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Addendum – Transportation Impact and TDM Option Study

ROXBOROUGH PARK RESIDENTIAL DEVELOPMENT FOR BLOCK 6

20 Reid Avenue N, 11, 17 and 41
Reid Avenue S, 22-116 Lang Street
City of Hamilton, Ontario

February 2022
Project No: NT-17-042

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NextEng Consulting Group Inc.

February 22, 2022

Messrs. Sergio Manchia, Dominic Carnicelli and David Horwood

Roxborough Park Inc.
3 Studebaker Place, Unit 1
Hamilton, ON L8L 0C8

Re: Addendum - Transportation Impact and TDM Option Study
Roxborough Park Residential Development – Block 6
Reid Avenue S, City of Hamilton, Ontario
Our Project No. NT-17-042

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) is pleased to present the enclosed Addendum for a Transportation Impact and TDM Study for the proposed Block 6 of the Roxborough Park Residential Development project in support of Official Plan and Zoning By-law Amendment applications.

The subject lands are located at 20 Reid Avenue N, 11, 17 and 41 Reid Avenue S, 22-116 Lang Street, in the City of Hamilton. The proposed development in bounded by Reid Street North and South to the west, Queenston Road to the south, Ayr Avenue to the north and Bingham Road to the east. The proposed Roxborough Park Development Block 1 to 5, 7 and Community Housing Hamilton building have been approved, with the proposed Block 6 considered herein will consist of a total 597 residential dwelling units in two high-rise buildings, Building A with 18-storey and Building B with 16-storey. This proposed final phase of the project will help addressing some of the ongoing the housing shortage and affordability crisis in the City of Hamilton.

Nextrans has completed the original Transportation Impact and TDM Option Study dated December, 2017, a Response Letter in April 2, 2018, an Addendum in June, 2018 and various correspondence to support the clearance of the proposed draft plan of subdivision conditions. The purpose of this Addendum Study is to support the proposed final phase of the project.

The Addendum for this Transportation Impact and TDM Study concludes that the proposed development can adequately be accommodated by the existing transportation network, existing Hamilton Transit services, as well as the Transportation Demand Management measures and incentives recommended in this report. No improvements to the existing road network and transit network are required to accommodate the proposed development.

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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Issues and Revisions Registry

Identification	Date	Description of issued and/or revision
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EXECUTIVE SUMMARY

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retailed by Roxborough Park Inc. (the Client) to undertake an Addendum for the Transportation Impact and TDM Study in support of Official Plan and Zoning By-law Amendment applications for Block 6 of the proposed Roxborough Park Development.

The subject lands are located at 20 Reid Avenue N, 11, 17 and 41 Reid Avenue S, 22-116 Lang Street, in the City of Hamilton. The proposed development in bounded by Reid Street North and South to the west, Queenston Road to the south, Ayr Avenue to the north and Bingham Road to the east.

It is Nextrans' understanding that the City of Hamilton Council adopted By-law No. 18-202 on July 13, 2018, which implemented Urban Hamilton Official Plan Amendment No. 108 and added Site Specific Policy UHN-25 to the Roxborough Park development lands. The site-specific Policy UHN-25 permits a maximum net residential density of 165 units per hectare for the entire Roxborough Park development area which includes Blocks 1-7 on Draft Plan of Subdivision 25T-201802 and the property known as 41 Reid Avenue South. The proposed final phase of the development, which is Block 6 of Draft Plan of Subdivision 25T-201802, consists of a total 597 units and will result in the total density within the Roxborough Park development area exceeding 165 units per hectare. For this reason, an Urban Hamilton Official Plan Amendment is required and this Addendum Study is prepared to support the Official Plan and Zoning By-law Amendment.

Proposed Final Phase (Block 6) of the Roxborough Park Residential Development

The proposed Roxborough Park Development/City Housing Hamilton consists of the following:

- Block 1 – 19 block townhouse units (approved)
- Block 2 – 38 block townhouse units (approved)
- Block 3 – 19 block townhouse units (approved)
- Block 4 – 88 back-to-back townhouse units (approved)
- Block 5 – 74 back-to-back townhouse units (approved)
- Block 7 – 352 multiple dwelling units (approved)
- Former Block 7 (City Housing Hamilton Building) – 103 multiple dwelling units (approved)
- Block 6 – 597 multiple dwelling units (subject development to be assessed in this Addendum Study)

For the purposes of this assessment, it is assumed that Block 6 of the proposed Roxborough Park Development will be fully built-out by 2024. A five-year horizon (2029) has been carried out for the study analysis. All other units will be considered as background development in order to identify the incremental impacts of Block 6.

Nextrans has completed the original Transportation Impact and TDM Option Study dated December, 2017, a Response Letter in April 2, 2018, an Addendum in June, 2018 and various correspondence to support the clearance of the proposed draft plan of subdivision conditions. To be consistent with previous studies, similar methodologies and assumptions will be utilized in this Addendum Study.

Proposed Development Access

The main development access is provided via a private condominium road that connects to Roxanne Drive (Street A) and Hayes Avenue. The internal condominium road has been approved as part of Block 5 approval. Roxanne Drive (Street A) is an east-west to north-south road connecting Reid Avenue S and Bingham Road, which will be constructed as part of this proposed development. Roxanne Drive will also facilitate development accesses from various blocks.

To be conservative, the majority of the site traffic has been assigned to Roxanne Drive in order to assess any potential impact and road improvements, especially the assessment for a potential exclusive southbound left turn at the Reid Avenue S/Roxanne Drive intersection.

The analysis indicates that under the future total traffic conditions, the Reid Avenue S/Roxanne Drive intersection is expected to operate at acceptable levels of service under the morning and afternoon peak periods. The proposed lane configuration includes: one inbound and one outbound lane for Roxanne Drive, northbound shared through/right and southbound shared through/left on Reid Avenue S. No exclusive left or right turn lanes are required based on this intersection operational capacity and left turn warrant analysis.

Similarly, Nextrans' review the potential traffic volumes and context of Hayes Avenue as part of this assessment and previous assessment indicates that the proposed condominium road at Hayes Avenue intersection is expected to operate at acceptable levels of service with the following lane configurations: one inbound lane, one outbound lane, shared eastbound through/right and one shared westbound through/left on Hayes Avenue.

Capacity Analysis

Based on the site trip generation analysis noted above, the proposed development is expected to generate 180 total two-way trips (43 inbound and 137 outbound) and 212 total two-way trips (129 inbound and 83 outbound) during the morning and afternoon peak hours, respectively.

