Caivan Communities

3713 Borrisokane Road: ABIC Facility

Transportation Impact Study

CGH TRANSPORTATION

3713 Borrisokane Road- ABIC Manufacturing Facility

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report

Prepared for:

Caivan Communities
2934 Baseline Road, Suite 302
Ottawa, ON K2H 1B2

Prepared by:

CGH TRANSPORTATION
13 Markham Avenue
Ottawa, ON K2G 3Z1

December 2019

PN: 2019-52

Table of Contents

List of Figures

Table of Tables

List of Appendices

1 Screening

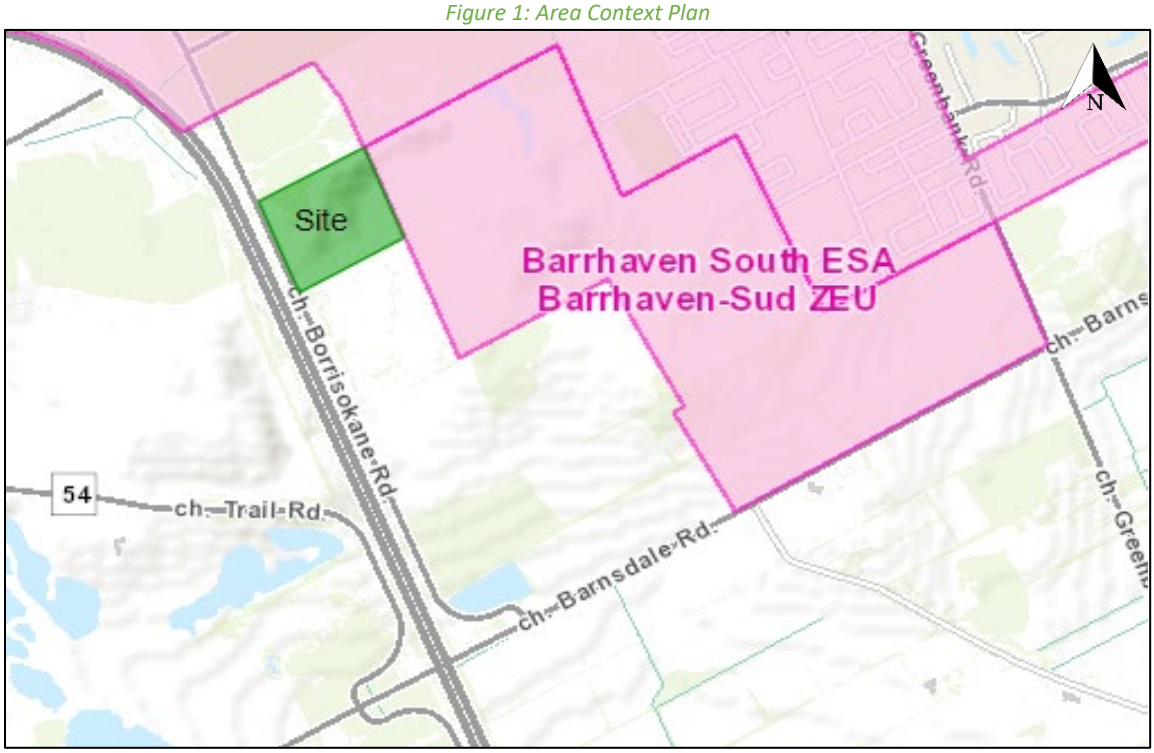
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for TIA Study PM. As shown in the Screening Form, a TIA is required including the Design Review component and the Network Impact Component.

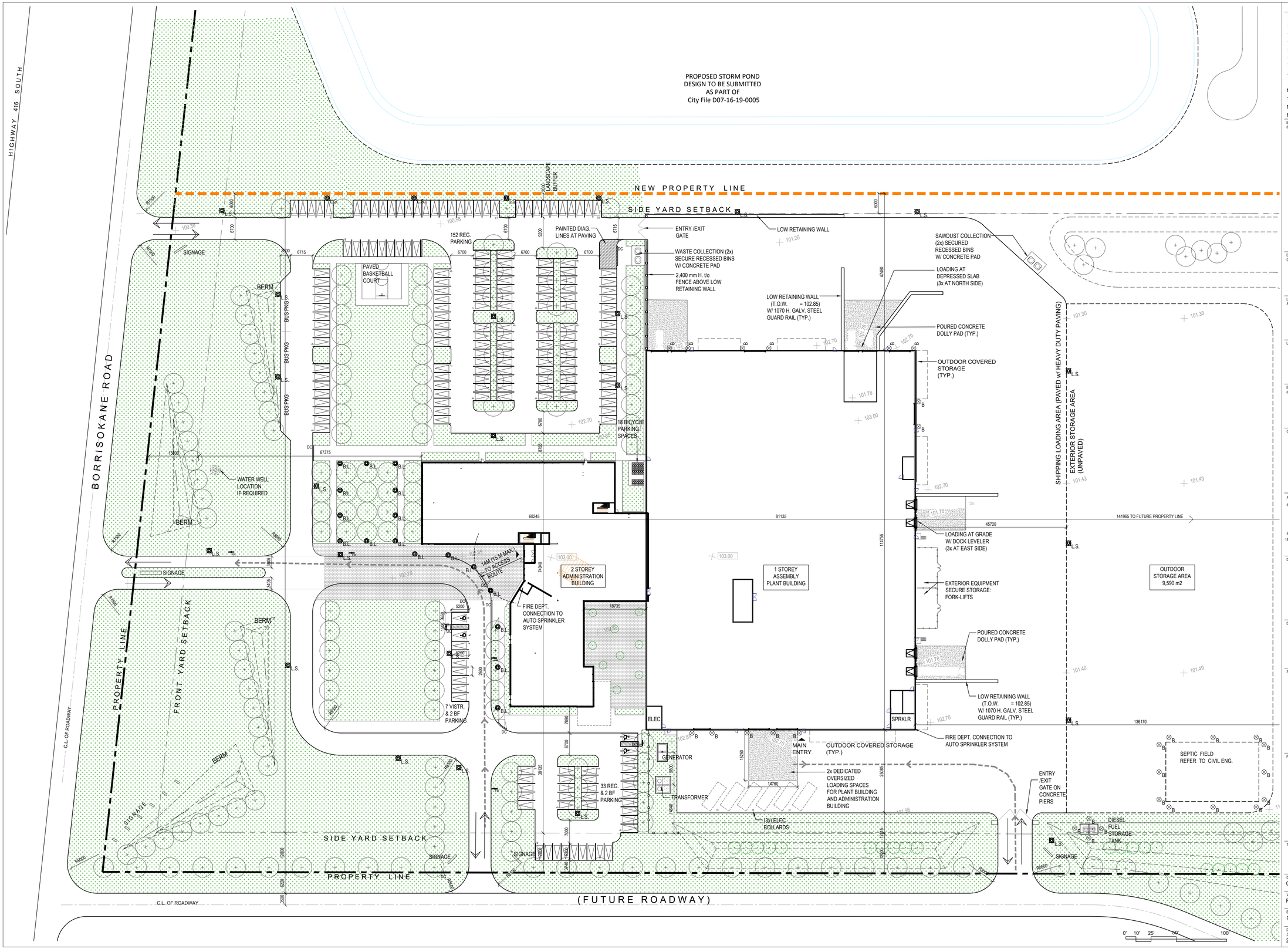
2 Existing and Planned Conditions

2.1 Proposed Development

The proposed development, located at 3713 Borrisokane Road, is currently an old quarry property, partially within the Barrhaven South Urban Expansion Area (UEA). The site is in an area that is currently zoned as a Mineral Extraction Operation Zone (ME2). The current development application would modify the zoning to allow for industrial uses on the western portion of the property. The eastern portion of the land which is within the Urban Expansion Boundary will not be included in this TIA but is the subject of an ongoing TIA for a residential development. The proposed industrial development will consist of approximately 3,465 square metres of general office space and 9,340 square metres of industrial buildings, approximately 185 regular parking spaces, seven visitor parking spaces and eighteen bicycle parking spots. Four site accesses are planned for the proposed development. Two full movement accesses to the development lands will be provided to the west of the proposed development onto Borrisokane Road approximately 630 metres (Site Access #1) and 735 metres (Site Access #2) south of Cambrian Road. The other two site accesses will be provided to the south of the proposed development onto a future roadway. These accesses will be located approximately 120 metres (Access #3) and 280 metres (Site Access #4) east of Borrisokane Road. Site Access #4 is designated for truck access only. The anticipated full build-out and occupancy horizon is 2022. Figure 1 illustrates the Study Area Context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan





No.	Date	Émis pour / Object
1	2019-10-25	COORDINATION
2	2019-10-28	COORDINATION
3	2019-10-29	CLIENT_REVIEW
4	2019-10-30	COORDINATION
5	2019-10-31	COORDINATION
6	2019-11-07	COORDINATION
7	2019-11-08	COORDINATION
8	2019-11-11	COORDINATION
9	2019-11-15	COORDINATION
10	2019-11-18	COORDINATION
11	2019-11-22	COORDINATION
12	2019-11-29	COORDINATION
13	2019-12-06	COORDINATION

Engineer / Trade Consultants (Mechanical / Electrical)

wsp

Goodkey Weedmark *Consulting Engineers*

DILFO
MECHANICAL | HVAC SERVICES
PLUMBING & HEATING

DRYCORE ELECTRIC · ÉLECTRIQUE

Engineer (Structural)

CLELAND JARDINE ENGINEERING LTD
200-1565 CARLING AVE. OTTAWA, ONTARIO K1Z 8R1 (613) 728-1793

Landscape Architect

NAK design strategies

Urban Planner

FOTENN PLANNING+DESIGN

Engineer (Civil)

DSEL david schaeffer engineering ltd

Owner

ABIC
ADVANCED BUILDING INNOVATION COMPANY

Architect — Collectif d'architectes / Architects Collective

fig. 1
3550, Saint-Antoine O.
Montreal QC H4C 1A9
T. 514 861-5122

fig. 2
190 Somerset St W #206
Ottawa ON K2P 0J4
T. 613 695-6122

figurr
www.figurr.ca

Design Builder

40th BBS CONSTRUCTION (ONTARIO)LTD
1805 WOODWARD DRIVE
OTTTAWA, ON K2C 0P9
CANADA (613) 226-8830 Fax: (613) 226-7709
www.bbsconstruction.ca

Sceau / *Seal*

Note:

L'entrepreneur doit vérifier toutes les dimensions et informations sur le site et aviser immédiatement l'architecte de toutes erreurs ou omissions.

Contractor shall verify all information and dimensions on site and immediately report any errors or omissions to the architect.

Projet / *Project*

ABIC OFFICE / ASSEMBLY PLANT

3713 BORRISOKANE RD.
Ottawa, Ontario

NORTH / TRUE NORTH

Titre / *Title*

SITE PLAN

Dessiné par / *Drawn by*	GB,TS
Vérifié par / *Verified by*	RC
Échelle / *Scale*	*1:500*
Date de création du dessin / *Drawing creation date*	2019-09-19
No. projet / *Project number*	*1944*
No. dessin / *Drawing number*	A105
Révision / *Revision*	0

2.2 Existing Conditions

2.2.1 Area Road Network

Borrisokane Road

Borrisokane Road is a Ministry of Ontario road with a two-lane cross-section and a posted speed limit of 80 km/h along the frontage of the site. Gravel shoulders are present on both sides of the road. No sidewalks are provided. North of Cambrian Road, Borrisokane Road is an Arterial Road, and south of Cambrian Road it is a Collector Road. Borrisokane is part of the Veterans Memorial Highway (Highway 416) corridor to the south of Cambrian Road and has a measured 37.5 metre right of way to the north of Cambrian Road.

Cambrian Road

Cambrian Road is a City of Ottawa collector road with a two-lane cross-section and a posted speed limit of 70 km/h for approximately 700 metres east of Borrisokane Road and 50 km/h in the remaining Study Area. To the west of Seeley's Bay Street, Cambrian Road has gravel shoulders and no sidewalks. To the east of Seeley's Bay Street, Cambrian Road has curbs and gutters as well as sidewalks. The Ottawa Official Plan reserves a 37.5 metre right-of-way from Cedarview (now Borrisokane Road) to Jockvale Road.

Barnsdale Road

Barnsdale Road is a City of Ottawa arterial road with a two-lane cross-section and a posted speed limit of 80 km/h. Gravel shoulders are present on both sides of the road and no sidewalks are provided. The City of Ottawa Official Plan reserves a 40 metre right-of-way within the Study Area.

Veterans Memorial Highway (Highway 416)

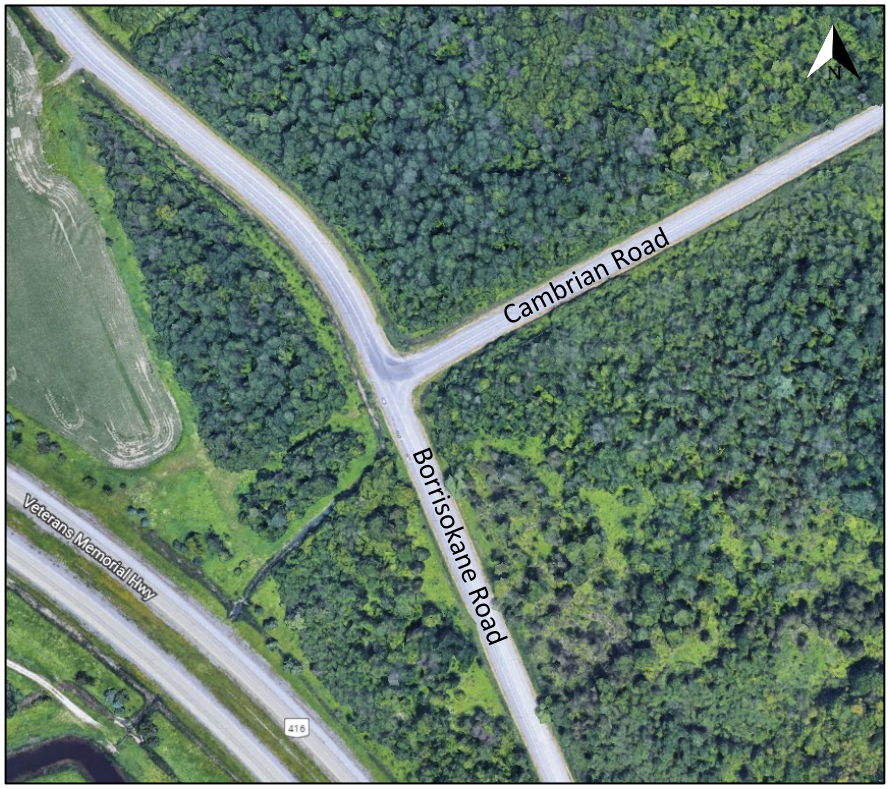
Highway 416 is a Ministry of Ontario freeway with a four-lane separated cross-section and a posted speed limit of 100 km/h. Paved shoulders are present on both sides of the road. The measured right-of-way is 130 metres.

2.2.2 Existing Intersections

A description and accompanying aerial photograph of the existing intersections within the Study Area can be found below.

Borrisokane Road / Cambrian Road

Borrisokane Road and Cambrian Road is an unsignalized t-intersection. The westbound approach is stop-controlled and consists of a shared left-turn/right-turn lane. The northbound approach consists of a shared through/right-turn lane and the southbound approach consists of a shared left-turn/through lane. No turn restrictions are noted.



Borrisokane Road / Barnsdale Road

Borrisokane Road and Barnsdale Road is an unsignalized t-intersection. The southbound approach is stop-controlled and consists of a shared left-turn/right-turn lane. The eastbound approach consists of a shared left-turn / through lane and the westbound approach consists of a shared right-turn/through lane. No turn restrictions are noted.

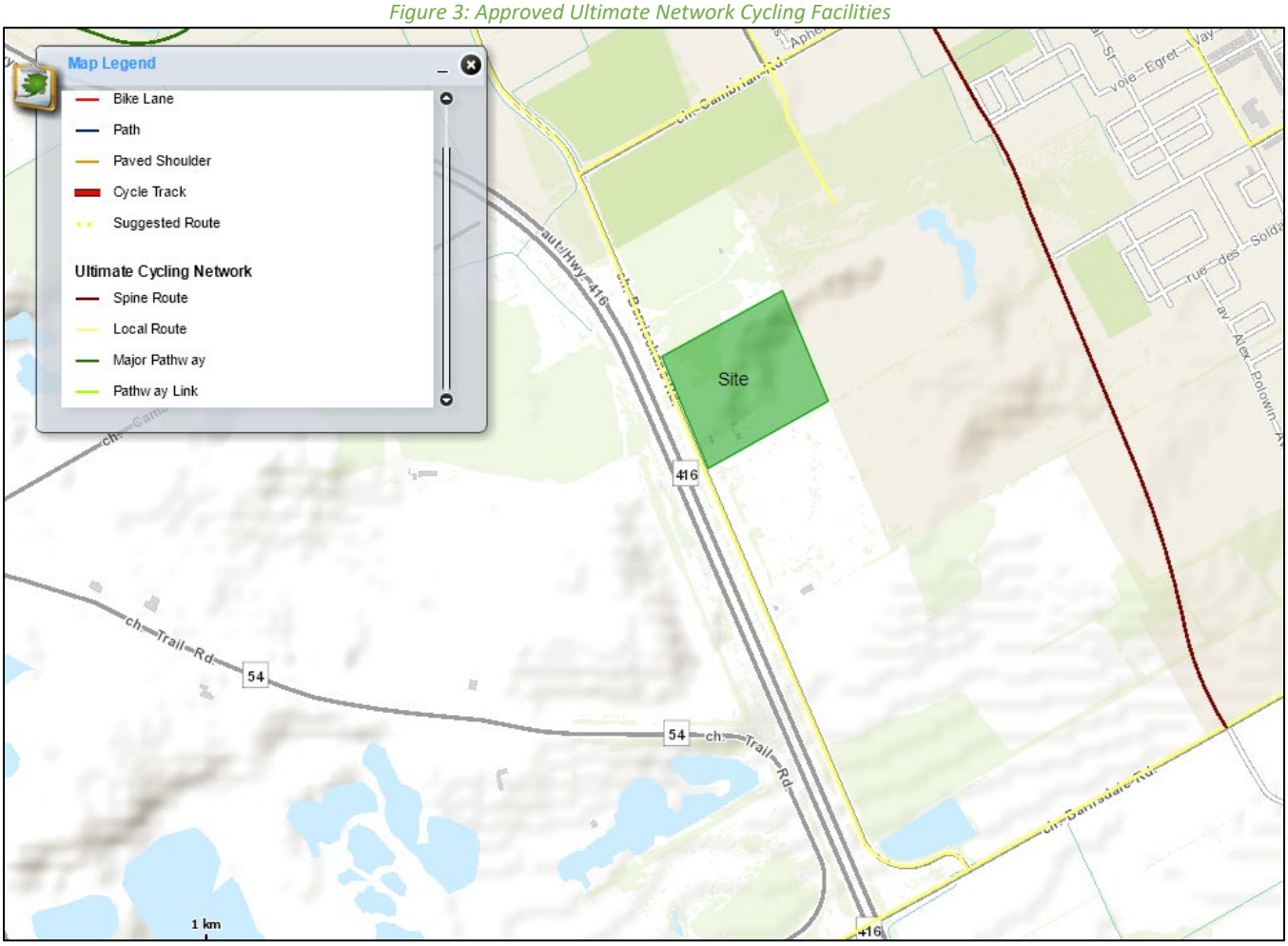
2.2.3 Existing Driveways

There are no existing driveways within 200 metres of the proposed site accesses.

2.2.4 Cycling and Pedestrian Facilities

No cycling facilities or pedestrian facilities currently exist along Borrisokane Road, Barnsdale Road or Cambrian Road. Approved cycling infrastructure as part of The City of Ottawa's Ultimate Cycling Network includes plans for local cycling routes along Cambrian Road, Borrisokane Road and Barnsdale Road as seen in Figure 3.

Figure 3: Approved Ultimate Network Cycling Facilities

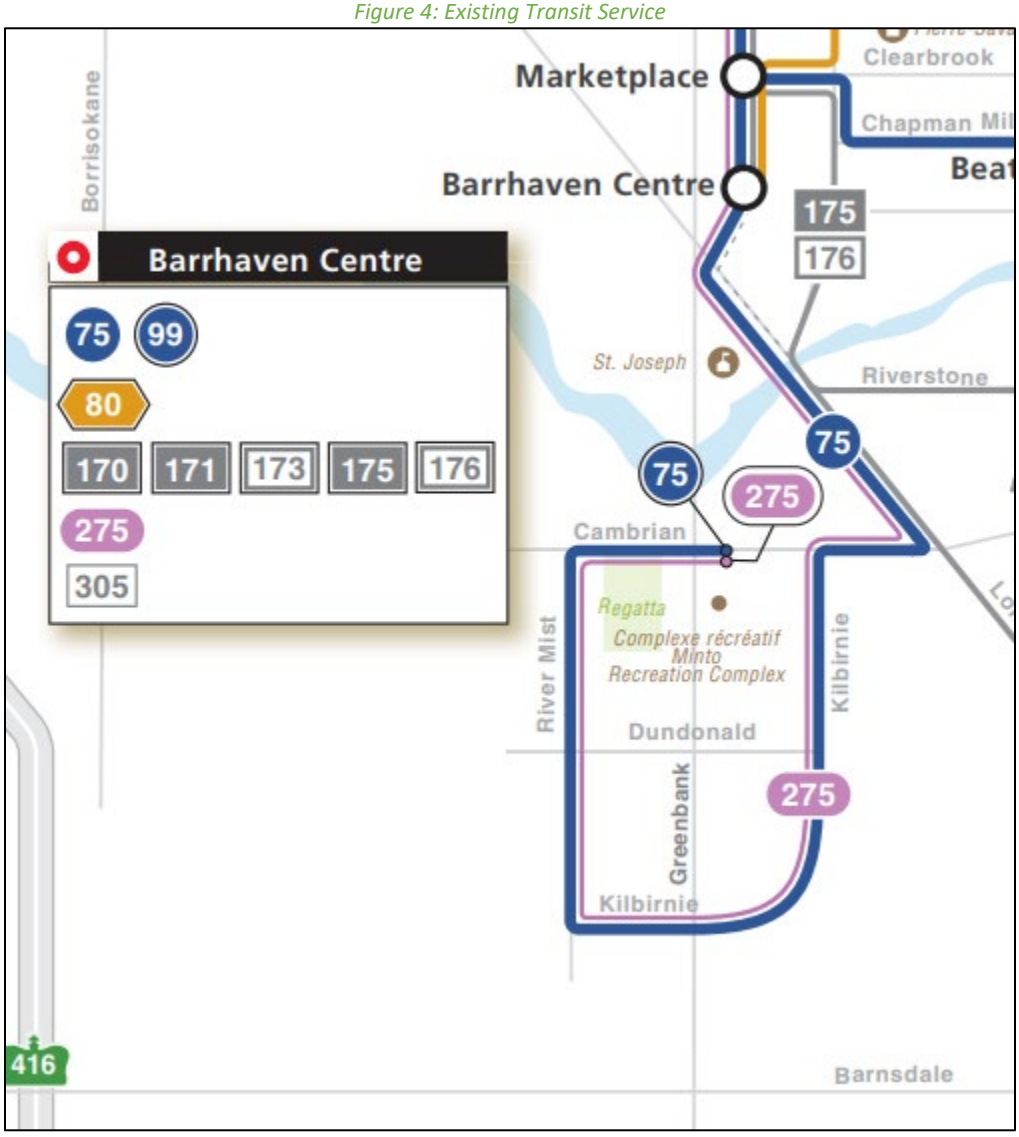


Source: http://maps.ottawa.ca/geoOttawa/Accessed: October 9, 2019

2.2.5 Existing Transit

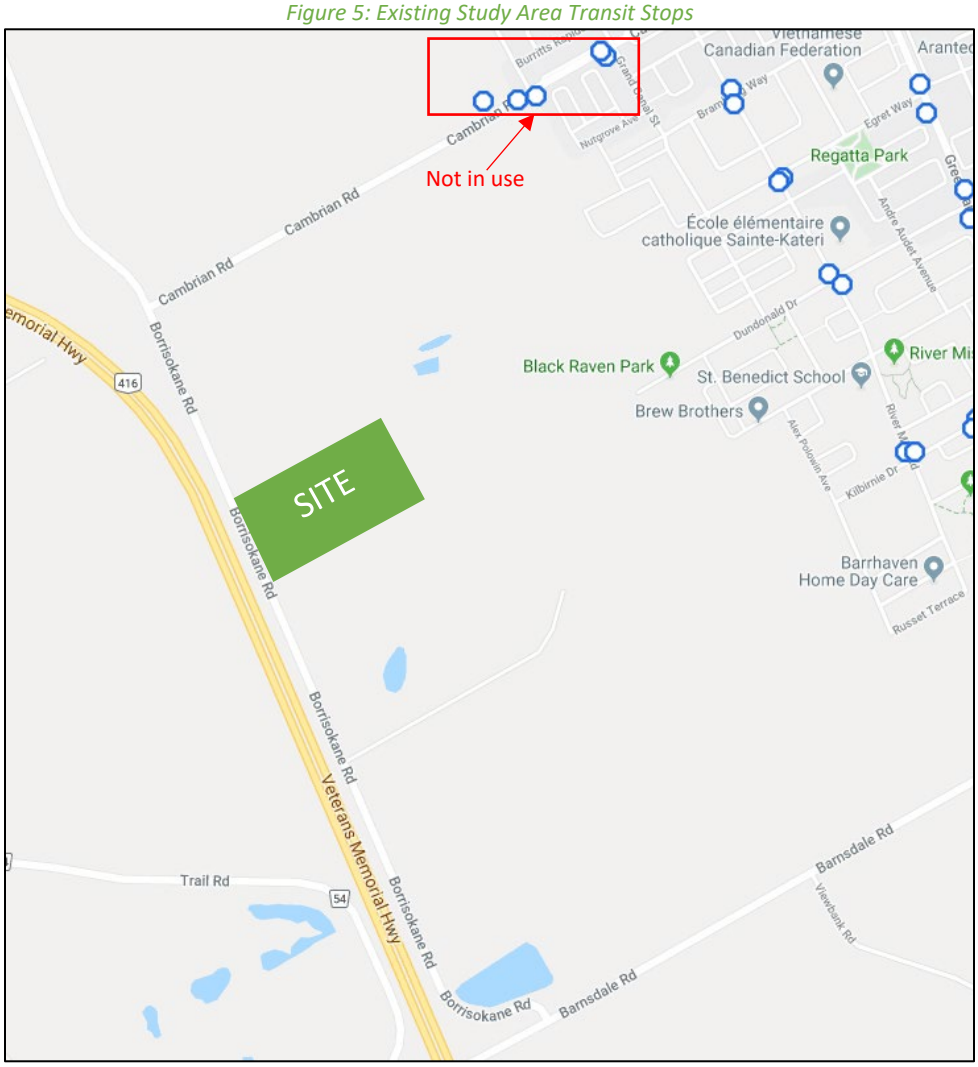
There is no existing transit service along the boundary roads. East of the subject development, Route 75 and Route 275 run along River Mist Road and Cambrian Road. Figure 4 illustrates the existing transit service and Figure 5 illustrates the existing transit stops.

Figure 4: Existing Transit Service



Source: http://www.octranspo.com/ Accessed: October 10, 2019

Figure 5: Existing Study Area Transit Stops



Source: http://plan.octranspo.com/plan Accessed: October 10, 2019

2.2.6 Existing Area Traffic Management Measures

There are no existing area traffic management measures within the Study Area.

2.2.7 Existing Peak Hour Travel Demand

Turning movement counts for the existing Study Area intersections were acquired from the City of Ottawa as well as from an excerpt from the Meadows Phase 5 TIA by others. Table 1 summarizes the intersection count dates and sources.

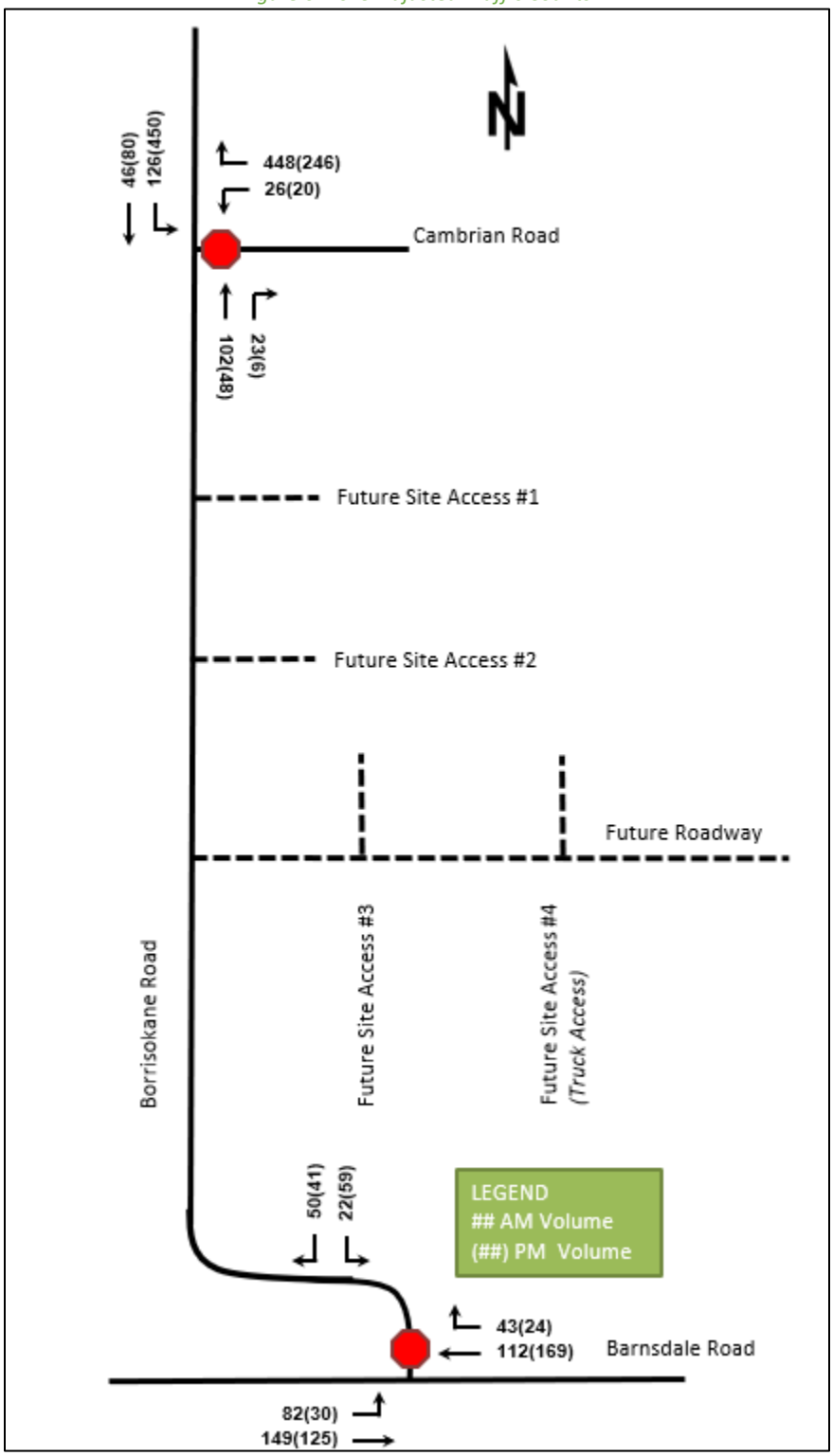
Table 1: Intersection Count Date

Intersection	Count Date	Data Source
Borrisokane Road / Cambrian Road	Tuesday, February 15, 2018	Meadows Phase 5 TIA
Borrisokane Road / Barnsdale Road	Thursday, January 10, 2019	City of Ottawa

Figure 6 illustrates the 2019 existing horizon traffic volumes. As shown above, the turning movement count data has been collected over different years. To reflect a constant horizon, a 2% background growth rate has been used which is consistent with surrounding development Traffic Impact Assessments. Additionally, volume balancing has

been applied within the Study Area and site-traffic generated by adjacent developments built-out during 2019 have been considered. Detailed turning movement count data is included in Appendix B.

Figure 6: 2019 Adjusted Traffic Counts



2.2.8 Collision Analysis

Collision data has been acquired from the City of Ottawa for five years (2014-2018) prior to the commencement of this TIA for the surrounding Study Area road network. Specific attention has been directed towards the Study Area intersections and road segments. Table 2 summarizes the total collisions for the intersections of interest. Collision data is included in Appendix C. As the segment of Borrisokane Road between Strandherd Drive and Barnsdale Road was named Cedarview Road prior to September 2016, all references in Appendix C to Cedarview Road should be taken to mean Borrisokane Road. For consistency within the body of this document, all references within this section to Cedarview Road have been changed to Borrisokane Road.

Table 2: Summary of Collision Locations

Intersections / Segments	Number	%
	42	**100%**
Barnsdale Rd btwn Trail Rd & Borrisokane Rd	1	2.38%
Borrisokane Rd btwn Cambrian Rd & Strandherd Dr	20	47.62%
Cambrian Rd btwn Borrisokane Rd & Grand Canal St	3	7.15%
Borrisokane Rd btwn Cambrian Rd & Barnsdale Rd	3	7.15%
Barnsdale Rd at Borrisokane Rd	5	11.90%
Cambrian Rd at Borrisokane Rd	10	23.80

Overall, no fatal collisions were documented in the Study Area and no collisions were noted involving pedestrians or cyclists.

The road segment of Barnsdale Road between Trail Road and Borrisokane Road experienced one collision between 2014-2018. The collision resulted in a non-fatal injury. The collision's initial impact type was recorded as SMV Other. Weather/road conditions are unknown for this collision. Table 3 summarizes the collisions at the road segment of Barnsdale Road between Trail Road and Borrisokane Road.

Table 3: Barnsdale Rd btwn Trail Rd and Borrisokane Rd Collision Summary

		Number	%
Total Collisions		**1**	**100%**
Classification	Fatality	0	0.00%
	Non-Fatal Injury	1	100.00%
	Property Damage Only	0	0.00%
Initial Impact Type	Angle	0	0.00%
	Rear end	0	0.00%
	Sideswipe	0	0.00%
	Turning Movement	0	0.00%
	SMV Other	1	100.00%
	Other	0	0.00%
Road Surface Condition	Dry	0	0.00%
	Wet	0	0.00%
	Loose Snow	0	0.00%
	Slush	0	0.00%
	Packed Snow	0	0.00%
	Ice	0	0.00%
Pedestrians Involved		0	0.00%
Cyclists Involved		0	0.00%

The road segment of Borrisokane Road between Cambrian Road and Strandherd Drive experienced 20 collisions between 2014-2018. Of these collisions, five resulted in non-fatal injuries and 15 resulted in property damage

only. The initial impact types are varied between the rear end, other and SMV other initial impact categories with 5%, 5% and 90% of all collisions respectively. Weather/road conditions are considered a contributing factor for 45% of collisions on this road segment. Table 4 summarizes the collisions at the road segment of Borrisokane Road between Cambrian Road and Strandherd Drive.

Table 4: Borrisokane Rd btwn Cambrian Rd & Strandherd Dr

		Number	%
Total Collisions		**20**	**100%**
Classification	Fatality	0	0.00%
	Non-Fatal Injury	5	25.00%
	Property Damage Only	15	75.00%
Initial Impact Type	Angle	0	0.00%
	Rear end	1	5.00%
	Sideswipe	0	0.00%
	Turning Movement	0	0.00%
	SMV Other	18	90.00%
	Other	1	5.00%
Road Surface Condition	Dry	11	55.00%
	Wet	2	10.00%
	Loose Snow	3	15.00%
	Slush	0	0.00%
	Packed Snow	1	5.00%
	Ice	3	15.00%
Pedestrians Involved		0	0.00%
Cyclists Involved		0	0.00%

The road segment of Cambrian Road between Borrisokane Road and Grand Canal Street experienced three collisions between 2014-2018. Two of these collisions resulted in non-fatal injuries and one resulted in property damage only. The collisions have been classified as approaching, SMV unattended vehicle and SMV other initial impact types. Weather/road conditions were considered a contributing factor for 33.33% of collisions on this road segment. Table 5 summarizes the collisions at the road segment of Cambrian Road between Borrisokane Road and Grand Canal Street.

