	1479	191	1466	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				100			96		40	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		198.6			170.6			174.7			243.1	
Travel Time (s)		11.9			30.7			7.9			10.9	
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 (%)	14%	0%	10%	0%	0%	0%	4%	3%	0%	0%	16%	19%
Adj. Flow (vph)	55	17	9	3	6	25	21	932	30	193	325	112
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	81	0	0	9	25	21	932	30	193	437	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

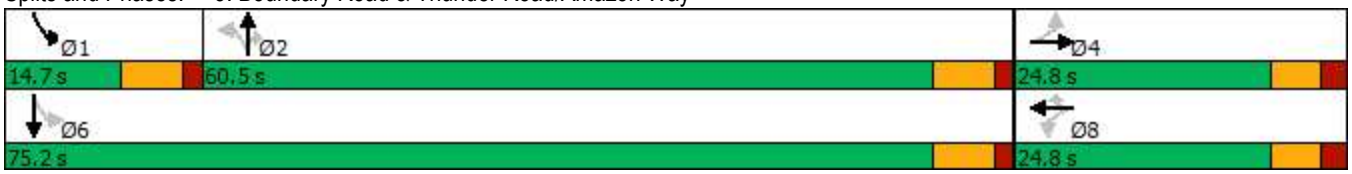


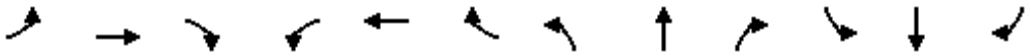
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	26.2	
Total Split (s)	24.8	24.8		24.8	24.8	24.8	60.5	60.5	60.5	14.7	75.2	
Total Split (%)	24.8%	24.8%		24.8%	24.8%	24.8%	60.5%	60.5%	60.5%	14.7%	75.2%	
Maximum Green (s)	19.0	19.0		19.0	19.0	19.0	54.3	54.3	54.3	8.7	69.0	
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	Min	Min	Min	None	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)		11.0			11.0	11.0	52.2	52.2	52.2	67.5	69.0	
Actuated g/C Ratio		0.13			0.13	0.13	0.60	0.60	0.60	0.78	0.79	
v/c Ratio		0.50			0.05	0.09	0.04	0.90	0.03	0.65	0.37	
Control Delay		46.1			35.3	0.6	9.3	30.6	0.1	21.5	4.9	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		46.1			35.3	0.6	9.3	30.6	0.1	21.5	4.9	
LOS		D			D	A	A	C	A	C	A	
Approach Delay		46.1			9.8			29.2			10.0	
Approach LOS		D			A			C			B	
Queue Length 50th (m)		13.3			1.5	0.0	1.5	142.0	0.0	8.4	20.4	
Queue Length 95th (m)		28.0			6.0	0.0	5.3	#261.7	0.0	#43.4	43.5	
Internal Link Dist (m)		174.6			146.6			150.7			219.1	
Turn Bay Length (m)							35.0		7.5	100.0		
Base Capacity (vph)		285			353	416	545	1107	982	298	1170	
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		0.28			0.03	0.06	0.04	0.84	0.03	0.65	0.37	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 87			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 22.6		Intersection LOS: C	
Intersection Capacity Utilization 89.5%		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.

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way





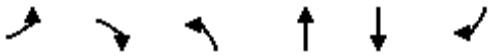
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	4	6	0	3	14	978	6	1	319	17
Future Volume (vph)	1	0	4	6	0	3	14	978	6	1	319	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.6
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	70.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			45.0			45.0		
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		0.892			0.955			0.999			0.992	
Flt Protected		0.990			0.968		0.950			0.950		
Satd. Flow (prot)	0	1572	0	0	823	0	1691	1750	0	846	1585	0
Flt Permitted		0.990			0.968		0.950			0.950		
Satd. Flow (perm)	0	1572	0	0	823	0	1691	1750	0	846	1585	0
Link Speed (k/h)		50			20			80			80	
Link Distance (m)		105.7			151.5			1150.2			174.7	
Travel Time (s)		7.6			27.3			51.8			7.9	
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 (%)	0%	0%	0%	100%	0%	100%	0%	1%	100%	100%	12%	0%
Adj. Flow (vph)	1	0	4	6	0	3	14	978	6	1	319	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	9	0	14	984	0	1	336	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	4	6	0	3	14	978	6	1	319	17
Future Volume (Veh/h)	1	0	4	6	0	3	14	978	6	1	319	17
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	0	4	6	0	3	14	978	6	1	319	17
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											175	
pX, platoon unblocked	0.97	0.97	0.97	0.97	0.97		0.97					
vC, conflicting volume	1338	1342	328	1334	1347	981	336			984		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1334	1337	297	1330	1343	981	306			984		
tC, single (s)	7.1	6.5	6.2	8.1	6.5	7.2	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.4	4.0	4.2	2.2			3.1		
p0 queue free %	99	100	99	92	100	99	99			100		
cM capacity (veh/h)	126	149	728	80	147	202	1234			427		

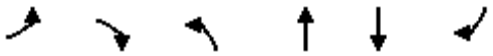
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	9	14	984	1	336
Volume Left	1	6	14	0	1	0
Volume Right	4	3	0	6	0	17
cSH	372	100	1234	1700	427	1700
Volume to Capacity	0.01	0.09	0.01	0.58	0.00	0.20
Queue Length 95th (m)	0.3	2.3	0.3	0.0	0.1	0.0
Control Delay (s)	14.8	44.6	7.9	0.0	13.4	0.0
Lane LOS	B	E	A		B	
Approach Delay (s)	14.8	44.6	0.1		0.0	
Approach LOS	B	E				

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	64.7%	ICU Level of Service	C	
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	83	30	134	894	133	108
Future Volume (vph)	83	30	134	894	133	108
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950			0.994		
Satd. Flow (prot)	1489	1264	0	1736	1575	1293
Flt Permitted	0.950			0.994		
Satd. Flow (perm)	1489	1264	0	1736	1575	1293
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	17%	8%	1%	13%	17%
Adj. Flow (vph)	83	30	134	894	133	108
Shared Lane Traffic (%)						
Lane Group Flow (vph)	83	30	0	1028	133	108
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 79.7%		ICU Level of Service D	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	30	134	894	133	108
Future Volume (Veh/h)	83	30	134	894	133	108
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	83	30	134	894	133	108
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1295	133	241			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1295	133	241			
tC, single (s)	6.5	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.5	2.3			
p0 queue free %	46	97	90			
cM capacity (veh/h)	154	878	1291			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	83	30	1028	133	108
Volume Left	83	0	134	0	0
Volume Right	0	30	0	0	108
cSH	154	878	1291	1700	1700
Volume to Capacity	0.54	0.03	0.10	0.08	0.06
Queue Length 95th (m)	21.6	0.8	2.8	0.0	0.0
Control Delay (s)	53.0	9.2	2.6	0.0	0.0
Lane LOS	F	A	A		
Approach Delay (s)	41.4		2.6	0.0	
Approach LOS	E				

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	65	0	38	101	0	16
Future Volume (vph)	65	0	38	101	0	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.987		
Satd. Flow (prot)	1589	0	0	1496	1466	0
Flt Permitted				0.987		
Satd. Flow (perm)	1589	0	0	1496	1466	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	163.7			198.6	103.6	
Travel Time (s)	9.8			14.3	7.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	12%	0%	0%	24%	0%	5%
Adj. Flow (vph)	65	0	38	101	0	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	0	139	16	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	65	0	38	101	0	16
Future Volume (Veh/h)	65	0	38	101	0	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	65	0	38	101	0	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				199		
pX, platoon unblocked						
vC, conflicting volume			65		242	65
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			65		242	65
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	98
cM capacity (veh/h)			1550		732	991

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	65	139	16
Volume Left	0	38	0
Volume Right	0	0	16
cSH	1700	1550	991
Volume to Capacity	0.04	0.02	0.02
Queue Length 95th (m)	0.0	0.6	0.4
Control Delay (s)	0.0	2.2	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	2.2	8.7
Approach LOS			A

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	24.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	62	0	11	90	0	3
Future Volume (vph)	62	0	11	90	0	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.995		
Satd. Flow (prot)	1679	0	0	1467	770	0
Flt Permitted				0.995		
Satd. Flow (perm)	1679	0	0	1467	770	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	185.0			163.7	105.8	
Travel Time (s)	11.1			11.8	7.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	0%	100%	11%	0%	100%
Adj. Flow (vph)	62	0	11	90	0	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	62	0	0	101	3	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	62	0	11	90	0	3
Future Volume (Veh/h)	62	0	11	90	0	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	62	0	11	90	0	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				362		
pX, platoon unblocked						
vC, conflicting volume			62		174	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			62		174	62
tC, single (s)			5.1		6.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		3.5	4.2
p0 queue free %			99		100	100
cM capacity (veh/h)			1092		812	785

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	62	101	3
Volume Left	0	11	0
Volume Right	0	0	3
cSH	1700	1092	785
Volume to Capacity	0.04	0.01	0.00
Queue Length 95th (m)	0.0	0.2	0.1
Control Delay (s)	0.0	1.0	9.6
Lane LOS		A	A
Approach Delay (s)	0.0	1.0	9.6
Approach LOS			A

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	55	0	23	67	0	7
Future Volume (vph)	55	0	23	67	0	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.987		
Satd. Flow (prot)	1695	0	0	1585	1351	0
Flt Permitted				0.987		
Satd. Flow (perm)	1695	0	0	1585	1351	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	95.5			185.0	109.7	
Travel Time (s)	5.7			13.3	7.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	0%	22%	7%	0%	14%
Adj. Flow (vph)	55	0	23	67	0	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	0	0	90	7	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	21.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	55	0	23	67	0	7
Future Volume (Veh/h)	55	0	23	67	0	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	55	0	23	67	0	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			55		168	55
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			55		168	55
tC, single (s)			4.3		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.4		3.5	3.4
p0 queue free %			98		100	99
cM capacity (veh/h)			1431		814	979

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	55	90	7
Volume Left	0	23	0
Volume Right	0	0	7
cSH	1700	1431	979
Volume to Capacity	0.03	0.02	0.01
Queue Length 95th (m)	0.0	0.4	0.2
Control Delay (s)	0.0	2.0	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	2.0	8.7
Approach LOS			A

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	21.7%	ICU Level of Service	A
Analysis Period (min)	15		

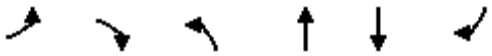
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	60	1	177	355	24	128
Future Volume (vph)	60	1	177	355	24	128
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
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)	1548	0	1523	0	0	1632
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1548	0	1523	0	0	1632
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	22%	0%	5%	7%	4%	9%
Adj. Flow (vph)	60	1	177	355	24	128
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	0	532	0	0	152
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

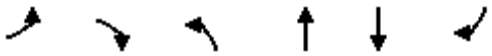
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	60	1	177	355	24	128
Future Volume (Veh/h)	60	1	177	355	24	128
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	60	1	177	355	24	128
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	530	354			532	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530	354			532	
tC, single (s)	6.6	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.7	3.3			2.2	
p0 queue free %	87	100			98	
cM capacity (veh/h)	465	694			1025	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	61	532	152
Volume Left	60	0	24
Volume Right	1	355	0
cSH	467	1700	1025
Volume to Capacity	0.13	0.31	0.02
Queue Length 95th (m)	3.6	0.0	0.6
Control Delay (s)	13.9	0.0	1.5
Lane LOS	B		A
Approach Delay (s)	13.9	0.0	1.5
Approach LOS	B		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	77	756	191	357	233	17
Future Volume (vph)	77	756	191	357	233	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.991	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1551	1422	1496	1604	1581	0
Flt Permitted	0.950		0.496			
Satd. Flow (perm)	1551	1422	781	1604	1581	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		577			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	9%	4%	13%	11%	12%	6%
Adj. Flow (vph)	77	756	191	357	233	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	77	756	191	357	250	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	

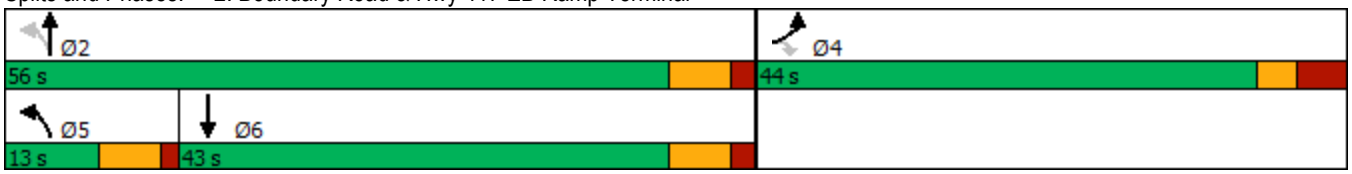


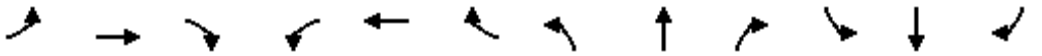
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	23.0	23.0	13.0	41.6	41.6	
Total Split (s)	44.0	44.0	13.0	56.0	43.0	
Total Split (%)	44.0%	44.0%	13.0%	56.0%	43.0%	
Maximum Green (s)	37.2	37.2	7.0	49.4	36.4	
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	Min	Min	
Walk Time (s)	7.0	7.0		0.0	7.0	
Flash Dont Walk (s)	5.0	5.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	23.7	23.7	49.6	49.0	35.7	
Actuated g/C Ratio	0.27	0.27	0.57	0.57	0.41	
v/c Ratio	0.18	0.94	0.38	0.39	0.38	
Control Delay	22.6	27.1	14.5	14.8	22.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	22.6	27.1	14.5	14.8	22.4	
LOS	C	C	B	B	C	
Approach Delay	26.7			14.7	22.4	
Approach LOS	C			B	C	
Queue Length 50th (m)	10.0	30.7	16.2	34.6	30.4	
Queue Length 95th (m)	20.2	#122.7	36.0	70.2	60.2	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	682	948	507	936	682	
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	0.11	0.80	0.38	0.38	0.37	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 86.3			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 22.0		Intersection LOS: C	
Intersection Capacity Utilization 89.7%		ICU Level of Service E	
Analysis Period (min) 15			

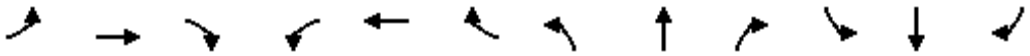
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	0	31	6	0	18	9	389	0	2	903	82
Future Volume (vph)	139	0	31	6	0	18	9	389	0	2	903	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		15.0	0.0		0.0	35.0		7.5	100.0		35.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.975				0.850					0.988	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1444	0	0	1271	1513	1503	1633	1740	1102	1686	0
Flt Permitted		0.761			0.732		0.206			0.449		
Satd. Flow (perm)	0	1143	0	0	980	1513	326	1633	1740	521	1686	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100					10	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		198.6			170.6			174.7			243.1	
Travel Time (s)		11.9			30.7			7.9			10.9	
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 (%)	19%	0%	0%	33%	0%	0%	10%	9%	0%	50%	4%	8%
Adj. Flow (vph)	139	0	31	6	0	18	9	389	0	2	903	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	170	0	0	6	18	9	389	0	2	985	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

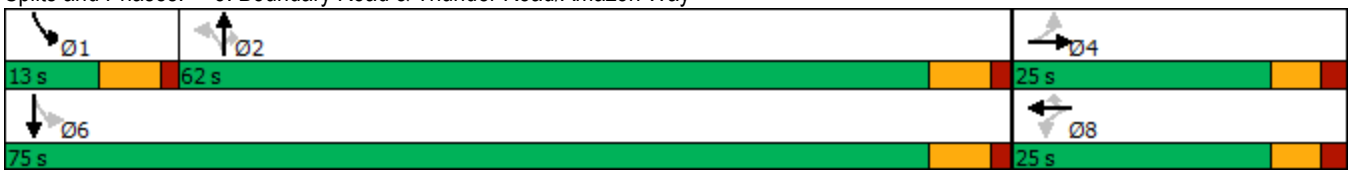


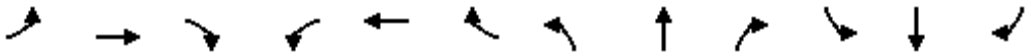
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	62.0	62.0	62.0	13.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	62.0%	62.0%	62.0%	13.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	55.8	55.8	55.8	7.0	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	Min	Min	Min	None	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)		11.5			11.5	11.5	46.5	46.5		48.7	48.4	
Actuated g/C Ratio		0.16			0.16	0.16	0.64	0.64		0.67	0.66	
v/c Ratio		0.64			0.04	0.06	0.04	0.37		0.00	0.88	
Control Delay		27.4			32.2	0.3	8.1	8.7		4.5	20.5	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		27.4			32.2	0.3	8.1	8.7		4.5	20.6	
LOS		C			C	A	A	A		A	C	
Approach Delay		27.4			8.3			8.7			20.5	
Approach LOS		C			A			A			C	
Queue Length 50th (m)		8.6			0.7	0.0	0.4	18.8		0.1	86.5	
Queue Length 95th (m)		35.0			4.6	0.0	3.3	66.0		0.8	#212.3	
Internal Link Dist (m)		174.6			146.6			150.7			219.1	
Turn Bay Length (m)							35.0			100.0		
Base Capacity (vph)		395			277	500	265	1330		408	1500	
Starvation Cap Reductn		0			0	0	0	0		0	17	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.43			0.02	0.04	0.03	0.29		0.00	0.66	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 72.8			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 18.1		Intersection LOS: B	
Intersection Capacity Utilization 82.2%		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.