Auto Mode Assessment

The analysis indicates that under the existing and future background traffic conditions, similar to the existing and future background conditions, all signalized intersections are expected to continue to operate at acceptable levels of service during the morning and afternoon peak periods. This is consistent with the previous assessment that was submitted to the City of Hamilton.

The analysis indicates that under the future total traffic conditions, similar to the existing and future background conditions, all signalized intersections are expected to continue to operate at acceptable levels of service during the morning and afternoon peak periods, with the exception of the eastbound left turn at the Queenston Road/Reid Avenue S intersection during the afternoon peak hour. This is due to the fact that this movement currently does not have an advance left turn phase. Given that this is a busy intersection located adjacent to the Red Hill Valley Parkway interchange, this is a typical condition for any major intersection and therefore it is Nextrans' opinion that it is acceptable and no physical improvements are required.

Nextrans has provided a potential mitigation measure such as the traffic signal timing optimization for this intersection during the afternoon peak hour. The analysis indicates that with only additional 10 s green time to be added to the east-west movement, the intersection is expected to operate at acceptable levels of service. The potential signal timing plan is included in the analysis for the City's consideration.

It is Nextrans' opinion that signal timing plan optimization is the most responsible way to address intersection capacity need while saving tax payer monies because this provision is fast and cost-effective. Physical improvements are not only unnecessary but also expensive to build and maintain, especially with the construction costs having increased two folds during the COVID-19 pandemic. It is strongly encouraged for the City of Hamilton to consider the signal timing optimization as suggested in this Addendum Study.

Auto Mode Queuing Assessment

Based on the queuing assessment conducted using SimTraffic microsimulation, it is Nextrans' opinion that the 95th queue length at the proposed Reid Avenue S/Roxanne Drive intersection is sufficient to accommodate the expected queues for the 2029 horizon year. No turning lanes are required on Reid Avenue S and Roxanne Drive as indicated in the intersection capacity analysis, left turn warrant analysis and queuing analysis.

Active Transportation Mode Assessment

Walking

The area is currently well served by a complete network of sidewalks as sidewalks are available on both sides of Queenston Road, Reid Avenue S, Main Street E, among other public streets in the area. The sidewalks are generally in good condition and reasonably maintained on the public streets. It is Nextrans' opinion that no improvements are required for the sidewalk network under the existing conditions on the public streets.

It is Nextrans' understanding that the proposed development will provide direct shared pedestrian and cycling connections from the proposed development to Reid Avenue S, Street A, Ayr Avenue and interconnections with surrounding developments. In addition, sidewalks will be provided for all internal streets, along the frontage of the proposed building blocks, to accommodate pedestrians and encourage residents to take active mode of transportation.

Cycling

Under the existing conditions, there are some bicycle facilities available in the area such as the existing Red Hill Valley Trail located to the east of the proposed development and along the western edge of the Red Hill Valley Parkway. However, there are no on-street bicycle facilities available in the immediate area. It is our opinion that the bicycle network could be improved in the future in coordination with the City's capital projects, reconstruction or resurfacing projects especially along Reid Avenue S/Roxborough Avenue, Queenston Road and Parkdale Avenue South. Better bicycle network will help increase cycling trips in the area and reduce the numbers of single-occupant-vehicle trips to and from the area. It is Nextrans' understanding that the proposed development will provide direct shared pedestrian and cycling connections from the proposed development to Reid Avenue S, Street A and interconnections with surrounding developments. In addition, the proposed development will also meet or exceed the bicycle parking requirements as per the applicable Zoning By-law.

Transit Mode Assessment

The analysis indicates that the transit passenger demands generated by the proposed development per transit vehicle is low (at most five passenger per transit vehicle). Therefore, the proposed development impact on transit service is negligible and no improvements are required. In reality, some passengers could be bunched together during the peak 15 minutes, instead of spreading during the entire peak hour. Even if this is the case, our estimates indicate that the demand per vehicle is low and can be accommodated without the need for additional transit vehicles or improvements during both the morning and afternoon peak periods.

Potential Traffic Calming Measures

The traffic calming measures were provided in a separate letter, dated September 2, 2020 and approved by the City of Hamilton. Therefore, no further actions are required as part of this Addendum Study.

Vehicle Parking Review

Based on the applicable Zoning By-law, the proposed development is required to provide a total of 627 parking spaces, inclusive of resident, visitor and barrier free parking spaces. The proposed development will provide a total of 568 vehicle parking spaces or 9% reduction based on the recommendations and comprehensive justifications provided in this Addendum Study. This is equivalent to a recommended residential parking rate of 0.7 spaces/unit. It is Nextrans' opinion that this recommended rate is reasonable for the context of the proposed development.

Bicycle Parking Review

Based on the Zoning By-law No. 05-200, the proposed development should consider providing a total of 304 bicycle parking spaces, which include 5 short-term and 299 long-term spaces. The proposed development will meet these requirements to support vehicle parking reduction and Transportation Demand Management.

Transportation Demand Management Measures and Incentives

The Report identifies and recommends appropriate Transportation Demand Management measures and incentives to support active transportation and transit, to meet the objectives and requirements in the City of Hamilton's TDM for Development Report (June, 2015).

Loading Requirement

The proposed development will provide one loading space for each building with the dimensions of: 3 m in width, 10 m in length and no vertical restriction. AutoTURN software will used to generate the vehicle turning templates to demonstrate the turning movements of the servicing vehicles in and out of the proposed loading spaces. The turning movement templates can be provided at the site plan stage.

Study Conclusions and Recommendations

Based on the Study assessment, our report recommends that:

- The proposed development to implement the Transportation Demand Management (TDM) measures and incentives identified in Section 9 of this report to support active transportation and public transit, to meet the objectives and requirements by the City of Hamilton's TDM for Development (June, 2015);

- The proposed development provides the following lane configuration for Reid Avenue S/Roxanne Drive intersection: one inbound and one outbound lane for Roxanne Drive, northbound shared through/right and southbound shared through/left on Reid Avenue S. No exclusive left or right turn lanes are required based on this intersection operational capacity and left turn warrant analysis.

- The proposed development provides the following lane configuration for Hayes Avenue/Site Access intersection: one inbound lane, one outbound lane, shared eastbound through/right and one shared westbound through/left on Hayes Avenue.

- The City of Hamilton to consider signal timing plan optimization suggested in this Addendum Study for the intersection of Queenston Road/Reid Avenue S during the afternoon peak hour.