Table 5: Cambrian Rd btwn Borrisokane Rd & Grand Canal St

		Number	%
Total Collisions		**3**	**100%**
Classification	Fatality	0	0.00%
	Non-Fatal Injury	2	66.67%
	Property Damage Only	1	33.33%
Initial Impact Type	Approaching	1	33.33%
	Angle	0	0.00%
	Rear end	0	0.00%
	Sideswipe	0	0.00%
	Turning Movement	0	0.00%
	SMV Unattended Vehicle	1	33.33%
	SMV Other	1	33.33%
	Other	0	0.00%
Road Surface Condition	Dry	2	66.67%
	Wet	0	0.00%
	Loose Snow	1	33.33%
	Slush	0	0.00%
	Packed Snow	0	0.00%
	Ice	0	0.00%
Pedestrians Involved		0	0.00%
Cyclists Involved		0	0.00%

The road segment of Borrisokane Road between Cambrian Road and Barnsdale Road experienced three collision between 2014-2018. All three of these collisions resulted in property damage only. The collisions have all been classified as SMV other initial impact types. Weather/road conditions were considered a contributing factor for 66.67% of collisions on this road segment. Table 6 summarizes the collisions at the road segment of Borrisokane Road between Cambrian Road and Barnsdale Road.

Table 6:Borrisokane Rd btwn Cambrian Rd & Barnsdale Rd Collision Summary

		Number	%
Total Collisions		**3**	**100%**
Classification	Fatality	0	0.00%
	Non-Fatal Injury	0	0.00%
	Property Damage Only	3	100.00%
Initial Impact Type	Approaching	0	33.33%
	Angle	0	0.00%
	Rear end	0	0.00%
	Sideswipe	0	0.00%
	Turning Movement	0	0.00%
	SMV Unattended Vehicle	0	0.00%
	SMV Other	3	100.00%
	Other	0	0.00%
Road Surface Condition	Dry	2	66.67%
	Wet	1	33.33%
	Loose Snow	0	0.00%
	Slush	0	0.00%
	Packed Snow	0	0.00%
	Ice	0	0.00%
Pedestrians Involved		0	0.00%
Cyclists Involved		0	0.00%

The intersection of Borrisokane Road and Barnsdale Road experienced four collisions between 2014-2018. Two collisions resulted in non-fatal injuries while the other two collisions resulted in property damage only. The initial impact types are varied between angle and rear end categories with 75% and 25% of all collisions respectively. Weather/road conditions were considered a contributing factor for 50% of collisions at this intersection. Table 7 summarizes the collisions at the intersection of Borrisokane Road and Barnsdale Road.

Table 7: Borrisokane Rd and Barnsdale Rd Collision Summary

		Number	%
Total Collisions		**4**	**100%**
Classification	Fatality	0	0.00%
	Non-Fatal Injury	2	50.00%
	Property Damage Only	2	50.00%
Initial Impact Type	Approaching	0	0.00%
	Angle	3	75.00%
	Rear end	1	25.00%
	Sideswipe	0	0.00%
	Turning Movement	0	20.00%
	SMV Unattended Vehicle	0	0.00%
	SMV Other	0	0.00%
	Other	0	0.00%
Road Surface Condition	Dry	3	50.00%
	Wet	1	25.00%
	Loose Snow	1	25.00%
	Slush	0	0.00%
	Packed Snow	0	0.00%
	Ice	0	0.00%
Pedestrians Involved		0	0.00%
Cyclists Involved		0	0.00%

The intersection of Cambrian Road and Borrisokane Road experienced ten collisions between 2014-2018. Three of these collisions resulted in non-fatal injuries and the other 7 resulted in property damage only. The collisions have all been classified as rear end and SMV other initial impact types with 40% and 60% of all collisions respectively. Weather/road conditions were considered a contributing factor for 40% of collisions at this intersection. Table 8 summarizes the collisions at the intersection of Cambrian Road and Borrisokane Road.

Table 8:Cambrian Rd and Borrisokane Rd Collision Summary

		Number	%
Total Collisions		**10**	**100%**
Classification	Fatality	0	0.00%
	Non-Fatal Injury	3	30.00%
	Property Damage Only	7	70.00%
Initial Impact Type	Approaching	0	0.00%
	Angle	0	0.00%
	Rear end	4	40.00%
	Sideswipe	0	0.00%
	Turning Movement	0	0.00%
	SMV Unattended Vehicle	0	0.00%
	SMV Other	6	60.00%
	Other	0	0.00%
Road Surface Condition	Dry	6	60.00%
	Wet	1	10.00%
	Loose Snow	0	0.00%
	Slush	0	0.00%
	Packed Snow	0	0.00%
	Ice	2	20.00%
	Loose sand or gravel	1	10.00%
Pedestrians Involved		0	0.00%
Cyclists Involved		0	0.00%

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

The planned development is subject to policies outlined in the City of Ottawa's Master Plan and City of Ottawa's Official Plan. Additionally, Development Charges (DC) outlined in the 2019 City of Ottawa Intersection Control Measures By-Law will impact the planned development.

Expected changes to the subject development as outlined in the City of Ottawa's Master Plan and City of Ottawa's Official Plan are:

- The widening of Barnsdale Road from two to four lanes between Highway 416 and Prince of Wales Drive. This widening is shown in the 2031 Network Concept Plan Map, however it is not shown on the 2031 Affordable Network Map.
- A new interchange on Barnsdale Road east of Highway 416 is also shown in the 2031 Network Concept Plan Map, however it is not shown on the 2031 Affordable Network Map.
- Local cycling routes along Cambrian Road, Borrisokane Road and Barnsdale Road within the Study Area as part of the City of Ottawa's Ultimate Cycling Network.

Intersection Control Measures outlined in the 2019 Ottawa Development Charges By-Law are expected to be implemented at the following intersections:

- Cambrian Road and Borrisokane Road at a gross project cost of $1,300,000 (2020-2031)
- Cambrian Road and Apolune Way at a gross project cost of $1,300,000 (2020-2031)

2.3.2 Other Study Area Developments

The Meadows Phase 4

Northeast of the proposed development is Phase 4 of the Meadows Tamarack Development and is expected to be built out during 2019. Phase 4 will have 136 townhouse units and 50 single family units This development is anticipated to produce 142 two-way AM peak period auto trips and 171 two-way PM peak period auto trips. (IBI 2018)

The Meadows Phase 5

North of the proposed development is Phase 5 of the Tamarack Development of the Meadows and is expected to be built-out during 2022. Phase 5 will have 221 townhouse units and 125 single family units. This development is anticipated to produce 294 two-way AM peak period auto trips and 334 two-way PM peak period auto trips. (IBI 2018)

3387 Borrisokane Road

North of Cambrian Road is the Glenview Development of 3387 Borrisokane Road which is expected to be built-out during 2022. The development is expected to have 179 single family units and 109 townhouses. The development is anticipated to produce 137 two-way AM peak period auto trips and 174 two-way PM peak period auto trips. (Stantec 2016)

3809 Borrisokane Road

South of the proposed development is the 3809 Borrisokane Road development which is expected to be built-out during 2025. This development will include 590 residential units, split between townhouse units and detached home units. The eastern parcel of 3713 Borrisokane Road will include a connection to 3809 Borrisokane Road and both developments will share an access to Borrisokane Road. This development is expected to produce 668 two-way AM peak period auto trips and 763 two-way PM peak period auto trips. (CGH 2019)

Half Moon Bay West

North of the proposed development is the Mattamy Development of Half Moon Bay West which is expected to be built-out during 2024. This development will include 552 single family homes and 464 townhomes. Construction has not yet commenced on this subdivision. This development is expected to produce 786 two-way AM peak period auto trips and 1193 two-way PM peak period auto trips. (Stantec 2016).

Citi Gate's Highway 416 Employment Lands

North of the proposed development is the Citi Gate Corporate Campus. This development will include 32,516 square metres allocated towards a shopping centre, 165,600 square metres allocated towards business parks and 105,000 square metres allocated towards car dealerships. The full build-out year is 2029 with an interim development year of 2019. This development is expected to produce 4267 two-way AM peak period auto trips and 4848 two-way PM peak period auto trips. (Novatech 2012).

Mattamy's Half Moon Bay North Phase 9 (Apartment Block)

North of the proposed development is the Half Moon Bay North Phase 9 development which is expected to be built-out during 2019. This development will consist of 60 stacked townhouses. This development is

expected to produce 74 two-way AM peak period auto trips and 80 two-way PM peak period auto trips. (Stantec 2018).

3285 Borrisokane Road

North of the proposed development is 3285 Borrisokane Road which is expected to be built-out during 2020. This development will include 125 single family homes and 75 townhouses. This development is expected to produce 129 two-way AM peak period auto trips and 146 two-way PM peak period auto trips. (Parsons 2018).

3713 Borrisokane Road-Residential Component

Directly east of the proposed development is the residential component of 3713 Borrisokane Road. The development will include approximately 281 detached homes and 161 townhouses and is expected to be built-out during 2024.

Barrhaven South Expansion Lands (Quinn's Pointe 2)

To the southeast of the proposed development is the Minto Development of Quinn's Pointe 2. This development will include 536 single-family dwelling units, 493 townhomes, 100 apartment units, and two elementary schools, anticipated over 2 phases of construction for the horizon years of 2022 and 2025. A total of 749 two-way AM peak period auto trips and 813 two-way PM peak period auto trips are expected from this development (Stantec 2018).

Half Moon Bay South Phase 5

Southeast of the proposed development is the Mattamy Development of Half Moon Bay South which is expected to be built-out during 2020. The development will consist of 164 single detached home units and 97 townhouse units. This development is expected to produce 180 two-way AM peak period auto trips and 207 two-way PM peak period auto trips. (CGH 2019)

Mattamy's Half Moon Bay North Phases 7,8

North of the proposed development is the Half Moon Bay North Phase 7 and 8 development and is expected to be built-out during 2019. The development will consist of 471 residential units. No TIA is currently available for this development.

4041 Moodie Drive

Southwest of the proposed development is 4041 Moodie Drive. This development is planned to be a temporary two-year training facility for the Ottawa Fire Services. No TIA is currently available for this development.

3 Study Area and Time Periods

3.1 Study Area

The Study Area will include the intersection of Cambrian Road and Borrisokane Road, and Borrisokane Road and Barnsdale Road, and will include examining Borrisokane Road as a Boundary Road.

3.2 Time Periods

As a result of the shift work schedule of the workers at the proposed development, peak site traffic generation will occur slightly outside of the AM and PM peak periods. However, to produce a conservative analysis, AM and PM peak hours will be examined.

3.3 Horizon Years

The anticipated build-out year is 2022. As a result, the full build-out plus five years horizon year is 2027.

4 Exemption Review

Table 9 summarizes the exemptions for this TIA.

Table 9: Exemption Review

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

5 Development-Generated Travel Demand

5.1 Trip Generation and Mode Shares

As a result of the expected unique trip generation of the proposed development, three trip generation methods have been considered. The first method is using the ITE Trip Generation Manual (10th Edition). The second trip generation method considered is using a first principles analysis based on project statistics provided by ABIC, and the third method is evaluating and applying the trip generation of a proxy site.

5.1.1 Method 1-ITE

Vehicle trip rates and rate equations for the industrial and office development components were taken from ITE Trip Generation Manual (10th Edition). The fitted curve equation was used along with the office building land use statistics to develop vehicle trip rates. As no fitted curve equations were available for the industrial-manufacturing land use, the average vehicle trip rate was used. To estimate the person trip generation for each development component, a factor of 1.28 has been applied to the vehicle trip rates. Table 10 summarizes the person trip rates for the proposed land uses for the ITE trip generation method.

Table 10: Trip Generation Person Trip Rates-Trip Generation Method

Land Uses	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates
General Office Building	710	AM	1.16	1.48
		PM	1.15	1.47
Industrial-Manufacturing	140	AM	0.62	0.79
		PM	0.67	0.86

Using the above Person Trip rates, the total person trip generation has been estimated. Table 11 below illustrates the total person trip generation by land use for the ITE trip generation method.

Table 11: Total Person Trip Generation-ITE Trip Generation Method

Land Use	GFA (1000 sq. ft.)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
General Office Building	37.30	47	8	55	9	46	55
Industrial-Manufacturing	100.53	61	18	79	27	59	86
Total Person Trips		**108**	**26**	**134**	**36**	**105**	**141**

Using the most recent National Capital Region Origin-Destination (OD Survey), the existing mode shares for South Nepean have been summarized in Table 12. Minor adjustments to these mode shares have been made in order to more accurately represent the expected mode choices within the Study Area. As a result of the limited pedestrian and cyclist facilities within the Study Area, the non-auto mode share was reduced by 5% and the auto driver mode share was increased by 5%. The adjusted South Nepean Mode Share can also be seen in Table 12 and will be used to generate the site trips for the proposed development.

Table 12: Mode Share

Travel Mode	South Nepean Mode Share	Adjusted South Nepean Mode Share
Auto Driver	60%	65%
Auto Passenger	15%	15%
Transit	15%	15%
Cycling	9%	4%
Walking	1%	1%
Total	100%	100%

Using the above adjusted mode shares and the ITE person trip rates, the person trips by mode have been projected. Table 13 summarizes the trip generation by mode for the ITE trip generation method.

Table 13: Trip Generation Mode-ITE Trip Generation Method

Travel Mode	Mode Share	In	Out	Total	In	Out	Total
Auto Driver	65%	71	17	87	24	68	92
Auto Passenger	15%	16	4	20	5	16	21
Transit	15%	16	4	20	5	16	21
Cycling	4%	4	1	6	2	4	6
Walking	1%	1	0	1	0	1	1
Total	100%	108	26	134	36	105	141

As shown above, 87 AM and 92 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

5.1.2 Method 2-First Principles

Using employee counts provided by ABIC, the person trips for the proposed development were determined. In order to produce a conservative analysis, it was assumed that all office workers (80) will arrive within the AM peak period and depart in the PM peak period. It was assumed that a shift change will occur during both the AM and PM peak periods producing in and out volumes of 40 industrial workers. In the PM peak period, it was assumed that all customers (30) will arrive and depart within the hour. This represents a conservative estimate of the site traffic. The site statistics with the expected employee counts can be found in Appendix D and the resulting person trips are summarized in Table 14.

Table 14: ABIC Facility Person Trips-First Principles Method

Peak Period	In/Out	Land Use Type	Person Trips
AM	In	Office Building	80
		Industrial	40
	Out	Industrial	40
PM	In	Industrial	40
		Customer	30
	Out	Industrial	40
		Customer	30
		Office Building	80

Using the adjusted mode shares summarized in Table 12 above, and the person trips from Table 14, the person trips by mode have been projected. Table 15 summarizes the trip generation by mode.

Table 15: Trip Generation by Mode-First Principles Method

Travel Mode	Mode Share	In	Out	Total	In	Out	Total
Auto Driver	65%	78	26	104	46	98	144
Auto Passenger	15%	18	6	24	10	22	32
Transit	15%	18	6	24	10	22	32
Cycling	4%	5	2	6	3	6	10
Walking	1%	1	0	2	1	2	2
Total	100%	120	40	160	70	150	220

As shown above, 104 AM and 144 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

5.1.3 Method 3-Proxy Study GFA Rate

Site statistics and traffic data for the AM and PM peak periods were collected and analyzed at the Canopy Growth Corporation in Smiths Falls. This information was used to determine the person trip generation rates at this proxy site based on the Gross Floor Area (GFA) of the development. As no land use distinction was provided between office space and industrial space, the resulting person trip rates can only be described by peak period and not by land use. Given the lack of transit, cycling and pedestrian facilities in the area surrounding the Canopy Growth development, the counted vehicle trips were considered person trips. The calculated person trip rates can be seen in Table 16. Canopy Growth Corporation site information can be found in Appendix E and traffic data collected at this proxy site can be found in Appendix F.

Table 16: Person Trip Generation Rates-Proxy Site Method

	In	Out	Total
AM	73.42%	26.58%	0.79
PM	15.29%	84.71%	0.85

Using the proxy study rates, the person trips for the proposed development were calculated using the GFA of the ABIC development. The person trip rates of this method can be seen in Table 17.

Table 17: Total Person Trip Generation-Proxy Study Method

GFA (1000 sq. ft.)	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
137.79	80	29	109	18	99	117
Total Person Trips	**80**	**29**	**109**	**18**	**99**	**117**

Using the adjusted mode shares summarized in Table 12 above, and the person trips from Table 17, the person trips by mode have been projected. Table 18 summarizes the trip generation by mode.

Table 18:Trip Generation by Mode-Proxy Study Method

Travel Mode	Mode Share	In	Out	Total	In	Out	Total
Auto Driver	65%	52	20	72	11	64	75
Auto Passenger	15%	12	4	16	3	15	18
Transit	15%	12	4	16	3	15	18
Cycling	4%	3	1	4	1	4	5
Walking	1%	1	0	1	0	1	1
Total	100%	80	29	109	18	99	117

As shown above, 72 AM and 75 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

5.1.4 Trip Generation Method Comparison

In order to determine the trip generation method that will be used, the person trip rates and the total person trips from each method were compared in Table 19 and Table 20 respectively.

Table 19: Trip Generation Methods Person Trip Rates Comparison

Land Uses	Land Use Code	Peak Hour	Person Trip Rates		
			ITE	First Principles	GFA Proxy Study
General Office Building	710	AM	1.48	2.15	0.79
		PM	1.47	2.15	0.85
Industrial-Manufacturing	140	AM	0.79	0.80	0.79
		PM	0.86	1.40	0.85

Table 20: Trip Generation Methods Total Person Trips Comparison

Trip Generation Methods	In	Out	Total	In	Out	Total
ITE	108	26	134	36	105	141
First Principles	120	40	160	70	150	220
Proxy Study	80	29	109	18	99	117

Based on these two comparison charts, the first principles method will be used. While the City of Ottawa's TIA guidelines indicate that this is not generally the preferred method, in this situation it provides the most accurate and conservative person trip estimates. This method also reflects the customer trips to the sales office and showroom which are not otherwise considered in the other two methods.

5.2 Trip Distribution

To understand the travel patterns of the subject development, the OD survey has been reviewed to determine the existing travel pattern that will be applied to the new vehicle trips. Table 21 below summarizes the distribution for South Nepean.

Table 21: OD Survey Existing Mode Share-South Nepean

To/From	% of Trips
North	80%
South	5%
East	10%
West	5%
Total	100%

5.3 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site using the first principles method have been assigned to the Study Area road network. The fourth site access is not considered as it will only be used by trucks.

It is anticipated that truck volumes will be spread out during the day with some occurring during the peak hours, and the majority occurring outside the peak periods. As this a unique land use there is no data to support this, however, based on the proposed operations, this is a reasonable assumption. While Borrisokane Road is not

identified as a truck route by the City of Ottawa, it is a Ministry of Ontario road and would not have been considered by the City when identifying the truck route network. Therefore, trucks will be directed to take truck routes outside of the Study Area and to travel on Borrisokane Road within the Study Area. Figure 7 illustrates the new site traffic assignment by percentage and Figure 8 illustrates the new site generated volumes.

Figure 7: New Site Generation Assignment (%)

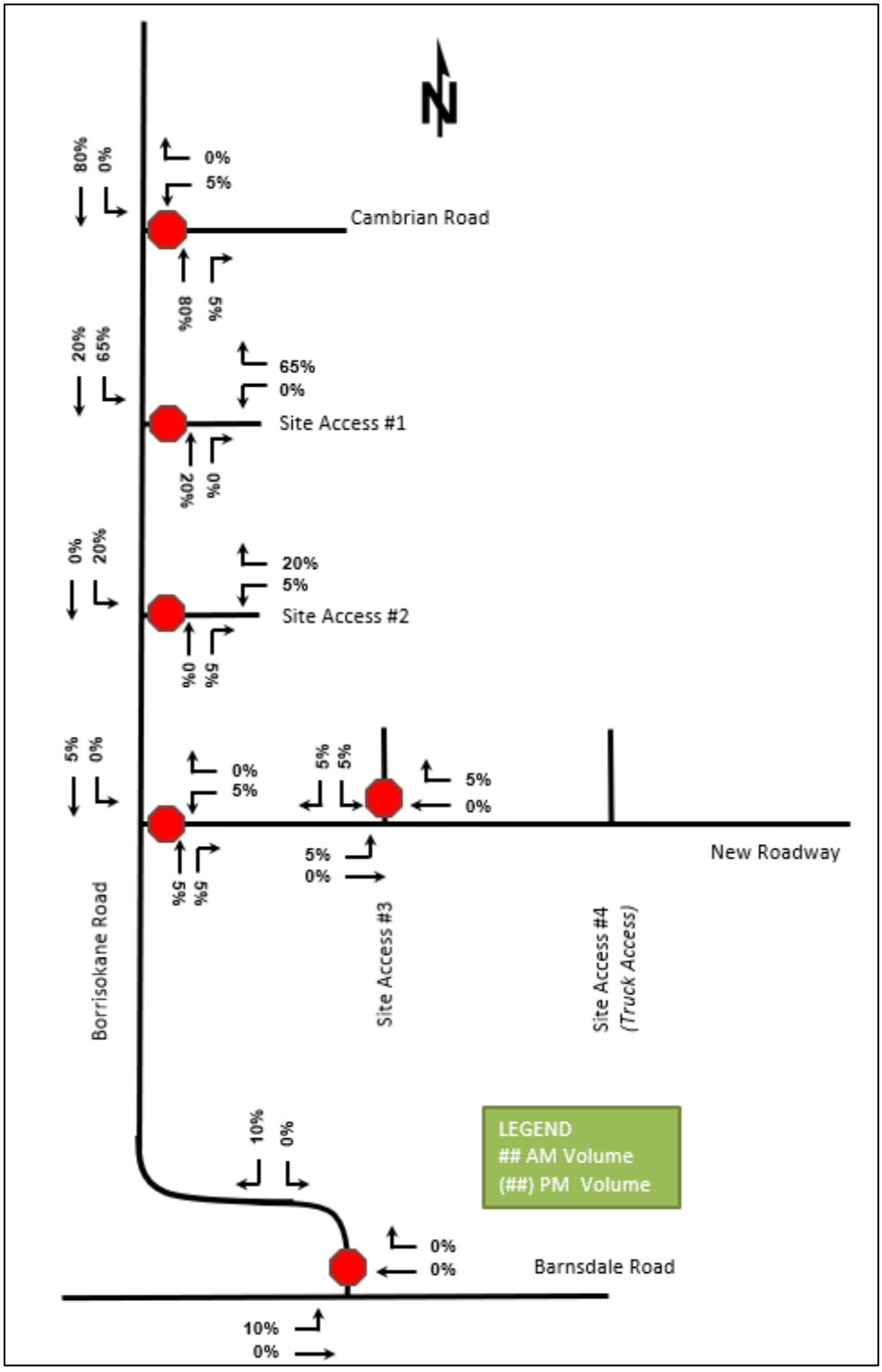
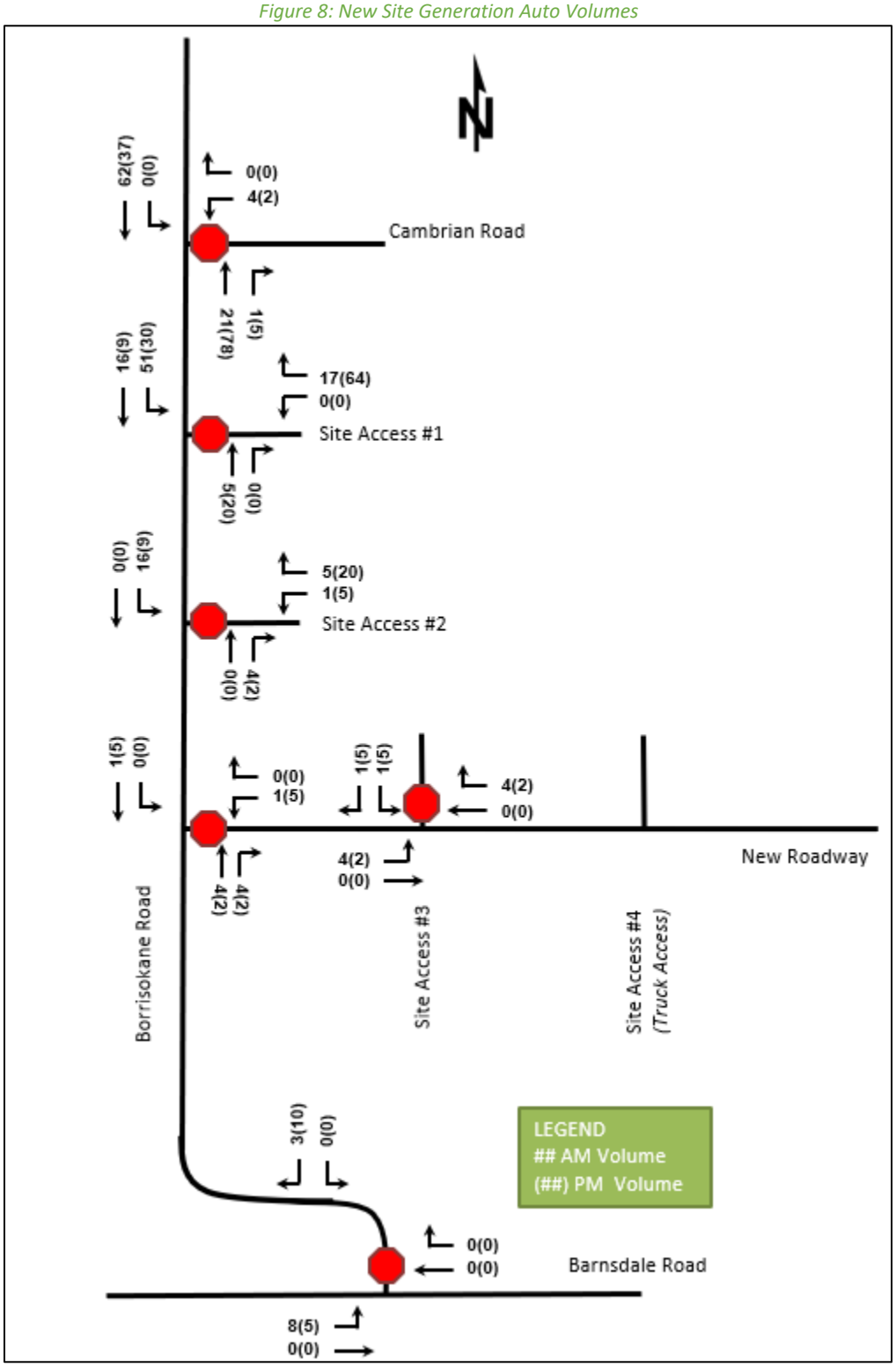


Figure 8: New Site Generation Auto Volumes



6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3.1. The additional connectivity provided by these plans has the potential to improve the active mode network but is not anticipated to significantly impact the modal shares used in the future trip generation.

6.2 Background Growth and Other Developments

Surrounding development Traffic Impact Assessments have used a 2% traffic growth within the Study Area of this report. As such, an annual background growth of 2% will be used in order to remain consistent with these studies.

The background developments explicitly considered in both the 2022 and 2027 background conditions include the Meadows Phase 5, 3387 Borrisokane Road, and 3285 Borrisokane Road developments. The Half Moon Bay West, the residential portion of 3713 Borrisokane Road and 3809 Borrisokane Road developments are only considered in the 2027 background conditions. All background developments are discussed in Section 2.3.2.

Figure 9 illustrates the 2022 background volumes and Figure 10 illustrates the 2027 background volumes.

Figure 9: Background 2022 Volumes

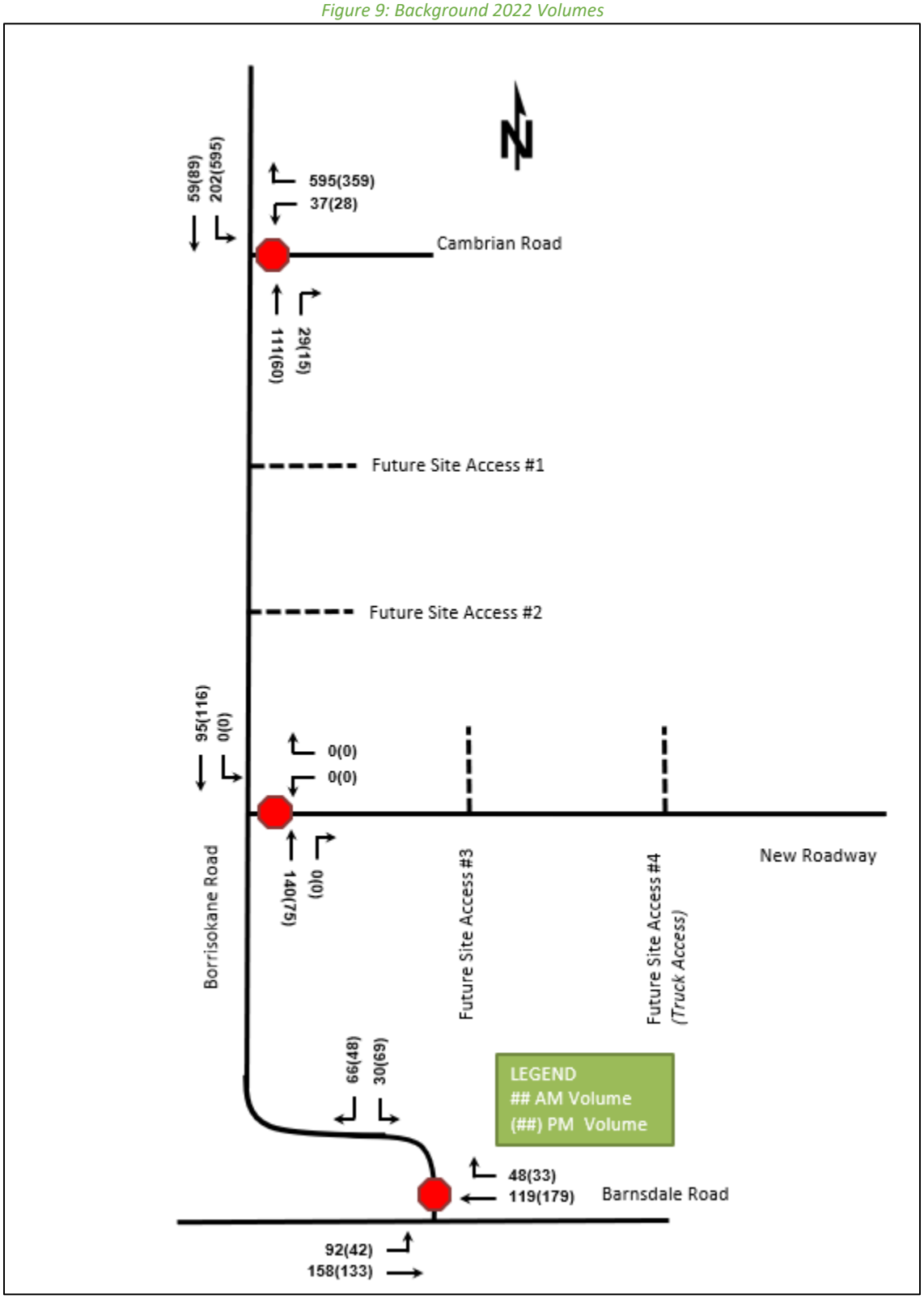
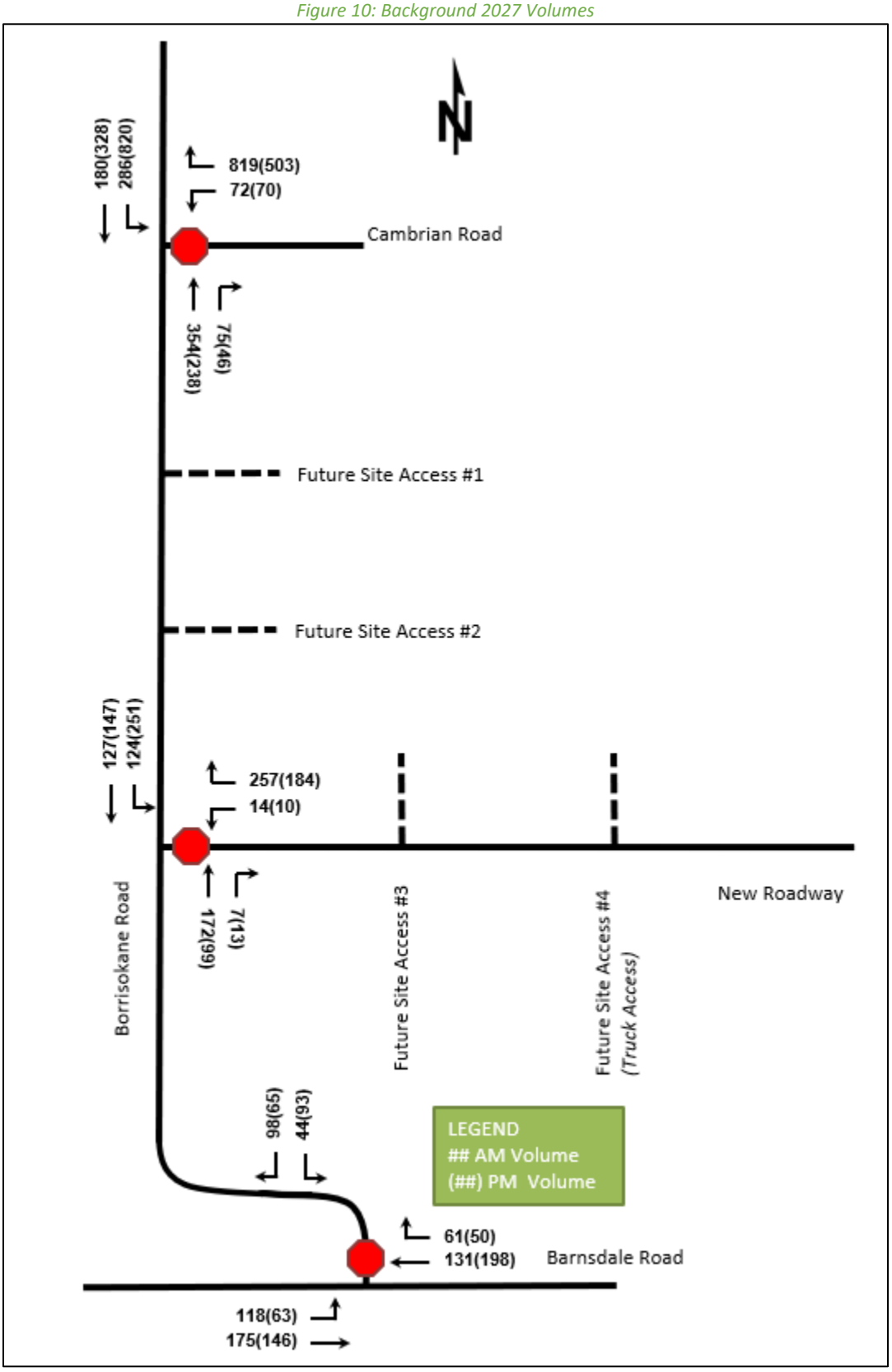


Figure 10: Background 2027 Volumes



7 Demand Rationalization

As documented in Section 16.2.1, the existing intersections within the Study Area are operating well and have additional capacity. The changes in volume between existing and future conditions will come from growth within the Study Area, the developments mentioned in Section 2.3.2, and the proposed development within this report. The trip generation of this development is the most conservative and accurate prediction, as can be seen in Section 5.1.4, and no adjustments are required.

Within this TIA, the New Roadway has been assigned volumes from surrounding residential developments (3809 Borrisokane Road) based on the assumption within that TIA that the new roadway will be used as the residential development's only access. It is likely that the new roadway will not connect Borrisokane Road to 3809 or at the very least, it will not be the only connection to this development. As such, the volumes at the intersection of the new roadway and Borrisokane Road may represent unrealistically high volumes in future scenarios.

The future total 2022 volumes are illustrated in Figure 11 and the future total 2027 volumes are illustrated in Figure 12.

