

Transportation Impact Study

PROPOSED RESIDENTIAL SUBDIVISION

7370 Centre Road
UXBRIDGE, ONTARIO

April 2021
Project No: NT-20-058

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NextEng Consulting Group Inc.

April 1, 2021

Attention: Tina Fang

Bridgebrook Corp.
7681 Highway 27, Unit 16
Woodbridge, ON L4L 4M5

Re: **Transportation Impact Study
Proposed Residential Subdivision
7370 Centre Road, Township of Uxbridge
Our Project No. NT-20-058**

Nextrans Consulting Engineers (a Division of NextEng Consulting Group Inc.) is pleased to present the enclosed Transportation Impact Study for the above noted site in support of a proposed draft plan of subdivision for a residential development.

The subject site is located at 7370 Centre Road, north of Bolton Drive, between Centre Road and Concession Road 6, in the Township of Uxbridge. The subject site is currently vacant. The proposed development consists of 590 residential dwelling units (including 461 single-detached, 69 townhouse and 60 linked units). Two full moves intersections are proposed onto Concession 6 and one full moves intersection is proposed onto Centre Road which will be aligned with future Maplebrook Drive extension, to service the proposed development.

The transportation study concludes that the proposed development can adequately be accommodated by the existing transportation network, transit network as well as the Transportation Demand Management measures and incentives recommended in this report. The Study also recommended appropriate traffic calming and safety measures that are consistent with Durham's Vision Zero Strategic Road Safety Action Plan.

We trust the enclosed sufficiently addresses your needs. Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

Nextrans Consulting Engineers

A Division of NextEng Consulting Group Inc.

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Report Submission Record

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EXECUTIVE SUMMARY

Nexttrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained by Bridgebrook Corp. (the 'Client') to undertake a Transportation Impact Study in support of a proposed draft plan of subdivision for a residential development. The subject site is located at 7370 Centre Road, north of Bolton Drive, between Centre Road and Concession Road 6, in the Township of Uxbridge.

This Transportation Impact Study has been prepared in accordance with the Region of Durham Traffic Impact Study Guidelines, as well as the requirements outlined in the proposed terms of reference submitted to the Township of Uxbridge and Durham Region.

Proposed Development

The subject site is current vacant. The proposed development consists of 590 residential dwelling units (including 461 single-detached, 69 townhouse and 60 semi/linked units). For the purposes of this assessment, the proposed 60 linked residential dwelling units will be treated as townhouse units, which is consistent with the definition of the Institute of Transportation Engineers (ITE) Trip Generation Manual 10th Edition.

Proposed Development Access

Two full moves intersections are proposed onto Concession 6, with the most southerly intersection is located approximately 225 m north of the Bolton Drive/Concession 6, with the northerly intersection is located approximately 150 m north of the southerly intersection.

A full moves intersection is also proposed onto Centre Road, which is located approximately 400 m north of the Bolton Drive/Centre Road intersection and to be aligned with the future Maplebrook Drive extension located on the east side of Centre Road.

The intersection capacity analysis indicates that all three proposed development intersections are expected to operate at acceptable levels of service with minimum delays or queues. The recommended intersection configurations and traffic controls include:

1. Concession 6/Site Intersection #1:
 - a. A shared left/right lane for westbound direction;
 - b. A shared through/right lane for the northbound and a shared through/left lane for the southbound direction; and
 - c. Stop controlled on the westbound direction (minor approach)
2. Concession 6/Site Intersection #2:
 - a. A shared left/through/right lane for eastbound and westbound directions;
 - b. A shared left/through/right lane for the northbound and southbound directions; and
 - c. Stop controlled on the westbound direction (minor approach)
3. Centre Road/Site Intersection #3/Maplebrook Drive Extension:
 - a. A shared left/through/right lane for eastbound and westbound directions;
 - b. A shared left/through/right lane for the northbound and southbound directions; and
 - c. Stop controlled on the Maplebrook Drive Extension and Site Intersection #3

Transportation Analysis

Based on the analysis noted above, the proposed development is expected to generate:

- 393 total two-way trips (97 inbound and 296 outbound) and 515 total two-way trips (325 inbound and 190 outbound) during the AM and PM peak hours, respectively;
- 361 two-way auto trips (89 inbound and 272 outbound) and 474 two-way auto trips (299 inbound and 175 outbound) during the AM and PM peak hours, respectively; and
- 32 two-way none single-occupant-vehicle trips (8 inbound and 24 outbound) and 41 two-way single-occupant-vehicle trips (26 inbound and 15 outbound) during the AM and PM peak hours, respectively.

Auto Mode Assessment

The intersection capacity analysis indicates that under existing, future background and future total conditions, all the intersections considered in the Study are expected to operate at acceptable levels of service. No physical improvements to the area road network and intersections are required for this horizon year.

Active Transportation Mode Assessment

Walking

As indicated, currently, there are some sidewalks located on one side of the street along Centre Road, Bolton Drive and Oakside Drive. Sidewalks are located on both sides of the street along Brock Street W east of Quaker Village Drive/S Balsam Street through the downtown area. Sidewalks are generally in good conditions.

Based on Nextrans' review and assessment of the proposed draft plan of subdivision for the proposed development, the following recommendations are provided:

- Sidewalks be provided at least on one side of all internal streets. If possible, sidewalks be provided on both sides of the main east-west streets, if appropriate;
- Sidewalk be provided on the west side of Centre Road from the northerly limit of the proposed development to connect with the existing sidewalk on Bolton Drive and Centre Road south of Bolton Drive;
- Sidewalk be provided on the east side of Concession 6 from the northerly limit of the proposed development to connect with the existing sidewalk on the south side of Bolton Drive; and
- Two sidewalk/cycling connections provided between Bolton Drive and proposed development to connect with the existing sidewalk on the south side of Bolton Drive and sidewalks on Quaker Village Drive.

Cycling

As indicated, under the existing conditions, there are no dedicated bicycle lanes along the main streets in the area. However, there are some existing trails such as Maple Bridge Trail, Quaker Trail, Butternut Trail and S Balsam Trail in the area.

It is Nextrans' understanding that the Township of Uxbridge initiated the Active Transportation Plan project (ATP) and has retained WSP Canada Group Limited with Share the Road Cycling Coalition to support the development of the Active Transportation Plan in the Township. The project is scheduled to be completed by the end of 2020. Based on the information provided on the Township's website and notice of study commencement, the objectives of the Project are:

- Expand educational and promotional initiatives that raise awareness of active transportation opportunities for people of all ages and abilities;
- Develop a continuous Township-wide active transportation network that connects to all communities within Uxbridge and builds upon existing trail systems found within the Township; and

- Collaborate with the Active Transportation Committee, the Trails Committee and the Accessibility Advisory Committee as well as local municipal stakeholders, residents and Durham Region staff to ensure the community's interests are addressed in the plan.

An external stakeholder workshop was held on Thursday November 5th, 2020 to get the public feedback on the project. Nextrans has reviewed and provided our own assessment and recommendations related to the proposed development based on the feedbacks and objectives of the ATP project

Transit Mode Assessment

Based on the information currently provided on the Township of Uxbridge website, Durham Region Transit offers three bus routes in the Township of Uxbridge: Route 601, Route 950 and Route 960. GO Transit also offers bus service and bus stops along Toronto Street in Uxbridge and Highway 47 in Goodwood.

However, based on the current information provided on Durham Region Transit website and system map, only bus route 905D is provided in the Township of Uxbridge at this time due to current COVID-19 pandemic situation.

The proposed development is expected to generate 32 two-way none single-occupant-vehicle trips (8 inbound and 24 outbound) and 41 two-way single-occupant-vehicle trips (26 inbound and 15 outbound) during the AM and PM peak hours, respectively.

The analysis indicates that no improvements are required to the existing active transportation and Durham Region Transit/GO Bus service in the area to accommodate the proposed development and this horizon year.

Durham's Vision Zero Strategic Road Safety Action Plan

Vision Zero

Vision Zero is a Swedish program that successfully halved traffic death using failsafe systems of road design, vehicle design and speed control. It aims to remove the possibility of any death or serious injury from transportation and road systems. No loss of life resulting from a motor vehicle collision is acceptable.

The context of Vision Zero in Canada, Durham Region and the Town of Uxbridge is described below:

- Canada - <https://visionzero.ca>
 - Spreads awareness about Vision Zero and includes guides/toolkits for implementation
- Durham Region - <https://www.durham.ca/en/living-here/vision-zero.aspx>
 - Durham has a Strategic Road Safety Action Plan that is fundamentally based on Vision Zero
 - Goal: 10% reduction of fatal and injury collisions within five years (2019-2023).
 - Lists possible (but generalized) actions to meet this goal for intersections, pedestrians, cyclists, distracted driving, and more
 - Article from Nov. 2020 says that number of collisions are down but fatalities are unchanged
- In Uxbridge
 - On Apr. 6, 2020, Durham Region staff presented Vision Zero and various stats to the Uxbridge General Purpose and Administration Committee. This was Agenda Item 10.1 and moved by Councillor Snooks
 - Concession Rd 6 and Davis Dr has the greatest collision frequency in Uxbridge
 - Presentation does not include any improvements for this intersection strangely
 - Region proposing many Regional projects to implement Red Light Cameras, Roundabouts, and more in Uxbridge.
 - Goodwood and Downtown Uxbridge are the main areas receiving these improvements

- The only nearby road improvement project is a roundabout at Reg. Hwy 47 (Toronto St) at Concession Rd 6 (construction in 2025, pending Region approval)
- Uxbridge Council endorsed the meeting minutes from Apr. 6 (as Item 9.1) on Apr. 27. Moved by Councillor Popp and seconded by Councillor Snooks.

Vision Zero for the Proposed Development

As requested by the Durham Region staff, Nextrans will also recommend the proposed development to include the following requirements from Durham's Vision Zero Strategic Road Safety Action Plan. These requirements were based on Nextrans' review of Durham Region's Strategic Road Safety Action Plan ([Durham Region staff presented Vision Zero](#)). These requirements are based on the context of the proposed development.

- Roundabout
 - It is anticipated that the forecast traffic volumes at the proposed internal intersections and external intersections are very low, which will not meet the warrant for roundabout treatments. It is Nextrans' opinion that the stop signs and associated intersection treatment recommended in this Study would address these concerns
- Traffic Signal Treatments
 - As the traffic signals are not warranted for the proposed intersections as part of the proposed development, no traffic signal treatments are required at this time
- Tighter Curb Radii
 - Provide smaller turning radii at all internal and external intersections to increase pedestrian safety by minimizing the crossing distances, increasing pedestrian visibility, and decreasing vehicle turning speed
 - The proposed locations with recommended tight turn radii are illustrated in **Figure 19** of this Study
- Roadway Design to Discourage Speeding
 - Minimize the lane widths, edge lines, curb and gutter for all internal roads, as well as on Concession Road 6 and Centre Road along the frontage of the proposed development to discourage aggressive driving
- Lane Widening for Truck
 - It is recommended that the proposed development to maintain a minimum of 1.2 m to 1.5 m paved shoulder width along the frontage of the subject site along Concession Road 6 and Centre Road.
- Flexible In-Road Warning Signs
 - Given that Nextrans recommended to minimize the lane widths for all internal roads, installation of flexible in-road warning signs to guide traffic into a specific lane are not required. It is recommended that the Region and the Town consider install these flexible in-road warning signs for Concession Road 6, Centre Road, Bolton Drive, Brock Street W and Quaker Village Drive in the area
- Transverse Rumble Strips
 - It is Nextrans' opinion that this is not required for the proposed development. It is recommended that the Town consider this treatment for Centre Road southbound and northbound north and south of Bolton Drive/North Street
- Zebra Crosswalks
 - It is recommended that raised and enhanced crosswalk markings (ladder/zebra) at all all-way stop intersections and approaches with stop signs, as well as at all pedestrian crossing locations
- Crossrides
 - Given that there is no update yet on the WSP's Active Transportation Plan at the time of preparation of this Transportation Impact Study, Nextrans recommends that these requirements be reviewed as part of the

detailed and engineering design at that time. It is recommended that the proposed development protect for this treatment in the future.

- Paved Shoulders
 - It is recommended that the proposed development to maintain a minimum of 1.2 m to 1.5 m paved shoulder width along the frontage of the subject site along Concession Road 6 and Centre Road.

It should be noted that since this Transportation Impact Study is prepared to support the proposed Official Plan and Zoning By-law Amendment applications, this Study is not a detailed designed or engineering study. Therefore, most of these requirements will be addressed through the detailed site design and engineering submission at the subsequent stage of the proposed development.

Transportation Demand Management Measures and Incentives

The TDM measures and incentives related to the proposed development have been assessed and recommended in Section 9 of this report to support active transportation and transit, to meet the objectives and requirements of the City's and the Region's Guidelines.

Servicing Truck Turning Movement

AutoTURN software was used to generate the turning movement templates for servicing trucks (TAC-HSU). More detailed vehicle turning movements will be provided as part of the future application, if required.

Study Conclusions and Recommendations

Based on the Study findings and conclusions, the following recommendations are provided:

- The proposed development implements the TDM measures and incentives identified in this report to support active transportation and transit and to reduce the numbers of single-occupant-vehicle trips to and from the proposed development
- The proposed development implements Durham's Vision Zero Strategic Road Safety Action Plan requirements for the internal roads and intersections, as well as the external intersections onto Concession Road 6 and Centre Road, as recommended in Sections 7.6 and 7.7 of this Study
- The proposed development provides the recommended internal and external active transportation network
- The proposed development provides the recommended traffic control types for the internal and external intersections
- No additional physical improvements for the area road network and intersection to accommodate the proposed development under the future total conditions for the horizon year considered

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	EXISTING TRAFFIC CONDITIONS	2
2.1.	Existing Road Network.....	2
2.2.	Existing Active Transportation Assessment.....	3
2.3.	Existing Transit Assessment.....	4
2.4.	Existing Traffic Volumes	4
2.5.	COVID-19 Pandemic Traffic Count Analysis and Adjustment	5
2.6.	Existing Traffic Assessment.....	7
3.0	TRANSPORTATION PLANNING CONTEXT IN THE AREA.....	8
3.1.	Land Use Context.....	8
3.2.	Transportation Planning Context	8
3.3.	Township of Uxbridge Active Transportation Plan.....	9
4.0	FUTURE BACKGROUND CONDITIONS	9
4.1.	Analysis Horizon.....	9
4.2.	Future Background Corridor Growth.....	9
4.3.	Background Development Applications	9
4.4.	Future Background Traffic Assessment.....	12
5.0	SITE TRAFFIC	13
5.1.	Proposed Development.....	13
5.2.	Modes of Travel Assessment in the Area	13
5.3.	Site Trip Generation.....	14
5.4.	Site Trip Distribution and Assignment.....	14
6.0	FUTURE TOTAL TRAFFIC CONDITIONS	16
6.1.	Future Total Traffic Assessment for Auto Mode	16
6.2.	Active Transportation Assessment.....	18
6.3.	Transit Mode Assessment.....	20
7.0	INTERNAL SITE REVIEW	20
7.1.	Truck Turning Movement Assessment.....	20
7.2.	Site Access Assessment.....	20
7.3.	Sightlines.....	21
7.4.	Left Turn Warrant Analysis	21
7.5.	Signal Warrant Analysis for the Brock Street W/Centre Road Intersection.....	24
7.6.	Durham Vision Zero Strategic Road Safety Action Plan	24
7.7.	Internal Intersection Lane Configurations and Traffic Control Types.....	26
8.0	TRANSPORTATION DEMAND MANAGEMENT.....	27
9.0	CONCLUSIONS / FINDINGS	28
9.1.	Study Conclusions.....	28
9.2.	Study Recommendations.....	29

LIST OF FIGURES

- Figure 1 – Proposed Development Location
- Figure 2 – Conceptual Plan
- Figure 3 – Existing Lane Configuration and Traffic Control
- Figure 4 – Existing Active Transportation Network in the Study Area
- Figure 5 – Existing Traffic Volumes
- Figure 6 – Link and Intersection Volume Comparison
- Figure 7 – Adjusted Existing Traffic Volumes (2020 Conditions)
- Figure 8 – 2028 Background Corridor Growth for the Area
- Figure 9 – Background Development Traffic Volumes
- Figure 10 – 2028 Future Background Traffic Volumes
- Figure 11 – Site Traffic Volumes
- Figure 12 – 2028 Future Total Traffic Volumes
- Figure 13 – Proposed Internal and External Sidewalk Connections
- Figure 14 – Draft Candidate Active Transportation Routes
- Figure 15 – MTO Left Turn Storage Warrant Analysis for Southbound Left Turn
- Figure 15 – MTO Left Turn Storage Warrant Analysis for Northbound Left Turn
- Figure 17 – MTO Left Turn Storage Warrant Analysis for Southbound Left Turn
- Figure 18 – MTO Left Turn Storage Warrant Analysis for Southbound Left Turn
- Figure 19 – Recommended Tight Radii at the Proposed Intersection
- Figure 20 – Proposed Internal and External Sidewalk Connections
- Figure 21 – AutoTURN Analysis (TAC-HSU)

LIST OF TABLES

- Table 1 – Existing Levels of Service
- Table 2 – Site Trip Generation
- Table 3 – 2028 Future Background Levels of Service
- Table 4 – Modes of Travel based on 2016 TTS Data
- Table 5 – Site Trip Generation
- Table 6 – Trip Distribution for Auto Mode
- Table 7 – Site Trip Distribution
- Table 8 – 2028 Future Total Levels of Service

APPENDICES

- Appendix A – Terms of Reference and Correspondence
- Appendix B – Existing Data and Traffic Counts
- Appendix C – Existing Traffic Level of Service Calculations
- Appendix D – Future Background Traffic Level of Service Calculations
- Appendix E – 2016 TTS Data Analysis
- Appendix F – Future Total Traffic Level of Service Calculations
- Appendix G – Signal Warrant Analysis

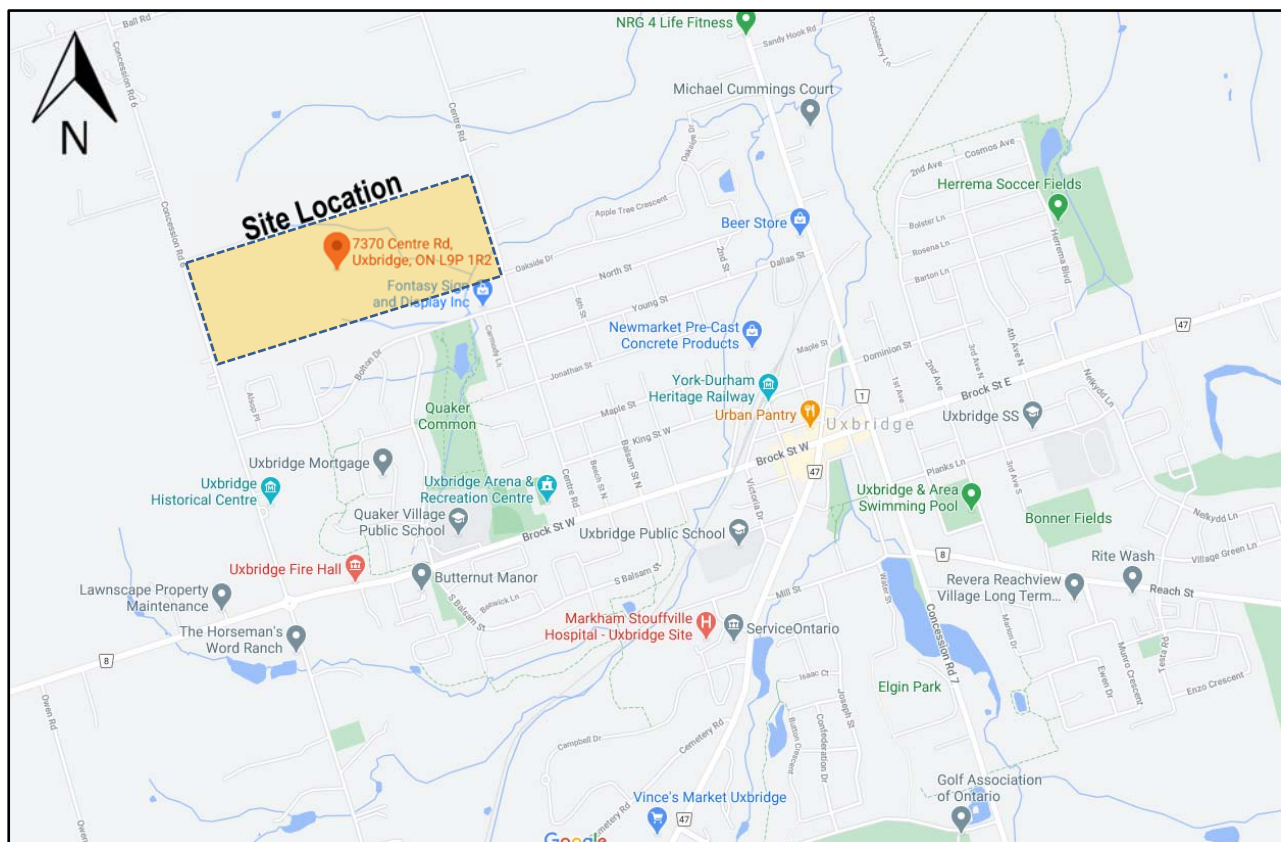
1.0 INTRODUCTION

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained by Bridgebrook Corp. (the 'Client') to undertake a Transportation Impact Study in support of a proposed draft plan of subdivision for a residential development. The subject site is located at 7370 Centre Road, north of Bolton Drive, between Centre Road and Concession Road 6, in the Town of Uxbridge.

This Transportation Impact Study has been prepared in accordance with the Region of Durham Traffic Impact Study Guidelines, as well as the requirements outlined in the proposed terms of reference submitted to the Township of Uxbridge and Durham Region. The relevant correspondence is included in **Appendix A**.

The location of the proposed development is illustrated in **Figure 1**.

Figure 1 – Proposed Development Location



Source: Google Map

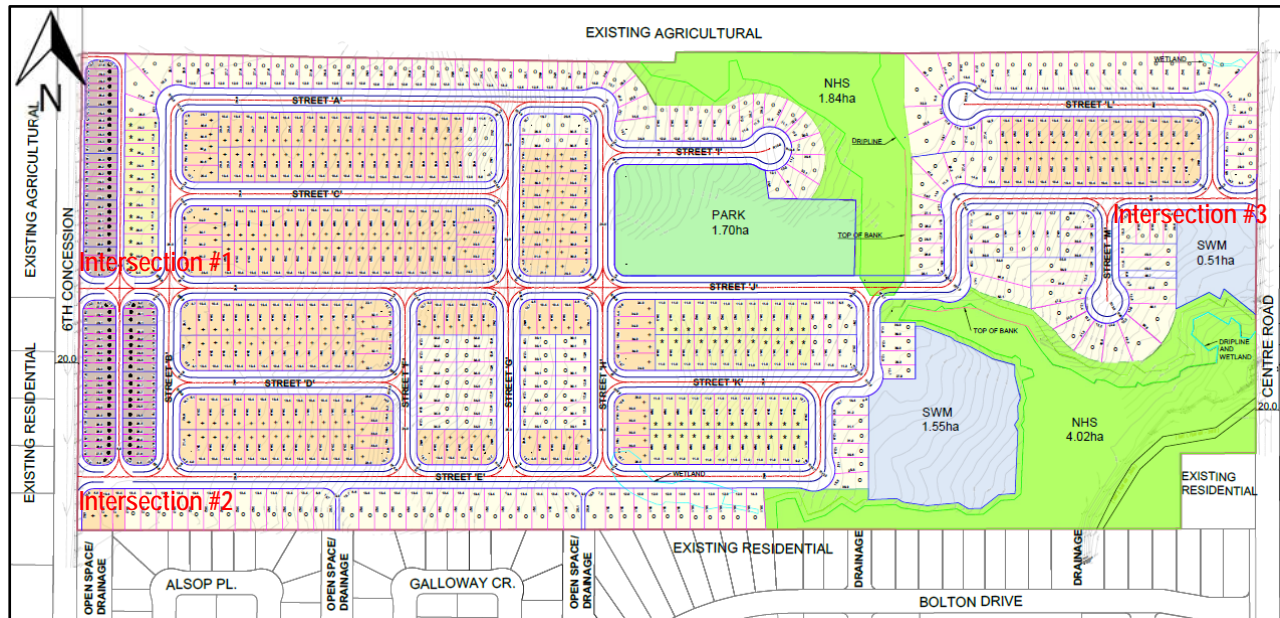
The subject site is current vacant. The proposed development consists of 590 residential dwelling units (including 461 single-detached, 69 townhouse and 60 semi/linked units). For the purposes of this assessment, the proposed 60 linked residential dwelling unit will be treated at townhouse units, which is consistent with the definition of the Institute of Transportation Engineers (ITE) Trip Generation Manual 10th Edition.

Two full moves intersections are proposed onto Concession 6, with the most southerly intersection is located approximately 225 m north of the Bolton Drive/Concession 6, with the northerly intersection is located approximately 150 m north of the southerly intersection.

A full moves intersection is also proposed onto Centre Road, which is located approximately 400 m north of the Bolton Drive/Centre Road intersection and will be aligned with the future Maplebrook Drive extension on the east side of Centre Road.

Figure 2 illustrates the proposed development conceptual plan.

Figure 2 – Conceptual Plan



2.0 EXISTING TRAFFIC CONDITIONS

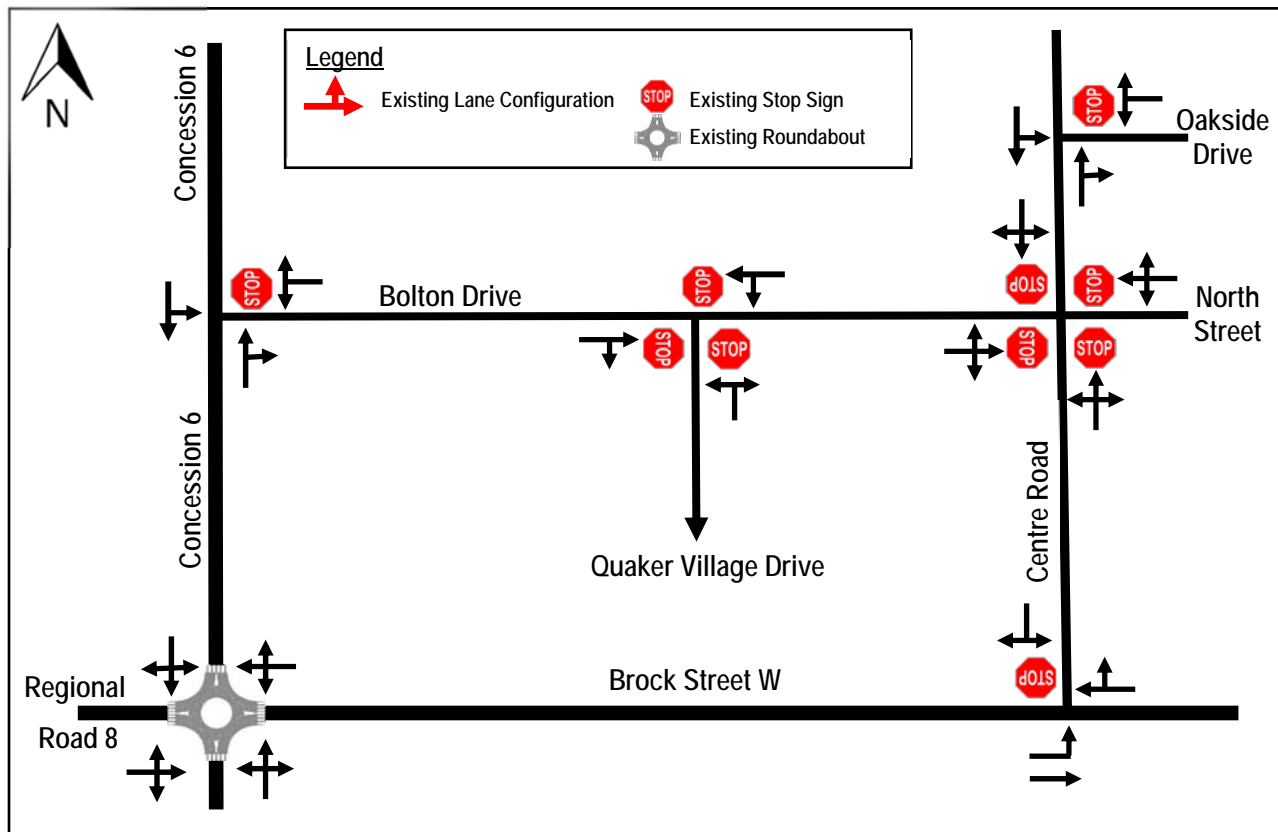
2.1. Existing Road Network

The existing road network, lane configuration and existing traffic control for the study area are shown in Figure 3 (Existing Lane Configurations). The details area described below:

- **Centre Road:** is a north-south collector road as identified in Schedule 'A' of the Township of Uxbridge Official Plan (Consolidated January 2014). Centre Road generally has a two-lane urban cross-section south of Oakside Drive with sidewalk on one side of the road, and rural cross-section north of Oakside Drive with no sidewalk. It generally maintains a posted speed limit of 50 km/h.
- **Bolton Drive/North Street:** is an east-west local road as identified in Schedule 'A' of the Township of Uxbridge Official Plan (Consolidated January 2014). It generally has two-lane urban cross-section west of North Street with sidewalks on both sides of the street, and rural cross-section east of North Street with no sidewalk. It generally maintains a posted speed limit of 50 km/h.
- **Quaker Village Drive:** is a north-south collector road as identified in Schedule 'A' of the Township of Uxbridge Official Plan (Consolidated January 2014). It generally has two-lane urban cross-section with sidewalks on both sides of the street. It maintains a posted speed limit of 40 km/h.
- **Oakside Drive:** is an east-west local road as identified in Schedule 'A' of the Township of Uxbridge Official Plan (Consolidated January 2014). It has two-lane urban cross-section with sidewalk located on the north side of the street. It generally maintains a posted speed limit of 50 km/h.
- **Concession Road 6:** is a north-south collector road as identified in Schedule 'A' of the Township of Uxbridge Official Plan (Consolidated January 2014). It generally has two-lane rural cross-section with no sidewalk. It maintains a posted speed limit of 60 km/h near the subject site.
- **Brock Street W/Regional Road 8:** is an east-west arterial road as identified in Schedule 'A' Map 'A2' of the Regional of Durham Official Plan (Consolidated May 2020). It generally has two lane rural cross-section with no sidewalk west of Concession Road 6, and has a two-lane urban cross-section east of Concession Road 6 with sidewalk located on the south side east of Norm Goodspeed Drive and both sides east of Quaker Village

Drive/S Balsam Street. It generally maintains a posted speed limit of 80 km/h west of Concession 6 and 50 km/h east of Concession Road 6.

Figure 3 – Existing Lane Configuration and Traffic Control



2.2. Existing Active Transportation Assessment

Walking

Currently, there are some sidewalks located on one side of the street along Centre Road, Bolton Drive and Oakside Drive. Sidewalks are located on both sides of the street along Brock Street W east of Quaker Village Drive/S Balsam Street through the downtown area. Sidewalks are generally in good conditions. Figure 4 illustrates the existing active transportation network in the study area.

Cycling

Under the existing conditions, there are no dedicated bicycle lanes along the main streets in the area. However, there are some existing trails such as Maple Bridge Trail, Quaker Trail, Butternut Trail and S Balsam Trail in the area.

It is Nextrans' opinion both the sidewalk and cycling network can be improved in the future as part of the Town wide capital project to connect the community better.

As part of this Study, Nextrans will provide assessment and recommendations for the proposed development to provide appropriate internal and external sidewalk and cycling network to accommodate the proposed development and to connect with the existing communities to encourage future residents to take active modes of transportation.

Figure 4 – Existing Active Transportation Network in the Study Area



Source: Google Map

2.3. Existing Transit Assessment

Based on the information currently provided on the Township of Uxbridge website, Durham Region Transit offers three bus routes in the Township of Uxbridge: Route 601, Route 950 and Route 960. GO Transit also offers bus service and bus stops along Toronto Street in Uxbridge and Highway 47 in Goodwood.

However, based on the current information provided on Durham Region Transit website and system map, only bus route 905D is provided in the Township of Uxbridge at this time due to current COVID-19 pandemic situation.

Below is a general description of the Durham Region Transit and GO Transit bus routes. It is anticipated that once the pandemic is under control or over, some of these routes may return to normal operation in the Township of Uxbridge.

- **Bus Route 950** – This bus route operates Uxbridge, Port Perry and Ontario Tech/Durham College North Campus.
- **Bus Route 601** – This bus route operates Uxbridge, Leaskdale, Sunderland, Manilla, Cannington and Beaverton.
- **Bus Route 960** – This bus route operates between Uxbridge and Davis Drive/Hwy 404 GO Bus and York Region Transit/Viva Terminal.
- **Bus Route 71 GO Transit** – This bus route operates between Uxbridge and Goodwood.

2.4. Existing Traffic Volumes

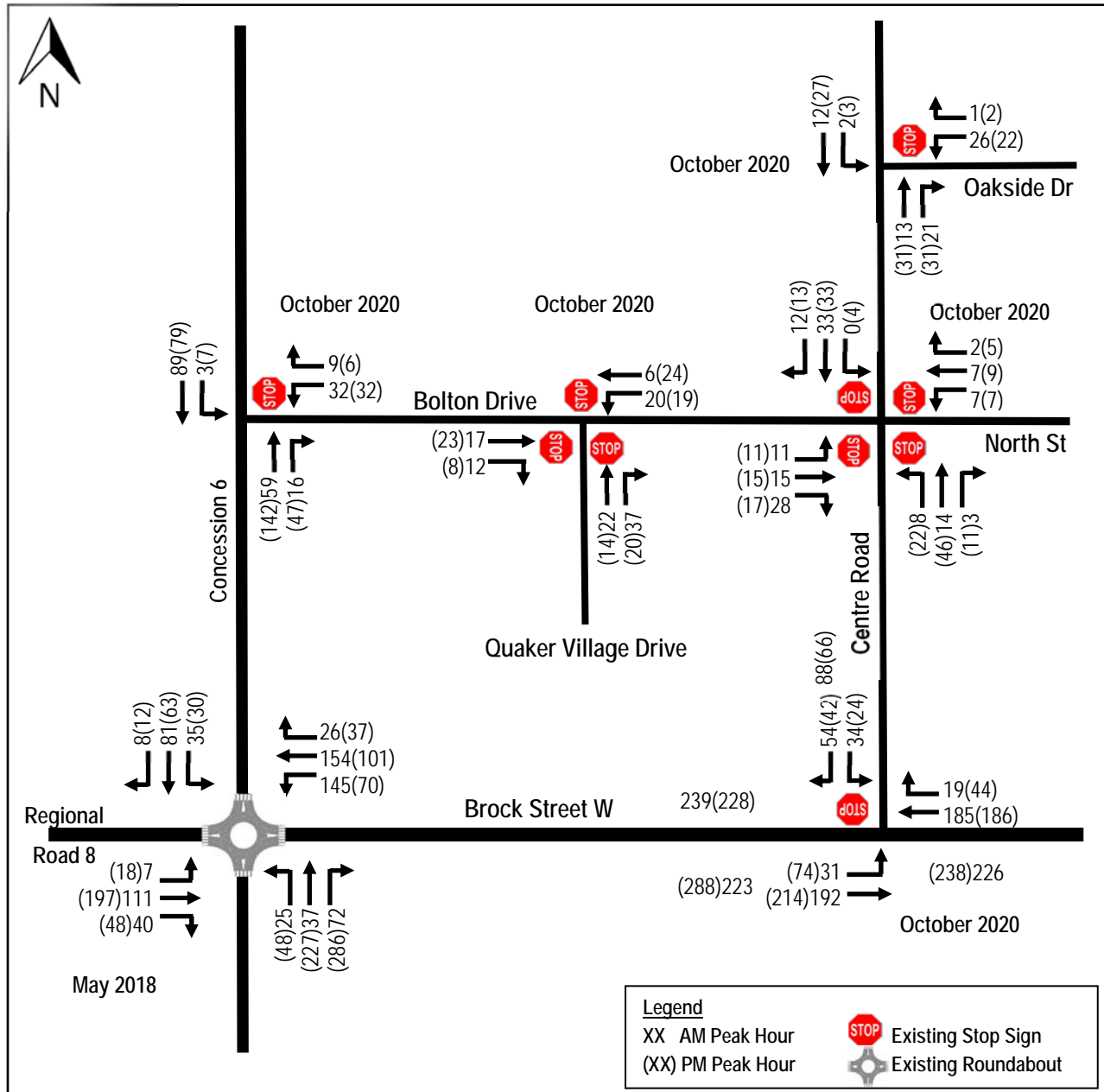
Existing traffic volumes at the study area intersections were undertaken by Spectrum on Wednesday October 28, 2020 during the morning (7:00 a.m. to 10:00 a.m.) and afternoon (4:00 p.m. to 7:00 p.m.) peak periods. As requested by Durham Region staff, the Regional Road 8/Brock Street/Concession 6 intersection (existing roundabout) was also

counted and will be reflected in the analysis. As these counts are conducted in 2020, it will be adjusted and normalized using the previous count factors or growth rate to account for the pandemic situation, where appropriate.

Nextrans also obtained existing traffic turning movement counts for the Regional Road 8/Brock Street/Concession 6 intersection (Thursday May 3, 2018) and the Brock Street W/Centre Road intersection (Wednesday November 13, 2013). The 2018 counts can be used as it is less than 2 years old, however, the 2013 counts will only be used for comparison and checking purposes.

Turning movement counts are summarized in **Appendix B**. The existing volumes are illustrated in **Figure 5**.

Figure 5 – Existing Traffic Volumes



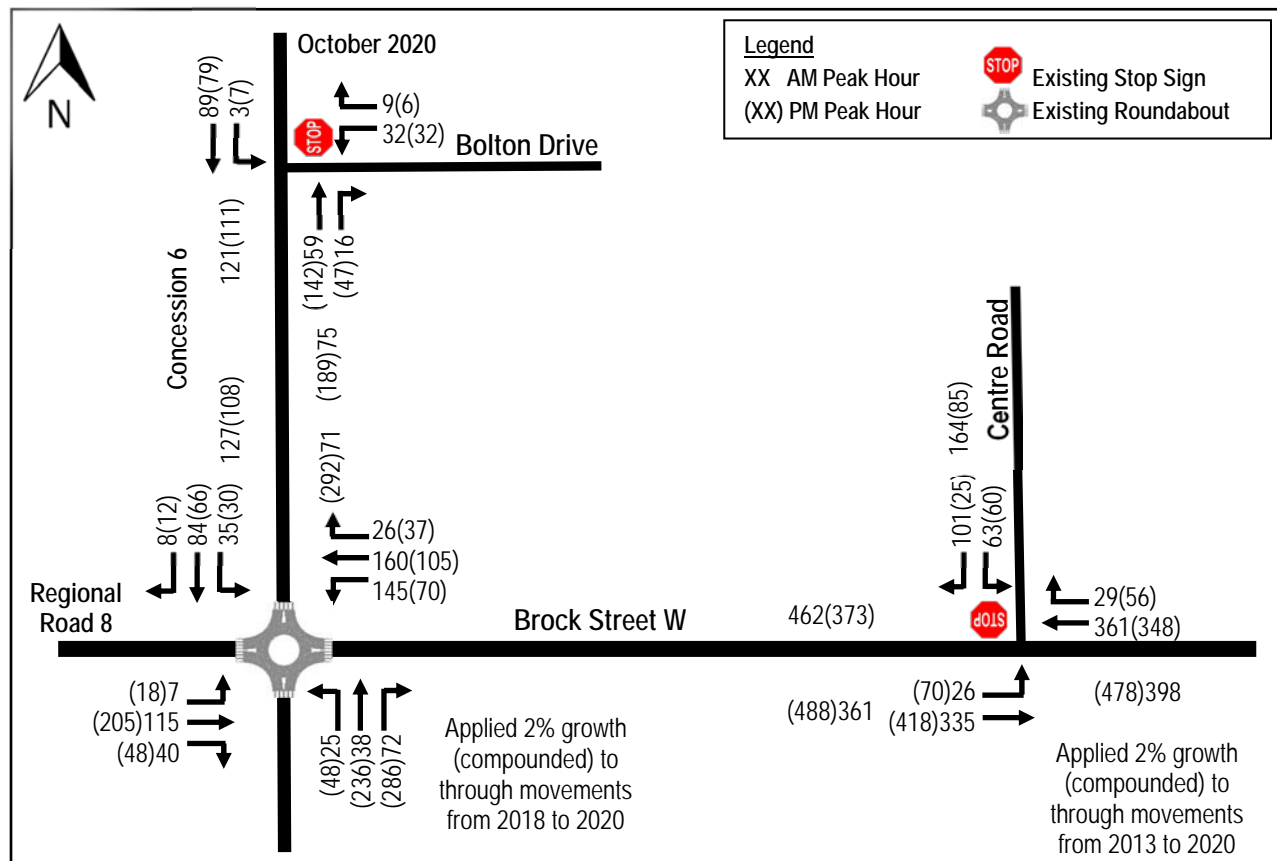
2.5. COVID-19 Pandemic Traffic Count Analysis and Adjustment

In light of the COVID-19 pandemic, there are some speculations and expectations that the traffic counts undertaken during the pandemic will be much lower than the pre-pandemic. This may be the case given that many offices and

employers allowed staff working from home. There is also a number of students learning online instead of attending classes. For these reasons, it is expected that there are less cars on the road during the peak period.

In order to understand the magnitude of the impact, Nextrans has conducted a review and comparison between the pre-pandemic counts and recent counts in October 2020. Given that Nextrans has obtained the previous counts dated May 2018 and November 2013 for the Regional Road 8/Brock Street/Concession 6 and Brock Street W/Centre Street, respectively, a 2% growth per annum (compounded) was applied to all movements at these two intersections. Based on this review, it is indicated that the north-south volumes along Concession 6 north of Regional Road 8/Brock Street are relatively comparable, with the exception of the northbound pm peak period, which sees a drop of about 100 vehicles or about 35%. In addition, the comparison indicates that there is a significant drop in traffic volume up to 50% at the Brock Street W/Centre Road intersection during the pandemic. **Figure 6** illustrates the link volumes and intersection volumes comparison.