- No physical improvements are required to the boundary roadway intersections to accommodate the proposed development and background development traffic.

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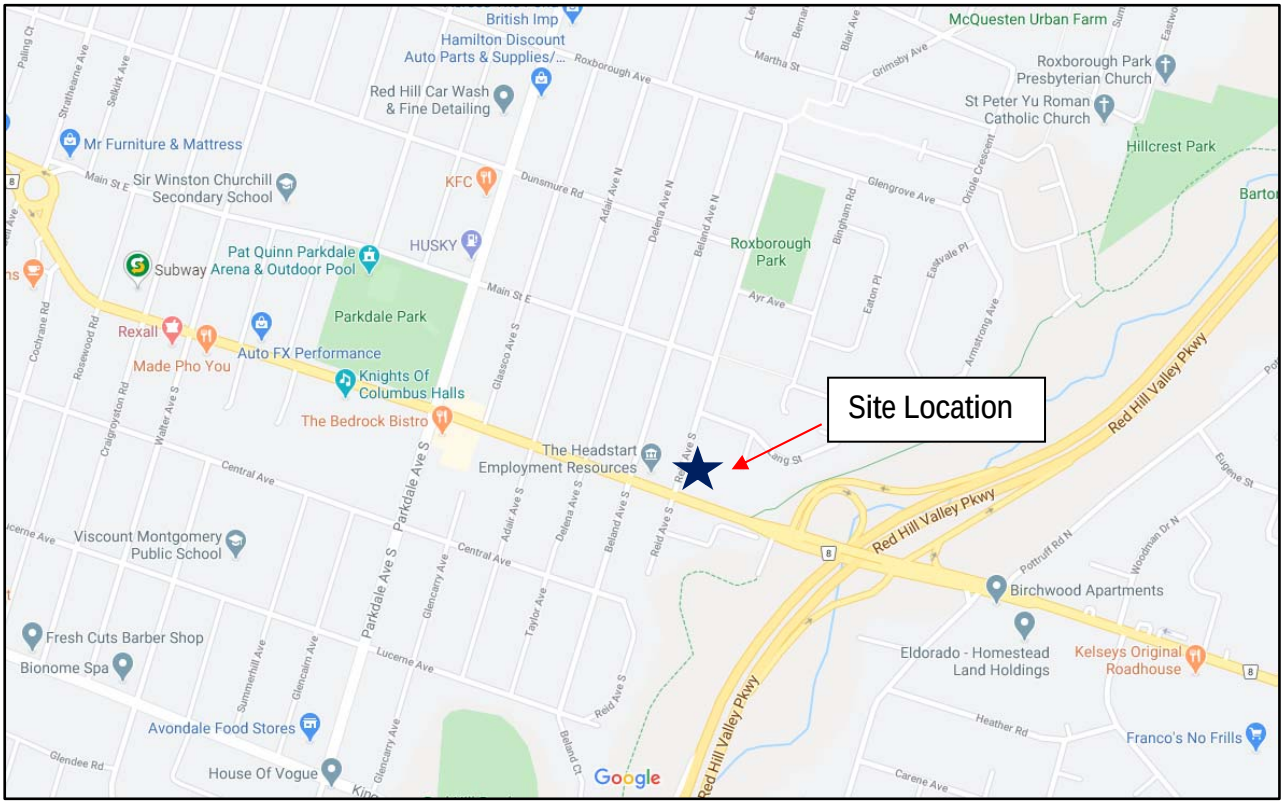
1.0 INTRODUCTION

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retailed by Roxborough Park Inc. (the Client) to undertake an Addendum for the Transportation Impact and TDM Study in support of Official Plan and Zoning By-law Amendment applications for Block 6 of the proposed Roxborough Park Development.

The subject lands are located at 20 Reid Avenue N, 11, 17 and 41 Reid Avenue S, 22-116 Lang Street, in the City of Hamilton. The proposed development in bounded by Reid Street North and South to the west, Queenston Road to the south, Ayr Avenue to the north and Bingham Road to the east.

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

Figure 1 – Proposed Development Location



Source: Google Map

The proposed Roxborough Park Development/City Housing Hamilton consists of the following:

- Block 1 – 19 block townhouse units (approved)
- Block 2 – 38 block townhouse units (approved)
- Block 3 – 19 block townhouse units (approved)
- Block 4 – 88 back-to-back townhouse units (approved)
- Block 5 – 74 back-to-back townhouse units (approved)
- Block 7 – 352 multiple dwelling units (approved)
- Former Block 7 (City Housing Hamilton Building) – 103 multiple dwelling units (approved)
- Block 6 – 597 multiple dwelling units (subject development to be assessed in this Addendum Study)

For the purposes of this assessment, it is assumed that Block 6 of the proposed Roxborough Park Development will be fully built-out by 2024. A five-year horizon (2029) has been carried out for the study analysis. All other units will be considered as background development in order to identify the incremental impacts of Block 6.

Nextrans has completed the original Transportation Impact and TDM Option Study dated December, 2017, a Response Letter in April 2, 2018, an Addendum in June, 2018 and various correspondence to support the clearance of the proposed draft plan of subdivision conditions. To be consistent with previous studies, similar methodologies and assumptions will be utilized in this Addendum Study.