Figure 11: Future Total 2022 Volumes

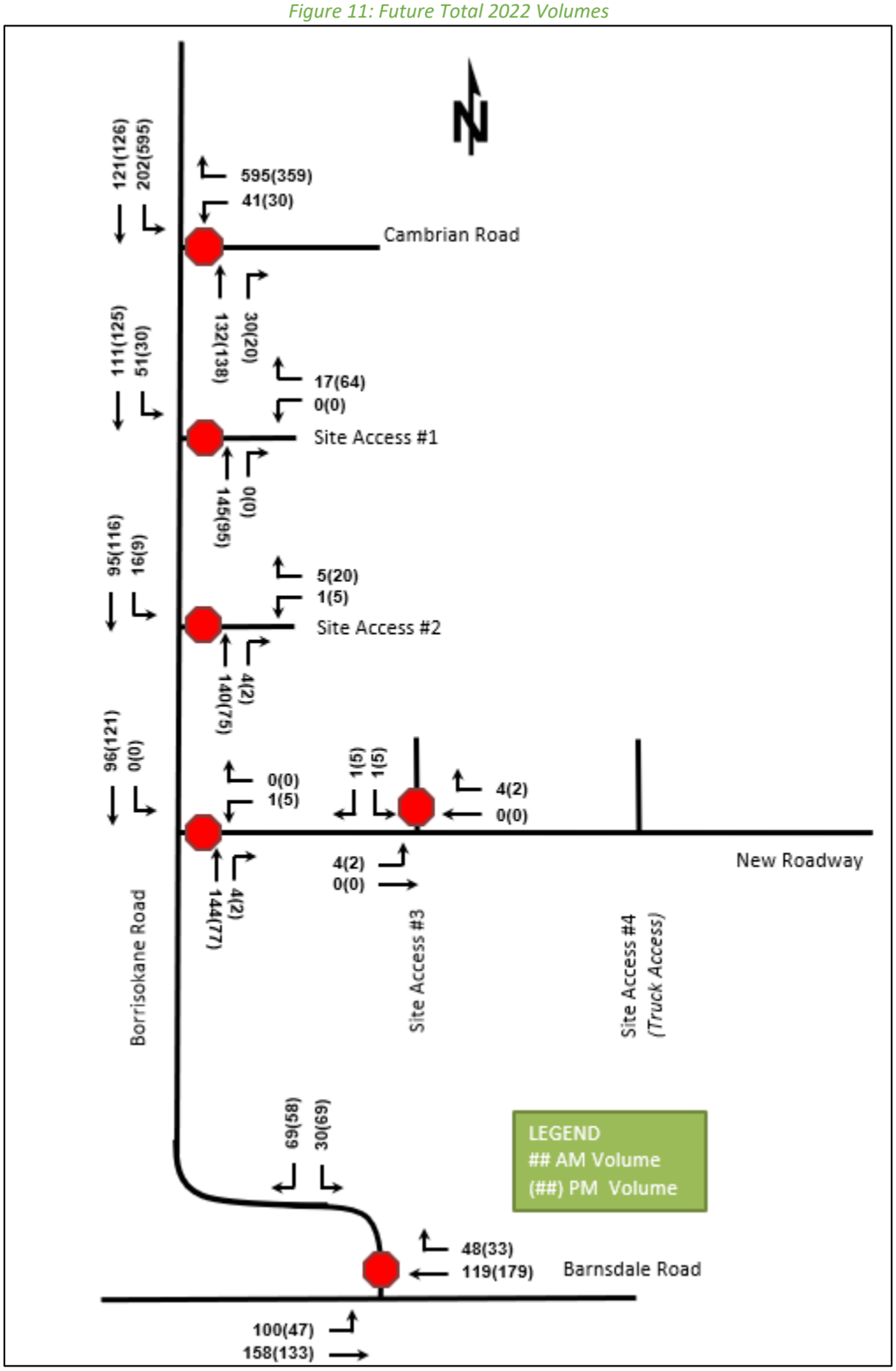
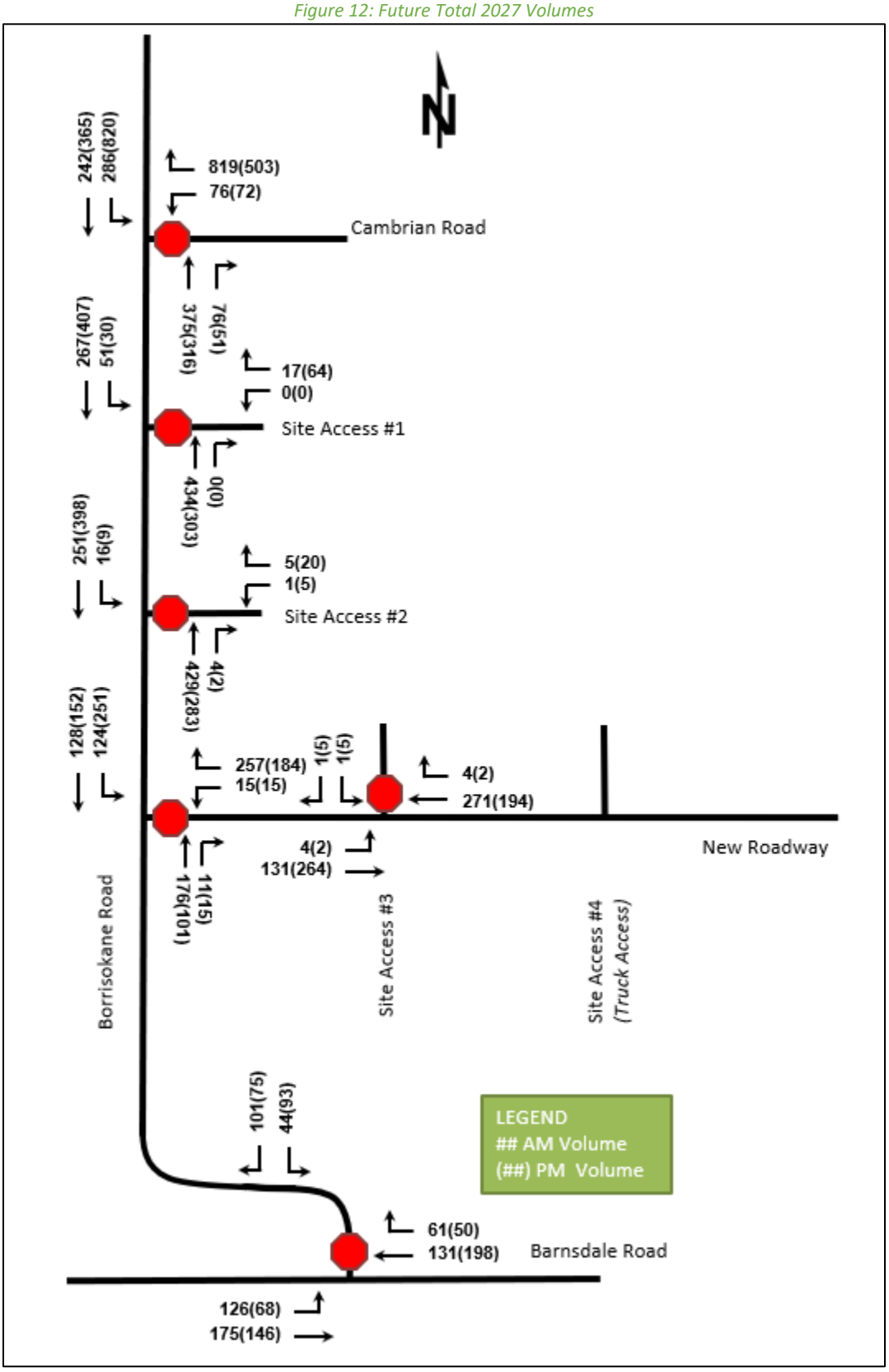


Figure 12: Future Total 2027 Volumes



8 Development Design

8.1 Design for Sustainable Modes

The proposed development is an industrial development with surface parking for both automobiles and bicycles.

Pedestrian facilities have been proposed within the development site plan and will connect pedestrians to internal surface parking as well as a proposed sidewalk along the future roadway to the south of the development. No cycling facilities or connections within the development have been proposed at this time due to the lack of cycling facilities in the surrounding area road network. However, future local cycling routes along Cambrian Road, Borrisokane Road, and Barnsdale Road, as shown in Figure 3, have been approved as part of the City of Ottawa's Ultimate Cycling Network. These local cycling routes will provide cycling access to the development.

It is recommended that transit service to the development be improved by means of developing a contract with OC Transpo to provide early transit services until regular services are warranted.

Additionally, development facilities supportive of sustainable modes in the City of Ottawa's TDM-supportive Development Design and Infrastructure Checklist which are required for zoning and standard site design are recommended. The following additional measures are also recommended:

- Locate building entrances in order to minimize walking distances to sidewalks and transit facilities
- Locate building doors and entrances to ensure visibility of pedestrians from the building
- Provide wayfinding signage for site access and egress
- Provide a permanent bike repair station
- Provide signed parking spaces for carpools in a priority location close to a major building entrance

TDM Checklists can be found in Appendix G.

8.2 Circulation and Access

Access #1, Access #2, and Access #3 will accommodate passenger vehicles accessing the surface automobile parking. Access #4 is considered the primary entrance/exit to the shipping and loading area and as such will be used exclusively by trucks. Trucks may also use Access #2, however this is considered a secondary access and will accommodate minimal truck volumes. Access #2 is also expected to be used by garbage trucks to access the development.

Turning templates for delivery trucks and garbage trucks can be found in Appendix H.

8.3 New Street Networks

This TIA is exempt from this Module (see Table 9).

9 Parking

9.1 Parking Supply

The parking requirements and provisions for the proposed development are summarized in Table 22.

Table 22: Parking Provisions

Land Use	Parking Rate	Parking Required	Parking Provided	Surplus/(Deficit)
Light Industrial (auto)	0.8 spaces/100m^2 GFA	75	185	26
Office (auto)	2.4 spaces/100m^2 GFA	84		
Light Industrial/Office (visitor)	N/A	0	7	7
Light Industrial (bicycle)	N/A	0	18	18
Office (bicycle)	N/A	0		

As shown above, vehicle parking requirements for light industrial and office land uses have been exceeded by a surplus of 26 spots.

Bicycle parking and auto visitor parking is not required in the proposed development area and as such the seven spots and 18 spots respectively have been provided to improve the functionality of the site.

9.2 Spillover Parking

This TIA is exempt from this Module (see Table 9).

10 Boundary Street Design

For the purposes of this TIA, Borrisokane Road will be considered a boundary street for the existing, future 2022 and future 2027 horizons. The future roadway to the south of the development will be considered a boundary road in the 2022 future horizon and the 2027 future horizon. Segment MMLOS is broken down into the Pedestrian Level of Service (PLOS), Bicycle Level of Service (BLOS), Transit Level of Service (TLOS) and Truck Level of Service (TkLOS)

Borrisokane Road is not currently a Complete Street and no plans currently exist to upgrade it to a Complete Street. The segment MMLOS for Borrisokane Road can be found in Table 23.

Table 23: Borrisokane Road Segment MMLOS

Road Segment	Horizon	MMLOS							
		PLOS		BLOS		TLOS		TkLOS	
		Actual	Target	Actual	Target	Actual	Target	Actual	Target
Borrisokane Road	Existing	F	None	F	None	-	-	C	E
	2022	F	None	F	None	-	-	C	E
	2027	F	None	F	None	-	-	C	E

The road segment of Borrisokane Road will meet the TkLOS target level in all horizons, however no targets exist for PLOS, BLOS or TLOS as the Study Area is considered a general rural area.

As the design of the future roadway is currently unclear, its MMLOS cannot be determined at this time however it is assumed that the design will incorporate and include transit and active mode supportive elements.

11 Access Intersections Design

11.1 Location and Design of Access

Four unsignalized site accesses are planned for the proposed development. Two full movement accesses to the development lands will be provided to the west of the proposed development onto Borrisokane Road approximately 630 metres (Site Access #1) and 735 metres (Site Access #2) south of Cambrian Road. The other two site accesses will be provided to the south of the proposed development onto a future roadway. These accesses will be located approximately 120 metres (Access #3) and 280 metres (Site Access #4) east of Borrisokane Road. Site Access #4 is designated for truck access only.

11.2 Intersection Control

Based on the projected volumes, the four site accesses will have stop-control on the minor approach for both future total horizons. No further traffic control is warranted to address operational issues.

11.3 Intersection Design

Left-turn lane warrants for unsignalized intersections were examined at all four access intersections for both 2022 and 2027 total future horizons. To determine if a left-turn lane is warranted, the MTO Geometric Design Standards for Ontario Highways, Section E, left-turn lane warrant nomographs were examined.

Southbound left-turn lanes were found to be warranted at Access #1 and Access #2 to support the full build-out of the development in the 2027 future horizon only. Left-turn lane warrants have been provided in Appendix I.

The southbound-left turn lane at Access #2 is barely triggered using a conservative design speed of 100 km/h and a conservatively rounded left-turn percentage of 10%. At a design speed of 90 km/h and a left-turn percentage of 5%, a southbound left-turn lane is not warranted at Access #2. Additionally, the southbound left-turn lane volumes at Access #2 are low with a maximum of 16 vehicles in the AM peak period. With the implementation of a southbound left-turn lane at the Access #1, the southbound left-turn volumes at Access #2 will decrease and be re-assigned to Access #1. For these reasons, a southbound left-turn lane at Access #2 will not be considered.

Preliminary storage and taper lengths for the proposed left-turn lane at Access #1 are summarized in Table 24.

Table 24: 2022 and 2027 Access #1 Left-turn Lane - Preliminary Design Criteria

Design Standard	Design Speed	Storage	Parallel Lane	Taper Ratio	Taper	Total Lane Length
TAC	100 km/h	15 m (min.)	115 m	30:1	105 m	235 m

Using Transportation Association of Canada's Geometric Design Guide for Canadian Roads (TAC) the storage, parallel lane, and taper lengths were determined for a 100 km/h design speed. For the purposes of determining the taper length it was assumed that this left-turn lane would be constructed as a left-turn on the left side of the centreline with a 3.5 metre turning lane width. The parallel lane length was calculated based on the following formula (TAC Formula 2.5.1):

$$d_b = 0.039\frac{V^2}{a}$$

Where:

$$d_b = Braking\ Distance\ (m)$$
$$V = Design\ Speed\ (^{km}/_{h})$$
$$a = Deceleration\ rate\ (^{m}/_{s^2}) = 3.4\ \ ^{m}/_{s^2}$$

The distance between Access #1 and the Stormwater Management Pond service access to the north of Access #1 is approximately 75 metres. This service access will therefore be located within the parallel lane portion of the southbound left-turn for Access #1 and as such, any southbound left-turning vehicles entering the service access will be able to move out of the through lane. Additionally, the service access is expected to have extremely low volumes.

Using Transportation Association of Canada's Geometric Design Guide for Canadian Roads (TAC) the runout lane is calculated to be 135 metres (30 metres + departure taper of 105 metres) with a design speed of 100 km/h. Using a design speed of 90 km/h, the runout lane is calculated to be 125 metres (30 metres + departure taper of 95 metres using a taper ratio of 27:1). The measured curb to curb distance between Access #1 and Access #2 is 96 metres. Using the calculated departure taper of 95 metres at a design speed of 90 km/h, the departure taper will fit between the two intersections, however the 30-metre departure parallel lane will not fit. The departure taper may be reduced in the functional design as it is based on an assumed lane width of 3.5 metres, however the lane width has the potential to be reduced. Additionally, an RMA will be required at this intersection at which time the design of both the auxiliary and runout lane will be refined.

As such, the southbound left-turn lane at Access #1 should be 235 metres long with a storage lane of 15 metres, a parallel lane of 115 metres and a taper of 105 metres.

12 Transportation Demand Management

Transportation Demand Management measures are implemented to encourage the use of non-auto modes of travel. This is aimed at reducing the reliance on single occupant auto trips in the City of Ottawa. The proposed development adheres to the City's TDM principles by facilitating connections to adjacent pedestrian facilities.

The following measures, consistent with the TDM Checklist included in Appendix G, could be implemented to ensure that the travel mode shares meet the TOD targets.

- Designate an internal TDM coordinator, or contract with an external TDM coordinator.
- Display local area maps with walking/cycling access routes and key destinations at major entrances.
- Display relevant transit schedules and route maps at major entrances.
- Provide online links to OC Transpo and STO information.
- Contract with OC Transpo to provide enhanced transit services.
- Provide discounts on parking costs for registered carpools.
- Charge for long-term parking.
- Provide a multimodal travel option information package to new/relocating employees.
- Encourage flexible work hours (office workers).
- Encourage telework (office workers).

13 Neighbourhood Traffic Management

13.1 Adjacent Neighbourhoods

This TIA is exempt from this Module (see Table 9).

14 Transit

In section 5.1.2 the trip generation by mode was estimated, including an estimate of the number of transit trips that will be generated by the proposed development. Table 25 summarizes the transit trip generation.

Table 25: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Transit	15%	18	6	24	10	22	32

The increase in travel demand is anticipated to be relatively minimal. Additionally, a contract with OC Transpo to provide enhanced transit service as discussed in Section 12, is expected to support the site's transit trip generation.

15 Review of Network Concept

The background and forecasted site trips do not exceed the anticipated lane capacities on the boundary road network. Beyond the TIA horizons, additional road and transit service via Re-Aligned Greenbank Road, will add additional capacity and promote higher transit use south of Jock River.

16 Intersection Design

16.1 Intersection Control

The intersection of the New Roadway and Borrisokane Road will be an unsignalized intersection with stop-control on the minor approach in all future horizons.

A signal warrant analysis was performed for the intersection of Cambrian Road and Borrisokane Road for the 2022 and 2027 horizons using the OTM Book 12 Justification 7 criteria. Using these criteria, it was found that a signal is warranted at this intersection during the 2027 background and total future horizons. Appendix J includes the signal warrant calculation sheets.

The intersection method of control for Barnsdale Road and Borrisokane Road will remain consistent with existing methods of control in both future horizons.

16.2 Intersection Design

To understand the intersection design, an MMLOS analysis of existing, 2022 future horizon, and 2027 future horizon demands is required. The existing and future segment MMLOS has been discussed in Section 10. The following sections will discuss the vehicle LOS at Study Area intersections which is based on the HCM criteria for average delay at unsignalized intersections. At signalized intersections, the level of service is based on the V/C ratio as required by the City of Ottawa. This will be followed by a discussion of the intersection MMLOS for other modes.

Additionally, left-turn lane warrants for unsignalized intersections were examined at both Cambrian Road and Borrisokane Road, and the New Roadway and Borrisokane Road at both 2022 and 2027 future background and

total future horizons To determine if a left-turn lane is warranted, the MTO Geometric Design Standards for Ontario Highways, Section E, left-turn lane warrant nomographs were examined.

Southbound left-turn lanes were found to be warranted at the intersection of Cambrian Road and Borrisokane Road for all future horizons. Southbound left-turn lanes were warranted at the intersection of the New Roadway and Borrisokane Road for the 2027 future background and total future horizons only. Left-turn lane warrants have been provided in Appendix H.

The southbound left-turn lane at the intersection of Cambrian Road and Borrisokane Road is warranted as a result of the significant volumes generated by future surrounding developments. As such, the left-turn lane has been developed for operational analysis purposes only as the intersection is required to be designed by others.

As mentioned in Section 7, the New Roadway has been assigned volumes from surrounding residential developments (3809 Borrisokane Road) based on the assumption within that TIA that the new roadway will be used as the residential development's only access. It is likely that the new roadway will not connect Borrisokane Road to 3809 or at the very least, it will not be the only connection to this development. As such, the volumes at the intersection of the new roadway and Borrisokane Road may represent unrealistically high volumes in future scenarios. As a result of this, a southbound left-turn lane at the intersection of the New Roadway and Borrisokane Road will not be considered.

16.2.1 Existing Conditions

The existing intersection volumes have been analyzed to establish a baseline condition and determine the impact of the subject development on the Study Area road network. Table 26 summarizes the operational analysis of the 2019 existing conditions. Appendix K contains the 2019 Existing Conditions Synchro sheets.

Table 26: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95th)	LOS	Delay	V/C	Q (95th)
Cambrian Road & Borrisokane Road *Unsignalized*	WBL/R	B	15	0.60	31	B	14	0.42	16
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	8	0.10	2	A	8	0.32	11
Barnsdale Road & Borrisokane Road *Unsignalized*	EBL/T	A	8	0.07	2	A	8	0.03	1
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	11	0.11	3	B	12	0.17	6
Notes:	Saturation flow rate of 1800 veh/h/lane								
	PHF = 0.90								

Both existing intersections within the Study Area operate satisfactorily during the peak hours. No mitigation measures are required or recommended.

16.2.2 2022 Future Background

The 2022 future background intersection volumes and other development traffic has been analyzed to allow a comparison between the future volumes with and without the proposed development. Table 27 summarizes the operational analysis of 2022 future background conditions. Appendix L contains the 2022 Future Background Synchro sheets.

Table 27: 2022 Future Background Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95th)	LOS	Delay	V/C	Q (95th)
Cambrian Road & Borrisokane Road *Unsignalized*	WBL/R	C	20	0.74	51	C	21	0.64	34
	NBT/R	-	-	-	-	-	-	-	-
	SBL	A	8	0.14	4	A	9	0.39	14
	SBT	-	-	-	-	-	-	-	-
Barnsdale Road & Borrisokane Road *Unsignalized*	EBL/T	A	8	0.07	2	A	8	0.03	1
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	11	0.13	4	B	12	0.18	5
New Roadway & Borrisokane Road *Unsignalized*	WBL/R	A	0	-	-	A	0	-	-
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	0	-	0	A	0	-	0
Notes:	Saturation flow rate of 1800 veh/h/lane								
	PHF = 1.00								

With the addition of background growth to reflect the 2022 horizon as well as traffic generated from surrounding developments, the existing intersections are anticipated to operate with similar operational characteristics to the existing conditions, and well within the City of Ottawa operational thresholds.

16.2.3 2027 Future Background

The 2027 future background intersection volumes and other development traffic has been analyzed to allow a comparison between the future volumes with and without the proposed development. As a result of the significant volumes expected to be generated by surrounding developments, signalization of the intersection of Cambrian Road and Borrisokane Road is warranted and has been optimized accordingly. In both the AM and PM peak periods, a westbound left-turn lane and a northbound right-turn lane was required at the intersection of Cambrian Road and Borrisokane Road to eliminate potential volume-to-capacity issues. In the PM peak period, the southbound left-turn movement will operate as a protected + permissive turn. Table 28 summarizes the operational analysis of the 2027 future background conditions. Appendix M contains the 2027 Future Background Synchro sheets.

Table 28: 2027 Future Background Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95th)	LOS	Delay	V/C	Q (95th)
Cambrian Road & Borrisokane Road *Signalized*	WBL	A	15	0.10	145	A	36	0.29	22
	WBR	E	39	0.97	#170	C	13	0.78	28
	NBT	A	21	0.46	67	A	32	0.48	64
	NBR	A	5	0.11	8	A	9	0.10	9
	SBL	D	44	0.82	#89	D	25	0.90	#189
	SBT	A	17	0.24	33	A	6	0.26	38
	Overall	**C**	**32**	**-**	**-**	**B**	**20**	**-**	**-**
Barnsdale Road & Borrisokane Road *Unsignalized*	EBL/T	A	8	0.09	2	A	8	0.05	7
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	12	0.21	6	B	13	0.26	5
New Roadway & Borrisokane Road *Unsignalized*	WBL/R	B	12	0.33	11	B	10	0.23	1
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	8	0.09	2	A	8	0.17	8
Notes:	Saturation flow rate of 1800 veh/h/lane								
	PHF = 1.00								
	# indicates the volume for the 95th percentile cycle exceeds capacity								

The 2027 future background conditions are forecasted to operate acceptably during the peak hours with no volume-to capacity issues noted at any intersections. The volume for the 95th percentile cycle exceeds capacity for the westbound right turn and the southbound left turn movements in the AM peak and the southbound left-turn movements in the PM peak. The V/C ratio for these movements is less than one and can therefore be assumed that in practice the 95th percentile queues will rarely be exceeded

16.2.4 2022 Total Future

The 2022 total future intersection volumes, including the site generated traffic and other development traffic, has been analyzed to understand the impact of the subject development on the Study Area intersections. Table 29 summarizes the operational analysis of the 2022 total future conditions. Appendix N contains the 2022 Future Total Synchro Sheets.

Table 29: 2022 Total Future Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95th)	LOS	Delay	V/C	Q (95th)
Cambrian Road & Borrisokane Road *Unsignalized*	WBL/R	C	23	0.78	59	D	32	0.77	51
	NBT/R	-	-	-	-	-	-	-	-
	SBL	A	8	0.14	4	A	9	0.42	16
	SBT	-	-	-	-	-	-	-	-
Barnsdale Road & Borrisokane Road *Unsignalized*	EBL/T	A	8	0.07	2	A	8	0.04	1
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	11	0.14	4	B	12	0.19	5
New Roadway & Borrisokane Road *Unsignalized*	WBL/R	A	10	0.00	0	A	10	0.01	<1
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	0	-	0	A	0	-	0
Access#1 & Borrisokane Road *Unsignalized*	WBL/R	A	9	0.02	<1	A	9	0.07	2
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	8	0.04	1	A	8	0.02	1
Access#2 & Borrisokane Road *Unsignalized*	WBL/R	A	9	0.01	<1	A	9	0.03	1
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	8	0.01	<1	A	7	0.01	<1
Access#3 & Barnsdale Road *Unsignalized*	EBL/T	A	7	0.00	<1	A	7	0.00	0
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	A	9	0.00	0	A	9	0.01	<1
Notes:	Saturation flow rate of 1800 veh/h/lane								
	PHF = 1.00								

With the addition of the site generated traffic, the Study Area are expected to operate with similar operational characteristics as the 2022 future background conditions, and well within the City of Ottawa operational thresholds.

16.2.5 2027 Total Future

The 2027 total future intersection volumes, including the site generated traffic and other development traffic, has been analyzed to understand the impact of the subject development on the Study Area intersections. As a result of the significant volumes expected to be generated by surrounding developments, signalization of the intersection of Cambrian Road and Borrisokane Road is warranted and has been optimized accordingly. In both the AM and PM peak periods, a westbound left-turn lane and a northbound right-turn lane was required at the intersection of Cambrian Road and Borrisokane Road to eliminate potential volume-to-capacity issues. In the PM peak period, the southbound left-turn movement will operate as a protected + permissive turn. Table 30 summarizes the operational analysis of the 2027 future total conditions. Appendix O contains the 2027 Future Total Synchro Sheets.

Table 30: 2027 Total Future Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95th)	LOS	Delay	V/C	Q (95th)
Cambrian Road & Borrisokane Road *Signalized*	WBL	A	16	0.11	16	A	44	0.37	25
	WBR	E	43	0.98	#175	D	15	0.81	31
	NBT	A	21	0.49	70	C	45	0.72	#106
	NBR	A	4	0.11	7	A	10	0.12	10
	SBL	C	48	0.85	#91	E	32	0.92	#229
	SBT	A	18	0.31	43	A	5	0.28	42
	Overall	**C**	**33**	**-**	**-**	**C**	**25**	**-**	**-**
Barnsdale Road & Borrisokane Road *Unsignalized*	EBL/T	A	8	0.09	2	A	8	0.05	1
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	12	0.21	6	B	13	0.28	9
New Roadway & Borrisokane Road *Unsignalized*	WBL/R	B	12	0.33	11	B	11	0.24	7
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	8	0.09	2	A	8	0.17	5
Access#1 & Borrisokane Road *Unsignalized*	WBL/R	B	11	0.03	1	B	10	0.09	2
	NBT/R	-	-	-	-	-	-	-	-
	SBL	A	8	0.05	1	A	8	0.02	1
	SBT	-	-	-	-	-	-	-	-
Access#2 & Borrisokane Road *Unsignalized*	WBL/R	B	11	0.01	<1	B	11	0.04	1
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	8	0.01	<1	A	8	0.01	<1
Access#3 & Barnsdale Road *Unsignalized*	EBL/T	A	8	0.01	<1	A	8	0.00	0
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	11	0.01	<1	B	10	0.02	<1
Notes:	Saturation flow rate of 1800 veh/h/lane								
	PHF = 1.00								
	# indicates the volume for the 95th percentile cycle exceeds capacity								

With the addition of site generated traffic, the Study Area intersections are anticipated to operate with similar operational characteristics as the 2027 future background conditions, and well within the City of Ottawa operational thresholds. The volume for the 95th percentile cycle exceeds capacity for the westbound right and southbound left movements in the AM peak and the northbound through and southbound left-turn movements in the PM peak. The V/C ratio for these movements is less than one and can therefore be assumed that in practice the 95th percentile queues will rarely be exceeded

16.2.6 Intersection MMLOS

As intersection MMLOS is only undertaken at signalized intersections, only the intersection of Cambrian Road and Borrisokane Road in the 2027 future horizons can be analyzed. As the design of this intersection is currently unclear, its MMLOS cannot be determined at this time, however it is assumed that the design will include transit and active mode supportive elements in order to achieve its MMLOS targets.

17 Conclusions

This Transportation Impact Assessment has documented the existing and future transportation conditions, for all travel modes, in the Study Area. The following conclusions can be offered based on the foregoing:

A. The proposed development, located on the western portion of 3713 Borrisokane Road, is an industrial development which will consist of approximately 3,465 square metres of general office space and 9,340 square metres of industrial buildings, approximately 185 regular parking spaces, seven visitor parking spaces and eighteen bicycle parking spots.
B. The proposed development will have four unsignalized accesses. Two accesses will be provided to the west of the proposed development onto Borrisokane Road approximately 630 metres (Site Access #1) and 735 metres (Site Access #2) south of Cambrian Road. The other two site accesses will be provided to the south of the proposed development onto a future roadway and will be located approximately 120 metres (Access #3) and 280 metres (Site Access #4) east of Borrisokane Road. Site Access #4 is designated for truck access only.
C. The existing Study Area is not currently served by any bus routes, however Route #75 and Route #275 serve the are east of the subject development.
D. The previous five years of collision history at the existing Study Area intersections has been reviewed. No patterns emerged that indicated that mitigation measures or further monitoring was required.
E. Three trip generation methods were considered as a result of the expected unique trip generation of the proposed development:
    a. Method 1: ITE
    b. Method 2: First Principles
    c. Method 3: Proxy Study GFA Rates
F. The first principles approach was selected to determine the total person trip generation and the South Nepean mode shares were used to determine the trip generation by mode. An estimated 104 AM and 144 PM new peak hour two-way vehicle trips are projected.
G. Approximately 185 regular parking spaces, seven visitor parking spaces and eighteen bicycle parking spots will be provided. No parking requirements exist for visitor or bicycle parking spaces, however the minimum parking requirements for regular vehicle parking spaces are exceeded.
H. Turning templates indicate the proposed accesses and circulation route within the development can accommodate the expected delivery trucks and garbage trucks.
I. It was found that the road segment of Borrisokane Road will meet the TkLOS target level in all horizons, however no targets exist for PLOS, BLOS or TLOS as the Study Area is considered a general rural area.
J. Left-turn lane warrants have been examined at the intersections of Cambrian Road and Borrisokane Road, and Borrisokane Road and the new roadway for the 2022 and 2027 future background and total future horizons.
    a. A southbound left-turn lane is warranted at the intersection of Cambrian Road and Borrisokane Road for all future horizons. Design details will be provided by others outside of this TIA.
    b. A southbound left-turn lane is warranted at the intersection of the new roadway for the 2027 future background and 2027 total future horizons. However, as explained in Section 16.2 the southbound left-turn lane is not recommended.
K. Left-turn lane warrants have been examined at the access intersection of Access #1 and Borrisokane Road, and Access #2 and Borrisokane Road for the 2022 and 2027 total future horizons.

   a. A southbound left-turn lane is warranted at Access #1 for the 2027 total future horizon. A 15-metre storage lane with a 95-metre parallel lane and a 105-metre taper should be provided.
   b. A southbound left-turn lane is warranted at Access #2 for the 2027 total future horizon. However, as explained in Section 11.3 the southbound left-turn lane is not recommended.

L. An RMA is required for the proposed southbound left turn lane at Access #1. This will be prepared upon approval of the findings of this TIA and will be submitted separately.
M. Signal warrants have been examined at the intersection of Cambrian Road and Borrisokane Road.
   a. Signalization is warranted for all future horizons at this intersection.
N. The Study Area intersections operate satisfactorily during the peak hours in the existing conditions operational analysis.
O. The Study Area intersections operate satisfactorily during the peak hours in the 2022 future background operational analysis.
P. The Study Area intersections operate satisfactorily during the peak hours in the 2022 future total operational analysis with similar operational characteristics as the 2022 future background conditions.
Q. The Study Area intersections operate satisfactorily during the peak hours in the 2027 future background operational analysis.
R. The Study Area intersections operate satisfactorily during the peak hours in the 2027 future total operational analysis with similar operational characteristics as the 2027 future background conditions.
S. As the design of the future signalized intersection of Borrisokane and Cambrian Road is currently unclear, its MMLOS cannot be determined at this time, however it is assumed that the design will include transit and active mode supportive elements in order to achieve its MMLOS targets.

The proposed development will function within the Study Area Road Network. It is recommended that, from a transportation perspective, the proposed development application process proceed.