Figure 6 – Link and Intersection Volume Comparison

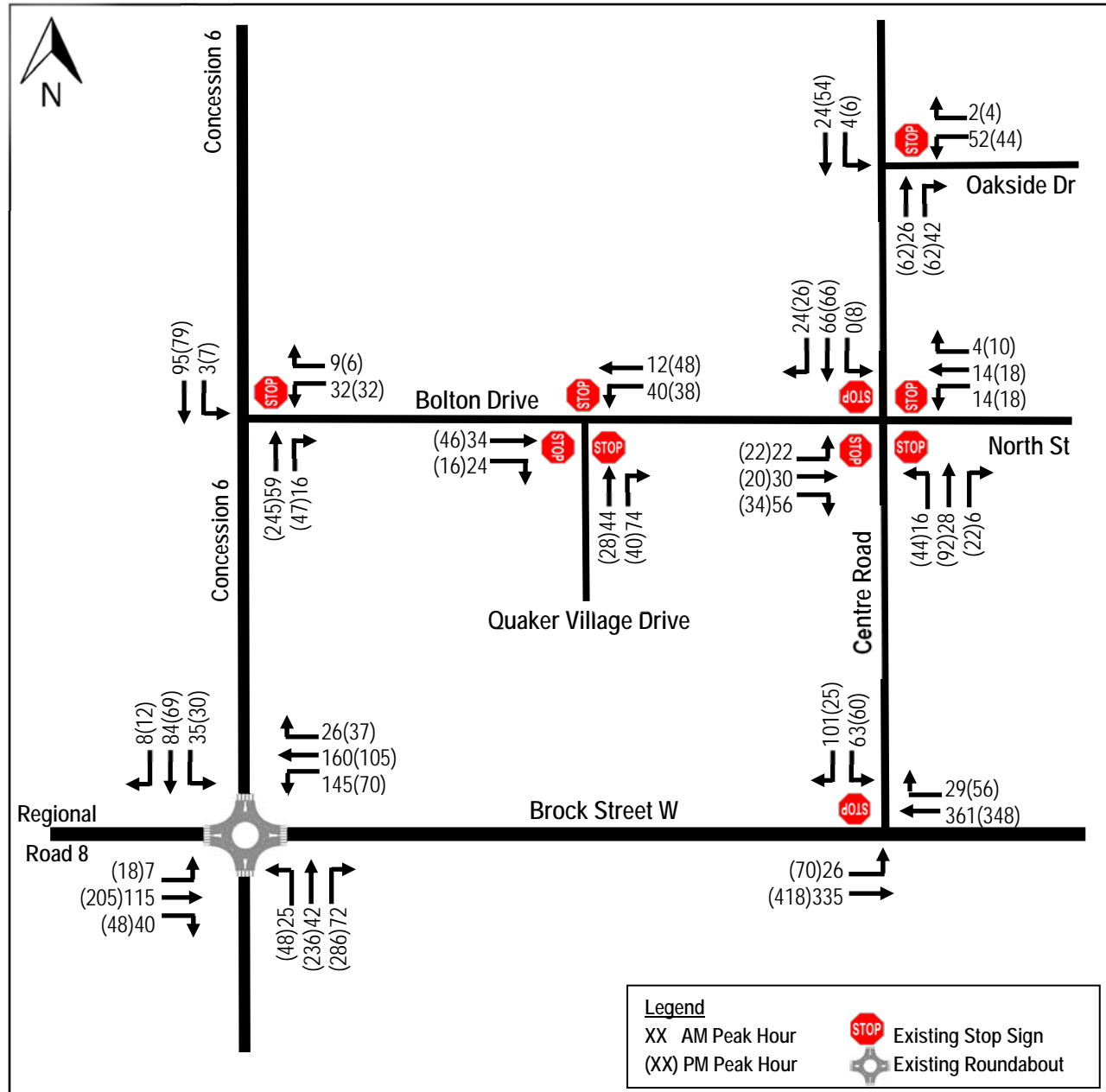


Based on the findings indicated above, the following approaches and adjustments will be applied to the existing traffic volumes to account for the pandemic:

- A 2% growth per annum (compounded) will be applied to the pre-pandemic traffic counts for all movements at the Regional Road 8/Brock Street/Concession 6 and Brock Street W/Centre Street;
- The turning movement volumes at the Concession 6/Bolton Drive intersection will be balance using the link volumes at the Regional Road 8/Brock Street/Concession 6 intersection
- 50% adjustment factor will be applied to all other intersections and for all movements.

It is Nextrans' opinion that the approaches and methodologies noted above are reasonable given the COVID-19 pandemic is still on-going in Uxbridge, Durham Region and Ontario. Adjusted turning movement counts are illustrated in **Figure 7**.

Figure 7 – Adjusted Existing Traffic Volumes (2020 Conditions)



2.6. Existing Traffic Assessment

The existing volumes in **Figure 7** were analyzed using Synchro Version 10 software. The methodology of the software and the result outputs are based on the procedures described and outlined in the Highway Capacity Manual (HCM), published by the Transportation Research Board.

The detailed results are provided in **Appendix C** and summarized in **Table 2**.

Table 1 – Existing Levels of Service

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage (m)
		LOS (v/c)	Delay (s)	95 th Queue (m)	LOS (v/c)	Delay (s)	95 th Queue (m)	
Regional Road 8/ Brock Street W/ Concession 6 (Roundabout)	EB – LTR	A (0.24)	7	1	A (0.31)	7	1	300+
	WB – LTR	A (0.36)	7	2	A (0.28)	8	1	250+
	NB – LTR	A (0.17)	6	1	C (0.71)	18	6	300+
	SB – LTR	A (0.19)	7	1	A (0.14)	6	0	580
Brock Street W/ Centre Road (Unsignalized)	EB – L	A (0.03)	8	1	A (0.08)	9	2	95
	EB – T	A (0.23)	0	0	A (0.28)	0	0	95
	WB – TR	A (0.27)	0	0	A (0.27)	0	0	95
	SB – TR	C (0.46)	20	19	D (0.35)	25	12	185
Concession 6/ Bolton Drive (Unsignalized)	WB – LR	A (0.06)	10	1	B (0.06)	11	2	75
	NB – TR	A (0.05)	0	0	A (0.18)	0	0	580
	SB – TL	A (0.00)	0	0	A (0.01)	1	0	300+
Bolton Drive/ Centre Road/ North Street (Unsignalized)	EB – LTR	A (0.22)	9	--	A (0.10)	8	--	100
	WB – LTR	A (0.07)	8	--	A (0.07)	8	--	200
	NB – LTR	A (0.11)	8	--	A (0.21)	9	--	135
	SB – LTR	A (0.19)	9	--	A (0.13)	8	--	105
Bolton Drive/ Quaker Village Dr (Unsignalized)	EB – TR	A (0.09)	8	--	A (0.08)	7	--	150
	WB – TL	A (0.09)	8	--	A (0.12)	8	--	240
	NB – LR	A (0.18)	8	--	A (0.09)	7	--	300
Centre Road/ Oaksdale Drive (Unsignalized)	WB – LR	A (0.08)	10	2	A (0.06)	10	2	300+
	NB – TR	A (0.05)	0	0	A (0.08)	0	0	105
	SB – TL	A (0.00)	1	0	A (0.00)	1	0	300+

Based on the intersection capacity analysis, under the existing traffic conditions, all the intersections considered are currently operating at acceptable levels of service. The expected queues can be accommodated with the current available storage, all v/c ratios are under 1.0 and the highest approach delays are less only 25 seconds. Therefore, no improvements are required at this time.

3.0 TRANSPORTATION PLANNING CONTEXT IN THE AREA

3.1. Land Use Context

As indicated, the subject site is currently vacant. The subject site is located north of the existing urban area north of Bolton Drive, between Centre Road and Concession 6. Based on Schedule “A” Land Use and Transportation Plan Uxbridge Urban Area (Uxbridge 2014 Official Plan), these lands are designated as future residential area.

Currently, the majority of the existing residential developments are located to the south and east of subject site, with some new and future developments are located to the east of Centre Road and north of North Street/Bolton Drive. The majority of the existing commercial, retails, employment and personal services are located in the downtown area at Brock Street W/Toronto Street/Main Street.

As the proposed development is consisting of 590 residential dwelling units (including 461 single-detached, 69 townhouses and 60 linked units), it is generally consistent with the existing developments and contexts of the community.

3.2. Transportation Planning Context

As indicated in Section 2, a complete network of sidewalk is generally provided along Bolton Drive, Centre Road, Brock Street W, Quaker Village Drive and Oaksdale Drive. Although sidewalks are mostly available on one side of the street, it is sufficient for the existing context. Currently, there is no existing on-street cycling lanes on the public street, however, there are existing trails in the area that connect to major destinations in the Township of Uxbridge. Under the current COVID-19 pandemic, there is only one Durham Region Transit Bus Route 905 servicing the area at this time. It is anticipated that more transit routes will be running again once the pandemic is over.

3.3. Township of Uxbridge Active Transportation Plan

The Township of Uxbridge initiated the Active Transportation Plan project (ATP) and has retained WSP Canada Group Limited with Share the Road Cycling Coalition to support the development of the Active Transportation Plan in the Township. The project is scheduled to be completed by the end of 2020. Based on the information provided on the Township's website and notice of study commencement, the objectives of the Project are:

- Expand educational and promotional initiatives that raise awareness of active transportation opportunities for people of all ages and abilities;
- Develop a continuous Township-wide active transportation network that connects to all communities within Uxbridge and builds upon existing trail systems found within the Township; and
- Collaborate with the Active Transportation Committee, the Trails Committee and the Accessibility Advisory Committee as well as local municipal stakeholders, residents and Durham Region staff to ensure the community's interests are addressed in the plan.

An external stakeholder workshop was held on Thursday November 5th, 2020 to get the public feedback on the project. Nextrans has reviewed and provided our own assessment and recommendations related to the proposed development based on the feedbacks and objectives of the ATP project.

4.0 FUTURE BACKGROUND CONDITIONS

4.1. Analysis Horizon

It is anticipated that the proposed development will be completed by 2023. For the purposes of this assessment, a five-year horizon (2028) has been carried out for the study analysis. This is consistent with Durham Region Traffic Impact Study Guidelines.

4.2. Future Background Corridor Growth

Nextrans has reviewed various background transportation studies prepared for proposed background development applications in the area. In general, a 2% growth per annum (compounded) or a total of 16% growth (from 2020 to 2028) is applied to the existing traffic volumes for both the Regional and Township roads.

Nextrans also reviewed the census profiles for the Township of Uxbridge. This information indicates that the population growth for the Township of Uxbridge between 2011 and 2016 is approximately 1.1%, or 0.22% per annum. Therefore, a 2% growth rate per annum (compounded) or a total of 16% growth is very conservative and will account for other developments in the Township of Uxbridge.

Nextrans has contacted and provided a study terms of reference to both the Region of Durham and the Township of Uxbridge. Nextrans has indicated that a 2% growth per annum (compounded) will be utilized for the study area intersections. **Figure 8** illustrates the 2025 background growth rate for the intersections considered.

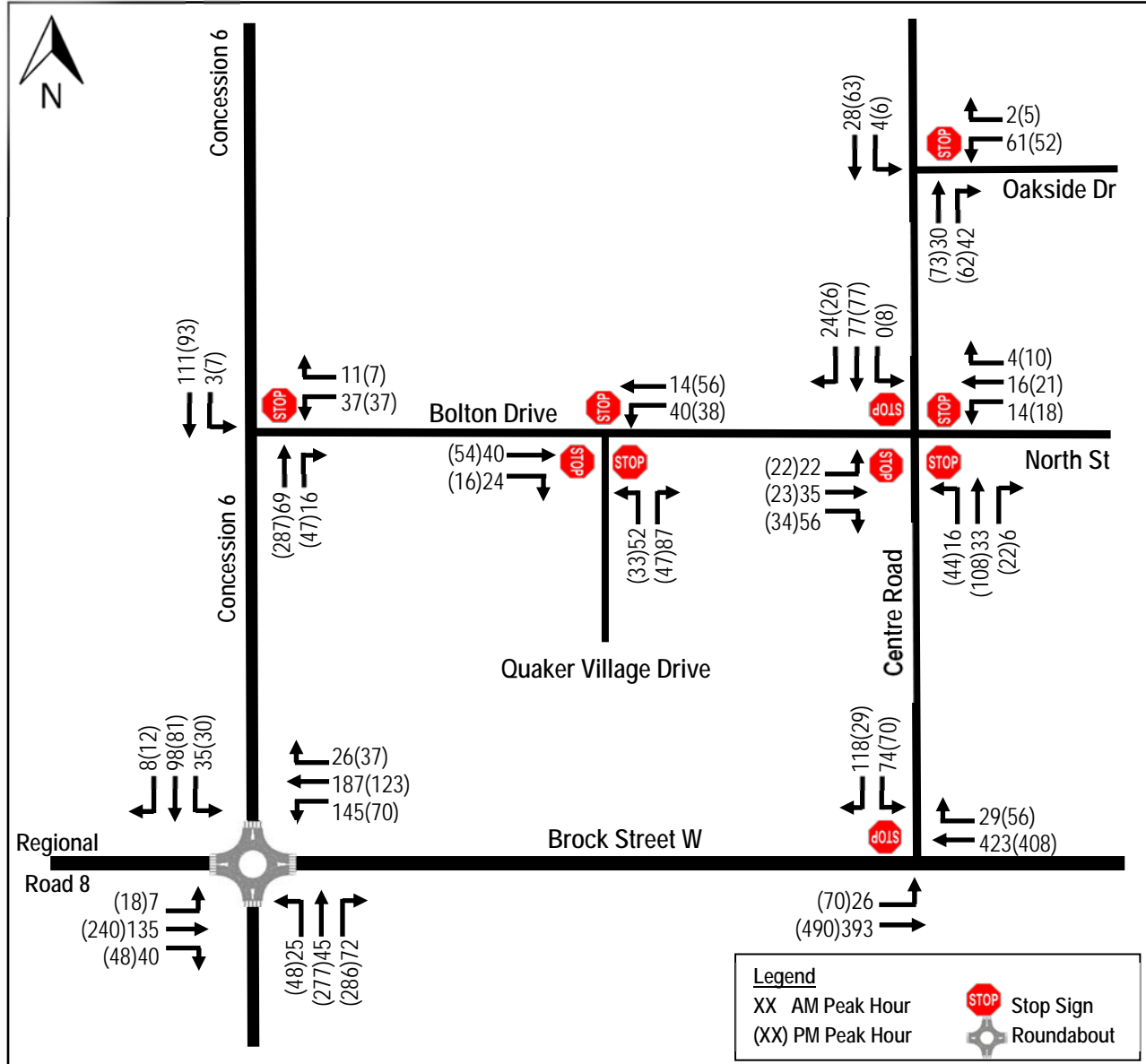
4.3. Background Development Applications

A full review of active background developments within the study area was conducted based on the information extracted from the Township of Uxbridge website (<https://www.uxbridge.ca/en/business-and-development/current-planning-applications.aspx>).

This review indicates that none of the active development applications are located within the study area and the intersections considered in the analysis. Therefore, it is Nextrans' opinion that a 2% growth rate per annum (compounded) or a total of 16% growth will account for all of these developments in the Township of Uxbridge.

In order to estimate the future turning movements at the Centre Road/Maplebrook Drive extension intersection, site trip generation and distribution for the Mason Home, Maple Bridge Residential Subdivision Phase II will be estimated using the *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE), 2016 Transportation Tomorrow Survey (TTS) data and existing travel patterns at the existing intersections.

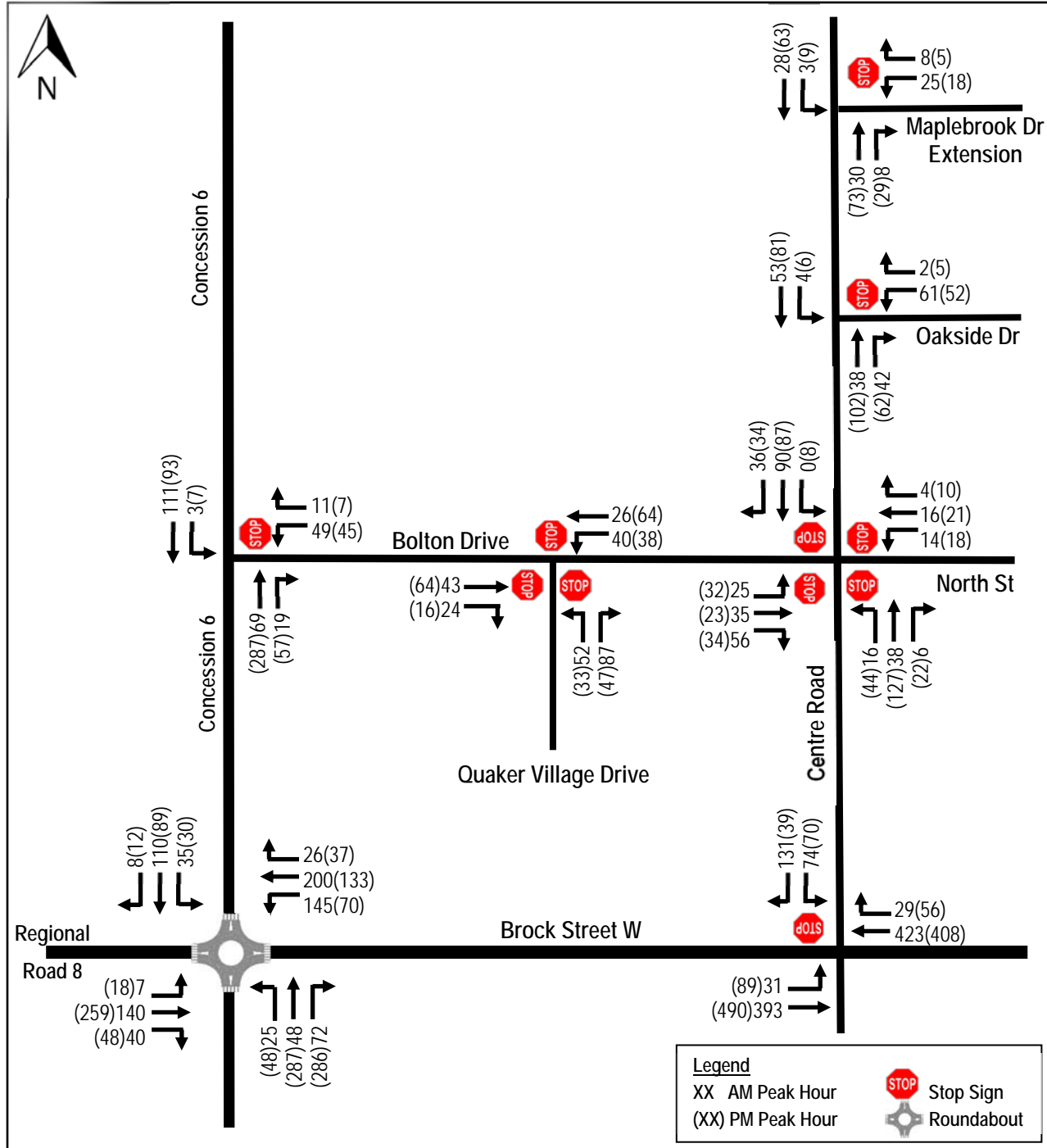
Figure 8 – 2028 Background Corridor Growth for the Area



Although the proposed Mason Homes proposed residential subdivision Phase II consists of 152 residential dwelling units, which also include single-family detached and semi-detached units, for the purposes of this assessment, it has been assumed that all 152 units are single-family detached. This assumption is conservative given that the single-family detached units typically generate more trips than the semi-detached units.

Based on our review of the *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE), the Land Use Code (LUC) 210 "Single-Family Detached Housing General Urban/Suburban" fitted curve equations and average have been utilized for the proposed development. The site trip generation is summarized in Table 5.

Figure 10 – 2028 Future Background Traffic Volumes



4.4. Future Background Traffic Assessment

The estimated 2028 future background traffic volumes are illustrated in Figure 8, and were analyzed using Synchro Version 10 software. The detailed calculations are provided in Appendix D and summarized in Table 5.

Table 3 – 2028 Future Background Levels of Service

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage (m)
		LOS (v/c)	Delay (s)	95 th Queue (m)	LOS (v/c)	Delay (s)	95 th Queue (m)	
Regional Road 8/ Brock Street W/ Concession 6 (Roundabout)	EB – LTR	A (0.28)	8	1	A (0.38)	8	2	300+
	WB – LTR	A (0.41)	8	2	A (0.34)	9	1	250+
	NB – LTR	A (0.18)	6	1	D (0.82)	26	9	300+
	SB – LTR	A (0.24)	8	1	A (0.17)	6	1	580
Brock Street W/ Centre Road (Unsignalized)	EB – L	A (0.04)	9	1	A (0.09)	9	2	95
	EB – T	A (0.28)	0	0	A (0.31)	0	0	95
	WB – TR	A (0.32)	0	0	A (0.29)	0	0	95
	SB – TR	C (0.66)	32	37	D (0.47)	31	19	185
Concession 6/ Bolton Drive (Unsignalized)	WB – LR	A (0.08)	10	2	B (0.10)	12	3	75
	NB – TR	A (0.06)	0	0	A (0.22)	0	0	580
	SB – TL	A (0.00)	0	0	A (0.01)	1	0	300+
Bolton Drive/ Centre Road/ North Street (Unsignalized)	EB – LTR	A (0.25)	9	--	A (0.13)	8	--	100
	WB – LTR	A (0.08)	9	--	A (0.07)	8	--	200
	NB – LTR	A (0.13)	9	--	A (0.26)	9	--	135
	SB – LTR	A (0.28)	9	--	A (0.18)	8	--	105
Bolton Drive/ Quaker Village Dr (Unsignalized)	EB – TR	A (0.11)	8	--	A (0.11)	8	--	150
	WB – TL	A (0.12)	8	--	A (0.14)	8	--	240
	NB – LR	A (0.22)	8	--	A (0.11)	8	--	300
Centre Road/ Oaksdale Drive (Unsignalized)	WB – LR	A (0.10)	10	3	A (0.06)	10	2	300+
	NB – TR	A (0.06)	0	0	A (0.10)	0	0	105
	SB – TL	A (0.00)	1	0	A (0.00)	1	0	300+
Centre Road/ Maplebrook Dr (Unsignalized)	WB – LR	A (0.05)	9	1	A (0.03)	10	1	300+
	NB – TR	A (0.03)	0	0	A (0.06)	0	0	280
	SB – TL	A (0.00)	1	0	A (0.01)	1	0	300+

Based on the intersection capacity analysis, under the 2028 future background traffic conditions, all the intersections considered are expected to operate at acceptable levels of service. Forecasted queues can be accommodated with the current available storage, v/c ratios are under 1.0 and the highest approach delays are expected to be approximately 32 seconds. Therefore, no improvements are required under this horizon year.

5.0 SITE TRAFFIC

5.1. Proposed Development

As indicated, the proposed development consists of 590 residential dwelling units (including 461 single-detached, 69 townhouse and 60 semi/linking units). The 2016 Transportation Tomorrow Survey (TTS), the catchment area and *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE) were reviewed to estimate the modal split, trip distribution and trip generation for the proposed development.

5.2. Modes of Travel Assessment in the Area

Since the subject site is currently vacant, the surrounding traffic zones have been utilized to analyze the existing modal split. For the purposes of this assessment, the inclusion of Traffic Zones 1313, 1316, 1317, 1318 is appropriate and reasonable. Table 4 summarizes the travel modal split information. The detailed 2016 TTS data analysis is included in Appendix E.

Table 4 – Modes of Travel based on 2016 TTS Data

Time	Trips Made to the Township of Uxbridge				
	Auto Driver (including motorcycle)	Auto Passenger (including paid rideshare and taxi)	Transit/ GO	Cycle	Walk
AM Peak Period (6:00 – 9:00)	69%	11%	4%	0%	16%
PM Peak Period (4:00 – 7:00)	77%	15%	3%	1%	4%

Based on the information provided above, currently the majority mode of transportation in the area is private automobile, which accounts for 69% during the morning and 77% during the afternoon peak periods. The none single-occupant-vehicle modal split (transit, walking and cycling) is 20% during the morning and only 8% during the afternoon peak period. It is Nextrans' opinion that, although the proposed development is not located as close to the downtown area as some of the traffic zones considered in the analysis above and therefore the walking mode will not be as high as 16%, however, it is anticipated that other none single-occupant-vehicle modes such as carpooling, paid rideshare (i.e. uber and taxi) and transit mode will be close to the percentage indicated above.

For the purposes of this assessment and to be conservative, an 8% modal split for all none single-occupant-vehicle modes such as walking, cycling, transit and carpooling/shared-ride will be applied to the proposed development and background developments in the area. Given that Nextrans will provide a comprehensive assessment and recommendations for the active transportation network within the proposed development, it is Nextrans' opinion that the proposed 8% modal split for all none single-occupant-vehicle mode can be achieved and justified.

5.3. Site Trip Generation

Based on Nextrans' review of the *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE), the Land Use Codes (LUC) 210 "Single-Family Detached Housing General Urban/Suburban" and (LUC) 220 "Multifamily Housing Low-Rise General Urban/Suburban" fitted curve equations and average have been utilized for the proposed development. The site trip generation is summarized in **Table 5**.

Table 5 – Site Trip Generation

ITE Land Use	Magnitude (units)	Parameters	Morning Peak Hour			Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
Multifamily Housing (Low-Rise) LUC 220 General Urban/Suburban	129	Trip Rates AM - $\text{Ln}(T) = 0.95\text{Ln}(X) - 0.51$ PM - $\text{Ln}(T) = 0.89\text{Ln}(X) - 0.02$	0.11	0.36	0.47	0.36	0.21	0.57
		Total Trips	14	47	61	47	27	74
Single-Family Detached Housing LUC 210 General Urban/Suburban	461	Trip Rates AM - $T = 0.71(X) + 4.80$ PM - $\text{Ln}(T) = 0.96\text{Ln}(X) + 0.20$	0.18	0.54	0.72	0.6	0.36	0.96
		Total Trips	83	249	332	278	163	441
<i>Total Trips</i>			<i>97</i>	<i>296</i>	<i>393</i>	<i>325</i>	<i>190</i>	<i>515</i>
<i>None Single-Occupant-Vehicle Modal Split (8%)</i>			<i>8</i>	<i>24</i>	<i>32</i>	<i>26</i>	<i>15</i>	<i>41</i>
<i>New Auto Trips</i>			<i>89</i>	<i>272</i>	<i>361</i>	<i>299</i>	<i>175</i>	<i>474</i>

Based on the analysis noted above, the proposed development is expected to generate:

- 393 total two-way trips (97 inbound and 296 outbound) and 515 total two-way trips (325 inbound and 190 outbound) during the AM and PM peak hours, respectively;
- 361 two-way auto trips (89 inbound and 272 outbound) and 474 two-way auto trips (299 inbound and 175 outbound) during the AM and PM peak hours, respectively; and
- 32 two-way none single-occupant-vehicle trips (8 inbound and 24 outbound) and 41 two-way single-occupant-vehicle trips (26 inbound and 15 outbound) during the AM and PM peak hours, respectively.

5.4. Site Trip Distribution and Assignment

The 2016 Transportation Tomorrow Survey (TTS) data was reviewed for Traffic Zones 1313, 1316, 1317, 1318 in order to estimate the general trip distribution for the proposed development. **Table 6** summarizes general distribution based on the 2016 TTS data for the proposed development, with **Table 7** summarizing the site traffic assignment. It should be noted that the auto site trip distribution and assignment have been taken into consideration the 2016 TTS information and existing intersection turning movements, where appropriate.

Table 6 – Trip Distribution for Auto Mode

Toronto	Uxbridge	Durham Region	York Region	Peel Region	Others
10%	38%	17%	31%	1%	3%

Table 7 – Site Trip Distribution

General Direction (To/From)	Inbound	Outbound
North (via Concession 6, Centre Road and Concession 7)	5%	5%
South (via Concession 6, Centre Road and Concession 7/Main Street S)	25%	25%
East (Brock Street W/Regional Road 8, Davis Drive)	25%	25%
West (Brock Street W/Regional Road 8, Davis Drive and Toronto Street)	45%	45%
Total	100%	100%

Figure 11 illustrates the proposed development generated traffic volumes

Figure 11 – Site Traffic Volumes

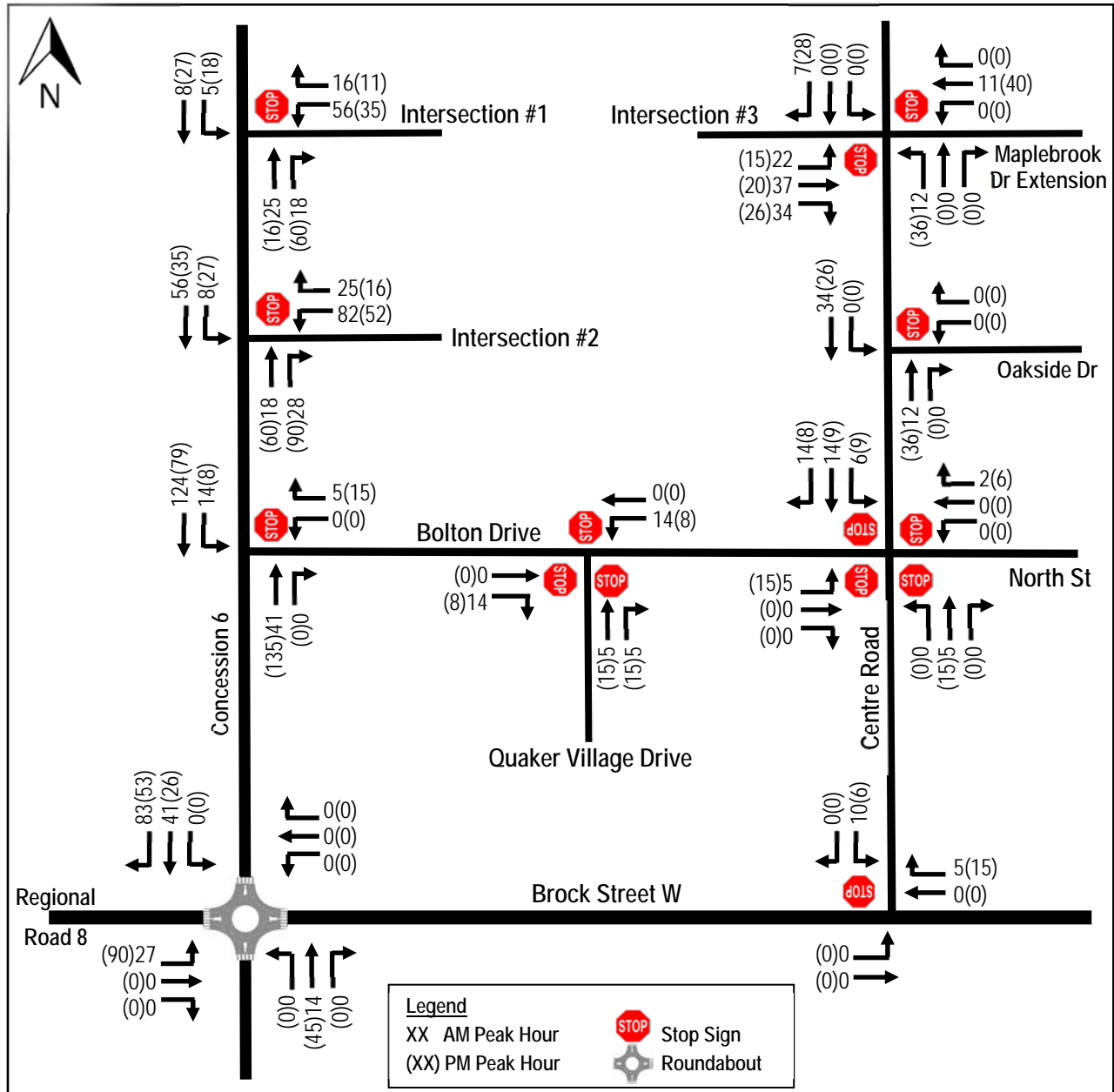
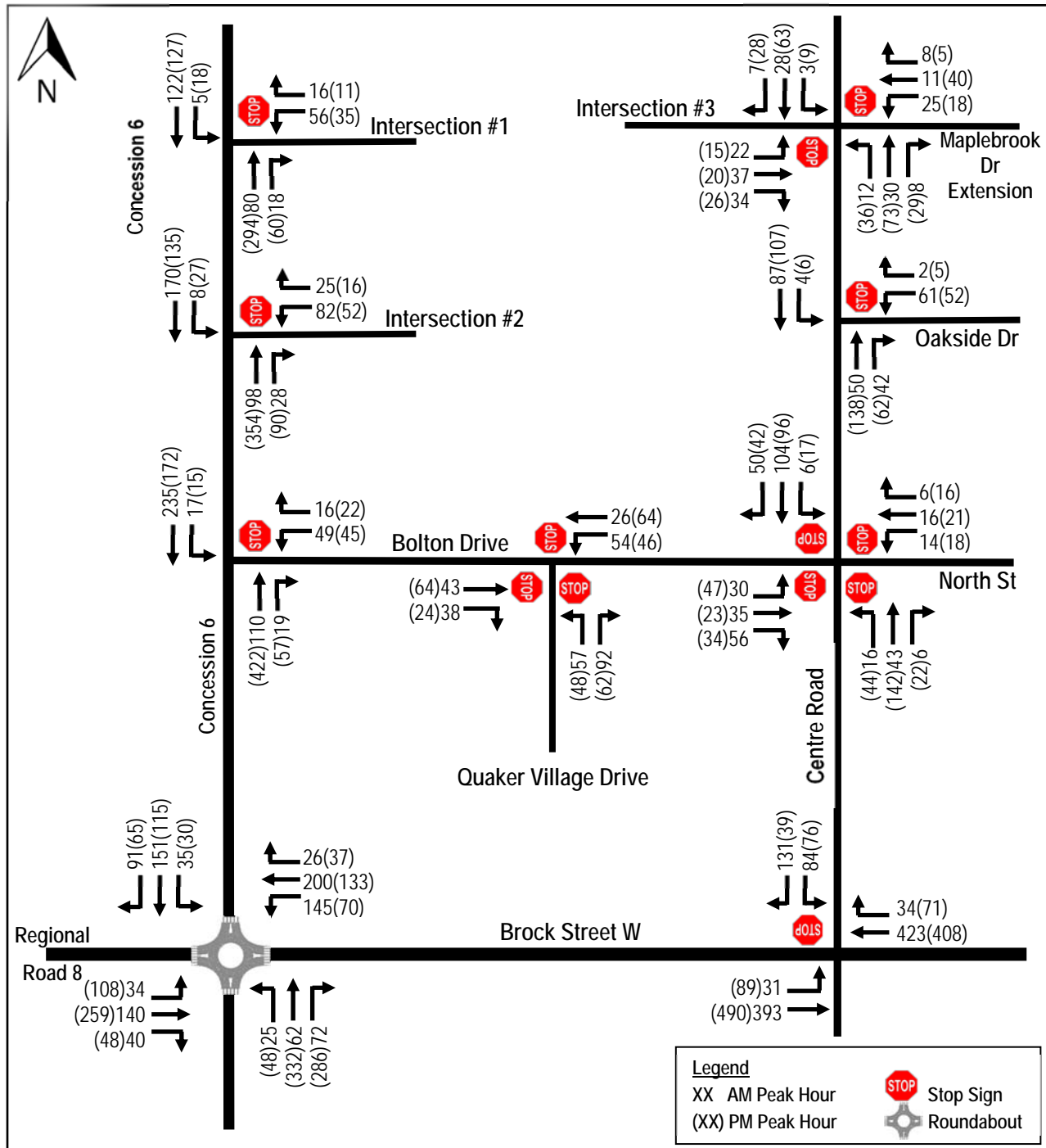


Figure 12 illustrating the 2028 future total traffic volumes (future background traffic volumes plus site generated traffic volumes).

Figure 12 – 2028 Future Total Traffic Volumes



6.0 FUTURE TOTAL TRAFFIC CONDITIONS

6.1 Future Total Traffic Assessment for Auto Mode

The estimated 2028 future total traffic volumes (future background traffic volumes plus site generated traffic volumes) are illustrated in Figure 12, and were analyzed using Synchro Version 10 software. The detailed calculations are provided in

Appendix F and summarized in Table 11.

Table 8 – 2028 Future Total Levels of Service

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage (m)
		LOS (v/c)	Delay (s)	95 th Queue (m)	LOS (v/c)	Delay (s)	95 th Queue (m)	
Regional Road 8/ Brock Street W/ Concession 6 (Roundabout)	EB – LTR	A (0.34)	9	2	B (0.50)	11	3	300+
	WB – LTR	A (0.43)	9	2	B (0.39)	11	2	250+
	NB – LTR	A (0.21)	6	1	E (0.97)	50	15	300+
	SB – LTR	B (0.43)	11	2	A (0.26)	7	1	580
Brock Street W/ Centre Road (Unsignalized)	EB – L	A (0.03)	9	1	A (0.09)	9	2	95
	EB – T	A (0.25)	0	0	A (0.31)	0	0	95
	WB – TR	A (0.29)	0	0	A (0.30)	0	0	95
	SB – TR	D (0.58)	26	28	D (0.51)	34	21	185
Concession 6/ Bolton Drive (Unsignalized)	WB – LR	B (0.12)	12	3	B (0.16)	15	5	75
	NB – TR	A (0.09)	0	0	A (0.30)	0	0	580
	SB – TL	A (0.01)	1	0	A (0.02)	1	0	300+
Bolton Drive/ Centre Road/ North Street (Unsignalized)	EB – LTR	A (0.27)	10	--	A (0.16)	9	--	100
	WB – LTR	A (0.08)	9	--	A (0.08)	8	--	200
	NB – LTR	A (0.15)	9	--	A (0.29)	9	--	135
	SB – LTR	B (0.35)	10	--	A (0.22)	9	--	105
Bolton Drive/ Quaker Village Dr (Unsignalized)	EB – TR	A (0.14)	8	--	A (0.12)	8	--	150
	WB – TL	A (0.14)	9	--	A (0.15)	8	--	240
	NB – LR	A (0.24)	9	--	A (0.15)	8	--	300
Centre Road/ Oaksdale Drive (Unsignalized)	WB – LR	B (0.11)	10	3	B (0.09)	11	2	300+
	NB – TR	A (0.07)	0	0	A (0.13)	0	0	105
	SB – TL	A (0.00)	0	0	A (0.00)	0	0	300+
Centre Road/ Maplebrook Dr/ Intersection #3 (Unsignalized)	EB – LTR	B (0.15)	10	4	B (0.09)	11	3	300+
	WB – LTR	B (0.08)	10	2	B (0.11)	12	3	300+
	NB – LTR	A (0.01)	2	0	A (0.03)	2	1	280
	SB – LTR	A (0.00)	1	0	A (0.01)	1	0	300+
Concession 6/ Intersection #1 (Unsignalized)	WB – LR	B (0.21)	11	6	B (0.16)	14	5	50
	NB – TR	A (0.08)	0	0	A (0.28)	0	0	150
	SB – TL	A (0.01)	0	0	A (0.03)	2	1	300+
Concession 6/ Intersection #2 (Unsignalized)	WB – LR	B (0.11)	10	3	B (0.09)	13	3	50
	NB – TR	A (0.06)	0	0	A (0.22)	0	0	225
	SB – TL	A (0.00)	0	0	A (0.02)	1	0	150

Based on the intersection capacity analysis, under the 2028 future total traffic conditions, all the intersections considered are expected to operate at acceptable levels of service. Forecasted queues can be accommodated with the current and future available storage, all v/c ratios are under 1.0 and the highest approach delays are expected to be approximately 50 seconds. Therefore, no improvements are required under this horizon year and to accommodate the proposed development.

The analysis also indicates that the proposed site intersections are expected to operate at acceptable levels of service with minimum delay and queues. The required lane configurations and traffic controls for the proposed site intersections based on the intersection operational capacity analysis are:

4. Concession 6/Site Intersection #1:
 - a. A shared left/right lane for westbound direction;
 - b. A shared through/right lane for the northbound and a shared through/left lane for the southbound direction; and
 - c. Stop controlled on the westbound direction (minor approach)
5. Concession 6/Site Intersection #2:
 - a. A shared left/through/right lane for eastbound and westbound directions;

- b. A shared left/through/right lane for the northbound and southbound directions; and
 - c. Stop controlled on the westbound direction (minor approach)
6. Centre Road/Site Intersection #3/Maplebrook Drive Extension:
- a. A shared left/through/right lane for eastbound and westbound directions;
 - b. A shared left/through/right lane for the northbound and southbound directions; and
 - c. Stop controlled on the Maplebrook Drive Extension and Site Intersection #3

6.2. Active Transportation Assessment

Walking

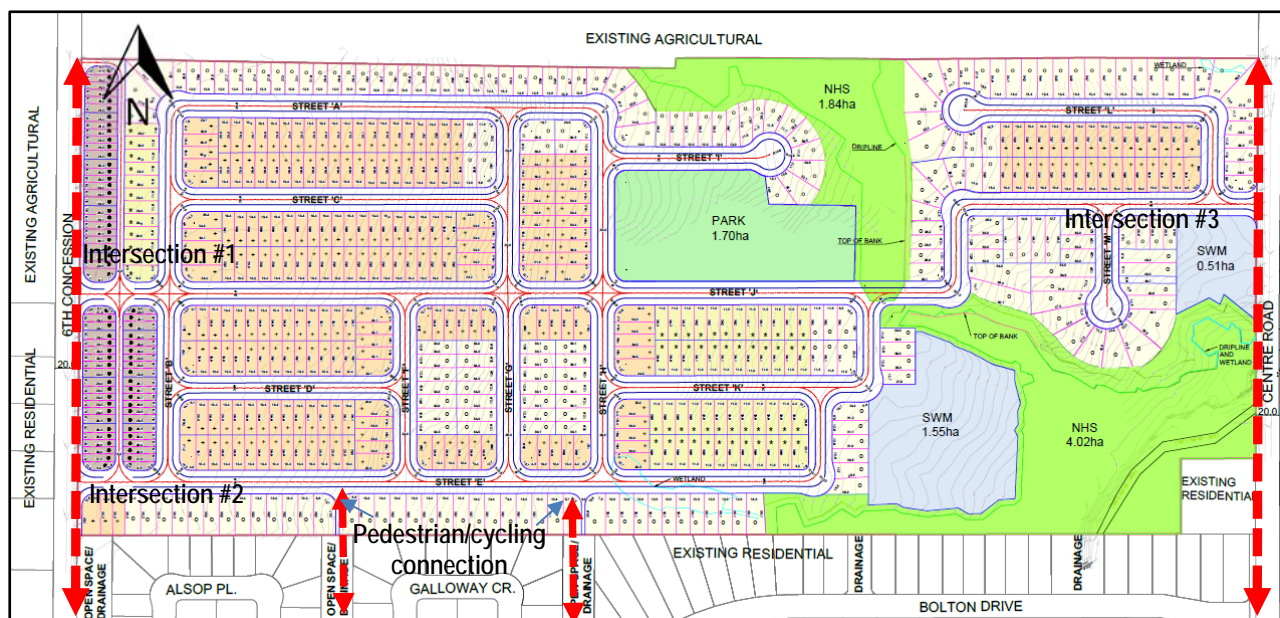
As indicated, currently, there are some sidewalks located on one side of the street along Centre Road, Bolton Drive and Oakside Drive. Sidewalks are located on both sides of the street along Brock Street W east of Quaker Village Drive/S Balsam Street through the downtown area. Sidewalks are generally in good conditions.

Based on Nextrans' review and assessment of the proposed draft plan of subdivision for the proposed development, the following recommendations are provided:

- Sidewalks be provided at least on one side of all internal streets. If possible, sidewalks be provided on both sides of the main east-west streets, if appropriate;
- Sidewalk be provided on the west side of Centre Road from the northerly limit of the proposed development to connect with the existing sidewalk on Bolton Drive and Centre Road south of Bolton Drive;
- Sidewalk be provided on the east side of Concession 6 from the northerly limit of the proposed development to connect with the existing sidewalk on the south side of Bolton Drive; and
- Two sidewalk/cycling connections provided between Bolton Drive and proposed development to connect with the existing sidewalk on the south side of Bolton Drive and sidewalks on Quaker Village Drive.

Figure 13 illustrates the proposed internal and external sidewalk connections for the proposed development.