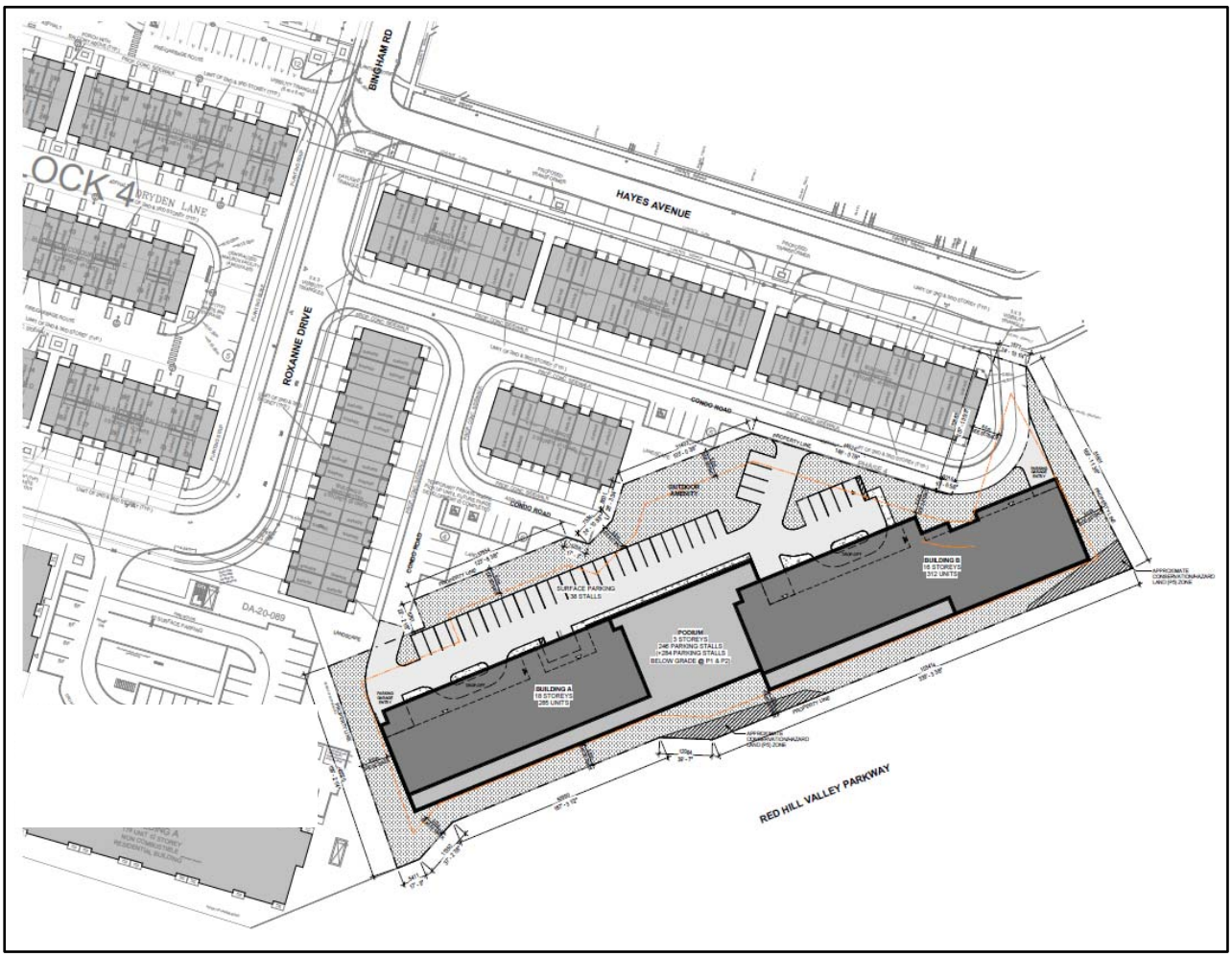
The proposed development provides a total of 568 vehicle parking spaces and 304 bicycle parking spaces, based on the recommendations of this Addendum Study.

The main development access is provided via a private condominium road that connects to Roxanne Drive (Street A) and Hayes Avenue. The internal condominium road has been approved as part of Block 5 approval. Roxanne Drive (Street A) is an east-west to north-south road connecting Reid Avenue S and Bingham Road, which will be constructed as part of this proposed development. Roxanne Drive will also facilitate development accesses from various blocks.

To be conservative, the majority of the site traffic has been assigned to Roxanne Drive in order to assess any potential impact and road improvements, especially the assessment for a potential exclusive southbound left turn at the Reid Avenue S/Roxanne Drive intersection.

Figure 2 illustrates the proposed draft plan of subdivision for high-rise block and the townhouse block, respectively.

Figure 2 – Proposed Block 6 Conceptual Site Plan



Given the current COVID-19 situation, it is not appropriate to undertake updated traffic counts at this time. In fact, traffic counts cannot be conducted until businesses and schools resume to full operations in order to accurately capture the existing operating conditions. For this reason, the existing traffic volume for Ayr Avenue has been estimated based on the through traffic volumes on Reid Avenue N and the number of existing homes located east of Reid Avenue N. Based on Nextrans' review of the area, there approximately 200 existing residential dwelling units. However, Glengrove Avenue provides more direct access to Reid Avenue N/Roxborough Drive than Ayr Avenue. To be conservative and for the purposes of this assessment, half to the existing residential units will be assigned to Ayr Avenue. Institute of Transportation Engineers (ITE) Trip Generation Manual 10th Edition (Appendix B) and 2016 TTS data (Appendix E) have been utilized to estimate the traffic volumes and turning movements for the Reid Avenue N/Ayr Avenue intersection. It is Nextrans' opinion that this approach is reasonable given the pandemic situation. This approach has been applied in Section 2.7 (Existing Traffic Volumes) and Section 2.8 (Existing Traffic Assessment) of this Study.

2.0 EXISTING TRANSPORTATION 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. The description of the existing road network in the study area is summarizes in Table 1 below.

Table 1 – Summary of Existing Road Network

Road Name	Jurisdiction	Number of Lanes	Sidewalk	Speed
Reid Avenue South	City of Hamilton	2	On both sides	40 km/h
Main Street East	City of Hamilton	2	On both sides	40 km/h
Queenston Road	City of Hamilton	4	On both sides	50 km/h
Parkdale Avenue South	City of Hamilton	4	On both sides	50 km/h
Dunsmure Road	City of Hamilton	2	On both sides	40 km/h
Roxborough Avenue	City of Hamilton	2	On both sides	40 km/h
Lang Street	City of Hamilton	2	On both sides	40 km/h
Ayr Avenue	City of Hamilton	2	On both sides	40 km/h
Bingham Road	City of Hamilton	2	On both sides	40 km/h

The road network is generally well laid out in a fine grid system in both the north-south and east-west directions. Main Street East is currently terminated at Reid Avenue N/S. It is our understanding that Lang Street, which is located within the proposed development block, will be closed in the future as per the approved draft plan of subdivision.

2.3. Existing Active Transportation Network

Under the existing conditions, sidewalks are available on both sides of the streets in the study area. There are also some existing trails in the general area. Figure 4 illustrates the existing cycling network in the study area.