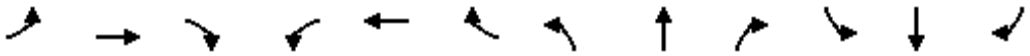
Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	14	6	0	12	4	382	6	13	920	7
Future Volume (vph)	4	0	14	6	0	12	4	382	6	13	920	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.6
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	70.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			45.0			45.0		
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		0.895			0.910			0.998			0.999	
Flt Protected		0.989			0.984		0.950			0.950		
Satd. Flow (prot)	0	1576	0	0	797	0	1691	1669	0	846	1744	0
Flt Permitted		0.989			0.984		0.950			0.950		
Satd. Flow (perm)	0	1576	0	0	797	0	1691	1669	0	846	1744	0
Link Speed (k/h)		50			20			80			80	
Link Distance (m)		105.7			151.5			1150.2			174.7	
Travel Time (s)		7.6			27.3			51.8			7.9	
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 (%)	0%	0%	0%	100%	0%	100%	0%	5%	100%	100%	2%	0%
Adj. Flow (vph)	4	0	14	6	0	12	4	382	6	13	920	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	18	0	0	18	0	4	388	0	13	927	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

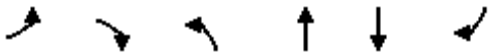
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	14	6	0	12	4	382	6	13	920	7
Future Volume (Veh/h)	4	0	14	6	0	12	4	382	6	13	920	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	4	0	14	6	0	12	4	382	6	13	920	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											175	
pX, platoon unblocked	0.55	0.55	0.55	0.55	0.55		0.55					
vC, conflicting volume	1352	1346	924	1353	1346	385	927			388		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1228	1217	446	1231	1218	385	452			388		
tC, single (s)	7.1	6.5	6.2	8.1	6.5	7.2	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.4	4.0	4.2	2.2			3.1		
p0 queue free %	95	100	96	88	100	98	99			98		
cM capacity (veh/h)	82	97	337	51	97	493	612			788		

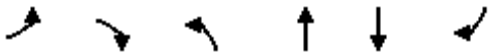
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	18	18	4	388	13	927
Volume Left	4	6	4	0	13	0
Volume Right	14	12	0	6	0	7
cSH	199	127	612	1700	788	1700
Volume to Capacity	0.09	0.14	0.01	0.23	0.02	0.55
Queue Length 95th (m)	2.4	3.8	0.2	0.0	0.4	0.0
Control Delay (s)	24.9	38.0	10.9	0.0	9.6	0.0
Lane LOS	C	E	B		A	
Approach Delay (s)	24.9	38.0	0.1		0.1	
Approach LOS	C	E				

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	61.6%	ICU Level of Service	B	
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	129	108	57	140	814	133
Future Volume (vph)	129	108	57	140	814	133
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950			0.986		
Satd. Flow (prot)	1463	1395	0	1664	1762	1363
Flt Permitted	0.950			0.986		
Satd. Flow (perm)	1463	1395	0	1664	1762	1363
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	6%	9%	4%	1%	11%
Adj. Flow (vph)	129	108	57	140	814	133
Shared Lane Traffic (%)						
Lane Group Flow (vph)	129	108	0	197	814	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 73.9%		ICU Level of Service D	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	129	108	57	140	814	133
Future Volume (Veh/h)	129	108	57	140	814	133
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	129	108	57	140	814	133
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1068	814	947			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1068	814	947			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	40	71	92			
cM capacity (veh/h)	215	372	697			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	129	108	197	814	133
Volume Left	129	0	57	0	0
Volume Right	0	108	0	0	133
cSH	215	372	697	1700	1700
Volume to Capacity	0.60	0.29	0.08	0.48	0.08
Queue Length 95th (m)	27.4	9.5	2.1	0.0	0.0
Control Delay (s)	44.2	18.6	3.7	0.0	0.0
Lane LOS	E	C	A		
Approach Delay (s)	32.5		3.7	0.0	
Approach LOS	D				

Intersection Summary				
Average Delay	6.1			
Intersection Capacity Utilization	73.9%	ICU Level of Service	D	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	118	0	14	78	0	52
Future Volume (vph)	118	0	14	78	0	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.992		
Satd. Flow (prot)	1483	0	0	1628	1426	0
Flt Permitted				0.992		
Satd. Flow (perm)	1483	0	0	1628	1426	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	163.7			198.6	103.6	
Travel Time (s)	9.8			14.3	7.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	20%	0%	0%	10%	0%	8%
Adj. Flow (vph)	118	0	14	78	0	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	118	0	0	92	52	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 21.9%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	118	0	14	78	0	52
Future Volume (Veh/h)	118	0	14	78	0	52
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	118	0	14	78	0	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				199		
pX, platoon unblocked						
vC, conflicting volume			118		224	118
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			118		224	118
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			99		100	94
cM capacity (veh/h)			1483		761	918

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	118	92	52
Volume Left	0	14	0
Volume Right	0	0	52
cSH	1700	1483	918
Volume to Capacity	0.07	0.01	0.06
Queue Length 95th (m)	0.0	0.2	1.4
Control Delay (s)	0.0	1.2	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	1.2	9.2
Approach LOS			A

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	21.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	107	0	4	74	0	11
Future Volume (vph)	107	0	4	74	0	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.997		
Satd. Flow (prot)	1648	0	0	1629	770	0
Flt Permitted				0.997		
Satd. Flow (perm)	1648	0	0	1629	770	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	185.0			163.7	105.8	
Travel Time (s)	11.1			11.8	7.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	0%	100%	4%	0%	100%
Adj. Flow (vph)	107	0	4	74	0	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	107	0	0	78	11	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	107	0	4	74	0	11
Future Volume (Veh/h)	107	0	4	74	0	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	107	0	4	74	0	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				362		
pX, platoon unblocked						
vC, conflicting volume			107		189	107
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			107		189	107
tC, single (s)			5.1		6.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		3.5	4.2
p0 queue free %			100		100	99
cM capacity (veh/h)			1045		802	736

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	107	78	11
Volume Left	0	4	0
Volume Right	0	0	11
cSH	1700	1045	736
Volume to Capacity	0.06	0.00	0.01
Queue Length 95th (m)	0.0	0.1	0.4
Control Delay (s)	0.0	0.5	10.0
Lane LOS		A	A
Approach Delay (s)	0.0	0.5	10.0
Approach LOS			A

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		17.6%	ICU Level of Service
Analysis Period (min)		15	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	83	0	9	65	0	24
Future Volume (vph)	83	0	9	65	0	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.994		
Satd. Flow (prot)	1695	0	0	1694	1272	0
Flt Permitted				0.994		
Satd. Flow (perm)	1695	0	0	1694	1272	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	95.5			185.0	109.7	
Travel Time (s)	5.7			13.3	7.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	0%	22%	2%	0%	21%
Adj. Flow (vph)	83	0	9	65	0	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	83	0	0	74	24	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	83	0	9	65	0	24
Future Volume (Veh/h)	83	0	9	65	0	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	83	0	9	65	0	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			83		166	83
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			83		166	83
tC, single (s)			4.3		6.4	6.4
tC, 2 stage (s)						
tF (s)			2.4		3.5	3.5
p0 queue free %			99		100	97
cM capacity (veh/h)			1397		824	926

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	83	74	24
Volume Left	0	9	0
Volume Right	0	0	24
cSH	1700	1397	926
Volume to Capacity	0.05	0.01	0.03
Queue Length 95th (m)	0.0	0.2	0.6
Control Delay (s)	0.0	1.0	9.0
Lane LOS		A	A
Approach Delay (s)	0.0	1.0	9.0
Approach LOS			A

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

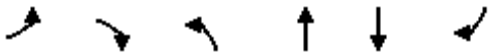
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	176	34	114	965	85	145
Future Volume (vph)	176	34	114	965	85	145
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.978		0.879			
Flt Protected	0.960					0.982
Satd. Flow (prot)	1703	0	1528	0	0	1604
Flt Permitted	0.960					0.982
Satd. Flow (perm)	1703	0	1528	0	0	1604
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	15%	14%	1%	9%	9%
Adj. Flow (vph)	176	34	114	965	85	145
Shared Lane Traffic (%)						
Lane Group Flow (vph)	210	0	1079	0	0	230
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 104.7%		ICU Level of Service G	
Analysis Period (min) 15			

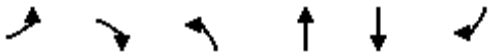
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	176	34	114	965	85	145
Future Volume (Veh/h)	176	34	114	965	85	145
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	176	34	114	965	85	145
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	912	596			1079	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	912	596			1079	
tC, single (s)	6.5	6.4			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	31	93			86	
cM capacity (veh/h)	256	480			621	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	210	1079	230
Volume Left	176	0	85
Volume Right	34	965	0
cSH	277	1700	621
Volume to Capacity	0.76	0.63	0.14
Queue Length 95th (m)	45.0	0.0	3.8
Control Delay (s)	49.5	0.0	5.4
Lane LOS	E		A
Approach Delay (s)	49.5	0.0	5.4
Approach LOS	E		

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	104.7%	ICU Level of Service	G
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	391	47	1063	288	10
Future Volume (vph)	20	391	47	1063	288	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1301	1345	1331	1745	1582	0
Flt Permitted	0.950		0.509			
Satd. Flow (perm)	1301	1345	713	1745	1582	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		391			3	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	30%	10%	27%	2%	12%	10%
Adj. Flow (vph)	20	391	47	1063	288	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	391	47	1063	298	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	

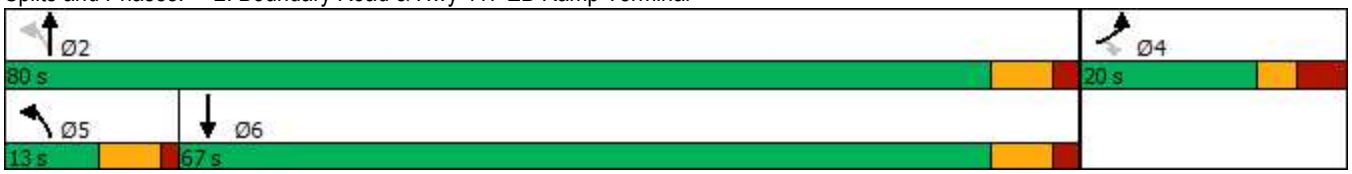


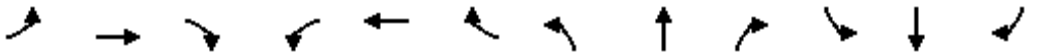
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	17.8	17.8	13.0	41.6	41.6	
Total Split (s)	20.0	20.0	13.0	80.0	67.0	
Total Split (%)	20.0%	20.0%	13.0%	80.0%	67.0%	
Maximum Green (s)	13.2	13.2	7.0	73.4	60.4	
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	Min	Min	
Walk Time (s)	5.0	5.0		0.0	7.0	
Flash Dont Walk (s)	6.0	6.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	9.2	9.2	51.5	50.8	44.0	
Actuated g/C Ratio	0.12	0.12	0.69	0.68	0.59	
v/c Ratio	0.12	0.77	0.08	0.89	0.32	
Control Delay	37.4	15.7	3.8	20.1	9.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	37.4	15.7	3.8	20.1	9.7	
LOS	D	B	A	C	A	
Approach Delay	16.8			19.4	9.7	
Approach LOS	B			B	A	
Queue Length 50th (m)	2.5	0.0	1.5	87.0	22.1	
Queue Length 95th (m)	10.9	#35.3	5.0	200.8	42.6	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	245	571	556	1583	1313	
Starvation Cap Reductn	0	0	0	25	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.08	0.68	0.08	0.68	0.23	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 74.2			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 17.2		Intersection LOS: B	
Intersection Capacity Utilization 76.1%		ICU Level of Service D	
Analysis Period (min) 15			

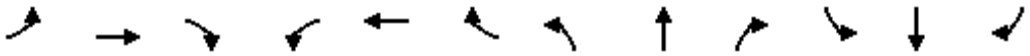
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	18	10	4	6	28	21	1023	33	213	346	118
Future Volume (vph)	59	18	10	4	6	28	21	1023	33	213	346	118
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		15.0	0.0		0.0	35.0		7.5	100.0		35.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.984				0.850			0.850		0.962	
Flt Protected		0.967			0.980		0.950			0.950		
Satd. Flow (prot)	0	1542	0	0	1744	1513	1589	1728	1479	1653	1467	0
Flt Permitted		0.791			0.876		0.496			0.066		
Satd. Flow (perm)	0	1261	0	0	1559	1513	830	1728	1479	115	1467	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				100			96		40	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		198.6			170.6			174.7			243.1	
Travel Time (s)		11.9			30.7			7.9			10.9	
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 (%)	13%	0%	9%	0%	0%	0%	4%	3%	0%	0%	16%	19%
Adj. Flow (vph)	59	18	10	4	6	28	21	1023	33	213	346	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	87	0	0	10	28	21	1023	33	213	464	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	



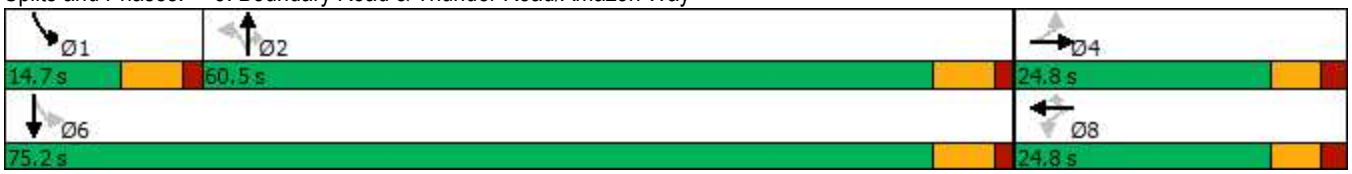
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	26.2	
Total Split (s)	24.8	24.8		24.8	24.8	24.8	60.5	60.5	60.5	14.7	75.2	
Total Split (%)	24.8%	24.8%		24.8%	24.8%	24.8%	60.5%	60.5%	60.5%	14.7%	75.2%	
Maximum Green (s)	19.0	19.0		19.0	19.0	19.0	54.3	54.3	54.3	8.7	69.0	
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	Min	Min	Min	None	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)		11.4			11.4	11.4	54.8	54.8	54.8	69.8	71.1	
Actuated g/C Ratio		0.13			0.13	0.13	0.61	0.61	0.61	0.78	0.79	
v/c Ratio		0.53			0.05	0.10	0.04	0.97	0.04	0.89	0.40	
Control Delay		47.3			35.2	0.7	9.6	42.8	0.1	60.8	5.3	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		47.3			35.2	0.7	9.6	42.8	0.1	60.8	5.3	
LOS		D			D	A	A	D	A	E	A	
Approach Delay		47.3			9.8			40.8			22.8	
Approach LOS		D			A			D			C	
Queue Length 50th (m)		14.4			1.7	0.0	1.5	~180.4	0.0	24.4	23.0	
Queue Length 95th (m)		29.7			6.5	0.0	5.4	#304.8	0.0	#75.0	49.1	
Internal Link Dist (m)		174.6			146.6			150.7			219.1	
Turn Bay Length (m)							35.0		7.5	100.0		
Base Capacity (vph)		273			331	400	504	1051	937	238	1166	
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		0.32			0.03	0.07	0.04	0.97	0.04	0.89	0.40	

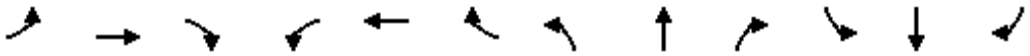
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 90			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 34.0		Intersection LOS: C	
Intersection Capacity Utilization 96.0%		ICU Level of Service F	
Analysis 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.

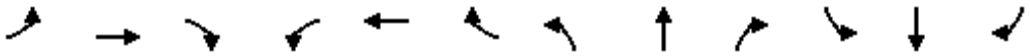
Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	4	6	0	4	14	1073	6	1	341	17
Future Volume (vph)	1	0	4	6	0	4	14	1073	6	1	341	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.6
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	70.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			45.0			45.0		
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		0.892			0.946			0.999			0.993	
Flt Protected		0.990			0.971		0.950			0.950		
Satd. Flow (prot)	0	1572	0	0	818	0	1691	1751	0	846	1586	0
Flt Permitted		0.990			0.971		0.950			0.950		
Satd. Flow (perm)	0	1572	0	0	818	0	1691	1751	0	846	1586	0
Link Speed (k/h)		50			20			80			80	
Link Distance (m)		105.7			151.5			1150.2			174.7	
Travel Time (s)		7.6			27.3			51.8			7.9	
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 (%)	0%	0%	0%	100%	0%	100%	0%	1%	100%	100%	12%	0%
Adj. Flow (vph)	1	0	4	6	0	4	14	1073	6	1	341	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	10	0	14	1079	0	1	358	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

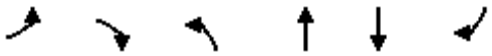
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	4	6	0	4	14	1073	6	1	341	17
Future Volume (Veh/h)	1	0	4	6	0	4	14	1073	6	1	341	17
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	0	4	6	0	4	14	1073	6	1	341	17
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											175	
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	1456	1458	350	1451	1464	1076	358			1079		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1455	1457	305	1449	1463	1076	314			1079		
tC, single (s)	7.1	6.5	6.2	8.1	6.5	7.2	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.4	4.0	4.2	2.2			3.1		
p0 queue free %	99	100	99	91	100	98	99			100		
cM capacity (veh/h)	101	124	712	63	123	175	1211			387		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	10	14	1079	1	358
Volume Left	1	6	14	0	1	0
Volume Right	4	4	0	6	0	17
cSH	323	85	1211	1700	387	1700
Volume to Capacity	0.02	0.12	0.01	0.63	0.00	0.21
Queue Length 95th (m)	0.4	3.1	0.3	0.0	0.1	0.0
Control Delay (s)	16.3	52.8	8.0	0.0	14.3	0.0
Lane LOS	C	F	A		B	
Approach Delay (s)	16.3	52.8	0.1		0.0	
Approach LOS	C	F				