Figure 13 – Proposed Internal and External Sidewalk Connections



Cycling

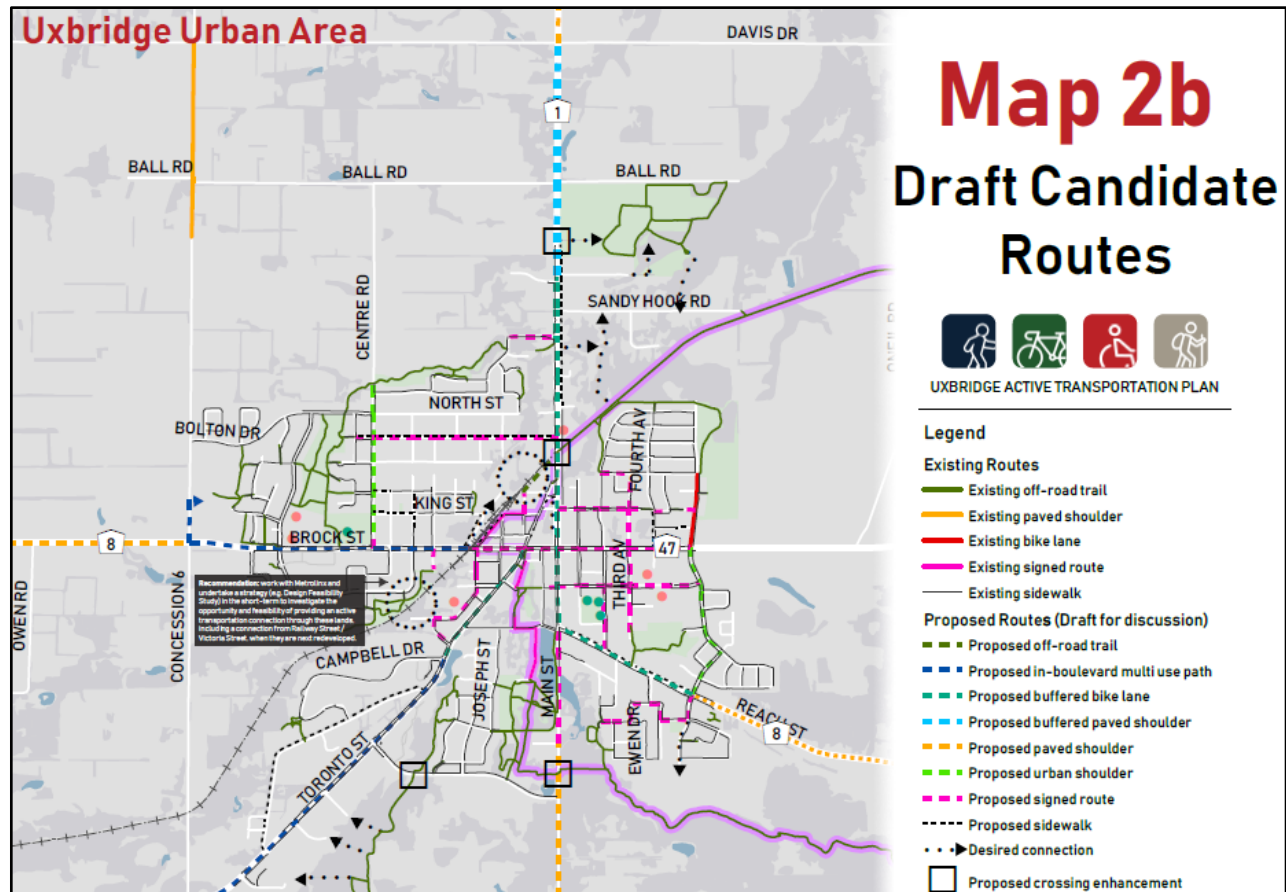
As indicated, under the existing conditions, there are no dedicated bicycle lanes along the main streets in the area. However, there are some existing trails such as Maple Bridge Trail, Quaker Trail, Butternut Trail and S Balsam Trail in the area.

It is Nextrans' understanding that the Township of Uxbridge initiated the Active Transportation Plan project (ATP) and has retained WSP Canada Group Limited with Share the Road Cycling Coalition to support the development of the Active Transportation Plan in the Township. The project is scheduled to be completed by the end of 2020. Based on the information provided on the Township's website and notice of study commencement, the objectives of the Project are:

- Expand educational and promotional initiatives that raise awareness of active transportation opportunities for people of all ages and abilities;
- Develop a continuous Township-wide active transportation network that connects to all communities within Uxbridge and builds upon existing trail systems found within the Township; and
- Collaborate with the Active Transportation Committee, the Trails Committee and the Accessibility Advisory Committee as well as local municipal stakeholders, residents and Durham Region staff to ensure the community's interests are addressed in the plan.

An external stakeholder workshop was held on Thursday November 5th, 2020 to get the public feedback on the project. Nextrans has reviewed and provided our own assessment and recommendations related to the proposed development based on the feedbacks and objectives of the ATP project. **Figure 14** illustrates the draft routes, as provided at the workshop.

Figure 14 – Draft Candidate Active Transportation Routes



Nextrans is supportive of the proposed draft candidate routes and suggest that the project team for the proposed development continue to review and partipate in this process in order to implement the recommendations of ATP into the proposed development, where appropriate.

6.3. Transit Mode Assessment

Based on the information currently provided on the Township of Uxbridge website, Durham Region Transit offers three bus routes in the Township of Uxbridge: Route 601, Route 950 and Route 960. GO Transit also offers bus service and bus stops along Toronto Street in Uxbridge and Highway 47 in Goodwood.

However, based on the current information provided on Durham Region Transit website and system map, only bus route 905D is provided in the Township of Uxbridge at this time due to current COVID-19 pandemic situation.

As indicated, the proposed development is expected to generate 32 two-way none single-occupant-vehicle trips (8 inbound and 24 outbound) and 41 two-way single-occupant-vehicle trips (26 inbound and 15 outbound) during the AM and PM peak hours, respectively.

For the purposes of this assessment, it is assumed that both Route 905D and GO Bus are operating at a 30-minute headway during the peak hours, there would be four buses operating in the Township during the peak hours.

If it is assumed that all of the none single-occupant-vehicle trips are related to transit trips, the transit demand would be:

- $8 \text{ passengers}/4 \text{ buses} = 2 \text{ passengers per transit vehicle inbound}$ and $24 \text{ passengers}/4 \text{ buses} = 6 \text{ passengers per transit vehicle outbound}$ during the morning peak hour; and
- $26 \text{ passengers}/4 \text{ buses} = 7 \text{ passengers per transit vehicle inbound}$ and $15 \text{ passengers}/4 \text{ buses} = 4 \text{ passengers per transit vehicle outbound}$ during the afternoon peak hour.

The calculations above are conservative given that not all passengers will take the buses during the peak hour, but rather these demands will spread out during the peak period, i.e. between 6am and 9am, and 4pm and 7pm.

Based on this analysis, it is Nextrans' opinion that the transit demand from the proposed development is low and will not require any improvements on the existing transit network once it resumes normal operations after the COVID-19 pandemic.

7.0 INTERNAL SITE REVIEW

7.1. Truck Turning Movement Assessment

The proposed development will meet the Township of Uxbridge and Durham Region's standards and requirements for both internal and external intersection designs and street cross-sections. These requirements include but not limited to: turning radii, daylight triangles, sidewalk dimensions, grades, among other requirements.

Therefore, these designs will accommodate servicing vehicles such as garbage truck, emergency vehicles and delivery/moving vehicles.

AutoTURN software was used to generate the turning movement templates for servicing trucks (TAC-HSU) and illustrated in **Figure 21**. More detailed vehicle turning movements will be provided as part of the future application, if required.

7.2. Site Access Assessment

Two full moves intersections are proposed onto Concession 6, with the most southerly intersection is located approximately 225 m north of the Bolton Drive/Concession 6, with the northerly intersection is located approximately 150 north of the southerly intersection.

A full moves intersection is also proposed onto Centre Road, which is located approximately 400 m north of the Bolton Drive/Centre Road intersection and to be aligned with the future Maplebrook Drive extension located on the east side of Centre Road.

The intersection capacity analysis indicates that all three proposed development intersections are expected to operate at acceptable levels of service with minimum delays or queues. The recommended intersection configurations and traffic controls include:

1. Concession 6/Site Intersection #1:
 - a. A shared left/right lane for westbound direction;
 - b. A shared through/right lane for the northbound and a shared through/left lane for the southbound direction; and
 - c. Stop controlled on the westbound direction (minor approach)
2. Concession 6/Site Intersection #2:
 - a. A shared left/through/right lane for eastbound and westbound directions;
 - b. A shared left/through/right lane for the northbound and southbound directions; and
 - c. Stop controlled on the westbound direction (minor approach)
3. Centre Road/Site Intersection #3/Maplebrook Drive Extension:
 - a. A shared left/through/right lane for eastbound and westbound directions;
 - b. A shared left/through/right lane for the northbound and southbound directions; and
 - c. Stop controlled on the Maplebrook Drive Extension and Site Intersection #3

7.3. Sightlines

Nextrans has reviewed the existing conditions on both Centre Road and Concession 6 at the proposed development intersection access locations. This review indicates that both Centre Road and Concession 6 are relatively flat and no horizon curves at the proposed development intersection locations. These conditions are similar to the existing Centre Road/Oakside Drive and Concession 6/Bolton Drive intersections.

Appropriate daylight triangles will be provided at the proposed intersections onto Centre Road and Concession 6, as per the Township and the Region requirements.

7.4. Left Turn Warrant Analysis

The Ontario Ministry of Transportation (MTO) Left Turn Warrant analysis for at grade intersection was conducted to examine the need for exclusive left turns on Centre Road and Concession 6 at the proposed site intersections.

Centre Road/Maplebrook Drive Extension/Site Intersection #3

Figures 15 and 16 illustrate the MTO warrant guidelines for Centre Road/Maplebrook Drive Extension/Intersection #3.

- 50 km/ posted speed limit, assumed 60 km/h design speed
- Southbound: 14% (3 left turns x 100% / 28 advancing traffic volumes = 11% AM and 9 left turns x 100% / 63 advancing traffic volumes = 14% PM)
- Northbound: 49% (12 left turns x 100% / 30 advancing traffic volumes = 40% AM and 36 left turns x 100% / 73 advancing traffic volumes = 49% PM)

Figure 15 – MTO Left Turn Storage Warrant Analysis for Southbound Left Turn

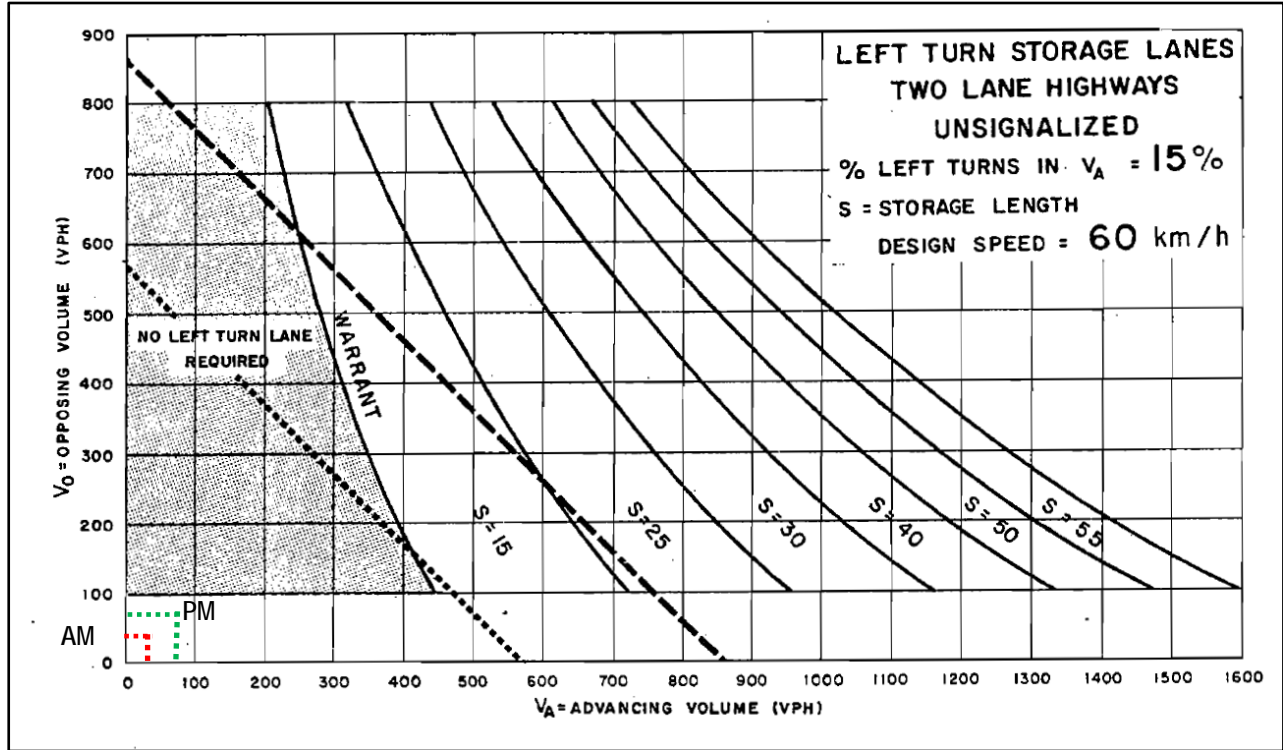
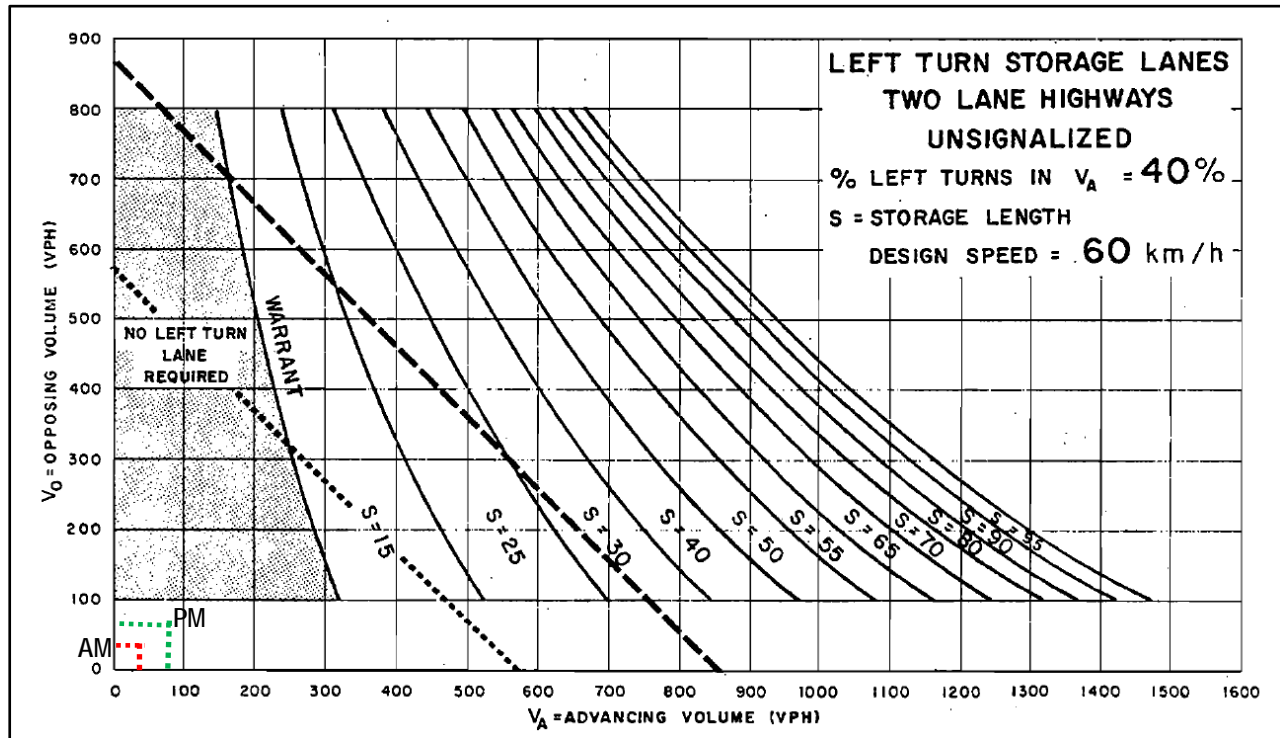


Figure 16 – MTO Left Turn Storage Warrant Analysis for Northbound Left Turn



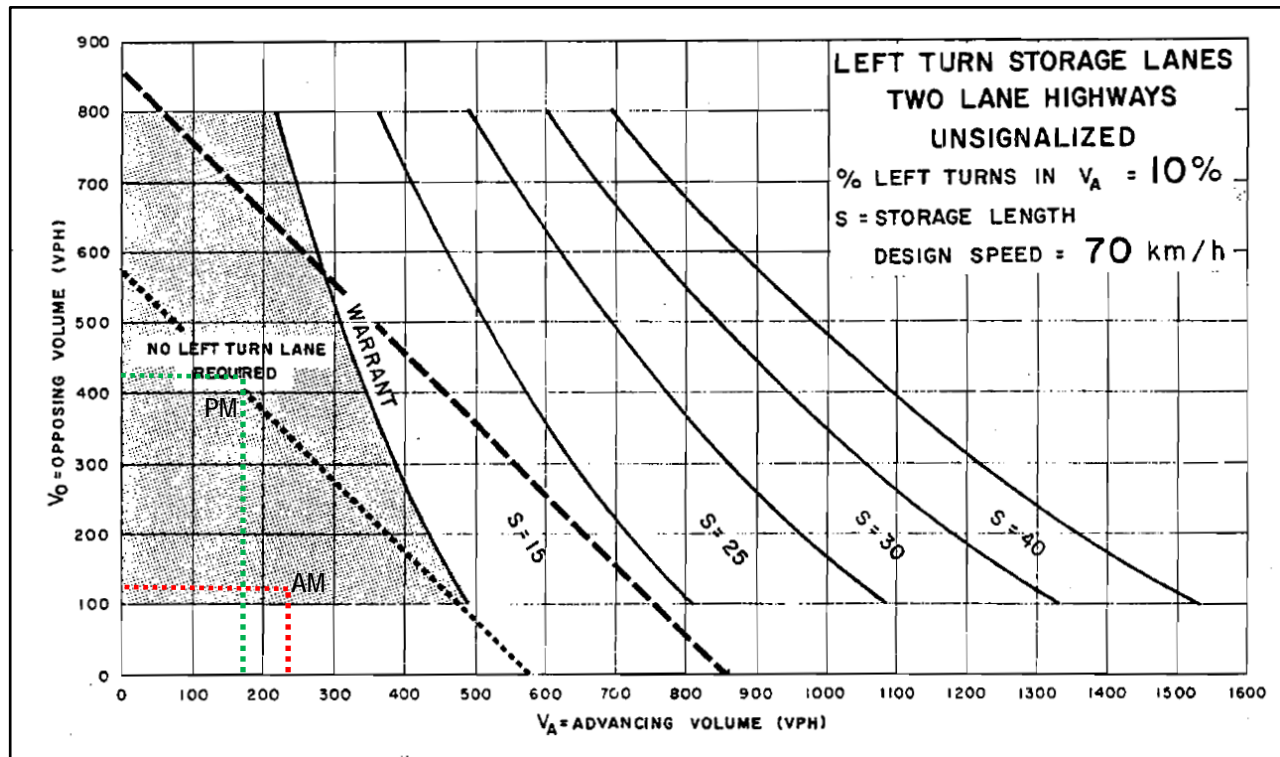
Based on the analysis, it is anticipated that the southbound and northbound left turn lanes do not numerically meet the MTO warrant guidelines under the 2028 horizon.

Concession 6/Intersection #2

Figure 17 illustrates the MTO warrant guidelines for Concession 6/Intersection #2.

- 60 km/ posted speed limit, assumed 70 km/h design speed
- Southbound: 9% (17 left turns x 100% / 235 advancing traffic volumes = 7% AM and 15 left turns x 100% / 172 advancing traffic volumes = 9% PM)

Figure 17 – MTO Left Turn Storage Warrant Analysis for Southbound Left Turn



Based on the analysis, it is anticipated that the southbound left turn lane does not numerically meet the MTO warrant guidelines under the 2028 horizon.

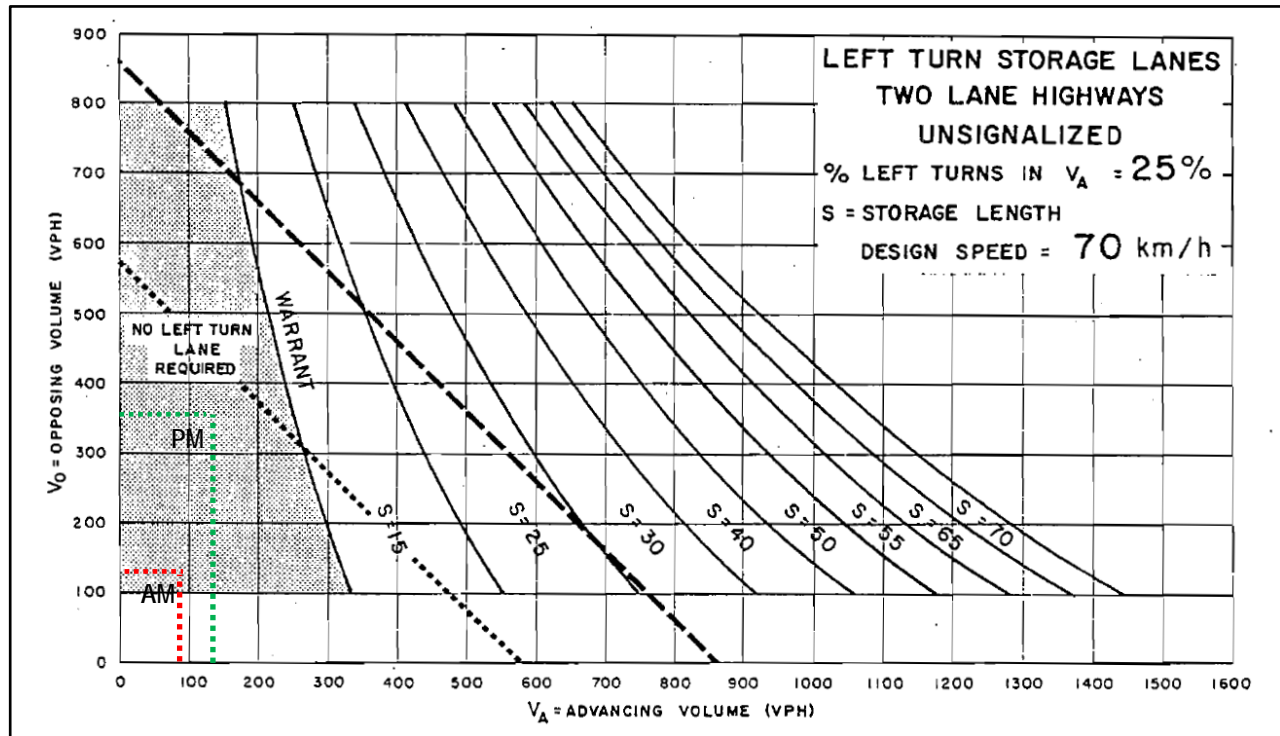
Concession 6/Intersection #1

Figure 18 illustrates the MTO warrant guidelines for Concession 6/Intersection #1.

- 60 km/ posted speed limit, assumed 70 km/h design speed
- Southbound: 21% (8 left turns x 100% / 122 advancing traffic volumes = 7% AM and 27 left turns x 100% / 127 advancing traffic volumes = 21% PM)

Based on the analysis, it is anticipated that the southbound left turn lane does not numerically meet the MTO warrant guidelines under the 2028 horizon.

Figure 18 – MTO Left Turn Storage Warrant Analysis for Southbound Left Turn



7.5. Signal Warrant Analysis for the Brock Street W/Centre Road Intersection

As requested by Durham Region, Nextrans has conducted a traffic signal warrant analysis for the Brock Street W/Centre Road intersection based on the future forecast volumes. The traffic signal warrant analysis as outlined in **Appendix G** indicates that minimum vehicular volume and delay to cross traffic for major street approaches may be warranted (Justification 7 of the Ontario Traffic Manual Book 12), however, the minor street approaches and traffic crossing major street are not warranted because of the low turning traffic volumes and this is a T-intersection.

7.6. Durham Vision Zero Strategic Road Safety Action Plan

Vision Zero

Vision Zero is a Swedish program that successfully halved traffic death using failsafe systems of road design, vehicle design and speed control. It aims to remove the possibility of any death or serious injury from transportation and road systems. No loss of life resulting from a motor vehicle collision is acceptable.

The context of Vision Zero in Canada, Durham Region and the Town of Uxbridge is described below:

- Canada - <https://visionzero.ca>
 - Spreads awareness about Vision Zero and includes guides/toolkits for implementation
- Durham Region - <https://www.durham.ca/en/living-here/vision-zero.aspx>
 - Durham has a Strategic Road Safety Action Plan that is fundamentally based on Vision Zero
 - Goal: 10% reduction of fatal and injury collisions within five years (2019-2023).
 - Lists possible (but generalized) actions to meet this goal for intersections, pedestrians, cyclists, distracted driving, and more
 - Article from Nov. 2020 says that number of collisions are down but fatalities are unchanged

- In Uxbridge
 - On Apr. 6, 2020, Durham Region staff presented Vision Zero and various stats to the Uxbridge General Purpose and Administration Committee. This was Agenda Item 10.1 and moved by Councillor Snooks
 - Concession Rd 6 and Davis Dr has the greatest collision frequency in Uxbridge
 - Presentation does not include any improvements for this intersection strangely
 - Region proposing many Regional projects to implement Red Light Cameras, Roundabouts, and more in Uxbridge.
 - Goodwood and Downtown Uxbridge are the main areas receiving these improvements
 - The only nearby road improvement project is a roundabout at Reg. Hwy 47 (Toronto St) at Concession Rd 6 (construction in 2025, pending Region approval)
 - Uxbridge Council endorsed the meeting minutes from Apr. 6 (as Item 9.1) on Apr. 27. Moved by Councillor Popp and seconded by Councillor Snooks.

Vision Zero for the Proposed Development

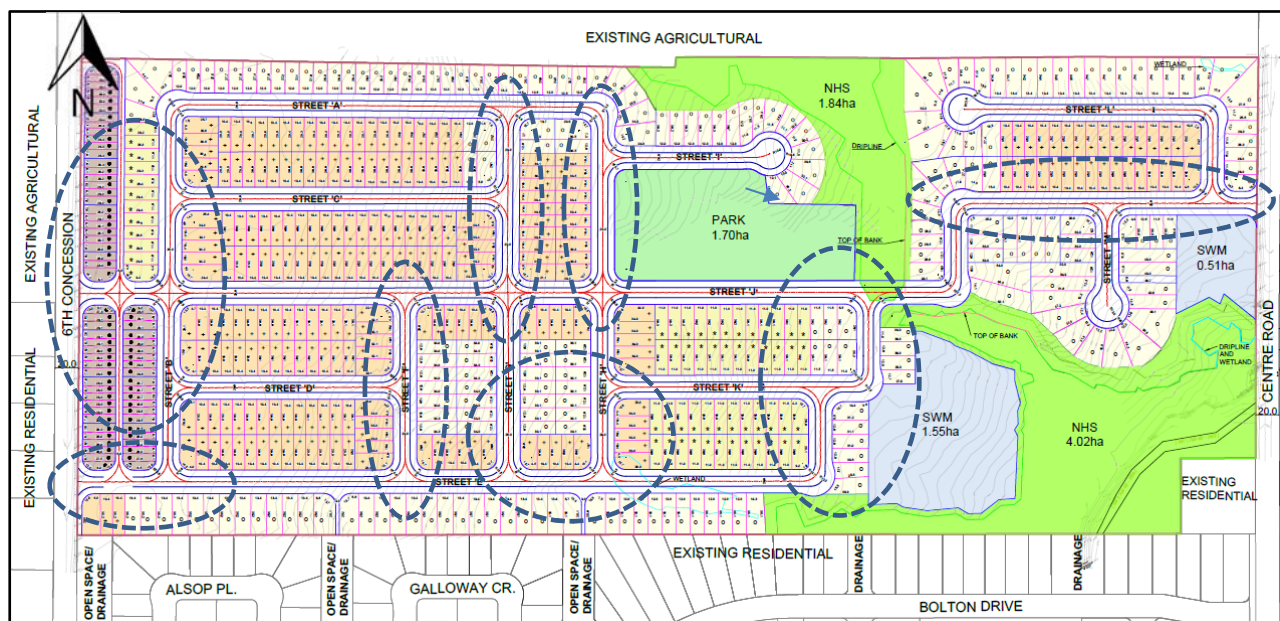
As requested by the Durham Region staff, Nextrans will also recommend the proposed development to include the following requirements from Durham's Vision Zero Strategic Road Safety Action Plan. These requirements were based on Nextrans' review of Durham Region's Strategic Road Safety Action Plan ([Durham Region staff presented Vision Zero](#)). These requirements are based on the context of the proposed development.

- Roundabout
 - It is anticipated that the forecast traffic volumes at the proposed internal intersections and external intersections are very low, which will not meet the warrant for roundabout treatments. It is Nextrans' opinion that the stop signs and associated intersection treatment recommended in this Study would address these concerns
- Traffic Signal Treatments
 - As the traffic signals are not warranted for the proposed intersections as part of the proposed development, no traffic signal treatments are required at this time
- Tighter Curb Radii
 - Provide smaller turning radii at all internal and external intersections to increase pedestrian safety by minimizing the crossing distances, increasing pedestrian visibility, and decreasing vehicle turning speed
 - The proposed locations with recommended tight turn radii are illustrated in **Figure 19** of this Study
- Roadway Design to Discourage Speeding
 - Minimize the lane widths, edge lines, curb and gutter for all internal roads, as well as on Concession Road 6 and Centre Road along the frontage of the proposed development to discourage aggressive driving
- Lane Widening for Truck
 - It is recommended that the proposed development to maintain a minimum of 1.2 m to 1.5 m paved shoulder width along the frontage of the subject site along Concession Road 6 and Centre Road.
- Flexible In-Road Warning Signs
 - Given that Nextrans recommended to minimize the lane widths for all internal roads, installation of flexible in-road warning signs to guide traffic into a specific lane are not required. It is recommended that the Region and the Town consider install these flexible in-road warning signs for Concession Road 6, Centre Road, Bolton Drive, Brock Street W and Quaker Village Drive in the area

- Transverse Rumble Strips
 - It is Nextrans' opinion that this is not required for the proposed development. It is recommended that the Town consider this treatment for Centre Road southbound and northbound north and south of Bolton Drive/North Street
- Zebra Crosswalks
 - It is recommended that raised and enhanced crosswalk markings (ladder/zebra) at all all-way stop intersections and approaches with stop signs, as well as at all pedestrian crossing locations
- Crossrides
 - Given that there is no update yet on the WSP's Active Transportation Plan at the time of preparation of this Transportation Impact Study, Nextrans recommends that these requirements be reviewed as part of the detailed and engineering design at that time. It is recommended that the proposed development protect for this treatment in the future.
- Paved Shoulders
 - It is recommended that the proposed development to maintain a minimum of 1.2 m to 1.5 m paved shoulder width along the frontage of the subject site along Concession Road 6 and Centre Road.

It should be noted that since this Transportation Impact Study is prepared to support the proposed Official Plan and Zoning By-law Amendment applications, this Study is not a detailed designed or engineering study. Therefore, most of these requirements will be addressed through the detailed site design and engineering submission at the subsequent stage of the proposed development.

Figure 19 – Recommended Tight Radii at the Proposed Intersection



7.7. Internal Intersection Lane Configurations and Traffic Control Types

Based on the external intersection operational capacity analysis findings, site traffic generation and the review of ATP objective and directions, Nextrans has reviewed the internal intersection and street network based on these principles:

- Internal street network should accommodate all modes of transportation: walking, cycling and cars
- Internal intersection lane configurations should minimize crossing/walking distance for pedestrians and cyclists; and

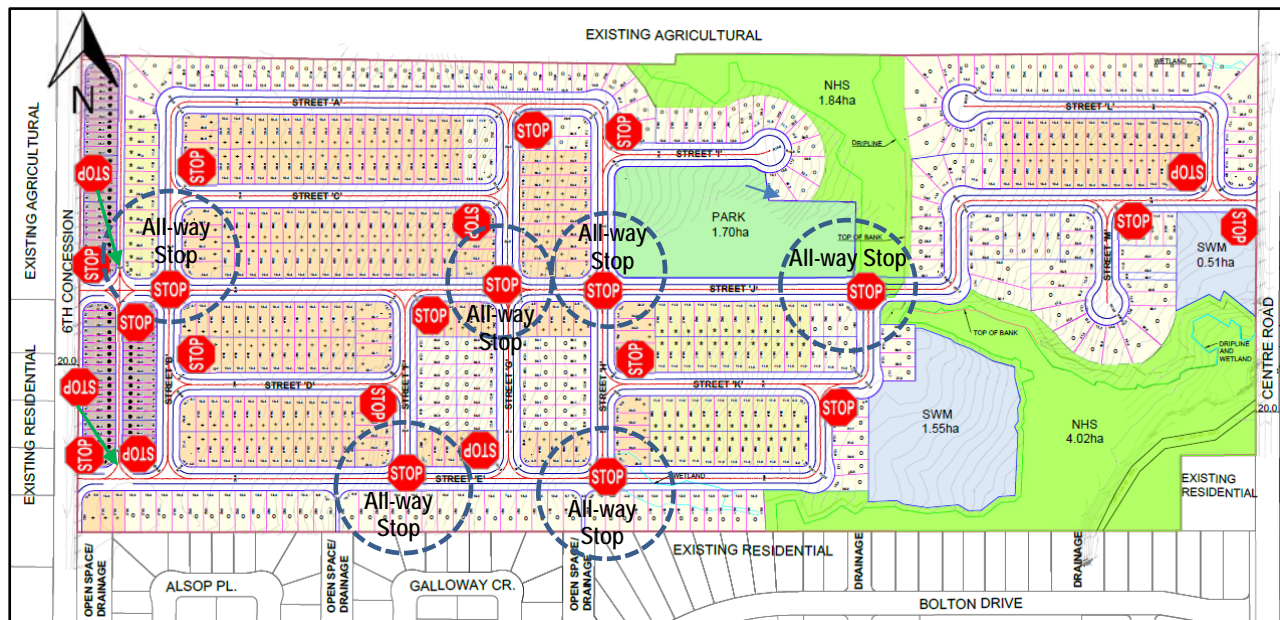
- Intersection traffic control types should take into consideration of the pedestrian and cyclist safety requirements.

To address the principles above, Nextrans identified and recommended the following requirements for internal streets and intersections:

- Sidewalks be provided at least on one side of all internal streets. If possible, provide sidewalks on both sides of the main east-west streets;
- All-way stops be provided at the main intersections with pedestrian crossings; and
- No exclusive turning lanes are required for traffic operation and capacity, as well as to minimize the crossing distance for pedestrians and cyclists.

Figure 20 illustrates the proposed traffic control types for internal intersections to accommodate pedestrians, cyclists and cars.

Figure 20 – Proposed Internal and External Sidewalk Connections



8.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is a co-ordinated series of actions aimed at maximizing the people moving capability of the transportation system. It is intended help reduce single-occupant auto use. Potential TDM measures may include but not limited to: TDM supportive land use, bicycle and pedestrian programs and facilities, public transit improvements, preferential treatments for buses and high occupancy vehicles (if applicable), ridesharing, and employee incentives.

It is Nextrans' understanding that the Township of Uxbridge initiated the Active Transportation Plan project (ATP) and has retained WSP Canada Group Limited with Share the Road Cycling Coalition to support the development of the Active Transportation Plan in the Township. The project is scheduled to completed by the end of 2020. Based on the information provided on the Township's website and notice of study commencement, the objectives of the Project are:

- Expand educational and promotional initiatives that raise awareness of active transportation opportunities for people of all ages and abilities;
- Develop a continuous Township-wide active transportation network that connects to all communities within Uxbridge and builds upon existing trail systems found within the Township; and

- Collaborate with the Active Transportation Committee, the Trails Committee and the Accessibility Advisory Committee as well as local municipal stakeholders, residents and Durham Region staff to ensure the community's interests are addressed in the plan.

Based on the review of the context of the proposed development in relation to the TDM requirements in the Township and the Region's Guidelines, as well as the information noted above, the following TDM measures and incentives are recommended for the proposed development:

- Active Transportation:
 - Sidewalks be provided at least on one side of all internal streets. If possible, sidewalks be provided on both sides of the main east-west streets, if appropriate;
 - Sidewalk be provided on the west side of Centre Road from the northerly limit of the proposed development to connect with the existing sidewalk on Bolton Drive and Centre Road south of Bolton Drive;
 - Sidewalk be provided on the east side of Concession 6 from the northerly limit of the proposed development to connect with the existing sidewalk on the south side of Bolton Drive; and
 - Two sidewalk/cycling connections provided between Bolton Drive and proposed development to connect with the existing sidewalk on the south side of Bolton Drive and sidewalks on Quaker Village Drive.
- Information Package:
 - Provide information package all residential units. The information package includes: Durham Region Transit schedules and maps, GO Bus schedule and maps, community major destinations and cycling maps;
 - The information package can be a form of a letter that includes all website links (QR codes) to the available public transit, community amenities and cycling resources

9.0 CONCLUSIONS / FINDINGS

9.1. Study Conclusions

The findings and conclusions of the analysis are as follows:

- The proposed development is expected to generate:
 - 393 total two-way trips (97 inbound and 296 outbound) and 515 total two-way trips (325 inbound and 190 outbound) during the AM and PM peak hours, respectively;
 - 361 two-way auto trips (89 inbound and 272 outbound) and 474 two-way auto trips (299 inbound and 175 outbound) during the AM and PM peak hours, respectively; and
 - 32 two-way none single-occupant-vehicle trips (8 inbound and 24 outbound) and 41 two-way single-occupant-vehicle trips (26 inbound and 15 outbound) during the AM and PM peak hours, respectively.
- The intersection capacity analysis indicates that under existing, future background and future total conditions, all the intersections considered in the Study are expected to operate at acceptable levels of service. No physical improvements to the area road network and intersections are required for this horizon year.
- The analysis indicates that no improvements are required to the existing active transportation and Durham Region Transit/GO Bus service in the area to accommodate the proposed development and this horizon year.

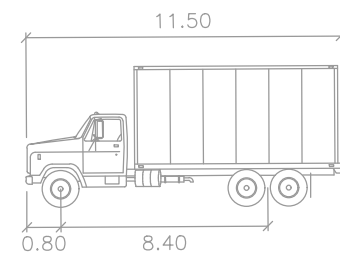
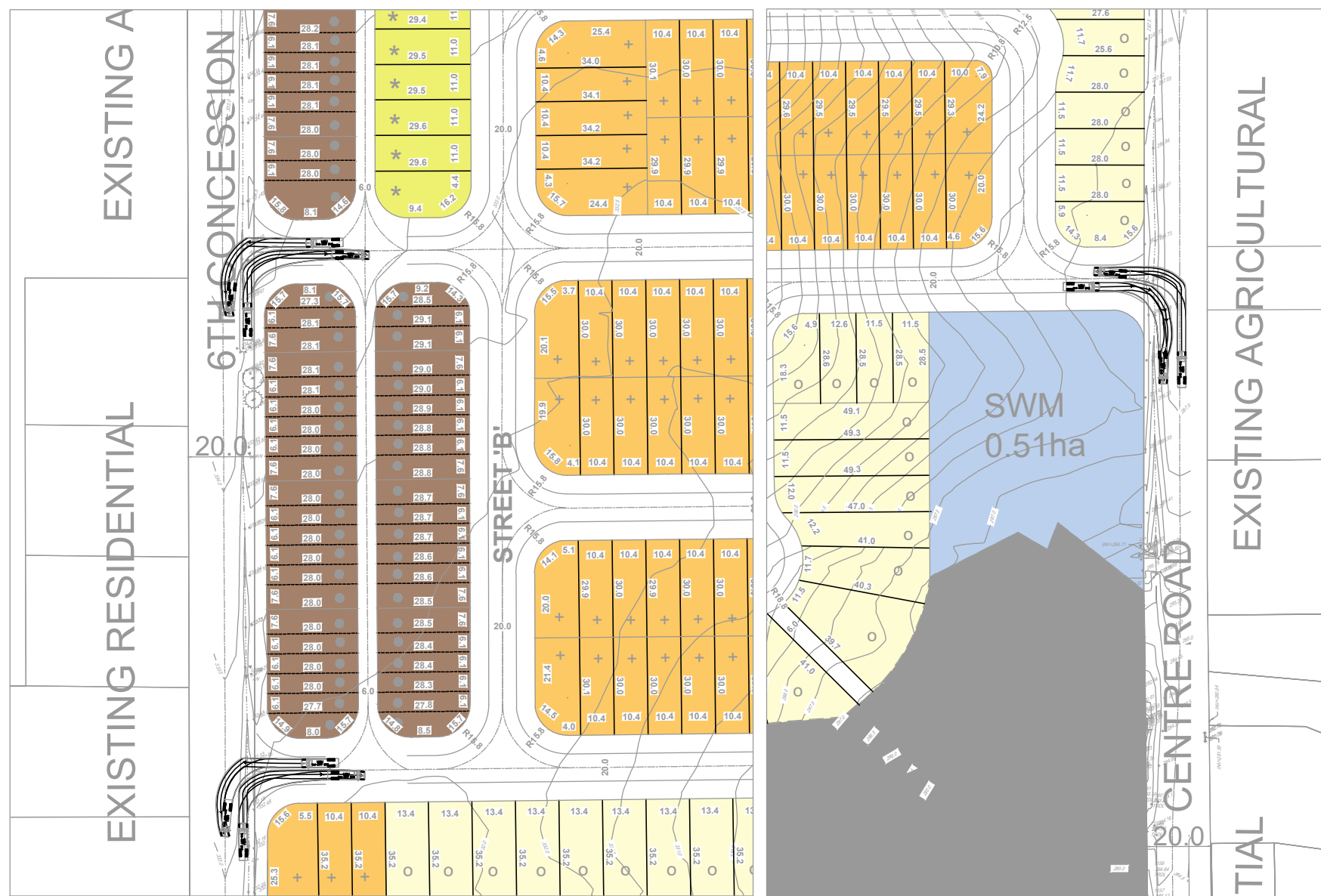
- The intersection capacity analysis indicates that all three proposed development intersections are expected to operate at acceptable levels of service with minimum delays or queues. The recommended intersection configurations and traffic controls include:
 - Concession 6/Site Intersection #1:
 - A shared left/right lane for westbound direction;
 - A shared through/right lane for the northbound and a shared through/left lane for the southbound direction; and
 - Stop controlled on the westbound direction (minor approach)
 - Concession 6/Site Intersection #2:
 - A shared left/through/right lane for eastbound and westbound directions;
 - A shared left/through/right lane for the northbound and southbound directions; and
 - Stop controlled on the westbound direction (minor approach)
 - Centre Road/Site Intersection #3/Maplebrook Drive Extension:
 - A shared left/through/right lane for eastbound and westbound directions;
 - A shared left/through/right lane for the northbound and southbound directions; and
 - Stop controlled on the Maplebrook Drive Extension and Site Intersection #3
- To accommodate pedestrians and cyclists to/from the proposed development, the following recommendations are provided:
 - Sidewalks be provided at least on one side of all internal streets. If possible, sidewalks be provided on both sides of the main east-west streets, if appropriate;
 - Sidewalk be provided on the west side of Centre Road from the northerly limit of the proposed development to connect with the existing sidewalk on Bolton Drive and Centre Road south of Bolton Drive;
 - Sidewalk be provided on the east side of Concession 6 from the northerly limit of the proposed development to connect with the existing sidewalk on the south side of Bolton Drive;
 - Two sidewalk/cycling connections provided between Bolton Drive and proposed development to connect with the existing sidewalk on the south side of Bolton Drive and sidewalks on Quaker Village Drive;
 - All-way stops must be provided at the main pedestrian crossings; and
 - No exclusive turning lanes are required for traffic operation and capacity, as well as to minimize the crossing distance for pedestrians and cyclists.