2.4. Existing Active Transportation Assessment

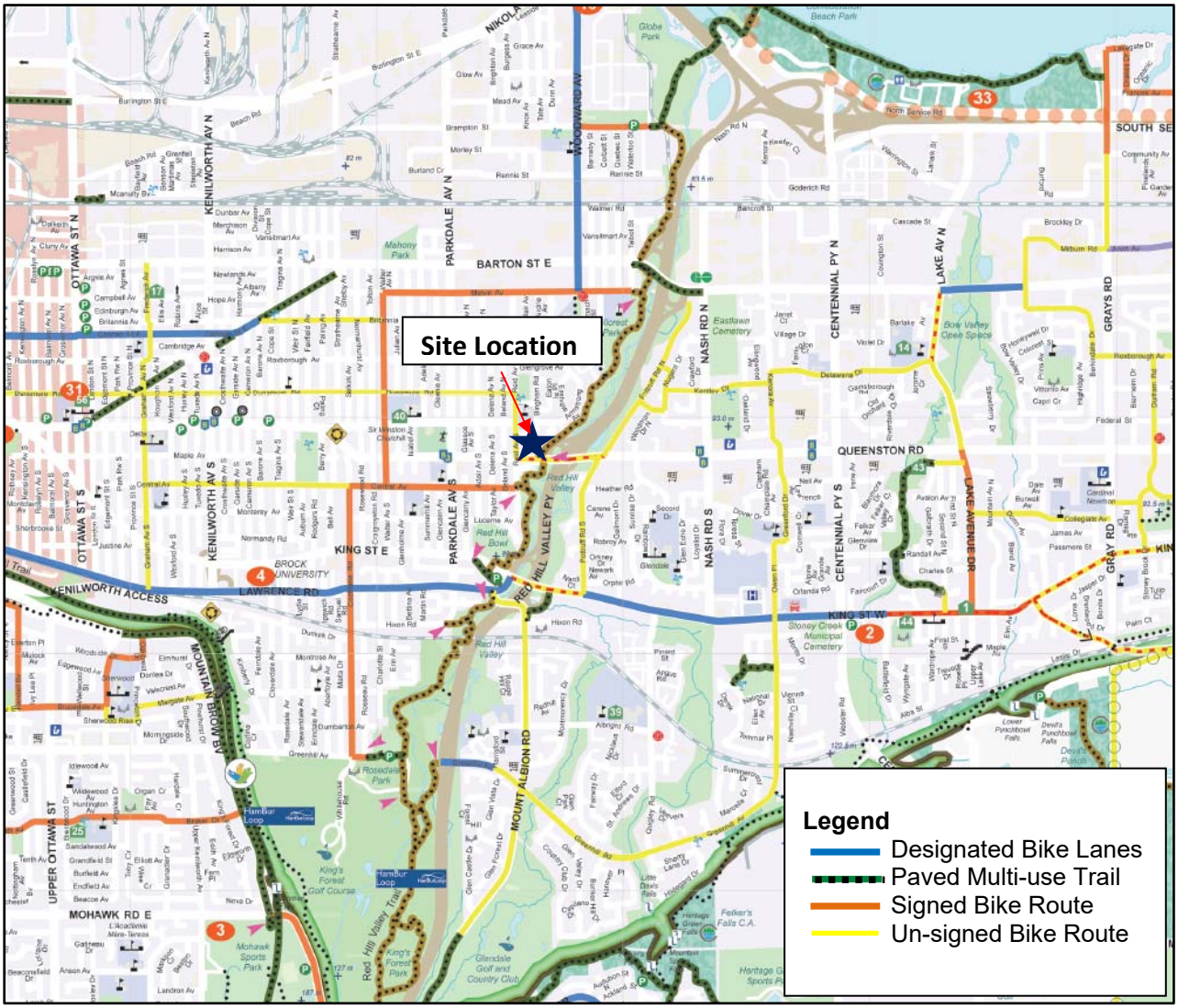
Walking

The area is currently well served by a complete network of sidewalks as sidewalks are available on both sides of Queenston Road, Reid Avenue S, Main Street E, among other public streets in the area. The sidewalks are generally in good condition and reasonably maintained on the public streets. It is Nextrans opinion that no improvements to the existing sidewalk network on public streets at this time.

Cycling

Under the existing conditions, there are some bicycle facilities available in the area such as the existing Red Hill Valley Trail located to the east of the proposed development and along the western edge of the Red Hill Valley Parkway. However, there are no on-street bicycle facilities available in the immediate area. It is Nextrans' opinion that the bicycle network could be improved in the future in coordination with the City's capital projects, reconstruction or resurfacing projects especially along Reid Avenue S/Roxborough Avenue, Queenston Road and Parkdale Avenue South. Better bicycle network will help increase cycling trips in the area and reduce the numbers of single-occupant-vehicle trips to and from the area. As part of this Study, Nextrans will provide an overall review of the proposed development internal and external pedestrian and cycling connections that will accommodate the proposed development and encourage future residents to use alternative modes of transportation rather than driving private vehicles.

Figure 4 – Existing Bicycle Network in the Study Area



Source: Hamilton Cycling Map

2.5. Existing Transit Service

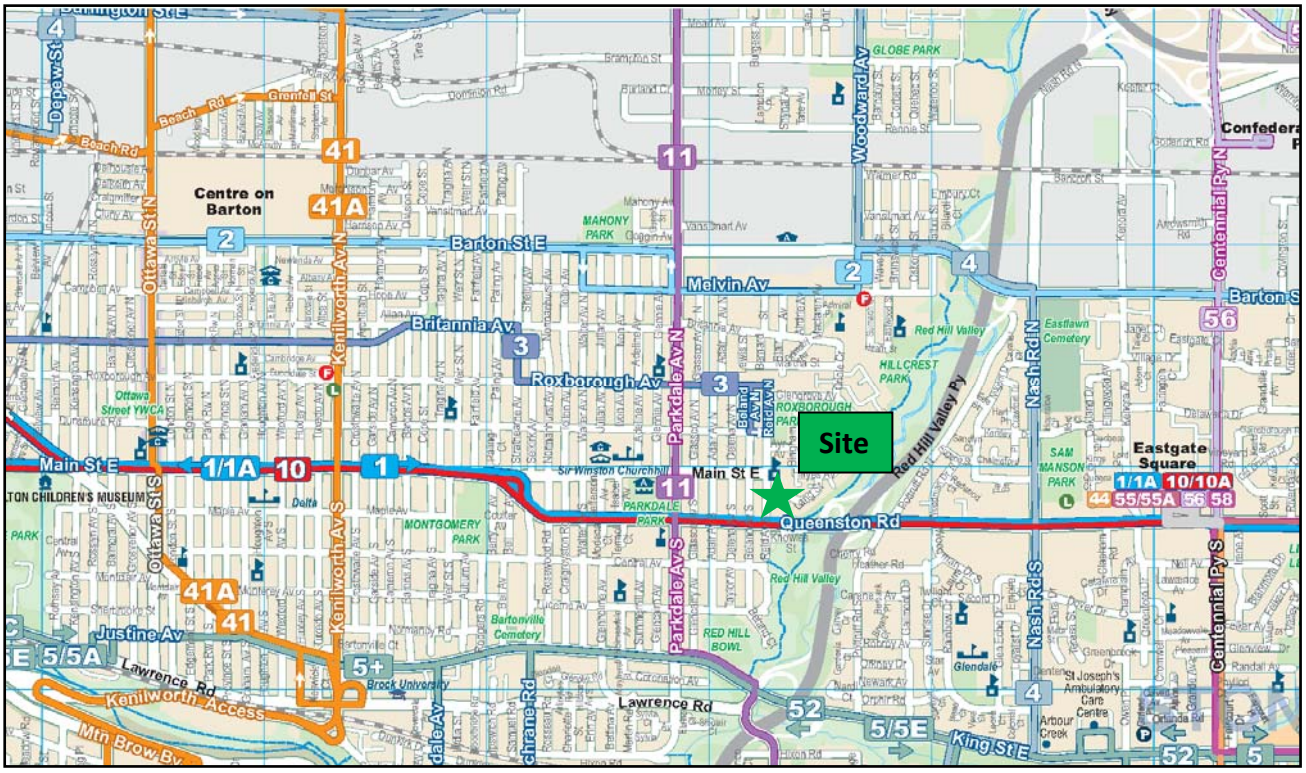
Figure 5 illustrates the existing HSR Transit Bus Routes in the study area. The area is currently served by four HSR Transit Bus Routes 1 King, 3 Cannon, 11 Parkdale and 10 B Line Express. Table 2 summarizes the existing HSR Bus Routes description and schedules.