Prepared By:

Reviewed By:

Robin Marinac, E.I.T.
437-242-5183
Robin.marinac@CGHTransportation.com

Mark Crockford, P. Eng.
905-251-4070
Mark.Crockford@CGHTransportation.com

Appendix A

TIA Screening Form and PM Certification Form

13 Markham Avenue
Ottawa ON K2G 3Z1

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: 04-Dec-19
Project Number: 2019-52
Project Reference: Caivan ABIC Manufacturing Facility

1.1 Description of Proposed Development	
Municipal Address	3713 Borrisokane Road
Description of Location	CON 3RF PT LOT 9 RP 5R-6254; PART 2 LESS RP 5R-13374 PTS;9 & 10 RD WIDENING
Land Use Classification	ME2-Mineral Extraction Operation-Pit Only and Urban Expansion Area (Residential Use)
Development Size	Approximately 9,340 sq. metres industrial, 3,465 sq. metres general office space & approximately 185 regular parking spaces, 7 visitor spaces & 18 bicycle parking spots
Accesses	Four total. Two accesses onto Borrisokane Road approx 625 metres & 730 metres south of Cambrian Road. Two access onto the future roadway approx 120 metres & 280 metres east of Borrisokane
Phase of Development	Single Phase
Buildout Year	2022
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Industrial	
Development Size	12805	G.F.A.
Trip Generation Trigger	Yes	

1.3 Location Triggers	
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?	No
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	No
Location Trigger	No

1.4. Safety Triggers	
Are posted speed limits on a boundary street 80 km/hr or greater?	Yes
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No
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)?	No
Is the proposed driveway within auxiliary lanes of an intersection?	No
Does the proposed driveway make use of an existing median break that serves an existing site?	No
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	No
Does the development include a drive-thru facility?	No
Safety Trigger	Yes

TIA Plan Reports

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

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

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

CERTIFICATION

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

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

City Of Ottawa
Infrastructure Services and Community Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
Ottawa, ON K1P 1J1
Tel. : 613-580-2424
Fax: 613-560-6006

Ville d'Ottawa
Services d 'infrastructure et Viabilité des collectivités
Urbanisme et Gestion de la croissance
110, avenue Laurier Ouest
Ottawa (Ontario) K1P 1J1
Tél. : 613-580-2424
Télécopieur: 613-560-6006

Dated at ___Newmarket_____ this __16__ day of _____October_____, 2019.
(City)

Name: _____Mark Crockford_____
(Please Print)

Professional Title: _____Professional Engineer_____

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

Office Contact Information (Please Print)
Address: 628 Haines Road
City / Postal Code: Newmarket / L3Y 6V5
Telephone / Extension: (905) 251-4070
E-Mail Address: Mark.Crockford@CGHTransportation.com

Appendix B

Turning Movement Counts

Survey Date: Tuesday February 15 2018
Weather: Cloudy

TURNING MOVEMENT COUNT SUMMARY - ALL MODES

AM Peak Hour: 7:30 AM to 8:30 AM
MD Peak Hour: 11:30 AM to 12:30 PM
PM Peak Hour: 4:45 PM to 5:45 PM

AADT FACTOR: 1.0

Turning Movement Count - Full Study Summary Report (Vehicles)

Time Period		Borrisokane Road Northbound					Borrisokane Road Southbound					N/S STREET TOTAL	0 Eastbound					Cambrian Road Westbound					E/W STREET TOTAL	Grand TOTAL
		LT	ST	RT	U-Turns	NB TOTAL	LT	ST	RT	U-Turns	SB TOTAL		LT	ST	RT	U-Turns	EB TOTAL	LT	ST	RT	U-Turns	WB TOTAL		
7:00	8:00	0	28	10	0	**38**	72	15	0	0	**87**	**125**	0	0	0	0	**0**	8	0	350	0	**358**	**358**	**483**
8:00	9:00	0	48	13	0	**61**	123	22	0	0	**145**	**206**	0	0	0	0	**0**	5	0	346	0	**351**	**351**	**557**
9:00	10:00	0	24	1	0	**25**	60	22	0	0	**82**	**107**	0	0	0	0	**0**	1	0	209	0	**210**	**210**	**317**
AVG AM Pk HR		0	33	8	0	**41**	85	20	0	0	**105**	**146**	0	0	0	0	**0**	5	0	302	0	**306**	**306**	**452**
11:30	12:30	0	54	9	0	**63**	105	26	0	0	**131**	**194**	0	0	0	0	**0**	4	0	139	0	**143**	**143**	**337**
12:30	13:30	0	48	6	0	**54**	87	23	0	0	**110**	**164**	0	0	0	0	**0**	2	0	117	0	**119**	**119**	**283**
AVG MD Pk HR		0	51	8	0	**59**	96	25	0	0	**121**	**179**	0	0	0	0	**0**	3	0	128	0	**131**	**131**	**310**
15:00	16:00	0	40	1	0	**41**	58	51	0	0	**109**	**150**	0	0	0	0	**0**	13	0	159	0	**172**	**172**	**322**
16:00	17:00	0	25	0	0	**25**	344	43	0	0	**387**	**412**	0	0	0	0	**0**	11	0	162	0	**173**	**173**	**585**
17:00	18:00	0	22	0	0	**22**	352	36	0	0	**388**	**410**	0	0	0	0	**0**	14	0	198	0	**212**	**212**	**622**
AVG PM Pk HR		0	29	0	0	**29**	251	43	0	0	**295**	**324**	0	0	0	0	**0**	13	0	173	0	**186**	**186**	**510**
TOTAL		0	373	56	0	**429**	1,382	282	0	0	**1,664**	**2,093**	0	0	0	0	**0**	66	0	2,110	0	**2,175**	**2,175**	**4,268**
EQ 12Hr		0	519	77	0	596	1921	392	0	0	2313	2909	0	0	0	0	0	91	0	2932	0	3024	3024	5933
Note: These volumes are calculated by multiplying the totals by the appropriate expansion factor.											1.39													
AVG 12Hr		0	519	77	0	596	1921	392	0	0	2313	2909	0	0	0	0	0	91	0	2932	0	3024	3024	5933
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.											1.0													
AVG 24Hr		0	680	101	0	781	2516	514	0	0	3030	3811	0	0	0	0	0	120	0	3841	0	3961	3961	7772
Note: These volumes are calculated by multiplying the Average Daily 12hr. totals by the 12 to 24 expansion factor.													1.31											

Turning Movement Count - Full Study Summary Report (Pedestrians)

Time Period		Borrisokane Road NB Approach (East or West Crossing)	Borrisokane Road SB Approach (East or West Crossing)	N/S STREET TOTAL	0 EB Approach (North or South Crossing)	Cambrian Road WB Approach (North or South Crossing)	E/W STREET TOTAL	Grand TOTAL
7:00	8:00	0	0	**0**	0	0	**0**	**0**
8:00	9:00	0	0	**0**	0	0	**0**	**0**
9:00	10:00	0	0	**0**	0	1	**1**	**1**
11:30	12:30	0	0	**0**	0	0	**0**	**0**
12:30	13:30	0	0	**0**	0	0	**0**	**0**
15:00	16:00	0	0	**0**	0	0	**0**	**0**
16:00	17:00	0	228	**228**	0	0	**0**	**228**
17:00	18:00	0	0	**0**	0	0	**0**	**0**
TOTAL:		0	228	**228**	0	1	**1**	**229**

Turning Movement Count - Full Study Summary Report (Cyclists)

Time Period		Borrisokane Road Northbound	Borrisokane Road Southbound	N/S STREET TOTAL	0 Eastbound	Cambrian Road Westbound	E/W STREET TOTAL	Grand TOTAL
7:00	8:00	0	0	**0**	0	0	**0**	**0**
8:00	9:00	0	0	**0**	0	0	**0**	**0**
9:00	10:00	0	0	**0**	0	0	**0**	**0**
11:30	12:30	0	0	**0**	0	0	**0**	**0**
12:30	13:30	0	0	**0**	0	0	**0**	**0**
15:00	16:00	0	0	**0**	0	0	**0**	**0**
16:00	17:00	0	0	**0**	0	0	**0**	**0**
17:00	18:00	0	0	**0**	0	0	**0**	**0**
TOTAL:		0	0	**0**	0	0	**0**	**0**

Turning Movement Count - Full Study Summary Report (Heavy Vehicles)

Time Period		Borrisokane Road Northbound					Borrisokane Road Southbound					N/S STREET TOTAL	0 Eastbound					Cambrian Road Westbound					E/W STREET TOTAL	Grand TOTAL
		LT	ST	RT	U-Turns	NB TOTAL	LT	ST	RT	U-Turns	SB TOTAL		LT	ST	RT	U-Turns	EB TOTAL	LT	ST	RT	U-Turns	WB TOTAL		
7:00	8:00	0	9	0	0	**9**	16	8	0	0	**24**	**33**	0	0	0	0	**0**	0	0	5	0	**5**	**5**	**38**
8:00	9:00	0	10	2	0	**12**	4	10	0	0	**14**	**26**	0	0	0	0	**0**	2	0	16	0	**18**	**18**	**44**
9:00	10:00	0	12	0	0	**12**	7	13	0	0	**20**	**32**	0	0	0	0	**0**	0	0	10	0	**10**	**10**	**42**
11:30	12:30	0	11	1	0	**12**	2	11	0	0	**13**	**25**	0	0	0	0	**0**	1	0	5	0	**6**	**6**	**31**
12:30	13:30	0	10	3	0	**13**	2	11	0	0	**13**	**26**	0	0	0	0	**0**	0	0	5	0	**5**	**5**	**31**
15:00	16:00	0	2	0	0	**2**	10	2	0	0	**12**	**14**	0	0	0	0	**0**	1	0	11	0	**12**	**12**	**26**
16:00	17:00	0	1	5	0	**6**	6	2	0	0	**8**	**14**	0	0	0	0	**0**	4	0	17	0	**21**	**21**	**35**
17:00	18:00	0	2	1	0	**3**	1	1	0	0	**2**	**5**	0	0	0	0	**0**	2	0	5	0	**7**	**7**	**12**
TOTAL:		0	57	12	0	**69**	48	58	0	0	**106**	**175**	0	0	0	0	**0**	10	0	74	0	**84**	**84**	**259**

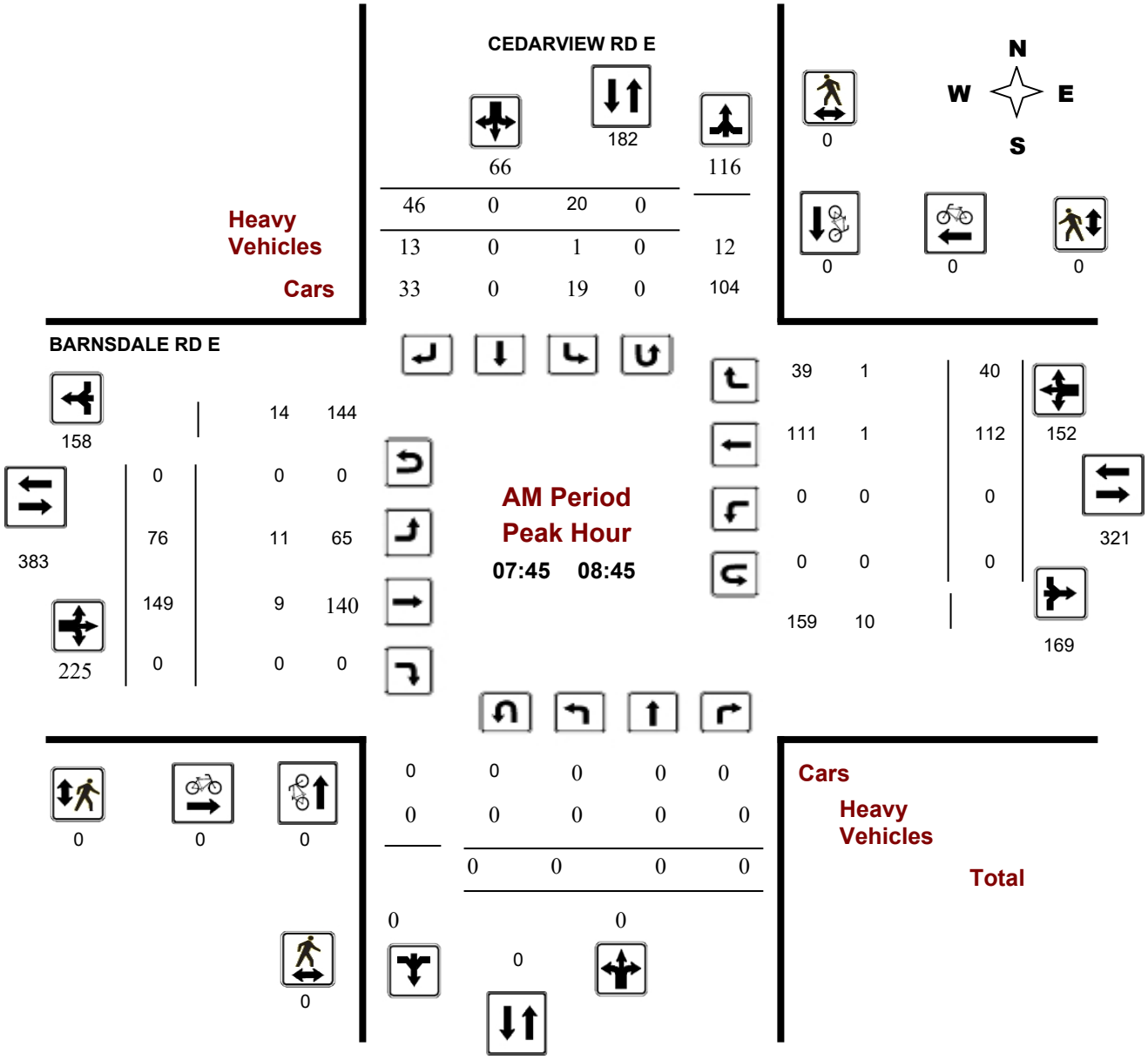
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BARNSDALE RD E @ CEDARVIEW RD E

Survey Date: Thursday, January 10, 2019 **WO No:** 38246

Start Time: 07:00 **Device:** Miovision



Comments

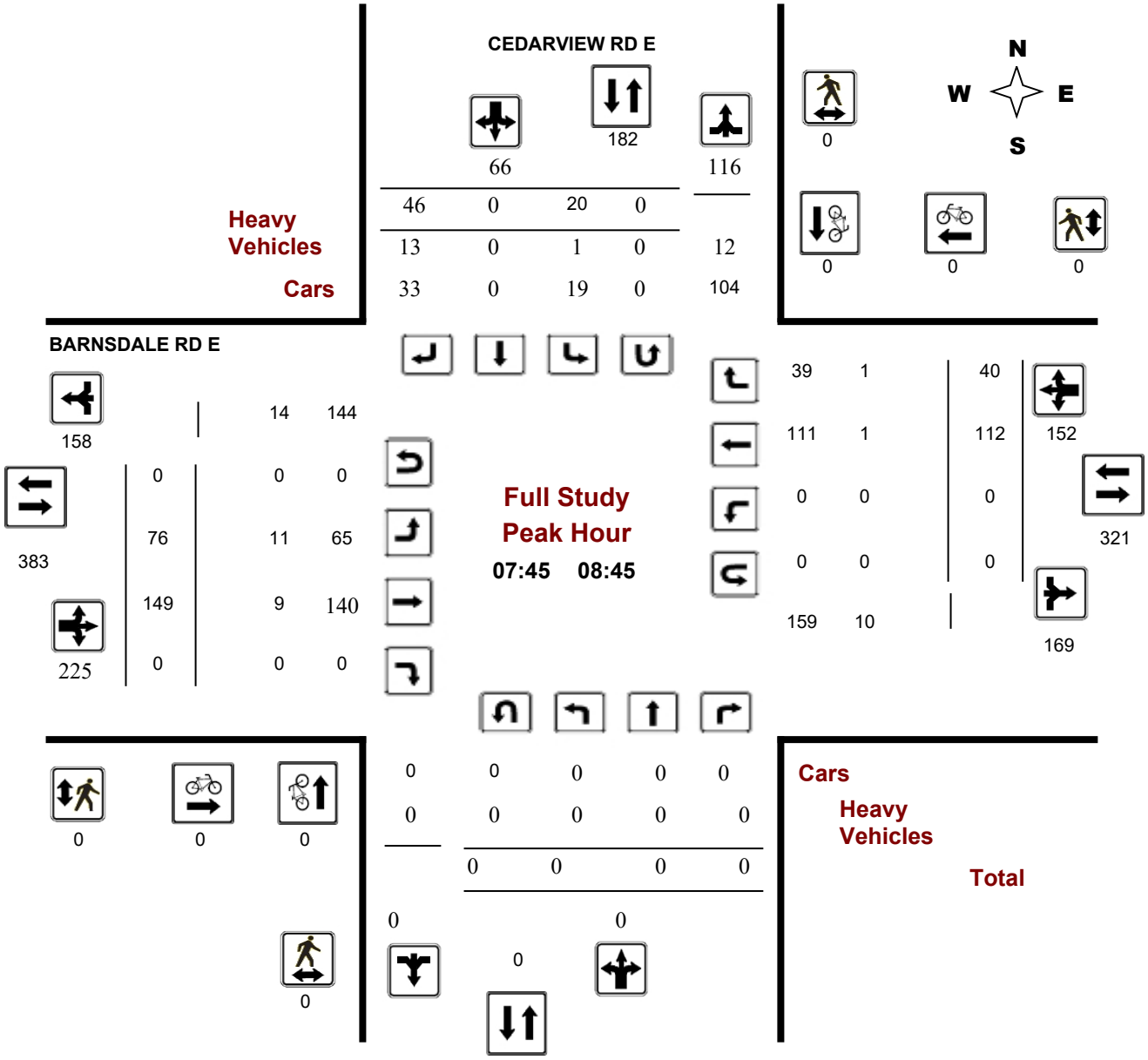
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BARNSDALE RD E @ CEDARVIEW RD E

Survey Date: Thursday, January 10, 2019 **WO No:** 38246

Start Time: 07:00 **Device:** Miovision



Comments

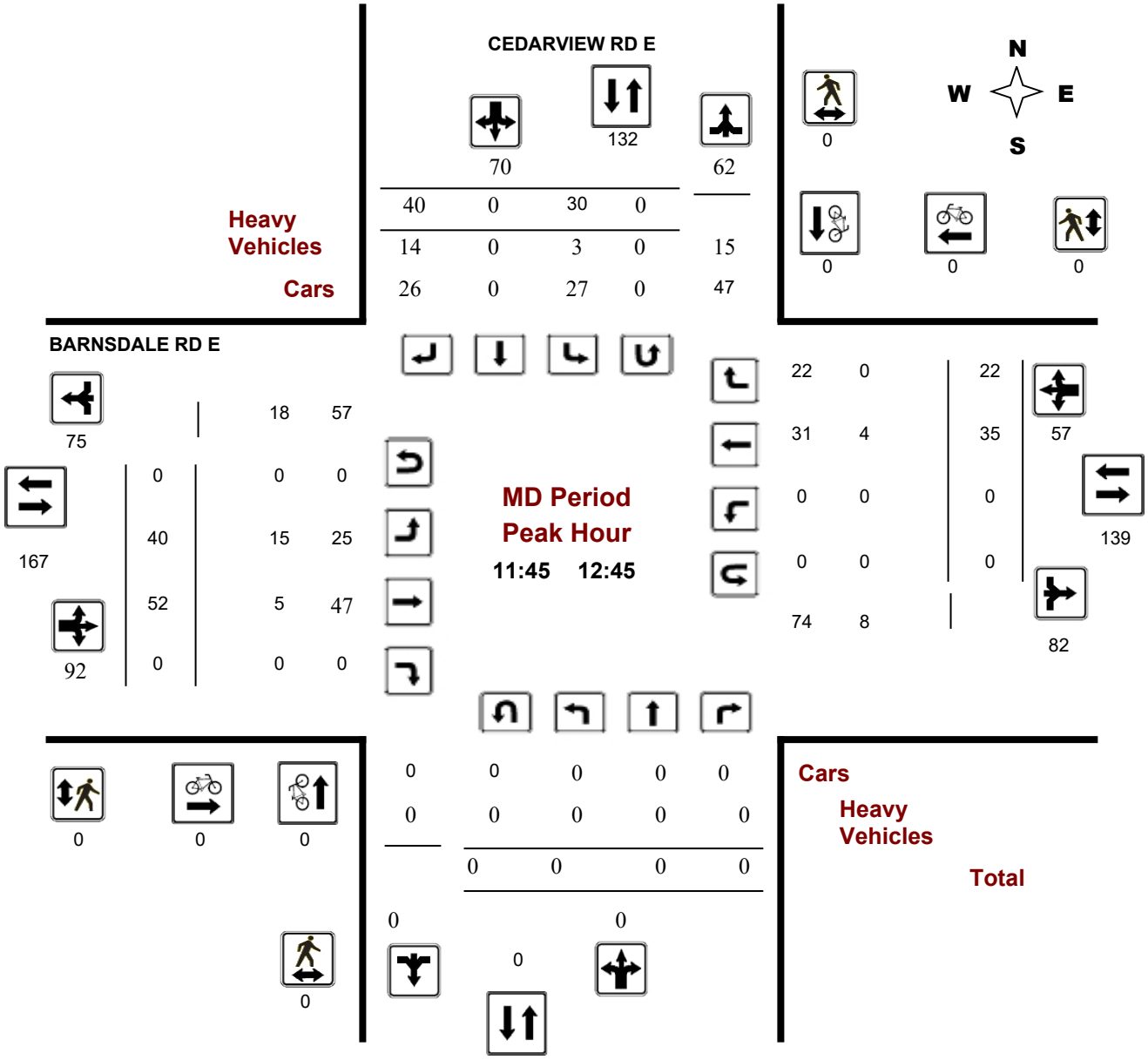
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BARNSDALE RD E @ CEDARVIEW RD E

Survey Date: Thursday, January 10, 2019 **WO No:** 38246

Start Time: 07:00 **Device:** Miovision



Comments

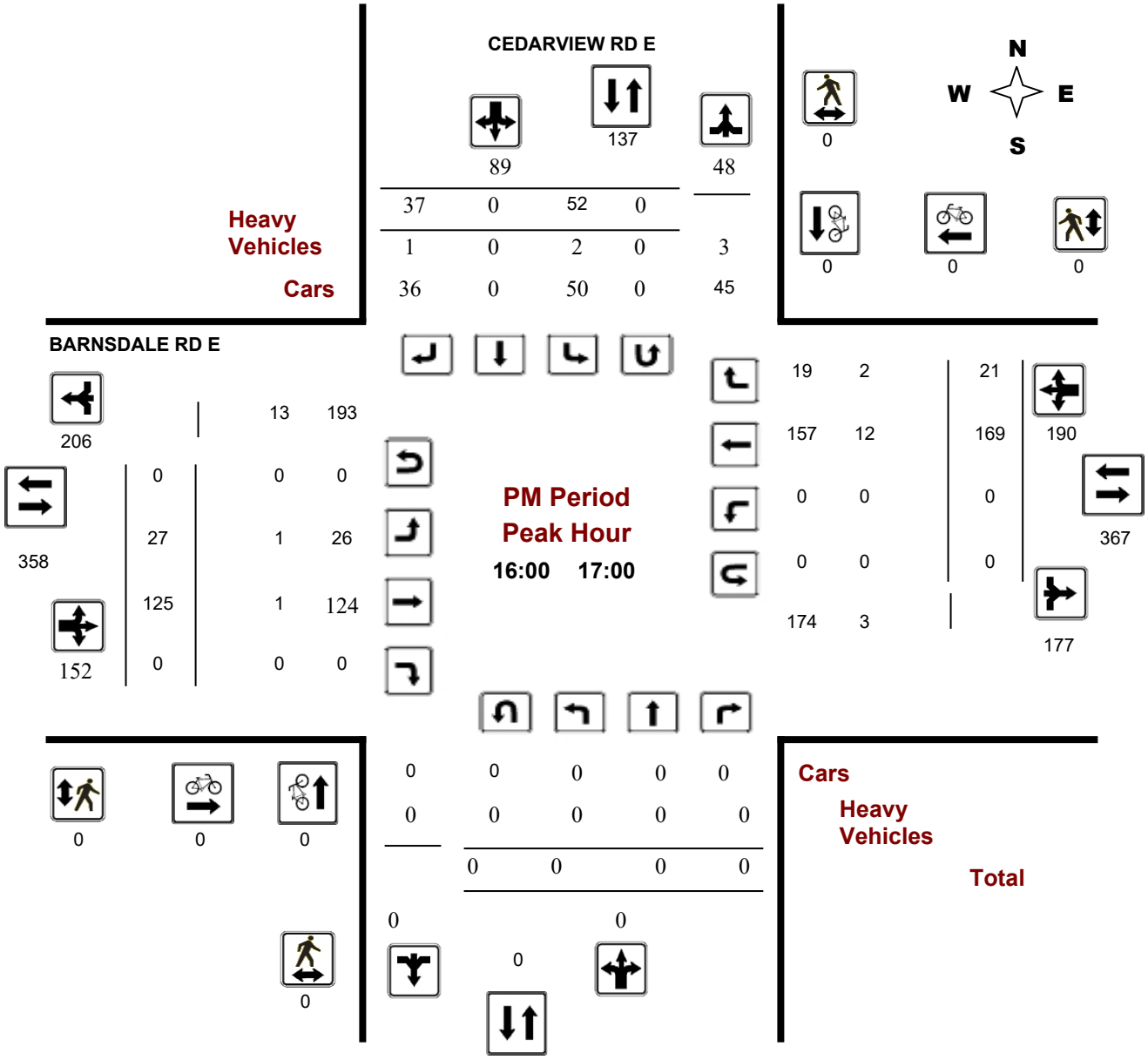
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BARNSDALE RD E @ CEDARVIEW RD E

Survey Date: Thursday, January 10, 2019 **WO No:** 38246

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

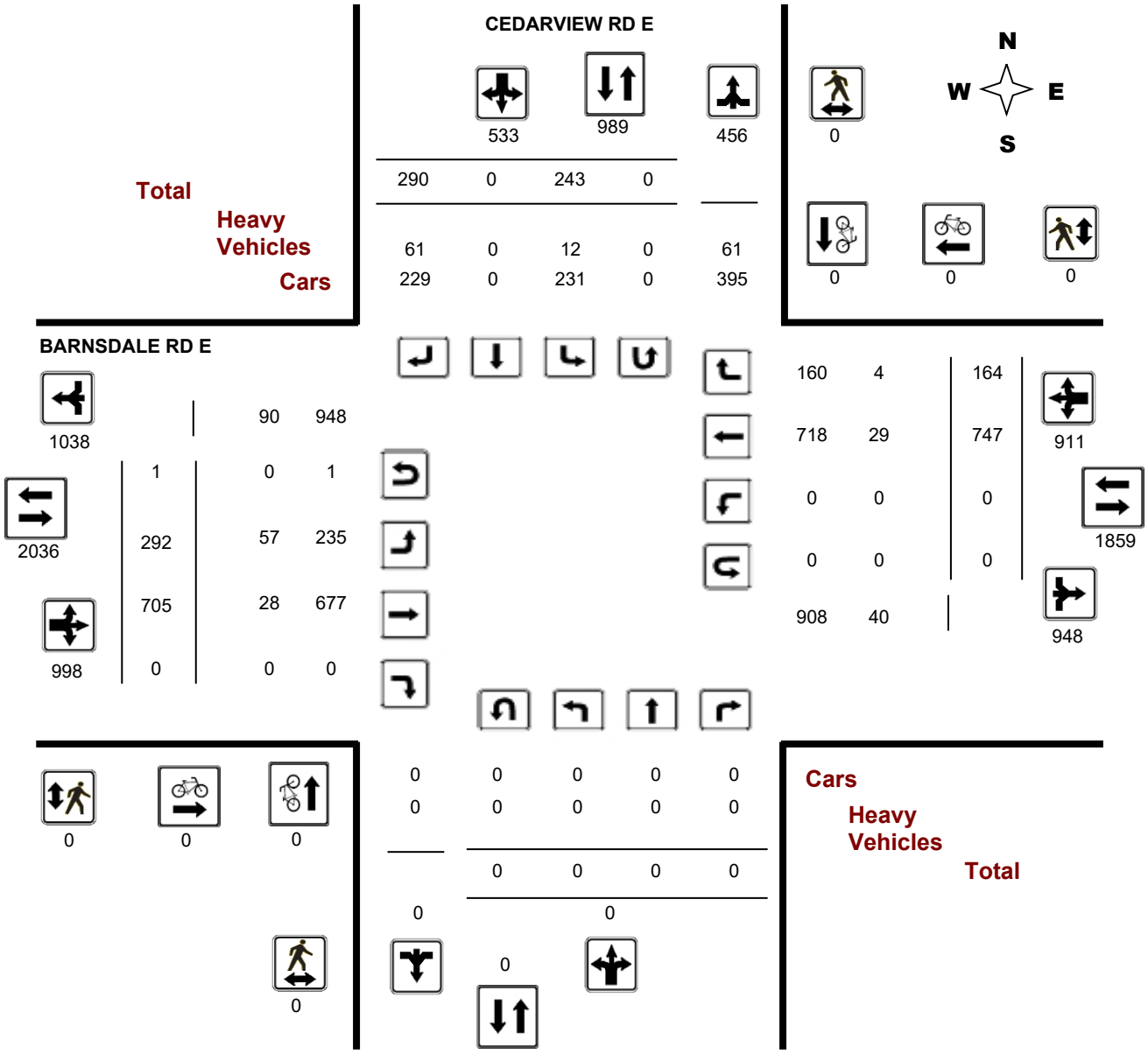
Turning Movement Count - Full Study Diagram

BARNSDALE RD E @ CEDARVIEW RD E

Survey Date: Thursday, January 10, 2019

WO#: 38246

Device: Miovision



Comments

Transportation Services - Traffic Services

Work Order 38246

Turning Movement Count - Full Study Summary Report

BARNSDALE RD E @ CEDARVIEW RD E

Survey Date: Thursday, January 10, 2019

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 1 Westbound: 0

AADT Factor 1.00

Full Study

	CEDARVIEW RD E									BARNSDALE RD E									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	**NB TOT**	LT	ST	RT	**SB TOT**	**STR TOT**	LT	ST	RT	**EB TOT**	LT	ST	RT	**WB TOT**	**STR TOT**	**Grand Total**
07:00 08:00	0	0	0	**0**	11	0	19	**30**	**30**	26	124	0	**150**	0	85	14	**99**	**249**	**279**
08:00 09:00	0	0	0	**0**	20	0	51	**71**	**71**	77	149	0	**226**	0	105	37	**142**	**368**	**439**
09:00 10:00	0	0	0	**0**	19	0	25	**44**	**44**	34	58	0	**92**	0	53	18	**71**	**163**	**207**
11:30 12:30	0	0	0	**0**	31	0	42	**73**	**73**	38	49	0	**87**	0	38	15	**53**	**140**	**213**
12:30 13:30	0	0	0	**0**	27	0	37	**64**	**64**	37	41	0	**78**	0	29	21	**50**	**128**	**192**
15:00 16:00	0	0	0	**0**	53	0	47	**100**	**100**	33	57	0	**90**	0	133	26	**159**	**249**	**349**
16:00 17:00	0	0	0	**0**	52	0	37	**89**	**89**	27	125	0	**152**	0	169	21	**190**	**342**	**431**
17:00 18:00	0	0	0	**0**	30	0	32	**62**	**62**	20	102	0	**122**	0	135	12	**147**	**269**	**331**
Sub Total	0	0	0	**0**	243	0	290	**533**	**533**	292	705	0	**997**	0	747	164	**911**	**1908**	**2441**
U Turns				**0**				**0**	**0**				**1**				**0**	**1**	**1**
Total	0	0	0	**0**	243	0	290	**533**	**533**	292	705	0	**998**	0	747	164	**911**	**1909**	**2442**
EQ 12Hr	0	0	0	**0**	338	0	403	**741**	**741**	406	980	0	**1387**	0	1038	228	**1266**	**2653**	**3394**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	0	0	0	**0**	338	0	403	**741**	**741**	406	980	0	**1387**	0	1038	228	**1266**	**2653**	**3394**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**1.00**						
AVG 24Hr	0	0	0	**0**	442	0	528	**971**	**971**	532	1284	0	**1817**	0	1360	299	**1659**	**3476**	**4447**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													**1.31**						

Comments:

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

W.O. 38246

Turning Movement Count - 15 Minute Summary Report

BARNSDALE RD E @ CEDARVIEW RD E

Survey Date: Thursday, January 10, 2019

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 1 Westbound: 0

		CEDARVIEW RD E									BARNSDALE RD E									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	0	0	**0**	3	0	5	**8**	**8**	8	17	0	**26**	0	9	1	**10**	**36**	**44**
07:15	07:30	0	0	0	**0**	4	0	4	**8**	**8**	2	39	0	**41**	0	27	2	**29**	**70**	**78**
07:30	07:45	0	0	0	**0**	1	0	4	**5**	**5**	4	35	0	**39**	0	20	4	**24**	**63**	**68**
07:45	08:00	0	0	0	**0**	3	0	6	**9**	**9**	12	33	0	**45**	0	29	7	**36**	**81**	**90**
08:00	08:15	0	0	0	**0**	6	0	6	**12**	**12**	27	46	0	**73**	0	26	11	**37**	**110**	**122**
08:15	08:30	0	0	0	**0**	5	0	13	**18**	**18**	24	41	0	**65**	0	27	15	**42**	**107**	**125**
08:30	08:45	0	0	0	**0**	6	0	21	**27**	**27**	13	29	0	**42**	0	30	7	**37**	**79**	**106**
08:45	09:00	0	0	0	**0**	3	0	11	**14**	**14**	13	33	0	**46**	0	22	4	**26**	**72**	**86**
09:00	09:15	0	0	0	**0**	6	0	9	**15**	**15**	10	14	0	**24**	0	16	4	**20**	**44**	**59**
09:15	09:30	0	0	0	**0**	7	0	8	**15**	**15**	11	23	0	**34**	0	12	4	**16**	**50**	**65**
09:30	09:45	0	0	0	**0**	2	0	6	**8**	**8**	8	8	0	**16**	0	16	6	**22**	**38**	**46**
09:45	10:00	0	0	0	**0**	4	0	2	**6**	**6**	5	13	0	**18**	0	9	4	**13**	**31**	**37**
11:30	11:45	0	0	0	**0**	9	0	13	**22**	**22**	8	10	0	**18**	0	9	0	**9**	**27**	**49**
11:45	12:00	0	0	0	**0**	6	0	8	**14**	**14**	12	13	0	**25**	0	10	4	**14**	**39**	**53**
12:00	12:15	0	0	0	**0**	6	0	14	**20**	**20**	8	11	0	**19**	0	10	8	**18**	**37**	**57**
12:15	12:30	0	0	0	**0**	10	0	7	**17**	**17**	10	15	0	**25**	0	9	3	**12**	**37**	**54**
12:30	12:45	0	0	0	**0**	8	0	11	**19**	**19**	10	13	0	**23**	0	6	7	**13**	**36**	**55**
12:45	13:00	0	0	0	**0**	7	0	5	**12**	**12**	13	10	0	**23**	0	7	4	**11**	**34**	**46**
13:00	13:15	0	0	0	**0**	8	0	9	**17**	**17**	8	11	0	**19**	0	6	5	**11**	**30**	**47**
13:15	13:30	0	0	0	**0**	4	0	12	**16**	**16**	6	7	0	**13**	0	10	5	**15**	**28**	**44**
15:00	15:15	0	0	0	**0**	9	0	10	**19**	**19**	12	11	0	**23**	0	27	8	**35**	**58**	**77**
15:15	15:30	0	0	0	**0**	14	0	12	**26**	**26**	9	15	0	**24**	0	31	3	**34**	**58**	**84**
15:30	15:45	0	0	0	**0**	11	0	15	**26**	**26**	6	16	0	**22**	0	43	8	**51**	**73**	**99**
15:45	16:00	0	0	0	**0**	19	0	10	**29**	**29**	6	15	0	**21**	0	32	7	**39**	**60**	**89**
16:00	16:15	0	0	0	**0**	12	0	9	**21**	**21**	8	33	0	**41**	0	42	5	**47**	**88**	**109**
16:15	16:30	0	0	0	**0**	17	0	6	**23**	**23**	8	23	0	**31**	0	44	5	**49**	**80**	**103**
16:30	16:45	0	0	0	**0**	12	0	8	**20**	**20**	4	39	0	**43**	0	39	3	**42**	**85**	**105**
16:45	17:00	0	0	0	**0**	11	0	14	**25**	**25**	7	30	0	**37**	0	44	8	**52**	**89**	**114**
17:00	17:15	0	0	0	**0**	8	0	9	**17**	**17**	6	25	0	**31**	0	44	3	**47**	**78**	**95**
17:15	17:30	0	0	0	**0**	3	0	10	**13**	**13**	8	39	0	**47**	0	28	5	**33**	**80**	**93**
17:30	17:45	0	0	0	**0**	11	0	8	**19**	**19**	4	21	0	**25**	0	37	2	**39**	**64**	**83**
17:45	18:00	0	0	0	**0**	8	0	5	**13**	**13**	2	17	0	**19**	0	26	2	**28**	**47**	**60**
TOTAL:		0	0	0	**0**	243	0	290	**533**	**533**	292	705	0	**998**	0	747	164	**911**	**1909**	**2442**

Note: U-Turns are included in Totals.