9.2. Study Recommendations

Based on the Study findings and conclusions, the following recommendations are provided:

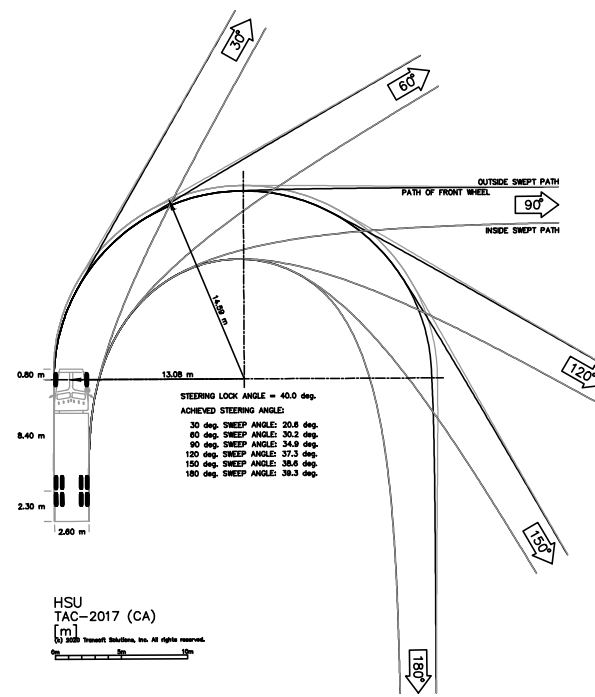
- The proposed development implements the TDM measures and incentives identified in this report to support active transportation and transit and to reduce the numbers of single-occupant-vehicle trips to and from the proposed development
- The proposed development implements Durham's Vision Zero Strategic Road Safety Action Plan requirements for the internal roads and intersections, as well as the external intersections onto Concession Road 6 and Centre Road, as recommended in Sections 7.6 and 7.7 of this Study

- The proposed development provides the recommended internal and external active transportation network
- The proposed development provides the recommended traffic control types for the internal and external intersections
- No additional physical improvements for the area road network and intersection to accommodate the proposed development under the future total conditions for the horizon year considered



HSU

Width : 2.60 meters
 Track : 2.60
 Lock to Lock Time : 6.0
 Steering Angle : 40.0



KEY PLAN

BENCHMARK

REVISIONS

NO.	REVISION	DATE	BY

STAMP



PROJECT NAME:
RESIDENTIAL DEVELOPMENT
7370 Centre Road
(TOWNSHIP OF UXBRIDGE)

DRAWING TITLE:
AutoTURN Analysis
(HSU TAC-2017)

DESIGN BY: A.S.	DATE: December 11, 2020
CHECKED BY: R.P.	PROJECT NO: NT-20-058
DRAWN BY: A.S.	SCALE: NTS
SCALE: NTS	DRAWING NO: Figure 21

Appendix A

Terms of Reference and Correspondence

From: Glyn Reedman <Glyn.Reedman@Durham.ca>
Sent: May 12, 2020 4:11 PM
To: Andy Bilawejian
Subject: FW: 7370 Centre Road Terms of Reference
Attachments: Transportation Impact Study Guidelines OCT 2011 Final.pdf; Synchro Guidelines - Section 9.pdf

Hi Andy.

Thank you for submitting the Terms of Reference for our review.

The challenge with preparing a TIS at this time is the inability to obtain up-to-date base traffic data. You state that traffic counts will be undertaken as part of the TIS, however this is not going to give accurate base data due to the Covid-19 restrictions currently in place.

We would require the intersections of Regional Road 8 / Centre Road and Regional Road 8 / Concession 6 (roundabout) to be included in the scope of the study. There is a traffic count in 2018 at Regional Road 8 / Concession 6, however the latest traffic count at Regional Road 8 / Centre Road is 2013. For the purposes of this study, we would consider using these counts with appropriate background traffic growth applied, in the absence of being able to take new traffic counts. We are not sure what data may be available on the Township Roads for the intersections included in your study area and this is going to require you to give this further consideration and discuss with the Township before an acceptable Terms of Reference can be agreed. We suggest that you consider what data is available and resubmit your Terms of Reference.

Below are our general comments on the scope of the study which you will need also to take account of.

1. Your study should comply with the Region's Traffic Impact Study Guidelines, including the requirements for Synchro analysis. I attach both for your information.
2. We would like you to include Regional intersections noted above. The report should include a signal warrant analysis of the Regional Road 8 / Centre Road intersection.
3. We generally agree with the use of a 5-year horizon from full build out. Please use an achievable / realistic full build out year.
4. We agree with the methodology for trip generation, distribution and background traffic growth. The growth rate and background developments should be agreed before the study is submitted.
5. Typically existing conditions should be noted by way of a site visit and any observations noted in the TIS. Due to Covid-19 restrictions we will not require this in this case, if the TIS is to be completed during the restrictions.
6. The most current intersection turning movement counts on the Regional roads (ATR counts and AADT data) as noted above, can be downloaded from our web site through the interactive [traffic counts map](#). Traffic counts taken or used on Township of Uxbridge roads will need to be confirmed with the Township.
7. As per the Region's TIS Guidelines, please include transit, active transportation and TDM discussions in the TIS. Recommendations should include infrastructure, network and program improvements to support non-auto travel.

Glyn Reedman
Project Coordinator
Transportation Infrastructure
905-668-7711 Ext 3476

From: Andy Bilawejian <andy@nextrans.ca>
Sent: May 6, 2020 10:25 AM
To: Doug Robertson <Doug.Robertson@Durham.ca>
Subject: 7370 Centre Road Terms of Reference

Good morning Doug,

Please see attached Terms of Reference for 7370 Centre Road in the Town of Uxbridge.

Please advise whether the attached ToR is acceptable, or if you have any comments.

Thanks,

Andy Bilawejian, B.Eng., EIT
Transportation Analyst

o: 905-503-2563 ext. 209
c: 416-358-2348
e: andy@nextrans.ca
w: www.nextrans.ca

NexTrans Consulting Engineers
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Terms of Reference

Reviewed on behalf of the Twp of Uxbridge
AECOM PN 60240627
Pre-Con follow up
Date: Nov 9, 2020
By: Peter Middaugh, P.Eng.

To: Peter Middaugh
From: Andy Bilawejian, Transportation Analyst, Nextrans Consulting Engineers
Date: April 4, 2019
Re: 7370 Centre Street, Uxbridge, Residential Subdivision – TOR for Traffic Impact Study

These terms of reference have been prepared to outline (for the Town's review and approval) the intended scope of work for a transportation impact and parking justification study for a proposed residential subdivision consisting of 607 dwelling units. The subject site is located north of Bolton Drive between Centre Street and Concession Road 6 in the Town of Uxbridge.

Introduction

The report introduction will include:

1. Description of site location
2. Description of nature of application
3. Description of proposed development and land use
4. Proposed study area

Existing Traffic Assessment

The existing conditions within the study area will be summarized and documented. This will include, but not limited to:

- A description of key roads and intersections (lanes, speed limits)
- Identifying forms of traffic control, lane configurations, turning restrictions
- Identifying pedestrian and cycling facilities
- Noting the location of adjacent driveways and access points
- Identifying other traffic generators in the vicinity of the site

Turning movement counts will be collected during weekday AM (7am-10am), weekday PM (4pm-7pm) peak periods at the following study area intersections:

- Bolton Drive and Concession Road 6
- Bolton Drive / North Street and Centre Road
- Bolton Drive and Quaker Village Drive
- Centre Road and Oakside Drive

Centre Street / Brock St W (Regional Road 8)



Once existing traffic volumes have been collected, we will prepare a baseline model of existing traffic operations at the study area intersections using Synchro v.10 analysis for the identified critical time periods (weekday AM and PM peak hours). The existing analysis will include levels of service, volume to capacity ratios, and queuing at the key study intersections.

Future Background Traffic Assessment

Future Background consists of background growth and other background development traffic. We will obtain historic AADT records and estimate a background growth rate for the assumed full build-out year for the proposed development along with a 5-year time horizon period thereafter.

We do understand that there is and may be further redevelopment applications, as such traffic generation associated with those developments will be included in our analysis to reflect our horizon year assessment.

Operational deficiencies as a result of future forecasted traffic volumes will be identified and mitigative measures will be proposed and documented in the final report.

Site Traffic Assessment

The weekday AM and PM peak hour traffic to be generated by the proposed development will be estimated based on information published in the *Trip Generation, 10th Edition*, by the Institute of Transportation Engineers (ITE).

The directional trip distribution and assignment for traffic approaching and departing the site will be determined based upon existing traffic patterns and Transportation Tomorrow Survey (TTS) 2016 data.

Future Total Traffic Assessment

Future total traffic consists of future background plus site traffic. Operational deficiencies as a result of site traffic will be identified and mitigative measures will be proposed and documented in the final report. We will develop and recommend appropriate intersection controls and geometric improvements for all key intersections as well as determine the appropriateness of the proposed site access location(s) and the lane requirements at these new locations.

Parking / On Site Circulation and Site Access Review

- Review the available parking to determine whether the proposed parking supply is sufficient to accommodate the parking demand of the proposed site and meets current by-law requirements.
- We will review and provide comment on the most recent site plan with respect to the functionality of the internal vehicular circulation to facilitate vehicle maneuvering, loading, servicing, parking and pick-up / drop-off activities.
- Using Auto TURN, we will confirm the turning radius requirements and site circulation for passenger and heavy vehicles.
- Determine the appropriateness of access location and ensure adequate connections to main corridors are provided.
- Assign appropriate internal signage to site plan.

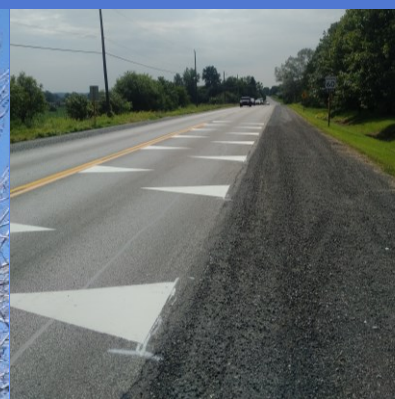
Coordinate assessment and review with the planned Mason Homes development on the east side of Centre Street. The planned location of the intersections on Centre Street for both the 7370 Centre Street plan and the Mason Homes plan need to be coordinated and details of such coordination and decisioning captured in the report.

Transit and Transportation Demand Management Plan

A review of the existing and future transit availability in the area and recommendations shall be made to ensure acceptable walking distances are proposed to the subject lands. Transit routes, service frequencies, and stations will be identified in the study area.



Vision Zero – A Strategic Road Safety Action Plan for Durham Region



Township of Uxbridge – General Purpose and Administration Committee
April 6, 2020

Vision and Goal

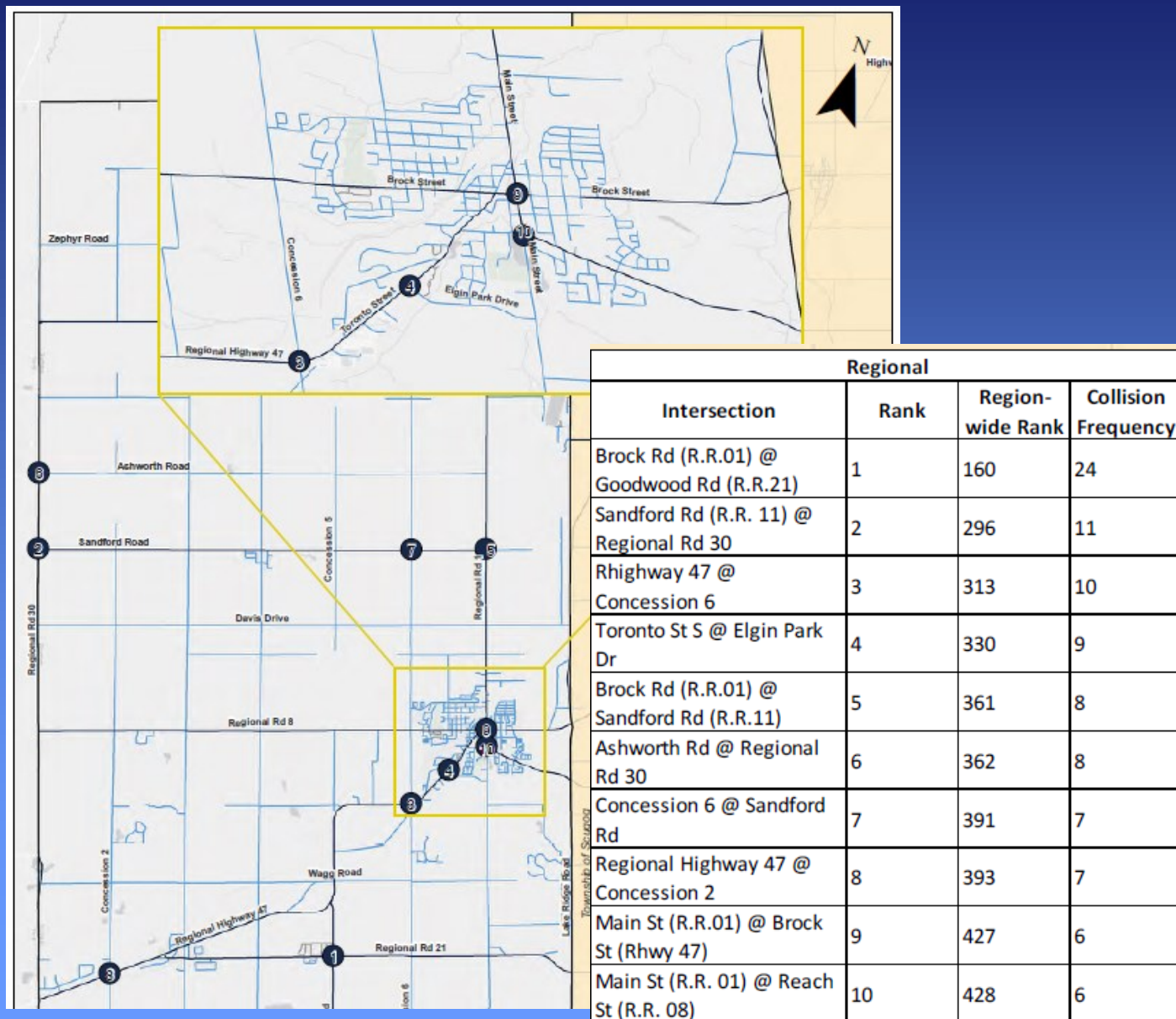
Vision

Zero people killed or injured across all modes of transportation.

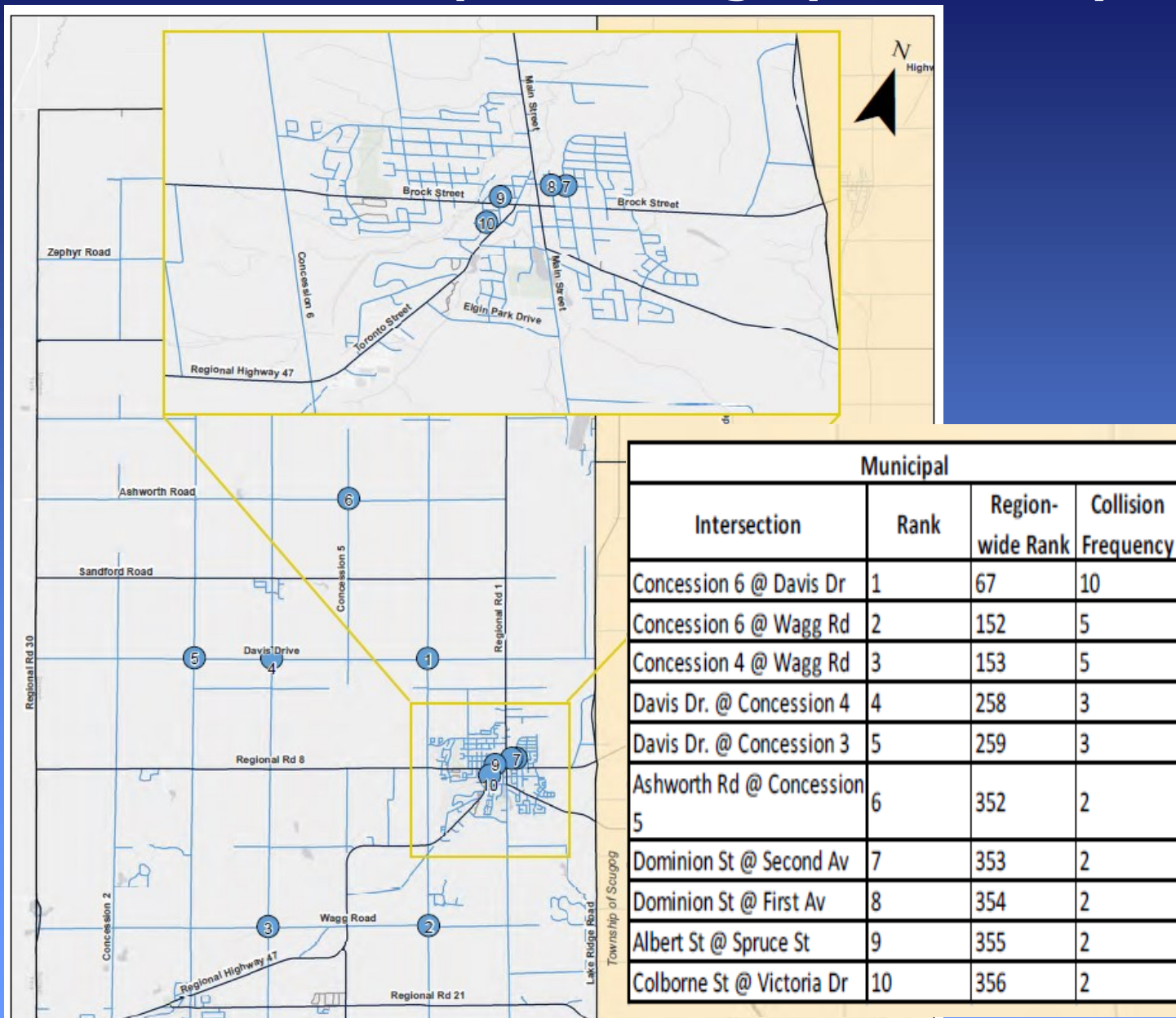
Goal

Minimum 10% reduction in fatal and injury collisions over a five year period.

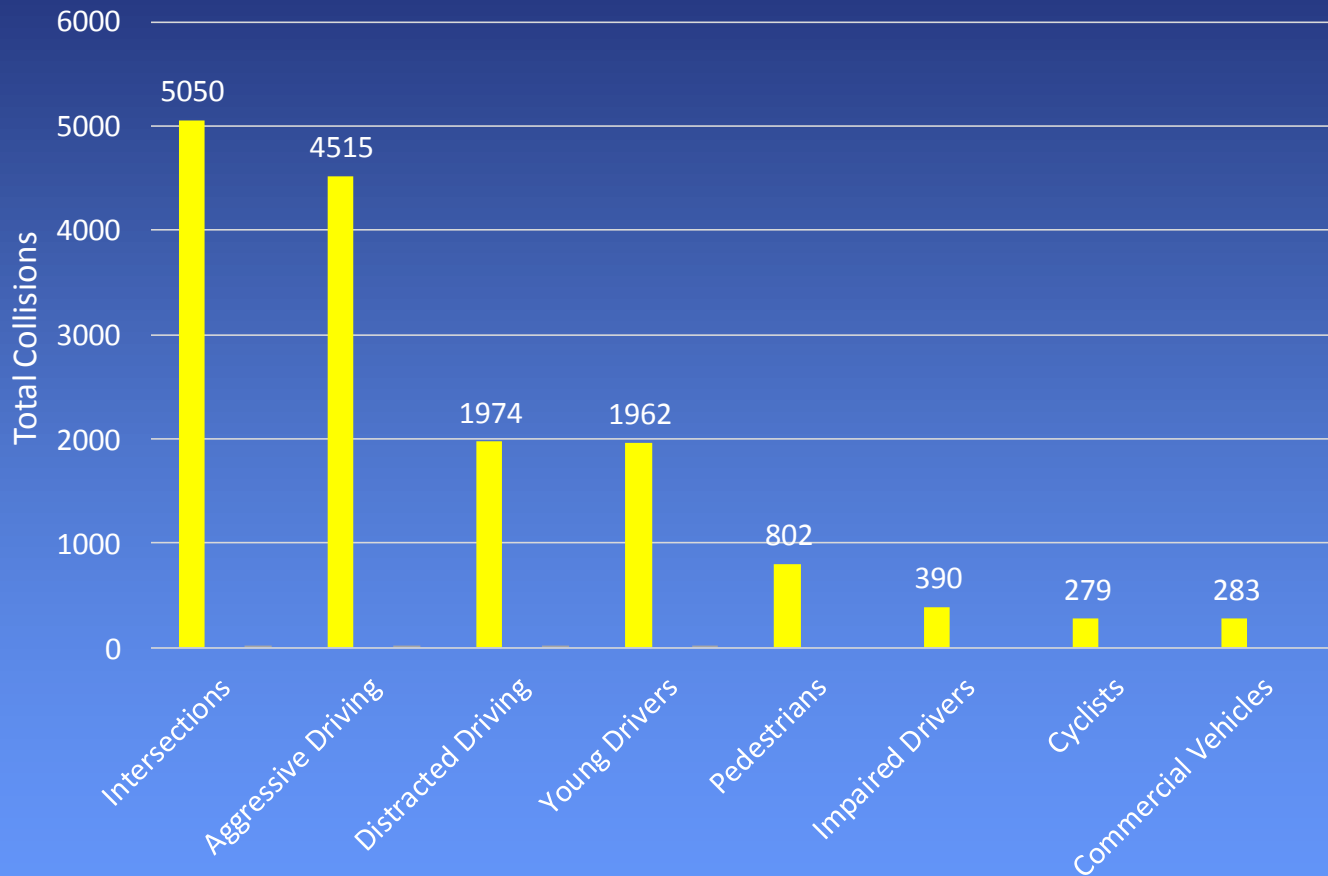
Top 10 Highest Collision Frequency Regional Intersections in Township of Uxbridge (2014-2018)



Top 10 Highest Collision Frequency Municipal Intersections in Township of Uxbridge (2014-2018)



The Data



Five Year Total Fatal and Injury Collisions by Emphasis Area (2012-2016)
Regional and Local Municipal Roads Combined

Intersections

- Red Light Cameras
 - Reg. Rd. 23 (Lake Ridge Rd) at Reg. Rd. 21 (Goodwood Rd)
- Roundabouts
 - Reg. Rd. 23 (Lake Ridge Rd) at Davis Drive
 - Reg. Rd. 21 (Goodwood Rd) at Brock Rd (construction 2024*)
 - Reg. Hwy 47 (Toronto St) at Concession Rd 6 (construction 2025*)
 - Reg. Rd. 21 (Goodwood Rd) at Concession Rd 6

*Subject to Regional Council approval

Intersections

- Protected Only Left Turn Phasing
- Physical Improvements (turning radii, offset left turn lanes, right turn lanes)
- DVZ Policy (Signal Warrants, Roundabouts)
- Traffic Control Signals
 - Reg. Rd. 1 (Main St N) at Toronto St N
 - Reg. Rd. 8 at Reg. Rd. 30

Aggressive Driving

- Automated Speed Enforcement
 - Reg. Hwy 47 – Goodwood
 - Reg. Rd. 11 - Sandford
- Radar Feedback Board Program
 - Reg. Hwy 47 (Brock Street East), east of Nelkydd Lane
 - Reg. Rd. 1 (Main Street), Fields of Uxbridge
 - Reg. Rd. 13, east of Leaskdale
 - Permanent Locations: Goodwood, Chalk Lake
- Line Marking Enhancements

Aggressive Driving

- DVZ Policy (Speeds, Community Safety Zone)
- Design to Discourage Speeding
 - Leaskdale, Toronto Street
- County Curve Program
 - Reg. Rd. 30 at Reg. Rd 39
 - Reg. Rd. 39 at Meyers Rd
 - Reg. Rd. 13 at Acton Rd
 - Reg. Rd. 23 at Townline Uxbridge-Brock (Vallentyne)

Distracted Driving

- Education and Enforcement
- Safety Edge

Young Drivers (16-25)

- Education Campaigns
 - Weed out the Risk
 - Distracted Walking Programs
 - PARTY Program
 - National Teen Driver Safety Week

Pedestrians

- Pedestrian Crossover Installations
 - Toronto Street at Colborne Street (2020)
 - Brock Street West at Centre Road (2022/23)
- Midblock Pedestrian Signal
 - Main Street North, north of Colby Road (2021)
- Intersection Pedestrian Signals
 - Reg. Hwy 47 at Concession Rd 3 (Front St) (2021)
 - Brock Street West at Victoria St/Railway St (2021)

Pedestrians

- Pedestrian Signal Timing Adjustments
- Pedestrian Countdown Signals
- Leading Pedestrian Interval Pilot Project
- Refuge Islands
- Zebra Markings

Impaired Drivers

- Education and Enforcement

Cyclists

- Paved Shoulders on Rural Roads
- Midblock Trail Crossing Study
- Cross-rides at Intersections
- Cyclist Detection at Traffic Signals

Commercial Vehicles

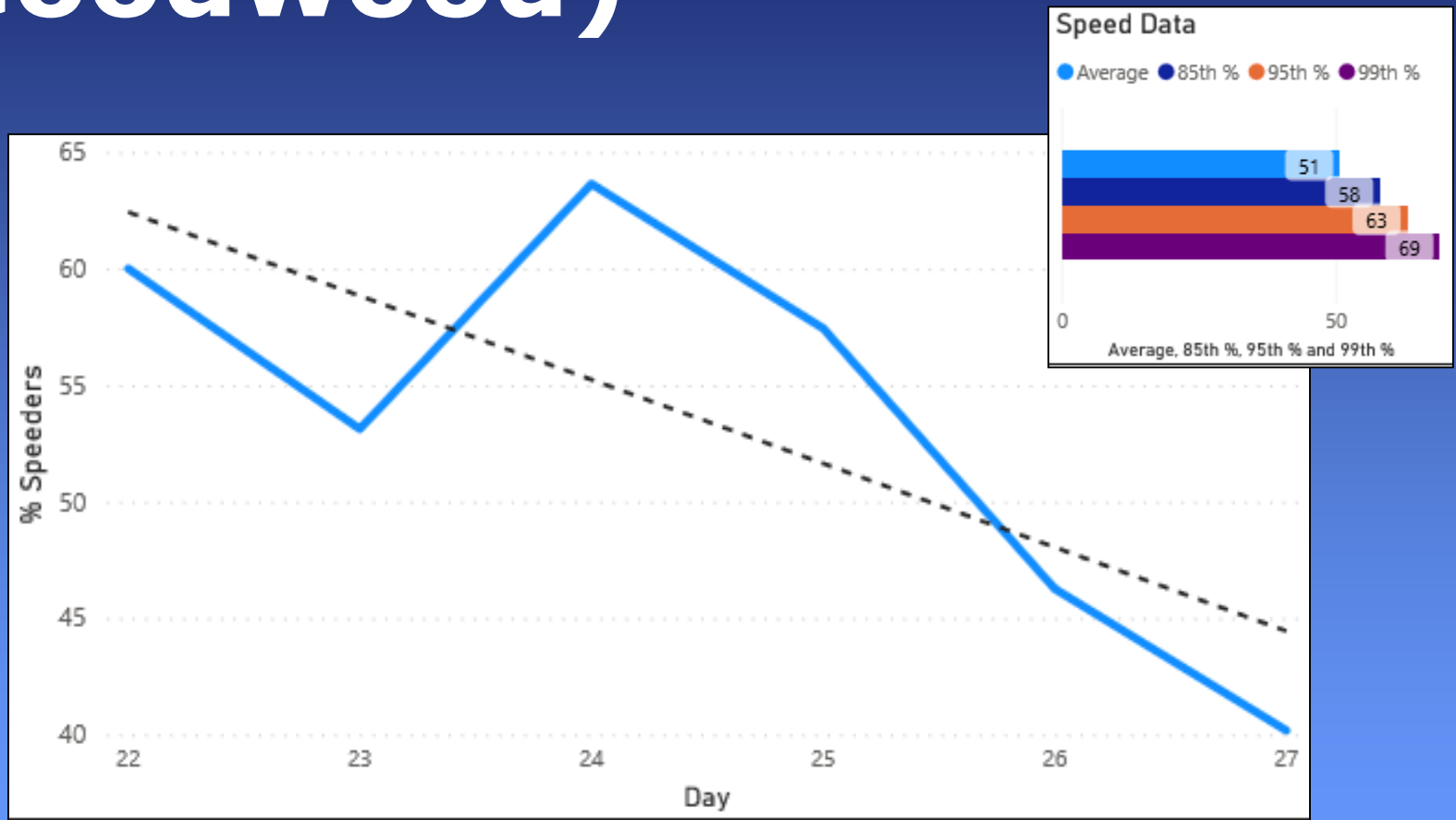
- Designated Truck Routes
- Additional Enforcement Efforts

Preliminary ASE Data

- Over 10000 fines issued since September
- Speeds reduced by approximately 30 percent
- Currently there two ASE Sites in Uxbridge:
 - Sandford Rd (Reg. Rd. 11)
 - 3rd Rotation Dec 2020
 - Goodwood Rd (Reg. Hwy 47)
 - 2nd Rotation Oct 23, 2020



Preliminary ASE Data (Goodwood)



Max Speed Recorded 89 km/hr – October 25th

AUTOMATED SPEED ENFORCEMENT SYSTEM OFFENCE NOTICE
AVIS D'INFRACTION – SYSTÈME DE CONTRÔLE AUTOMATISÉ DE LA VITESSE

22-517

Form / Formulaire 6.2

Provincial Offences Act / Loi sur les infractions provinciales
 O. Reg. / Règl. de l'Ont. 108/11

ONTARIO COURT OF JUSTICE
 COUR DE JUSTICE DE L'ONTARIO

You / Vous: THE REGIONAL MUNICIPALITY OF DURHAM,
 (Name / Nom):

2860-994-20-G0020736-00



OFFENCE NO. / N° D'AVIS D'INFRACTION

(Address / Adresse): 825 CONLIN RD,
 WHITBY, ON, L1N6A3

being the owner of a motor vehicle displaying
 propriétaire d'un véhicule automobile muni de la
 Ontario number plate AP48777
 plaque d'immatriculation de l'Ontario

are charged with the offence of speeding
 êtes accusé(e) de l'infraction d'excès de vitesse

on the 15 day of September, 2020 at 1:24 PM
 le 15 jour de septembre, 2020 à 1:24 PM

on Simcoe St. North, Northbound North of Selleck Lane
 sur le/la (street/road / rue/chemin)

a community safety zone in the
 une zone de sécurité communautaire dans le/a

Regional Municipality of Durham, City of Oshawa
 (municipality / municipalité)

as shown in the digitized image set forth in this notice, contrary to section 128 and
 pursuant to section 207 of the Highway Traffic Act.
 comme il est indiqué dans les images numérisées présentées dans le présent
 avis, contrairement à l'article 128 et conformément à l'article 207 du Code de la
 route.

The photograph taken by the automated speed enforcement system shows the
 La photographie prise par le système de contrôle automatisé de la vitesse montre

motor vehicle travelling at 68 kilometres per hour in a posted 50
 que le véhicule roulait à 68 kilomètres à l'heure dans une
 la vitesse de zone où la vitesse est limitée à
 kilomètre per hour zone.
 kilomètres à l'heure.

I believe and certify that the above offence has been committed.
 Je crois et j'atteste que l'infraction mentionnée ci-dessus a été commise.

Signature of the Officer issuing this notice
 Signature de l'agent qui a délivré l'avis d'infraction

Issuing Officer Number: 00111
 Matricule de l'agent qui a délivré l'avis d'infraction :
 Date of Deemed Service: October 6, 2020
 Date de signification présumée :

PLEASE NOTE: Section 207 of the Highway Traffic Act provides that you, as the owner, are liable for this offence even if you were not the driver at the time, subject to limited exceptions. Neither demerit points nor a driver's licence suspension will result from your conviction for this offence. The provincial offences officer has certified that the automated speed enforcement system used in the detection of this offence complied with section 2 of Ontario Regulation 398/19, was in proper working order at the time that the photograph was recorded by that system and was used in an area authorized by law. A certified photograph will be tendered in evidence at your trial. You must apply to the justice at trial if you wish to compel the attendance of the Provincial Offences Officer who issued the certificate of offence or who certified the photograph to be tendered at your trial.

Set Fine
 Amende fixée
 \$ 90.00 \$
Total Payable:
Montant total exigible:
 (includes set fine, applicable
 victim fine surcharge and
 costs)
 (comprend l'amende fixée, la
 suramende compensatoire
 pour l'aide aux victimes
 applicable et les frais)
\$ 115.00 \$

REMARQUE: L'article 207 du Code de la route prévoit que vous-même, à titre de propriétaire, êtes responsable de cette infraction même si vous ne conduisez pas le véhicule à ce moment-là, sous réserve d'exceptions restreintes. Une déclaration de culpabilité pour cette infraction ne mènera pas à l'inscription de points d'inaptitude dans votre dossier ou à la suspension de votre permis de conduire. L'agent des infractions provinciales a attesté que le système de contrôle automatisé de la vitesse utilisé pour détecter cette infraction était conforme à l'article 2 du Règlement de l'Ontario 398/19, qu'il fonctionnait correctement au moment de la prise de la photographie et qu'il était utilisé dans un secteur autorisé par la loi. Une photographie certifiée sera présentée en preuve à votre procès. Vous devez vous adresser au juge du procès si vous désirez obtenir la comparution de l'agent des infractions provinciales qui a délivré le procès-verbal d'infraction ou qui a certifié la photographie qui sera présentée en preuve lors de votre procès.

15/09/2020 FORWARD YOUR RETURN SLIP IN THE SELF-ADDRESSED ENVELOPE PROVIDED. / ENVOYEZ VOTRE BORDERAU DANS L'ENVELOPPE-RÉPONSE FOURNIE. 06/10/2020
 POA 0926 (Form / formulaire 6.2, Décembre 1, 2015 / 1er décembre 2015) CSD



Location: Simcoe St. North, Northbound North of Selleck Lane
 Date: 15/09/2020 Time: 13:24 Posted Speed Limit: 50 KPH Motor Vehicle Speed: 68 KPH
 Lane: 2 System ID: 115996-0012

Preliminary RLC Results

- All twelve Red Light Cameras installed
- Ten of twelve Red Light Cameras full operational issuing charges
- One site in Uxbridge at Lake Ridge and Goodwood

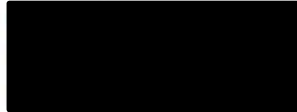


RED LIGHT CAMERA SYSTEM OFFENCE NOTICE
AVIS D'INFRACTION – SYSTÈME PHOTOGRAPHIQUE RELIÉ AUX FEUX ROUGES

Form 5 Provincial Offences Act, O. Reg 108/11
Formulaire 5, Loi sur les infractions provinciales, Règl. de l'Ont. 108/11
ONTARIO COURT OF JUSTICE
COUR DE JUSTICE DE L'ONTARIO

4961-997-18-30240195-00
OFFENCE NO. / N° D'AVIS D'INFRACTION

You/Vous
(Name/Nom):
(Address/Adresse):



being the owner of a motor vehicle displaying
étant le propriétaire d'un véhicule automobile muni de la

Ontario number plate
plaque d'immatriculation de l'Ontario

are charged with the offence of failing to stop at a red light
êtes accusé(e) de l'infraction d'omettre de s'arrêter à un feu rouge

on the 04 day of September, 2018 at 12:44 PM
le jour de à

at the intersection of Bayview Ave. and Crosby Ave. / Redstone Rd.
à l'intersection de

(location / endroit)

in the Regional Municipality of York
dans le/la

(municipality / municipalité)

as shown in the digitized images set forth in this notice, contrary to subsection
144(18.1) and pursuant to section 207 of the Highway Traffic Act,
comme il est indiqué dans les images numérisées présentées dans cet avis,
contrairement au paragraphe 144(18.1) et à l'article 207 du Code de la route.

The photographs taken by the red light camera system show the vehicle approaching the
intersection, at which time the signal had displayed red for
Les photographies prises par le système photographique relié aux feux rouges
montrent le véhicule qui s'approche de l'intersection, au moment où le feu était rouge
depuis

001.2 seconds and that vehicle proceeded through the intersection when
001.2 secondes et que le véhicule a franchi l'intersection alors que

the light had been red for 001.9 seconds.
le feu était rouge depuis 001.9 secondes.

I believe and certify that the above offence has been committed.
Je crois et atteste que l'infraction susmentionnée a été commise.

Signature of Officer issuing this notice:
Signature de l'agent qui délivre le présent avis:

Issuing Officer Number: 27
Numéro de l'agent qui délivre le présent avis:

Date of Deemed Service: September 19, 2018
Date de signification présumée:



Next Steps

- Implementation of Countermeasures
- Continued Partnership and Collaboration with Durham Regional Police Service and Local Area Municipalities
- Ongoing monitoring and evaluation of progress **towards zero.**

durham.ca/DurhamVisionZero

TOWNSHIP OF UXBRIDGE

ACTIVE TRANSPORTATION PLAN



EXTERNAL STAKEHOLDER WORKSHOP

Thursday November 5th, 2020



+



The Township of
UXBRIDGE
Trail Capital of Canada

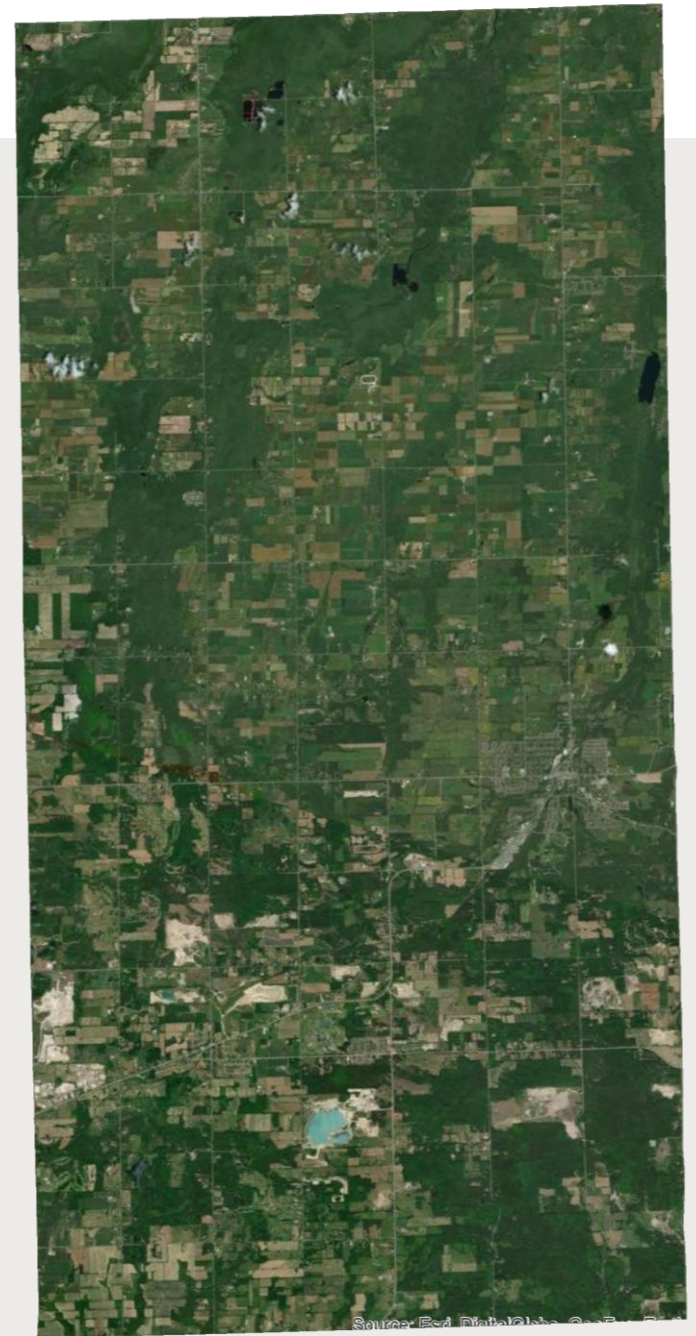
Agenda

1. Introductions **10 min**
2. Project Overview **20 min**
 - Study Process
 - ATP Part 1 Engagement Overview
 - ATP Part 1 Outcomes
 - ATP Part 2 Considerations
3. Interactive Activities **60 min**
 - Draft Candidate Network
 - Programs and Outreach
4. Wrap-up and Next Steps **5 min**



Today's Objectives

1. Gather input on a draft candidate network including any modifications to proposed routes and facility types.
2. Gather input on network priorities that should be identified in the plan.
3. Prioritize education, encouragement and outreach initiatives.



PROJECT OVERVIEW



What is an ATP?

The Active Transportation Plan (ATP)

Is:

- ✓ Long-term vision
- ✓ Flexible document
- ✓ Community building asset
- ✓ Communication tool
- ✓ Implementation guide
- ✓ Support for existing plans

Is not:

- ✗ Detailed or final design
- ✗ Authority to construct
- ✗ Prescriptive
- ✗ Requirement
- ✗ Financial commitment



Study Process

SUMMER
2020



Future Directions, Strategies and Actions

- Undertake a strengths, weaknesses, opportunities and threats (SWOT) analysis of active transportation in Uxbridge.
- Assess demand and potential for active transportation in Uxbridge, using available data from Statistics Canada, Transportation Tomorrow Survey and Strava.



We are working through Part 2



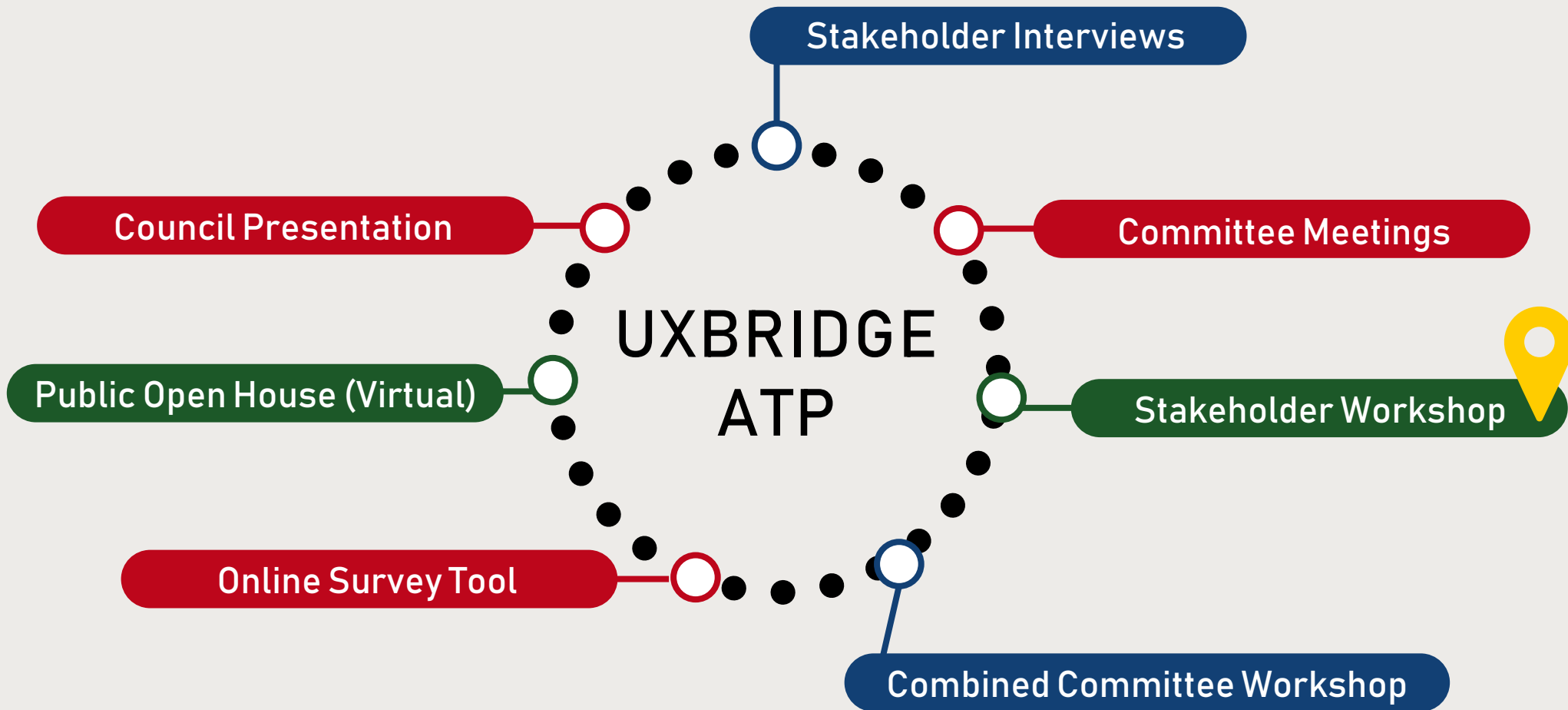
Implementation, Operations and Maintenance Plans

- Review existing conditions and identify missing links.
- Identify an active transportation network including preferred facility types.
- Develop an implementation strategy including phasing, priorities and costing estimates.
- Establish educational, promotional and programming recommendations.
- Draft and finalize the plan.