Table 2 – Existing Bus Route Description and Frequency

HSR Bus Route	Direction	Start	End	Frequency (Weekday Peak Period)
1 King	East-West	McMaster Medical Centre	Eastgate Square	~ 15 minutes
3 Cannon	East-West	Downtown Hamilton	Parkdale Avenue	~ 30 minutes
11 Parkdale	North-South	Valley Park	Burlington Terminal	~ 30 minutes
10 B Line Express	East-West	University Plaza	Eastgate Square	~ 10 minutes

Source: HSR Transit System (www.hamilton.ca)

Figure 5 – HSR Transit System Map for the Area



Source: HSR Transit System Map

2.6. Existing Transit Assessment

As indicated in Figure 5 and Table 2, the area is currently well serviced by the existing transit network. The proposed development is located approximately:

- 50-300 m (1-4 minute-walk) to Routes 1 King and 10 B Line Express bus stops at the Queenston Road/Reid Avenue South intersection;
- 125-400 m (2-6 minute-walk) to Route 3 Cannon bus stop at the Dunsmure Road/Reid Avenue North intersection);
- 400 m (6 minute-walk) to Route 11 Parkdale bus stops at the Parkdale Avenue North/Main Street East.

2.7. Existing Traffic Volumes

Existing traffic volumes at the study area intersections were undertaken by Spectrum on Wednesday March 22, 2017 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. Turning movement count summaries are provided in Appendix A. For the purposes of this assessment, a 2% background through traffic

growth rate (compounded) has been applied to the 2017 through traffic volumes on Queenston Road and other public streets to bring it up to the 2020 conditions. This is about 6% total growth in background traffic, which is quite significant. In addition, given the current pandemic situation, updated traffic turning movement counts can not be conducted, therefore, the traffic turning movements for the Reid Avenue N/Ayr Avenue intersection has been estimated based on the methodology outlined in Section 1 of this Study.

2.8. Existing Traffic Assessment

The existing volumes are illustrated in Figure 6, and were analyzed using Synchro Version 10 software. The methodology of the software follows the procedures described and outlined in the Highway Capacity Manual, HCM 2000, published by the Transportation Research Board. It should be noted that the printouts for unsignalized intersections are based on HCM outputs and the results for signalized intersections are based on Synchro so that queues and more detailed information are provided. The detailed results are provided in Appendix C and summarized in Table 3.

Table 3 – Existing Levels of Service (2020 Conditions)

Intersection	Key Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	95th Queue (m)	LOS (v/c)	Delay (s)	95th Queue (m)
Queenston Rd/ Parkdale Ave S (signalized)	Overall	B (0.64)	16		B (0.73)	17	
	EB – L	B (0.25)	13	17	B (0.22)	14	16
	EB – T	A (0.33)	10	46	B (0.52)	13	82
	WB – L	B (0.15)	11	12	B (0.16)	13	10
	WB – T	B (0.43)	11	61	B (0.43)	12	63
	NB – L	D (0.51)	42	28	D (0.41)	41	16
	NB – T	D (0.64)	36	40	C (0.37)	24	23
	SB – L	C (0.30)	22	14	B (0.55)	19	28
	SB – T	B (0.24)	14	11	C (0.73)	22	43
Queenston Rd/ Reid Ave S (signalized)	Overall	B (0.52)	12		B (0.58)	13	
	EB – L	A (0.09)	9	4	A (0.14)	10	6
	EB – T	A (0.36)	10	44	B (0.58)	12	79
	WB – L	A (0.00)	0	0	A (0.03)	8	2
	WB – T	B (0.52)	11	63	B (0.56)	11	71
	NB – LTR	B (0.01)	18	3	A (0.02)	3	1
	SB – LTR	C (0.34)	26	31	C (0.47)	30	43
Parkdale Ave N/ Main Street E (signalized)	Overall	B (0.48)	14		B (0.51)	11	
	EB – LTR	C (0.48)	32	37	C (0.45)	31	38
	WB – LTR	C (0.26)	26	24	C (0.22)	25	21
	NB – LTR	B (0.24)	12	35	A (0.21)	8	24
	SB – LTR	A (0.15)	4	11	A (0.51)	8	58
Parkdale Ave N/ Roxborough Ave (signalized)	Overall	A (0.31)	8		B (0.63)	13	
	EB – LTR	B (0.16)	18	17	B (0.16)	14	16
	WB – LTR	B (0.13)	15	14	B (0.16)	16	17
	NB – LTR	A (0.31)	5	12	A (0.25)	6	11
	SB – LTR	A (0.18)	10	18	B (0.63)	16	87
Queenston Rd/ Red Hill Parkway West Ramp (signalized)	Overall	A (0.55)	8		A (0.49)	8	
	EB – L	A (0.37)	5	12	A (0.45)	6	11
	EB – T	A (0.20)	4	18	A (0.30)	4	26
	WB – T	A (0.41)	9	60	A (0.49)	10	72
	WB – R	A (0.18)	2	8	A (0.32)	2	10
	SB – L	D (0.17)	42	11	D (0.28)	44	17
	SB – R	B (0.55)	14	18	B (0.43)	14	15
Queenston Rd/ Red Hill Parkway East Ramp (signalized)	Overall	B (0.60)	11		B (0.79)	17	
	EB – L	A (0.39)	5	15	B (0.63)	15	35
	EB – T	A (0.17)	4	15	A (0.30)	8	39
	WB – T	A (0.30)	9	36	B (0.49)	17	78
	NB – L	D (0.50)	40	28	C (0.36)	31	26
	NB – R	B (0.60)	11	19	D (0.79)	35	57
Main Street E/ Reid Ave (unsignalized)	EB – LR	A (0.08)	8	0	A (0.11)	8	0
	NB – TL	A (0.15)	8	0	A (0.23)	9	0
	SB – TR	A (0.16)	8	0	A (0.17)	8	0
Main Street E/ Ayr Ave (unsignalized)	WB – LR	A (0.06)	8	0	A (0.03)	8	0
	NB – TR	A (0.15)	8	0	A (0.18)	8	0
	SB – TL	A (0.13)	8	0	A (0.16)	8	0