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	70.0%	ICU Level of Service	C	
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	91	33	147	983	146	119
Future Volume (vph)	91	33	147	983	146	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950			0.994		
Satd. Flow (prot)	1489	1286	0	1736	1575	1293
Flt Permitted	0.950			0.994		
Satd. Flow (perm)	1489	1286	0	1736	1575	1293
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	15%	8%	1%	13%	17%
Adj. Flow (vph)	91	33	147	983	146	119
Shared Lane Traffic (%)						
Lane Group Flow (vph)	91	33	0	1130	146	119
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 86.6%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	91	33	147	983	146	119
Future Volume (Veh/h)	91	33	147	983	146	119
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	91	33	147	983	146	119
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1423	146	265			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1423	146	265			
tC, single (s)	6.5	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	28	96	88			
cM capacity (veh/h)	126	868	1265			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	91	33	1130	146	119
Volume Left	91	0	147	0	0
Volume Right	0	33	0	0	119
cSH	126	868	1265	1700	1700
Volume to Capacity	0.72	0.04	0.12	0.09	0.07
Queue Length 95th (m)	32.3	0.9	3.1	0.0	0.0
Control Delay (s)	85.3	9.3	3.0	0.0	0.0
Lane LOS	F	A	A		
Approach Delay (s)	65.1		3.0	0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	71	0	38	107	0	16
Future Volume (vph)	71	0	38	107	0	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.987		
Satd. Flow (prot)	1604	0	0	1502	1466	0
Flt Permitted				0.987		
Satd. Flow (perm)	1604	0	0	1502	1466	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	163.7			198.6	103.6	
Travel Time (s)	9.8			14.3	7.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	0%	0%	23%	0%	5%
Adj. Flow (vph)	71	0	38	107	0	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	0	0	145	16	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	71	0	38	107	0	16
Future Volume (Veh/h)	71	0	38	107	0	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	71	0	38	107	0	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				199		
pX, platoon unblocked						
vC, conflicting volume			71		254	71
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			71		254	71
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	98
cM capacity (veh/h)			1542		721	983

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	71	145	16
Volume Left	0	38	0
Volume Right	0	0	16
cSH	1700	1542	983
Volume to Capacity	0.04	0.02	0.02
Queue Length 95th (m)	0.0	0.6	0.4
Control Delay (s)	0.0	2.1	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	2.1	8.7
Approach LOS			A

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	24.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	68	0	11	96	0	3
Future Volume (vph)	68	0	11	96	0	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.995		
Satd. Flow (prot)	1679	0	0	1474	770	0
Flt Permitted				0.995		
Satd. Flow (perm)	1679	0	0	1474	770	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	185.0			163.7	105.8	
Travel Time (s)	11.1			11.8	7.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	0%	100%	11%	0%	100%
Adj. Flow (vph)	68	0	11	96	0	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	68	0	0	107	3	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	68	0	11	96	0	3
Future Volume (Veh/h)	68	0	11	96	0	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	68	0	11	96	0	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				362		
pX, platoon unblocked						
vC, conflicting volume			68		186	68
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			68		186	68
tC, single (s)			5.1		6.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		3.5	4.2
p0 queue free %			99		100	100
cM capacity (veh/h)			1086		800	778

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	68	107	3
Volume Left	0	11	0
Volume Right	0	0	3
cSH	1700	1086	778
Volume to Capacity	0.04	0.01	0.00
Queue Length 95th (m)	0.0	0.2	0.1
Control Delay (s)	0.0	0.9	9.6
Lane LOS		A	A
Approach Delay (s)	0.0	0.9	9.6
Approach LOS			A

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	22.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	61	0	23	73	0	7
Future Volume (vph)	61	0	23	73	0	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.988		
Satd. Flow (prot)	1695	0	0	1579	1351	0
Flt Permitted				0.988		
Satd. Flow (perm)	1695	0	0	1579	1351	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	95.5			185.0	109.7	
Travel Time (s)	5.7			13.3	7.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	0%	22%	8%	0%	14%
Adj. Flow (vph)	61	0	23	73	0	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	0	0	96	7	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.1%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	61	0	23	73	0	7
Future Volume (Veh/h)	61	0	23	73	0	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	61	0	23	73	0	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			61		180	61
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			61		180	61
tC, single (s)			4.3		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.4		3.5	3.4
p0 queue free %			98		100	99
cM capacity (veh/h)			1424		801	971

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	61	96	7
Volume Left	0	23	0
Volume Right	0	0	7
cSH	1700	1424	971
Volume to Capacity	0.04	0.02	0.01
Queue Length 95th (m)	0.0	0.4	0.2
Control Delay (s)	0.0	1.9	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	1.9	8.7
Approach LOS			A

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

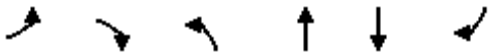
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	65	1	191	381	27	141
Future Volume (vph)	65	1	191	381	27	141
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
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)	1548	0	1519	0	0	1632
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1548	0	1519	0	0	1632
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	22%	0%	6%	7%	4%	9%
Adj. Flow (vph)	65	1	191	381	27	141
Shared Lane Traffic (%)						
Lane Group Flow (vph)	66	0	572	0	0	168
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

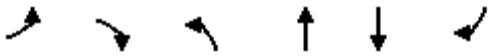
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	65	1	191	381	27	141
Future Volume (Veh/h)	65	1	191	381	27	141
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	65	1	191	381	27	141
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	576	382			572	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	576	382			572	
tC, single (s)	6.6	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.7	3.3			2.2	
p0 queue free %	85	100			97	
cM capacity (veh/h)	435	670			991	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	66	572	168
Volume Left	65	0	27
Volume Right	1	381	0
cSH	437	1700	991
Volume to Capacity	0.15	0.34	0.03
Queue Length 95th (m)	4.2	0.0	0.7
Control Delay (s)	14.7	0.0	1.6
Lane LOS	B		A
Approach Delay (s)	14.7	0.0	1.6
Approach LOS	B		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	85	828	206	380	254	18
Future Volume (vph)	85	828	206	380	254	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.991	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1551	1422	1496	1618	1581	0
Flt Permitted	0.950		0.448			
Satd. Flow (perm)	1551	1422	706	1618	1581	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		548			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	9%	4%	13%	10%	12%	6%
Adj. Flow (vph)	85	828	206	380	254	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	85	828	206	380	272	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	

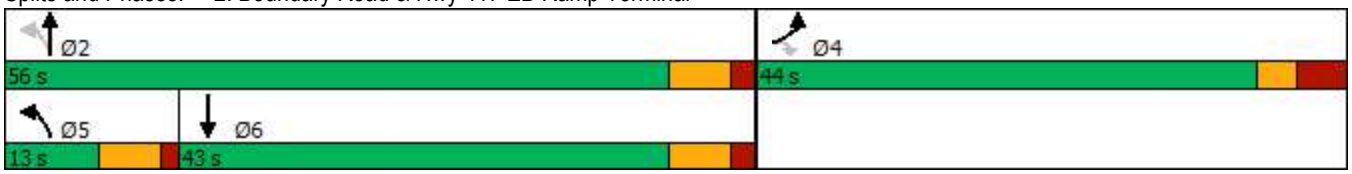


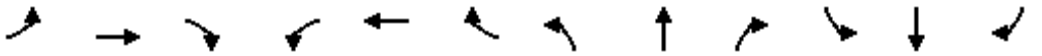
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	23.0	23.0	13.0	41.6	41.6	
Total Split (s)	44.0	44.0	13.0	56.0	43.0	
Total Split (%)	44.0%	44.0%	13.0%	56.0%	43.0%	
Maximum Green (s)	37.2	37.2	7.0	49.4	36.4	
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	Min	Min	
Walk Time (s)	7.0	7.0		0.0	7.0	
Flash Dont Walk (s)	5.0	5.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	33.6	33.6	48.9	48.3	35.2	
Actuated g/C Ratio	0.35	0.35	0.51	0.51	0.37	
v/c Ratio	0.16	0.97	0.49	0.46	0.46	
Control Delay	21.3	35.2	19.2	18.6	26.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.3	35.2	19.2	18.6	26.9	
LOS	C	D	B	B	C	
Approach Delay	33.9			18.8	26.9	
Approach LOS	C			B	C	
Queue Length 50th (m)	11.1	65.2	23.4	49.3	41.4	
Queue Length 95th (m)	21.8	#163.6	38.8	75.3	66.0	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	608	890	420	843	609	
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	0.93	0.49	0.45	0.45	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 95.3			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 27.9		Intersection LOS: C	
Intersection Capacity Utilization 94.5%		ICU Level of Service F	
Analysis Period (min) 15			

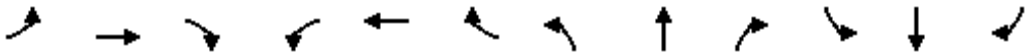
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	0	33	6	0	20	10	418	0	2	991	88
Future Volume (vph)	147	0	33	6	0	20	10	418	0	2	991	88
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		15.0	0.0		0.0	35.0		7.5	100.0		35.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.975				0.850					0.988	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1444	0	0	1271	1513	1517	1633	1740	1102	1686	0
Flt Permitted		0.761			0.745		0.164			0.439		
Satd. Flow (perm)	0	1143	0	0	997	1513	262	1633	1740	509	1686	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100					10	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		198.6			170.6			174.7			243.1	
Travel Time (s)		11.9			30.7			7.9			10.9	
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 (%)	19%	0%	0%	33%	0%	0%	9%	9%	0%	50%	4%	8%
Adj. Flow (vph)	147	0	33	6	0	20	10	418	0	2	991	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	180	0	0	6	20	10	418	0	2	1079	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

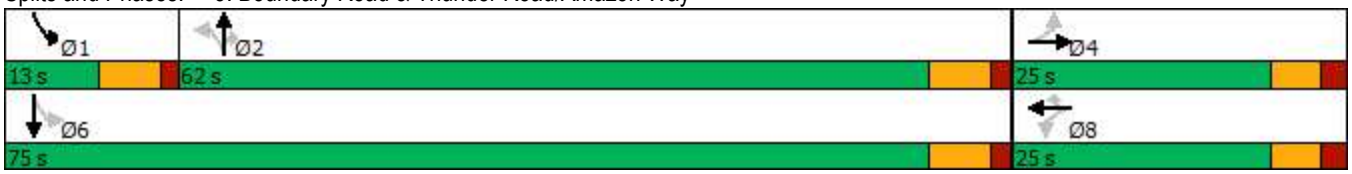


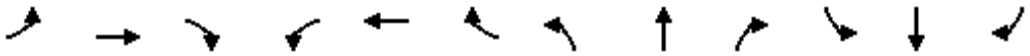
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	62.0	62.0	62.0	13.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	62.0%	62.0%	62.0%	13.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	55.8	55.8	55.8	7.0	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	Min	Min	Min	None	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)		12.3			12.3	12.3	55.6	55.6		57.9	57.7	
Actuated g/C Ratio		0.15			0.15	0.15	0.67	0.67		0.70	0.70	
v/c Ratio		0.71			0.04	0.06	0.06	0.38		0.00	0.91	
Control Delay		33.4			34.2	0.4	8.5	8.6		4.5	24.4	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.3	
Total Delay		33.4			34.2	0.4	8.5	8.6		4.5	24.7	
LOS		C			C	A	A	A		A	C	
Approach Delay		33.4			8.2			8.6			24.7	
Approach LOS		C			A			A			C	
Queue Length 50th (m)		13.6			1.0	0.0	0.4	23.0		0.1	121.2	
Queue Length 95th (m)		38.2			4.6	0.0	3.7	72.0		0.8	#291.1	
Internal Link Dist (m)		174.6			146.6			150.7			219.1	
Turn Bay Length (m)							35.0			100.0		
Base Capacity (vph)		353			242	443	197	1232		409	1406	
Starvation Cap Reductn		0			0	0	0	0		0	47	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.51			0.02	0.05	0.05	0.34		0.00	0.79	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 82.5			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 21.3		Intersection LOS: C	
Intersection Capacity Utilization 88.1%		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.

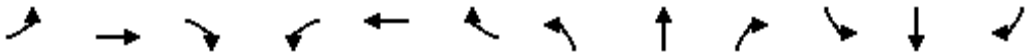
Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	14	6	0	13	4	410	6	15	1008	7
Future Volume (vph)	4	0	14	6	0	13	4	410	6	15	1008	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.6
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	70.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			45.0			45.0		
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		0.895			0.908			0.998			0.999	
Flt Protected		0.989			0.984		0.950			0.950		
Satd. Flow (prot)	0	1576	0	0	795	0	1691	1670	0	846	1744	0
Flt Permitted		0.989			0.984		0.950			0.950		
Satd. Flow (perm)	0	1576	0	0	795	0	1691	1670	0	846	1744	0
Link Speed (k/h)		50			20			80			80	
Link Distance (m)		105.7			151.5			1150.2			174.7	
Travel Time (s)		7.6			27.3			51.8			7.9	
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 (%)	0%	0%	0%	100%	0%	100%	0%	5%	100%	100%	2%	0%
Adj. Flow (vph)	4	0	14	6	0	13	4	410	6	15	1008	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	18	0	0	19	0	4	416	0	15	1015	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

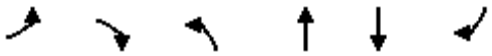
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	14	6	0	13	4	410	6	15	1008	7
Future Volume (Veh/h)	4	0	14	6	0	13	4	410	6	15	1008	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	4	0	14	6	0	13	4	410	6	15	1008	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											175	
pX, platoon unblocked	0.44	0.44	0.44	0.44	0.44		0.44					
vC, conflicting volume	1472	1466	1012	1473	1466	413	1015			416		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1437	1421	387	1438	1423	413	394			416		
tC, single (s)	7.1	6.5	6.2	8.1	6.5	7.2	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.4	4.0	4.2	2.2			3.1		
p0 queue free %	91	100	95	79	100	97	99			98		
cM capacity (veh/h)	47	59	292	28	59	473	516			766		

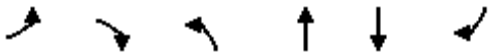
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	18	19	4	416	15	1015
Volume Left	4	6	4	0	15	0
Volume Right	14	13	0	6	0	7
cSH	135	78	516	1700	766	1700
Volume to Capacity	0.13	0.24	0.01	0.24	0.02	0.60
Queue Length 95th (m)	3.6	6.9	0.2	0.0	0.5	0.0
Control Delay (s)	35.7	65.0	12.0	0.0	9.8	0.0
Lane LOS	E	F	B		A	
Approach Delay (s)	35.7	65.0	0.1		0.1	
Approach LOS	E	F				

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	66.4%	ICU Level of Service	C	
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	142	119	63	153	895	146
Future Volume (vph)	142	119	63	153	895	146
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950			0.986		
Satd. Flow (prot)	1463	1395	0	1669	1762	1351
Flt Permitted	0.950			0.986		
Satd. Flow (perm)	1463	1395	0	1669	1762	1351
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	6%	8%	4%	1%	12%
Adj. Flow (vph)	142	119	63	153	895	146
Shared Lane Traffic (%)						
Lane Group Flow (vph)	142	119	0	216	895	146
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 80.2%		ICU Level of Service D	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	142	119	63	153	895	146
Future Volume (Veh/h)	142	119	63	153	895	146
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	142	119	63	153	895	146
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1174	895	1041			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1174	895	1041			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	22	64	90			
cM capacity (veh/h)	182	334	645			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	142	119	216	895	146
Volume Left	142	0	63	0	0
Volume Right	0	119	0	0	146
cSH	182	334	645	1700	1700
Volume to Capacity	0.78	0.36	0.10	0.53	0.09
Queue Length 95th (m)	41.8	12.6	2.6	0.0	0.0
Control Delay (s)	72.4	21.6	4.1	0.0	0.0
Lane LOS	F	C	A		
Approach Delay (s)	49.2		4.1	0.0	
Approach LOS	E				

Intersection Summary			
Average Delay	9.1		
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	128	0	14	85	0	52
Future Volume (vph)	128	0	14	85	0	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.993		
Satd. Flow (prot)	1496	0	0	1641	1426	0
Flt Permitted				0.993		
Satd. Flow (perm)	1496	0	0	1641	1426	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	163.7			198.6	103.6	
Travel Time (s)	9.8			14.3	7.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	19%	0%	0%	9%	0%	8%
Adj. Flow (vph)	128	0	14	85	0	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	128	0	0	99	52	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	128	0	14	85	0	52
Future Volume (Veh/h)	128	0	14	85	0	52
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	128	0	14	85	0	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				199		
pX, platoon unblocked						
vC, conflicting volume			128		241	128
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			128		241	128
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			99		100	94
cM capacity (veh/h)			1470		745	906

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	128	99	52
Volume Left	0	14	0
Volume Right	0	0	52
cSH	1700	1470	906
Volume to Capacity	0.08	0.01	0.06
Queue Length 95th (m)	0.0	0.2	1.5
Control Delay (s)	0.0	1.1	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	1.1	9.2
Approach LOS			A

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	26.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	117	0	4	81	0	11
Future Volume (vph)	117	0	4	81	0	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.998		
Satd. Flow (prot)	1633	0	0	1637	770	0
Flt Permitted				0.998		
Satd. Flow (perm)	1633	0	0	1637	770	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	185.0			163.7	105.8	
Travel Time (s)	11.1			11.8	7.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	9%	0%	100%	4%	0%	100%
Adj. Flow (vph)	117	0	4	81	0	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	117	0	0	85	11	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	17.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	117	0	4	81	0	11
Future Volume (Veh/h)	117	0	4	81	0	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	117	0	4	81	0	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				362		
pX, platoon unblocked						
vC, conflicting volume			117		206	117
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			117		206	117
tC, single (s)			5.1		6.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		3.5	4.2
p0 queue free %			100		100	98
cM capacity (veh/h)			1034		784	726

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	117	85	11
Volume Left	0	4	0
Volume Right	0	0	11
cSH	1700	1034	726
Volume to Capacity	0.07	0.00	0.02
Queue Length 95th (m)	0.0	0.1	0.4
Control Delay (s)	0.0	0.4	10.0
Lane LOS		A	B
Approach Delay (s)	0.0	0.4	10.0
Approach LOS			B

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		17.9%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	93	0	9	72	0	24
Future Volume (vph)	93	0	9	72	0	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.994		
Satd. Flow (prot)	1695	0	0	1712	1272	0
Flt Permitted				0.994		
Satd. Flow (perm)	1695	0	0	1712	1272	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	95.5			185.0	109.7	
Travel Time (s)	5.7			13.3	7.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	0%	22%	1%	0%	21%
Adj. Flow (vph)	93	0	9	72	0	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	93	0	0	81	24	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	21.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	93	0	9	72	0	24
Future Volume (Veh/h)	93	0	9	72	0	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	93	0	9	72	0	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			93		183	93
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			93		183	93
tC, single (s)			4.3		6.4	6.4
tC, 2 stage (s)						
tF (s)			2.4		3.5	3.5
p0 queue free %			99		100	97
cM capacity (veh/h)			1385		806	914