Comment:

Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order
38246

BARNSDALE RD E @ CEDARVIEW RD E

Count Date: Thursday, January 10, 2019 **Start Time:** 07:00

	CEDARVIEW RD E			BARNSDALE RD E			
Time Period	Northbound	Southbound	**Street Total**	Eastbound	Westbound	**Street Total**	**Grand Total**
07:00 08:00	0	0	**0**	0	0	**0**	**0**
08:00 09:00	0	0	**0**	0	0	**0**	**0**
09:00 10:00	0	0	**0**	0	0	**0**	**0**
11:30 12:30	0	0	**0**	0	0	**0**	**0**
12:30 13:30	0	0	**0**	0	0	**0**	**0**
15:00 16:00	0	0	**0**	0	0	**0**	**0**
16:00 17:00	0	0	**0**	0	0	**0**	**0**
17:00 18:00	0	0	**0**	0	0	**0**	**0**
Total	0	0	**0**	0	0	**0**	**0**

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

W.O. 38246

Turning Movement Count - Heavy Vehicle Report

BARNSDALE RD E @ CEDARVIEW RD E

Survey Date: Thursday, January 10, 2019

Time Period		CEDARVIEW RD E Northbound LT	ST	RT	N TOT	CEDARVIEW RD E Southbound LT	ST	RT	S TOT	STR TOT	BARNSDALE RD E Eastbound LT	ST	RT	E TOT	BARNSDALE RD E Westbound LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	08:00	0	0	0	**0**	0	0	3	**3**	**3**	2	9	0	**11**	0	1	0	**1**	**12**	**15**
08:00	09:00	0	0	0	**0**	1	0	16	**17**	**17**	13	6	0	**19**	0	0	1	**1**	**20**	**37**
09:00	10:00	0	0	0	**0**	3	0	10	**13**	**13**	10	0	0	**10**	0	2	1	**3**	**13**	**26**
11:30	12:30	0	0	0	**0**	3	0	16	**19**	**19**	16	6	0	**22**	0	5	0	**5**	**27**	**46**
12:30	13:30	0	0	0	**0**	0	0	9	**9**	**9**	13	3	0	**16**	0	3	0	**3**	**19**	**28**
15:00	16:00	0	0	0	**0**	3	0	5	**8**	**8**	2	2	0	**4**	0	4	0	**4**	**8**	**16**
16:00	17:00	0	0	0	**0**	2	0	1	**3**	**3**	1	1	0	**2**	0	12	2	**14**	**16**	**19**
17:00	18:00	0	0	0	**0**	0	0	1	**1**	**1**	0	1	0	**1**	0	2	0	**2**	**3**	**4**
Sub Total		0	0	0	**0**	12	0	61	**73**	**73**	57	28	0	**85**	0	29	4	**33**	**118**	**191**
U-Turns (Heavy Vehicles)					**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total		0	0	0	**0**	12	0	61	**73**	**73**	57	28	0	**85**	0	29	4	**33**	**118**	**191**

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

Work Order
38246

Turning Movement Count - Pedestrian Volume Report

BARNSDALE RD E @ CEDARVIEW RD E

Count Date: Thursday, January 10, 2019 **Start Time:** 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	**0**	0	0	**0**	**0**
07:15 07:30	0	0	**0**	0	0	**0**	**0**
07:30 07:45	0	0	**0**	0	0	**0**	**0**
07:45 08:00	0	0	**0**	0	0	**0**	**0**
07:00 08:00	0	0	**0**	0	0	**0**	**0**
08:00 08:15	0	0	**0**	0	0	**0**	**0**
08:15 08:30	0	0	**0**	0	0	**0**	**0**
08:30 08:45	0	0	**0**	0	0	**0**	**0**
08:45 09:00	0	0	**0**	0	0	**0**	**0**
08:00 09:00	0	0	**0**	0	0	**0**	**0**
09:00 09:15	0	0	**0**	0	0	**0**	**0**
09:15 09:30	0	0	**0**	0	0	**0**	**0**
09:30 09:45	0	0	**0**	0	0	**0**	**0**
09:45 10:00	0	0	**0**	0	0	**0**	**0**
09:00 10:00	0	0	**0**	0	0	**0**	**0**
11:30 11:45	0	0	**0**	0	0	**0**	**0**
11:45 12:00	0	0	**0**	0	0	**0**	**0**
12:00 12:15	0	0	**0**	0	0	**0**	**0**
12:15 12:30	0	0	**0**	0	0	**0**	**0**
11:30 12:30	0	0	**0**	0	0	**0**	**0**
12:30 12:45	0	0	**0**	0	0	**0**	**0**
12:45 13:00	0	0	**0**	0	0	**0**	**0**
13:00 13:15	0	0	**0**	0	0	**0**	**0**
13:15 13:30	0	0	**0**	0	0	**0**	**0**
12:30 13:30	0	0	**0**	0	0	**0**	**0**
15:00 15:15	0	0	**0**	0	0	**0**	**0**
15:15 15:30	0	0	**0**	0	0	**0**	**0**
15:30 15:45	0	0	**0**	0	0	**0**	**0**
15:45 16:00	0	0	**0**	0	0	**0**	**0**
15:00 16:00	0	0	**0**	0	0	**0**	**0**
16:00 16:15	0	0	**0**	0	0	**0**	**0**
16:15 16:30	0	0	**0**	0	0	**0**	**0**
16:30 16:45	0	0	**0**	0	0	**0**	**0**
16:45 17:00	0	0	**0**	0	0	**0**	**0**
16:00 17:00	0	0	**0**	0	0	**0**	**0**
17:00 17:15	0	0	**0**	0	0	**0**	**0**
17:15 17:30	0	0	**0**	0	0	**0**	**0**
17:30 17:45	0	0	**0**	0	0	**0**	**0**
17:45 18:00	0	0	**0**	0	0	**0**	**0**
17:00 18:00	0	0	**0**	0	0	**0**	**0**
Total	0	0	**0**	0	0	**0**	**0**

Comment:

Transportation Services - Traffic Services

Work Order
38246

Turning Movement Count - 15 Min U-Turn Total Report

BARNSDALE RD E @ CEDARVIEW RD E

Survey Date: Thursday, January 10, 2019

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	1	0	1
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	1	0	1

Appendix C

Collision Data

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-07-23	2014	8:55:00 AM	BARNSDALE RD btwn TRAIL RD & CEDARVIEW RD	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	07 - SMV other

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-03-22	2014	11:54:00 AM	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	03 - Loose snow
2015-04-03	2015	8:09:00 PM	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2015-01-09	2015	7:21:00 AM	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	03 - Dawn	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice
2015-01-09	2015	7:14:00 AM	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	03 - Snow	03 - Dawn	10 - No control	03 - P.D. only	07 - SMV other	05 - Packed snow
2016-09-28	2016	1:17:00 PM	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2017-05-23	2017	2:40:00 PM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	99 - Other	01 - Dry
2017-10-07	2017	10:28:00 AM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	02 - Rain	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2017-09-23	2017	9:27:00 PM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2017-12-06	2017	8:10:00 AM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2017-02-10	2017	10:39:00 PM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	04 - Freezing Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice
2017-02-06	2017	8:11:00 PM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	03 - Loose snow
2018-03-07	2018	8:37:00 AM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (__3ZA1CC)	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	03 - Loose snow
2018-05-15	2018	8:26:00 AM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (__3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2018-08-02	2018	4:36:00 PM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (__3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-08-15	2018	11:11:00 AM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (__3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-08-24	2018	5:17:00 PM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (__3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2018-09-15	2018	5:30:00 PM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (__3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-10-08	2018	1:45:00 PM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (__3ZA1CC)	02 - Rain	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2018-12-01	2018	10:45:00 PM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (__3ZA1CC)	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-12-27	2018	12:27:00 PM	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (__3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	06 - Ice

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-03-15	2014	4:05:00 PM	CAMBRIAN RD btwn BORRISOKANE RD & GRAND CANAL ST	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	01 - Approaching	01 - Dry
2015-10-09	2015	12:00:00 AM	CAMBRIAN RD btwn BORRISOKANE RD & GRAND CANAL ST	01 - Clear	00 - Unknown	10 - No control	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2016-01-30	2016	4:40:00 AM	CAMBRIAN RD btwn BORRISOKANE RD & GRAND CANAL ST	03 - Snow	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	03 - Loose snow

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2015-06-04	2015	3:22:00 PM	CEDARVIEW RD btwn CAMBRIAN RD & BARNSDALE RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2016-04-04	2016	7:59:00 PM	CEDARVIEW RD btwn CAMBRIAN RD & BARNSDALE RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-05-05	2018	9:15:00 AM	CEDARVIEW RD btwn CAMBRIAN RD & BARNSDALE RD (__3ZA1T5)	06 - Strong wind	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2015-02-09	2015	12:26:00 PM	BARNSDALE RD W @ CEDARVIEW RD W	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	03 - Loose snow
2017-12-14	2017	9:30:00 AM	BARNSDALE RD E @ CEDARVIEW RD E	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	02 - Angle	02 - Wet
2018-01-10	2018	12:13:00 PM	BARNSDALE RD E @ CEDARVIEW RD E (0001077)	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	02 - Angle	01 - Dry
2018-04-08	2018	12:20:00 AM	BARNSDALE RD E @ CEDARVIEW RD E (0001077)	01 - Clear	07 - Dark	02 - Stop sign	02 - Non-fatal injury	02 - Angle	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-08-08	2014	3:30:00 PM	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	07 - SMV other	01 - Dry
2015-07-10	2015	8:58:00 AM	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2015-01-25	2015	4:43:00 PM	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	05 - Dusk	02 - Stop sign	03 - P.D. only	07 - SMV other	06 - Ice
2016-06-23	2016	5:10:00 PM	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	03 - Rear end	01 - Dry
2016-07-29	2016	3:27:00 AM	CAMBRIAN RD @ CEDARVIEW RD	07 - Fog, mist, smoke, d	07 - Dark	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2016-07-22	2016	8:56:00 PM	CAMBRIAN RD @ CEDARVIEW RD	02 - Rain	05 - Dusk	02 - Stop sign	03 - P.D. only	07 - SMV other	02 - Wet
2016-12-11	2016	9:30:00 AM	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	07 - SMV other	06 - Ice
2017-08-29	2017	1:57:00 PM	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2017-12-17	2017	8:33:00 AM	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	07 - SMV other	01 - Dry
2018-06-26	2018	11:51:00 AM	CAMBRIAN RD @ CEDARVIEW RD (0001571)	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	07 - SMV other	08 - Loose sand or gravel

LOCATION & GEOID	TOTAL_COLLISIONS	TOTAL_CYCLIST_COLLISIONS	TOTAL_PEDESTRIAN_COLLISIONS
BARNSDALE RD btwn TRAIL RD & CEDARVIEW RD	1	0	0
BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	20	0	0
CAMBRIAN RD btwn BORRISOKANE RD & GRAND CANAL ST	3	0	0
CEDARVIEW RD btwn CAMBRIAN RD & BARNSDALE RD	3	0	0
BARNSDALE RD E @ CEDARVIEW RD E	5	0	0
CAMBRIAN RD @ CEDARVIEW RD	10	0	0

Appendix D

ABIC Site Statistics

1944 ABIC Admin Offices & Assembly Plant
Site / Building Design Review

October 30, 2019

Occupant Load:

Offices / admin: 78 employees
Daycare: 15 children + 2 adults
Visitors : assume 30 visitors at any given time
Plant: 40 employees per shift

Plumbing

3.7.4.3i group A2 child care:
(*10 children per water closet*, 15 children require 2 WC) **Provided: 2 children WC + 1 adult WC**

3.7.4.7 group D Office:
(*5 per sex = 10 water closets total required)* **Provided: 8 women WC + 8 men WC**

3.7.4.9 group F2 Industrial Plant:
(*3 per sex = 6 water closets total required)* **Provided: 3 women WC + 3 men WC**

1 Universal washroom: **Provided: 1 Barrier-Free water closet**

Total Water Closet count**:** **26 water closets**
(including urinals which account for 50% of men's water closets)

Other plumbing:
22 lavatories
2 kitchen sinks
4 showers (2 / sex)
1 mop sink
Drinking fountains: 2 or more, 1 being barrier-free

Areas: Building Area (greatest horizontal area above grade) at level 1: **2,917 m2**

Admin Building **3.2.2.54. Group D, up to 3 Storeys, Sprinklered** (**+** Group A2 Child Care minor occupancy)

L1, Offices:	1,410 m2
L1, Lobby:	622 m2
L1, Design / Visitor's center:	674 m2
L1, Daycare:	135 m2
L2, Atrium / offices:	624 m2
Total:	**3,465 m2 / 37,283 sq.ft.**

Assembly Plant **3.2.2.70. Group F, Division 2, up to 4 Storeys**

Shop floor:	**9,341 m2 / 100,509 sq.ft.**
(Mezzanine office:	80 m2)

3.2.5.7. Water Supply
(2) Hydrants shall be located within 90 m horizontally of any portion of a *building* perimeter that is required to face a *street* in Subsection 3.2.2.

3.2.5.16. Fire Department Connections
(1) The fire department connection for a standpipe system shall be located so that the distance from the fire department connection to a hydrant is not more than 45 m and is unobstructed.
(2) The fire department connection for an automatic sprinkler system shall be located so that the distance from the fire department connection to a hydrant is not more than 45 m and is unobstructed.

Appendix E

Canopy Growth Corporation Site Information

Canopy Growth Information Call

Source: Aaron.king@canopygrowth.com

- 1500 employees in/out per day
- 24/5 7am to 7am (24 hours/day Monday- Friday)
    - 8.5 hour shifts
    - 3 shifts
- 60%-70% of employees work day shifts
- 1 million sq ft-3 buildings
- New bottling plant
- Visitor centre
- Future parking garage and 5 storey office tower and will need 1800 spots
- 800 parking spots (existing)
- 7:30 for parking accommodations

Appendix F

Canopy Growth Corporation Traffic Data

ACCURATE TRUSTED TRAFFIC DATA

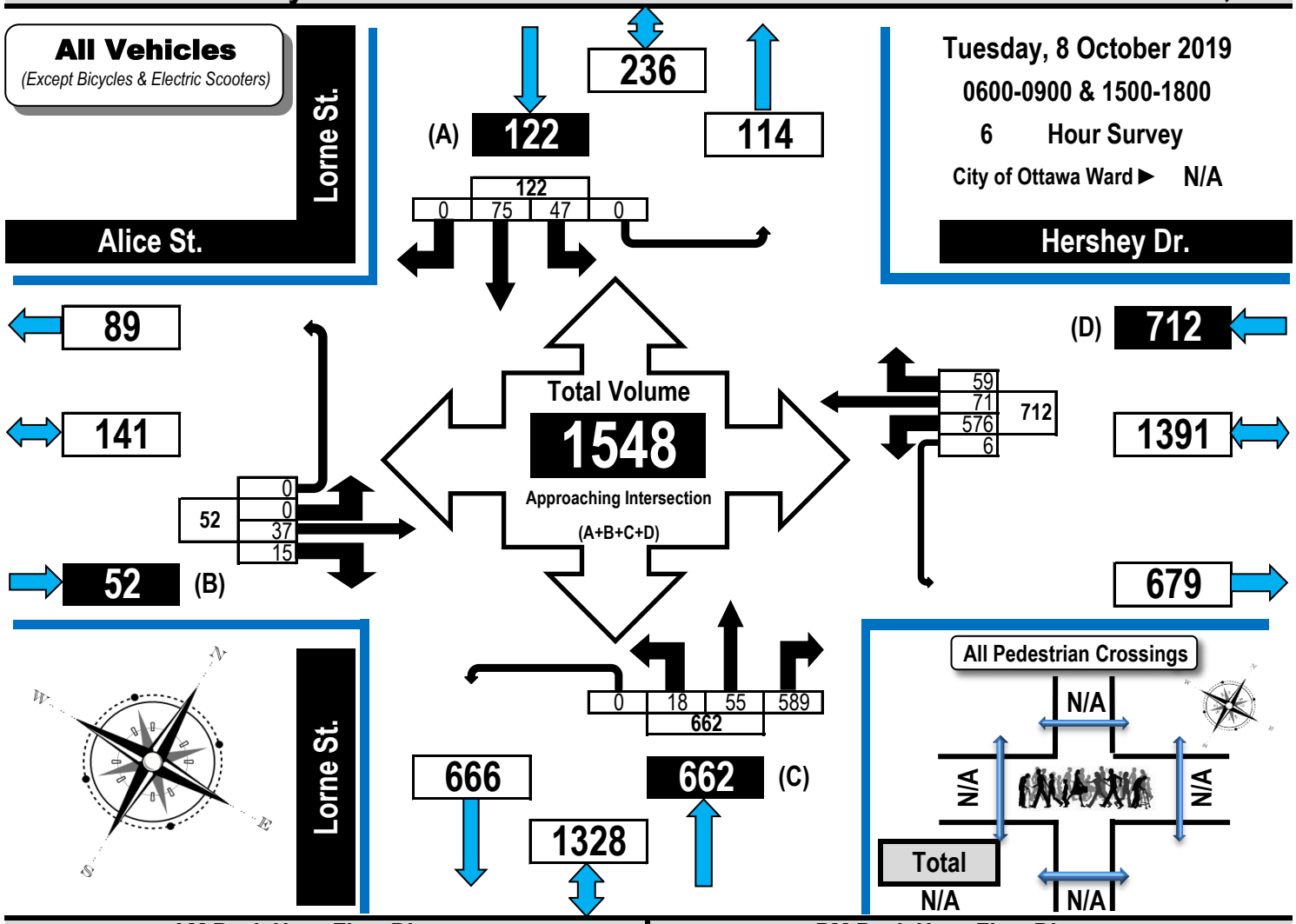
Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams

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

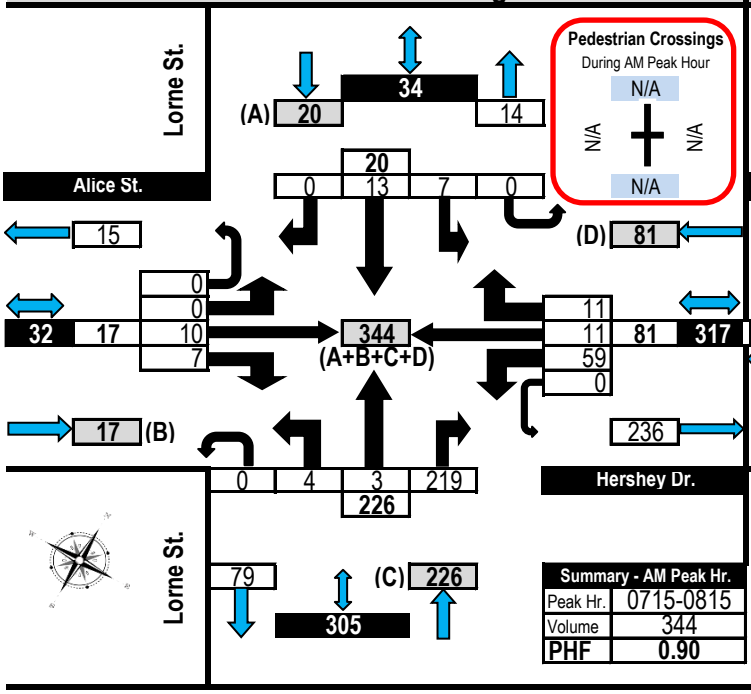
Alice Street/Hershey Drive & Lorne Street — Smiths Falls, ON

All Vehicles
(Except Bicycles & Electric Scooters)

Tuesday, 8 October 2019
0600-0900 & 1500-1800
6 Hour Survey
City of Ottawa Ward ► N/A

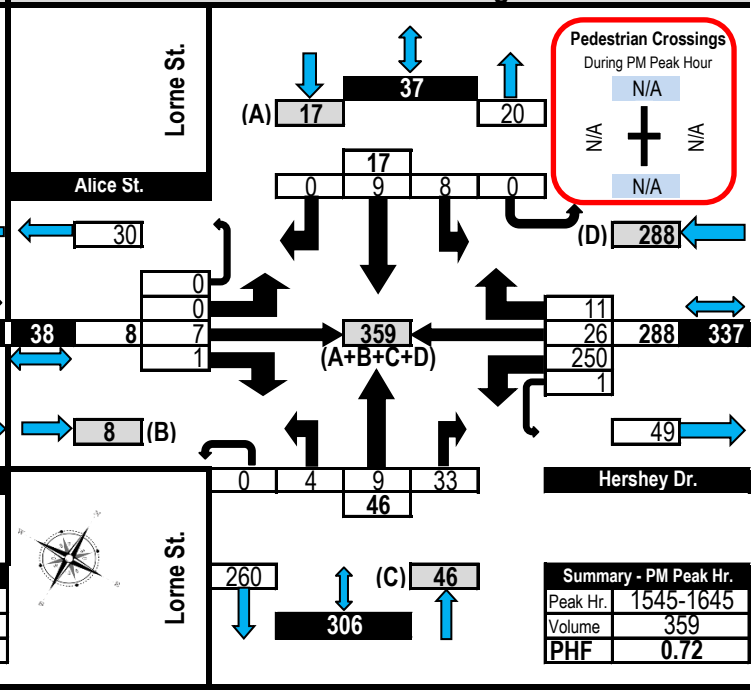


AM Peak Hour Flow Diagram



Summary - AM Peak Hr.	
Peak Hr.	0715-0815
Volume	344
PHF	0.90

PM Peak Hour Flow Diagram



Summary - PM Peak Hr.	
Peak Hr.	1545-1645
Volume	359
PHF	0.72

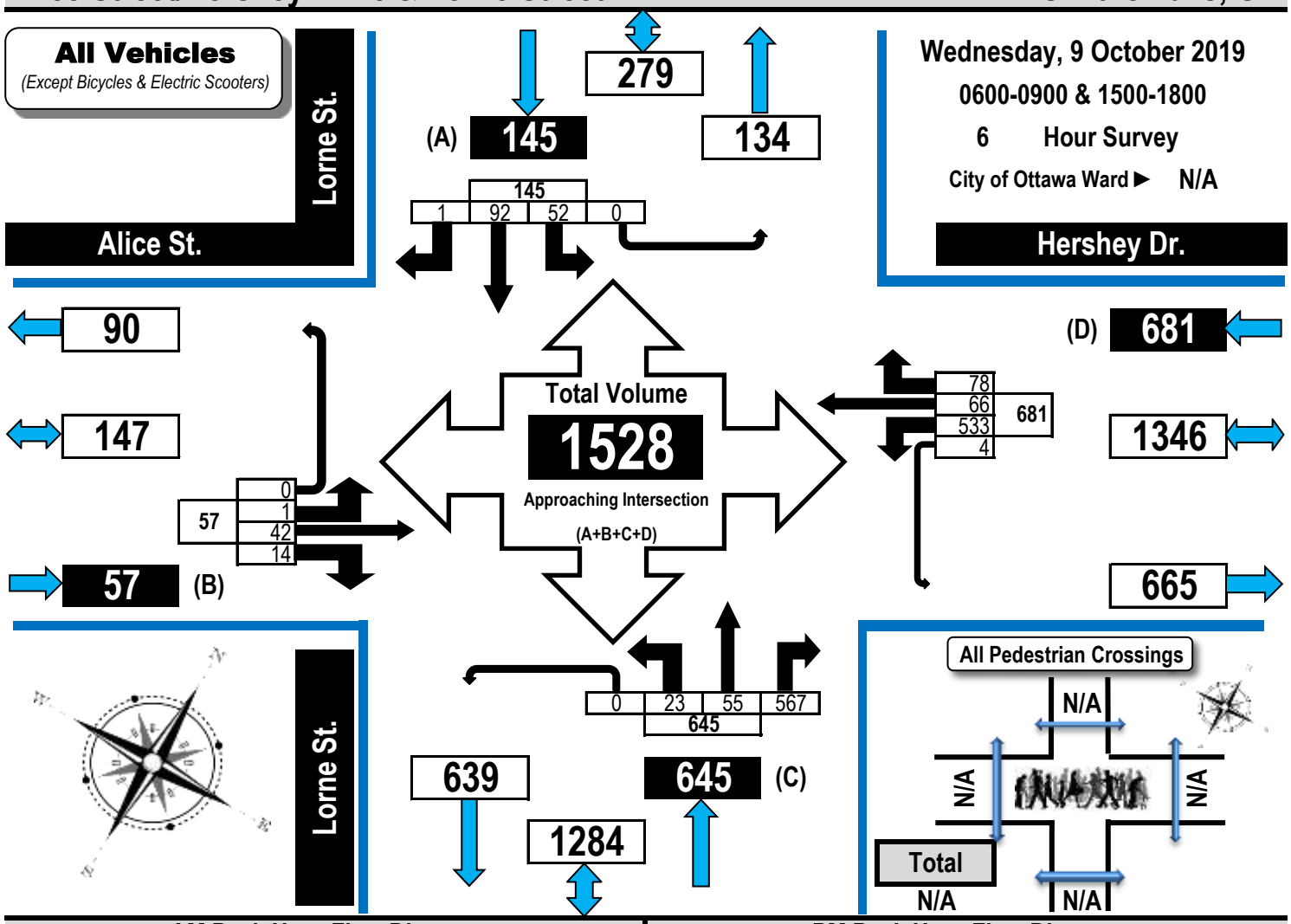
Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams

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

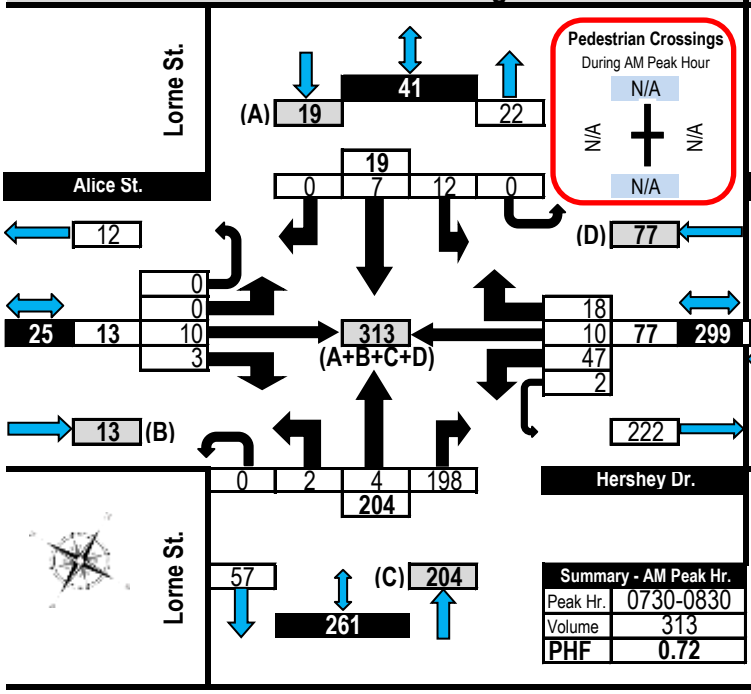
Alice Street/Hershey Drive & Lorne Street — Smiths Falls, ON

All Vehicles
(Except Bicycles & Electric Scooters)

Wednesday, 9 October 2019
0600-0900 & 1500-1800
6 Hour Survey
City of Ottawa Ward ► N/A

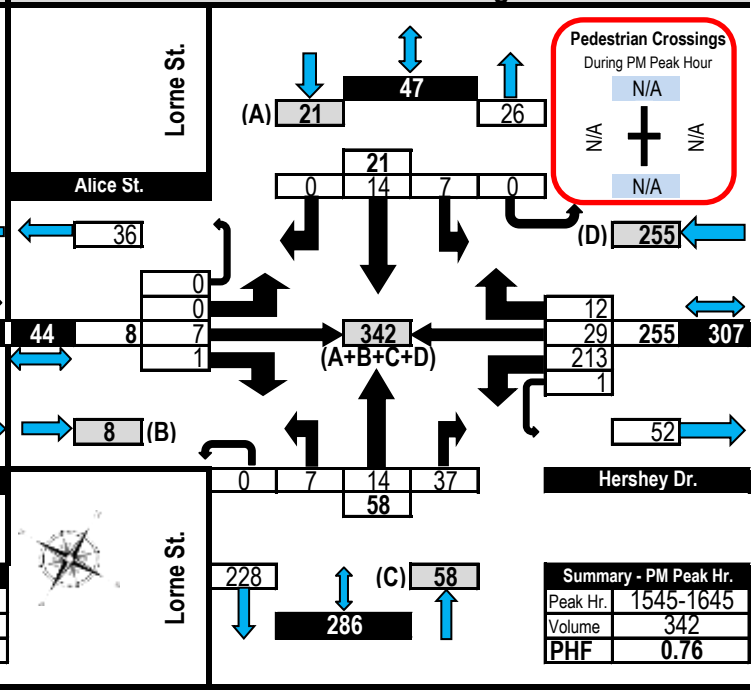


AM Peak Hour Flow Diagram



Summary - AM Peak Hr.	
Peak Hr.	0730-0830
Volume	313
PHF	0.72

PM Peak Hour Flow Diagram



Summary - PM Peak Hr.	
Peak Hr.	1545-1645
Volume	342
PHF	0.76

ACCURATE TRUSTED TRAFFIC DATA

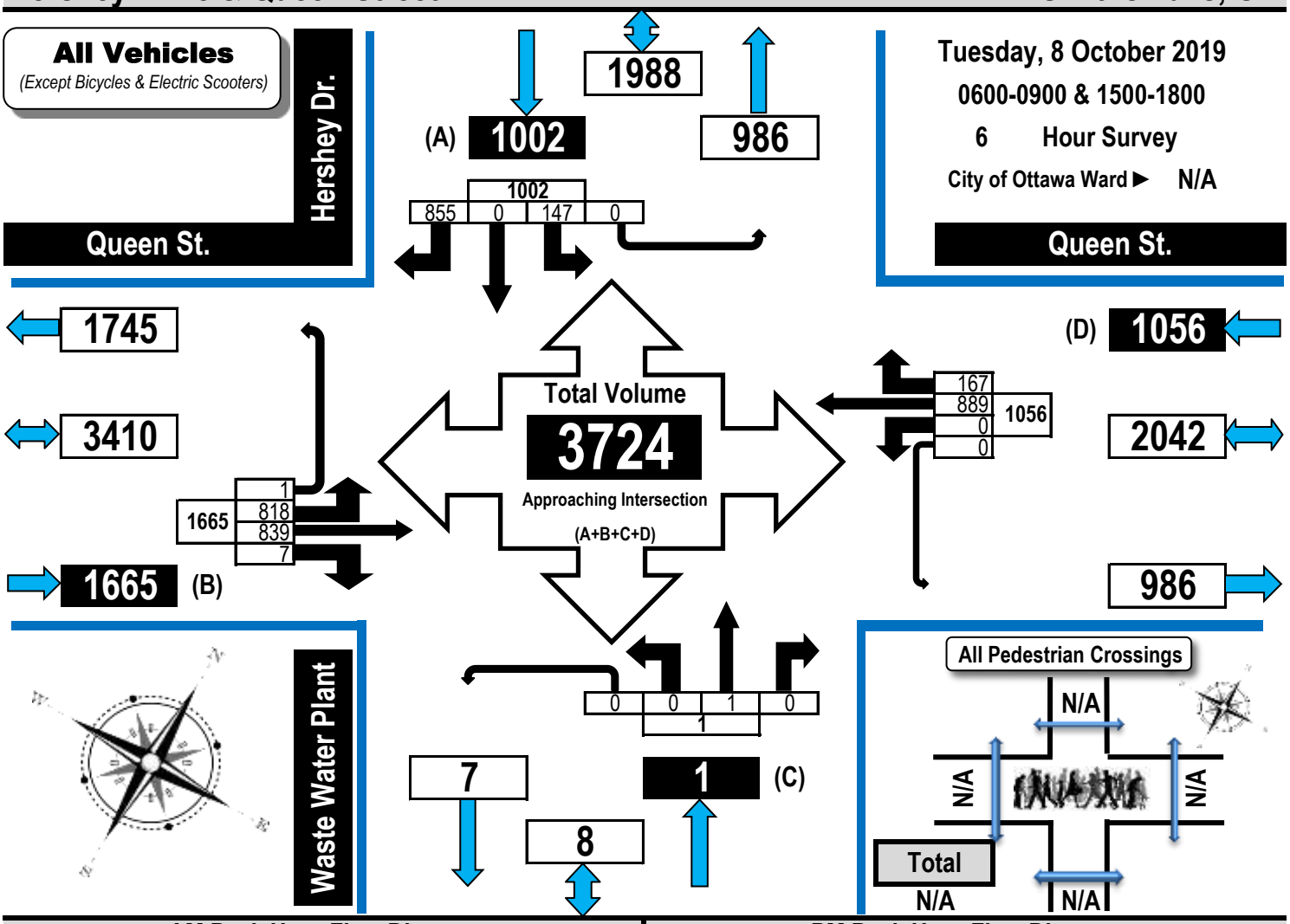
Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams

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

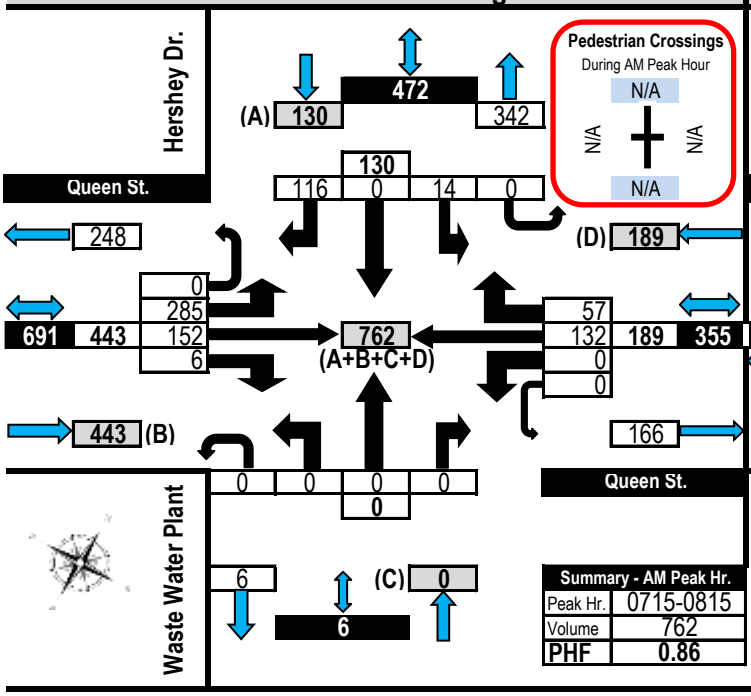
Hershey Drive & Queen Street — Smiths Falls, ON

All Vehicles
(Except Bicycles & Electric Scooters)

Tuesday, 8 October 2019
0600-0900 & 1500-1800
6 Hour Survey
City of Ottawa Ward ► N/A

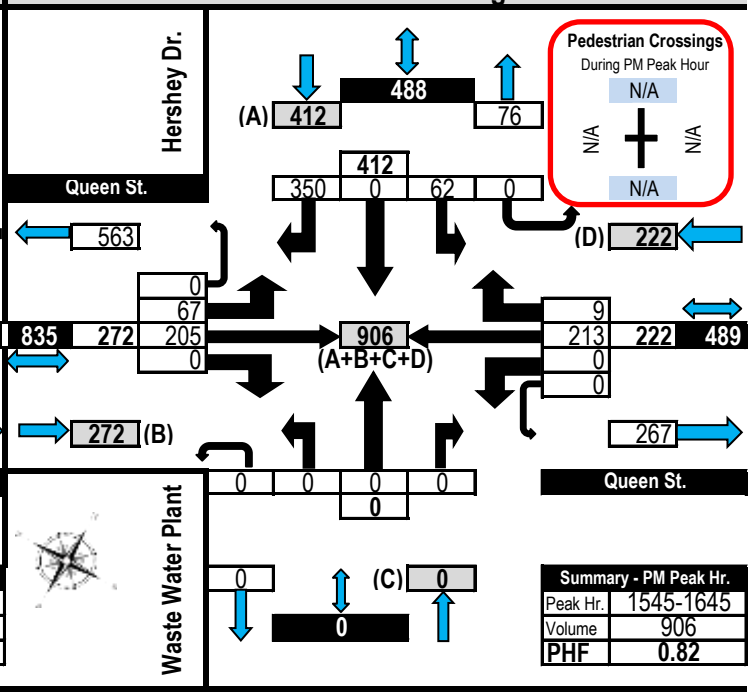


AM Peak Hour Flow Diagram



Summary - AM Peak Hr.	
Peak Hr.	0715-0815
Volume	762
PHF	0.86

PM Peak Hour Flow Diagram



Summary - PM Peak Hr.	
Peak Hr.	1545-1645
Volume	906
PHF	0.82

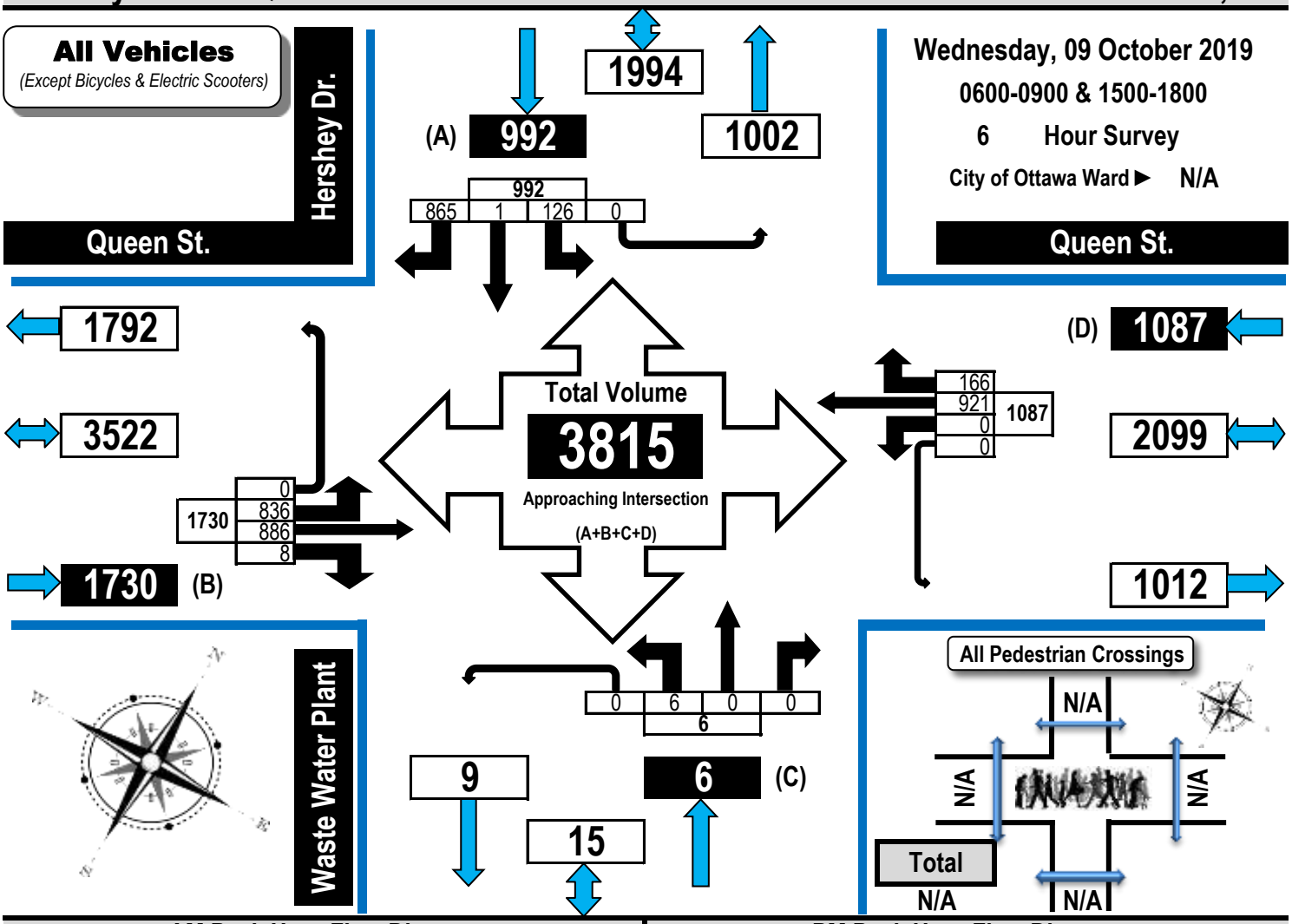
Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams

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

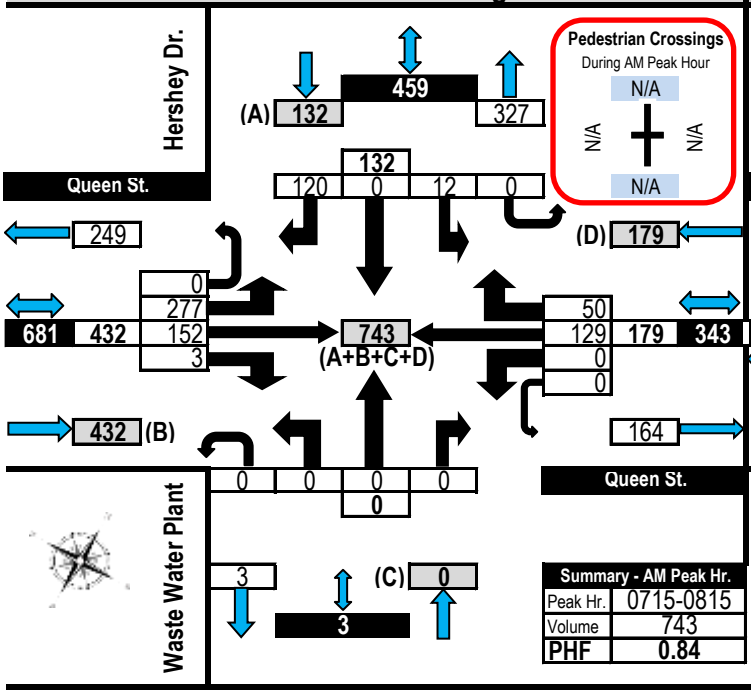
Hershey Drive & Queen Street — Smiths Falls, ON

All Vehicles
(Except Bicycles & Electric Scooters)

Wednesday, 09 October 2019
0600-0900 & 1500-1800
6 Hour Survey
City of Ottawa Ward ► N/A

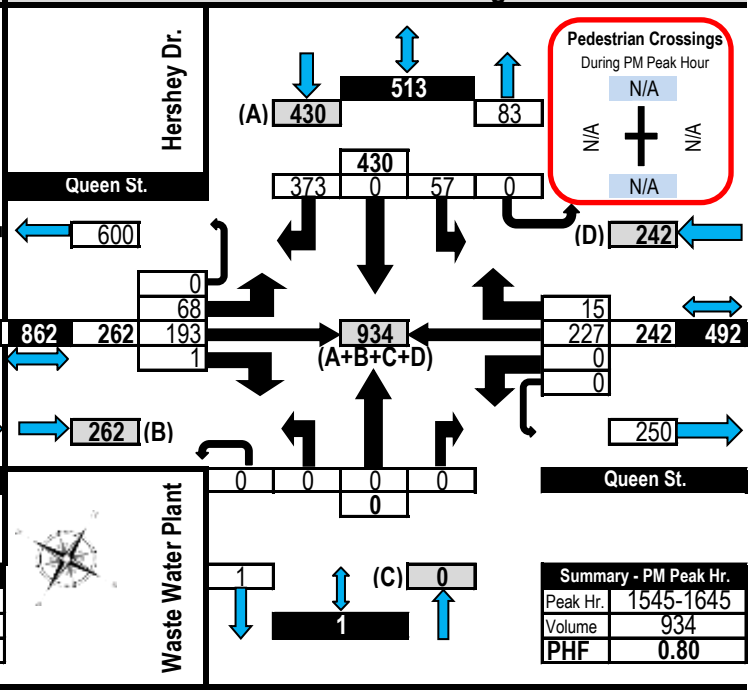


AM Peak Hour Flow Diagram



Summary - AM Peak Hr.	
Peak Hr.	0715-0815
Volume	743
PHF	0.84

PM Peak Hour Flow Diagram



Summary - PM Peak Hr.	
Peak Hr.	1545-1645
Volume	934
PHF	0.80

Appendix G

TDM Checklists

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

Legend

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

		TDM-supportive design & infrastructure measures: *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	☑
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☑
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)*	☑

		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)*	☑
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)*	☑
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)*	☑
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)*	☑
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)*	☑
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)*	☑
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☐
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☑
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	☑
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	☐

TDM Measures Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend

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

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
	1.	**TDM PROGRAM MANAGEMENT**	
	1.1	**Program coordinator**	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☒
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
	2.	**WALKING AND CYCLING**	
	2.1	**Information on walking/cycling routes & destinations**	
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances	☒
	2.2	**Bicycle skills training**	
		Commuter travel	
BETTER ★	2.2.1	Offer on-site cycling courses for commuters, or subsidize off-site courses	☐
	2.3	**Valet bike parking**	
		Visitor travel	
BETTER	2.3.1	Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games)	☐

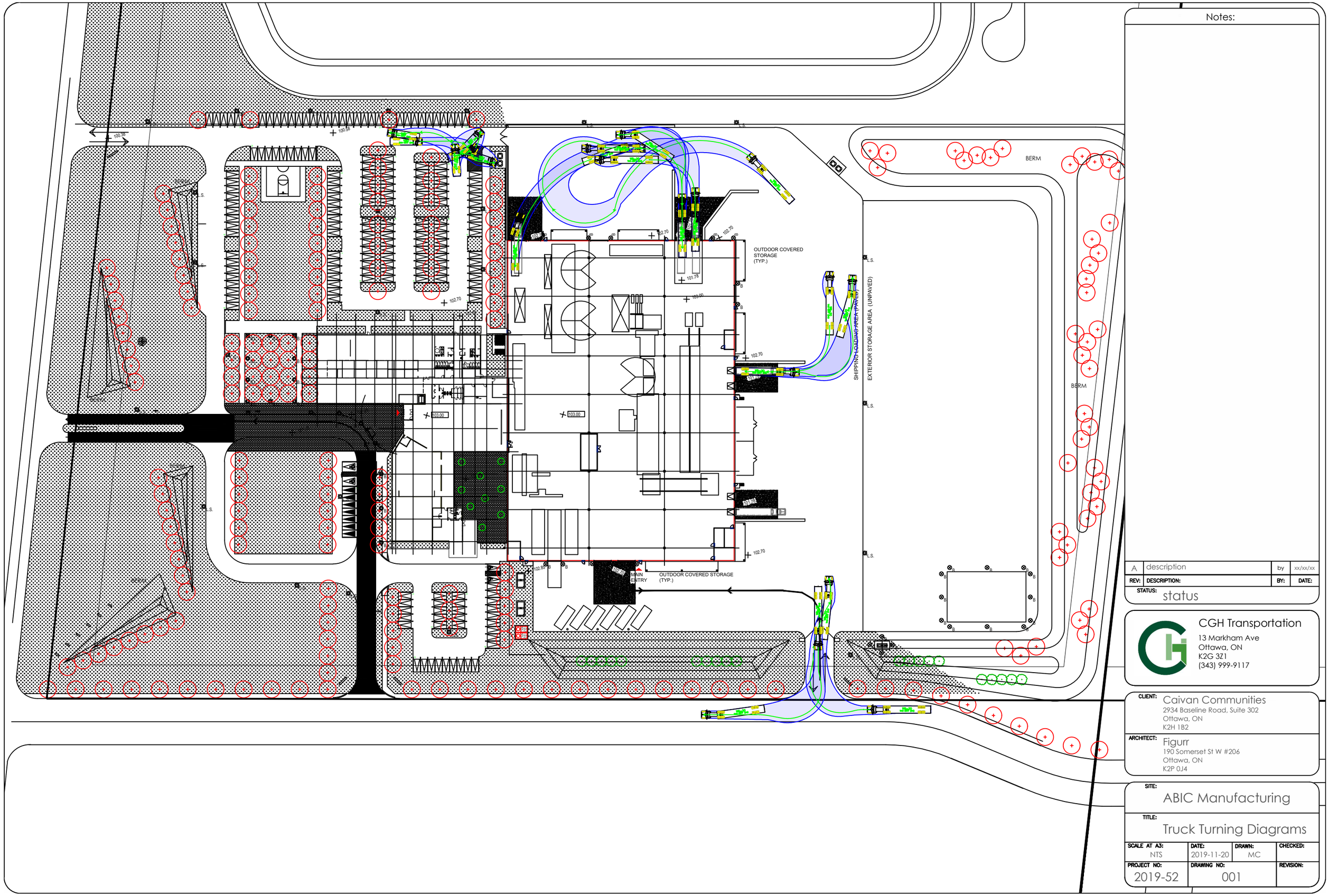
		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		3. TRANSIT	
		3.1 Transit information	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances	☒
BASIC	3.1.2	Provide online links to OC Transpo and STO information	☒
BETTER	3.1.3	Provide real-time arrival information display at entrances	☐
		3.2 Transit fare incentives	
		Commuter travel	
BETTER	3.2.1	Offer preloaded PRESTO cards to encourage commuters to use transit	☐
BETTER ★	3.2.2	Subsidize or reimburse monthly transit pass purchases by employees	☐
		Visitor travel	
BETTER	3.2.3	Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	☐
		3.3 Enhanced public transit service	
		Commuter travel	
BETTER	3.3.1	Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends)	☒
		Visitor travel	
BETTER	3.3.2	Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	☐
		3.4 Private transit service	
		Commuter travel	
BETTER	3.4.1	Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for shift changes, weekends)	☐
		Visitor travel	
BETTER	3.4.2	Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for festivals, concerts, games)	☐

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		4. RIDESHARING	
		4.1 Ridematching service	
		Commuter travel	
BASIC	★ 4.1.1	Provide a dedicated ridematching portal at OttawaRideMatch.com	☐
		4.2 Carpool parking price incentives	
		Commuter travel	
BETTER	4.2.1	Provide discounts on parking costs for registered carpools	☒
		4.3 Vanpool service	
		Commuter travel	
BETTER	4.3.1	Provide a vanpooling service for long-distance commuters	☐
		5. CARSHARING & BIKESHARING	
		5.1 Bikeshare stations & memberships	
BETTER	5.1.1	Contract with provider to install on-site bikeshare station for use by commuters and visitors	☐
		Commuter travel	
BETTER	5.1.2	Provide employees with bikeshare memberships for local business travel	☐
		5.2 Carshare vehicles & memberships	
		Commuter travel	
BETTER	5.2.1	Contract with provider to install on-site carshare vehicles and promote their use by tenants	☐
BETTER	5.2.2	Provide employees with carshare memberships for local business travel	☐
		6. PARKING	
		6.1 Priced parking	
		Commuter travel	
BASIC	★ 6.1.1	Charge for long-term parking (daily, weekly, monthly)	☒
BASIC	6.1.2	Unbundle parking cost from lease rates at multi-tenant sites	☐
		Visitor travel	
BETTER	6.1.3	Charge for short-term parking (hourly)	☐

			TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		7.	**TDM MARKETING & COMMUNICATIONS**	
		7.1	**Multimodal travel information**	
			Commuter travel	
BASIC	★	7.1.1	Provide a multimodal travel option information package to new/relocating employees and students	☒
			Visitor travel	
BETTER	★	7.1.2	Include multimodal travel option information in invitations or advertising that attract visitors or customers (e.g. for festivals, concerts, games)	☐
		7.2	**Personalized trip planning**	
			Commuter travel	
BETTER	★	7.2.1	Offer personalized trip planning to new/relocating employees	☐
		7.3	**Promotions**	
			Commuter travel	
BETTER		7.3.1	Deliver promotions and incentives to maintain awareness, build understanding, and encourage trial of sustainable modes	☐
		8.	**OTHER INCENTIVES & AMENITIES**	
		8.1	**Emergency ride home**	
			Commuter travel	
BETTER	★	8.1.1	Provide emergency ride home service to non-driving commuters	☐
		8.2	**Alternative work arrangements**	
			Commuter travel	
BASIC	★	8.2.1	Encourage flexible work hours	☒ For office workers only
BETTER		8.2.2	Encourage compressed workweeks	☐
BETTER	★	8.2.3	Encourage telework	☒ For office workers only
		8.3	**Local business travel options**	
			Commuter travel	
BASIC	★	8.3.1	Provide local business travel options that minimize the need for employees to bring a personal car to work	☐
		8.4	**Commuter incentives**	
			Commuter travel	
BETTER		8.4.1	Offer employees a taxable, mode-neutral commuting allowance	☐
		8.5	**On-site amenities**	
			Commuter travel	
BETTER		8.5.1	Provide on-site amenities/services to minimize mid-day or mid-commute errands	☐

Appendix H

Turning Templates



Notes:

REV:	DESCRIPTION:	BY:	DATE:
A	description	by	xx/xx/xx

STATUS: status

CGH Transportation
13 Markham Ave
Ottawa, ON
K2G 3Z1
(343) 999-9117

CLIENT: Caivan Communities
2934 Baseline Road, Suite 302
Ottawa, ON
K2H 1B2

ARCHITECT: Figurr
190 Somerset St W #206
Ottawa, ON
K2P 0J4

SITE: ABIC Manufacturing

TITLE: Truck Turning Diagrams

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2019-11-20	MC	

PROJECT NO:	DRAWING NO:	REVISION:
2019-52	001	

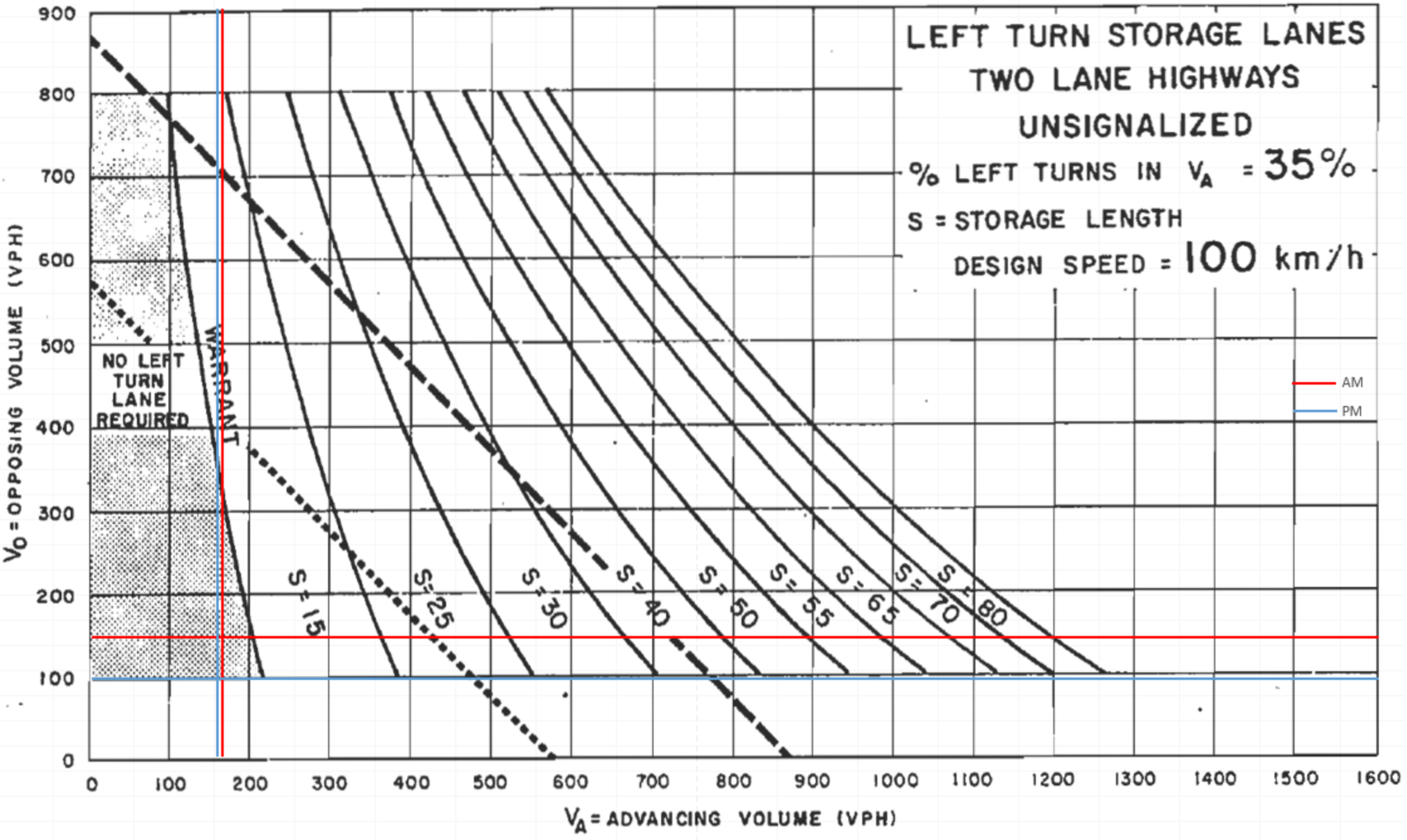
Appendix I

Left-turn Lane Warrants

Appendix I(1)

Left-turn Lane Warrants:
Access #1 2022 FT

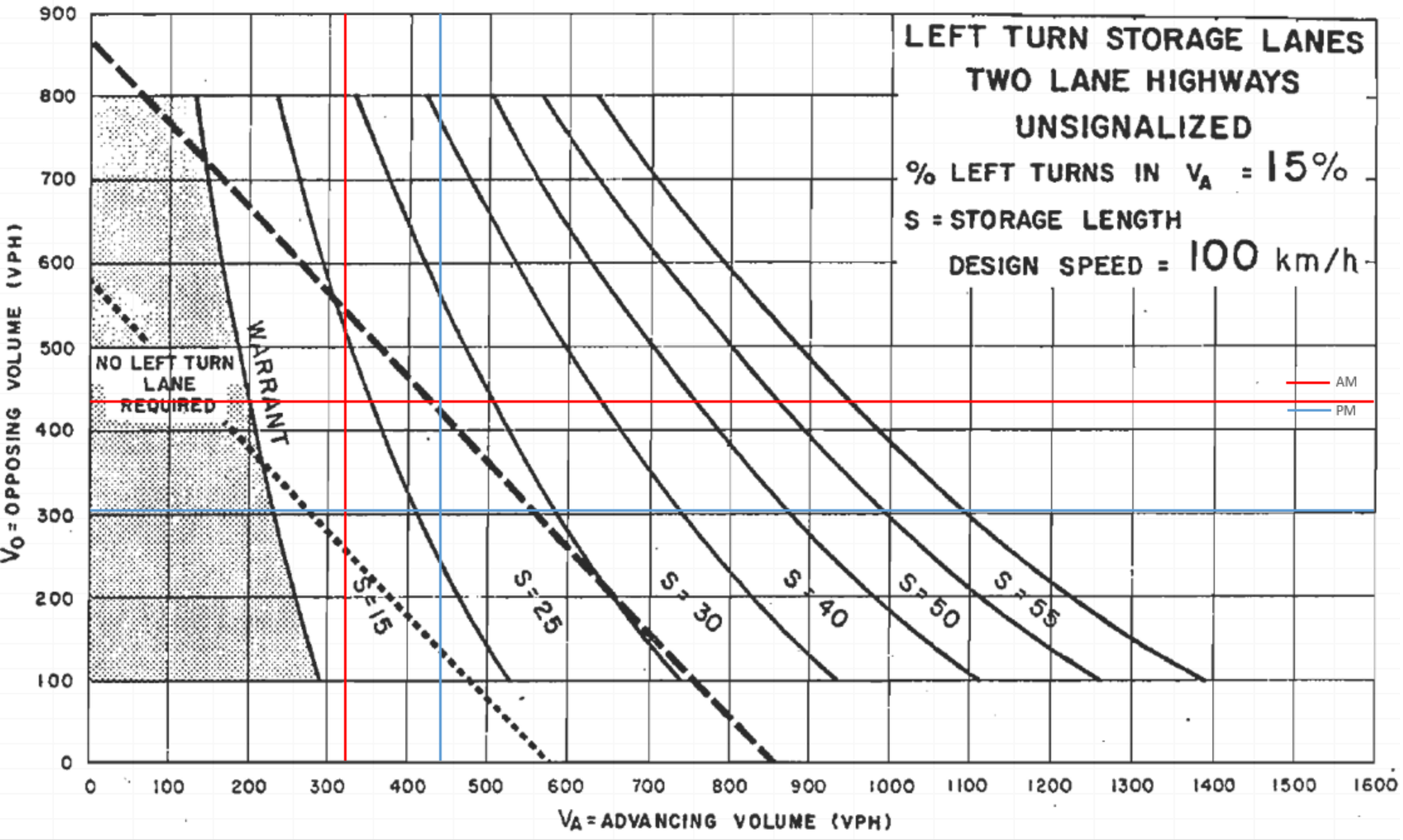
Design Speed	Southbound Left									Yes					
100 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	0	0	0	0	0	0	17	0	145	0	51	111	0	31.5%	162	145
PM	0	0	0	0	0	0	64	0	95	0	30	125	0	19.4%	155	95


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 35%
S = STORAGE LENGTH
DESIGN SPEED = 100 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
S=65
S=70
S=80
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Appendix I(2)

Left-turn Lane Warrants:
Access #1 2027 FT

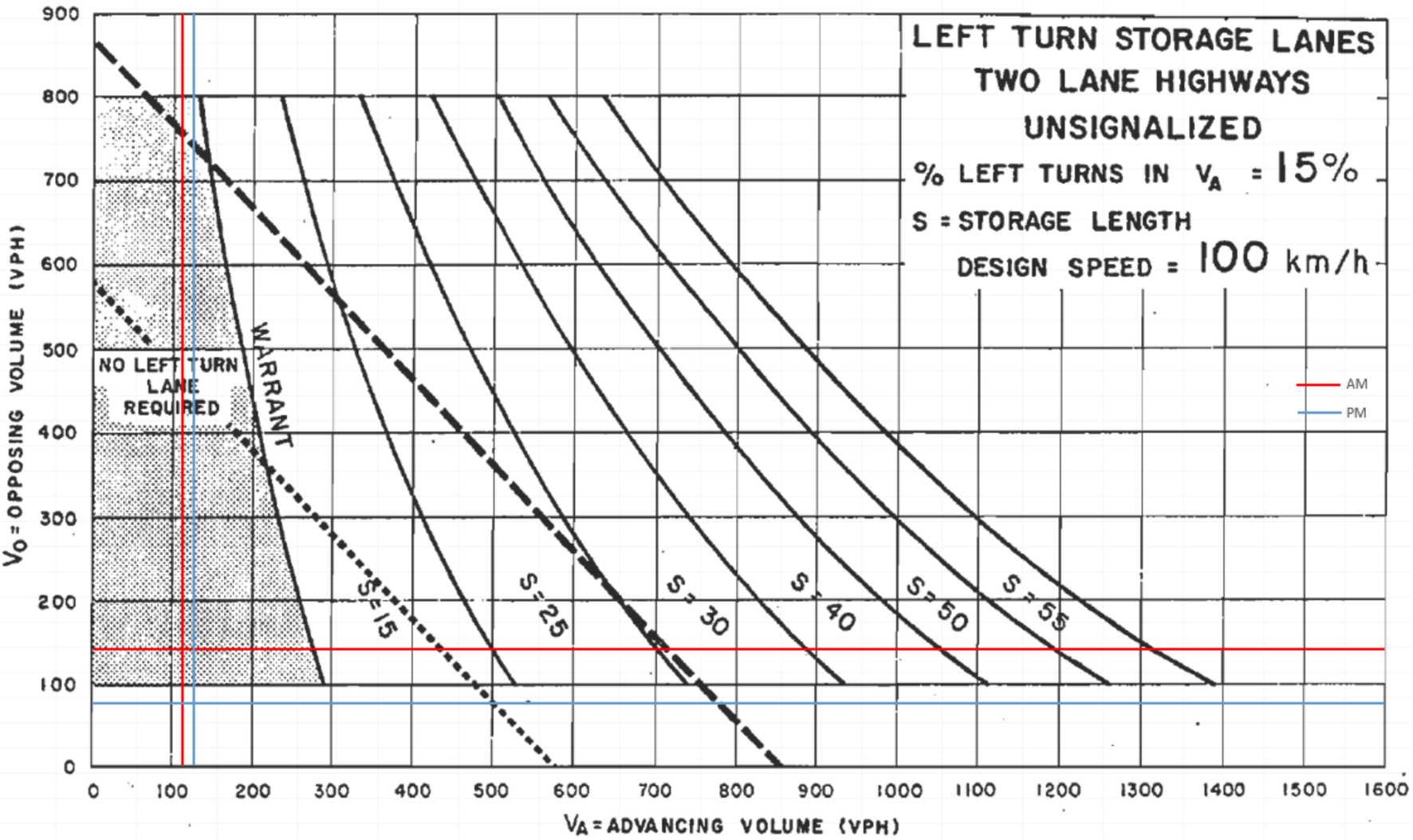
Design Speed	Southbound Left									Yes					
100 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	0	0	0	0	0	0	17	0	434	0	51	267	0	16.0%	318	434
PM	0	0	0	0	0	0	64	0	303	0	30	407	0	6.9%	437	303


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 15%
S = STORAGE LENGTH
DESIGN SPEED = 100 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Appendix I(3)

Left-turn Lane Warrants:
Access #2 2022 FT

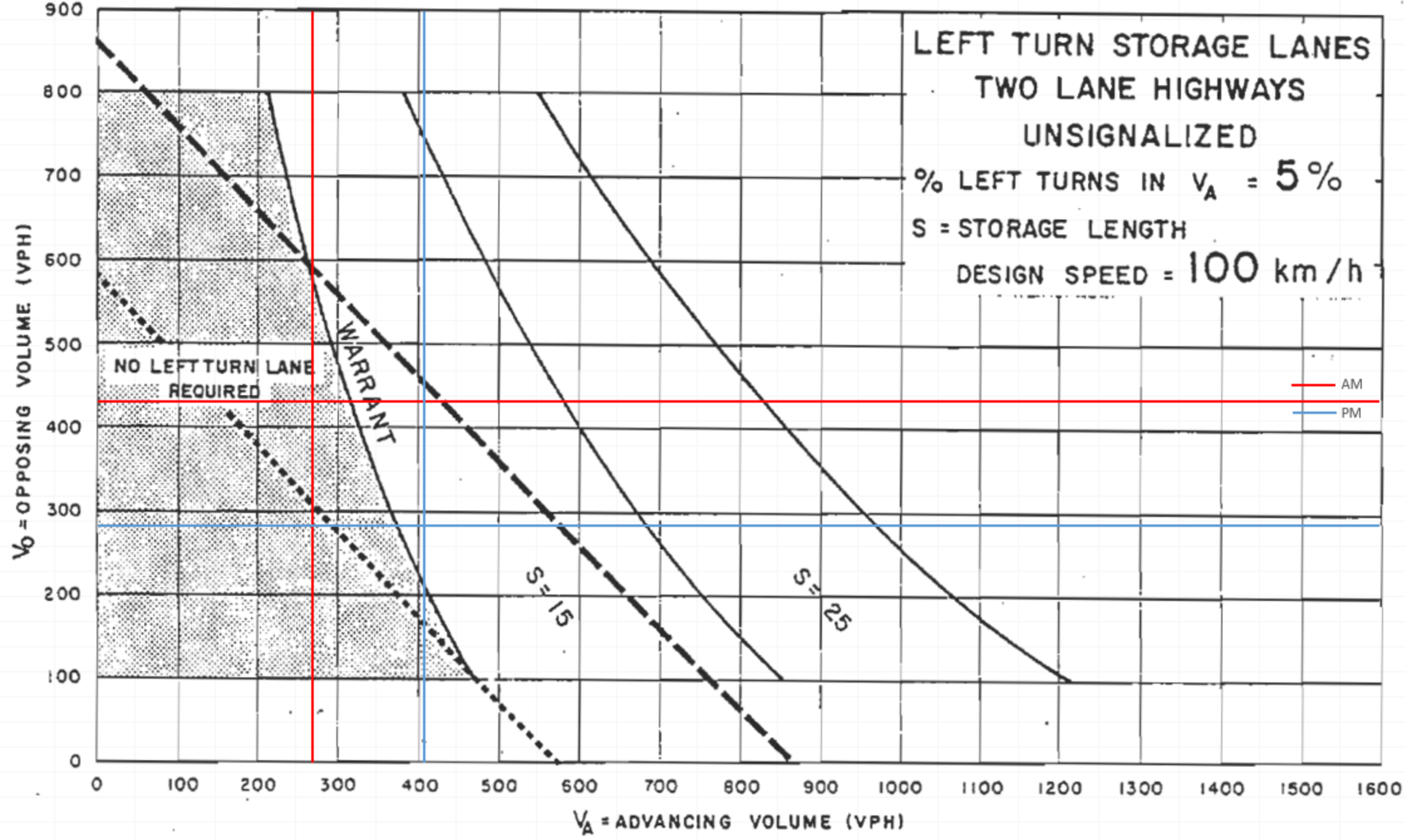
Design Speed	Southbound Left									Yes					
100 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	0	0	0	0	0	0	5	0	140	0	16	95	0	14.4%	111	140
PM	0	0	0	0	0	0	20	0	75	0	9	116	0	7.2%	125	75


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 15%
S = STORAGE LENGTH
DESIGN SPEED = 100 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
900
800
700
600
500
400
300
200
100
0
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

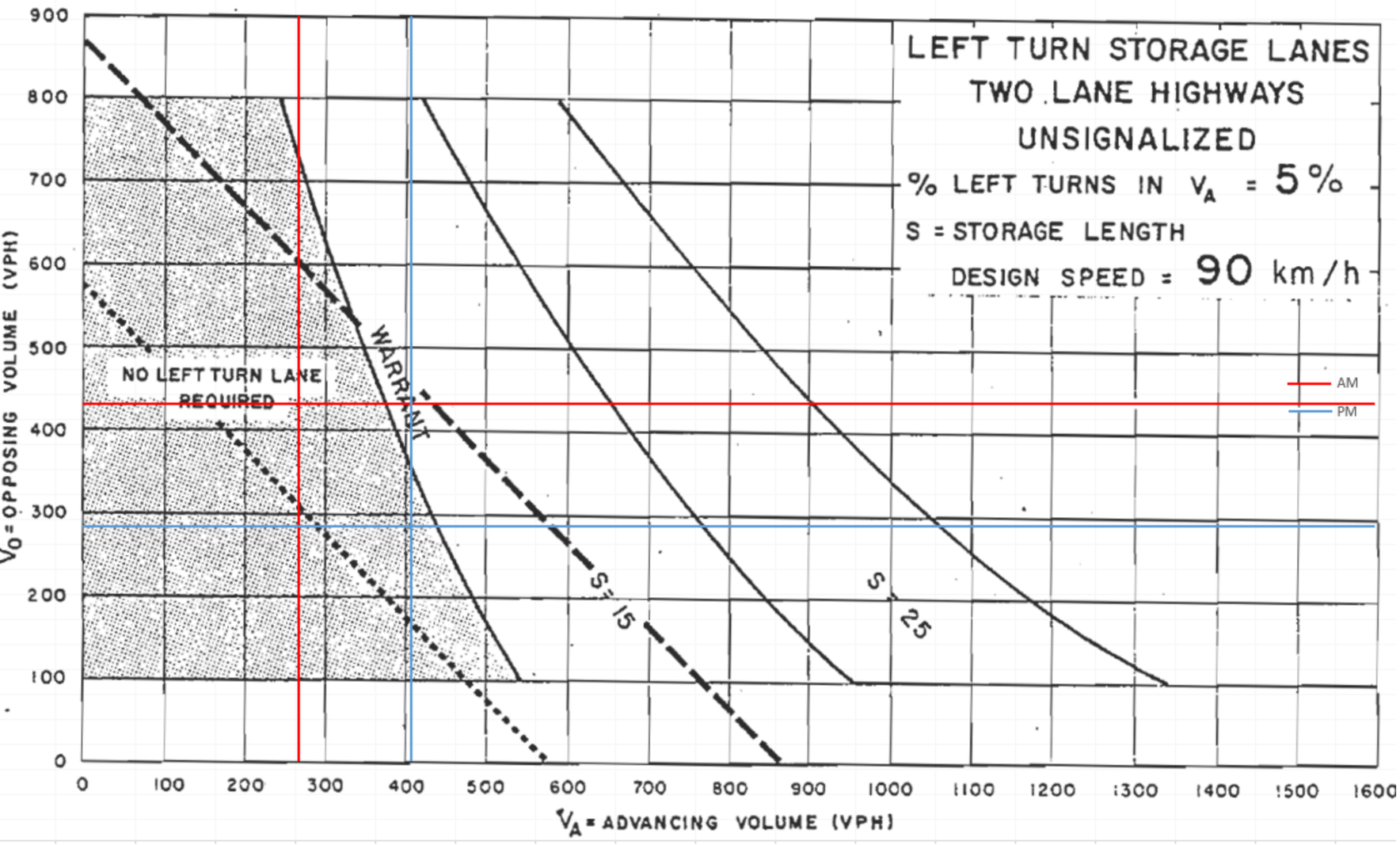
Appendix I(4)

Left-turn Lane Warrants:
Access #2 2027 FT

Design Speed	Southbound Left									Yes					
100 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	0	0	0	1	0	5	0	429	4	16	251	0	6.0%	267	433
PM	0	0	0	5	0	20	0	283	2	9	398	0	2.2%	407	285


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 5 %
S = STORAGE LENGTH
DESIGN SPEED = 100 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
900
800
700
600
500
400
300
200
100
0
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