Nextrans received the existing traffic signal timing plans from the City of Hamilton. The input parameters outlined in the signal timing plans such as cycle lengths, yellow and all-red intervals, minimum initials, extensions, offsets and maximum green times have been reflected in the analysis. Based on the analysis, it is Nextrans' opinion that the timing plans have been very well optimized by the City staff, therefore no adjustments are required under the existing conditions.

The analysis indicates that under the existing conditions (2020), all signalized and unsignalized intersections are currently operating at acceptable levels of service during the morning and afternoon peak periods. No critical movements have been identified in the intersection capacity analysis at this time.

3.0 TRANSPORTATION AND LAND USE PLANNING CONTEXT

3.1. Existing Neighbourhood Context

Based on Nextrans comprehensive review of the study area, it is evident that there is a wide range of land uses and housing types that currently exist in this area such as residential (including rental) and retail/commercial (banks, grocery stores, restaurants, medical offices) along Queenston Road and Parkdale Avenue North/South.

3.2. Proposed Development Context

As indicated, the proposed development has been approved in various phases, with the proposed Block 6 of the development considered herein will consist of a total 597 residential dwelling units in two high-rise buildings, Building A with 18-storey and Building B with 16-storey. The proposed development is very compact and efficient, as well as it will help addressing the City housing shortage and affordability. It is Nextrans' opinion that the proposed development represents good transportation planning since it utilizes the existing transportation network, transit network, as well as the existing active transportation network in the area. The traffic pattern and generation are also consistent with the existing neighbourhood.

3.3. Hamilton Future High Order Transit

Previously, the City of Hamilton and Metrolinx considered building Hamilton High Order Transit, a new 11-kilometre LRT line that would run through downtown Hamilton along Main and King Streets, which scheduled for completion in 2024, with major construction starting in 2019. The original Hamilton LRT proposal would connect McMaster in the west to East Gate Mall in the east, and protect for future growth through segregated LRT lines. The LRT would also connect to the existing Hamilton Centre GO Station through a high-order pedestrian connection. In light of the recent announcement from the Province it is our understanding that Metrolinx and Hamilton may consider a High Order Transit option instead of LRT. Although the LRT could accommodate higher ridership, however, the Future Rapid Transit Corridor will be a significant improvement from the existing conditions. It is Nextrans' opinion that the proposed development will contribute a healthy transit ridership for both the existing conventional transit system and the future High Order Transit system.

4.0 FUTURE BACKGROUND CONDITIONS

4.1. Analysis Horizon

For the purposes of this assessment, it is assumed that the proposed development will be fully built-out by 2024. As such, a five-year horizon (2029) after the full built-out of the proposed development has been carried out for the study analysis.

4.2. Future Background Corridor Growth

Based on previous consultation with the City staff, it is indicated that the City of Hamilton assumes 2% background traffic growth per annum. In addition, based on our comprehensive review of the area, we concluded that study area is quite stable, as such, none or negligible background traffic growth is anticipated for Reid Avenue S, Roxborough Avenue and Main Street East. For the purposes of this assessment, a 2% traffic growth per annum (compounded) has been applied

to the existing through traffic turning movement counts to 2029 horizon year for all intersections. Figure 7 illustrates the background traffic growth, based on 2% growth per annum (compounded). This is equivalent to a total growth of 18% from 2020 to 2029. This is a significant growth assumption and it is Nextrans' opinion that the analysis is very conservative.

4.3. Background Development Applications

Nextrans has reviewed the background development application information on the City of Hamilton development portal. Based on this review, currently, there are no major and active development applications in the vicinity of the proposed development, with the exception of the City Housing Hamilton (CHH) proposed building and proposed development blocks (Block 1 to 5 and 7) which are part of the proposed Roxborough Park redevelopment. These developments will be included in the analysis:

- Block 1 – 19 block townhouse units (approved)
- Block 2 – 38 block townhouse units (approved)
- Block 3 – 19 block townhouse units (approved)
- Block 4 – 88 back-to-back townhouse units (approved)
- Block 5 – 74 back-to-back townhouse units (approved)
- Block 7 – 352 multiple dwelling units (approved)
- Former Block 7 (City Housing Hamilton Building) – 103 multiple dwelling units (approved)

Given that this report will include the corridor background through traffic growth (Section 4.3) of 2% per annum for the through traffic for all intersections considered in the analysis, or a total of 18% in between 2020 and 2029. It is anticipated that the background growth will also include all potential background development traffic in the area. Table 4 summarizes the site trip generation for Blocks 1 to 5 and CHH building.

Table 4 – Blocks 1 to 5, 7 and CHH Developments

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	238 townhouse units	Trip Rates AM - Ln(T) = 0.95Ln(X) - 0.51 PM - Ln(T) = 0.89Ln(X) - 0.02	0.11	0.35	0.46	0.34	0.2	0.54
		Total Trips	25	84	109	81	47	128
Multifamily Housing (High-Rise) LUC 222 General Urban/Suburban	455 multiple dwelling units	Trip Rates AM - T = 0.28(X) + 12.86 PM - T = 0.34(X) + 8.56	0.07	0.24	0.31	0.22	0.14	0.36
		Total Trips	34	106	140	99	64	163
Total New Auto Trips			*59*	*190*	*249*	*180*	*111*	*291*

The trip distribution as assignment for these trips are based on the 2016 TTS data, consistent with the methodologies employed in the previous assessments submitted to the City of Hamilton. Figure 8 illustrates the site traffic volumes for Blocks 1 to 5, 7 and CHH Building.