WINTER
2020



Engagement and Consultation



Shaping the Process

A number of activities have been undertaken to inform the study process and next steps:

6

stakeholder
interviews

Interviews with:

Township staff
Committees
Interest groups

4

committee
meetings

Meetings with:

Trails – August 6
AT – August 11
Accessibility – August 17
Combined Committee
meeting – September 22

1

online
survey

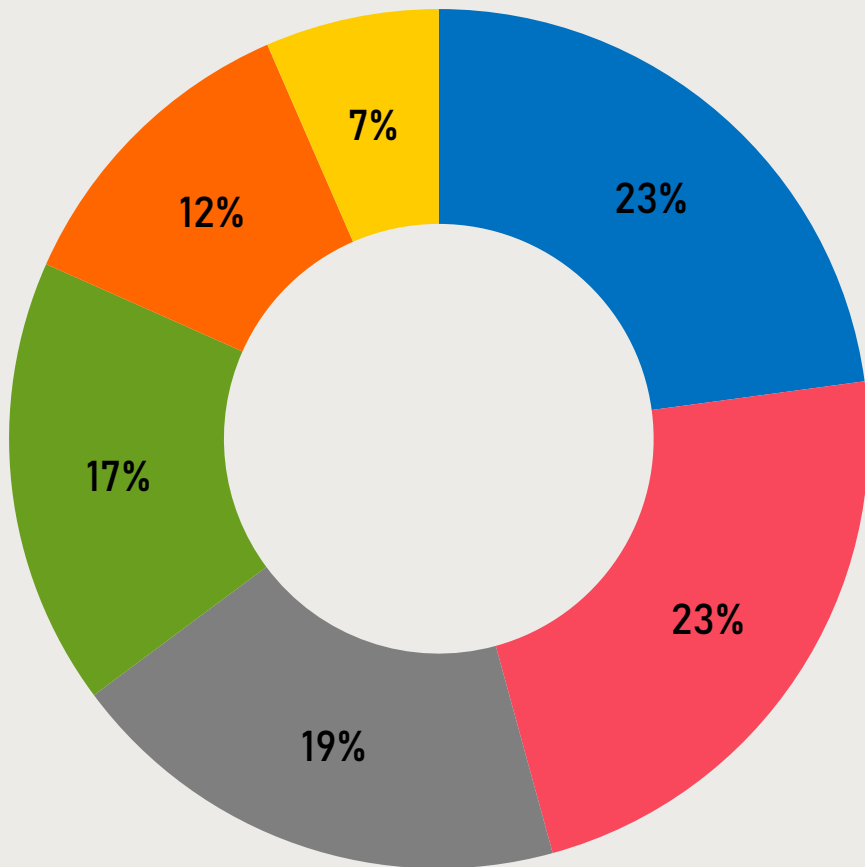
140 participants
survey was active from
July 24 to August 31

Plus calls / meetings with Township staff



Online Survey Results

Most important principles that should be used to identify routes in the plan:



Top principles:

- 1 ■ Safety (23%)
- 2 ■ Connected (23%)
- 3 ■ Convenient (19%)
- 4 ■ Accessible (17%)
- 5 ■ Development-driven (12%)
- 6 ■ Education and awareness (7%)

What does this tell us?

When identifying an active transportation network for Uxbridge, consideration should be given to routes that:

- Improve a user's sense of **safety** and ultimately makes them feel more comfortable to walk, bike and use other non-motorized forms of travel.
- **Connect** to where people live and where they want to go,
- Are a **convenient** and realistic option for people to use for travel or recreation.



Online Survey Results

337 pins were placed
a sample of the input:



Destinations:

Swimming pool, Farmers Market, Fields of Uxbridge, downtown area and shops, Second Wedge, Elgin Park, schools



Barriers:

Missing links to / from existing trails, lack of trail crossings, missing sidewalk connections, truck traffic, narrow roads



Bike Routes:

Wagg Road, Maple Bridge Trail, connections to Regional Forests, York-Durham Line, Ashworth Road



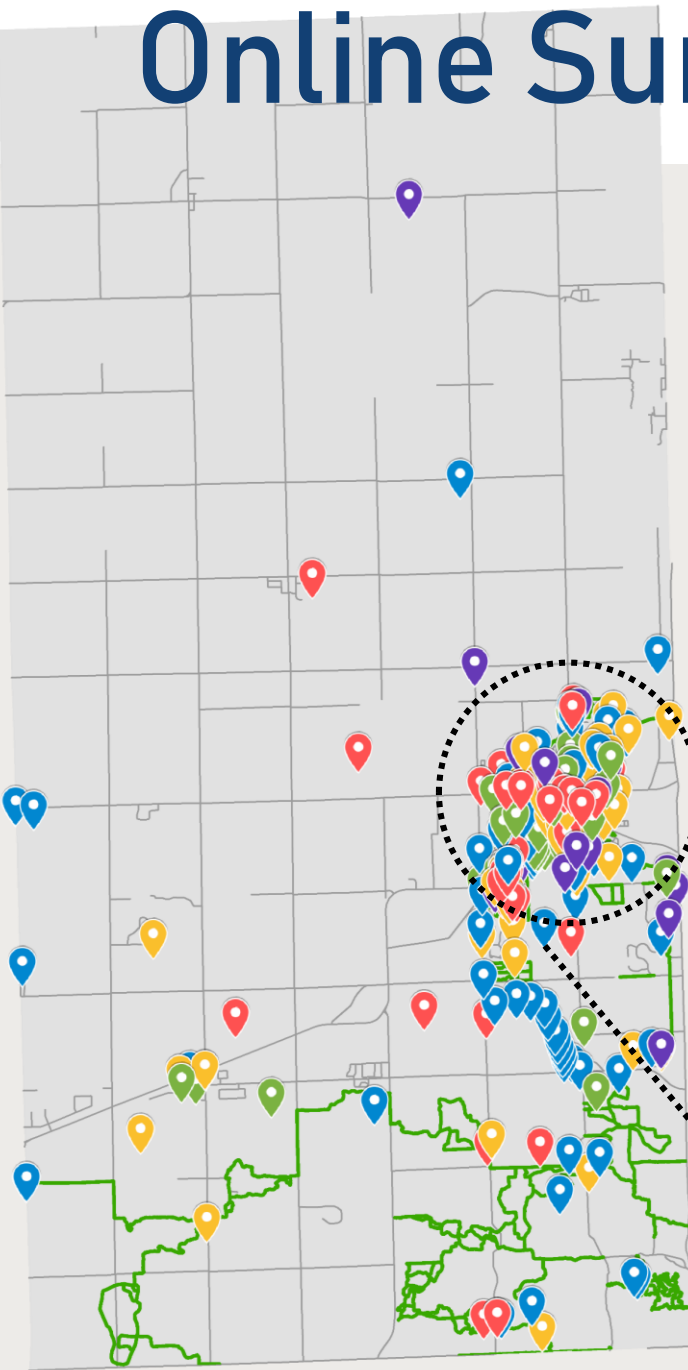
Walking Routes:

Elgin Park, to / from schools and shops, trails in Countryside Preserve



Other Comments:

Need improvement beyond downtown, parking, trail conditions, crossings



Online Survey Results

Types of users:



37%

Pedestrians



22%

Cyclists

What would encourage more people to be active:



22% a connected Township-wide network



19% more infrastructure / facilities such as paved shoulders



14% better connections to key destinations

Trip purpose:



39%

For recreation and leisure



36%

For health and fitness

Summary of priorities

1. Provide opportunities for people to walk, bike and be more active (27%)
2. Improve the quality of life and health of residents (20%)
3. Improve biking and walking as a viable transportation option (15%)



SWOT Analysis

Informed by input collected from stakeholder interviews and Committee meetings

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"> • Presence of existing Committees • Existing trail systems • Engaged community volunteers and local groups • Community is a good size for walking and biking • Strong BIA • Supportive Council and staff • Common interest amongst residents to be more active • Variety of trail levels that allow people to explore Uxbridge 	<ul style="list-style-type: none"> • Lack of driver awareness • Sidewalk gaps • Trails that do not make the final connection to a destination • Previous developments have no / minimal provisions for AT infrastructure • Lack of crosswalks • Lack of funding to implement routes • Lack of trailheads, parking and other amenities at trails • No safe way to get in / out of Uxbridge 	<ul style="list-style-type: none"> • Expand outreach through Committees • New policies to support AT and complete streets • Uxbridge PS has a student AT Committee – leverage resources • Shovel ready projects for the Federal COVID funding stream • Work with partners, BIA and CoC to demonstrate economic benefits of investing in active transportation • Create loops connections • Cycle tourism benefits 	<ul style="list-style-type: none"> • Lack of available funding programs • Many stakeholders involved • Population growth is slow – small tax base • Constrained road right-of-way could limit desired facility type • Temporary easements • Aggregate industry is increasing, busy roads • Maintenance costs • Regional roads have many destinations along them – implementation determined by Region



Part 1 Outcomes

SWOT Analysis

Build a better understanding of the needs, interests and priorities to ensure recommendations are best-suited for success in Uxbridge.

Demand and Potential

Understand travel patterns (where people are walking and biking within the Township) and popular destinations, to help identify potential areas for improvement.

Existing Conditions

Identify and map where active transportation infrastructure currently exists within the Township including off-road trails and on-road routes on local and regional roads.

The findings from Part 1 will be used to inform the recommendations developed and identified in Part 2.



What's Next?

SUMMER
2020

PART 1

Future Directions, Strategies and Actions

- Undertake a strengths, weaknesses, opportunities and threats (SWOT) analysis of active transportation in Uxbridge.
- Assess demand and potential for active transportation in Uxbridge, using available data from Statistics Canada, Transportation Tomorrow Survey and Strava.

PART 2

Implementation, Operations and Maintenance Plans

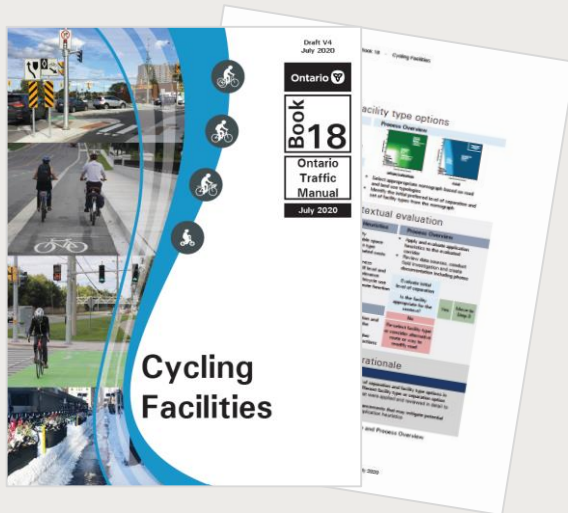
- Review existing conditions and **identify missing links.**
- Identify an active transportation network including **preferred facility types.**
- Develop an **implementation strategy** including phasing, priorities and costing estimates.
- Establish **educational, promotional and programming** recommendations.

WINTER
2020



Informing Part 2

A number of factors to be considered and integrated when undertaking Part 2:



Current standards and guidelines

Including the forth-coming update to OTM Book 18: Cycling Facilities



Updates to the Durham Region RCP

Study is on-going: routes and recommendations will be integrated into the ATP



Planning and design principles

All ages and abilities
Complete streets
Equity



Input and feedback through on-going engagement



Applying OTM Book 18

Route Selection Criteria

Network connectivity

- Connectivity and physical barriers
- Directness
- Existing and potential future demand

Conflict mitigation

Social and economic factors

- Equity
- Social and economic trends
- Public and stakeholder input

Attractiveness

- Natural scenery and urban streetscape
- Tourism, business strategies and goals

Feasibility

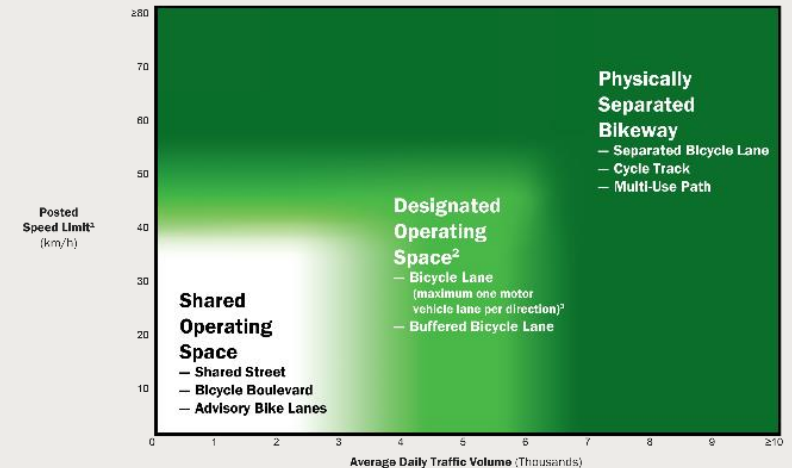
- Constructability
- Potential cost

How are the criteria applied?

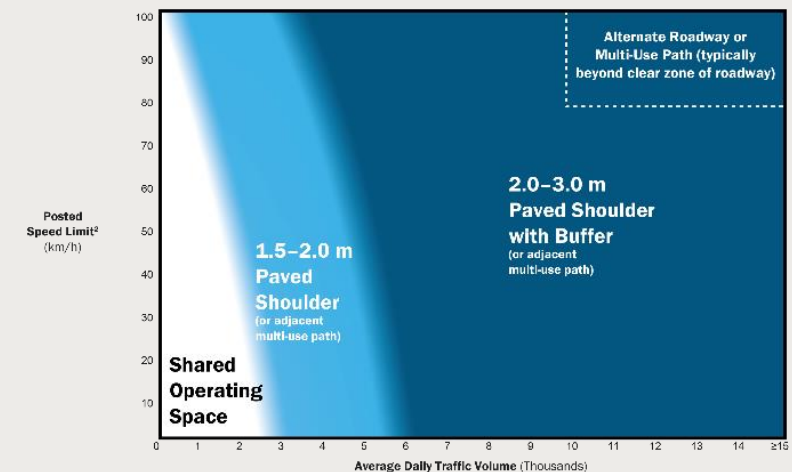
- Potential new linkages (candidate routes) are assessed using the route selection criteria

Desirable Level of Separation

Desirable Cycling Facility Pre-Selection Nomograph
Urban/Suburban Context



Desirable Cycling Facility Pre-Selection Nomograph
Rural Context¹



INTERACTIVE ACTIVITIES



Draft Candidate Routes

The intent of this activity was to use an online interactive tool to collect your feedback and mark-ups on candidate active transportation routes in Uxbridge.

miro | Ideation & Brainstorming

Map 2a Draft Candidate Routes

UXBRIDGE ACTIVE TRANSPORTATION PLAN

Legend

Existing Routes

- Existing off-road trail
- Existing paved shoulder
- Existing bike lane
- Existing signed route

Proposed Routes (Draft for discussion)

- Proposed off-road trail
- Proposed in-boulevard multi-use path
- Proposed buffered bike lane
- Proposed buffered paved shoulder
- Proposed paved shoulder
- Proposed urban shoulder
- Proposed signed route

Other

- Community Centre / Facility
- School
- Trail Access Point
- Regional and Provincial Trail Systems
- Regional Road
- Township Road
- Railway
- Park
- Conservation Authority Land
- Range National Urban Park
- Wooded Area

THE TOWNSHIP OF UXBRIDGE

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Projection and Coordinate System:
Universal Transverse Mercator (UTM Zone 18N)

400%



For reference, we have inserted a snippet of the input we received from the Town's AT, Trails and Accessibility Committees during a meeting on September 22, 2020.

Map 2a Draft Candidate Routes

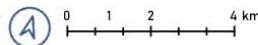


- UXBRIDGE ACTIVE TRANSPORTATION PLAN
- Legend**
- Existing Routes**
- Existing off-road trail
 - Existing paved shoulder
 - Existing bike lane
 - Existing signed route
- Proposed Routes (Draft for discussion)**
- Proposed off-road trail
 - Proposed in-boulevard multi use path
 - Proposed buffered bike lane
 - Proposed buffered paved shoulder
 - Proposed paved shoulder
 - Proposed urban shoulder
 - Proposed signed route
- Other**
- Community Centre / Facility
 - School
 - Trail Access Point
 - Regional and Provincial Trail Systems
 - Regional Road
 - Township Road
 - Railway
 - Park
 - Conservation Authority Land
 - Rough National Urban Park
 - Wooded Area
- Note:
1 Includes routes on Regional roads identified in the Durham Regional Cycling Plan Update (on-going)
2 Regional and Provincial Trail System includes the Great Trail, the MTO Province-wide Cycling Network, the Greenbelt Cycling Route and the Oak Ridge Trail.

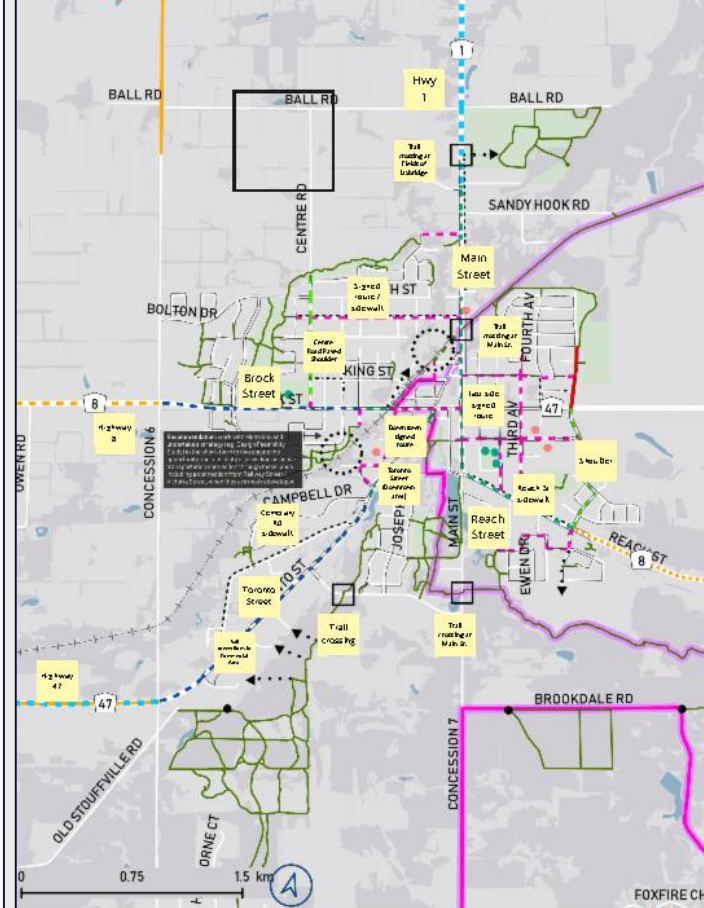


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Projection and Coordinate System:
Universal Transverse Mercator UTM Zone 17N



Uxbridge Urban Area



Map 2b Draft Candidate Routes



UXBRIDGE ACTIVE TRANSPORTATION PLAN

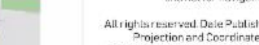
- Legend**
- Existing Routes**
- Existing off-road trail
 - Existing paved shoulder
 - Existing bike lane
 - Existing signed route
 - Existing sidewalk
- Proposed Routes (Draft for discussion)**
- Proposed off-road trail
 - Proposed in-boulevard multi use path
 - Proposed buffered bike lane
 - Proposed buffered paved shoulder
 - Proposed paved shoulder
 - Proposed urban shoulder
 - Proposed signed route
 - Proposed sidewalk
 - Desired connection
 - Proposed crossing enhancement
- Other**
- Community Centre / Facility
 - School
 - Trail Access Point
 - Regional and Provincial Trail System
 - Regional Road
 - Township Road
 - Railway
 - Park
 - Conservation Authority Land
 - Wooded Area
- Note:
1 Includes routes on Regional roads identified in the Durham Regional Cycling Plan Update (on-going)
2 Includes routes on the Province-wide Cycling Network, the Greenbelt Cycling Route and the Oak Ridge Trail.

Goodwood



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Projection and Coordinate System:
Universal Transverse Mercator UTM Zone 17N



We want to know:

- 1** Additional candidate routes that should be explored / identified.
- 2** Your comments and feedback on the proposed facility types and / or location of routes.
- 3** Routes / projects that should be prioritized in the short term.

Please feel free to mark-up the following maps with your comments and input, and send this back to Lukas Gillham (lgillham@uxbridge.ca).



Map 2a

Draft Candidate Routes



UXBRIDGE ACTIVE TRANSPORTATION PLAN

Legend

Existing Routes

- Existing off-road trail
- Existing paved shoulder
- Existing bike lane
- Existing signed route

Proposed Routes (Draft for discussion)

- Proposed off-road trail
- Proposed in-boulevard multi use path
- Proposed buffered bike lane
- Proposed buffered paved shoulder
- Proposed paved shoulder
- Proposed urban shoulder
- Proposed signed route
- Proposed crossing enhancement

Other

- Community Centre / Facility
- School
- Trail Access Point
- Regional and Provincial Trail Systems
- Regional Road
- Township Road
- Railway
- Park
- Conservation Authority Land
- Rouge National Urban Park
- Wooded Area

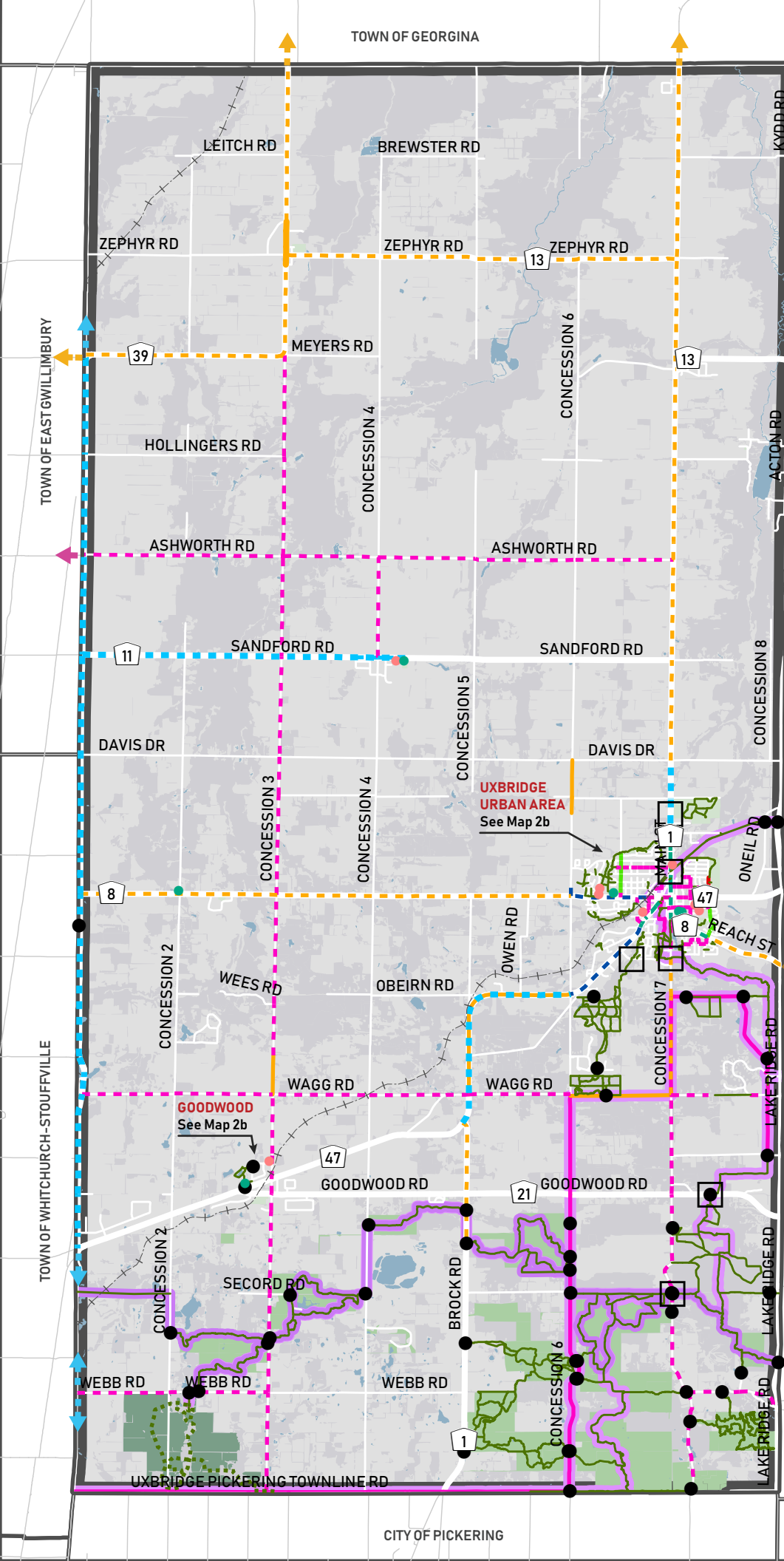
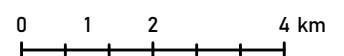
Note:

1. Includes routes on Regional roads identified in the Durham Regional Cycling Plan Update (on-going).
2. Regional and Provincial Trail System includes the Great Trail, the MTO Province-wide Cycling Network, the Greenbelt Cycling Route and the Oak Ridges Trail.



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Projection and Coordinate System:
Universal Transverse Mercator UTM Zone 17N



Map 2b

Draft Candidate Routes



UXBRIDGE ACTIVE TRANSPORTATION PLAN

Legend

Existing Routes

- Existing off-road trail
- Existing paved shoulder
- Existing bike lane
- Existing signed route
- Existing sidewalk

Proposed Routes (Draft for discussion)

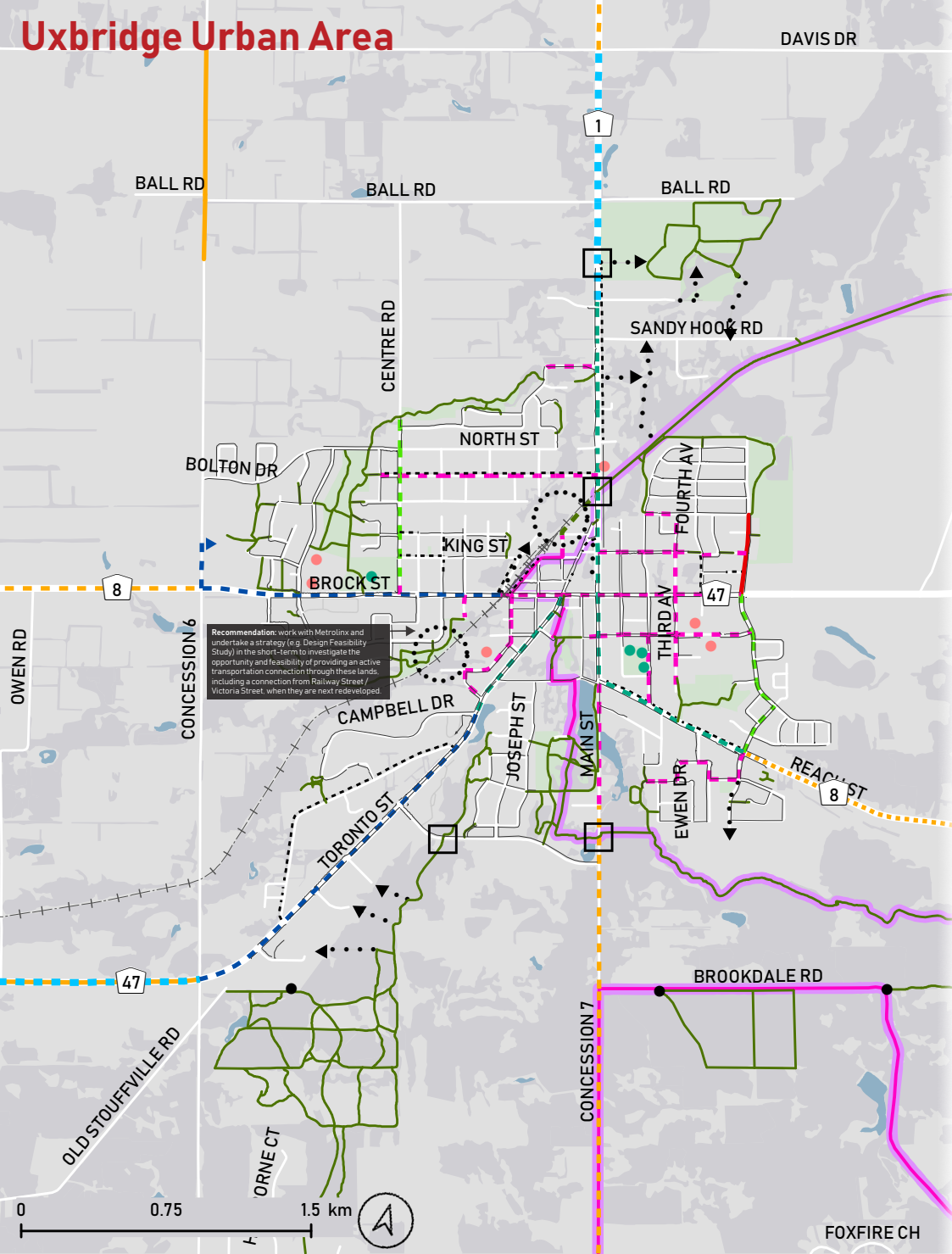
- Proposed off-road trail
- Proposed in-boulevard multi use path
- Proposed buffered bike lane
- Proposed buffered paved shoulder
- Proposed paved shoulder
- Proposed urban shoulder
- Proposed signed route
- Proposed sidewalk
- Desired connection
- Proposed crossing enhancement

Other

- Community Centre / Facility
- School
- Trail Access Point
- Regional and Provincial Trail System
- Regional Road
- Township Road
- Railway
- Park
- Conservation Authority Land
- Wooded Area

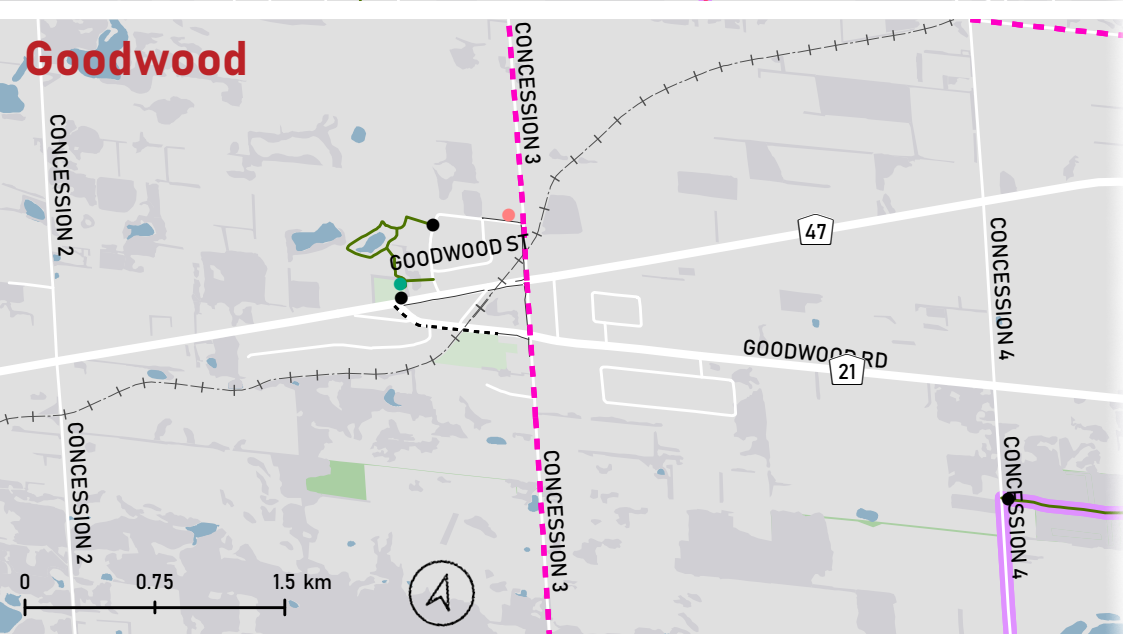
Note:

1. Includes routes on Regional roads identified in the Durham Regional Cycling Plan Update (on-going).
2. Desire connections indicate linkages (or areas) which are proposed to be explored in the future as development occurs throughout the Township.
3. Regional and Provincial Trail System includes the Great Trail, the MTO Province-wide Cycling Network, the Greenbelt Cycling Route and the Oak Ridges Trail.



Recommendation: work with Metrolinx and undertake a strategy (e.g. Design Feasibility Study) in the short-term to investigate the opportunity and feasibility of providing an active transportation connection through these lands, including a connection from Railway Street / Victoria Street, when they are next redeveloped.

Goodwood

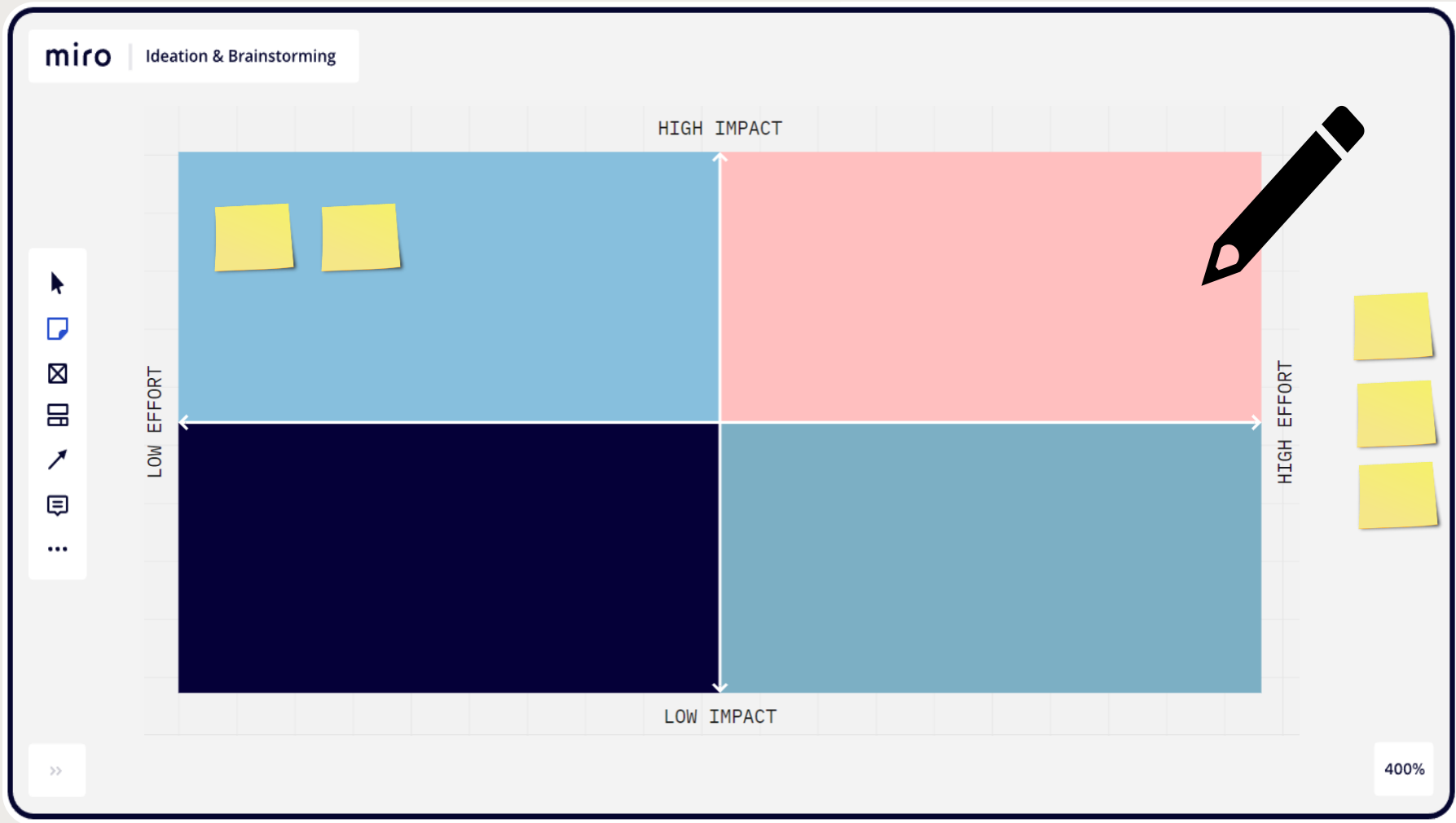


Produced in association with the Township of Uxbridge. This map is intended for information only, and not for navigation.

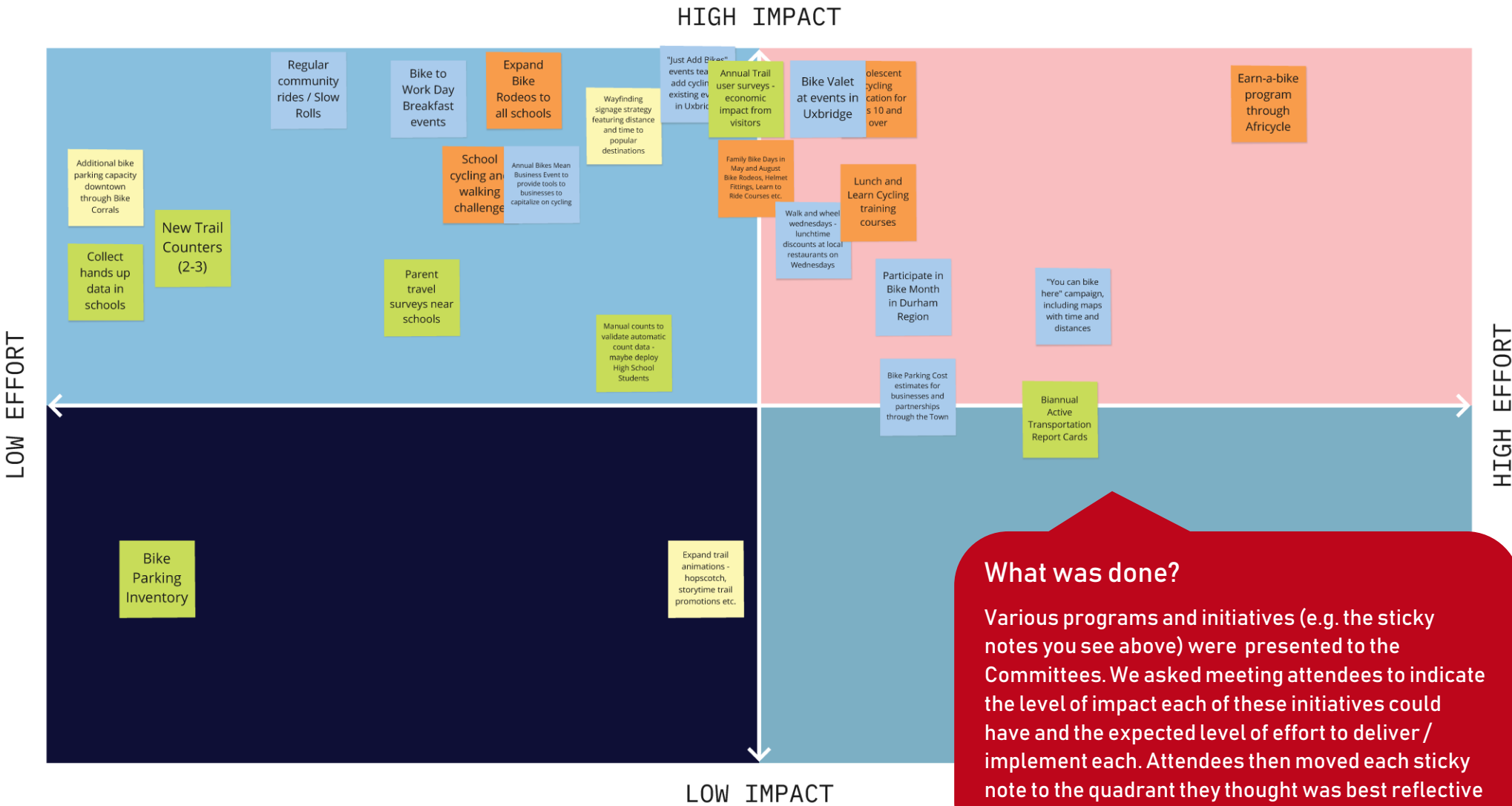
All rights reserved. Date Published: 11/04/2020
 Projection and Coordinate System:
 Universal Transverse Mercator UTM Zone 17N

Programming and Outreach

The intent of this activity was to use an online interactive tool to collect your feedback and input on potential programs and initiatives for Uxbridge.



For reference, we have inserted a snippet of the input we received from the Town's AT, Trails and Accessibility Committees during a meeting on September 22, 2020.



What was done?

Various programs and initiatives (e.g. the sticky notes you see above) were presented to the Committees. We asked meeting attendees to indicate the level of impact each of these initiatives could have and the expected level of effort to deliver / implement each. Attendees then moved each sticky note to the quadrant they thought was best reflective of the initiative.



We want to know:

1 Do you agree with the identified level of impact and effort for the proposed programs and initiatives?

2 Are there any other programs and / or initiatives that could be considered in the Township's AT Plan?

Please feel free to provide your comments and input to Lukas Gillham (lgillham@uxbridge.ca).



WRAP-UP



Next Steps

1. Summarize input received today.
2. Refine and prioritize routes to form part of a preferred active transportation network.
3. Refine and prioritize programming and outreach initiatives.
4. Prepare for upcoming consultation activities:
 - Final combined Committee Meeting (TBD)
 - Virtual Public Open House (TBD)
5. Prepare draft Active Transportation Plan (ATP) report.



Thank you for participating!

Visit the project website for more information and updates:

www.uxbridge.ca/en/your-local-government/active-transportation-plan.aspx

Contact Information

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Appendix B

Existing Traffic Data

TMC No: 0080800000 Intersection ID: 1497 Count ID: 35702017157 Count Date: 05/03/2018, Thu

AM Peak 08:15	Ped. 0	0.50 0%	0.65 4%	0.73 6%	2 33	2 78	2 68	Ped. ↗				
									Cars	Trucks	Trucks %	PHF
↕	←	5	182	↕	↕	↕	↕	26	0	0%	0.59	
0.88	14%	1	6	↕	↕	↕	↕	149	5	3%	0.74	
0.79	10%	11	100	↕	↕	↕	↕	145	0	0%	0.76	
0.71	5%	2	38	↕	↕	↕	↕	204	14	→		
PHF	Trucks %	Trucks	Cars	↕	↕	↕	↕	0				
			261	25	36	71	↕	Ped. ↕				
			5	0	1	1						
				0%	3%	1%						
				↕	0.89	0.64						

MD Peak 12:15	Ped. 0	0.63 20%	0.86 2%	0.75 0%	0 18	1 47	2 80	Ped. ↗				
									Cars	Trucks	Trucks %	PHF
↕	←	6	112	↕	↕	↕	↕	20	0	0%	0.71	
0.33	0%	0	4	↕	↕	↕	↕	82	5	6%	0.91	
0.89	3%	3	114	↕	↕	↕	↕	78	1	1%	0.90	
0.59	0%	0	26	↕	↕	↕	↕	204	3	→		
PHF	Trucks %	Trucks	Cars	↕	↕	↕	↕	0				
			151	26	56	72	↕	Ped. ↕				
			2	0	2	0						
				0%	3%	0%						
				↕	0.91	0.78						
					0.72							

PM Peak 16:45	Ped. 0	0.75 0%	0.72 5%	0.54 0%	0 30	3 60	3 169	Ped. ↗				
									Cars	Trucks	Trucks %	PHF
↕	←	6	155	↕	↕	↕	↕	36	1	3%	0.71	
0.64	0%	0	18	↕	↕	↕	↕	97	4	4%	0.77	
0.95	3%	6	191	↕	↕	↕	↕	70	0	0%	0.83	
0.80	0%	0	48	↕	↕	↕	↕	406	7	→		
PHF	Trucks %	Trucks	Cars	↕	↕	↕	↕	0				
			178	46	115	185	↕	Ped. ↕				
			3	2	2	1						
				4%	2%	1%						
				↕	0.63	0.85						

Total Count 7 hours*	Ped. 0	5%	3%	5%	9 177	13 506	17 712	Ped. ↗				
									Cars	Trucks	Trucks %	PHF
↕	←	45	1222	↕	↕	↕	↕	178	1	1%		
	6%	4	68	↕	↕	↕	↕	934	32	3%		
	4%	42	903	↕	↕	↕	↕	819	2	0%		
	3%	8	274	↕	↕	↕	↕	1819	58	→		
PHF	Trucks %	Trucks	Cars	↕	↕	↕	↕	0				
			1599	219	466	739	↕	Ped. ↕				
			23	9	12	7						
				4%	3%	1%						
				↕								

TMC 15 Min Report

Brock St (R.R.08) @ Concession 6

TMC No: 0080800000 Intersection ID: 1497 Count ID: 35702017157 Count Date: 05/03/2018, Thu

Table with columns for Time, Approach (North, East, South, West), and vehicle types (Cars, Trucks, Heavies, Ped). Rows are grouped into Period 1, Period 2, and Period 3, showing traffic counts for each approach and direction.