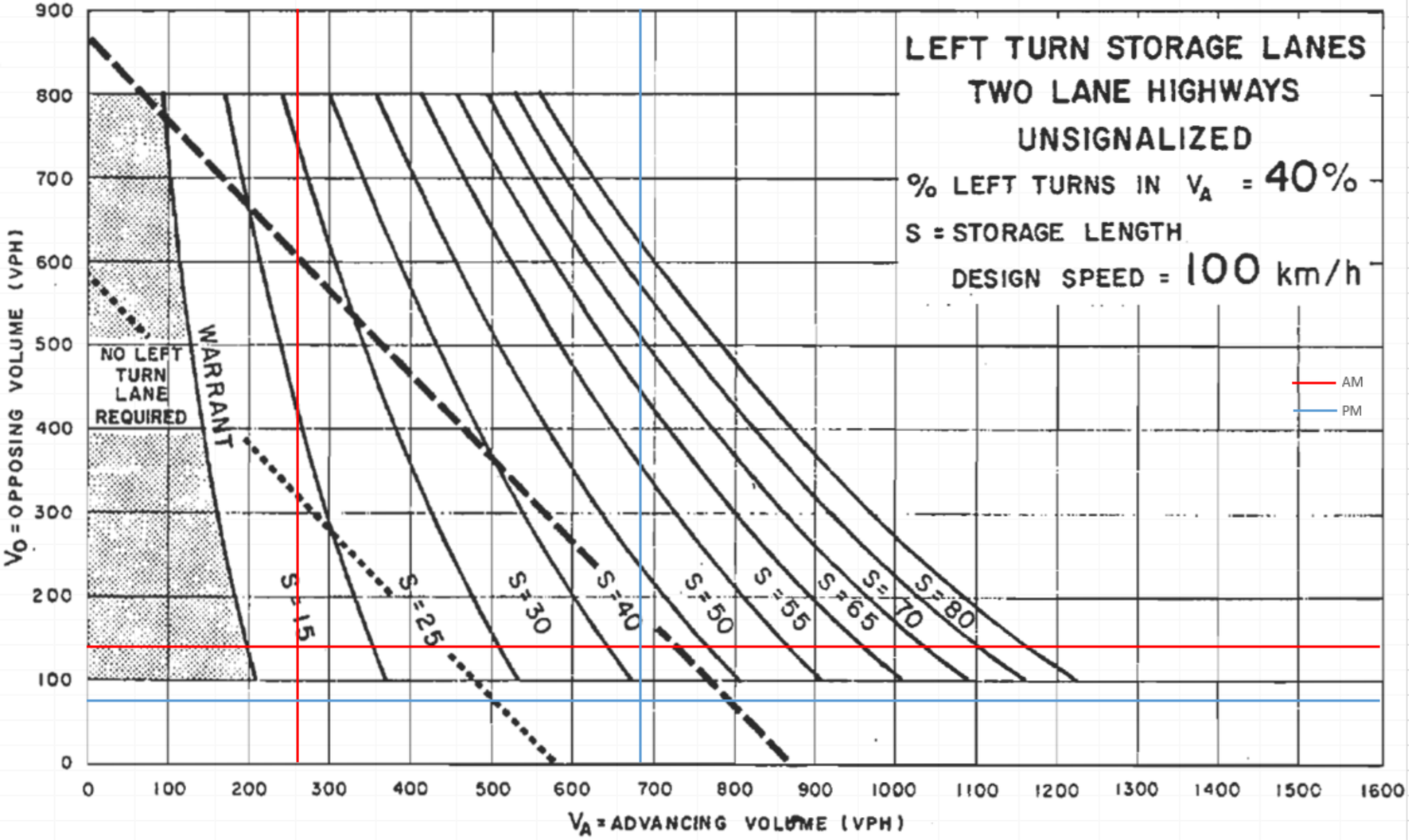
Design Speed	Southbound Left									Yes					
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	0	0	0	1	0	5	0	429	4	16	251	0	6.0%	267	433
PM	0	0	0	5	0	20	0	283	2	9	398	0	2.2%	407	285


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 5%
S = STORAGE LENGTH
DESIGN SPEED = 90 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Appendix I(5)

Left-turn Lane Warrants:
Cambrian Rd & Borrisokane Rd 2022 FB

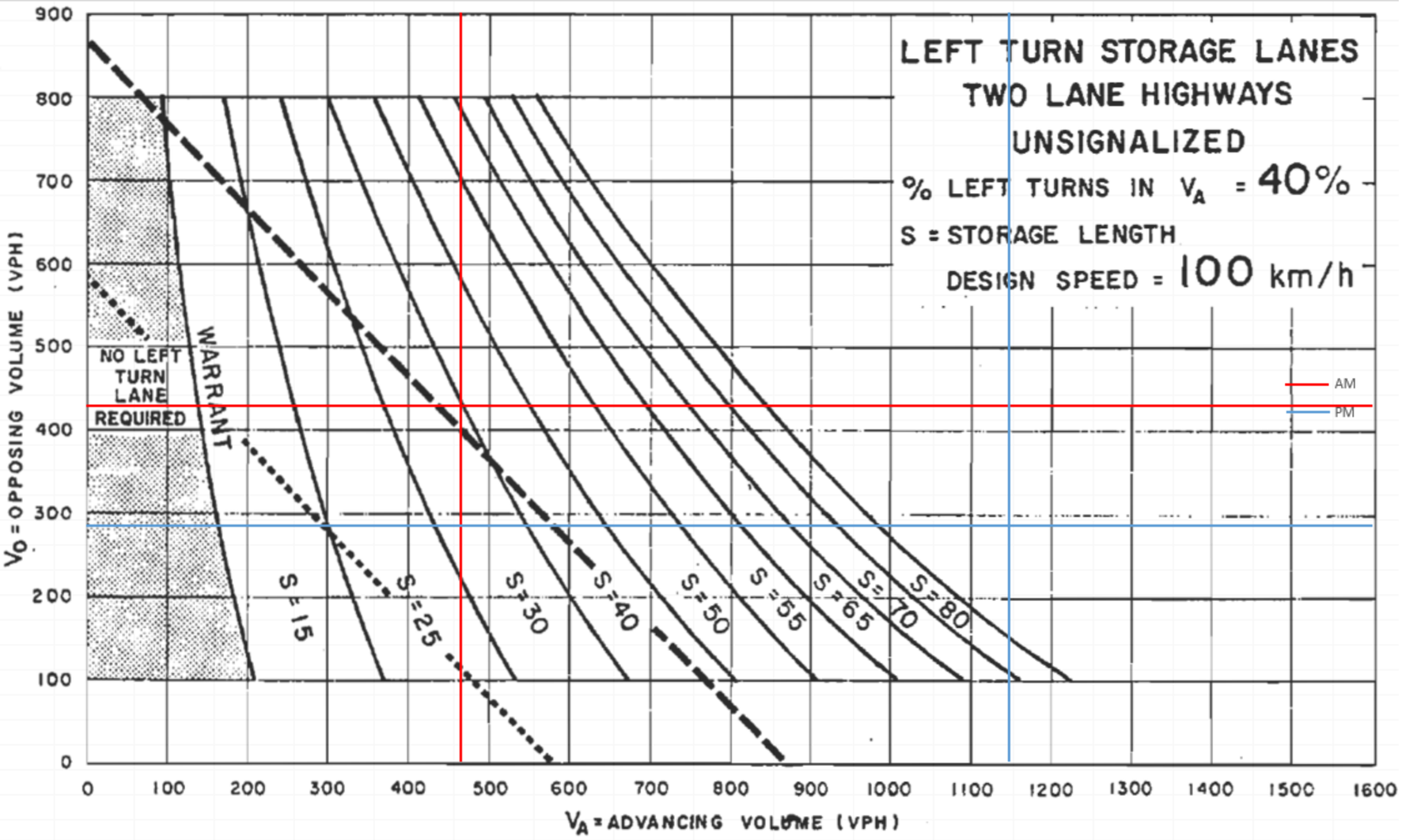
Design Speed	Southbound Left									Yes					
100 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	0	0	0	37	0	595	0	111	29	202	59	0	77.4%	261	140
PM	0	0	0	28	0	359	0	60	15	595	89	0	87.0%	684	75


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 40%
S = STORAGE LENGTH
DESIGN SPEED = 100 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
S=65
S=70
S=80
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Appendix I(6)

Left-turn Lane Warrants:
Cambrian Rd & Borrisokane Rd 2027 FB

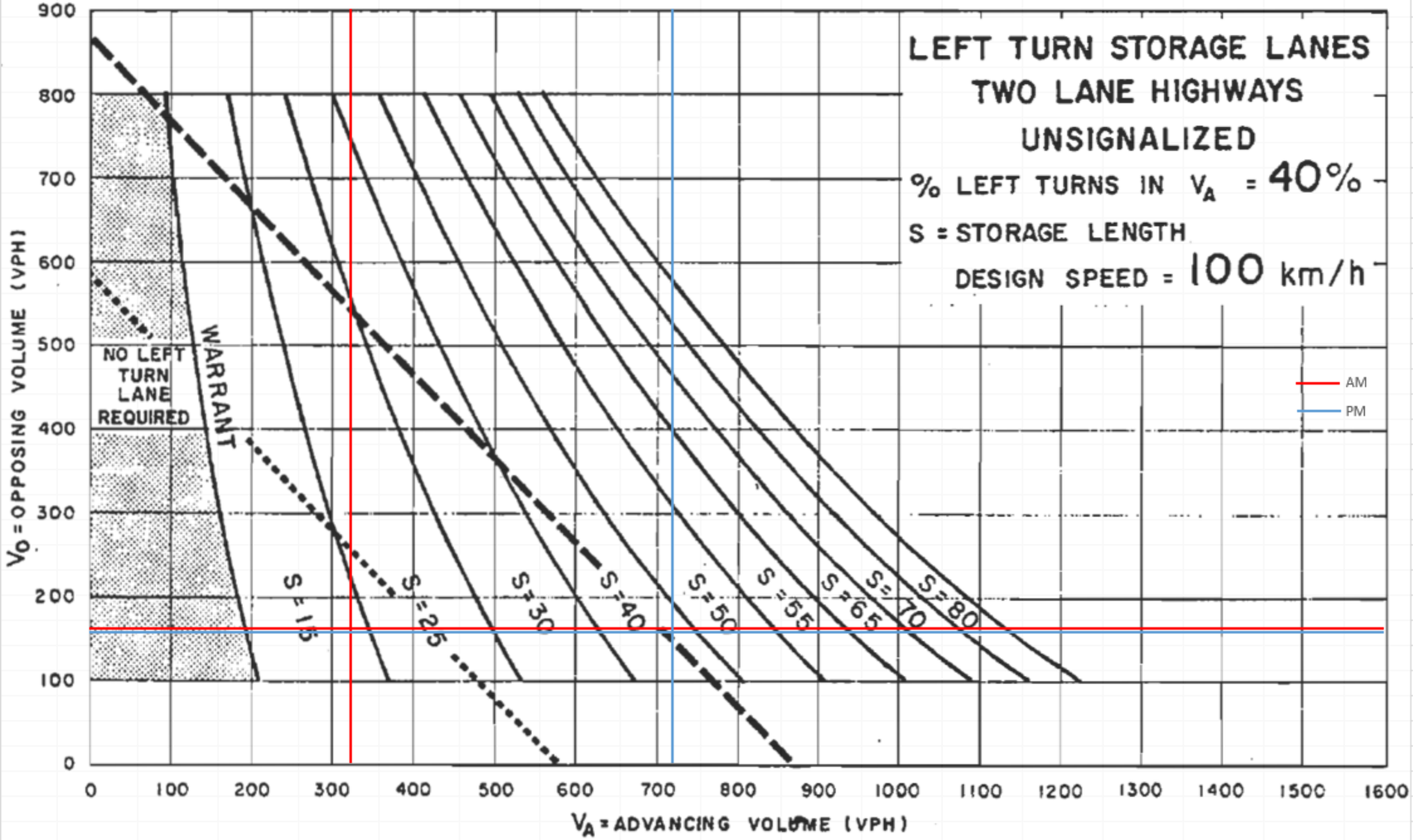
Design Speed	Southbound Left									Yes					
100 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing
	AM	0	0	0	72	0	819	0	354	75	286	180	0	61.4%	466
	PM	0	0	0	70	0	503	0	238	46	820	328	0	71.4%	1148


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 40%
S = STORAGE LENGTH
DESIGN SPEED = 100 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
S=65
S=70
S=80
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Appendix I(7)

Left-turn Lane Warrants:
Cambrian Rd & Borrisokane Rd 2022 FT

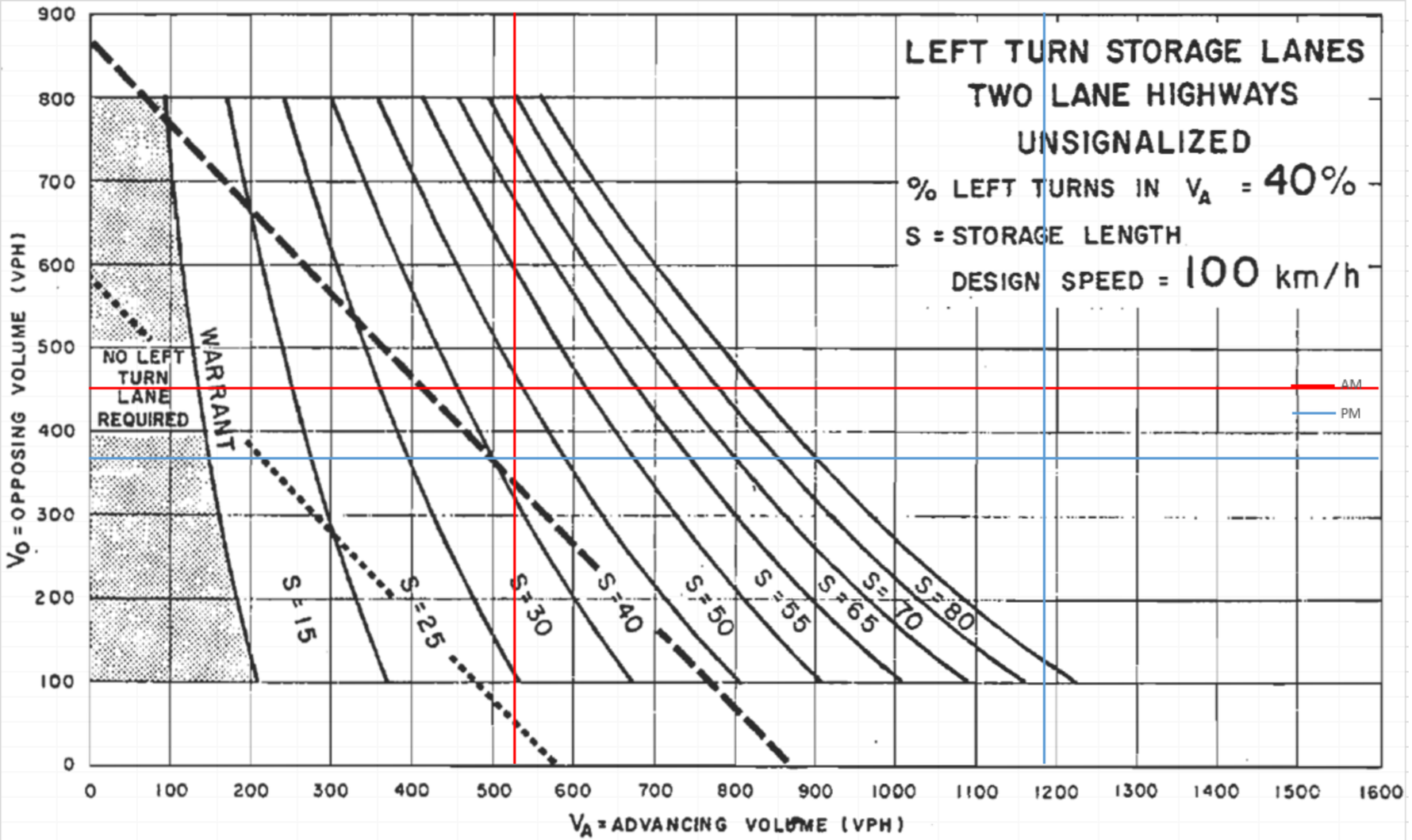
Design Speed	Southbound Left									Yes					
100 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	0	0	0	41	0	595	0	132	30	202	121	0	62.5%	323	162
PM	0	0	0	30	0	359	0	138	20	595	126	0	82.5%	721	158


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 40%
S = STORAGE LENGTH
DESIGN SPEED = 100 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
S=65
S=70
S=80
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Appendix I(8)

Left-turn Lane Warrants:
Cambrian Rd & Borrisokane Rd 2027 FT

Design Speed	Southbound Left									Yes					
100 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	0	0	0	76	0	819	0	375	76	286	242	0	54.2%	528	451
PM	0	0	0	72	0	503	0	316	51	820	365	0	69.2%	1185	367


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 40%
S = STORAGE LENGTH
DESIGN SPEED = 100 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S=15
S=25
S=30
S=40
S=50
S=55
S=65
S=70
S=80
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
900
800
700
600
500
400
300
200
100
0
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Appendix J

Signal Warrants

Cambrian Rd & Borrisokane Rd
2022 FB

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	545	76%	76%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	382	225%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	290	40%	40%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	116	155%		

Notes
1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

Cambrian Rd & Borrisokane Rd
2022 FT

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	597	83%	83%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	384	226%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	341	47%	47%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	117	157%		

Notes
1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

Cambrian Rd & Borrisokane Rd
2027 FB

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	948	132%	132%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	549	323%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	582	81%	81%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	174	232%		

Notes
1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

Cambrian Rd & Borrisokane Rd
2027 FT

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	1000	139%	139%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	551	324%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	633	88%	88%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	175	234%		

Notes
1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

Appendix K

Existing 2019 Synchro Worksheets

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	26	448	102	23	126	46
Future Volume (vph)	26	448	102	23	126	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.872		0.975			
Flt Protected	0.997					0.965
Satd. Flow (prot)	1517	0	1701	0	0	1684
Flt Permitted	0.997					0.965
Satd. Flow (perm)	1517	0	1701	0	0	1684
Link Speed (k/h)	70		80			80
Link Distance (m)	602.9		2165.3			321.8
Travel Time (s)	31.0		97.4			14.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	498	113	26	140	51
Shared Lane Traffic (%)						
Lane Group Flow (vph)	527	0	139	0	0	191
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 57.8%		ICU Level of Service B	
Analysis Period (min) 15			

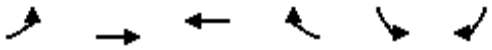
Intersection	
Int Delay, s/veh	10.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	448	102	23	126	46
Future Vol, veh/h	26	448	102	23	126	46
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	498	113	26	140	51

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	457	126	0	0	139	0
Stage 1	126	-	-	-	-	-
Stage 2	331	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	562	924	-	-	1445	-
Stage 1	900	-	-	-	-	-
Stage 2	728	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	506	924	-	-	1445	-
Mov Cap-2 Maneuver	506	-	-	-	-	-
Stage 1	900	-	-	-	-	-
Stage 2	655	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.9	0	5.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	884	1445	-
HCM Lane V/C Ratio	-	-	0.596	0.097	-
HCM Control Delay (s)	-	-	14.9	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	4.1	0.3	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	82	149	112	43	22	50
Future Volume (vph)	82	149	112	43	22	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.962		0.905	
Flt Protected		0.983			0.985	
Satd. Flow (prot)	0	1715	1679	0	1556	0
Flt Permitted		0.983			0.985	
Satd. Flow (perm)	0	1715	1679	0	1556	0
Link Speed (k/h)		80	80		80	
Link Distance (m)		324.2	761.4		2165.3	
Travel Time (s)		14.6	34.3		97.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	91	166	124	48	24	56
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	257	172	0	80	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	82	149	112	43	22	50
Future Vol, veh/h	82	149	112	43	22	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	91	166	124	48	24	56

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	172	0	-	0	496	148
Stage 1	-	-	-	-	148	-
Stage 2	-	-	-	-	348	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1405	-	-	-	533	899
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	715	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1405	-	-	-	495	899
Mov Cap-2 Maneuver	-	-	-	-	495	-
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	715	-

Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1405	-	-	-	720
HCM Lane V/C Ratio	0.065	-	-	-	0.111
HCM Control Delay (s)	7.7	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	246	48	6	450	80
Future Volume (vph)	20	246	48	6	450	80
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.875		0.984			
Flt Protected	0.996					0.959
Satd. Flow (prot)	1521	0	1717	0	0	1674
Flt Permitted	0.996					0.959
Satd. Flow (perm)	1521	0	1717	0	0	1674
Link Speed (k/h)	70		80			80
Link Distance (m)	602.9		2165.3			321.8
Travel Time (s)	31.0		97.4			14.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	273	53	7	500	89
Shared Lane Traffic (%)						
Lane Group Flow (vph)	295	0	60	0	0	589
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 61.3%		ICU Level of Service B	
Analysis Period (min) 15			

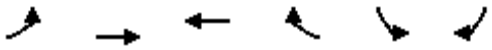
Intersection	
Int Delay, s/veh	8.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	246	48	6	450	80
Future Vol, veh/h	20	246	48	6	450	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	273	53	7	500	89

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1146	57	0	0	60	0
Stage 1	57	-	-	-	-	-
Stage 2	1089	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	220	1009	-	-	1544	-
Stage 1	966	-	-	-	-	-
Stage 2	323	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	145	1009	-	-	1544	-
Mov Cap-2 Maneuver	145	-	-	-	-	-
Stage 1	966	-	-	-	-	-
Stage 2	213	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.9	0	7.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	697	1544	-
HCM Lane V/C Ratio	-	-	0.424	0.324	-
HCM Control Delay (s)	-	-	13.9	8.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	2.1	1.4	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	30	125	169	24	59	41
Future Volume (vph)	30	125	169	24	59	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.983		0.945	
Flt Protected		0.990			0.971	
Satd. Flow (prot)	0	1728	1715	0	1601	0
Flt Permitted		0.990			0.971	
Satd. Flow (perm)	0	1728	1715	0	1601	0
Link Speed (k/h)		80	80		80	
Link Distance (m)		324.2	761.4		2165.3	
Travel Time (s)		14.6	34.3		97.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	139	188	27	66	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	172	215	0	112	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	30	125	169	24	59	41
Future Vol, veh/h	30	125	169	24	59	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	139	188	27	66	46

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	215	0	-	0	407	202
Stage 1	-	-	-	-	202	-
Stage 2	-	-	-	-	205	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1355	-	-	-	600	839
Stage 1	-	-	-	-	832	-
Stage 2	-	-	-	-	829	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1355	-	-	-	584	839
Mov Cap-2 Maneuver	-	-	-	-	584	-
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	829	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1355	-	-	-	667
HCM Lane V/C Ratio	0.025	-	-	-	0.167
HCM Control Delay (s)	7.7	0	-	-	11.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Appendix L

2022 Future Background Synchro Worksheets

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	37	595	111	29	202	59
Future Volume (vph)	37	595	111	29	202	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	115.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.873		0.972			
Flt Protected	0.997				0.950	
Satd. Flow (prot)	1519	0	1696	0	1658	1745
Flt Permitted	0.997				0.950	
Satd. Flow (perm)	1519	0	1696	0	1658	1745
Link Speed (k/h)	70		80			80
Link Distance (m)	602.9		828.5			321.8
Travel Time (s)	31.0		37.3			14.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	37	595	111	29	202	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	632	0	140	0	202	59
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

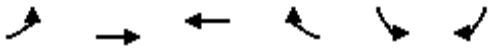
Intersection	
Int Delay, s/veh	13.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	37	595	111	29	202	59
Future Vol, veh/h	37	595	111	29	202	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	1150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	595	111	29	202	59

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	589	126	0	0	140	0
Stage 1	126	-	-	-	-	-
Stage 2	463	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	471	924	-	-	1443	-
Stage 1	900	-	-	-	-	-
Stage 2	634	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	405	924	-	-	1443	-
Mov Cap-2 Maneuver	405	-	-	-	-	-
Stage 1	900	-	-	-	-	-
Stage 2	545	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.8	0	6.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	860	1443	-
HCM Lane V/C Ratio	-	-	0.735	0.14	-
HCM Control Delay (s)	-	-	19.8	7.9	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	6.7	0.5	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	92	158	119	48	30	66
Future Volume (vph)	92	158	119	48	30	66
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.961		0.907	
Flt Protected		0.982			0.985	
Satd. Flow (prot)	0	1714	1677	0	1559	0
Flt Permitted		0.982			0.985	
Satd. Flow (perm)	0	1714	1677	0	1559	0
Link Speed (k/h)		80	80		80	
Link Distance (m)		324.2	761.4		1316.9	
Travel Time (s)		14.6	34.3		59.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	92	158	119	48	30	66
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	250	167	0	96	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	92	158	119	48	30	66
Future Vol, veh/h	92	158	119	48	30	66
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	158	119	48	30	66

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	167	0	-	0	485	143
Stage 1	-	-	-	-	143	-
Stage 2	-	-	-	-	342	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1411	-	-	-	541	905
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	719	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1411	-	-	-	503	905
Mov Cap-2 Maneuver	-	-	-	-	503	-
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	719	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	10.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1411	-	-	-	724
HCM Lane V/C Ratio	0.065	-	-	-	0.133
HCM Control Delay (s)	7.7	0	-	-	10.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	140	0	0	95
Future Volume (vph)	0	0	140	0	0	95
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1745	0	1745	0	0	1745
Flt Permitted						
Satd. Flow (perm)	1745	0	1745	0	0	1745
Link Speed (k/h)	50		80			80
Link Distance (m)	858.3		1316.9			828.5
Travel Time (s)	61.8		59.3			37.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	140	0	0	95
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	140	0	0	95
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 11.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	140	0	0	95
Future Vol, veh/h	0	0	140	0	0	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	140	0	0	95

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	235	140	0	0	140	0
Stage 1	140	-	-	-	-	-
Stage 2	95	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	753	908	-	-	1443	-
Stage 1	887	-	-	-	-	-
Stage 2	929	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	753	908	-	-	1443	-
Mov Cap-2 Maneuver	753	-	-	-	-	-
Stage 1	887	-	-	-	-	-
Stage 2	929	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1443	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	28	359	60	15	595	89
Future Volume (vph)	28	359	60	15	595	89
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	115.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.875		0.973			
Flt Protected	0.996				0.950	
Satd. Flow (prot)	1521	0	1698	0	1658	1745
Flt Permitted	0.996				0.950	
Satd. Flow (perm)	1521	0	1698	0	1658	1745
Link Speed (k/h)	70		80			80
Link Distance (m)	602.9		828.5			321.8
Travel Time (s)	31.0		37.3			14.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	28	359	60	15	595	89
Shared Lane Traffic (%)						
Lane Group Flow (vph)	387	0	75	0	595	89
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 73.2%		ICU Level of Service D	
Analysis Period (min) 15			

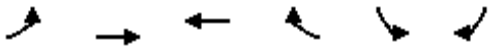
Intersection	
Int Delay, s/veh	11.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	28	359	60	15	595	89
Future Vol, veh/h	28	359	60	15	595	89
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	1150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	359	60	15	595	89

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1347	68	0	0	75	0
Stage 1	68	-	-	-	-	-
Stage 2	1279	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	167	995	-	-	1524	-
Stage 1	955	-	-	-	-	-
Stage 2	261	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	102	995	-	-	1524	-
Mov Cap-2 Maneuver	102	-	-	-	-	-
Stage 1	955	-	-	-	-	-
Stage 2	159	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.6	0	7.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	609	1524	-
HCM Lane V/C Ratio	-	-	0.635	0.39	-
HCM Control Delay (s)	-	-	20.6	8.9	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	4.5	1.9	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	42	133	179	33	69	48
Future Volume (vph)	42	133	179	33	69	48
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.979		0.945	
Flt Protected		0.988			0.971	
Satd. Flow (prot)	0	1724	1708	0	1601	0
Flt Permitted		0.988			0.971	
Satd. Flow (perm)	0	1724	1708	0	1601	0
Link Speed (k/h)		80	80		80	
Link Distance (m)		324.2	761.4		1316.9	
Travel Time (s)		14.6	34.3		59.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	42	133	179	33	69	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	175	212	0	117	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	42	133	179	33	69	48
Future Vol, veh/h	42	133	179	33	69	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	133	179	33	69	48

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	212	0	-	0	413	196
Stage 1	-	-	-	-	196	-
Stage 2	-	-	-	-	217	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1358	-	-	-	595	845
Stage 1	-	-	-	-	837	-
Stage 2	-	-	-	-	819	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1358	-	-	-	575	845
Mov Cap-2 Maneuver	-	-	-	-	575	-
Stage 1	-	-	-	-	809	-
Stage 2	-	-	-	-	819	-

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1358	-	-	-	662
HCM Lane V/C Ratio	0.031	-	-	-	0.177
HCM Control Delay (s)	7.7	0	-	-	11.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	75	0	0	116
Future Volume (vph)	0	0	75	0	0	116
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1745	0	1745	0	0	1745
Flt Permitted						
Satd. Flow (perm)	1745	0	1745	0	0	1745
Link Speed (k/h)	50		80			80
Link Distance (m)	858.3		1316.9			828.5
Travel Time (s)	61.8		59.3			37.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	75	0	0	116
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	75	0	0	116
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 9.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	75	0	0	116
Future Vol, veh/h	0	0	75	0	0	116
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	75	0	0	116

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	191	75	0	0	75	0
Stage 1	75	-	-	-	-	-
Stage 2	116	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	798	986	-	-	1524	-
Stage 1	948	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	798	986	-	-	1524	-
Mov Cap-2 Maneuver	798	-	-	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	909	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1524	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Appendix M

2027 Future Background Synchro Worksheets

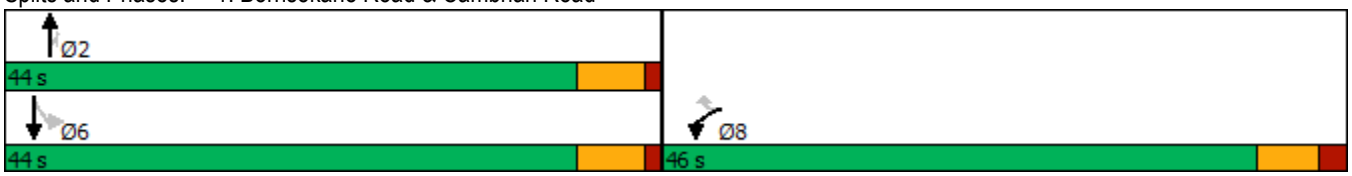
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	72	819	354	75	286	180
Future Volume (vph)	72	819	354	75	286	180
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0	0.0		100.0	130.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	50.0				100.0	
Lane Util. 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)	1658	1483	1745	1483	1658	1745
Flt Permitted	0.950				0.458	
Satd. Flow (perm)	1658	1483	1745	1483	799	1745
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		372		75		
Link Speed (k/h)	70		80			80
Link Distance (m)	602.9		828.5			321.8
Travel Time (s)	31.0		37.3			14.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	819	354	75	286	180
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	819	354	75	286	180
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	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
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	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
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	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	

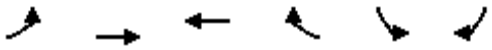
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.2	30.2	29.7	29.7	29.7	29.7
Total Split (s)	46.0	46.0	44.0	44.0	44.0	44.0
Total Split (%)	51.1%	51.1%	48.9%	48.9%	48.9%	48.9%
Maximum Green (s)	39.8	39.8	38.3	38.3	38.3	38.3
Yellow Time (s)	4.2	4.2	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	1.1	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	5.7	5.7	5.7	5.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	37.2	37.2	38.4	38.4	38.4	38.4
Actuated g/C Ratio	0.42	0.42	0.44	0.44	0.44	0.44
v/c Ratio	0.10	0.97	0.46	0.11	0.82	0.24
Control Delay	15.2	39.4	20.6	4.5	43.9	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.2	39.4	20.6	4.5	43.9	17.3
LOS	B	D	C	A	D	B
Approach Delay	37.5		17.8			33.6
Approach LOS	D		B			C
Queue Length 50th (m)	7.0	82.7	42.9	0.0	43.0	19.4
Queue Length 95th (m)	14.7	#170.1	66.7	7.5	#89.4	33.3
Internal Link Dist (m)	578.9		804.5			297.8
Turn Bay Length (m)	100.0			100.0	130.0	
Base Capacity (vph)	755	878	765	692	350	765
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	0.10	0.93	0.46	0.11	0.82	0.24

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 87.6			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 31.7		Intersection LOS: C	
Intersection Capacity Utilization 83.1%		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: 1: Borrisokane Road & Cambrian Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	118	175	131	61	44	98
Future Volume (vph)	118	175	131	61	44	98
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.957		0.907	
Flt Protected		0.980			0.985	
Satd. Flow (prot)	0	1710	1670	0	1559	0
Flt Permitted		0.980			0.985	
Satd. Flow (perm)	0	1710	1670	0	1559	0
Link Speed (k/h)		80	80		80	
Link Distance (m)		324.2	761.4		1316.9	
Travel Time (s)		14.6	34.3		59.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	118	175	131	61	44	98
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	293	192	0	142	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 46.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	118	175	131	61	44	98
Future Vol, veh/h	118	175	131	61	44	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	118	175	131	61	44	98

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	192	0	-	0	573	162
Stage 1	-	-	-	-	162	-
Stage 2	-	-	-	-	411	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1381	-	-	-	481	883
Stage 1	-	-	-	-	867	-
Stage 2	-	-	-	-	669	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1381	-	-	-	435	883
Mov Cap-2 Maneuver	-	-	-	-	435	-
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	669	-

Approach	EB	WB	SB
HCM Control Delay, s	3.2	0	11.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1381	-	-	-	669
HCM Lane V/C Ratio	0.085	-	-	-	0.212
HCM Control Delay (s)	7.8	0	-	-	11.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.8

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	14	257	172	7	124	127
Future Volume (vph)	14	257	172	7	124	127
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.872		0.995			
Flt Protected	0.997					0.976
Satd. Flow (prot)	1517	0	1736	0	0	1703
Flt Permitted	0.997					0.976
Satd. Flow (perm)	1517	0	1736	0	0	1703
Link Speed (k/h)	50		80			80
Link Distance (m)	858.3		1316.9			828.5
Travel Time (s)	61.8		59.3			37.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	257	172	7	124	127
Shared Lane Traffic (%)						
Lane Group Flow (vph)	271	0	179	0	0	251
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 51.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	5.8

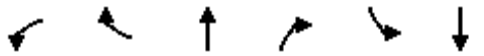
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	257	172	7	124	127
Future Vol, veh/h	14	257	172	7	124	127
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	257	172	7	124	127

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	551	176	0	0	179	0
Stage 1	176	-	-	-	-	-
Stage 2	375	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	495	867	-	-	1397	-
Stage 1	855	-	-	-	-	-
Stage 2	695	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	448	867	-	-	1397	-
Mov Cap-2 Maneuver	448	-	-	-	-	-
Stage 1	855	-	-	-	-	-
Stage 2	629	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	3.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	827	1397	-
HCM Lane V/C Ratio	-	-	0.328	0.089	-
HCM Control Delay (s)	-	-	11.5	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.4	0.3	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	70	503	238	46	820	328
Future Volume (vph)	70	503	238	46	820	328
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0	0.0		100.0	130.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	50.0				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)	1658	1483	1745	1483	1658	1745
Flt Permitted	0.950				0.431	
Satd. Flow (perm)	1658	1483	1745	1483	752	1745
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		503		46		
Link Speed (k/h)	70		80			80
Link Distance (m)	602.9		828.5			321.8
Travel Time (s)	31.0		37.3			14.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	70	503	238	46	820	328
Shared Lane Traffic (%)						
Lane Group Flow (vph)	70	503	238	46	820	328
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	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
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	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
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	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	