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	93	81	24
Volume Left	0	9	0
Volume Right	0	0	24
cSH	1700	1385	914
Volume to Capacity	0.05	0.01	0.03
Queue Length 95th (m)	0.0	0.2	0.6
Control Delay (s)	0.0	0.9	9.0
Lane LOS		A	A
Approach Delay (s)	0.0	0.9	9.0
Approach LOS			A

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	21.2%	ICU Level of Service	A
Analysis Period (min)	15		

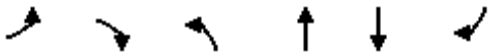
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	189	38	124	1059	94	156
Future Volume (vph)	189	38	124	1059	94	156
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.977		0.879			
Flt Protected	0.960					0.982
Satd. Flow (prot)	1706	0	1530	0	0	1595
Flt Permitted	0.960					0.982
Satd. Flow (perm)	1706	0	1530	0	0	1595
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	13%	13%	1%	9%	10%
Adj. Flow (vph)	189	38	124	1059	94	156
Shared Lane Traffic (%)						
Lane Group Flow (vph)	227	0	1183	0	0	250
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 113.6%		ICU Level of Service H	
Analysis Period (min) 15			

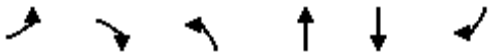
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	189	38	124	1059	94	156
Future Volume (Veh/h)	189	38	124	1059	94	156
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	189	38	124	1059	94	156
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	998	654			1183	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	998	654			1183	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	14	92			83	
cM capacity (veh/h)	220	448			566	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	227	1183	250
Volume Left	189	0	94
Volume Right	38	1059	0
cSH	240	1700	566
Volume to Capacity	0.94	0.70	0.17
Queue Length 95th (m)	67.4	0.0	4.7
Control Delay (s)	88.3	0.0	6.2
Lane LOS	F		A
Approach Delay (s)	88.3	0.0	6.2
Approach LOS	F		

Intersection Summary			
Average Delay	13.0		
Intersection Capacity Utilization	113.6%	ICU Level of Service	H
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	22	421	51	1166	310	11
Future Volume (vph)	22	421	51	1166	310	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1281	1357	1311	1745	1583	0
Flt Permitted	0.950		0.503			
Satd. Flow (perm)	1281	1357	694	1745	1583	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		421			3	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	32%	9%	29%	2%	12%	9%
Adj. Flow (vph)	22	421	51	1166	310	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	421	51	1166	321	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	

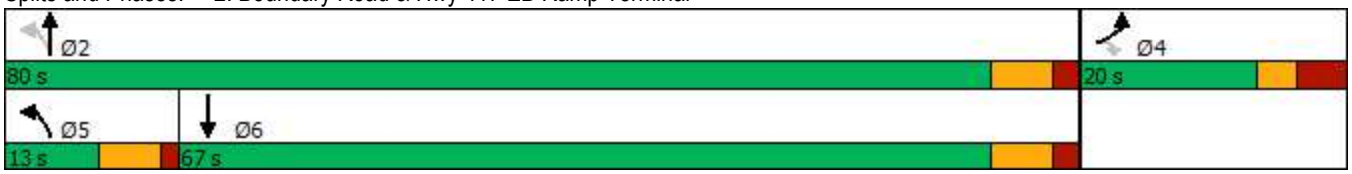


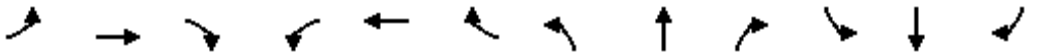
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	17.8	17.8	13.0	41.6	41.6	
Total Split (s)	20.0	20.0	13.0	80.0	67.0	
Total Split (%)	20.0%	20.0%	13.0%	80.0%	67.0%	
Maximum Green (s)	13.2	13.2	7.0	73.4	60.4	
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	Min	Min	
Walk Time (s)	5.0	5.0		0.0	7.0	
Flash Dont Walk (s)	6.0	6.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	9.3	9.3	59.1	58.5	51.7	
Actuated g/C Ratio	0.11	0.11	0.72	0.71	0.63	
v/c Ratio	0.15	0.80	0.09	0.94	0.32	
Control Delay	40.3	16.9	3.6	25.4	9.2	
Queue Delay	0.0	0.0	0.0	0.2	0.0	
Total Delay	40.3	16.9	3.6	25.6	9.2	
LOS	D	B	A	C	A	
Approach Delay	18.0			24.7	9.2	
Approach LOS	B			C	A	
Queue Length 50th (m)	3.4	0.0	1.6	112.8	24.3	
Queue Length 95th (m)	11.5	#42.6	5.3	#304.2	46.4	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	216	579	556	1522	1205	
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	0.10	0.73	0.09	0.79	0.27	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 81.9			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 20.7		Intersection LOS: C	
Intersection Capacity Utilization 81.8%		ICU Level of Service D	
Analysis Period (min) 15			

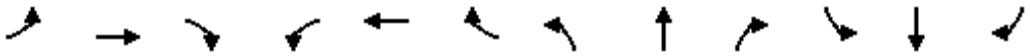
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	20	10	4	7	31	22	1124	36	236	369	124
Future Volume (vph)	63	20	10	4	7	31	22	1124	36	236	369	124
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		15.0	0.0		0.0	35.0		7.5	100.0		35.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.985				0.850			0.850		0.962	
Flt Protected		0.967			0.982		0.950			0.950		
Satd. Flow (prot)	0	1544	0	0	1748	1513	1589	1728	1479	1653	1479	0
Flt Permitted		0.790			0.891		0.483			0.066		
Satd. Flow (perm)	0	1262	0	0	1586	1513	808	1728	1479	115	1479	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				100			96		39	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		198.6			170.6			174.7			243.1	
Travel Time (s)		11.9			30.7			7.9			10.9	
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 (%)	13%	0%	9%	0%	0%	0%	4%	3%	0%	0%	15%	18%
Adj. Flow (vph)	63	20	10	4	7	31	22	1124	36	236	369	124
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	93	0	0	11	31	22	1124	36	236	493	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	



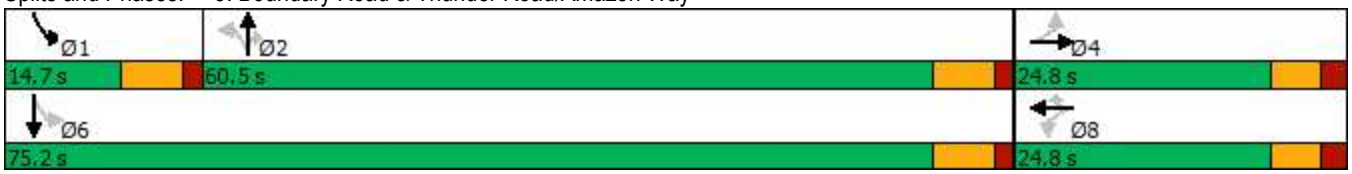
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	26.2	
Total Split (s)	24.8	24.8		24.8	24.8	24.8	60.5	60.5	60.5	14.7	75.2	
Total Split (%)	24.8%	24.8%		24.8%	24.8%	24.8%	60.5%	60.5%	60.5%	14.7%	75.2%	
Maximum Green (s)	19.0	19.0		19.0	19.0	19.0	54.3	54.3	54.3	8.7	69.0	
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	Min	Min	Min	None	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)		11.8			11.8	11.8	54.8	54.8	54.8	69.9	71.1	
Actuated g/C Ratio		0.13			0.13	0.13	0.61	0.61	0.61	0.77	0.79	
v/c Ratio		0.55			0.05	0.11	0.04	1.07	0.04	1.00	0.42	
Control Delay		48.3			35.0	0.8	9.8	71.9	0.1	83.9	5.7	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		48.3			35.0	0.8	9.8	71.9	0.1	83.9	5.7	
LOS		D			C	A	A	E	A	F	A	
Approach Delay		48.3			9.7			68.6			31.0	
Approach LOS		D			A			E			C	
Queue Length 50th (m)		15.8			1.9	0.0	1.6	~243.7	0.0	~32.3	26.0	
Queue Length 95th (m)		31.7			6.8	0.0	5.8	#352.5	0.0	#87.7	55.4	
Internal Link Dist (m)		174.6			146.6			150.7			219.1	
Turn Bay Length (m)							35.0		7.5	100.0		
Base Capacity (vph)		271			336	399	489	1046	933	237	1170	
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		0.34			0.03	0.08	0.04	1.07	0.04	1.00	0.42	

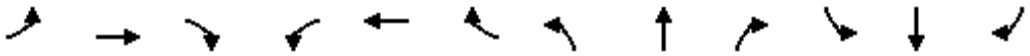
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 90.5			
Natural Cycle: 140			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.07			
Intersection Signal Delay: 53.1		Intersection LOS: D	
Intersection Capacity Utilization 103.3%		ICU Level of Service G	
Analysis 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.

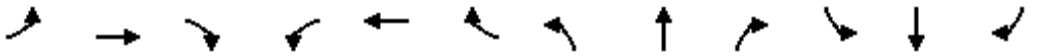
Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	4	7	0	4	14	1177	7	1	365	17
Future Volume (vph)	1	0	4	7	0	4	14	1177	7	1	365	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.6
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	70.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			45.0			45.0		
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		0.892			0.951			0.999			0.993	
Flt Protected		0.990			0.969		0.950			0.950		
Satd. Flow (prot)	0	1572	0	0	820	0	1691	1750	0	846	1586	0
Flt Permitted		0.990			0.969		0.950			0.950		
Satd. Flow (perm)	0	1572	0	0	820	0	1691	1750	0	846	1586	0
Link Speed (k/h)		50			20			80			80	
Link Distance (m)		105.7			151.5			1150.2			174.7	
Travel Time (s)		7.6			27.3			51.8			7.9	
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 (%)	0%	0%	0%	100%	0%	100%	0%	1%	100%	100%	12%	0%
Adj. Flow (vph)	1	0	4	7	0	4	14	1177	7	1	365	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	11	0	14	1184	0	1	382	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

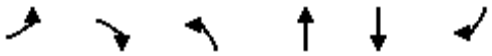
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	4	7	0	4	14	1177	7	1	365	17
Future Volume (Veh/h)	1	0	4	7	0	4	14	1177	7	1	365	17
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	0	4	7	0	4	14	1177	7	1	365	17
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											175	
pX, platoon unblocked	0.95	0.95	0.95	0.95	0.95		0.95					
vC, conflicting volume	1584	1588	374	1580	1592	1180	382			1184		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1589	1592	309	1584	1598	1180	318			1184		
tC, single (s)	7.1	6.5	6.2	8.1	6.5	7.2	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.4	4.0	4.2	2.2			3.1		
p0 queue free %	99	100	99	86	100	97	99			100		
cM capacity (veh/h)	80	101	696	49	100	149	1186			346		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	11	14	1184	1	382
Volume Left	1	7	14	0	1	0
Volume Right	4	4	0	7	0	17
cSH	274	65	1186	1700	346	1700
Volume to Capacity	0.02	0.17	0.01	0.70	0.00	0.22
Queue Length 95th (m)	0.4	4.5	0.3	0.0	0.1	0.0
Control Delay (s)	18.4	71.9	8.1	0.0	15.4	0.0
Lane LOS	C	F	A		C	
Approach Delay (s)	18.4	71.9	0.1		0.0	
Approach LOS	C	F				

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	75.8%	ICU Level of Service	D	
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	100	36	163	1081	160	131
Future Volume (vph)	100	36	163	1081	160	131
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
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)	1489	1297	0	1734	1575	1293
Flt Permitted	0.950			0.993		
Satd. Flow (perm)	1489	1297	0	1734	1575	1293
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	14%	8%	1%	13%	17%
Adj. Flow (vph)	100	36	163	1081	160	131
Shared Lane Traffic (%)						
Lane Group Flow (vph)	100	36	0	1244	160	131
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 94.3%		ICU Level of Service F	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	100	36	163	1081	160	131
Future Volume (Veh/h)	100	36	163	1081	160	131
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	100	36	163	1081	160	131
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1567	160	291			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1567	160	291			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	1	96	87			
cM capacity (veh/h)	101	855	1237			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	100	36	1244	160	131
Volume Left	100	0	163	0	0
Volume Right	0	36	0	0	131
cSH	101	855	1237	1700	1700
Volume to Capacity	0.99	0.04	0.13	0.09	0.08
Queue Length 95th (m)	48.4	1.1	3.6	0.0	0.0
Control Delay (s)	164.1	9.4	3.7	0.0	0.0
Lane LOS	F	A	A		
Approach Delay (s)	123.1		3.7	0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	12.8		
Intersection Capacity Utilization	94.3%	ICU Level of Service	F
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	77	0	38	115	0	16
Future Volume (vph)	77	0	38	115	0	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.988		
Satd. Flow (prot)	1589	0	0	1509	1466	0
Flt Permitted				0.988		
Satd. Flow (perm)	1589	0	0	1509	1466	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	163.7			198.6	103.6	
Travel Time (s)	9.8			14.3	7.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	12%	0%	0%	22%	0%	5%
Adj. Flow (vph)	77	0	38	115	0	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	77	0	0	153	16	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	77	0	38	115	0	16
Future Volume (Veh/h)	77	0	38	115	0	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	77	0	38	115	0	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				199		
pX, platoon unblocked						
vC, conflicting volume			77		268	77
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			77		268	77
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	98
cM capacity (veh/h)			1535		708	976

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	77	153	16
Volume Left	0	38	0
Volume Right	0	0	16
cSH	1700	1535	976
Volume to Capacity	0.05	0.02	0.02
Queue Length 95th (m)	0.0	0.6	0.4
Control Delay (s)	0.0	2.0	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	2.0	8.8
Approach LOS			A

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	74	0	11	104	0	3
Future Volume (vph)	74	0	11	104	0	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.995		
Satd. Flow (prot)	1664	0	0	1482	770	0
Flt Permitted				0.995		
Satd. Flow (perm)	1664	0	0	1482	770	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	185.0			163.7	105.8	
Travel Time (s)	11.1			11.8	7.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	0%	100%	11%	0%	100%
Adj. Flow (vph)	74	0	11	104	0	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	0	0	115	3	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.1%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	74	0	11	104	0	3
Future Volume (Veh/h)	74	0	11	104	0	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	74	0	11	104	0	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				362		
pX, platoon unblocked						
vC, conflicting volume			74		200	74
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			74		200	74
tC, single (s)			5.1		6.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		3.5	4.2
p0 queue free %			99		100	100
cM capacity (veh/h)			1079		785	772

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	74	115	3
Volume Left	0	11	0
Volume Right	0	0	3
cSH	1700	1079	772
Volume to Capacity	0.04	0.01	0.00
Queue Length 95th (m)	0.0	0.2	0.1
Control Delay (s)	0.0	0.9	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	0.9	9.7
Approach LOS			A

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	23.1%	ICU Level of Service	A
Analysis Period (min)	15		

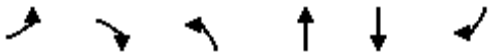
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	67	0	23	81	0	7
Future Volume (vph)	67	0	23	81	0	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.989		
Satd. Flow (prot)	1679	0	0	1596	1351	0
Flt Permitted				0.989		
Satd. Flow (perm)	1679	0	0	1596	1351	0
Link Speed (k/h)	60			50	50	
Link Distance (m)	95.5			185.0	109.7	
Travel Time (s)	5.7			13.3	7.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	0%	22%	7%	0%	14%
Adj. Flow (vph)	67	0	23	81	0	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	0	0	104	7	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.5%		ICU Level of Service A	
Analysis Period (min) 15			

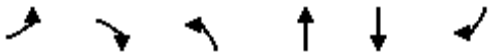
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	67	0	23	81	0	7
Future Volume (Veh/h)	67	0	23	81	0	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	67	0	23	81	0	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			67		194	67
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			67		194	67
tC, single (s)			4.3		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.4		3.5	3.4
p0 queue free %			98		100	99
cM capacity (veh/h)			1416		786	964

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	67	104	7
Volume Left	0	23	0
Volume Right	0	0	7
cSH	1700	1416	964
Volume to Capacity	0.04	0.02	0.01
Queue Length 95th (m)	0.0	0.4	0.2
Control Delay (s)	0.0	1.8	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	1.8	8.8
Approach LOS			A

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	100	36	163	1081	160	131
Future Volume (vph)	100	36	163	1081	160	131
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	15.0			30.0
Storage Lanes	1	1	1			1
Taper Length (m)	47.5		100.0			
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)	1489	1297	1566	1762	1575	1293
Flt Permitted	0.950		0.656			
Satd. Flow (perm)	1489	1297	1081	1762	1575	1293
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		36				131
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	575.1	
Travel Time (s)	8.1			6.1	25.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	14%	8%	1%	13%	17%
Adj. Flow (vph)	100	36	163	1081	160	131
Shared Lane Traffic (%)						
Lane Group Flow (vph)	100	36	163	1081	160	131
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
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)	2.0	2.0	2.0	0.6	0.6	2.0
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	Perm

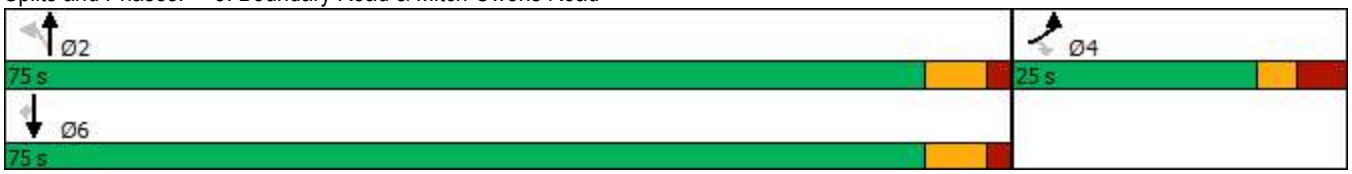


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	35.0	35.0	35.0	35.0
Minimum Split (s)	24.8	24.8	41.6	41.6	41.6	41.6
Total Split (s)	25.0	25.0	75.0	75.0	75.0	75.0
Total Split (%)	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Maximum Green (s)	18.2	18.2	68.4	68.4	68.4	68.4
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.6	6.6	6.6	6.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	11.4	11.4	60.2	60.2	60.2	60.2
Actuated g/C Ratio	0.14	0.14	0.75	0.75	0.75	0.75
v/c Ratio	0.47	0.17	0.20	0.81	0.13	0.13
Control Delay	43.0	14.0	5.4	16.4	4.7	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.0	14.0	5.4	16.4	4.7	1.2
LOS	D	B	A	B	A	A
Approach Delay	35.3			15.0	3.2	
Approach LOS	D			B	A	
Queue Length 50th (m)	15.4	0.0	8.1	117.8	7.5	0.0
Queue Length 95th (m)	34.3	8.8	18.5	#275.9	16.5	5.2
Internal Link Dist (m)	156.5			111.8	551.1	
Turn Bay Length (m)	25.0		15.0			30.0
Base Capacity (vph)	355	337	917	1495	1336	1117
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	0.28	0.11	0.18	0.72	0.12	0.12

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 79.8			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 14.6		Intersection LOS: B	
Intersection Capacity Utilization 80.8%		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.