TMC Tabular Report

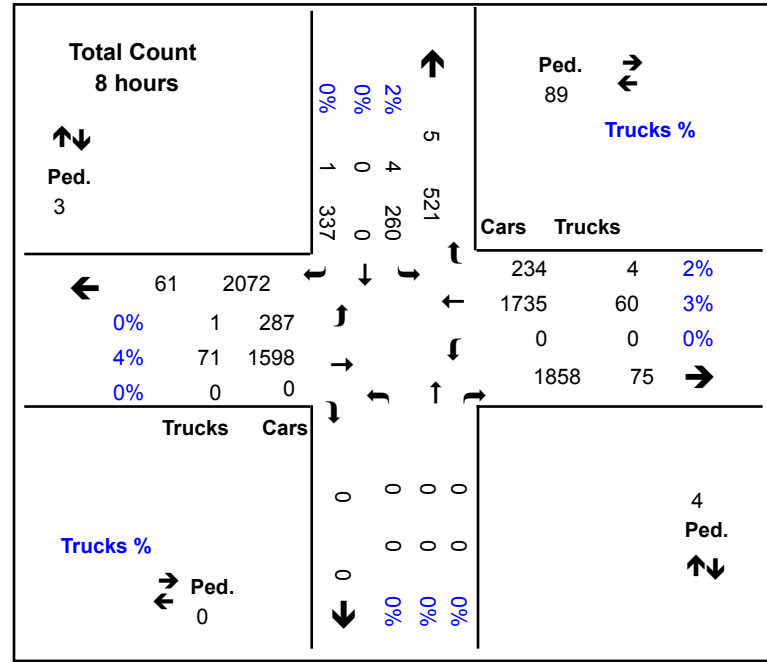
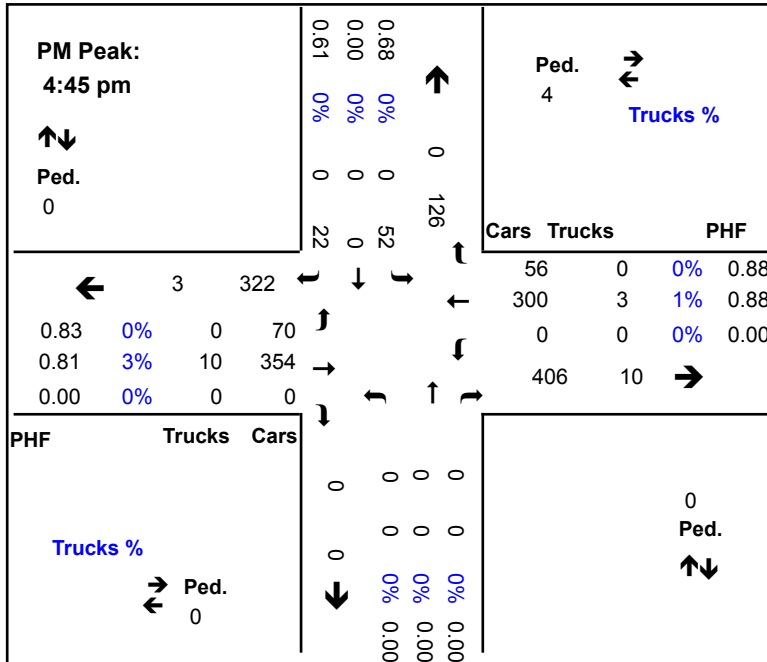
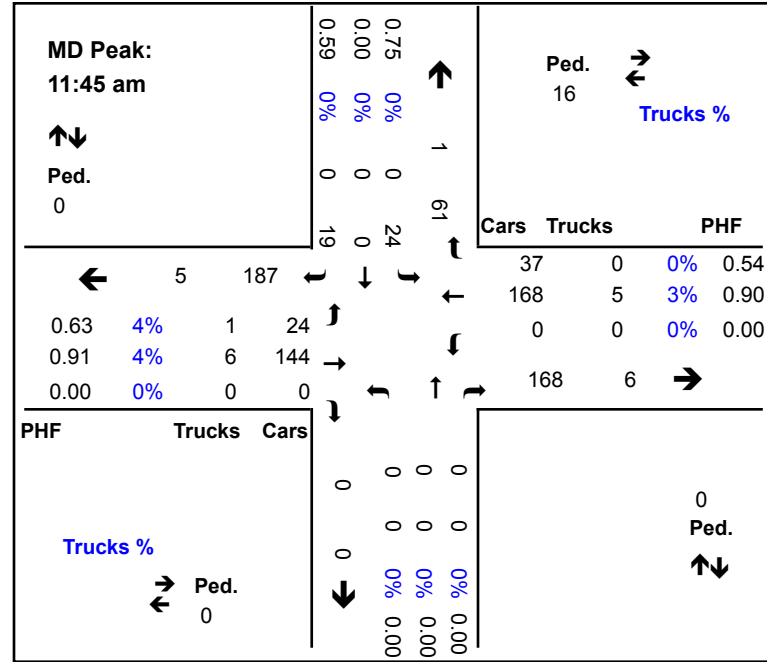
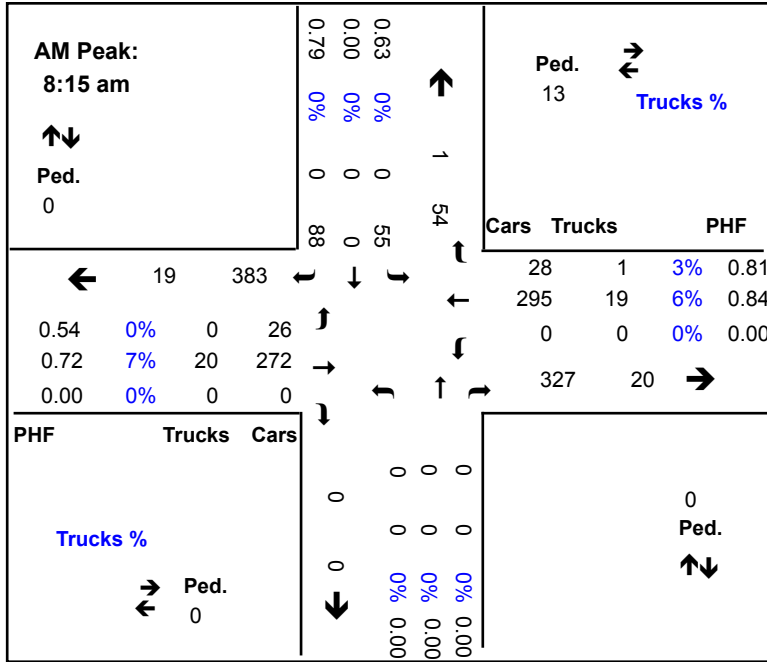
BROCK ST W @ CENTRE RD

TMC No. : 0081200000

Intersection ID : 1425

Count ID: 34322013317

Count Date: 11/13/2013



TMC 15 Min Report

BROCK ST W @ CENTRE RD

Time	NORTH APPROACH									EAST APPROACH									SOUTH APPROACH									WEST APPROACH									Total								
	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped															
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right												
Period 1																																													
6:15	1	0	13	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	0	0	0	0	0	0	0	0	45	
6:30	3	0	12	0	0	1	0	0	0	0	0	21	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	43	
6:45	5	0	15	0	0	0	0	0	0	1	0	34	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	0	0	1	0	0	0	0	0	0	0	0	69	
7:00	3	0	24	0	0	0	0	0	0	0	0	30	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	16	0	0	1	0	0	0	0	0	0	0	0	79	
7:15	3	0	16	0	0	0	0	0	0	0	0	52	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	10	0	0	1	0	0	0	0	0	0	0	0	86	
7:30	1	0	20	0	0	0	0	0	0	2	0	68	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	116	
7:45	5	0	17	0	0	0	0	0	0	0	0	53	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	18	0	0	2	0	0	0	0	0	0	0	0	101	
8:00	3	0	17	1	0	0	0	0	0	0	0	50	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	35	0	0	3	0	0	0	0	0	0	0	0	119	
8:15	12	0	26	0	0	0	0	0	0	5	0	68	4	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	48	0	0	4	0	0	0	0	0	0	0	0	174	
8:30	12	0	28	0	0	0	0	0	0	5	0	82	6	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	97	0	0	4	0	0	0	0	0	0	0	0	244	
8:45	6	0	19	0	0	0	0	0	0	1	0	90	9	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	64	0	0	5	0	0	0	0	0	0	0	0	201	
9:00	22	0	14	0	0	0	0	0	0	2	0	47	6	0	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	56	0	0	7	0	0	0	0	0	0	0	0	174	
Period 2																																													
11:45	7	0	8	0	0	0	0	0	0	3	0	46	17	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	40	0	0	1	0	0	0	0	0	0	0	0	131	
12:00	4	0	3	0	0	0	0	0	0	4	0	41	6	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	38	0	0	2	0	0	0	0	0	0	0	0	103	
12:15	5	0	3	0	0	0	0	0	0	1	0	48	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	30	0	1	1	0	0	0	0	0	0	0	0	102	
12:30	8	0	5	0	0	0	0	0	0	8	0	33	10	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	36	0	0	2	0	0	0	0	0	0	0	0	108	
12:45	4	0	6	1	0	0	0	0	0	1	0	28	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	33	0	0	3	0	0	0	0	0	0	0	0	92	
13:00	11	0	4	0	0	0	0	0	0	2	0	37	8	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	46	0	0	0	0	0	0	0	0	0	0	0	117	
13:15	6	0	5	0	0	0	0	0	0	0	0	37	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	36	0	0	2	0	0	0	0	0	0	0	0	93	
13:30	2	0	2	0	0	0	0	0	0	1	0	42	7	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	41	0	0	2	0	0	0	0	0	0	0	0	102	
Period 3																																													
15:15	9	0	10	0	0	0	0	0	0	8	0	71	14	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	50	0	0	1	0	0	0	0	1	0	0	0	0	177
15:30	17	0	10	0	0	0	0	0	0	23	0	56	4	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	62	0	0	4	0	0	0	0	1	0	0	0	0	199
15:45	5	0	4	0	0	0	0	0	0	7	0	51	9	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	70	0	0	9	0	0	0	0	0	0	0	0	187	
16:00	10	0	11	0	0	0	0	0	0	7	0	63	12	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	73	0	0	1	0	0	0	0	0	0	0	0	190	
16:15	14	0	5	1	0	0	0	0	0	2	0	65	13	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	86	0	0	2	0	0	0	0	1	0	0	0	0	203
16:30	10	0	8	0	0	0	0	0	0	0	0	63	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	82	0	0	2	0	0	0	0	0	0	0	0	183	
16:45	19	0	5	0	0	0	0	0	0	0	0	79	16	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	111	0	0	1	0	0	0	0	0	0	0	0	247	
17:00	14	0	2	0	0	0	0	0	0	4	0	67	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	90	0	0	0	0	0	0	0	0	0	0	0	208	
17:15	8	0	9	0	0	0	0	0	0	0	0	85	14	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	72	0	0	6	0	0	0	0	0	0	0	0	214	
17:30	11	0	6	0	0	0	0	0	0	0	0	69	16	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	81	0	0	3	0	0	0	0	0	0	0	0	202	
17:45	10	0	6	1	0	0	0	0	0	0	0	70	7	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	33	87	0	0	0	0	0	0	0	0	0	0	0	217	
18:00	10	0	4	0	0	0	0	0	0	2	0	67	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	51	0	0	1	0	0	0	0	0	0	0	0	162	
18:00	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	7	



Turning Movement Count (2 . BOLTON DR / NORTH ST & CENTRE RD)

Start Time	N Approach CENTRE RD						E Approach NORTH ST						S Approach CENTRE RD						W Approach BOLTON DR						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	2	8	0	0	1	10	0	0	2	0	0	2	0	3	0	0	0	3	1	0	0	0	0	1	16		
07:15:00	0	5	0	0	4	5	0	0	1	0	0	1	1	2	0	0	0	3	0	0	1	0	2	1	10		
07:30:00	0	7	0	0	0	7	0	0	1	0	0	1	0	1	0	0	0	1	0	0	1	0	1	1	10		
07:45:00	1	6	0	0	0	7	1	0	3	0	0	4	0	2	0	0	0	2	4	3	0	0	0	7	20	56	
08:00:00	1	9	0	0	0	10	1	1	2	0	0	4	0	5	1	0	0	6	3	2	0	0	2	5	25	65	
08:15:00	3	9	0	0	0	12	1	1	2	0	0	4	0	1	2	0	0	3	4	2	2	0	0	8	27	82	
08:30:00	8	11	0	0	4	19	0	3	1	0	1	4	1	2	2	0	0	5	5	2	2	0	5	9	37	109	
08:45:00	0	4	0	0	0	4	0	2	2	0	0	4	2	6	3	0	0	11	16	9	7	0	2	32	51	140	
09:00:00	0	4	0	0	1	4	1	2	0	0	0	3	1	4	1	0	0	6	2	2	1	0	0	5	18	133	
09:15:00	3	9	0	0	1	12	2	1	2	0	0	5	1	8	0	0	1	9	3	0	0	0	1	3	29	135	
09:30:00	2	6	0	0	0	8	0	1	0	0	0	1	0	5	0	0	0	5	3	1	0	0	1	4	18	116	
09:45:00	0	9	1	0	1	10	0	0	2	0	0	2	2	4	1	0	0	7	2	4	0	0	5	6	25	90	
BREAK																											
16:00:00	2	7	0	0	0	9	0	2	2	0	0	4	5	14	3	0	1	22	3	3	5	0	2	11	46		
16:15:00	2	8	0	0	3	10	2	4	1	0	0	7	3	6	3	0	0	12	2	3	1	0	1	6	35		
16:30:00	2	11	0	0	4	13	0	1	2	0	1	3	1	10	6	0	0	17	6	2	3	0	2	11	44		
16:45:00	3	8	1	0	4	12	2	4	3	0	1	9	4	12	6	0	0	22	5	4	5	0	0	14	57	182	
17:00:00	3	5	0	0	4	8	1	2	1	0	0	4	1	12	7	0	0	20	2	5	0	0	4	7	39	175	
17:15:00	5	9	3	0	4	17	2	2	1	0	0	5	5	12	3	0	2	20	4	4	3	0	4	11	53	193	
17:30:00	1	5	2	0	0	8	3	2	0	0	2	5	2	5	5	0	1	12	2	2	3	0	0	7	32	181	
17:45:00	1	7	1	1	0	10	1	4	0	0	1	5	4	8	6	0	1	18	2	2	4	0	0	8	41	165	
18:00:00	2	9	0	0	1	11	1	2	0	0	0	3	2	4	4	0	1	10	2	4	3	0	1	9	33	159	
18:15:00	0	9	1	0	1	10	0	1	0	0	0	1	0	6	6	0	2	12	1	2	0	0	0	3	26	132	
18:30:00	2	4	0	0	1	6	1	2	2	0	2	5	4	6	3	0	1	13	4	0	1	0	1	5	29	129	
18:45:00	4	9	0	0	0	13	0	0	0	0	0	0	2	5	3	0	0	10	4	4	2	0	1	10	33	121	
Grand Total	47	178	9	1	34	235	19	37	30	0	8	86	41	143	65	0	10	249	80	60	44	0	35	184	754	-	
Approach%	20%	75.7%	3.8%	0.4%	-	-	22.1%	43%	34.9%	0%	-	-	16.5%	57.4%	26.1%	0%	-	43.5%	32.6%	23.9%	0%	-	-	-	-	-	
Totals %	6.2%	23.6%	1.2%	0.1%	-	31.2%	2.5%	4.9%	4%	0%	11.4%	5.4%	19%	8.6%	0%	-	33%	10.6%	8%	5.8%	0%	-	24.4%	-	-		
Heavy	1	3	0	0	-	-	0	2	0	0	-	0	4	0	0	-	-	1	1	2	0	-	-	-	-	-	
Heavy %	2.1%	1.7%	0%	0%	-	-	0%	5.4%	0%	0%	-	0%	2.8%	0%	0%	-	-	1.3%	1.7%	4.5%	0%	-	-	-	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (1.5 °C)

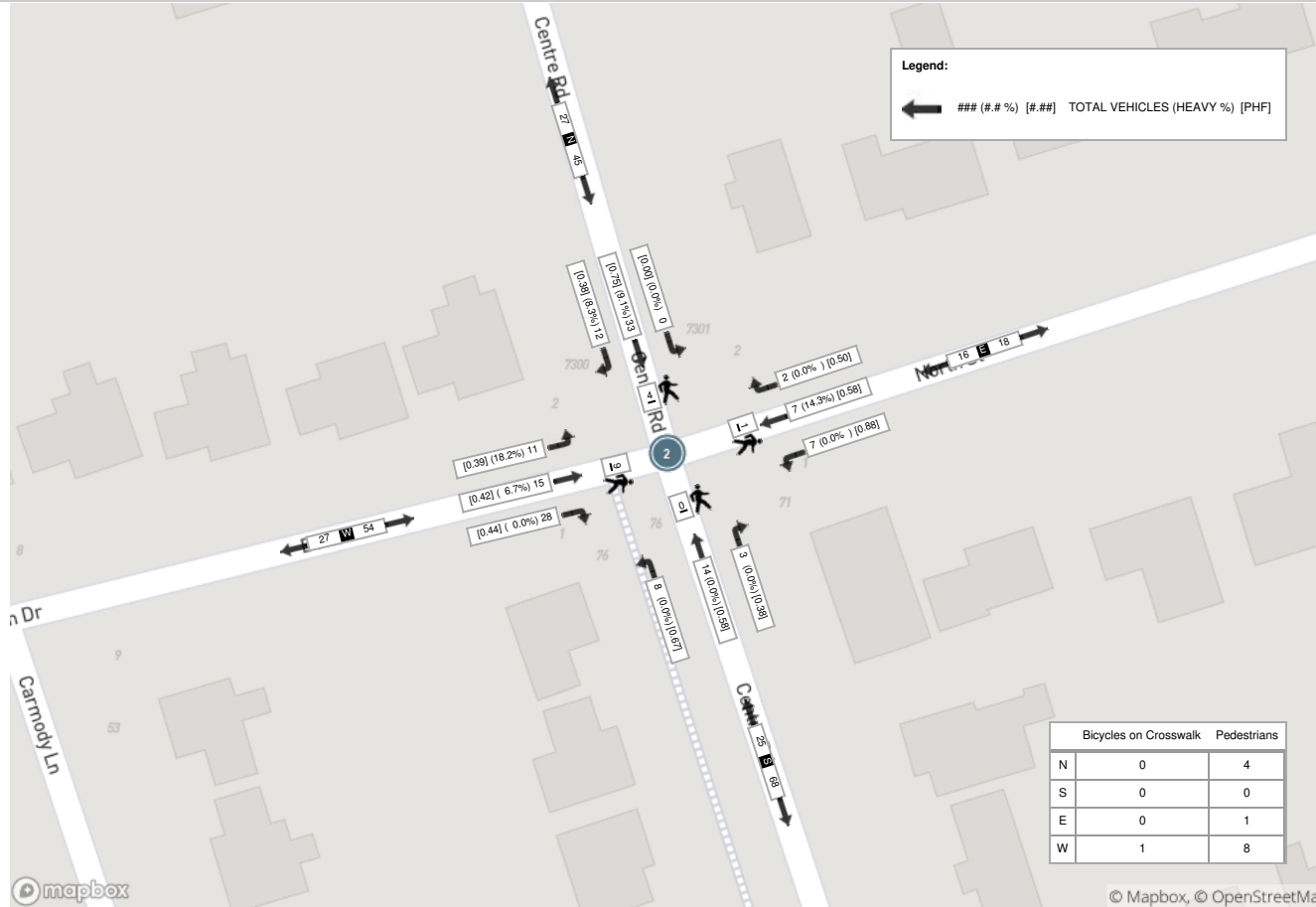
Start Time	N Approach CENTRE RD						E Approach NORTH ST						S Approach CENTRE RD						W Approach BOLTON DR						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	1	9	0	0	0	10	1	1	2	0	0	4	0	5	1	0	0	6	3	2	0	0	2	5	25
08:15:00	3	9	0	0	0	12	1	1	2	0	0	4	0	1	2	0	0	3	4	2	2	0	0	8	27
08:30:00	8	11	0	0	4	19	0	3	1	0	1	4	1	2	2	0	0	5	5	2	2	0	5	9	37
08:45:00	0	4	0	0	0	4	0	2	2	0	0	4	2	6	3	0	0	11	16	9	7	0	2	32	51
Grand Total	12	33	0	0	4	45	2	7	7	0	1	16	3	14	8	0	0	25	28	15	11	0	9	54	140
Approach%	26.7%	73.3%	0%	0%	-	-	12.5%	43.8%	43.8%	0%	-	-	12%	56%	32%	0%	-	-	51.9%	27.8%	20.4%	0%	-	-	-
Totals %	8.6%	23.6%	0%	0%	32.1%	32.1%	1.4%	5%	5%	0%	11.4%	11.4%	2.1%	10%	5.7%	0%	17.9%	17.9%	20%	10.7%	7.9%	0%	38.6%	38.6%	-
PHF	0.38	0.75	0	0	0.59	0.59	0.5	0.58	0.88	0	1	1	0.38	0.58	0.67	0	0.57	0.57	0.44	0.42	0.39	0	0.42	0.42	-
Heavy	1	3	0	0	4	4	0	1	0	0	1	1	0	0	0	0	0	0	0	1	2	0	3	3	-
Heavy %	8.3%	9.1%	0%	0%	8.9%	8.9%	0%	14.3%	0%	0%	6.3%	6.3%	0%	0%	0%	0%	0%	0%	0%	6.7%	18.2%	0%	5.6%	5.6%	-
Lights	11	30	0	0	41	41	2	6	7	0	15	15	3	14	8	0	25	25	28	14	9	0	51	51	-
Lights %	91.7%	90.9%	0%	0%	91.1%	91.1%	100%	85.7%	100%	0%	93.8%	93.8%	100%	100%	0%	0%	100%	100%	100%	93.3%	81.8%	0%	94.4%	94.4%	-
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Buses	1	3	0	0	4	4	0	1	0	0	1	1	0	0	0	0	0	0	0	1	2	0	3	3	-
Buses %	8.3%	9.1%	0%	0%	8.9%	8.9%	0%	14.3%	0%	0%	6.3%	6.3%	0%	0%	0%	0%	0%	0%	0%	6.7%	18.2%	0%	5.6%	5.6%	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Bicycles on Road %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	8	-	-
Pedestrians%	-	-	-	-	28.6%	-	-	-	-	-	7.1%	-	-	-	-	-	0%	-	-	-	-	-	57.1%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	7.1%	-	-



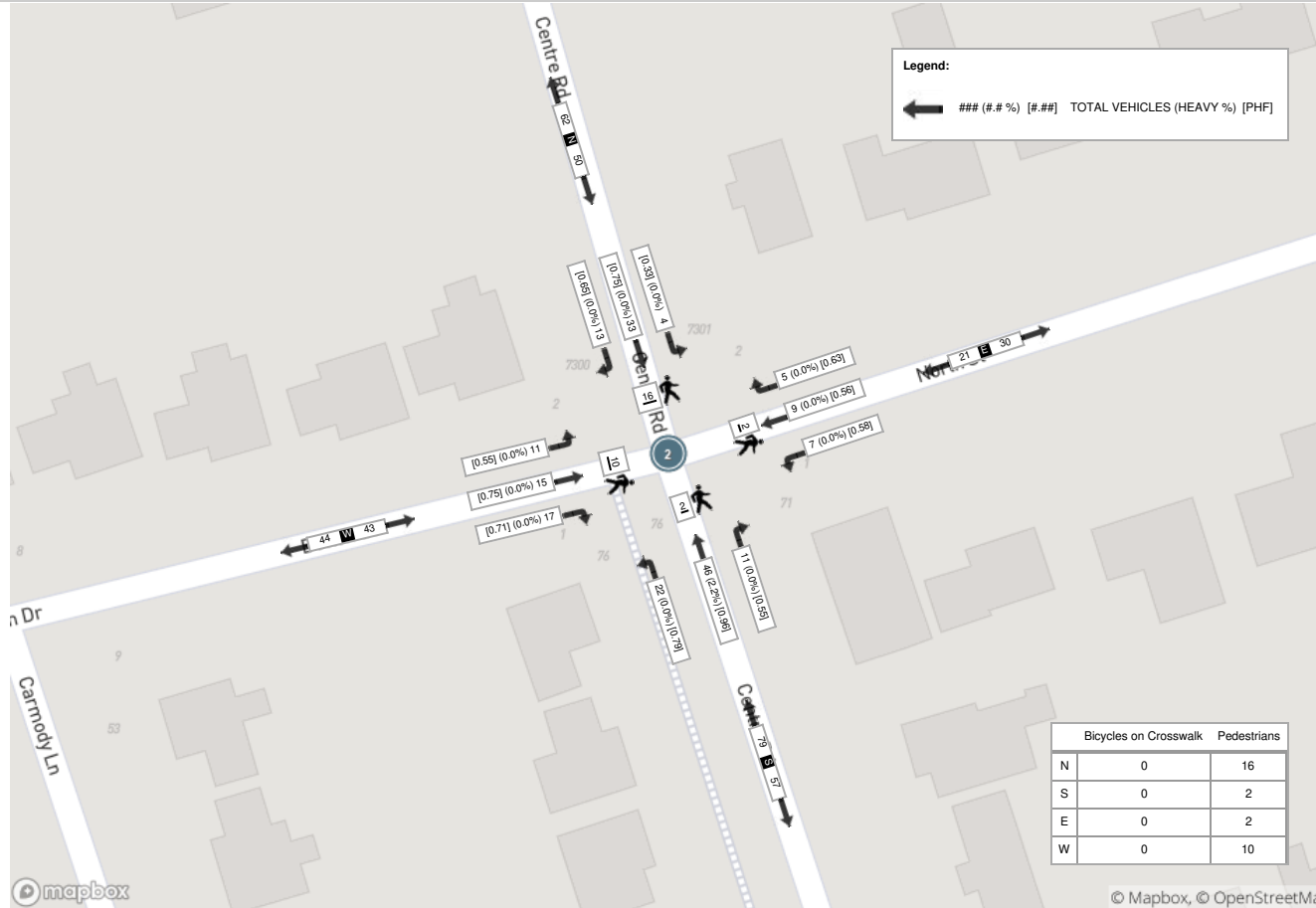
Peak Hour: 04:30 PM - 05:30 PM Weather: Few Clouds (10.39 °C)

Start Time	N Approach CENTRE RD						E Approach NORTH ST						S Approach CENTRE RD						W Approach BOLTON DR						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	2	11	0	0	4	13	0	1	2	0	1	3	1	10	6	0	0	17	6	2	3	0	2	11	44
16:45:00	3	8	1	0	4	12	2	4	3	0	1	9	4	12	6	0	0	22	5	4	5	0	0	14	57
17:00:00	3	5	0	0	4	8	1	2	1	0	0	4	1	12	7	0	0	20	2	5	0	0	4	7	39
17:15:00	5	9	3	0	4	17	2	2	1	0	0	5	5	12	3	0	2	20	4	4	3	0	4	11	53
Grand Total	13	33	4	0	16	50	5	9	7	0	2	21	11	46	22	0	2	79	17	15	11	0	10	43	193
Approach%	26%	66%	8%	0%	-	-	23.8%	42.9%	33.3%	0%	-	-	13.9%	58.2%	27.8%	0%	-	-	39.5%	34.9%	25.6%	0%	-	-	-
Totals %	6.7%	17.1%	2.1%	0%	25.9%	25.9%	2.6%	4.7%	3.6%	0%	10.9%	10.9%	5.7%	23.8%	11.4%	0%	40.9%	40.9%	8.8%	7.8%	5.7%	0%	22.3%	22.3%	-
PHF	0.65	0.75	0.33	0	0.74	0.74	0.63	0.56	0.58	0	0.58	0.58	0.55	0.96	0.79	0	0.9	0.9	0.71	0.75	0.55	0	0.77	0.77	-
Heavy	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	-
Heavy %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2.2%	0%	0%	1.3%	1.3%	0%	0%	0%	0%	0%	0%	-
Lights	13	29	4	0	46	46	5	9	7	0	21	21	11	45	21	0	77	77	17	15	11	0	43	43	
Lights %	100%	87.9%	100%	0%	92%	92%	100%	100%	100%	0%	100%	100%	100%	97.8%	95.5%	0%	97.5%	97.5%	100%	100%	100%	0%	100%	100%	-
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Buses %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2.2%	0%	0%	1.3%	1.3%	0%	0%	0%	0%	0%	0%	-
Bicycles on Road	0	4	0	0	4	4	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	-
Bicycles on Road %	0%	12.1%	0%	0%	8%	8%	0%	0%	0%	0%	0%	0%	0%	0%	4.5%	0%	1.3%	1.3%	0%	0%	0%	0%	0%	0%	-
Pedestrians	-	-	-	-	16	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	10	-	-
Pedestrians %	-	-	-	-	53.3%	-	-	-	-	-	6.7%	-	-	-	-	-	6.7%	-	-	-	-	-	33.3%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk %	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (1.5 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Few Clouds (10.39 °C)





Turning Movement Count (1 . BOLTON DR & CONCESSION RD 6)

Start Time	N Approach CONCESSION RD 6					E Approach BOLTON DR					S Approach CONCESSION RD 6					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	U-Turn S:S	Peds S:	Approach Total		
07:00:00	19	0	0	0	19	2	4	0	0	6	0	10	0	0	10	35	
07:15:00	21	0	0	0	21	2	8	0	0	10	3	11	0	0	14	45	
07:30:00	21	5	0	0	26	1	3	0	0	4	1	8	0	0	9	39	
07:45:00	39	2	0	0	41	1	3	0	0	4	0	6	0	0	6	51	170
08:00:00	32	0	0	0	32	0	3	0	0	3	4	5	0	0	9	44	179
08:15:00	21	0	0	0	21	0	5	0	0	5	4	17	0	0	21	47	181
08:30:00	22	2	0	0	24	1	9	0	1	10	1	8	0	0	9	43	185
08:45:00	23	0	0	0	23	3	19	0	0	22	5	12	0	0	17	62	196
09:00:00	19	1	0	0	20	3	4	0	0	7	4	15	0	0	19	46	198
09:15:00	20	1	0	0	21	3	6	0	0	9	3	15	0	0	18	48	199
09:30:00	27	1	0	0	28	0	3	0	0	3	4	17	0	0	21	52	208
09:45:00	21	1	0	0	22	1	9	0	0	10	3	15	0	0	18	50	196
BREAK																	
16:00:00	21	1	0	0	22	2	4	0	2	6	5	36	0	0	41	69	
16:15:00	21	3	0	0	24	0	3	1	0	4	9	32	0	0	41	69	
16:30:00	21	2	0	0	23	1	6	0	0	7	7	32	0	0	39	69	
16:45:00	20	3	0	0	23	2	8	0	0	10	18	33	0	0	51	84	291
17:00:00	19	0	0	0	19	3	8	0	0	11	13	43	0	1	56	86	308
17:15:00	19	2	0	0	21	0	10	0	0	10	9	34	0	0	43	74	313
17:30:00	9	2	0	0	11	1	7	0	0	8	12	31	0	2	43	62	306
17:45:00	20	1	0	0	21	3	1	0	0	4	13	34	0	0	47	72	294
18:00:00	16	1	0	0	17	3	10	1	0	14	13	18	0	0	31	62	270
18:15:00	10	4	0	0	14	1	6	0	0	7	16	18	0	0	34	55	251
18:30:00	9	1	0	0	10	0	3	0	0	3	6	16	0	0	22	35	224
18:45:00	12	0	0	0	12	2	5	0	0	7	3	15	0	0	18	37	189
Grand Total	482	33	0	0	515	35	147	2	3	184	156	481	0	3	637	1336	-
Approach%	93.6%	6.4%	0%	-	-	19%	79.9%	1.1%	-	-	24.5%	75.5%	0%	-	-	-	-
Totals %	36.1%	2.5%	0%	-	38.5%	2.6%	11%	0.1%	-	13.8%	11.7%	36%	0%	-	47.7%	-	-
Heavy	22	5	0	-	-	1	3	0	-	-	2	12	0	-	-	-	-
Heavy %	4.6%	15.2%	0%	-	-	2.9%	2%	0%	-	-	1.3%	2.5%	0%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 08:45 AM - 09:45 AM Weather: Scattered Clouds (1.5 °C)

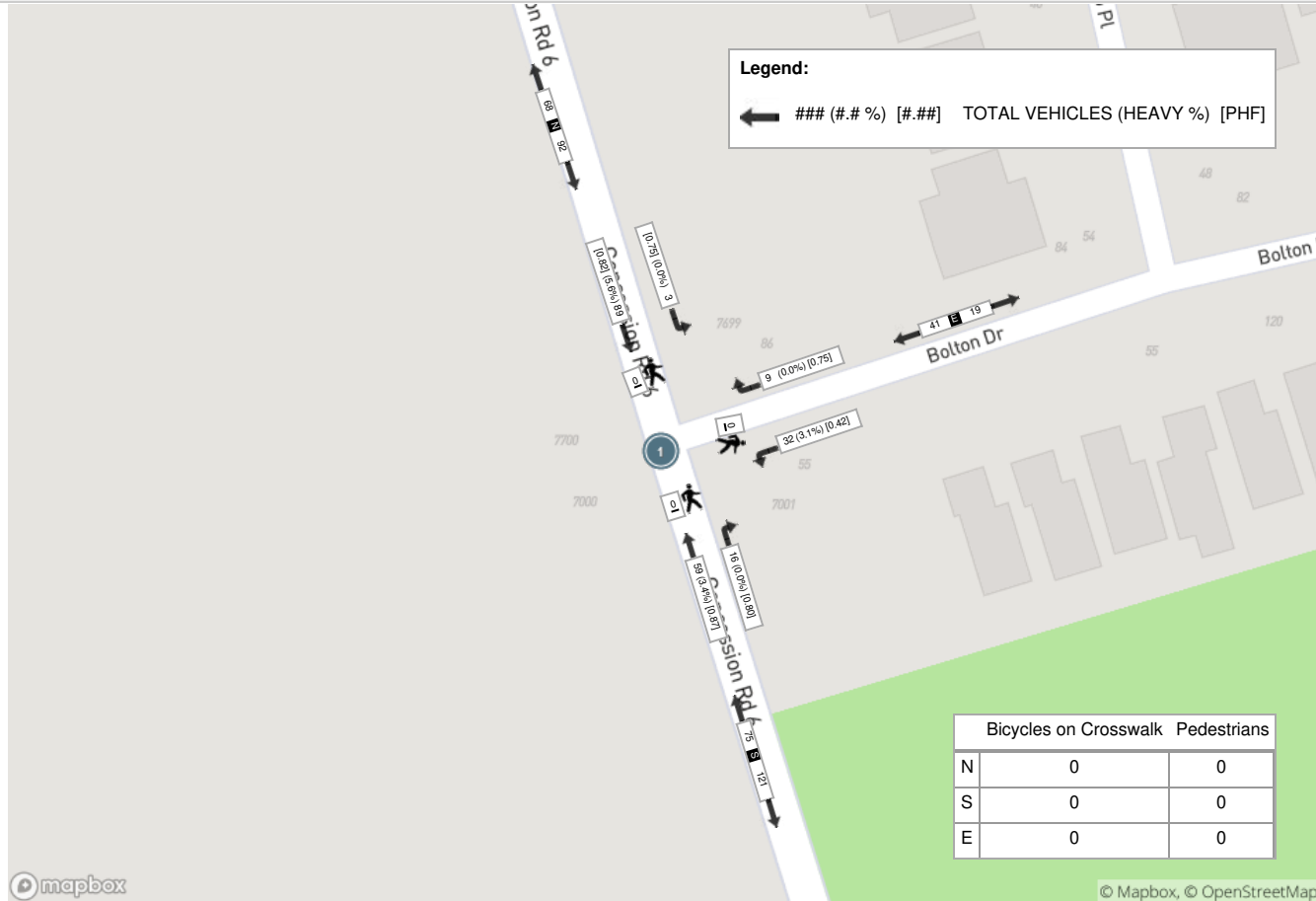
Start Time	N Approach CONCESSION RD 6					E Approach BOLTON DR					S Approach CONCESSION RD 6					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
08:45:00	23	0	0	0	23	3	19	0	0	22	5	12	0	0	17	62
09:00:00	19	1	0	0	20	3	4	0	0	7	4	15	0	0	19	46
09:15:00	20	1	0	0	21	3	6	0	0	9	3	15	0	0	18	48
09:30:00	27	1	0	0	28	0	3	0	0	3	4	17	0	0	21	52
Grand Total	89	3	0	0	92	9	32	0	0	41	16	59	0	0	75	208
Approach%	96.7%	3.3%	0%	-	-	22%	78%	0%	-	-	21.3%	78.7%	0%	-	-	-
Totals %	42.8%	1.4%	0%	-	44.2%	4.3%	15.4%	0%	-	19.7%	7.7%	28.4%	0%	-	36.1%	-
PHF	0.82	0.75	0	-	0.82	0.75	0.42	0	-	0.47	0.8	0.87	0	-	0.89	-
Heavy	5	0	0	-	5	0	1	0	-	1	0	2	0	-	2	-
Heavy %	5.6%	0%	0%	-	5.4%	0%	3.1%	0%	-	2.4%	0%	3.4%	0%	-	2.7%	-
Lights	84	3	0	-	87	9	31	0	-	40	16	57	0	-	73	-
Lights %	94.4%	100%	0%	-	94.6%	100%	96.9%	0%	-	97.6%	100%	96.6%	0%	-	97.3%	-
Single-Unit Trucks	4	0	0	-	4	0	0	0	-	0	0	0	0	-	0	-
Single-Unit Trucks %	4.5%	0%	0%	-	4.3%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	-
Buses	0	0	0	-	0	0	1	0	-	1	0	1	0	-	1	-
Buses %	0%	0%	0%	-	0%	0%	3.1%	0%	-	2.4%	0%	1.7%	0%	-	1.3%	-
Articulated Trucks	1	0	0	-	1	0	0	0	-	0	0	1	0	-	1	-
Articulated Trucks %	1.1%	0%	0%	-	1.1%	0%	0%	0%	-	0%	0%	1.7%	0%	-	1.3%	-
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	-
Bicycles on Road %	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	0	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%	-	-	-	0%	-	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	0%	-	-	-	-	-	0%	-	-



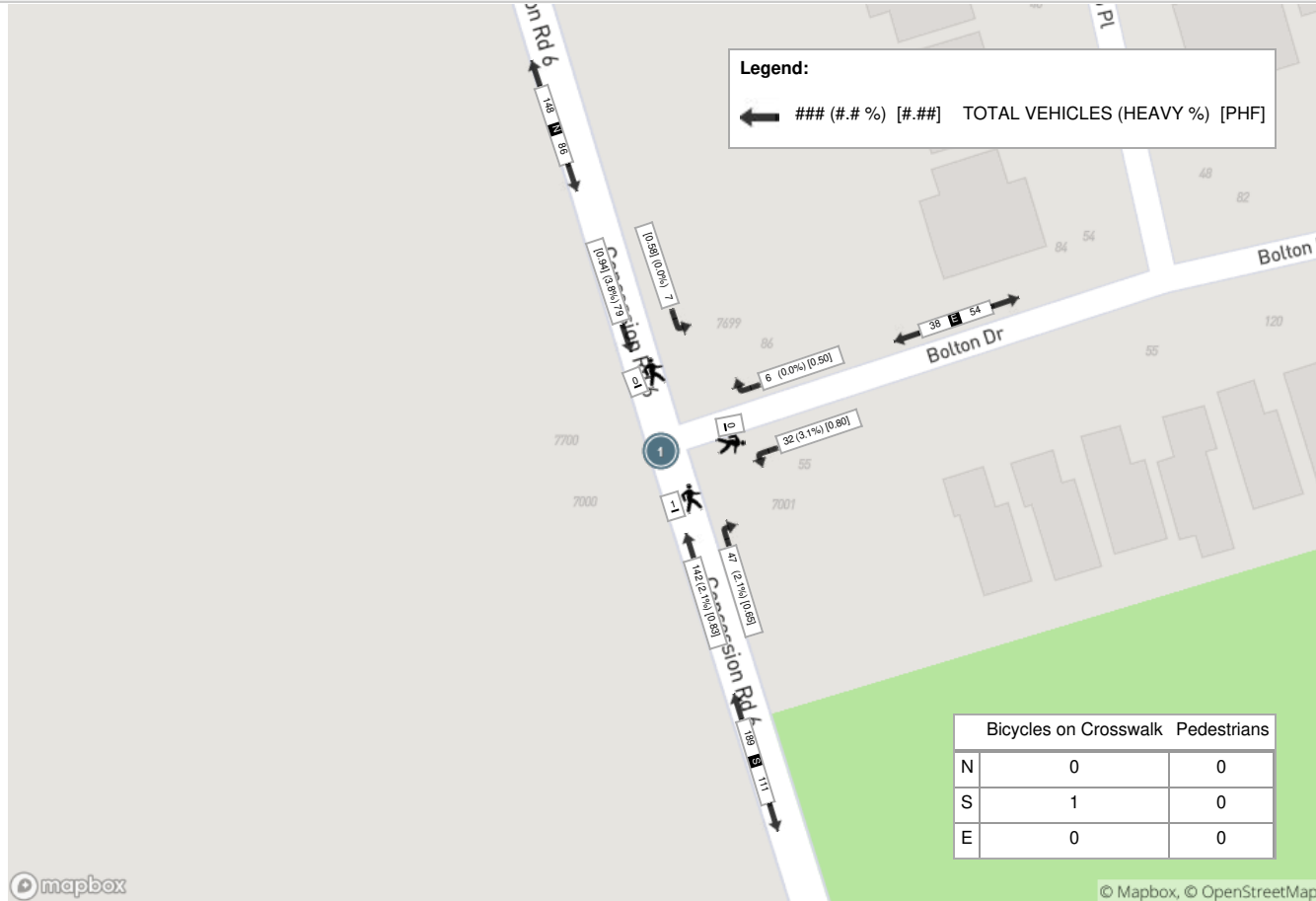
Peak Hour: 04:30 PM - 05:30 PM Weather: Few Clouds (10.39 °C)

Start Time	N Approach CONCESSION RD 6					E Approach BOLTON DR					S Approach CONCESSION RD 6					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
16:30:00	21	2	0	0	23	1	6	0	0	7	7	32	0	0	39	69
16:45:00	20	3	0	0	23	2	8	0	0	10	18	33	0	0	51	84
17:00:00	19	0	0	0	19	3	8	0	0	11	13	43	0	1	56	86
17:15:00	19	2	0	0	21	0	10	0	0	10	9	34	0	0	43	74
Grand Total	79	7	0	0	86	6	32	0	0	38	47	142	0	1	189	313
Approach%	91.9%	8.1%	0%	-	-	15.8%	84.2%	0%	-	-	24.9%	75.1%	0%	-	-	-
Totals %	25.2%	2.2%	0%	27.5%	1.9%	10.2%	0%	12.1%	15%	45.4%	0%	60.4%	-	-	-	-
PHF	0.94	0.58	0	0.93	0.5	0.8	0	0.86	0.65	0.83	0	0.84	-	-	-	-
Heavy	3	0	0	3	0	1	0	1	1	3	0	4	-	-	-	-
Heavy %	3.8%	0%	0%	3.5%	0%	3.1%	0%	2.6%	2.1%	2.1%	0%	2.1%	-	-	-	-
Lights	76	7	0	83	6	31	0	37	46	138	0	184	-	-	-	-
Lights %	96.2%	100%	0%	96.5%	100%	96.9%	0%	97.4%	97.9%	97.2%	0%	97.4%	-	-	-	-
Single-Unit Trucks	2	0	0	2	0	1	0	1	1	2	0	3	-	-	-	-
Single-Unit Trucks %	2.5%	0%	0%	2.3%	0%	3.1%	0%	2.6%	2.1%	1.4%	0%	1.6%	-	-	-	-
Buses	1	0	0	1	0	0	0	0	0	0	0	0	-	-	-	-
Buses %	1.3%	0%	0%	1.2%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	1	0	1	-	-	-	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.7%	0%	0.5%	-	-	-	-
Bicycles on Road	0	0	0	0	0	0	0	0	0	1	0	1	-	-	-	-
Bicycles on Road %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.7%	0%	0.5%	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-
Pedestrians%	-	-	-	0%	-	-	-	0%	-	-	-	0%	-	-	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	0	-	-	-	1	-	-	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	0%	-	-	-	100%	-	-	-	-