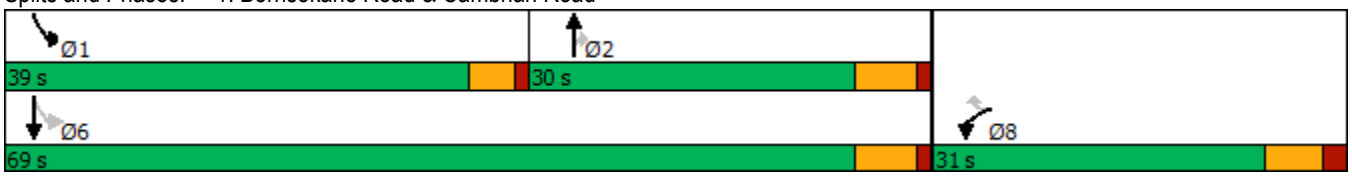


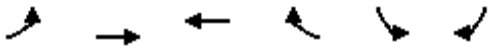
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	30.2	30.2	29.7	29.7	9.5	29.7
Total Split (s)	31.0	31.0	30.0	30.0	39.0	69.0
Total Split (%)	31.0%	31.0%	30.0%	30.0%	39.0%	69.0%
Maximum Green (s)	24.8	24.8	24.3	24.3	34.5	63.3
Yellow Time (s)	4.2	4.2	4.6	4.6	3.5	4.6
All-Red Time (s)	2.0	2.0	1.1	1.1	1.0	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	5.7	5.7	4.5	5.7
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	12.7	12.7	24.4	24.4	64.7	63.5
Actuated g/C Ratio	0.14	0.14	0.28	0.28	0.73	0.72
v/c Ratio	0.29	0.78	0.49	0.10	0.90	0.26
Control Delay	36.4	12.6	31.9	9.2	25.1	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.4	12.6	31.9	9.2	25.1	5.5
LOS	D	B	C	A	C	A
Approach Delay	15.5		28.2			19.5
Approach LOS	B		C			B
Queue Length 50th (m)	10.7	0.0	32.0	0.0	58.9	13.5
Queue Length 95th (m)	22.0	27.9	63.6	8.5	#188.7	38.0
Internal Link Dist (m)	578.9		804.5			297.8
Turn Bay Length (m)	100.0			100.0	130.0	
Base Capacity (vph)	468	779	482	443	908	1257
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	0.15	0.65	0.49	0.10	0.90	0.26

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 88.1			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 19.6		Intersection LOS: B	
Intersection Capacity Utilization 83.2%		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: 1: Borrisokane Road & Cambrian Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	63	146	198	50	93	65
Future Volume (vph)	63	146	198	50	93	65
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.973		0.944	
Flt Protected		0.985			0.971	
Satd. Flow (prot)	0	1719	1698	0	1600	0
Flt Permitted		0.985			0.971	
Satd. Flow (perm)	0	1719	1698	0	1600	0
Link Speed (k/h)		80	80		80	
Link Distance (m)		324.2	761.4		1316.9	
Travel Time (s)		14.6	34.3		59.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	63	146	198	50	93	65
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	209	248	0	158	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 45.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	63	146	198	50	93	65
Future Vol, veh/h	63	146	198	50	93	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	146	198	50	93	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	248	0	-	0	495	223
Stage 1	-	-	-	-	223	-
Stage 2	-	-	-	-	272	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1318	-	-	-	534	817
Stage 1	-	-	-	-	814	-
Stage 2	-	-	-	-	774	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1318	-	-	-	506	817
Mov Cap-2 Maneuver	-	-	-	-	506	-
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	774	-

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	13.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1318	-	-	-	600
HCM Lane V/C Ratio	0.048	-	-	-	0.263
HCM Control Delay (s)	7.9	0	-	-	13.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	184	99	13	251	147
Future Volume (vph)	10	184	99	13	251	147
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.872		0.984			
Flt Protected	0.997					0.969
Satd. Flow (prot)	1517	0	1717	0	0	1691
Flt Permitted	0.997					0.969
Satd. Flow (perm)	1517	0	1717	0	0	1691
Link Speed (k/h)	50		80			80
Link Distance (m)	858.3		1316.9			828.5
Travel Time (s)	61.8		59.3			37.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	184	99	13	251	147
Shared Lane Traffic (%)						
Lane Group Flow (vph)	194	0	112	0	0	398
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 48.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	5.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	184	99	13	251	147
Future Vol, veh/h	10	184	99	13	251	147
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	184	99	13	251	147

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	755	106	0	0	112	0
Stage 1	106	-	-	-	-	-
Stage 2	649	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	376	948	-	-	1478	-
Stage 1	918	-	-	-	-	-
Stage 2	520	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	306	948	-	-	1478	-
Mov Cap-2 Maneuver	306	-	-	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	424	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	855	1478	-
HCM Lane V/C Ratio	-	-	0.227	0.17	-
HCM Control Delay (s)	-	-	10.4	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.9	0.6	-

Appendix N

2022 Future Total Synchro Worksheets

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	41	595	132	30	202	121
Future Volume (vph)	41	595	132	30	202	121
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	115.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.874		0.975			
Flt Protected	0.997				0.950	
Satd. Flow (prot)	1521	0	1701	0	1658	1745
Flt Permitted	0.997				0.950	
Satd. Flow (perm)	1521	0	1701	0	1658	1745
Link Speed (k/h)	70		80			80
Link Distance (m)	602.9		624.0			321.8
Travel Time (s)	31.0		28.1			14.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	41	595	132	30	202	121
Shared Lane Traffic (%)						
Lane Group Flow (vph)	636	0	162	0	202	121
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

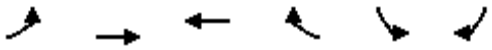
Intersection	
Int Delay, s/veh	14.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	41	595	132	30	202	121
Future Vol, veh/h	41	595	132	30	202	121
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	1150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	595	132	30	202	121

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	672	147	0	0	162	0
Stage 1	147	-	-	-	-	-
Stage 2	525	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	421	900	-	-	1417	-
Stage 1	880	-	-	-	-	-
Stage 2	593	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	361	900	-	-	1417	-
Mov Cap-2 Maneuver	361	-	-	-	-	-
Stage 1	880	-	-	-	-	-
Stage 2	508	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.7	0	5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	821	1417	-
HCM Lane V/C Ratio	-	-	0.775	0.143	-
HCM Control Delay (s)	-	-	22.7	8	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	7.7	0.5	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	100	158	119	48	30	69
Future Volume (vph)	100	158	119	48	30	69
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.961		0.906	
Flt Protected		0.981			0.985	
Satd. Flow (prot)	0	1712	1677	0	1557	0
Flt Permitted		0.981			0.985	
Satd. Flow (perm)	0	1712	1677	0	1557	0
Link Speed (k/h)		80	80		80	
Link Distance (m)		324.2	761.4		1316.9	
Travel Time (s)		14.6	34.3		59.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	158	119	48	30	69
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	258	167	0	99	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 40.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	100	158	119	48	30	69
Future Vol, veh/h	100	158	119	48	30	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	100	158	119	48	30	69

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	167	0	-	0	501	143
Stage 1	-	-	-	-	143	-
Stage 2	-	-	-	-	358	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1411	-	-	-	530	905
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	707	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1411	-	-	-	489	905
Mov Cap-2 Maneuver	-	-	-	-	489	-
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	707	-

Approach	EB	WB	SB
HCM Control Delay, s	3	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1411	-	-	-	720
HCM Lane V/C Ratio	0.071	-	-	-	0.138
HCM Control Delay (s)	7.7	0	-	-	10.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	0	144	4	0	96
Future Volume (vph)	1	0	144	4	0	96
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.996			
Flt Protected	0.950					
Satd. Flow (prot)	1658	0	1738	0	0	1745
Flt Permitted	0.950					
Satd. Flow (perm)	1658	0	1738	0	0	1745
Link Speed (k/h)	50		80			80
Link Distance (m)	122.4		1316.9			99.9
Travel Time (s)	8.8		59.3			4.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	0	144	4	0	96
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	148	0	0	96
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 18.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	0	144	4	0	96
Future Vol, veh/h	1	0	144	4	0	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	0	144	4	0	96

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	242	146	0	0	148	0
Stage 1	146	-	-	-	-	-
Stage 2	96	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	746	901	-	-	1434	-
Stage 1	881	-	-	-	-	-
Stage 2	928	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	746	901	-	-	1434	-
Mov Cap-2 Maneuver	746	-	-	-	-	-
Stage 1	881	-	-	-	-	-
Stage 2	928	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	746	1434	-
HCM Lane V/C Ratio	-	-	0.001	-	-
HCM Control Delay (s)	-	-	9.8	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	17	145	0	51	111
Future Volume (vph)	0	17	145	0	51	111
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						0.985
Satd. Flow (prot)	1510	0	1745	0	0	1719
Flt Permitted						0.985
Satd. Flow (perm)	1510	0	1745	0	0	1719
Link Speed (k/h)	50		80			80
Link Distance (m)	103.7		104.6			624.0
Travel Time (s)	7.5		4.7			28.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	17	145	0	51	111
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	145	0	0	162
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 30.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	17	145	0	51	111
Future Vol, veh/h	0	17	145	0	51	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	17	145	0	51	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	358	145	0	0	145	0
Stage 1	145	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	640	902	-	-	1437	-
Stage 1	882	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	616	902	-	-	1437	-
Mov Cap-2 Maneuver	616	-	-	-	-	-
Stage 1	882	-	-	-	-	-
Stage 2	792	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	2.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	902	1437	-
HCM Lane V/C Ratio	-	-	0.019	0.035	-
HCM Control Delay (s)	-	-	9.1	7.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	5	140	4	16	95
Future Volume (vph)	1	5	140	4	16	95
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.887		0.996			
Flt Protected	0.992					0.993
Satd. Flow (prot)	1536	0	1738	0	0	1733
Flt Permitted	0.992					0.993
Satd. Flow (perm)	1536	0	1738	0	0	1733
Link Speed (k/h)	50		80			80
Link Distance (m)	102.1		99.9			104.6
Travel Time (s)	7.4		4.5			4.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	5	140	4	16	95
Shared Lane Traffic (%)						
Lane Group Flow (vph)	6	0	144	0	0	111
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 27.6%		ICU Level of Service A	
Analysis Period (min) 15			

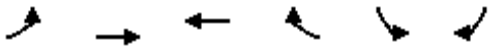
Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	5	140	4	16	95
Future Vol, veh/h	1	5	140	4	16	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	5	140	4	16	95

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	269	142	0	0	144	0
Stage 1	142	-	-	-	-	-
Stage 2	127	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	720	906	-	-	1438	-
Stage 1	885	-	-	-	-	-
Stage 2	899	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	711	906	-	-	1438	-
Mov Cap-2 Maneuver	711	-	-	-	-	-
Stage 1	885	-	-	-	-	-
Stage 2	888	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	1.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	866	1438	-
HCM Lane V/C Ratio	-	-	0.007	0.011	-
HCM Control Delay (s)	-	-	9.2	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	0	0	4	1	1
Future Volume (vph)	4	0	0	4	1	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.932	
Flt Protected		0.950			0.976	
Satd. Flow (prot)	0	1658	1510	0	1587	0
Flt Permitted		0.950			0.976	
Satd. Flow (perm)	0	1658	1510	0	1587	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		122.4	158.0		81.3	
Travel Time (s)		8.8	11.4		5.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	0	0	4	1	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	4	4	0	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	0	0	4	1	1
Future Vol, veh/h	4	0	0	4	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	0	4	1	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	4	0	-	0	10	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	8	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1618	-	-	-	1010	1082
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	1015	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1618	-	-	-	1008	1082
Mov Cap-2 Maneuver	-	-	-	-	1008	-
Stage 1	-	-	-	-	1019	-
Stage 2	-	-	-	-	1015	-

Approach	EB	WB	SB
HCM Control Delay, s	7.2	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1618	-	-	-	1044
HCM Lane V/C Ratio	0.002	-	-	-	0.002
HCM Control Delay (s)	7.2	0	-	-	8.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	359	138	20	595	126
Future Volume (vph)	30	359	138	20	595	126
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	115.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.875		0.983			
Flt Protected	0.996				0.950	
Satd. Flow (prot)	1521	0	1715	0	1658	1745
Flt Permitted	0.996				0.950	
Satd. Flow (perm)	1521	0	1715	0	1658	1745
Link Speed (k/h)	70		80			80
Link Distance (m)	602.9		624.0			321.8
Travel Time (s)	31.0		28.1			14.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	359	138	20	595	126
Shared Lane Traffic (%)						
Lane Group Flow (vph)	389	0	158	0	595	126
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

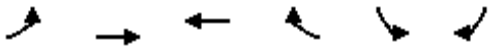
Intersection	
Int Delay, s/veh	14.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	359	138	20	595	126
Future Vol, veh/h	30	359	138	20	595	126
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	1150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	359	138	20	595	126

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1464	148	0	0	158	0
Stage 1	148	-	-	-	-	-
Stage 2	1316	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	141	899	-	-	1422	-
Stage 1	880	-	-	-	-	-
Stage 2	251	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	82	899	-	-	1422	-
Mov Cap-2 Maneuver	82	-	-	-	-	-
Stage 1	880	-	-	-	-	-
Stage 2	146	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	31.6	0	7.7
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	508	1422	-
HCM Lane V/C Ratio	-	-	0.766	0.418	-
HCM Control Delay (s)	-	-	31.6	9.3	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	6.7	2.1	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	47	133	179	33	69	58
Future Volume (vph)	47	133	179	33	69	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.979		0.938	
Flt Protected		0.987			0.974	
Satd. Flow (prot)	0	1722	1708	0	1594	0
Flt Permitted		0.987			0.974	
Satd. Flow (perm)	0	1722	1708	0	1594	0
Link Speed (k/h)		80	80		80	
Link Distance (m)		324.2	761.4		1316.9	
Travel Time (s)		14.6	34.3		59.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	47	133	179	33	69	58
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	180	212	0	127	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 40.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	47	133	179	33	69	58
Future Vol, veh/h	47	133	179	33	69	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	133	179	33	69	58

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	212	0	-	0	423	196
Stage 1	-	-	-	-	196	-
Stage 2	-	-	-	-	227	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1358	-	-	-	588	845
Stage 1	-	-	-	-	837	-
Stage 2	-	-	-	-	811	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1358	-	-	-	566	845
Mov Cap-2 Maneuver	-	-	-	-	566	-
Stage 1	-	-	-	-	806	-
Stage 2	-	-	-	-	811	-

Approach	EB	WB	SB
HCM Control Delay, s	2	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1358	-	-	-	667
HCM Lane V/C Ratio	0.035	-	-	-	0.19
HCM Control Delay (s)	7.7	0	-	-	11.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	0	77	2	0	121
Future Volume (vph)	5	0	77	2	0	121
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.997			
Flt Protected	0.950					
Satd. Flow (prot)	1658	0	1740	0	0	1745
Flt Permitted	0.950					
Satd. Flow (perm)	1658	0	1740	0	0	1745
Link Speed (k/h)	50		80			80
Link Distance (m)	122.4		1316.9			99.9
Travel Time (s)	8.8		59.3			4.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	0	77	2	0	121
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	79	0	0	121
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 16.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	0	77	2	0	121
Future Vol, veh/h	5	0	77	2	0	121
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	0	77	2	0	121

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	199	78	0	0	79	0
Stage 1	78	-	-	-	-	-
Stage 2	121	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	790	983	-	-	1519	-
Stage 1	945	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	790	983	-	-	1519	-
Mov Cap-2 Maneuver	790	-	-	-	-	-
Stage 1	945	-	-	-	-	-
Stage 2	904	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	790	1519	-
HCM Lane V/C Ratio	-	-	0.006	-	-
HCM Control Delay (s)	-	-	9.6	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	64	95	0	30	125
Future Volume (vph)	0	64	95	0	30	125
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						0.990
Satd. Flow (prot)	1510	0	1745	0	0	1728
Flt Permitted						0.990
Satd. Flow (perm)	1510	0	1745	0	0	1728
Link Speed (k/h)	50		80			80
Link Distance (m)	103.7		104.6			624.0
Travel Time (s)	7.5		4.7			28.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	64	95	0	30	125
Shared Lane Traffic (%)						
Lane Group Flow (vph)	64	0	95	0	0	155
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 26.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	64	95	0	30	125
Future Vol, veh/h	0	64	95	0	30	125
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	64	95	0	30	125

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	280	95	0	0	95	0
Stage 1	95	-	-	-	-	-
Stage 2	185	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	710	962	-	-	1499	-
Stage 1	929	-	-	-	-	-
Stage 2	847	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	694	962	-	-	1499	-
Mov Cap-2 Maneuver	694	-	-	-	-	-
Stage 1	929	-	-	-	-	-
Stage 2	828	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	1.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	962	1499	-
HCM Lane V/C Ratio	-	-	0.067	0.02	-
HCM Control Delay (s)	-	-	9	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	20	75	2	9	116
Future Volume (vph)	5	20	75	2	9	116
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.892		0.996			
Flt Protected	0.990					0.996
Satd. Flow (prot)	1541	0	1738	0	0	1738
Flt Permitted	0.990					0.996
Satd. Flow (perm)	1541	0	1738	0	0	1738
Link Speed (k/h)	50		80			80
Link Distance (m)	102.1		99.9			104.6
Travel Time (s)	7.4		4.5			4.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	20	75	2	9	116
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	0	77	0	0	125
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 23.6%		ICU Level of Service A	
Analysis Period (min) 15			

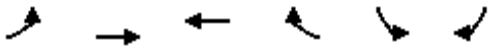
Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	20	75	2	9	116
Future Vol, veh/h	5	20	75	2	9	116
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	20	75	2	9	116

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	210	76	0	0	77	0
Stage 1	76	-	-	-	-	-
Stage 2	134	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	778	985	-	-	1522	-
Stage 1	947	-	-	-	-	-
Stage 2	892	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	773	985	-	-	1522	-
Mov Cap-2 Maneuver	773	-	-	-	-	-
Stage 1	947	-	-	-	-	-
Stage 2	887	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	934	1522	-
HCM Lane V/C Ratio	-	-	0.027	0.006	-
HCM Control Delay (s)	-	-	9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	0	0	2	5	5
Future Volume (vph)	2	0	0	2	5	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865		0.932	
Flt Protected		0.950			0.976	
Satd. Flow (prot)	0	1658	1510	0	1587	0
Flt Permitted		0.950			0.976	
Satd. Flow (perm)	0	1658	1510	0	1587	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		122.4	158.0		81.3	
Travel Time (s)		8.8	11.4		5.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2	0	0	2	5	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2	2	0	10	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	7.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	0	0	2	5	5
Future Vol, veh/h	2	0	0	2	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	0	0	2	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	2	0	-	0	5	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	4	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1620	-	-	-	1017	1084
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1019	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1620	-	-	-	1016	1084
Mov Cap-2 Maneuver	-	-	-	-	1016	-
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	1019	-

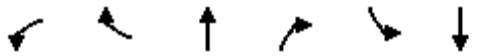
Approach	EB	WB	SB
HCM Control Delay, s	7.2	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1620	-	-	-	1049
HCM Lane V/C Ratio	0.001	-	-	-	0.01
HCM Control Delay (s)	7.2	0	-	-	8.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Appendix O

2027 Future Total Synchro Worksheets

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	76	819	375	76	286	242
Future Volume (vph)	76	819	375	76	286	242
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0	0.0		100.0	130.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	50.0				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)	1658	1483	1745	1483	1658	1745
Flt Permitted	0.950				0.438	
Satd. Flow (perm)	1658	1483	1745	1483	764	1745
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		359		76		
Link Speed (k/h)	70		80			80
Link Distance (m)	602.9		624.0			321.8
Travel Time (s)	31.0		28.1			14.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	76	819	375	76	286	242
Shared Lane Traffic (%)						
Lane Group Flow (vph)	76	819	375	76	286	242
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	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
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	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
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	Prot	NA	Perm	Perm	NA
Protected Phases	3	3	2			6
Permitted Phases				2	6	

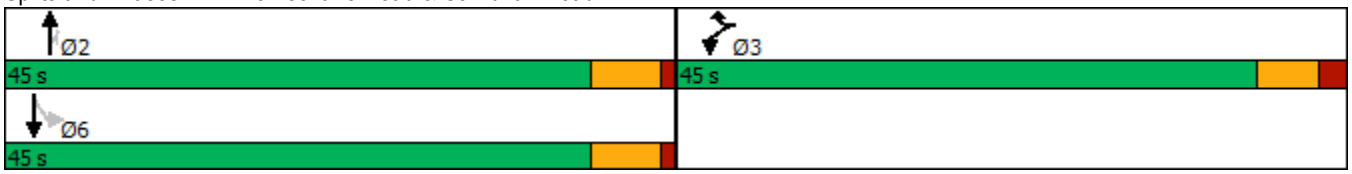


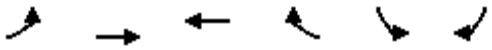
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	3	3	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.2	30.2	29.7	29.7	29.7	29.7
Total Split (s)	45.0	45.0	45.0	45.0	45.0	45.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	38.8	38.8	39.3	39.3	39.3	39.3
Yellow Time (s)	4.2	4.2	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	1.1	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	5.7	5.7	5.7	5.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	17.0	17.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	37.6	37.6	39.3	39.3	39.3	39.3
Actuated g/C Ratio	0.42	0.42	0.44	0.44	0.44	0.44
v/c Ratio	0.11	0.98	0.49	0.11	0.85	0.31
Control Delay	15.9	43.0	20.6	4.2	47.6	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	43.0	20.6	4.2	47.6	17.8
LOS	B	D	C	A	D	B
Approach Delay	40.7		17.8			33.9
Approach LOS	D		B			C
Queue Length 50th (m)	7.6	88.0	45.1	0.0	43.2	26.6
Queue Length 95th (m)	15.7	#174.5	69.6	7.3	#90.6	43.4
Internal Link Dist (m)	578.9		600.0			297.8
Turn Bay Length (m)	100.0			100.0	130.0	
Base Capacity (vph)	724	850	772	699	338	772
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	0.10	0.96	0.49	0.11	0.85	0.31

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 88.8			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 33.3		Intersection LOS: C	
Intersection Capacity Utilization 84.3%		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: 1: Borrisokane Road & Cambrian Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	126	175	131	61	44	101
Future Volume (vph)	126	175	131	61	44	101
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.957		0.906	
Flt Protected		0.979			0.985	
Satd. Flow (prot)	0	1708	1670	0	1557	0
Flt Permitted		0.979			0.985	
Satd. Flow (perm)	0	1708	1670	0	1557	0
Link Speed (k/h)		80	80		80	
Link Distance (m)		324.2	761.4		1316.9	
Travel Time (s)		14.6	34.3		59.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	126	175	131	61	44	101
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	301	192	0	145	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	126	175	131	61	44	101
Future Vol, veh/h	126	175	131	61	44	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	126	175	131	61	44	101

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	192	0	-	0	589	162
Stage 1	-	-	-	-	162	-
Stage 2	-	-	-	-	427	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1381	-	-	-	471	883
Stage 1	-	-	-	-	867	-
Stage 2	-	-	-	-	658	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1381	-	-	-	423	883
Mov Cap-2 Maneuver	-	-	-	-	423	-
Stage 1	-	-	-	-	779	-
Stage 2	-	-	-	-	658	-

Approach	EB	WB	SB
HCM Control Delay, s	3.3	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1381	-	-	-	664
HCM Lane V/C Ratio	0.091	-	-	-	0.218
HCM Control Delay (s)	7.9	0	-	-	11.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.8

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	15	257	176	11	124	128
Future Volume (vph)	15	257	176	11	124	128
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.872		0.992			
Flt Protected	0.997					0.976
Satd. Flow (prot)	1517	0	1731	0	0	1703
Flt Permitted	0.997					0.976
Satd. Flow (perm)	1517	0	1731	0	0	1703
Link Speed (k/h)	50		80			80
Link Distance (m)	122.4		1316.9			99.9
Travel Time (s)	8.8		59.3			4.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	257	176	11	124	128
Shared Lane Traffic (%)						
Lane Group Flow (vph)	272	0	187	0	0	252
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 52.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	5.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	257	176	11	124	128
Future Vol, veh/h	15	257	176	11	124	128
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	257	176	11	124	128

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	558	182	0	0	187	0
Stage 1	182	-	-	-	-	-
Stage 2	376	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	491	861	-	-	1387	-
Stage 1	849	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	444	861	-	-	1387	-
Mov Cap-2 Maneuver	444	-	-	-	-	-
Stage 1	849	-	-	-	-	-
Stage 2	627	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	3.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	819	1387	-
HCM Lane V/C Ratio	-	-	0.332	0.089	-
HCM Control Delay (s)	-	-	11.6	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.5	0.3	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	17	434	0	51	267
Future Volume (vph)	0	17	434	0	51	267
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	130.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected					0.950	
Satd. Flow (prot)	1510	0	1745	0	1658	1745
Flt Permitted					0.950	
Satd. Flow (perm)	1510	0	1745	0	1658	1745
Link Speed (k/h)	50		80			80
Link Distance (m)	103.7		104.6			624.0
Travel Time (s)	7.5		4.7			28.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	17	434	0	51	267
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	434	0	51	267
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	17	434	0	51	267
Future Vol, veh/h	0	17	434	0	51	267
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	1300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	17	434	0	51	267

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	803	434	0	0	434	0
Stage 1	434	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	353	622	-	-	1126	-
Stage 1	653	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	337	622	-	-	1126	-
Mov Cap-2 Maneuver	337	-	-	-	-	-
Stage 1	653	-	-	-	-	-
Stage 2	668	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	1.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	622	1126	-
HCM Lane V/C Ratio	-	-	0.027	0.045	-
HCM Control Delay (s)	-	-	11	8.3	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	5	429	4	16	251
Future Volume (vph)	1	5	429	4	16	251
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.887		0.999			
Flt Protected	0.992					0.997
Satd. Flow (prot)	1536	0	1743	0	0	1740
Flt Permitted	0.992					0.997
Satd. Flow (perm)	1536	0	1743	0	0	1740
Link Speed (k/h)	50		80			80
Link Distance (m)	102.1		99.9			104.6
Travel Time (s)	7.4		4.5			4.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	5	429	4	16	251
Shared Lane Traffic (%)						
Lane Group Flow (vph)	6	0	433	0	0	267
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 37.8%		ICU Level of Service A	
Analysis Period (min) 15			

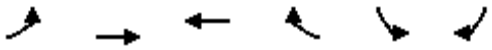
Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	5	429	4	16	251
Future Vol, veh/h	1	5	429	4	16	251
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	5	429	4	16	251

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	714	431	0	0	433	0
Stage 1	431	-	-	-	-	-
Stage 2	283	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	398	624	-	-	1127	-
Stage 1	655	-	-	-	-	-
Stage 2	765	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	392	624	-	-	1127	-
Mov Cap-2 Maneuver	392	-	-	-	-	-
Stage 1	655	-	-	-	-	-
Stage 2	753	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.4	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	568	1127	-
HCM Lane V/C Ratio	-	-	0.011	0.014	-
HCM Control Delay (s)	-	-	11.4	8.2	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	131	271	4	1	1
Future Volume (vph)	4	131	271	4	1	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.998		0.932	
Flt Protected		0.999			0.976	
Satd. Flow (prot)	0	1743	1742	0	1587	0
Flt Permitted		0.999			0.976	
Satd. Flow (perm)	0	1743	1742	0	1587	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		122.4	158.0		81.3	
Travel Time (s)		8.8	11.4		5.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	131	271	4	1	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	135	275	0	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	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			

Intersection	
Int Delay, s/veh	0.1

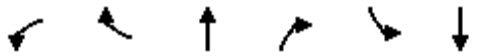
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	131	271	4	1	1
Future Vol, veh/h	4	131	271	4	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	131	271	4	1	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	275	0	-	0	412	273
Stage 1	-	-	-	-	273	-
Stage 2	-	-	-	-	139	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1288	-	-	-	596	766
Stage 1	-	-	-	-	773	-
Stage 2	-	-	-	-	888	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1288	-	-	-	594	766
Mov Cap-2 Maneuver	-	-	-	-	594	-
Stage 1	-	-	-	-	771	-
Stage 2	-	-	-	-	888	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1288	-	-	-	669
HCM Lane V/C Ratio	0.003	-	-	-	0.003
HCM Control Delay (s)	7.8	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	72	503	316	51	820	365
Future Volume (vph)	72	503	316	51	820	365
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0	0.0		100.0	130.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	50.0				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)	1658	1483	1745	1483	1658	1745
Flt Permitted	0.950				0.277	
Satd. Flow (perm)	1658	1483	1745	1483	483	1745
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		503		51		
Link Speed (k/h)	70		80			80
Link Distance (m)	602.9		624.0			321.8
Travel Time (s)	31.0		28.1			14.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	503	316	51	820	365
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	503	316	51	820	365
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	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
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	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
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	Prot	NA	Perm	pm+pt	NA
Protected Phases	3	3	2		1	6
Permitted Phases				2	6	

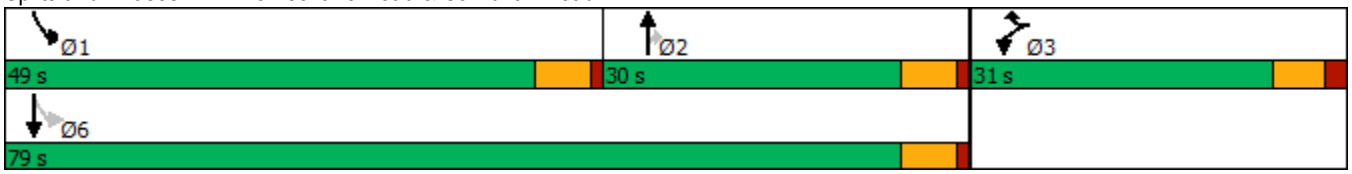


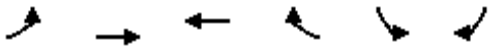
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	3	3	2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	30.2	30.2	29.7	29.7	10.7	29.7
Total Split (s)	31.0	31.0	30.0	30.0	49.0	79.0
Total Split (%)	28.2%	28.2%	27.3%	27.3%	44.5%	71.8%
Maximum Green (s)	24.8	24.8	24.3	24.3	43.3	73.3
Yellow Time (s)	4.2	4.2	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	1.1	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	5.7	5.7	5.7	5.7
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	11.4	11.4	24.4	24.4	73.6	73.6
Actuated g/C Ratio	0.12	0.12	0.25	0.25	0.76	0.76
v/c Ratio	0.37	0.81	0.72	0.12	0.92	0.28
Control Delay	44.0	15.1	45.0	10.1	32.3	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.0	15.1	45.0	10.1	32.3	4.9
LOS	D	B	D	B	C	A
Approach Delay	18.7		40.2			23.9
Approach LOS	B		D			C
Queue Length 50th (m)	12.6	0.0	52.4	0.0	94.8	14.9
Queue Length 95th (m)	25.0	30.6	#106.3	9.6	#228.6	41.9
Internal Link Dist (m)	578.9		600.0			297.8
Turn Bay Length (m)	100.0			100.0	130.0	
Base Capacity (vph)	425	754	439	411	893	1325
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	0.17	0.67	0.72	0.12	0.92	0.28

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 96.9			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 25.3		Intersection LOS: C	
Intersection Capacity Utilization 84.4%		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: 1: Borrisokane Road & Cambrian Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	68	146	198	50	93	75
Future Volume (vph)	68	146	198	50	93	75
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.973		0.940	
Flt Protected		0.984			0.973	
Satd. Flow (prot)	0	1717	1698	0	1596	0
Flt Permitted		0.984			0.973	
Satd. Flow (perm)	0	1717	1698	0	1596	0
Link Speed (k/h)		80	80		80	
Link Distance (m)		324.2	761.4		1316.9	
Travel Time (s)		14.6	34.3		59.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	68	146	198	50	93	75
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	214	248	0	168	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 46.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	68	146	198	50	93	75
Future Vol, veh/h	68	146	198	50	93	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	146	198	50	93	75

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	248	0	-	0	505	223
Stage 1	-	-	-	-	223	-
Stage 2	-	-	-	-	282	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1318	-	-	-	527	817
Stage 1	-	-	-	-	814	-
Stage 2	-	-	-	-	766	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1318	-	-	-	497	817
Mov Cap-2 Maneuver	-	-	-	-	497	-
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	766	-

Approach	EB	WB	SB
HCM Control Delay, s	2.5	0	13.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1318	-	-	-	602
HCM Lane V/C Ratio	0.052	-	-	-	0.279
HCM Control Delay (s)	7.9	0	-	-	13.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	1.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	15	184	101	15	251	152
Future Volume (vph)	15	184	101	15	251	152
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.875		0.983			
Flt Protected	0.996					0.970
Satd. Flow (prot)	1521	0	1715	0	0	1693
Flt Permitted	0.996					0.970
Satd. Flow (perm)	1521	0	1715	0	0	1693
Link Speed (k/h)	50		80			80
Link Distance (m)	122.4		1316.9			99.9
Travel Time (s)	8.8		59.3			4.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	184	101	15	251	152
Shared Lane Traffic (%)						
Lane Group Flow (vph)	199	0	116	0	0	403
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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 49.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	5.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	184	101	15	251	152
Future Vol, veh/h	15	184	101	15	251	152
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	184	101	15	251	152

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	763	109	0	0	116	0
Stage 1	109	-	-	-	-	-
Stage 2	654	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	372	945	-	-	1473	-
Stage 1	916	-	-	-	-	-
Stage 2	517	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	303	945	-	-	1473	-
Mov Cap-2 Maneuver	303	-	-	-	-	-
Stage 1	916	-	-	-	-	-
Stage 2	421	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	4.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	815	1473	-
HCM Lane V/C Ratio	-	-	0.244	0.17	-
HCM Control Delay (s)	-	-	10.8	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1	0.6	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	64	303	0	30	407
Future Volume (vph)	0	64	303	0	30	407
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0		0.0	130.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected					0.950	
Satd. Flow (prot)	1510	0	1745	0	1658	1745
Flt Permitted					0.950	
Satd. Flow (perm)	1510	0	1745	0	1658	1745
Link Speed (k/h)	50		80			80
Link Distance (m)	103.7		104.6			624.0
Travel Time (s)	7.5		4.7			28.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	64	303	0	30	407
Shared Lane Traffic (%)						
Lane Group Flow (vph)	64	0	303	0	30	407
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	64	303	0	30	407
Future Vol, veh/h	0	64	303	0	30	407
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	1300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	64	303	0	30	407

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	770	303	0	0	303	0
Stage 1	303	-	-	-	-	-
Stage 2	467	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	369	737	-	-	1258	-
Stage 1	749	-	-	-	-	-
Stage 2	631	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	360	737	-	-	1258	-
Mov Cap-2 Maneuver	360	-	-	-	-	-
Stage 1	749	-	-	-	-	-
Stage 2	616	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	737	1258	-
HCM Lane V/C Ratio	-	-	0.087	0.024	-
HCM Control Delay (s)	-	-	10.3	7.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	20	283	2	9	398
Future Volume (vph)	5	20	283	2	9	398
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.892		0.999			
Flt Protected	0.990					0.999
Satd. Flow (prot)	1541	0	1743	0	0	1743
Flt Permitted	0.990					0.999
Satd. Flow (perm)	1541	0	1743	0	0	1743
Link Speed (k/h)	50		80			80
Link Distance (m)	102.1		99.9			104.6
Travel Time (s)	7.4		4.5			4.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	20	283	2	9	398
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	0	285	0	0	407
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	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			

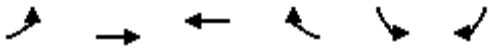
Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	20	283	2	9	398
Future Vol, veh/h	5	20	283	2	9	398
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	20	283	2	9	398

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	700	284	0	0	285	0
Stage 1	284	-	-	-	-	-
Stage 2	416	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	405	755	-	-	1277	-
Stage 1	764	-	-	-	-	-
Stage 2	666	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	401	755	-	-	1277	-
Mov Cap-2 Maneuver	401	-	-	-	-	-
Stage 1	764	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	642	1277	-
HCM Lane V/C Ratio	-	-	0.039	0.007	-
HCM Control Delay (s)	-	-	10.8	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	264	194	2	5	5
Future Volume (vph)	2	264	194	2	5	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999		0.932	
Flt Protected					0.976	
Satd. Flow (prot)	0	1745	1743	0	1587	0
Flt Permitted					0.976	
Satd. Flow (perm)	0	1745	1743	0	1587	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		122.4	158.0		81.3	
Travel Time (s)		8.8	11.4		5.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2	264	194	2	5	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	266	196	0	10	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	264	194	2	5	5
Future Vol, veh/h	2	264	194	2	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	264	194	2	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	196	0	-	0	463	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	268	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1377	-	-	-	557	846
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	777	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1377	-	-	-	556	846
Mov Cap-2 Maneuver	-	-	-	-	556	-
Stage 1	-	-	-	-	836	-
Stage 2	-	-	-	-	777	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1377	-	-	-	671
HCM Lane V/C Ratio	0.001	-	-	-	0.015
HCM Control Delay (s)	7.6	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0