Splits and Phases: 5: Boundary Road & Mitch Owens Road



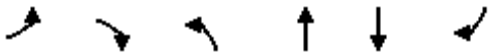
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	71	1	208	409	30	154
Future Volume (vph)	71	1	208	409	30	154
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	4.5	4.5	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	10.0		0.0	0.0	
Storage Lanes	1	0		0	0	
Taper Length (m)	7.5				7.5	
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)	1547	0	1520	0	0	1625
Flt Permitted	0.953					0.992
Satd. Flow (perm)	1547	0	1520	0	0	1625
Link Speed (k/h)	40		80			80
Link Distance (m)	155.0		545.7			134.1
Travel Time (s)	14.0		24.6			6.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	22%	0%	6%	7%	7%	9%
Adj. Flow (vph)	71	1	208	409	30	154
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	0	617	0	0	184
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	0.95	0.95	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

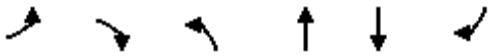
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	71	1	208	409	30	154
Future Volume (Veh/h)	71	1	208	409	30	154
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	71	1	208	409	30	154
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	626	412			617	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	626	412			617	
tC, single (s)	6.6	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.7	3.3			2.3	
p0 queue free %	82	100			97	
cM capacity (veh/h)	404	644			939	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	72	617	184
Volume Left	71	0	30
Volume Right	1	409	0
cSH	406	1700	939
Volume to Capacity	0.18	0.36	0.03
Queue Length 95th (m)	5.1	0.0	0.8
Control Delay (s)	15.8	0.0	1.7
Lane LOS	C		A
Approach Delay (s)	15.8	0.0	1.7
Approach LOS	C		

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	94	908	223	405	278	20
Future Volume (vph)	94	908	223	405	278	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	0.0	25.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.991	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1551	1422	1496	1618	1582	0
Flt Permitted	0.950		0.409			
Satd. Flow (perm)	1551	1422	644	1618	1582	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		517			4	
Link Speed (k/h)	40			80	80	
Link Distance (m)	154.2			243.1	545.7	
Travel Time (s)	13.9			10.9	24.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	9%	4%	13%	10%	12%	5%
Adj. Flow (vph)	94	908	223	405	278	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	94	908	223	405	298	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
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)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	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	
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	



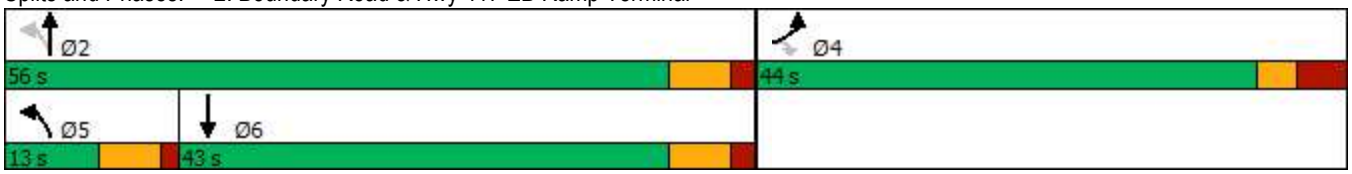
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	35.0	35.0	
Minimum Split (s)	23.0	23.0	13.0	41.6	41.6	
Total Split (s)	44.0	44.0	13.0	56.0	43.0	
Total Split (%)	44.0%	44.0%	13.0%	56.0%	43.0%	
Maximum Green (s)	37.2	37.2	7.0	49.4	36.4	
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	Min	Min	
Walk Time (s)	7.0	7.0		0.0	7.0	
Flash Dont Walk (s)	5.0	5.0		0.0	21.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	37.2	37.2	48.6	48.0	35.0	
Actuated g/C Ratio	0.38	0.38	0.49	0.49	0.35	
v/c Ratio	0.16	1.06	0.59	0.51	0.53	
Control Delay	21.3	62.3	23.1	20.2	29.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.3	62.3	23.1	20.2	29.1	
LOS	C	E	C	C	C	
Approach Delay	58.5			21.2	29.1	
Approach LOS	E			C	C	
Queue Length 50th (m)	12.3	~131.3	25.7	53.5	46.3	
Queue Length 95th (m)	23.7	#208.2	42.1	81.6	73.2	
Internal Link Dist (m)	130.2			219.1	521.7	
Turn Bay Length (m)		25.0	50.0			
Base Capacity (vph)	585	858	377	810	586	
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	1.06	0.59	0.50	0.51	

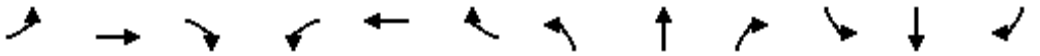
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 98.6			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.06			
Intersection Signal Delay: 41.8		Intersection LOS: D	
Intersection Capacity Utilization 99.7%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

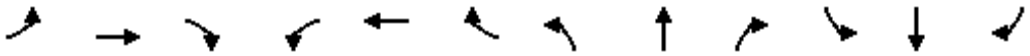
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	0	35	7	0	22	10	450	0	3	1088	95
Future Volume (vph)	154	0	35	7	0	22	10	450	0	3	1088	95
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.5	3.3	3.3	3.5	3.5
Storage Length (m)	0.0		15.0	0.0		0.0	35.0		7.5	100.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			45.0			75.0		
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		0.975				0.850					0.988	
Flt Protected		0.961			0.950		0.950			0.950		
Satd. Flow (prot)	0	1454	0	0	1183	1513	1517	1633	1740	990	1687	0
Flt Permitted		0.761			0.764		0.124			0.430		
Satd. Flow (perm)	0	1152	0	0	951	1513	198	1633	1740	448	1687	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100				100					10	
Link Speed (k/h)		60			20			80			80	
Link Distance (m)		198.6			170.6			174.7			243.1	
Travel Time (s)		11.9			30.7			7.9			10.9	
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 (%)	18%	0%	0%	43%	0%	0%	9%	9%	0%	67%	4%	7%
Adj. Flow (vph)	154	0	35	7	0	22	10	450	0	3	1088	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	189	0	0	7	22	10	450	0	3	1183	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.12	1.09	1.12	1.12	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
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)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

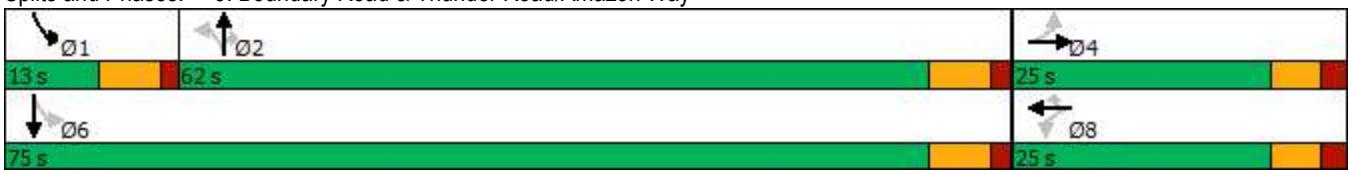


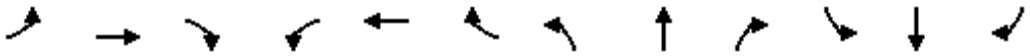
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	20.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	24.8	24.8		24.8	24.8	24.8	26.2	26.2	26.2	13.0	26.2	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	62.0	62.0	62.0	13.0	75.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	62.0%	62.0%	62.0%	13.0%	75.0%	
Maximum Green (s)	19.2	19.2		19.2	19.2	19.2	55.8	55.8	55.8	7.0	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	Min	Min	Min	None	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)		13.0			13.0	13.0	67.2	67.2		69.8	69.6	
Actuated g/C Ratio		0.14			0.14	0.14	0.71	0.71		0.74	0.73	
v/c Ratio		0.77			0.05	0.07	0.07	0.39		0.01	0.95	
Control Delay		40.0			34.6	0.5	9.3	8.5		4.7	30.4	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	5.7	
Total Delay		40.0			34.6	0.5	9.3	8.5		4.7	36.1	
LOS		D			C	A	A	A		A	D	
Approach Delay		40.0			8.7			8.5			36.0	
Approach LOS		D			A			A			D	
Queue Length 50th (m)		16.1			1.2	0.0	0.5	26.4		0.2	166.5	
Queue Length 95th (m)		41.3			5.2	0.0	3.9	79.1		1.0	#337.6	
Internal Link Dist (m)		174.6			146.6			150.7			219.1	
Turn Bay Length (m)							35.0			100.0		
Base Capacity (vph)		313			192	387	140	1158		370	1243	
Starvation Cap Reductn		0			0	0	0	0		0	49	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.60			0.04	0.06	0.07	0.39		0.01	0.99	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 94.7			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 29.2		Intersection LOS: C	
Intersection Capacity Utilization 94.4%		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.

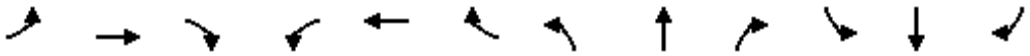
Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	14	7	0	15	4	441	7	16	1106	7
Future Volume (vph)	4	0	14	7	0	15	4	441	7	16	1106	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.6
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	70.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			45.0			45.0		
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		0.895			0.908			0.998			0.999	
Flt Protected		0.989			0.984		0.950			0.950		
Satd. Flow (prot)	0	1576	0	0	795	0	1691	1668	0	846	1744	0
Flt Permitted		0.989			0.984		0.950			0.950		
Satd. Flow (perm)	0	1576	0	0	795	0	1691	1668	0	846	1744	0
Link Speed (k/h)		50			20			80			80	
Link Distance (m)		105.7			151.5			1150.2			174.7	
Travel Time (s)		7.6			27.3			51.8			7.9	
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 (%)	0%	0%	0%	100%	0%	100%	0%	5%	100%	100%	2%	0%
Adj. Flow (vph)	4	0	14	7	0	15	4	441	7	16	1106	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	18	0	0	22	0	4	448	0	16	1113	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			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

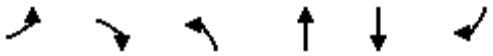
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	14	7	0	15	4	441	7	16	1106	7
Future Volume (Veh/h)	4	0	14	7	0	15	4	441	7	16	1106	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	4	0	14	7	0	15	4	441	7	16	1106	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											175	
pX, platoon unblocked	0.28	0.28	0.28	0.28	0.28		0.28					
vC, conflicting volume	1606	1598	1110	1604	1598	444	1113			448		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1879	1850	98	1875	1850	444	110			448		
tC, single (s)	7.1	6.5	6.2	8.1	6.5	7.2	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	4.4	4.0	4.2	2.2			3.1		
p0 queue free %	72	100	95	11	100	97	99			98		
cM capacity (veh/h)	14	20	268	8	20	452	416			742		

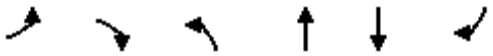
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	18	22	4	448	16	1113
Volume Left	4	7	4	0	16	0
Volume Right	14	15	0	7	0	7
cSH	55	24	416	1700	742	1700
Volume to Capacity	0.33	0.92	0.01	0.26	0.02	0.65
Queue Length 95th (m)	9.4	22.0	0.2	0.0	0.5	0.0
Control Delay (s)	100.0	387.0	13.7	0.0	10.0	0.0
Lane LOS	F	F	B		A	
Approach Delay (s)	100.0	387.0	0.1		0.1	
Approach LOS	F	F				

Intersection Summary				
Average Delay	6.5			
Intersection Capacity Utilization	71.9%	ICU Level of Service	C	
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	156	132	70	168	984	160
Future Volume (vph)	156	132	70	168	984	160
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	0.0			30.0
Storage Lanes	1	1	0			1
Taper Length (m)	47.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950			0.986		
Satd. Flow (prot)	1463	1395	0	1664	1762	1351
Flt Permitted	0.950			0.986		
Satd. Flow (perm)	1463	1395	0	1664	1762	1351
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	1150.2	
Travel Time (s)	8.1			6.1	51.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	6%	9%	4%	1%	12%
Adj. Flow (vph)	156	132	70	168	984	160
Shared Lane Traffic (%)						
Lane Group Flow (vph)	156	132	0	238	984	160
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 87.2%		ICU Level of Service E	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	156	132	70	168	984	160
Future Volume (Veh/h)	156	132	70	168	984	160
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	156	132	70	168	984	160
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1292	984	1144			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1292	984	1144			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	0	55	88			
cM capacity (veh/h)	150	296	586			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	156	132	238	984	160
Volume Left	156	0	70	0	0
Volume Right	0	132	0	0	160
cSH	150	296	586	1700	1700
Volume to Capacity	1.04	0.45	0.12	0.58	0.09
Queue Length 95th (m)	64.1	17.4	3.2	0.0	0.0
Control Delay (s)	143.8	26.6	4.6	0.0	0.0
Lane LOS	F	D	A		
Approach Delay (s)	90.1		4.6	0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	16.2		
Intersection Capacity Utilization	87.2%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	137	0	14	92	0	52
Future Volume (vph)	137	0	14	92	0	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.993		
Satd. Flow (prot)	1508	0	0	1639	1426	0
Flt Permitted				0.993		
Satd. Flow (perm)	1508	0	0	1639	1426	0
Link Speed (k/h)	60			60	50	
Link Distance (m)	163.7			198.6	103.6	
Travel Time (s)	9.8			11.9	7.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	0%	0%	9%	0%	8%
Adj. Flow (vph)	137	0	14	92	0	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	137	0	0	106	52	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.9%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	137	0	14	92	0	52
Future Volume (Veh/h)	137	0	14	92	0	52
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	137	0	14	92	0	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				199		
pX, platoon unblocked						
vC, conflicting volume			137		257	137
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			137		257	137
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			99		100	94
cM capacity (veh/h)			1459		729	896

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	137	106	52
Volume Left	0	14	0
Volume Right	0	0	52
cSH	1700	1459	896
Volume to Capacity	0.08	0.01	0.06
Queue Length 95th (m)	0.0	0.2	1.5
Control Delay (s)	0.0	1.1	9.3
Lane LOS		A	A
Approach Delay (s)	0.0	1.1	9.3
Approach LOS			A

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	126	0	4	88	0	11
Future Volume (vph)	126	0	4	88	0	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.998		
Satd. Flow (prot)	1648	0	0	1657	770	0
Flt Permitted				0.998		
Satd. Flow (perm)	1648	0	0	1657	770	0
Link Speed (k/h)	60			60	50	
Link Distance (m)	185.0			163.7	105.8	
Travel Time (s)	11.1			9.8	7.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	0%	100%	3%	0%	100%
Adj. Flow (vph)	126	0	4	88	0	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	126	0	0	92	11	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	126	0	4	88	0	11
Future Volume (Veh/h)	126	0	4	88	0	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	126	0	4	88	0	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				362		
pX, platoon unblocked						
vC, conflicting volume			126		222	126
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			126		222	126
tC, single (s)			5.1		6.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		3.5	4.2
p0 queue free %			100		100	98
cM capacity (veh/h)			1025		768	716

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	126	92	11
Volume Left	0	4	0
Volume Right	0	0	11
cSH	1700	1025	716
Volume to Capacity	0.07	0.00	0.02
Queue Length 95th (m)	0.0	0.1	0.4
Control Delay (s)	0.0	0.4	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	0.4	10.1
Approach LOS			B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

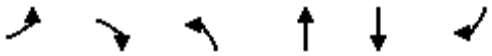
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	102	0	9	79	0	24
Future Volume (vph)	102	0	9	79	0	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.995		
Satd. Flow (prot)	1695	0	0	1717	1272	0
Flt Permitted				0.995		
Satd. Flow (perm)	1695	0	0	1717	1272	0
Link Speed (k/h)	60			60	50	
Link Distance (m)	95.5			185.0	109.7	
Travel Time (s)	5.7			11.1	7.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	0%	22%	1%	0%	21%
Adj. Flow (vph)	102	0	9	79	0	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	102	0	0	88	24	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	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		

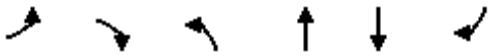
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	102	0	9	79	0	24
Future Volume (Veh/h)	102	0	9	79	0	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	102	0	9	79	0	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			102		199	102
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			102		199	102
tC, single (s)			4.3		6.4	6.4
tC, 2 stage (s)						
tF (s)			2.4		3.5	3.5
p0 queue free %			99		100	97
cM capacity (veh/h)			1374		789	904

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	102	88	24
Volume Left	0	9	0
Volume Right	0	0	24
cSH	1700	1374	904
Volume to Capacity	0.06	0.01	0.03
Queue Length 95th (m)	0.0	0.2	0.7
Control Delay (s)	0.0	0.8	9.1
Lane LOS		A	A
Approach Delay (s)	0.0	0.8	9.1
Approach LOS			A