Peak Hour: 08:45 AM - 09:45 AM Weather: Scattered Clouds (1.5 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Few Clouds (10.39 °C)





Turning Movement Count (3 . BOLTON DR & QUAKER VILLAGE DR)

Start Time	E Approach BOLTON DR					S Approach QUAKER VILLAGE DR					W Approach BOLTON DR					Int. Total (15 min)	Int. Total (1 hr)
	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	U-Turn W:W	Peds W:	Approach Total		
07:00:00	1	1	0	0	2	0	0	0	2	0	1	1	0	0	2	4	
07:15:00	0	0	0	0	0	1	1	0	1	2	0	0	0	0	0	2	
07:30:00	0	1	0	0	1	0	0	0	4	0	0	1	0	0	1	2	
07:45:00	0	2	0	0	2	1	0	0	0	1	1	6	0	0	7	10	18
08:00:00	0	2	0	0	2	3	2	0	4	5	2	2	0	1	4	11	25
08:15:00	1	4	0	4	5	2	0	0	3	2	2	5	0	1	7	14	37
08:30:00	4	13	0	0	17	10	6	0	0	16	7	3	0	0	10	43	78
08:45:00	1	1	0	1	2	22	14	0	2	36	1	7	0	0	8	46	114
09:00:00	3	1	0	0	4	3	0	1	2	4	0	1	0	0	1	9	112
09:15:00	4	0	0	0	4	1	2	0	0	3	0	5	0	0	5	12	110
09:30:00	2	0	0	0	2	0	0	0	1	0	0	3	0	0	3	5	72
09:45:00	5	1	0	0	6	4	0	0	2	4	0	2	0	0	2	12	38
BREAK																	
16:00:00	2	4	0	0	6	7	2	0	2	9	0	3	0	0	3	18	
16:15:00	4	3	0	0	7	2	0	0	0	2	3	7	1	0	11	20	
16:30:00	5	4	0	2	9	7	6	0	2	13	2	6	0	0	8	30	
16:45:00	7	6	0	2	13	5	4	0	0	9	1	8	0	0	9	31	99
17:00:00	9	6	0	0	15	3	1	0	1	4	2	5	0	0	7	26	107
17:15:00	3	3	0	0	6	5	3	0	3	8	3	4	0	0	7	21	108
17:30:00	2	3	1	0	6	2	2	0	0	4	0	3	0	0	3	13	91
17:45:00	10	0	0	0	10	3	2	0	1	5	2	9	0	0	11	26	86
18:00:00	7	2	0	1	9	2	0	0	0	2	1	5	0	0	6	17	77
18:15:00	5	2	0	0	7	1	0	0	2	1	2	5	0	0	7	15	71
18:30:00	5	1	0	0	6	2	1	0	3	3	0	3	0	0	3	12	70
18:45:00	3	6	0	0	9	4	3	0	4	7	1	6	0	0	7	23	67
Grand Total	83	66	1	10	150	90	49	1	39	140	31	100	1	2	132	422	-
Approach%	55.3%	44%	0.7%	-	-	64.3%	35%	0.7%	-	-	23.5%	75.8%	0.8%	-	-	-	-
Totals %	19.7%	15.6%	0.2%	-	35.5%	21.3%	11.6%	0.2%	-	33.2%	7.3%	23.7%	0.2%	-	31.3%	-	-
Heavy	0	2	0	-	-	2	2	0	-	-	1	3	0	-	-	-	-
Heavy %	0%	3%	0%	-	-	2.2%	4.1%	0%	-	-	3.2%	3%	0%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (1.5 °C)

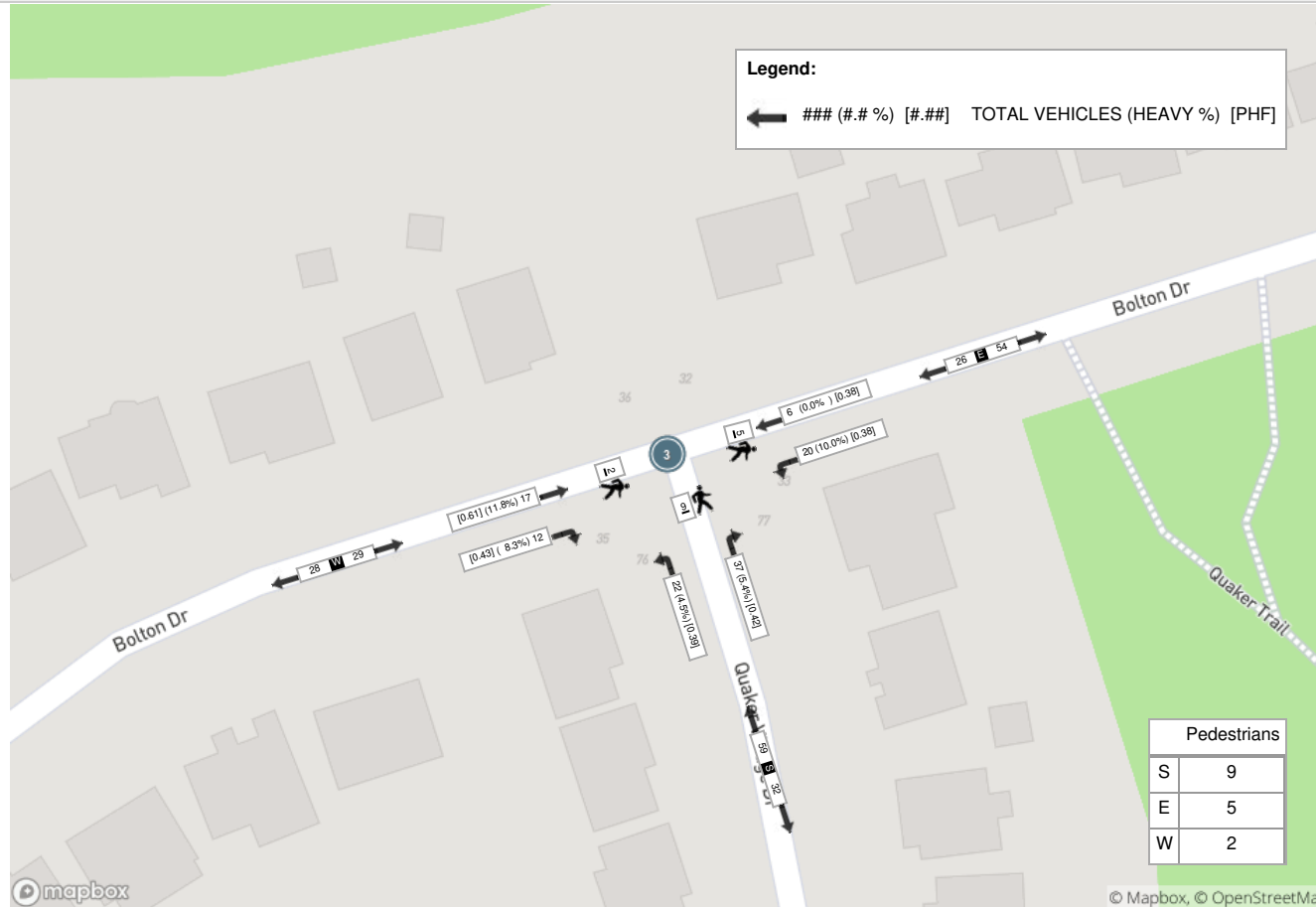
Start Time	E Approach BOLTON DR					S Approach QUAKER VILLAGE DR					W Approach BOLTON DR				Int. Total (15 min)	
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds		Approach Total
08:00:00	0	2	0	0	2	3	2	0	4	5	2	2	0	1	4	11
08:15:00	1	4	0	4	5	2	0	0	3	2	2	5	0	1	7	14
08:30:00	4	13	0	0	17	10	6	0	0	16	7	3	0	0	10	43
08:45:00	1	1	0	1	2	22	14	0	2	36	1	7	0	0	8	46
Grand Total	6	20	0	5	26	37	22	0	9	59	12	17	0	2	29	114
Approach%	23.1%	76.9%	0%	-	-	62.7%	37.3%	0%	-	-	41.4%	58.6%	0%	-	-	-
Totals %	5.3%	17.5%	0%	-	22.8%	32.5%	19.3%	0%	-	51.8%	10.5%	14.9%	0%	-	25.4%	-
PHF	0.38	0.38	0	-	0.38	0.42	0.39	0	-	0.41	0.43	0.61	0	-	0.73	-
Heavy	0	2	0	-	2	2	1	0	-	3	1	2	0	-	3	-
Heavy %	0%	10%	0%	-	7.7%	5.4%	4.5%	0%	-	5.1%	8.3%	11.8%	0%	-	10.3%	-
Lights	6	18	0	-	24	35	21	0	-	56	11	15	0	-	26	-
Lights %	100%	90%	0%	-	92.3%	94.6%	95.5%	0%	-	94.9%	91.7%	88.2%	0%	-	89.7%	-
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	1	0	-	1	-
Single-Unit Trucks %	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	5.9%	0%	-	3.4%	-
Buses	0	2	0	-	2	2	1	0	-	3	1	1	0	-	2	-
Buses %	0%	10%	0%	-	7.7%	5.4%	4.5%	0%	-	5.1%	8.3%	5.9%	0%	-	6.9%	-
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	-
Bicycles on Road %	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	5	-	-	-	-	9	-	-	-	-	2	-	-
Pedestrians%	-	-	-	31.3%	-	-	-	-	56.3%	-	-	-	-	12.5%	-	-



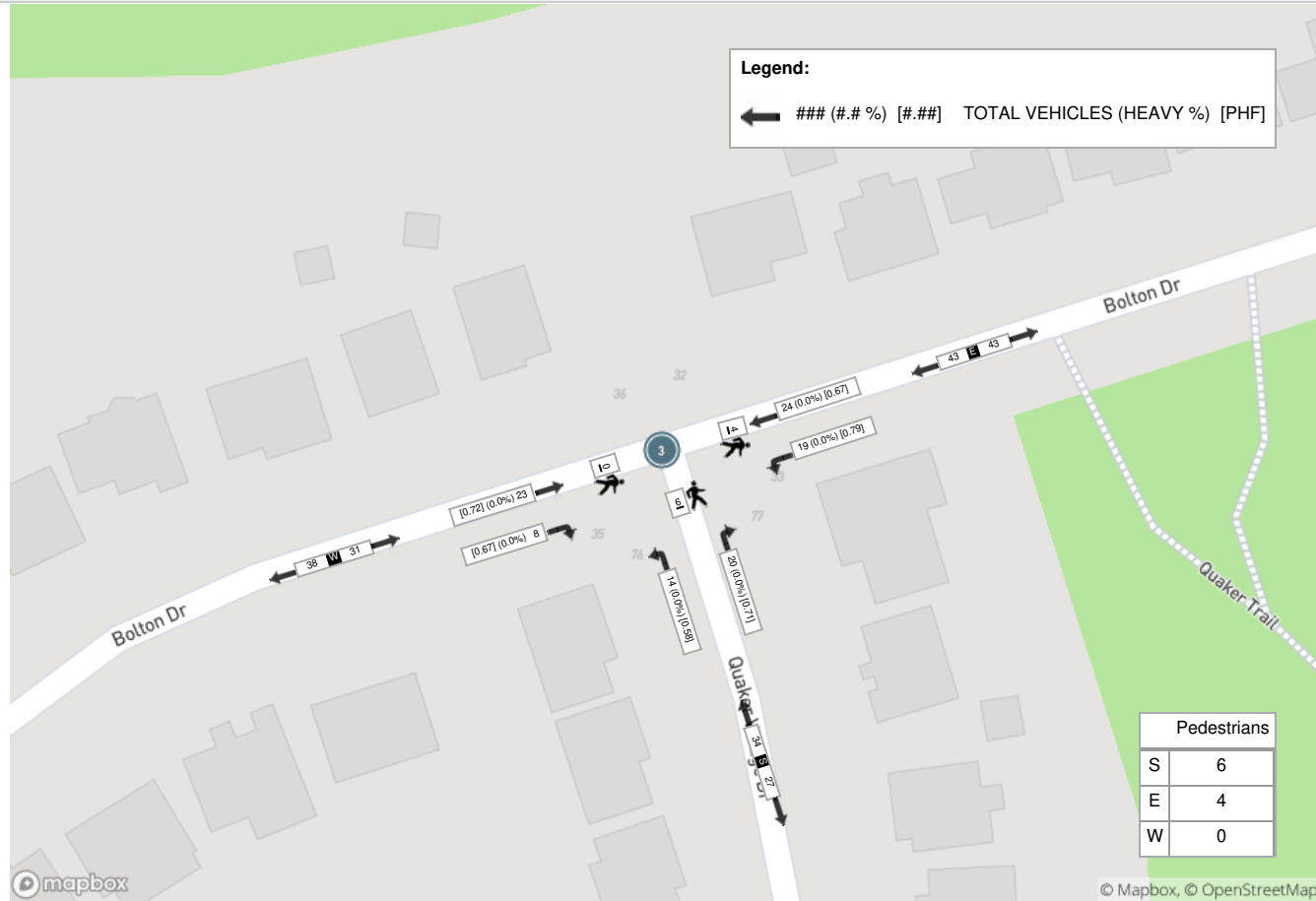
Peak Hour: 04:30 PM - 05:30 PM Weather: Few Clouds (10.39 °C)

Start Time	E Approach BOLTON DR					S Approach QUAKER VILLAGE DR					W Approach BOLTON DR				Int. Total (15 min)	
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds		Approach Total
16:30:00	5	4	0	2	9	7	6	0	2	13	2	6	0	0	8	30
16:45:00	7	6	0	2	13	5	4	0	0	9	1	8	0	0	9	31
17:00:00	9	6	0	0	15	3	1	0	1	4	2	5	0	0	7	26
17:15:00	3	3	0	0	6	5	3	0	3	8	3	4	0	0	7	21
Grand Total	24	19	0	4	43	20	14	0	6	34	8	23	0	0	31	108
Approach%	55.8%	44.2%	0%		-	58.8%	41.2%	0%		-	25.8%	74.2%	0%		-	-
Totals %	22.2%	17.6%	0%		39.8%	18.5%	13%	0%		31.5%	7.4%	21.3%	0%		28.7%	-
PHF	0.67	0.79	0		0.72	0.71	0.58	0		0.65	0.67	0.72	0		0.86	-
Heavy	0	0	0		0	0	0	0		0	0	0	0		0	-
Heavy %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Lights	23	19	0		42	20	12	0		32	8	23	0		31	-
Lights %	95.8%	100%	0%		97.7%	100%	85.7%	0%		94.1%	100%	100%	0%		100%	-
Single-Unit Trucks	0	0	0		0	0	0	0		0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Buses	0	0	0		0	0	0	0		0	0	0	0		0	-
Buses %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Bicycles on Road	1	0	0		1	0	2	0		2	0	0	0		0	-
Bicycles on Road %	4.2%	0%	0%		2.3%	0%	14.3%	0%		5.9%	0%	0%	0%		0%	-
Pedestrians	-	-	-	4	-	-	-	-	6	-	-	-	-	0	-	-
Pedestrians%	-	-	-	40%	-	-	-	-	60%	-	-	-	-	0%	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (1.5 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Few Clouds (10.39 °C)





Turning Movement Count (4 . CENTRE RD & OAKSIDE DR)

Start Time	N Approach CENTRE RD					E Approach OAKSIDE DR					S Approach CENTRE RD					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	U-Turn S:S	Peds S:	Approach Total		
07:00:00	4	0	0	0	4	1	7	0	1	8	0	3	0	0	3	15	
07:15:00	0	0	0	0	0	1	5	0	4	6	1	2	0	0	3	9	
07:30:00	1	0	0	0	1	0	4	0	4	4	1	1	0	0	2	7	
07:45:00	3	0	0	0	3	0	5	0	4	5	0	3	0	0	3	11	42
08:00:00	7	0	0	0	7	0	2	0	3	2	0	6	0	0	6	15	42
08:15:00	6	0	0	0	6	1	8	0	0	9	2	2	0	0	4	19	52
08:30:00	5	1	0	0	6	0	12	0	4	12	4	2	0	0	6	24	69
08:45:00	1	0	0	0	1	1	3	0	3	4	7	4	0	0	11	16	74
09:00:00	2	0	0	0	2	0	3	0	1	3	3	3	0	0	6	11	70
09:15:00	4	1	0	0	5	0	8	0	1	8	7	4	0	0	11	24	75
09:30:00	3	0	0	0	3	0	8	0	2	8	3	1	0	0	4	15	66
09:45:00	0	1	0	0	1	0	8	0	3	8	1	3	0	0	4	13	63
BREAK																	
16:00:00	3	1	0	0	4	0	6	0	2	6	8	9	0	0	17	27	
16:15:00	5	1	0	0	6	1	6	0	3	7	5	5	0	0	10	23	
16:30:00	7	1	0	0	8	0	6	0	5	6	6	7	0	0	13	27	
16:45:00	6	1	0	0	7	1	5	0	5	6	9	10	0	0	19	32	109
17:00:00	6	1	0	0	7	0	4	0	2	4	9	4	0	0	13	24	106
17:15:00	8	0	0	0	8	1	7	0	7	8	7	10	0	0	17	33	116
17:30:00	4	1	0	0	5	0	4	0	2	4	7	5	0	0	12	21	110
17:45:00	6	1	0	0	7	0	4	0	1	4	7	5	0	0	12	23	101
18:00:00	6	0	0	0	6	0	7	0	1	7	3	5	0	0	8	21	98
18:15:00	4	0	0	0	4	0	5	0	3	5	5	1	0	0	6	15	80
18:30:00	2	0	0	0	2	0	2	0	1	2	6	2	0	0	8	12	71
18:45:00	7	0	0	0	7	1	7	0	0	8	4	3	0	0	7	22	70
Grand Total	100	10	0	0	110	8	136	0	62	144	105	100	0	0	205	459	-
Approach%	90.9%	9.1%	0%	-	-	5.6%	94.4%	0%	-	-	51.2%	48.8%	0%	-	-	-	-
Totals %	21.8%	2.2%	0%	-	24%	1.7%	29.6%	0%	-	31.4%	22.9%	21.8%	0%	-	44.7%	-	-
Heavy	2	0	0	-	-	1	2	0	-	-	3	3	0	-	-	-	-
Heavy %	2%	0%	0%	-	-	12.5%	1.5%	0%	-	-	2.9%	3%	0%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (1.5 °C)

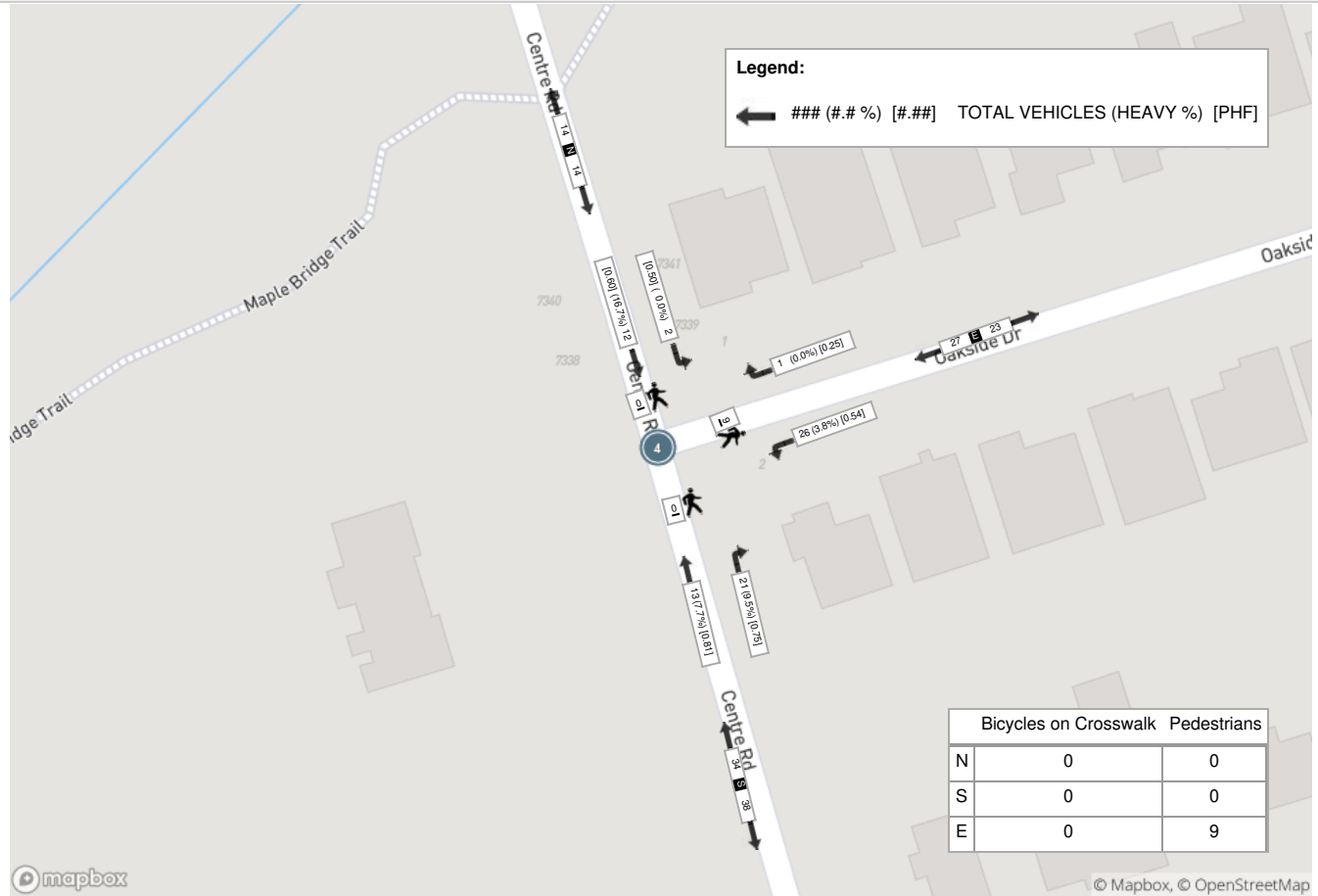
Start Time	N Approach CENTRE RD					E Approach OAKSIDE DR					S Approach CENTRE RD					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
08:30:00	5	1	0	0	6	0	12	0	4	12	4	2	0	0	6	24
08:45:00	1	0	0	0	1	1	3	0	3	4	7	4	0	0	11	16
09:00:00	2	0	0	0	2	0	3	0	1	3	3	3	0	0	6	11
09:15:00	4	1	0	0	5	0	8	0	1	8	7	4	0	0	11	24
Grand Total	12	2	0	0	14	1	26	0	9	27	21	13	0	0	34	75
Approach%	85.7%	14.3%	0%	-	-	3.7%	96.3%	0%	-	-	61.8%	38.2%	0%	-	-	-
Totals %	16%	2.7%	0%	18.7%	1.3%	34.7%	0%	36%	28%	17.3%	0%	45.3%	-	-	-	-
PHF	0.6	0.5	0	0.58	0.25	0.54	0	0.56	0.75	0.81	0	0.77	-	-	-	-
Heavy	2	0	0	2	0	1	0	1	2	1	0	3	-	-	-	-
Heavy %	16.7%	0%	0%	14.3%	0%	3.8%	0%	3.7%	9.5%	7.7%	0%	8.8%	-	-	-	-
Lights	10	2	0	12	1	25	0	26	19	12	0	31	-	-	-	-
Lights %	83.3%	100%	0%	85.7%	100%	96.2%	0%	96.3%	90.5%	92.3%	0%	91.2%	-	-	-	-
Single-Unit Trucks	0	0	0	0	0	0	0	0	1	0	0	1	-	-	-	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	4.8%	0%	0%	2.9%	-	-	-	-
Buses	2	0	0	2	0	1	0	1	1	1	0	2	-	-	-	-
Buses %	16.7%	0%	0%	14.3%	0%	3.8%	0%	3.7%	4.8%	7.7%	0%	5.9%	-	-	-	-
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-
Bicycles on Road %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	9	-	-	-	0	-	-	-	-
Pedestrians%	-	-	-	0%	-	-	-	100%	-	-	-	0%	-	-	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	0%	-	-	-	0%	-	-	-	-



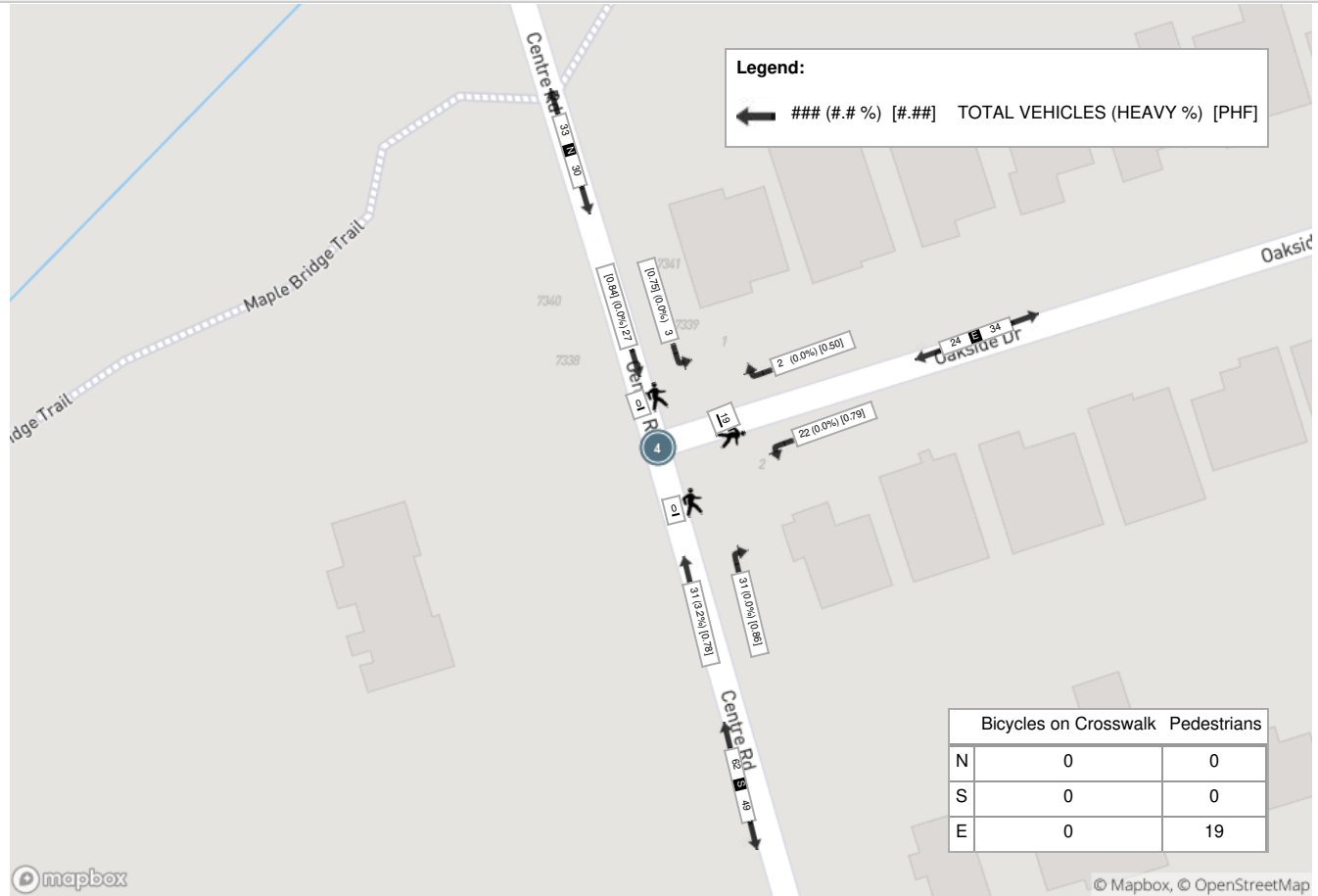
Peak Hour: 04:30 PM - 05:30 PM Weather: Few Clouds (10.39 °C)

Start Time	N Approach CENTRE RD					E Approach OAKSIDE DR					S Approach CENTRE RD					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
16:30:00	7	1	0	0	8	0	6	0	5	6	6	7	0	0	13	27
16:45:00	6	1	0	0	7	1	5	0	5	6	9	10	0	0	19	32
17:00:00	6	1	0	0	7	0	4	0	2	4	9	4	0	0	13	24
17:15:00	8	0	0	0	8	1	7	0	7	8	7	10	0	0	17	33
Grand Total	27	3	0	0	30	2	22	0	19	24	31	31	0	0	62	116
Approach%	90%	10%	0%	-	-	8.3%	91.7%	0%	-	-	50%	50%	0%	-	-	-
Totals %	23.3%	2.6%	0%	0%	25.9%	1.7%	19%	0%	0%	20.7%	26.7%	26.7%	0%	0%	53.4%	-
PHF	0.84	0.75	0	0	0.94	0.5	0.79	0	0	0.75	0.86	0.78	0	0	0.82	-
Heavy	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	-
Heavy %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3.2%	0%	0%	1.6%	-
Lights	23	3	0	0	26	2	22	0	0	24	31	30	0	0	61	-
Lights %	85.2%	100%	0%	0%	86.7%	100%	100%	0%	0%	100%	100%	96.8%	0%	0%	98.4%	-
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	-
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3.2%	0%	0%	1.6%	-
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Buses %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Bicycles on Road	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	-
Bicycles on Road %	14.8%	0%	0%	0%	13.3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Pedestrians	-	-	-	0	-	-	-	-	19	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	100%	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-

Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (1.5 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Few Clouds (10.39 °C)





Turning Movement Count (5 . REGIONAL RD 8 & CENTRE RD)

Start Time	N Approach CENTRE RD					E Approach REGIONAL RD 8					W Approach REGIONAL RD 8					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	U-Turn E:E	Peds E:	Approach Total	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	13	4	0	2	17	1	27	0	0	28	7	1	0	0	8	53	
07:15:00	12	3	0	1	15	1	36	0	0	37	12	3	0	0	15	67	
07:30:00	14	3	0	0	17	0	26	0	0	26	21	2	0	0	23	66	
07:45:00	11	7	0	3	18	2	45	0	0	47	24	3	0	0	27	92	278
08:00:00	20	9	0	0	29	1	33	0	0	34	32	3	0	0	35	98	323
08:15:00	13	7	0	1	20	3	34	0	0	37	25	3	0	0	28	85	341
08:30:00	27	5	0	2	32	6	65	0	0	71	35	7	0	0	42	145	420
08:45:00	11	18	0	2	29	5	55	0	0	60	73	8	0	0	81	170	498
09:00:00	9	5	0	1	14	5	31	0	0	36	43	9	0	0	52	102	502
09:15:00	7	6	0	1	13	3	34	0	0	37	41	7	0	0	48	98	515
09:30:00	8	12	0	7	20	5	18	0	0	23	40	4	0	1	44	87	457
09:45:00	11	5	0	9	16	4	24	0	0	28	37	4	0	0	41	85	372
BREAK																	
16:00:00	17	5	0	5	22	9	34	0	0	43	52	17	0	0	69	134	
16:15:00	8	5	0	5	13	8	48	0	0	56	47	15	0	0	62	131	
16:30:00	12	7	0	4	19	10	42	0	0	52	48	24	0	2	72	143	
16:45:00	10	9	0	4	19	11	48	0	0	59	59	15	0	1	74	152	560
17:00:00	12	3	0	1	15	15	48	0	0	63	60	20	0	0	80	158	584
17:15:00	6	8	0	6	14	3	37	0	0	40	56	20	0	3	76	130	583
17:30:00	9	5	0	3	14	9	38	0	0	47	48	13	0	0	61	122	562
17:45:00	7	5	0	1	12	9	30	0	0	39	69	19	0	0	88	139	549
18:00:00	7	1	0	1	8	10	35	0	0	45	42	8	0	2	50	103	494
18:15:00	7	4	0	2	11	5	27	0	0	32	40	7	0	1	47	90	454
18:30:00	4	6	0	7	10	8	26	0	0	34	35	10	0	0	45	89	421
18:45:00	11	5	0	1	16	3	30	0	0	33	42	10	0	0	52	101	383
Grand Total	266	147	0	69	413	136	871	0	0	1007	988	232	0	10	1220	2640	-
Approach%	64.4%	35.6%	0%	-	-	13.5%	86.5%	0%	-	-	81%	19%	0%	-	-	-	-
Totals %	10.1%	5.6%	0%	-	15.6%	5.2%	33%	0%	-	38.1%	37.4%	8.8%	0%	-	46.2%	-	-
Heavy	5	2	0	-	-	2	29	0	-	-	47	3	0	-	-	-	-
Heavy %	1.9%	1.4%	0%	-	-	1.5%	3.3%	0%	-	-	4.8%	1.3%	0%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (1.5 °C)

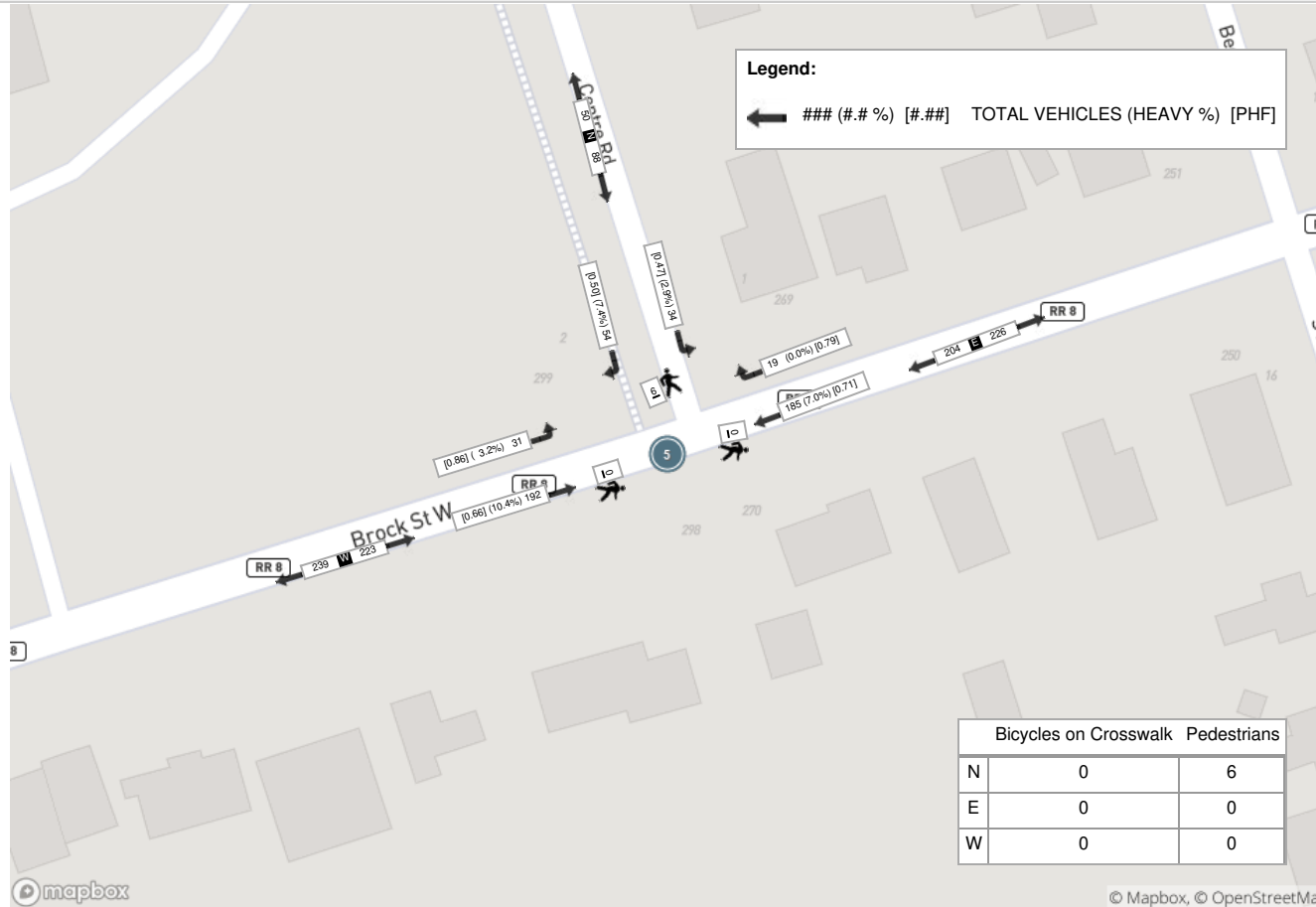
Start Time	N Approach CENTRE RD					E Approach REGIONAL RD 8					W Approach REGIONAL RD 8					Int. Total (15 min)
	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	
08:30:00	27	5	0	2	32	6	65	0	0	71	35	7	0	0	42	145
08:45:00	11	18	0	2	29	5	55	0	0	60	73	8	0	0	81	170
09:00:00	9	5	0	1	14	5	31	0	0	36	43	9	0	0	52	102
09:15:00	7	6	0	1	13	3	34	0	0	37	41	7	0	0	48	98
Grand Total	54	34	0	6	88	19	185	0	0	204	192	31	0	0	223	515
Approach%	61.4%	38.6%	0%	-	-	9.3%	90.7%	0%	-	-	86.1%	13.9%	0%	-	-	-
Totals %	10.5%	6.6%	0%	17.1%	17.1%	3.7%	35.9%	0%	39.6%	39.6%	37.3%	6%	0%	43.3%	43.3%	-
PHF	0.5	0.47	0	0.69	0.69	0.79	0.71	0	0.72	0.72	0.66	0.86	0	0.69	0.69	-
Heavy	4	1	0	5	5	0	13	0	13	13	20	1	0	21	21	-
Heavy %	7.4%	2.9%	0%	5.7%	5.7%	0%	7%	0%	6.4%	6.4%	10.4%	3.2%	0%	9.4%	9.4%	-
Lights	50	33	0	83	83	19	172	0	191	191	172	30	0	202	202	-
Lights %	92.6%	97.1%	0%	94.3%	94.3%	100%	93%	0%	93.6%	93.6%	89.6%	96.8%	0%	90.6%	90.6%	-
Single-Unit Trucks	1	0	0	1	1	0	1	0	1	1	5	1	0	6	6	-
Single-Unit Trucks %	1.9%	0%	0%	1.1%	1.1%	0%	0.5%	0%	0.5%	0.5%	2.6%	3.2%	0%	2.7%	2.7%	-
Buses	3	1	0	4	4	0	9	0	9	9	12	0	0	12	12	-
Buses %	5.6%	2.9%	0%	4.5%	4.5%	0%	4.9%	0%	4.4%	4.4%	6.3%	0%	0%	5.4%	5.4%	-
Articulated Trucks	0	0	0	0	0	0	3	0	3	3	3	0	0	3	3	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	1.6%	0%	1.5%	1.5%	1.6%	0%	0%	1.3%	1.3%	-
Pedestrians	-	-	-	6	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	100%	-	-	-	0%	-	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	0%	-	-	-	-	-	0%	-	-



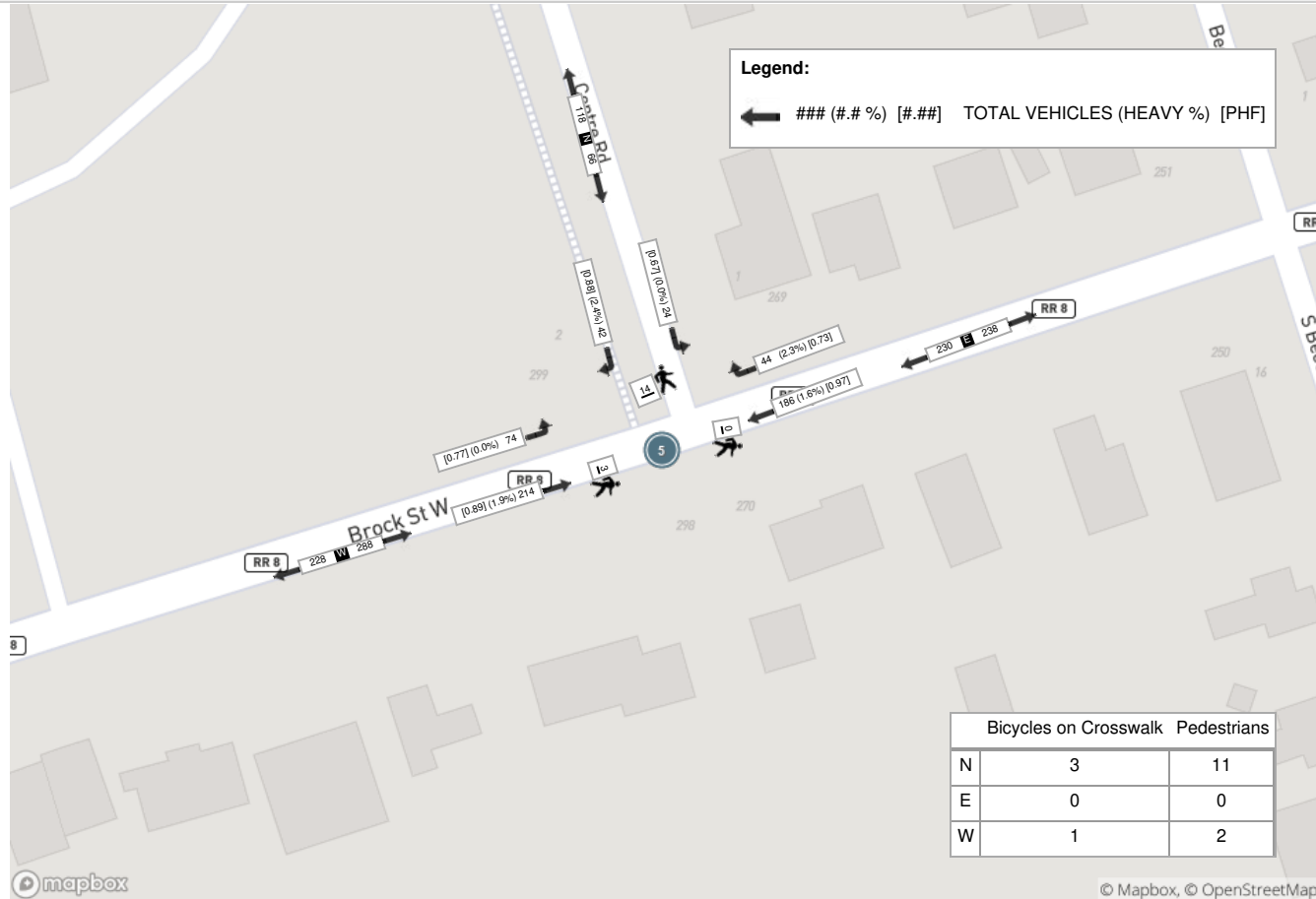
Peak Hour: 04:15 PM - 05:15 PM Weather: Few Clouds (10.39 °C)