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		



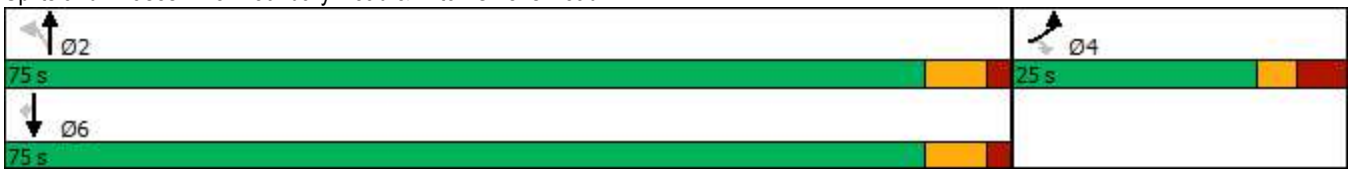
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	156	132	70	168	984	160
Future Volume (vph)	156	132	70	168	984	160
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.3	3.3	3.5	3.5	3.5	3.5
Storage Length (m)	25.0	0.0	15.0			30.0
Storage Lanes	1	1	1			1
Taper Length (m)	47.5		100.0			
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)	1463	1395	1551	1712	1762	1351
Flt Permitted	0.950		0.149			
Satd. Flow (perm)	1463	1395	243	1712	1762	1351
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		132				88
Link Speed (k/h)	80			80	80	
Link Distance (m)	180.5			135.8	575.1	
Travel Time (s)	8.1			6.1	25.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	6%	9%	4%	1%	12%
Adj. Flow (vph)	156	132	70	168	984	160
Shared Lane Traffic (%)						
Lane Group Flow (vph)	156	132	70	168	984	160
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.12	1.12	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
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)	2.0	2.0	2.0	0.6	0.6	2.0
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)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	Perm



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	35.0	35.0	35.0	35.0
Minimum Split (s)	24.8	24.8	41.6	41.6	41.6	41.6
Total Split (s)	25.0	25.0	75.0	75.0	75.0	75.0
Total Split (%)	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Maximum Green (s)	18.2	18.2	68.4	68.4	68.4	68.4
Yellow Time (s)	3.0	3.0	4.6	4.6	4.6	4.6
All-Red Time (s)	3.8	3.8	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.6	6.6	6.6	6.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	13.3	13.3	49.9	49.9	49.9	49.9
Actuated g/C Ratio	0.17	0.17	0.65	0.65	0.65	0.65
v/c Ratio	0.62	0.38	0.45	0.15	0.87	0.18
Control Delay	44.5	10.1	17.9	5.9	20.8	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.5	10.1	17.9	5.9	20.8	3.2
LOS	D	B	B	A	C	A
Approach Delay	28.7			9.4	18.3	
Approach LOS	C			A	B	
Queue Length 50th (m)	21.5	0.0	4.6	8.7	103.8	3.6
Queue Length 95th (m)	51.1	16.0	18.2	17.9	195.9	11.0
Internal Link Dist (m)	156.5			111.8	551.1	
Turn Bay Length (m)	25.0		15.0			30.0
Base Capacity (vph)	363	445	210	1480	1523	1179
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	0.43	0.30	0.33	0.11	0.65	0.14

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 77.3			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 18.9		Intersection LOS: B	
Intersection Capacity Utilization 81.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Boundary Road & Mitch Owens Road



APPENDIX N

TDM Checklist

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: *Non-residential developments*	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	☐ To be incorporated
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☐ To be incorporated
	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 Official Plan policy 4.3.3)*	☐ To be provided as applicable for site location.
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 Official Plan policy 4.3.12)*	☐ No public sidewalks. However, will be provided as applicable for site location.

		TDM-supportive design & infrastructure measures: *Non-residential developments*	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 *(see Official Plan policy 4.3.10)*	☐ Yes. To be provided as applicable for site location.
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 *(see Official Plan policy 4.3.10)*	☐ Yes. To be provided as applicable for site location.
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 *(see Official Plan policy 4.3.11)*	☐ Not Applicable
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: *Non-residential developments*	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 Official Plan policy 4.3.6)*	☐ To be Included.
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 Zoning By-law Section 111)*	☐ To be Included.
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 Zoning By-law Section 111)*	☐ To be Incorporated.
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	☐ To be Incorporated.
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 Zoning By-law Section 111)*	☐ Not applicable
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: *Non-residential developments*		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 *(see Zoning By-law Section 94)*	☐
	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: *Non-residential developments*		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	☐ The slight parking supply surplus due to ZBL updated will be coordinated.
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 *(see Zoning By-law Section 104)*	☐
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 *(see Zoning By-law Section 111)*	☐
	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 O

Sight Distance Assessment Drawings

LEGEND

AVAILABLE SIGHT DISTANCE

REQUIRED SIGHT DISTANCE

Project

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

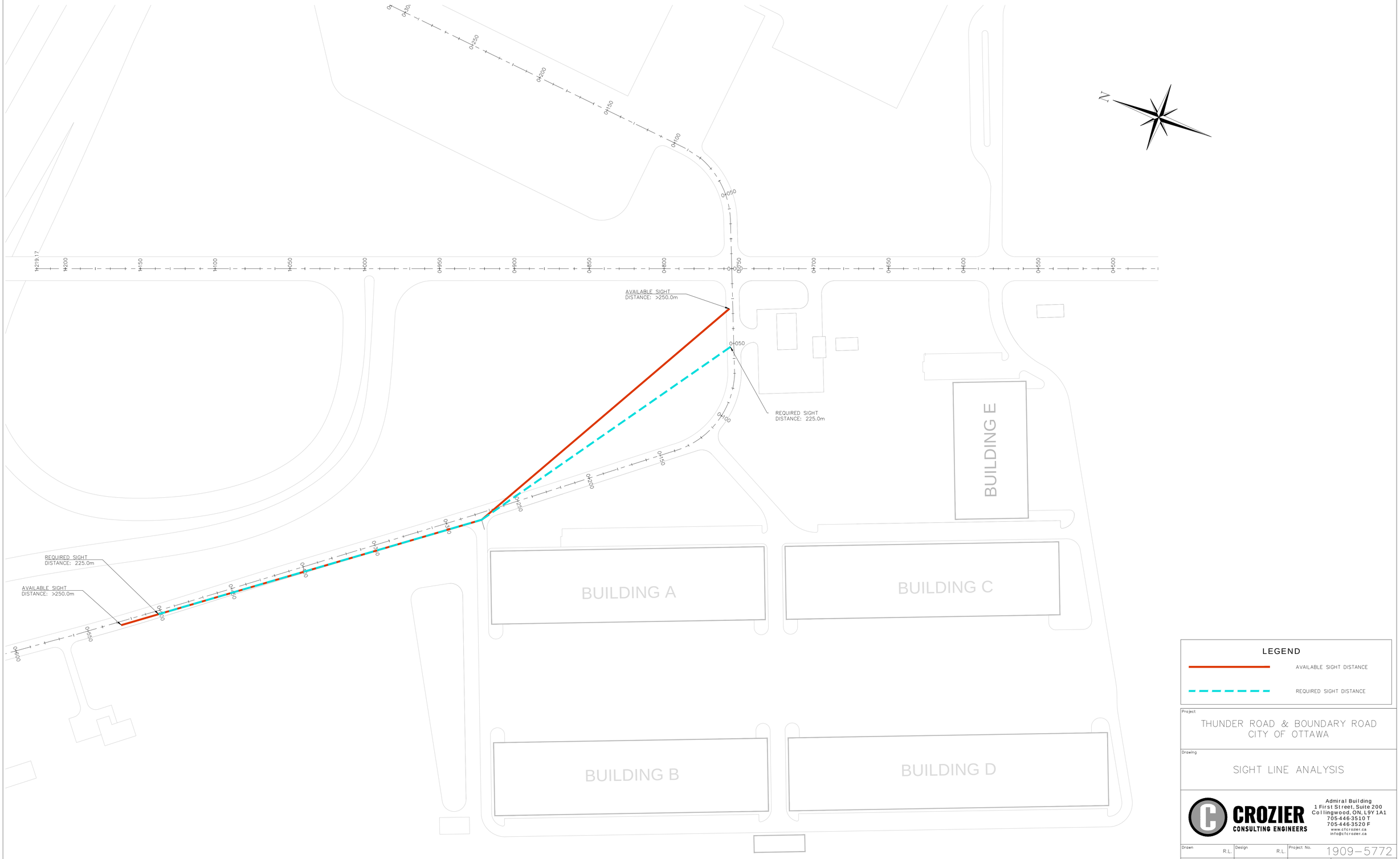
Drawing

SIGHT LINE ANALYSIS

CROZIER CONSULTING ENGINEERS

Admiral Building
1 First Street, Suite 200
Collingwood, ON, L9Y 1A1
705-446-3510 T
705-446-3520 F
www.cfcrozier.ca
info@cfcrozier.ca

Drawn	R.L.	Design	R.L.	Project No.	1909-5772
Check	A.H.	DATE	SEPT/16/2021	Scale	N.T.S.
				Dwg.	S 1



LEGEND

AVAILABLE SIGHT DISTANCE

REQUIRED SIGHT DISTANCE

Project

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

Drawing

SIGHT LINE ANALYSIS

CROZIER CONSULTING ENGINEERS

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Drawn	Design	Project No.	
R.L.	R.L.		1909-5772
Check	DATE	Scale	Dwg.
A.H.	SEPT/16/2021	N.T.S.	S 2

FIGURES

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

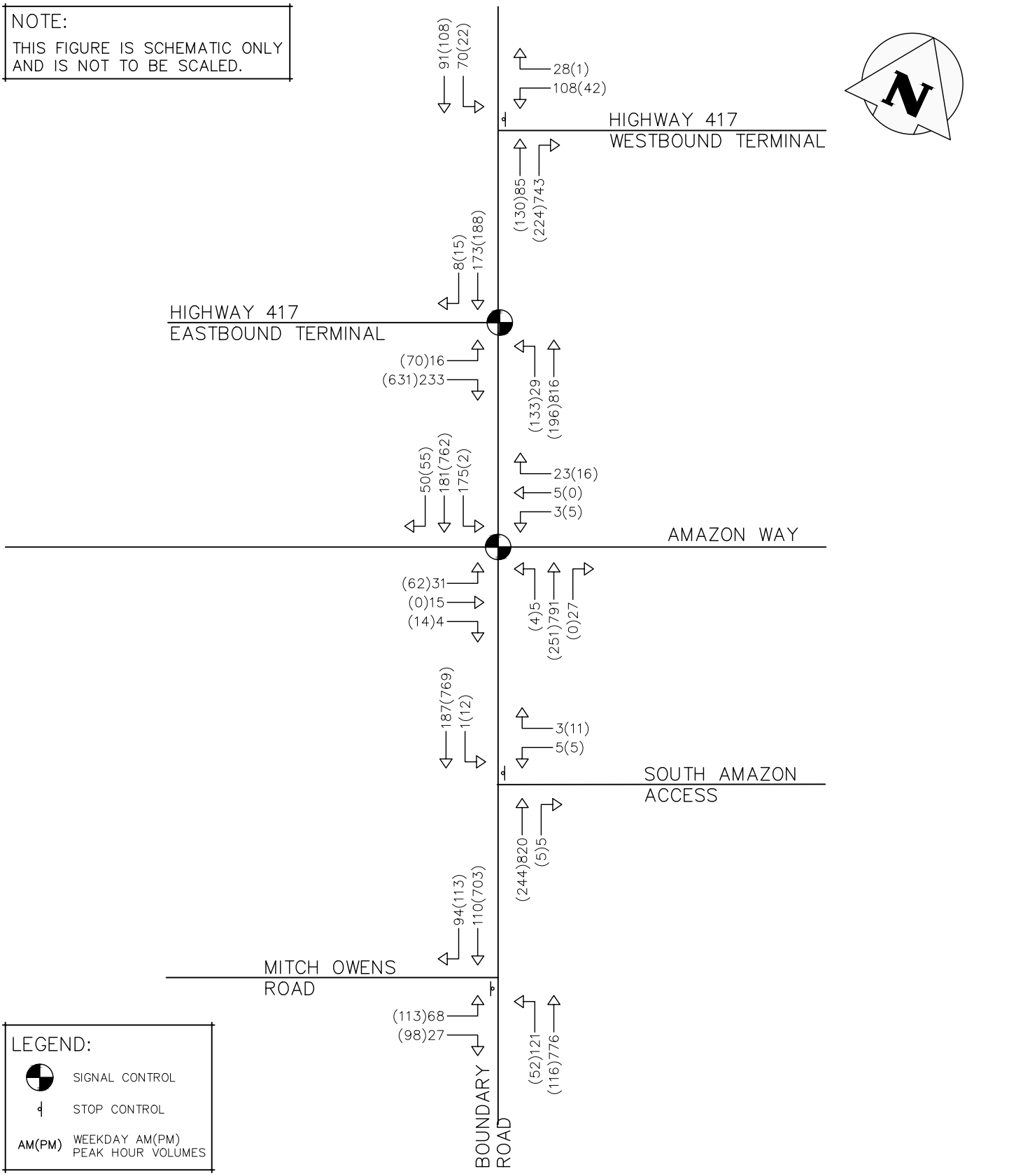
SITE LOCATION PLAN

CROZIER & ASSOCIATES
Consulting Engineers

2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905 875-0026 T
905 875-4915 F
www.cfcrozier.ca

Drawn	Project No.	
T.D.S.	1909–5772	
Date	Scale	Dwg.
2021/07/23	N.T.S	FIG. 01

NOTE:
THIS FIGURE IS SCHEMATIC ONLY AND IS NOT TO BE SCALED.



LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- AM(PM) WEEKDAY AM(PM) PEAK HOUR VOLUMES

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

2020 EXISTING TRAFFIC VOLUMES

CROZIER & ASSOCIATES
Consulting Engineers

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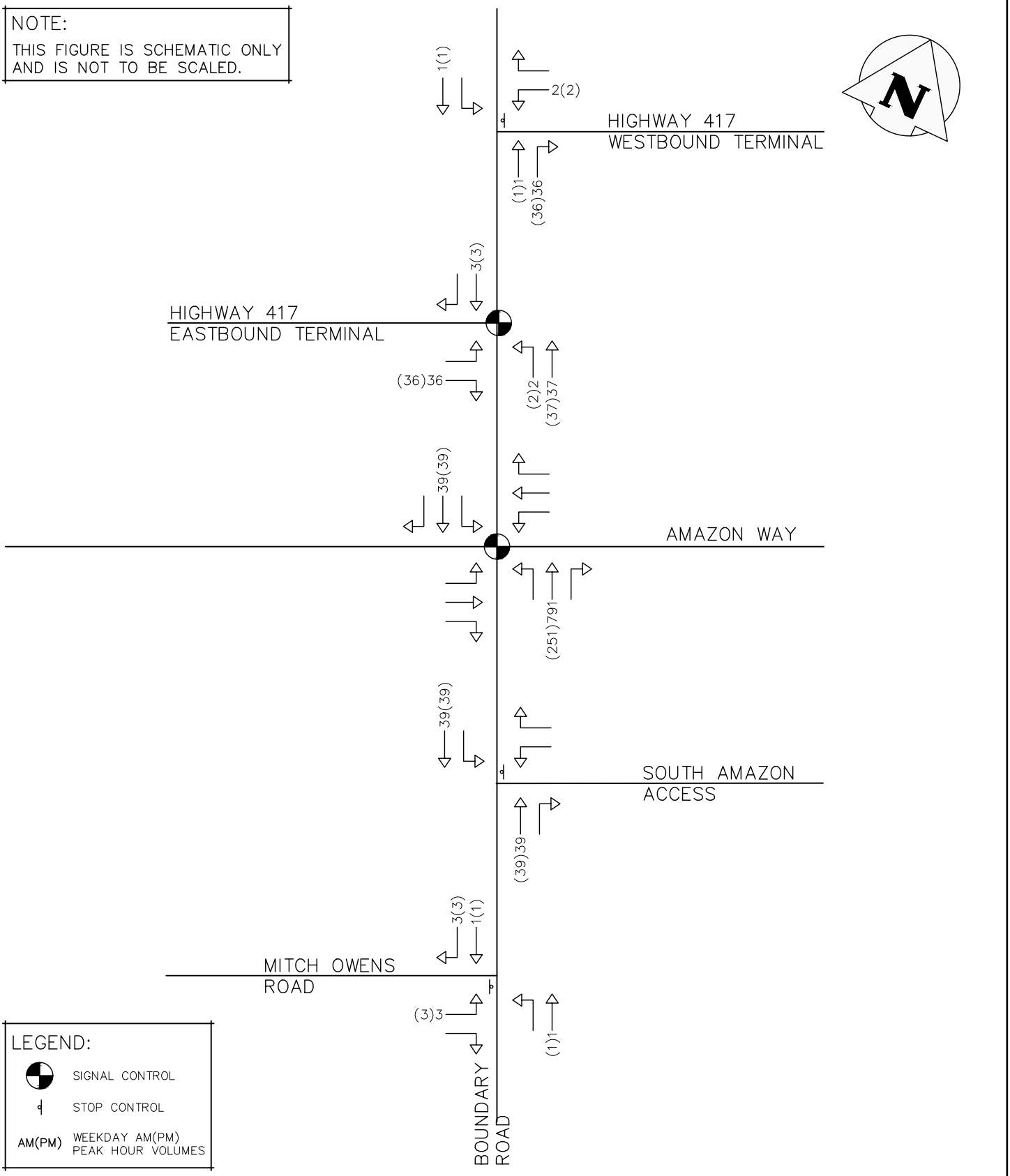
Drawn	Design	Project No.	
S.K./T.D.S.	S.K.		1909–5772
Date	Check	Scale	Dwg.
2021/07/23	P.A.	N.T.S	FIG. 03



THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

CRRC BACKGROUND TRIP ASSIGNMENT

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Consulting Engineers

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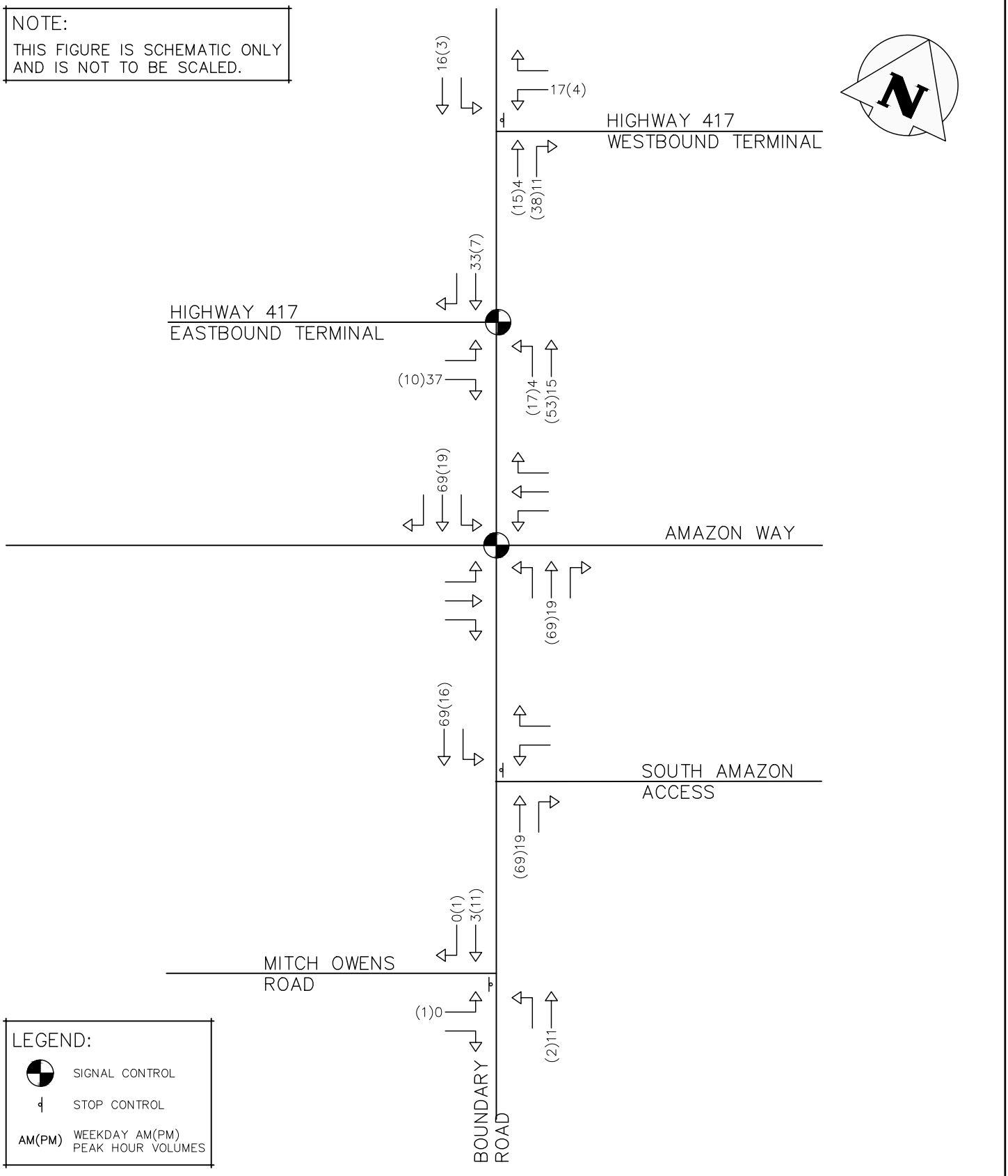
Drawn	Design	Project No.	
S.K./T.D.S.	S.K.		1909–5772
Date	Check	Scale	Dwg.
2021/07/23	P.A.	N.T.S	FIG. 04.1



THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

5494, 5500 AND 5510 BOUNDARY ROAD
BACKGROUND TRIP ASSIGNMENT

CROZIER & ASSOCIATES
Consulting Engineers

2800 High Point Drive
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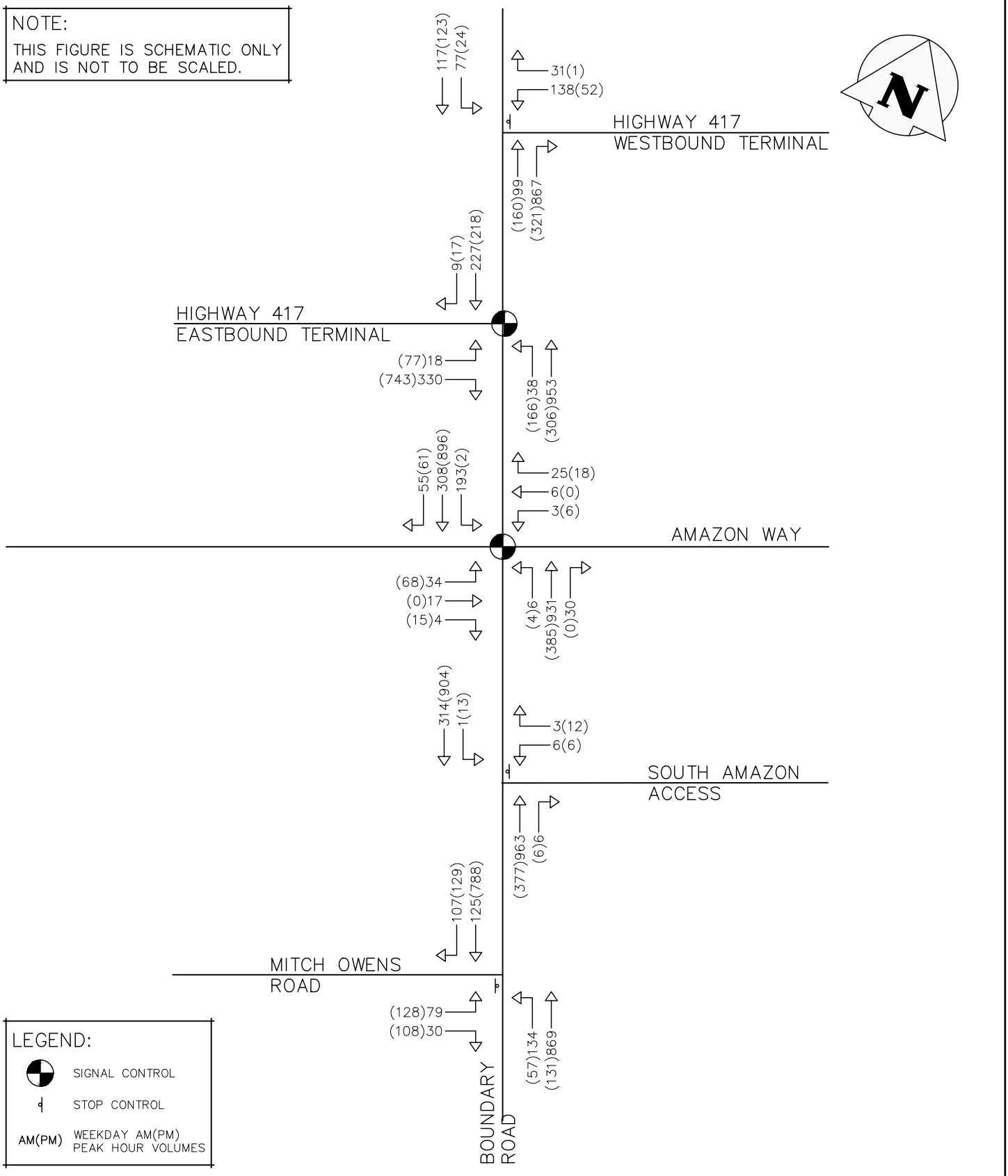
Drawn	Design	Project No.	
S.K./T.D.S.	S.K.		1909–5772
Date	Check	Scale	Dwg.
2021/07/23	P.A.	N.T.S	FIG. 04.2



THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

2025 FUTURE BACKGROUND TRAFFIC VOLUMES

CROZIER & ASSOCIATES
Consulting Engineers

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Drawn	Design	Project No.	
S.K./T.D.S.	S.K.		1909–5772
Date	Check	Scale	Dwg.
2021/07/23	P.A.	N.T.S	FIG. 05

NOTE:
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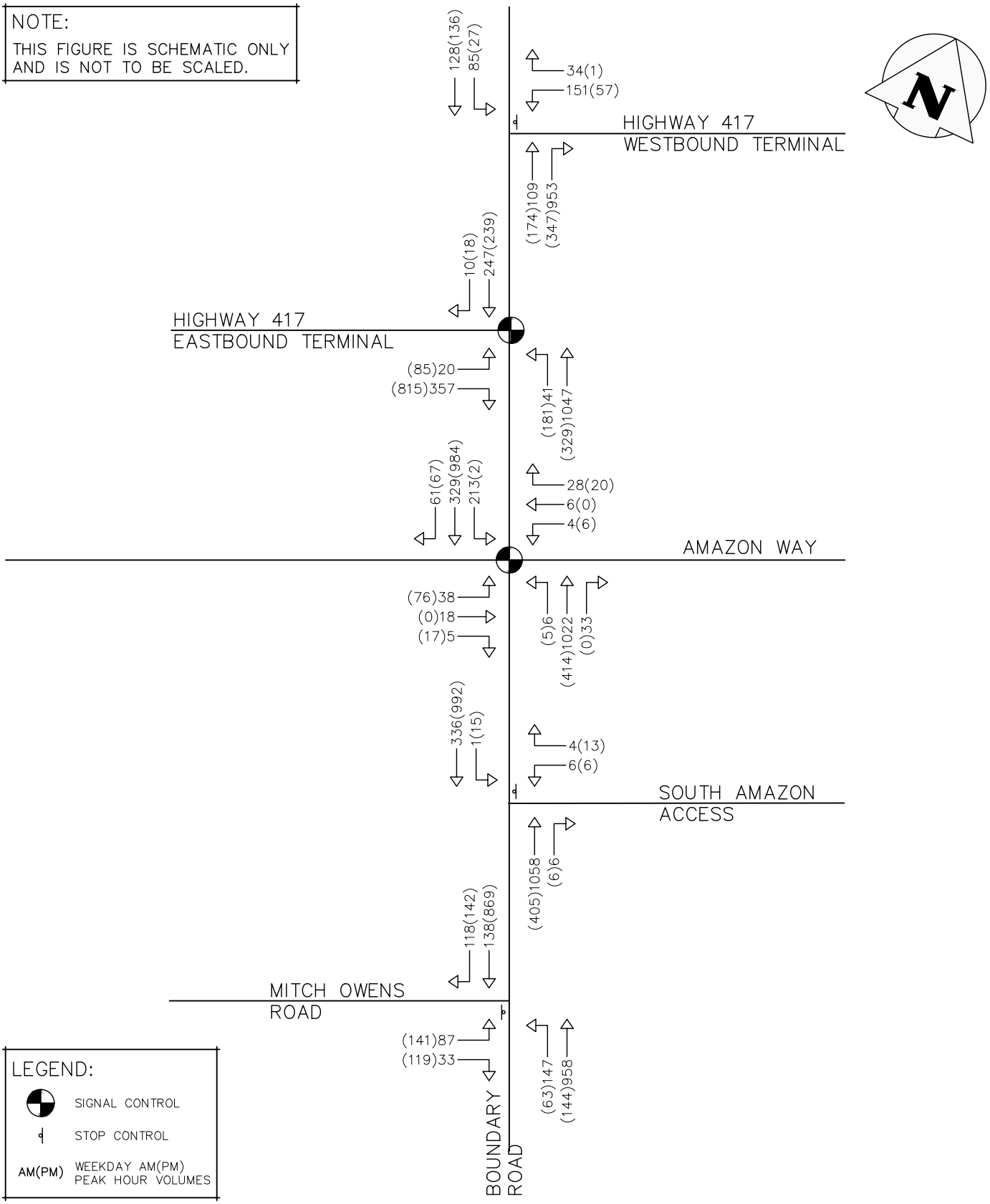

LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- AM(PM) WEEKDAY AM(PM) PEAK HOUR VOLUMES

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

2030 FUTURE BACKGROUND TRAFFIC VOLUMES

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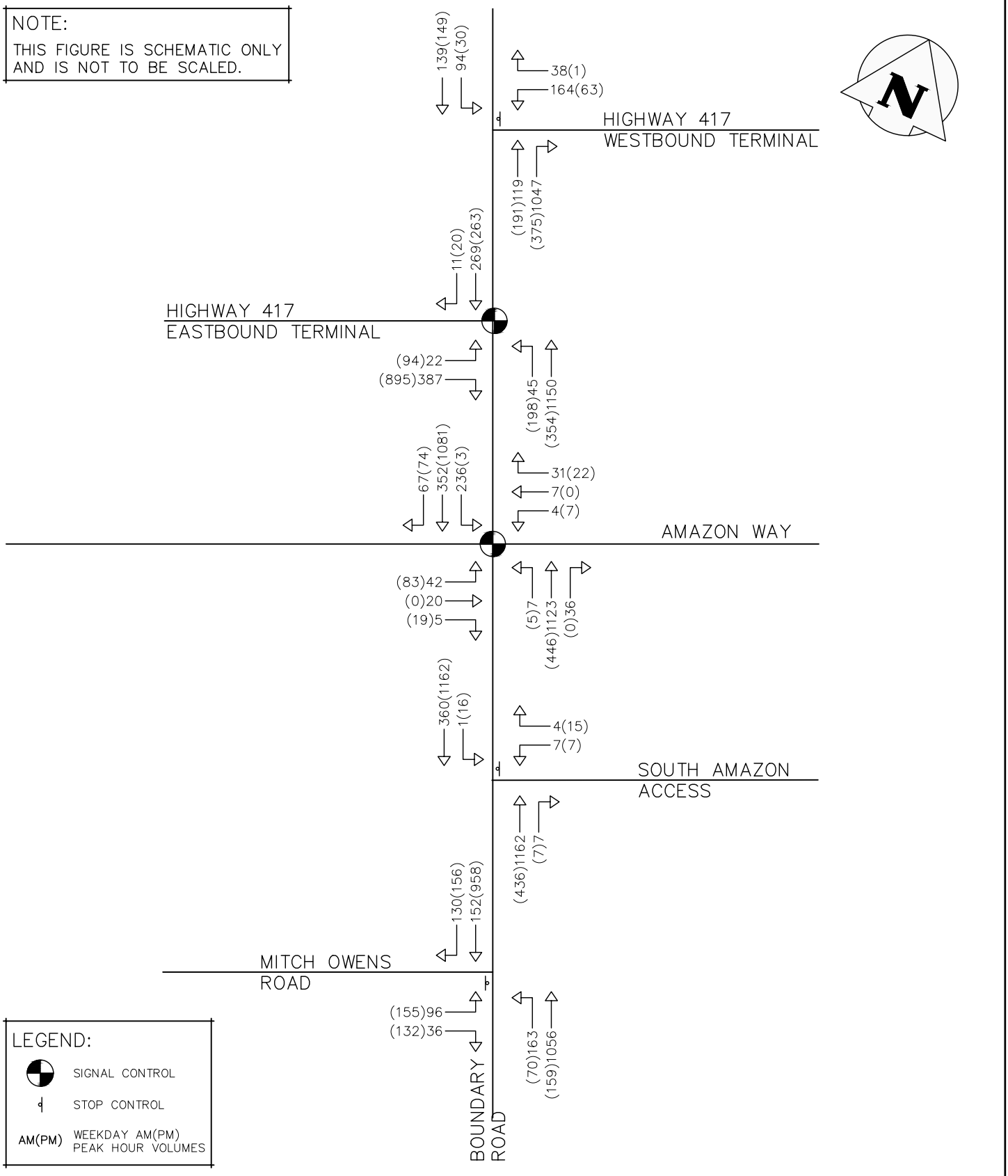
Drawn	Design	Project No.	
S.K./T.D.S.	S.K.		1909–5772
Date	Check	Scale	Dwg.
2021/07/23	P.A.	N.T.S	FIG. 06



THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

2035 FUTURE BACKGROUND TRAFFIC VOLUMES

CROZIER & ASSOCIATES
Consulting Engineers

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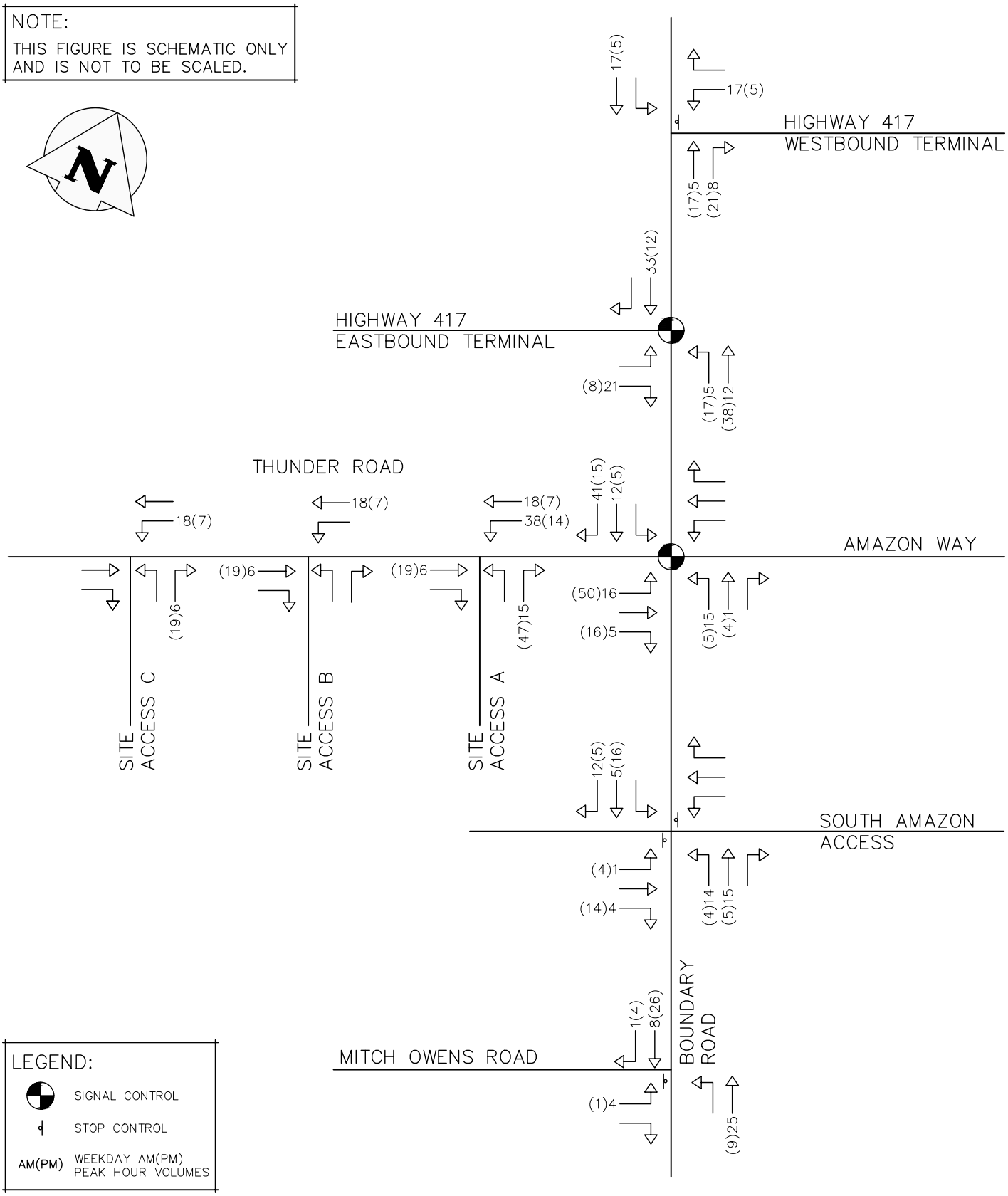
Drawn	Design	Project No.	
S.K./T.D.S.	S.K.		1909–5772
Date	Check	Scale	Dwg.
2021/07/23	P.A.	N.T.S	FIG. 07

NOTE:
THIS FIGURE IS SCHEMATIC ONLY AND IS NOT TO BE SCALED.



LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- AM(PM) WEEKDAY AM(PM) PEAK HOUR VOLUMES

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

SITE TRIP ASSIGNMENT – EMPLOYEES

CROZIER & ASSOCIATES
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905 875-4915 F
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Drawn	Design	Project No.	
S.K./T.D.S.	S.K.		1909–5772
Date	Check	Scale	Dwg.
2021/07/23	P.A.	N.T.S	FIG. 08

NOTE:
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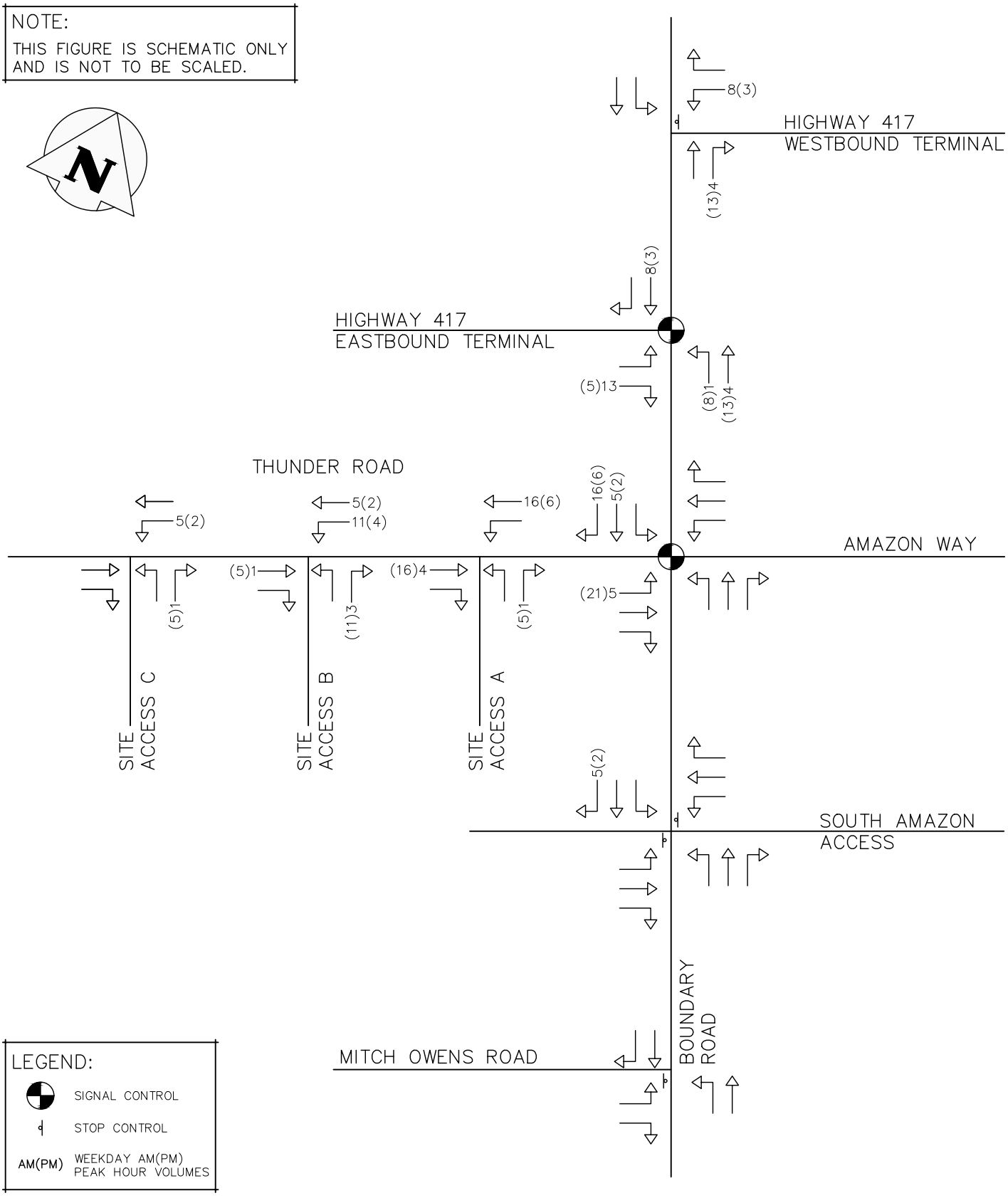

LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- AM(PM) WEEKDAY AM(PM) PEAK HOUR VOLUMES

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

SITE TRIP ASSIGNMENT – TRUCKS

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Suite 100
Milton, ON L9T 6P4
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905 875-4915 F
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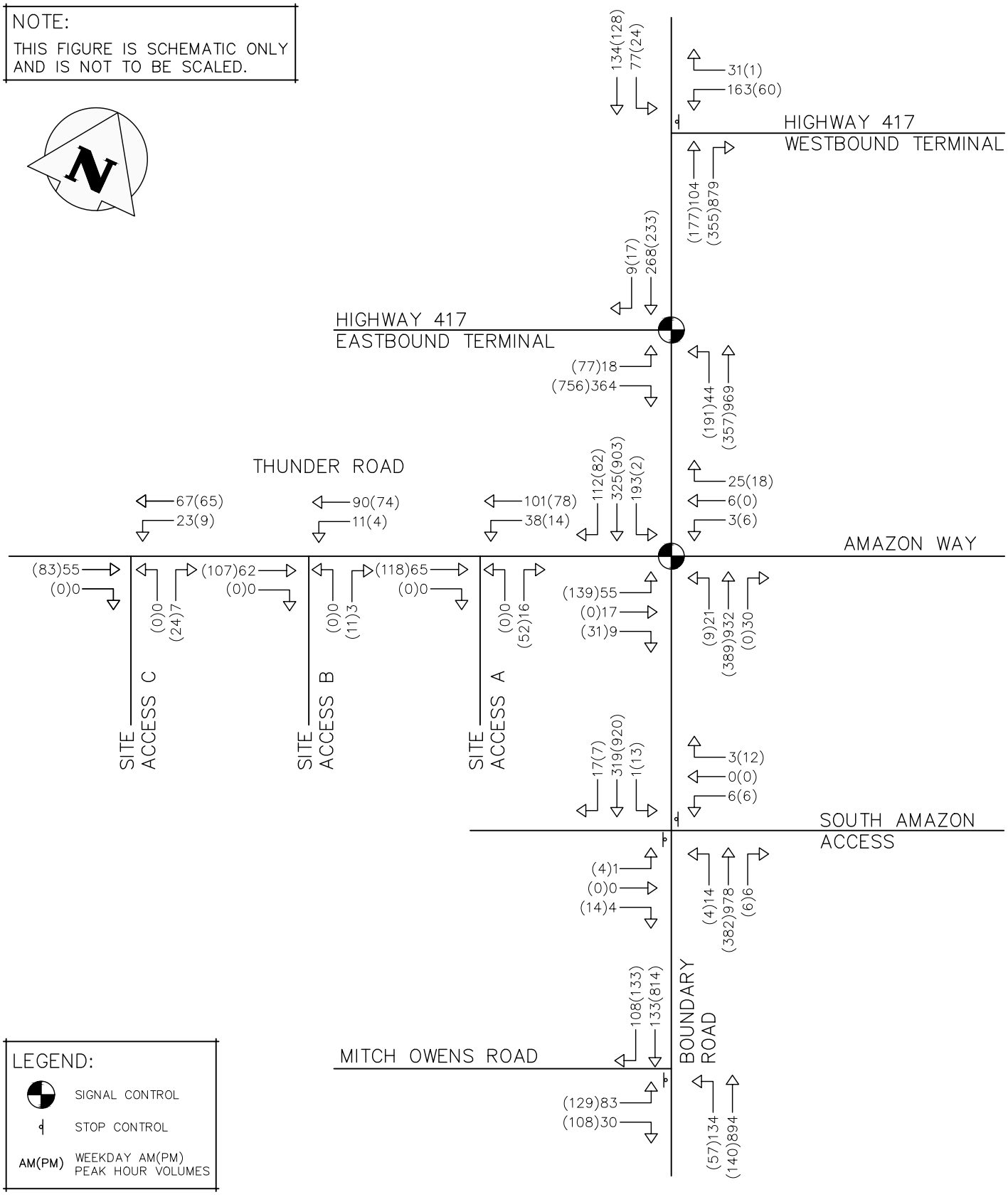
Drawn	Design	Project No.	
S.K./T.D.S.	S.K.		1909–5772
Date	Check	Scale	Dwg.
2021/07/23	P.A.	N.T.S	FIG. 09



THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

2025 FUTURE TOTAL TRAFFIC VOLUMES

CROZIER & ASSOCIATES
Consulting Engineers
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Suite 100
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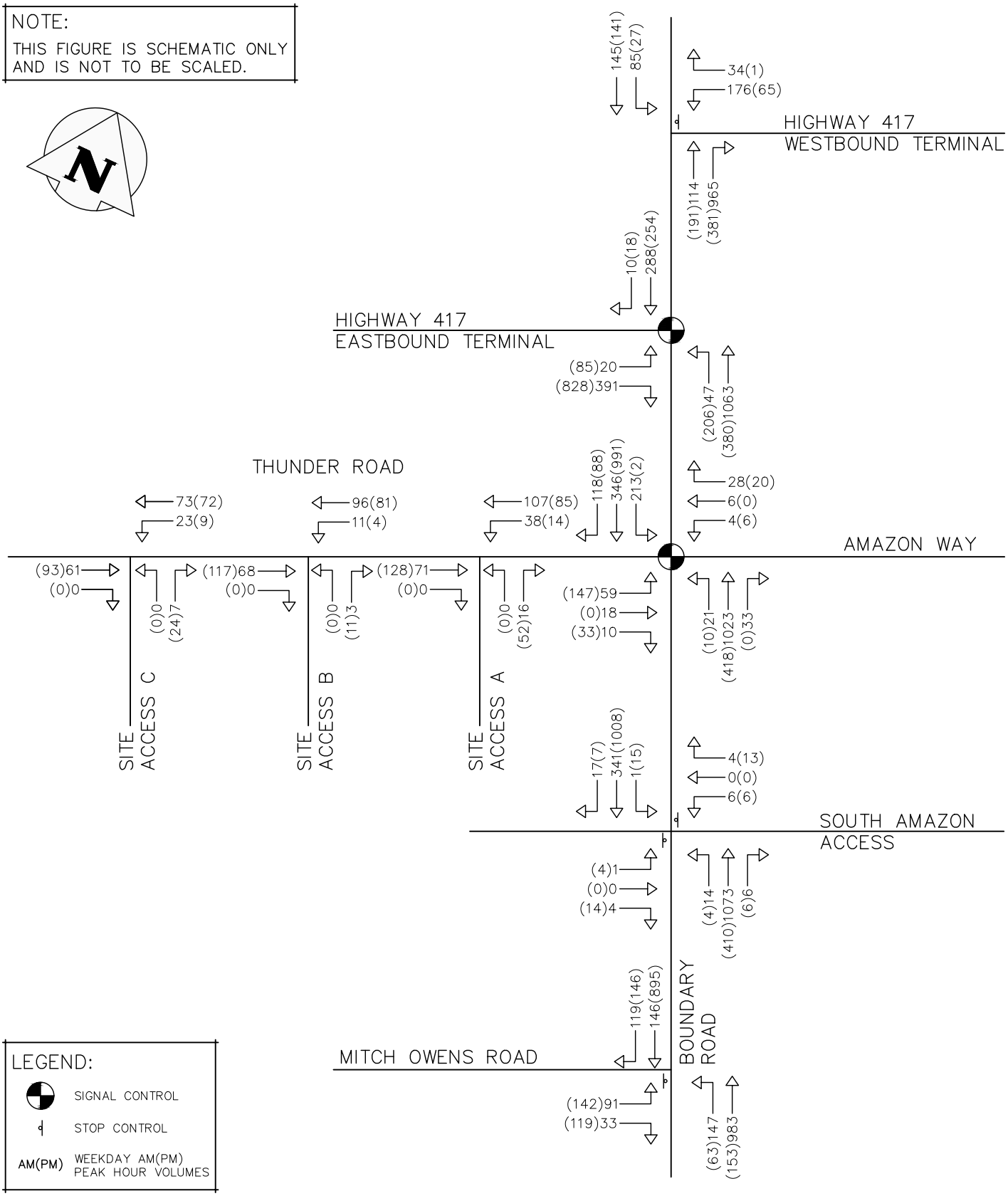
Drawn	Design	Project No.	
S.K./T.D.S.	S.K.		1909–5772
Date	Check	Scale	Dwg.
2021/07/23	P.A.	N.T.S	FIG. 10

NOTE:
THIS FIGURE IS SCHEMATIC ONLY AND IS NOT TO BE SCALED.



LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- AM(PM) WEEKDAY AM(PM) PEAK HOUR VOLUMES

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

2030 FUTURE TOTAL TRAFFIC VOLUMES

CROZIER & ASSOCIATES Consulting Engineers
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905 875-0026 T
905 875-4915 F
www.cfcrozier.ca

Drawn	Design	Project No.	
S.K./T.D.S.	S.K.		1909–5772
Date	Check	Scale	Dwg.
2021/07/23	P.A.	N.T.S	FIG. 11

NOTE:
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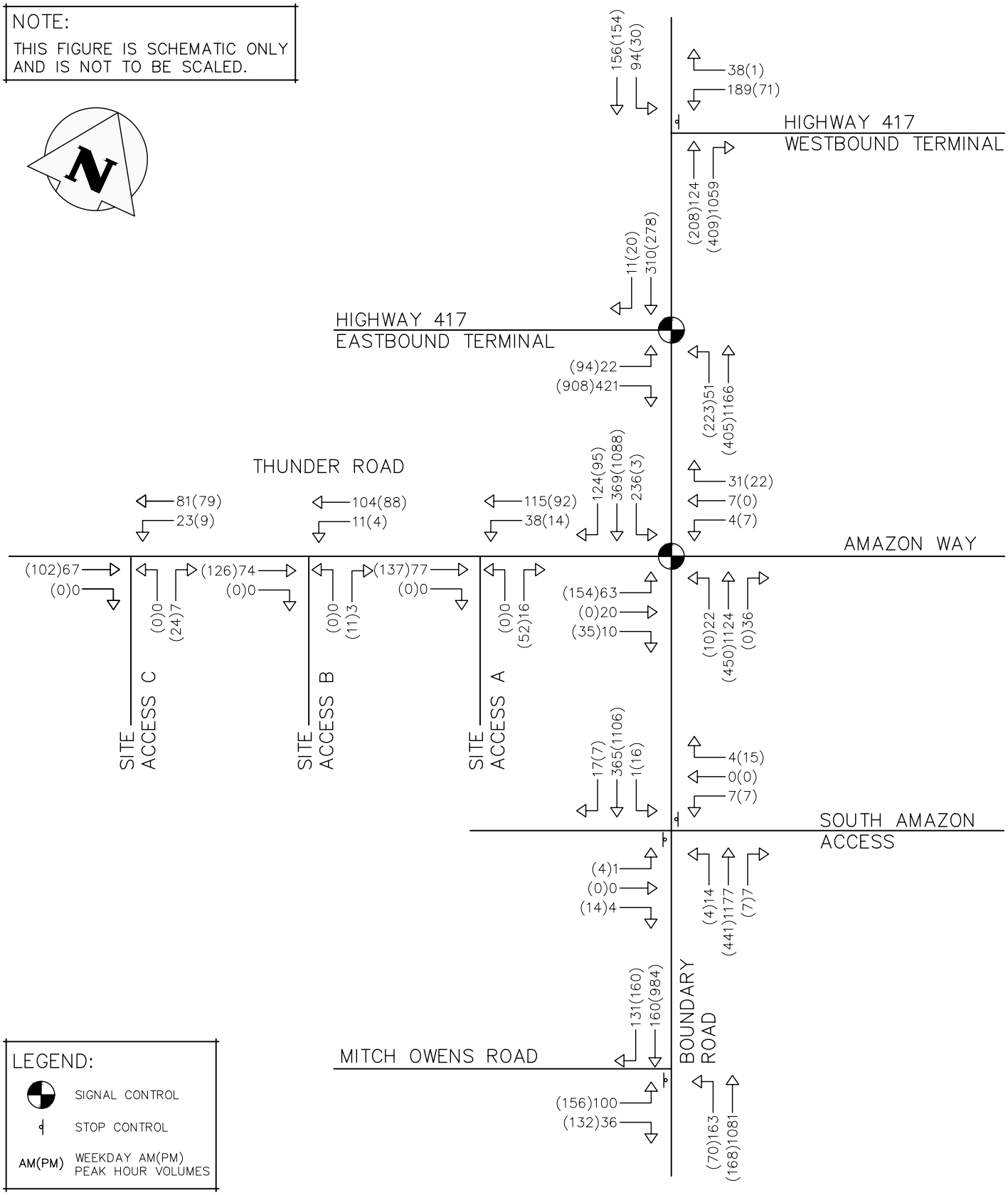

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

2035 FUTURE TOTAL TRAFFIC VOLUMES

CROZIER & ASSOCIATES Consulting Engineers
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
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Drawn	Design	Project No.	
S.K./T.D.S.	S.K.		1909–5772
Date	Check	Scale	Dwg.
2021/07/23	P.A.	N.T.S	FIG. 12