Start Time	N Approach CENTRE RD					E Approach REGIONAL RD 8					W Approach REGIONAL RD 8					Int. Total (15 min)
	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	
16:15:00	8	5	0	5	13	8	48	0	0	56	47	15	0	0	62	131
16:30:00	12	7	0	4	19	10	42	0	0	52	48	24	0	2	72	143
16:45:00	10	9	0	4	19	11	48	0	0	59	59	15	0	1	74	152
17:00:00	12	3	0	1	15	15	48	0	0	63	60	20	0	0	80	158
Grand Total	42	24	0	14	66	44	186	0	0	230	214	74	0	3	288	584
Approach%	63.6%	36.4%	0%	-	-	19.1%	80.9%	0%	-	-	74.3%	25.7%	0%	-	-	-
Totals %	7.2%	4.1%	0%	11.3%	11.3%	7.5%	31.8%	0%	39.4%	39.4%	36.6%	12.7%	0%	49.3%	49.3%	-
PHF	0.88	0.67	0	0.87	0.87	0.73	0.97	0	0.91	0.91	0.89	0.77	0	0.9	0.9	-
Heavy	1	0	0	1	1	1	3	0	4	4	4	0	0	4	4	-
Heavy %	2.4%	0%	0%	1.5%	1.5%	2.3%	1.6%	0%	1.7%	1.7%	1.9%	0%	0%	1.4%	1.4%	-
Lights	41	24	0	65	65	43	183	0	226	226	210	74	0	284	284	-
Lights %	97.6%	100%	0%	98.5%	98.5%	97.7%	98.4%	0%	98.3%	98.3%	98.1%	100%	0%	98.6%	98.6%	-
Single-Unit Trucks	1	0	0	1	1	0	2	0	2	2	3	0	0	3	3	-
Single-Unit Trucks %	2.4%	0%	0%	1.5%	1.5%	0%	1.1%	0%	0.9%	0.9%	1.4%	0%	0%	1%	1%	-
Buses	0	0	0	0	0	1	1	0	2	2	1	0	0	1	1	-
Buses %	0%	0%	0%	0%	0%	2.3%	0.5%	0%	0.9%	0.9%	0.5%	0%	0%	0.3%	0.3%	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Pedestrians	-	-	-	11	-	-	-	0	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	64.7%	-	-	-	0%	-	-	-	-	-	11.8%	-	-
Bicycles on Crosswalk	-	-	-	3	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	17.6%	-	-	-	0%	-	-	-	-	-	5.9%	-	-

Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (1.5 °C)



Peak Hour: 04:15 PM - 05:15 PM Weather: Few Clouds (10.39 °C)



Appendix C

Existing Traffic Level of Service Calculations

HCM 2010 Roundabout
 3: Concession 6 & Regional Road 8/Brock Street W

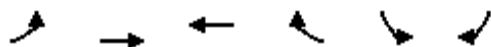
12-09-2020

Intersection				
Intersection Delay, s/veh	6.9			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	182	372	156	142
Demand Flow Rate, veh/h	198	377	158	148
Vehicles Circulating, veh/h	302	85	192	376
Vehicles Exiting, veh/h	222	265	308	86
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.3	7.3	5.6	6.9
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	198	377	158	148
Cap Entry Lane, veh/h	835	1038	933	776
Entry HV Adj Factor	0.920	0.986	0.985	0.961
Flow Entry, veh/h	182	372	156	142
Cap Entry, veh/h	768	1023	918	746
V/C Ratio	0.237	0.363	0.169	0.191
Control Delay, s/veh	7.3	7.3	5.6	6.9
LOS	A	A	A	A
95th %tile Queue, veh	1	2	1	1

HCM Unsignalized Intersection Capacity Analysis

7: Brock Street W & Centre Road

12-09-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	335	361	29	63	101
Future Volume (Veh/h)	26	335	361	29	63	101
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	31	399	430	35	75	120
Pedestrians					13	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	478				922	460
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	478				922	460
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				74	80
cM capacity (veh/h)	1083				291	599
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	31	399	465	195		
Volume Left	31	0	0	75		
Volume Right	0	0	35	120		
cSH	1083	1700	1700	425		
Volume to Capacity	0.03	0.23	0.27	0.46		
Queue Length 95th (m)	0.7	0.0	0.0	18.8		
Control Delay (s)	8.4	0.0	0.0	20.4		
Lane LOS	A			C		
Approach Delay (s)	0.6		0.0	20.4		
Approach LOS				C		
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization			38.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Concession 6 & Bolton Drive

12-09-2020



















Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	32	9	59	16	3	95
Future Volume (Veh/h)	32	9	59	16	3	95
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	36	10	66	18	3	107
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	188	75			84	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	188	75			84	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	99			100	
cM capacity (veh/h)	797	992			1526	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	46	84	110			
Volume Left	36	0	3			
Volume Right	10	18	0			
cSH	833	1700	1526			
Volume to Capacity	0.06	0.05	0.00			
Queue Length 95th (m)	1.4	0.0	0.0			
Control Delay (s)	9.6	0.0	0.2			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	0.2			
Approach LOS	A					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization		17.4%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Centre Road & Bolton Drive/North Street

12-09-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	22	30	56	14	14	4	16	28	6	0	66	24
Future Volume (vph)	22	30	56	14	14	4	16	28	6	0	66	24
Peak Hour Factor	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Hourly flow rate (vph)	37	51	95	24	24	7	27	47	10	0	112	41
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	183	55	84	153								
Volume Left (vph)	37	24	27	0								
Volume Right (vph)	95	7	10	41								
Hadj (s)	-0.18	0.11	-0.01	-0.01								
Departure Headway (s)	4.4	4.8	4.6	4.5								
Degree Utilization, x	0.22	0.07	0.11	0.19								
Capacity (veh/h)	776	696	727	743								
Control Delay (s)	8.6	8.2	8.2	8.6								
Approach Delay (s)	8.6	8.2	8.2	8.6								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.5									
Level of Service			A									
Intersection Capacity Utilization			22.9%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

14: Quaker Village Drive & Bolton Drive

12-09-2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	↘
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	34	24	40	12	44	74
Future Volume (vph)	34	24	40	12	44	74
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	47	33	55	16	60	101
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	80	71	161			
Volume Left (vph)	0	55	60			
Volume Right (vph)	33	0	101			
Hadj (s)	-0.07	0.29	-0.22			
Departure Headway (s)	4.3	4.6	4.0			
Degree Utilization, x	0.09	0.09	0.18			
Capacity (veh/h)	810	739	858			
Control Delay (s)	7.7	8.1	7.9			
Approach Delay (s)	7.7	8.1	7.9			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.9			
Level of Service			A			
Intersection Capacity Utilization			24.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

16: Centre Road & Oakside Drive

12-09-2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	52	2	26	42	4	24
Future Volume (Veh/h)	52	2	26	42	4	24
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	68	3	34	55	5	31
Pedestrians	9					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	112	70			98	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112	70			98	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	100			100	
cM capacity (veh/h)	871	990			1497	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	71	89	36			
Volume Left	68	0	5			
Volume Right	3	55	0			
cSH	876	1700	1497			
Volume to Capacity	0.08	0.05	0.00			
Queue Length 95th (m)	2.1	0.0	0.1			
Control Delay (s)	9.5	0.0	1.1			
Lane LOS	A		A			
Approach Delay (s)	9.5	0.0	1.1			
Approach LOS	A					
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			16.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM 2010 Roundabout
 3: Concession 6 & Regional Road 8/Brock Street W

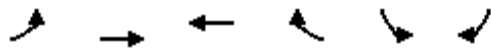
12-09-2020

Intersection				
Intersection Delay, s/veh	12.1			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	286	224	600	118
Demand Flow Rate, veh/h	292	229	610	120
Vehicles Circulating, veh/h	181	325	273	242
Vehicles Exiting, veh/h	181	558	200	312
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.2	7.7	17.5	5.5
Approach LOS	A	A	C	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	292	229	610	120
Cap Entry Lane, veh/h	943	816	860	887
Entry HV Adj Factor	0.978	0.976	0.984	0.982
Flow Entry, veh/h	286	224	600	118
Cap Entry, veh/h	922	797	846	871
V/C Ratio	0.310	0.280	0.709	0.135
Control Delay, s/veh	7.2	7.7	17.5	5.5
LOS	A	A	C	A
95th %tile Queue, veh	1	1	6	0

HCM Unsignalized Intersection Capacity Analysis

7: Brock Street W & Centre Road

12-09-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	80	418	348	56	60	25
Future Volume (Veh/h)	80	418	348	56	60	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	91	475	395	64	68	28
Pedestrians					4	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	463				1088	431
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	463				1088	431
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				69	96
cM capacity (veh/h)	1105				220	627
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	91	475	459	96		
Volume Left	91	0	0	68		
Volume Right	0	0	64	28		
cSH	1105	1700	1700	272		
Volume to Capacity	0.08	0.28	0.27	0.35		
Queue Length 95th (m)	2.1	0.0	0.0	12.3		
Control Delay (s)	8.5	0.0	0.0	25.3		
Lane LOS	A			D		
Approach Delay (s)	1.4		0.0	25.3		
Approach LOS				D		
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			41.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Concession 6 & Bolton Drive

12-09-2020



















Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	32	6	245	47	7	79
Future Volume (Veh/h)	32	6	245	47	7	79
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	34	6	263	51	8	85
Pedestrians			1			
Lane Width (m)			3.5			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	390	288			314	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	390	288			314	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	99			99	
cM capacity (veh/h)	607	755			1258	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	40	314	93			
Volume Left	34	0	8			
Volume Right	6	51	0			
cSH	626	1700	1258			
Volume to Capacity	0.06	0.18	0.01			
Queue Length 95th (m)	1.6	0.0	0.2			
Control Delay (s)	11.1	0.0	0.7			
Lane LOS	B		A			
Approach Delay (s)	11.1	0.0	0.7			
Approach LOS	B					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			25.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Centre Road & Bolton Drive/North Street

12-09-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	22	20	34	18	18	10	44	92	22	8	66	26
Future Volume (vph)	22	20	34	18	18	10	44	92	22	8	66	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	24	22	38	20	20	11	49	102	24	9	73	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	84	51	175	111								
Volume Left (vph)	24	20	49	9								
Volume Right (vph)	38	11	24	29								
Hadj (s)	-0.21	-0.05	-0.01	-0.14								
Departure Headway (s)	4.4	4.6	4.3	4.3								
Degree Utilization, x	0.10	0.07	0.21	0.13								
Capacity (veh/h)	758	723	799	800								
Control Delay (s)	7.9	7.9	8.5	7.9								
Approach Delay (s)	7.9	7.9	8.5	7.9								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.1									
Level of Service			A									
Intersection Capacity Utilization			29.9%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

14: Quaker Village Drive & Bolton Drive

12-09-2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	➔			➔	➔	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	46	16	38	48	28	40
Future Volume (vph)	46	16	38	48	28	40
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	53	19	44	56	33	47










Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	72	100	80
Volume Left (vph)	0	44	33
Volume Right (vph)	19	0	47
Hadj (s)	-0.16	0.09	-0.27
Departure Headway (s)	4.0	4.2	4.0
Degree Utilization, x	0.08	0.12	0.09
Capacity (veh/h)	871	830	856
Control Delay (s)	7.4	7.8	7.4
Approach Delay (s)	7.4	7.8	7.4
Approach LOS	A	A	A

Intersection Summary		
Delay		7.5
Level of Service		A
Intersection Capacity Utilization	23.4%	ICU Level of Service
Analysis Period (min)		15

HCM Unsignalized Intersection Capacity Analysis

16: Centre Road & Oakside Drive

12-09-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	44	4	62	62	6	54
Future Volume (Veh/h)	44	4	62	62	6	54
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	47	4	66	66	6	57
Pedestrians	19					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	187	118			151	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	187	118			151	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	100			100	
cM capacity (veh/h)	791	925			1420	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	51	132	63			
Volume Left	47	0	6			
Volume Right	4	66	0			
cSH	800	1700	1420			
Volume to Capacity	0.06	0.08	0.00			
Queue Length 95th (m)	1.6	0.0	0.1			
Control Delay (s)	9.8	0.0	0.7			
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	0.7			
Approach LOS	A					
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			20.5%	ICU Level of Service		A
Analysis Period (min)			15			

Appendix D

Future Background Level of Service Calculations

HCM 2010 Roundabout
 3: Concession 6 & Regional Road 8/Brock Street W

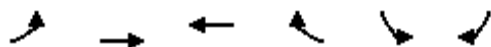
12-09-2020

Intersection				
Intersection Delay, s/veh	7.7			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	210	417	163	172
Demand Flow Rate, veh/h	229	424	166	179
Vehicles Circulating, veh/h	333	93	223	423
Vehicles Exiting, veh/h	269	296	339	94
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.2	8.1	5.9	7.9
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	229	424	166	179
Cap Entry Lane, veh/h	810	1030	904	740
Entry HV Adj Factor	0.918	0.984	0.984	0.961
Flow Entry, veh/h	210	417	163	172
Cap Entry, veh/h	744	1013	890	711
V/C Ratio	0.283	0.412	0.184	0.242
Control Delay, s/veh	8.2	8.1	5.9	7.9
LOS	A	A	A	A
95th %tile Queue, veh	1	2	1	1

HCM Unsignalized Intersection Capacity Analysis

7: Brock Street W & Centre Road

12-09-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	393	423	29	74	131
Future Volume (Veh/h)	31	393	423	29	74	131
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	37	468	504	35	88	156
Pedestrians					13	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	552				1076	534
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	552				1076	534
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				62	71
cM capacity (veh/h)	1017				233	544
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	37	468	539	244		
Volume Left	37	0	0	88		
Volume Right	0	0	35	156		
cSH	1017	1700	1700	367		
Volume to Capacity	0.04	0.28	0.32	0.66		
Queue Length 95th (m)	0.9	0.0	0.0	36.6		
Control Delay (s)	8.7	0.0	0.0	32.2		
Lane LOS	A			D		
Approach Delay (s)	0.6		0.0	32.2		
Approach LOS				D		
Intersection Summary						
Average Delay			6.3			
Intersection Capacity Utilization			44.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Concession 6 & Bolton Drive

















12-09-2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	49	11	69	19	3	111
Future Volume (Veh/h)	49	11	69	19	3	111
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	55	12	78	21	3	125
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	220	88			99	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	220	88			99	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	99			100	
cM capacity (veh/h)	765	975			1507	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	67	99	128			
Volume Left	55	0	3			
Volume Right	12	21	0			
cSH	796	1700	1507			
Volume to Capacity	0.08	0.06	0.00			
Queue Length 95th (m)	2.2	0.0	0.0			
Control Delay (s)	9.9	0.0	0.2			
Lane LOS	A		A			
Approach Delay (s)	9.9	0.0	0.2			
Approach LOS	A					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			18.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 12: Centre Road & Bolton Drive/North Street

12-09-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	25	35	56	14	16	4	16	38	6	0	90	36
Future Volume (vph)	25	35	56	14	16	4	16	38	6	0	90	36
Peak Hour Factor	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Hourly flow rate (vph)	42	59	95	24	27	7	27	64	10	0	153	61
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	196	58	101	214								
Volume Left (vph)	42	24	27	0								
Volume Right (vph)	95	7	10	61								
Hadj (s)	-0.15	0.12	-0.01	-0.02								
Departure Headway (s)	4.6	5.0	4.8	4.6								
Degree Utilization, x	0.25	0.08	0.13	0.28								
Capacity (veh/h)	730	651	701	732								
Control Delay (s)	9.1	8.5	8.5	9.4								
Approach Delay (s)	9.1	8.5	8.5	9.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.1									
Level of Service			A									
Intersection Capacity Utilization			29.8%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

14: Quaker Village Drive & Bolton Drive

12-09-2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			→	←	→
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	43	24	40	26	52	87
Future Volume (vph)	43	24	40	26	52	87
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	59	33	55	36	71	119










Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	92	91	190
Volume Left (vph)	0	55	71
Volume Right (vph)	33	0	119
Hadj (s)	-0.04	0.22	-0.22
Departure Headway (s)	4.4	4.7	4.1
Degree Utilization, x	0.11	0.12	0.22
Capacity (veh/h)	780	731	838
Control Delay (s)	8.0	8.3	8.3
Approach Delay (s)	8.0	8.3	8.3
Approach LOS	A	A	A

Intersection Summary			
Delay		8.2	
Level of Service		A	
Intersection Capacity Utilization	26.2%		ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis

16: Centre Road & Oakside Drive

12-09-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	61	2	38	42	4	53
Future Volume (Veh/h)	61	2	38	42	4	53
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	79	3	49	55	5	69
Pedestrians	9					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None		None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	164	86			113	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	164	86			113	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	100			100	
cM capacity (veh/h)	813	972			1478	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	82	104	74			
Volume Left	79	0	5			
Volume Right	3	55	0			
cSH	818	1700	1478			
Volume to Capacity	0.10	0.06	0.00			
Queue Length 95th (m)	2.7	0.0	0.1			
Control Delay (s)	9.9	0.0	0.5			
Lane LOS	A		A			
Approach Delay (s)	9.9	0.0	0.5			
Approach LOS	A					
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization			17.4%	ICU Level of Service		A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

18: Centre Road & Maplebrook Drive Extension

12-09-2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	25	8	30	8	3	28
Future Volume (Veh/h)	25	8	30	8	3	28
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	32	10	39	10	4	36
Pedestrians	9					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	97	53			58	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	97	53			58	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	99			100	
cM capacity (veh/h)	888	1013			1548	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	42	49	40			
Volume Left	32	0	4			
Volume Right	10	10	0			
cSH	915	1700	1548			
Volume to Capacity	0.05	0.03	0.00			
Queue Length 95th (m)	1.2	0.0	0.1			
Control Delay (s)	9.1	0.0	0.8			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	0.8			
Approach LOS	A					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization		15.9%		ICU Level of Service		A
Analysis Period (min)			15			

HCM 2010 Roundabout
 3: Concession 6 & Regional Road 8/Brock Street W

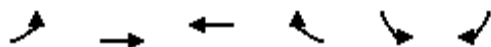
12-10-2020

Intersection				
Intersection Delay, s/veh	16.3			
Intersection LOS	C			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	343	253	654	139
Demand Flow Rate, veh/h	351	260	665	142
Vehicles Circulating, veh/h	203	380	332	273
Vehicles Exiting, veh/h	212	617	222	367
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.3	8.9	25.6	5.9
Approach LOS	A	A	D	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	351	260	665	142
Cap Entry Lane, veh/h	922	773	811	860
Entry HV Adj Factor	0.977	0.975	0.983	0.980
Flow Entry, veh/h	343	253	654	139
Cap Entry, veh/h	901	753	797	843
V/C Ratio	0.381	0.336	0.820	0.165
Control Delay, s/veh	8.3	8.9	25.6	5.9
LOS	A	A	D	A
95th %tile Queue, veh	2	1	9	1

HCM Unsignalized Intersection Capacity Analysis

7: Brock Street W & Centre Road

12-10-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	89	490	408	56	70	39
Future Volume (Veh/h)	89	490	408	56	70	39
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	96	527	439	60	75	42
Pedestrians					4	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	503				1192	473
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	503				1192	473
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				60	93
cM capacity (veh/h)	1068				189	593
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	96	527	499	117		
Volume Left	96	0	0	75		
Volume Right	0	0	60	42		
cSH	1068	1700	1700	251		
Volume to Capacity	0.09	0.31	0.29	0.47		
Queue Length 95th (m)	2.4	0.0	0.0	18.5		
Control Delay (s)	8.7	0.0	0.0	31.3		
Lane LOS	A			D		
Approach Delay (s)	1.3		0.0	31.3		
Approach LOS				D		
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			46.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Concession 6 & Bolton Drive

















12-10-2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	45	7	287	57	7	93
Future Volume (Veh/h)	45	7	287	57	7	93
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	48	8	309	61	8	100
Pedestrians			1			
Lane Width (m)			3.5			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type			None		None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	456	340			370	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	456	340			370	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	99			99	
cM capacity (veh/h)	556	707			1200	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	56	370	108			
Volume Left	48	0	8			
Volume Right	8	61	0			
cSH	573	1700	1200			
Volume to Capacity	0.10	0.22	0.01			
Queue Length 95th (m)	2.6	0.0	0.2			
Control Delay (s)	12.0	0.0	0.6			
Lane LOS	B		A			
Approach Delay (s)	12.0	0.0	0.6			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			28.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 12: Centre Road & Bolton Drive/North Street

12-10-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	32	23	34	18	21	10	44	127	22	8	87	34
Future Volume (vph)	32	23	34	18	21	10	44	127	22	8	87	34
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	36	26	38	20	23	11	49	141	24	9	97	38
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	100	54	214	144								
Volume Left (vph)	36	20	49	9								
Volume Right (vph)	38	11	24	38								
Hadj (s)	-0.16	-0.05	0.00	-0.15								
Departure Headway (s)	4.6	4.8	4.4	4.4								
Degree Utilization, x	0.13	0.07	0.26	0.18								
Capacity (veh/h)	713	683	778	778								
Control Delay (s)	8.3	8.2	9.0	8.3								
Approach Delay (s)	8.3	8.2	9.0	8.3								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.6									
Level of Service			A									
Intersection Capacity Utilization			37.5%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 14: Quaker Village Drive & Bolton Drive

12-10-2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	64	16	38	64	33	47
Future Volume (vph)	64	16	38	64	33	47
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	74	19	44	74	38	55










Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	93	118	93
Volume Left (vph)	0	44	38
Volume Right (vph)	19	0	55
Hadj (s)	-0.12	0.07	-0.27
Departure Headway (s)	4.1	4.3	4.1
Degree Utilization, x	0.11	0.14	0.11
Capacity (veh/h)	850	820	833
Control Delay (s)	7.6	8.0	7.6
Approach Delay (s)	7.6	8.0	7.6
Approach LOS	A	A	A

Intersection Summary		
Delay		7.7
Level of Service		A
Intersection Capacity Utilization	24.8%	ICU Level of Service
Analysis Period (min)		15

HCM Unsignalized Intersection Capacity Analysis

16: Centre Road & Oakside Drive

12-10-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	52	5	102	62	6	81
Future Volume (Veh/h)	52	5	102	62	6	81
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	55	5	109	66	6	86
Pedestrians	19					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	259	161			194	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	259	161			194	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	99			100	
cM capacity (veh/h)	720	876			1370	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	60	175	92			
Volume Left	55	0	6			
Volume Right	5	66	0			
cSH	731	1700	1370			
Volume to Capacity	0.08	0.10	0.00			
Queue Length 95th (m)	2.1	0.0	0.1			
Control Delay (s)	10.4	0.0	0.5			
Lane LOS	B		A			
Approach Delay (s)	10.4	0.0	0.5			
Approach LOS	B					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			21.5%	ICU Level of Service		A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

18: Centre Road & Maplebrook Drive Extension

12-10-2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	18	5	73	29	9	63
Future Volume (Veh/h)	18	5	73	29	9	63
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	19	5	78	31	10	67
Pedestrians	19					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	200	112			128	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	200	112			128	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			99	
cM capacity (veh/h)	776	931			1448	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	24	109	77			
Volume Left	19	0	10			
Volume Right	5	31	0			
cSH	804	1700	1448			
Volume to Capacity	0.03	0.06	0.01			
Queue Length 95th (m)	0.7	0.0	0.2			
Control Delay (s)	9.6	0.0	1.0			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	1.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			20.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Appendix E

2016 Transportation Tomorrow Survey (TTS)

Data Analysis

Mode of Transportation - AM Peak Period

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of household - gta06_hhld

Filters:

Primary travel mode of trip - mode_prime In B

and

2006 GTA zone of household - gta06_hhld In 1313

and

Start time of trip - start_time In 600-900

Trip 2016

Table:

Mode of Transportation/Traffic Zones	1313	1316	1317	1318	Total	Percentage
Transit excluding GO rail	10	0	26	21	57	1%
Cycle	0	0	0	23	23	0%
Auto driver	593	459	2160	1325	4537	68%
GO rail only	0	0	162	56	218	3%
Joint GO rail and local transit	0	0	13	0	13	0%
Auto passenger	88	0	335	318	741	11%
Walk	0	27	612	402	1041	16%
Total	691	486	3308	2145	6630	100%

Mode of Transportation - PM Peak Period

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of household - gta06_hhld

Filters:

Primary travel mode of trip - mode_prime In B C D G J M P T U W
 and
 2006 GTA zone of household - gta06_hhld In 1313 1316 1317 1318
 and
 Start time of trip - start_time In 1600-1900

Trip 2016

Table:

Mode of Transportation/Traffic Zones	1313	1316	1317	1318	Total	Percentage
Transit excluding GO rail	0	0	0	57	57	1%
Cycle	0	0	48	23	71	1%
Auto driver	852	652	1815	2063	5382	74%
GO rail only	0	0	96	56	152	2%
Joint GO rail and local transit	10	0	13	0	23	0%
Motorcycle	0	0	0	146	146	2%
Auto passenger	226	11	337	542	1116	15%
Taxi passenger	0	0	0	17	17	0%
Walk	0	0	186	94	280	4%
Total	1088	663	2495	2998	7244	100%

Auto Distribution

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
 Column: Planning district of destination - pd_dest

Filters:

Primary travel mode of trip - mode_prime In D
 and
 2006 GTA zone of origin - gta06_orig In 1313
 and
 Start time of trip - start_time In 600-900

Trip 2016
 Table:

	PD 1 of Tor	PD 5 of Tor	PD 6 of Tor	PD 9 of Tor	PD 12 of Tor	PD 13 of Tor	PD 14 of Tor	PD 15 of Tor	PD 16 of Tor	Brock	Uxbridge	Scugog	Pickering	Ajax	Whitby	Oshawa	Clarington	Georgina	East Gwillim	Newmarke	Aurora	Richmond	Whitchurc	Markham	Vaughan	Mississaug	St. Cathari	Peterboro	Hastings	Brantford	External	
1313	33	0	0	0	0	0	0	0	7	0	253	0	0	0	46	0	0	0	0	103	0	11	17	67	0	0	0	0	25	0	0	
1316	0	0	0	0	0	0	0	0	0	0	193	0	0	0	47	0	0	0	0	0	0	0	11	0	0	73	0	0	0	0	0	
1317	80	0	0	14	0	0	0	20	78	0	914	82	107	0	49	113	0	109	0	137	86	75	212	344	44	0	32	0	0	14	63	
1318	43	78	13	0	18	26	26	0	119	59	744	90	0	44	213	27	21	0	9	10	12	9	197	153	90	0	0	10	13	0	0	
	156	78	13	14	18	26	26	20	204	59	2104	172	107	44	355	140	21	109	9	250	98	95	437	564	134	73	32	10	38	14	63	5483
	3%	1%	0%	0%	0%	1%	1%	0%	4%	1%	38%	3%	2%	1%	7%	3%	0%	2%	0%	5%	2%	2%	8%	10%	2%	1%	1%	0%	1%	0%	1%	100%

Uxbridge	38%
Durham	17%
York	31%
Peel	1%
Toronto	10%
Others	3%
	100%

Transit Distribution

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig

Column: Planning district of destination - pd_dest

Filters:

Primary travel mode of trip - mode_prime In G	C	G	J	W
and				
2006 GTA zone of origin - gta06_orig In 1313		1316	1317	1318
and				
Start time of trip - start_time In 600-900				

Trip 2016

Table:

	PD 1 of Toronto	Uxbridge	
1316	0	14	
1318	56	443	
	56	457	513
	11%	89%	

Appendix F

Future Total Level of Service Calculations

HCM 2010 Roundabout
 3: Concession 6 & Regional Road 8/Brock Street W

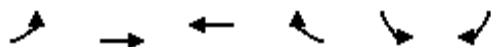
12-10-2020

Intersection				
Intersection Delay, s/veh	9.1			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	240	417	179	311
Demand Flow Rate, veh/h	263	424	182	320
Vehicles Circulating, veh/h	381	143	257	423
Vehicles Exiting, veh/h	362	296	387	144
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.4	8.7	6.3	10.9
Approach LOS	A	A	A	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	263	424	182	320
Cap Entry Lane, veh/h	772	979	874	740
Entry HV Adj Factor	0.914	0.984	0.983	0.972
Flow Entry, veh/h	240	417	179	311
Cap Entry, veh/h	705	964	859	720
V/C Ratio	0.341	0.433	0.208	0.432
Control Delay, s/veh	9.4	8.7	6.3	10.9
LOS	A	A	A	B
95th %tile Queue, veh	2	2	1	2

HCM Unsignalized Intersection Capacity Analysis

7: Brock Street W & Centre Road

12-10-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	393	423	34	84	131
Future Volume (Veh/h)	31	393	423	34	84	131
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	33	423	455	37	90	141
Pedestrians					13	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	505				976	486
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	505				976	486
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				67	76
cM capacity (veh/h)	1059				269	579
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	33	423	492	231		
Volume Left	33	0	0	90		
Volume Right	0	0	37	141		
cSH	1059	1700	1700	400		
Volume to Capacity	0.03	0.25	0.29	0.58		
Queue Length 95th (m)	0.8	0.0	0.0	28.1		
Control Delay (s)	8.5	0.0	0.0	25.6		
Lane LOS	A			D		
Approach Delay (s)	0.6		0.0	25.6		
Approach LOS				D		
Intersection Summary						
Average Delay			5.3			
Intersection Capacity Utilization			45.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Concession 6 & Bolton Drive

















12-10-2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	49	16	110	19	17	235
Future Volume (Veh/h)	49	16	110	19	17	235
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	55	18	124	21	19	264
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	436	134			145	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	436	134			145	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	98			99	
cM capacity (veh/h)	568	920			1450	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	73	145	283			
Volume Left	55	0	19			
Volume Right	18	21	0			
cSH	627	1700	1450			
Volume to Capacity	0.12	0.09	0.01			
Queue Length 95th (m)	3.1	0.0	0.3			
Control Delay (s)	11.5	0.0	0.6			
Lane LOS	B		A			
Approach Delay (s)	11.5	0.0	0.6			
Approach LOS	B					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			33.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 12: Centre Road & Bolton Drive/North Street

12-10-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	30	35	56	14	16	4	16	43	6	6	104	50
Future Volume (vph)	30	35	56	14	16	4	16	43	6	6	104	50
Peak Hour Factor	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Hourly flow rate (vph)	51	59	95	24	27	7	27	73	10	10	176	85
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	205	58	110	271								
Volume Left (vph)	51	24	27	10								
Volume Right (vph)	95	7	10	85								
Hadj (s)	-0.12	0.12	-0.01	-0.04								
Departure Headway (s)	4.8	5.2	4.9	4.7								
Degree Utilization, x	0.27	0.08	0.15	0.35								
Capacity (veh/h)	696	618	679	727								
Control Delay (s)	9.6	8.7	8.8	10.2								
Approach Delay (s)	9.6	8.7	8.8	10.2								
Approach LOS	A	A	A	B								
Intersection Summary												
Delay			9.6									
Level of Service			A									
Intersection Capacity Utilization			24.9%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

14: Quaker Village Drive & Bolton Drive

12-10-2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	→
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	43	38	54	26	57	92
Future Volume (vph)	43	38	54	26	57	92
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	59	52	74	36	78	126










Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	111	110	204
Volume Left (vph)	0	74	78
Volume Right (vph)	52	0	126
Hadj (s)	-0.11	0.25	-0.21
Departure Headway (s)	4.4	4.7	4.2
Degree Utilization, x	0.14	0.14	0.24
Capacity (veh/h)	779	716	814
Control Delay (s)	8.1	8.5	8.5
Approach Delay (s)	8.1	8.5	8.5
Approach LOS	A	A	A

Intersection Summary			
Delay		8.4	
Level of Service		A	
Intersection Capacity Utilization	27.5%		ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis

16: Centre Road & Oakside Drive

















12-10-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	61	2	50	42	4	87
Future Volume (Veh/h)	61	2	50	42	4	87
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	79	3	65	55	5	113
Pedestrians	9					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	224	102			129	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	224	102			129	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	100			100	
cM capacity (veh/h)	751	952			1458	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	82	120	118			
Volume Left	79	0	5			
Volume Right	3	55	0			
cSH	757	1700	1458			
Volume to Capacity	0.11	0.07	0.00			
Queue Length 95th (m)	2.9	0.0	0.1			
Control Delay (s)	10.3	0.0	0.3			
Lane LOS	B		A			
Approach Delay (s)	10.3	0.0	0.3			
Approach LOS	B					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			18.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

18: Centre Road & Site Intersection #3/Maplebrook Drive Extension

12-10-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	37	34	25	11	8	12	30	8	3	28	7
Future Volume (Veh/h)	22	37	34	25	11	8	12	30	8	3	28	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	29	48	44	32	14	10	16	39	10	4	36	9
Pedestrians		10			9							
Lane Width (m)		3.5			3.5							
Walking Speed (m/s)		1.2			1.2							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	152	148	50	202	148	53	55			58		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	152	148	50	202	148	53	55			58		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	93	96	95	98	99	99			100		
cM capacity (veh/h)	777	726	1015	664	726	1013	1550			1548		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	121	56	65	49								
Volume Left	29	32	16	4								
Volume Right	44	10	10	9								
cSH	824	724	1550	1548								
Volume to Capacity	0.15	0.08	0.01	0.00								
Queue Length 95th (m)	4.1	2.0	0.3	0.1								
Control Delay (s)	10.1	10.4	1.9	0.6								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.1	10.4	1.9	0.6								
Approach LOS	B	B										
Intersection Summary												
Average Delay			6.7									
Intersection Capacity Utilization			19.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

21: Concession 6 & Site Intersection #2

12-10-2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	82	52	98	28	8	170
Future Volume (Veh/h)	82	52	98	28	8	170
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	92	58	110	31	9	191
Pedestrians	10					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	344	136			151	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	344	136			151	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	86	94			99	
cM capacity (veh/h)	641	911			1431	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	150	141	200			
Volume Left	92	0	9			
Volume Right	58	31	0			
cSH	724	1700	1431			
Volume to Capacity	0.21	0.08	0.01			
Queue Length 95th (m)	6.2	0.0	0.2			
Control Delay (s)	11.3	0.0	0.4			
Lane LOS	B		A			
Approach Delay (s)	11.3	0.0	0.4			
Approach LOS	B					
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			29.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

23: Concession 6 & Site Intersection #1

12-10-2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	56	16	80	18	5	122
Future Volume (Veh/h)	56	16	80	18	5	122
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	63	18	90	20	6	137
Pedestrians	10					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	259	110			120	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	259	110			120	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	98			100	
cM capacity (veh/h)	719	941			1468	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	81	110	143			
Volume Left	63	0	6			
Volume Right	18	20	0			
cSH	759	1700	1468			
Volume to Capacity	0.11	0.06	0.00			
Queue Length 95th (m)	2.9	0.0	0.1			
Control Delay (s)	10.3	0.0	0.3			
Lane LOS	B		A			
Approach Delay (s)	10.3	0.0	0.3			
Approach LOS	B					
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			21.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM 2010 Roundabout
 3: Concession 6 & Regional Road 8/Brock Street W

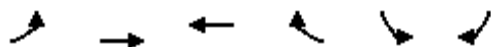
12-10-2020

Intersection				
Intersection Delay, s/veh	27.0			
Intersection LOS	D			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	438	253	701	221
Demand Flow Rate, veh/h	446	260	713	225
Vehicles Circulating, veh/h	231	523	427	273
Vehicles Exiting, veh/h	267	617	250	510
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.6	10.9	49.5	7.1
Approach LOS	B	B	E	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	446	260	713	225
Cap Entry Lane, veh/h	897	670	737	860
Entry HV Adj Factor	0.982	0.975	0.983	0.984
Flow Entry, veh/h	438	253	701	221
Cap Entry, veh/h	880	653	725	846
V/C Ratio	0.497	0.388	0.967	0.262
Control Delay, s/veh	10.6	10.9	49.5	7.1
LOS	B	B	E	A
95th %tile Queue, veh	3	2	15	1

HCM Unsignalized Intersection Capacity Analysis

7: Brock Street W & Centre Road

12-10-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	89	490	408	71	76	39
Future Volume (Veh/h)	89	490	408	71	76	39
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	96	527	439	76	82	42
Pedestrians					4	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	519				1200	481
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	519				1200	481
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				56	93
cM capacity (veh/h)	1054				187	587
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	96	527	515	124		
Volume Left	96	0	0	82		
Volume Right	0	0	76	42		
cSH	1054	1700	1700	243		
Volume to Capacity	0.09	0.31	0.30	0.51		
Queue Length 95th (m)	2.4	0.0	0.0	21.2		
Control Delay (s)	8.8	0.0	0.0	34.3		
Lane LOS	A			D		
Approach Delay (s)	1.3		0.0	34.3		
Approach LOS				D		
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			47.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Concession 6 & Bolton Drive

















12-10-2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	45	22	422	57	15	172
Future Volume (Veh/h)	45	22	422	57	15	172
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	48	24	454	61	16	185
Pedestrians			1			
Lane Width (m)			3.5			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type			None		None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	702	484			515	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	702	484			515	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	88	96			98	
cM capacity (veh/h)	396	587			1061	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	72	515	201			
Volume Left	48	0	16			
Volume Right	24	61	0			
cSH	444	1700	1061			
Volume to Capacity	0.16	0.30	0.02			
Queue Length 95th (m)	4.6	0.0	0.4			
Control Delay (s)	14.7	0.0	0.8			
Lane LOS	B		A			
Approach Delay (s)	14.7	0.0	0.8			
Approach LOS	B					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			36.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 12: Centre Road & Bolton Drive/North Street

12-10-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	47	23	34	18	21	16	44	142	22	17	96	42
Future Volume (vph)	47	23	34	18	21	16	44	142	22	17	96	42
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	52	26	38	20	23	18	49	158	24	19	107	47
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	116	61	231	173								
Volume Left (vph)	52	20	49	19								
Volume Right (vph)	38	18	24	47								
Hadj (s)	-0.11	-0.11	0.00	-0.14								
Departure Headway (s)	4.8	4.9	4.6	4.5								
Degree Utilization, x	0.16	0.08	0.29	0.22								
Capacity (veh/h)	683	662	756	758								
Control Delay (s)	8.7	8.3	9.4	8.7								
Approach Delay (s)	8.7	8.3	9.4	8.7								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.0									
Level of Service			A									
Intersection Capacity Utilization			35.2%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

14: Quaker Village Drive & Bolton Drive

12-10-2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	➔			➔	➔	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	64	24	46	64	48	62
Future Volume (vph)	64	24	46	64	48	62
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	74	28	53	74	56	72










Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	102	127	128
Volume Left (vph)	0	53	56
Volume Right (vph)	28	0	72
Hadj (s)	-0.16	0.08	-0.25
Departure Headway (s)	4.2	4.4	4.2
Degree Utilization, x	0.12	0.15	0.15
Capacity (veh/h)	833	786	819
Control Delay (s)	7.7	8.2	7.9
Approach Delay (s)	7.7	8.2	7.9
Approach LOS	A	A	A

Intersection Summary			
Delay		7.9	
Level of Service		A	
Intersection Capacity Utilization	26.8%		ICU Level of Service
Analysis Period (min)		15	A

HCM Unsignalized Intersection Capacity Analysis

16: Centre Road & Oakside Drive

















12-10-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	52	5	138	62	6	107
Future Volume (Veh/h)	52	5	138	62	6	107
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	55	5	147	66	6	114
Pedestrians	19					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	325	199			232	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	325	199			232	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	99			100	
cM capacity (veh/h)	660	834			1327	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	60	213	120			
Volume Left	55	0	6			
Volume Right	5	66	0			
cSH	671	1700	1327			
Volume to Capacity	0.09	0.13	0.00			
Queue Length 95th (m)	2.3	0.0	0.1			
Control Delay (s)	10.9	0.0	0.4			
Lane LOS	B		A			
Approach Delay (s)	10.9	0.0	0.4			
Approach LOS	B					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			22.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

18: Centre Road & Site Intersection #3/Maplebrook Drive Extension

12-10-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	20	26	18	40	5	36	73	29	9	63	28
Future Volume (Veh/h)	15	20	26	18	40	5	36	73	29	9	63	28
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	16	21	28	19	43	5	38	78	31	10	67	30
Pedestrians		10			19							
Lane Width (m)		3.5			3.5							
Walking Speed (m/s)		1.2			1.2							
Percent Blockage		1			2							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	308	316	92	329	316	112	107			128		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	308	316	92	329	316	112	107			128		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	96	97	97	92	99	97			99		
cM capacity (veh/h)	578	570	963	559	570	931	1484			1448		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	65	67	147	107								
Volume Left	16	19	38	10								
Volume Right	28	5	31	30								
cSH	694	584	1484	1448								
Volume to Capacity	0.09	0.11	0.03	0.01								
Queue Length 95th (m)	2.5	3.1	0.6	0.2								
Control Delay (s)	10.7	12.0	2.1	0.8								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.7	12.0	2.1	0.8								
Approach LOS	B	B										
Intersection Summary												
Average Delay			4.9									
Intersection Capacity Utilization			26.1%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

21: Concession 6 & Site Intersection #2

12-10-2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	52	16	354	90	27	135
Future Volume (Veh/h)	52	16	354	90	27	135
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	56	17	381	97	29	145
Pedestrians	10					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	642	440			488	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	642	440			488	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	97			97	
cM capacity (veh/h)	423	617			1077	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	73	478	174			
Volume Left	56	0	29			
Volume Right	17	97	0			
cSH	456	1700	1077			
Volume to Capacity	0.16	0.28	0.03			
Queue Length 95th (m)	4.5	0.0	0.7			
Control Delay (s)	14.4	0.0	1.6			
Lane LOS	B		A			
Approach Delay (s)	14.4	0.0	1.6			
Approach LOS	B					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			40.7%	ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

23: Concession 6 & Site Intersection #1

12-10-2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	35	11	294	60	18	127
Future Volume (Veh/h)	35	11	294	60	18	127
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	38	12	316	65	19	137
Pedestrians	10					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	534	358			391	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	534	358			391	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	98			98	
cM capacity (veh/h)	495	685			1169	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	50	381	156			
Volume Left	38	0	19			
Volume Right	12	65	0			
cSH	530	1700	1169			
Volume to Capacity	0.09	0.22	0.02			
Queue Length 95th (m)	2.5	0.0	0.4			
Control Delay (s)	12.5	0.0	1.1			
Lane LOS	B		A			
Approach Delay (s)	12.5	0.0	1.1			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			31.9%		ICU Level of Service	A
Analysis Period (min)			15			

Appendix G

Signal Warrant Analysis

Signal Warrant Calculation (OTM Book 12 - Justification 7)

Major Street: Brock Street W

Minor Street: Centre Road

Comment: Future Total (2028) Traffic Condition

Number of Approaches: 1 2

Tee Intersection Configuration: Yes No

Flow Condition: Free Fv (Rural)
Restricted Flow (Urban)

VOLUME	AM	PM	FACTOR *	
1A - All	1,096	1,173	n/a	568
1B - Minor	215	115	25%	83
2A - Major	881	1,058	25%	485
2B - Cross	100	121	25%	55

* This factor relates average of the "peak eight hours" to the average of the "am and pm peak hours"

OVERALL WARRANT	150% Satisfied:	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Warrant for new intersection with forecast traffic
	120% Satisfied:	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Warrant for existing intersection with forecast traffic
	100% Satisfied:	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Warrant for existing intersection with existing traffic *
	COMBO 80% Satisfied:	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Warrant for existing intersection with existing traffic
	80% Satisfied:	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	

* Consider full underground provisions if 100% for forecast traffic

WARRANT 1 - MINIMUM VEHICULAR VOLUME

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
FLOW CONDITION					X
ALL APPROACHES	480	720	600	900	568
	% FULFILLED				63%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
MINOR STREET APPROACHES	180	255	180	255	83
	% FULFILLED				33%

150% Satisfied: Yes No

120% Satisfied: Yes No

100% Satisfied: Yes No

80% Satisfied: Yes No

WARRANT 2 - DELAY TO CROSS TRAFFIC

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
FLOW CONDITION					X
MAJOR STREET APPROACHES	480	720	600	900	485
	% FULFILLED				54%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
TRAFFIC CROSSING MAJOR STREET	50	75	120	170	55
	% FULFILLED				32%

150% Satisfied: Yes No

120% Satisfied: Yes No

100% Satisfied: Yes No

80% Satisfied: Yes No

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day

1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets

2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day

2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street; comprising: (1) lefts from both minor streets, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a) left turn volume >120 and (b) left turn volume plus opposing volume > 720, (4) pedestrians crossing the major street.