4.4. Future Background Traffic Assessment

The estimated future background traffic volumes are illustrated in Figure 9 (background development traffic + background corridor traffic growth), and were analyzed using Synchro v.10 software. The detailed calculations are provided in Appendix D and summarized in Table 5.

The analysis indicates that under the future background traffic conditions, all signalized and unsignalized intersections are expected to continue to operate at acceptable levels of service during the morning and afternoon peak periods. No

critical movements have been identified in the intersection capacity analysis and therefore no physical improvements are recommended under this horizon year.

Table 5 – 2029 Future Background Levels of Service

Intersection	Key Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	95th Queue (m)	LOS (v/c)	Delay (s)	95th Queue (m)
Queenston Rd/ Parkdale Ave S (signalized)	Overall	B (0.67)	17		B (0.74)	19	
	EB – L	B (0.36)	18	21	B (0.32)	20	20
	EB – T	B (0.41)	12	60	B (0.69)	19	124
	WB – L	B (0.18)	13	13	B (0.29)	22	13
	WB – T	B (0.55)	13	86	B (0.56)	16	89
	NB – L	D (0.46)	39	27	D (0.42)	40	16
	NB – T	D (0.67)	36	46	C (0.35)	24	26
	SB – L	B (0.31)	20	13	B (0.50)	17	33
	SB – T	B (0.25)	14	12	C (0.74)	21	61
Queenston Rd/ Reid Ave S (signalized)	Overall	B (0.69)	14		B (0.68)	16	
	EB – L	B (0.24)	13	9	D (0.67)	40	39
	EB – T	B (0.45)	10	55	B (0.68)	14	104
	WB – L	A (0.00)	0	0	A (0.04)	8	2
	WB – T	B (0.62)	13	83	B (0.68)	14	97
	NB – LTR	B (0.01)	18	3	A (0.02)	3	1
	SB – LTR	D (0.69)	37	66	D (0.63)	35	59
Parkdale Ave N/ Main Street E (signalized)	Overall	B (0.51)	14		B (0.61)	14	
	EB – LTR	C (0.51)	33	37	C (0.45)	31	37
	WB – LTR	C (0.34)	21	27	C (0.26)	20	22
	NB – LTR	B (0.28)	14	44	A (0.24)	9	30
	SB – LTR	A (0.18)	5	13	B (0.61)	12	83
Parkdale Ave N/ Roxborough Ave (signalized)	Overall	A (0.39)	8		B (0.79)	16	
	EB – LTR	B (0.16)	18	17	B (0.16)	14	16
	WB – LTR	B (0.16)	13	15	B (0.18)	15	18
	NB – LTR	A (0.39)	6	20	A (0.31)	7	20
	SB – LTR	B (0.22)	10	23	C (0.79)	20	123
Queenston Rd/ Red Hill Parkway West Ramp (signalized)	Overall	A (0.60)	9		B (0.70)	12	
	EB – L	A (0.46)	6	14	B (0.46)	11	27
	EB – T	A (0.25)	4	25	A (0.36)	4	34
	WB – T	A (0.52)	12	88	B (0.70)	19	120
	WB – R	A (0.19)	2	9	A (0.35)	2	12
	SB – L	D (0.16)	41	11	D (0.28)	44	17
	SB – R	B (0.60)	19	24	B (0.45)	14	16
Queenston Rd/ Red Hill Parkway East Ramp (signalized)	Overall	B (0.65)	12		B (0.79)	20	
	EB – L	A (0.54)	8	22	C (0.77)	30	54
	EB – T	A (0.21)	5	21	A (0.37)	9	49
	WB – T	B (0.37)	11	53	C (0.62)	21	98
	NB – L	D (0.50)	38	29	C (0.40)	30	31
	NB – R	B (0.65)	17	28	D (0.79)	39	64
Main Street E/ Reid Ave (unsignalized)	EB – LR	A (0.10)	8	0	A (0.16)	8	0
	NB – TL	A (0.26)	9	0	A (0.34)	10	0
	SB – TR	A (0.23)	9	0	A (0.23)	9	0
Reid Ave N/ Ayr Ave (unsignalized)	WB – LR	A (0.14)	8	0	A (0.07)	8	0
	NB – TR	A (0.20)	9	0	A (0.25)	8	0
	SB – TL	A (0.17)	8	0	A (0.22)	9	0
Reid Ave S/ Roxanne Drive (unsignalized)	WB – LR	B (0.30)	13	10	B (0.20)	15	6
	NB – TR	A (0.12)	0	0	A (0.22)	0	0
	SB – TL	A (0.01)	1	0	A (0.03)	1	1

5.0 PROPOSED DEVELOPMENT ASSESSMENT

5.1. Proposed Development

As indicated, Block 6 of the proposed Roxborough Park Development consists of a total 597 residential dwelling units in two high-rise buildings, Building A with 18-storey and Building B with 16-storey.

The 2016 Transportation Tomorrow Survey (TTS) and the *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE) information was reviewed to estimate the modal split, trip distribution and trip generation for the proposed development.

5.2. Modes of Travel Assessment in the Area

Table 6 summarizes the travel mode split information based on the review of the 2016 Transportation Tomorrow Survey data for Traffic Zones 5117, 5120, 5148 and 5151. The detail extractions are summarized in Appendix E.

Table 6 – Modes of Travel based on 2016 TTS Data for Traffic Zones 5117, 5120, 5148 and 5151

Time	Trips Made by Traffic Zones				
	Auto Driver (including motorcycle)	Auto Passenger (including paid rideshare and taxi)	Transit	Cycle	Walk
AM Peak Period (6:00 – 9:00)	67%	10%	22%	0%	1%
PM Peak Period (4:00 – 7:00)	72%	14%	14%	0%	0%

Based on the information outlines in the table above, the predominant mode of travel in the area is private automobile and public transit. The walking mode and cycling mode are very low for this area.

Although the transit and carpooling trips are heading in the right direction, however, the active transportation modes should be encouraged and promoted in this area as driving private cars are not sustainable and will require the City to invest in additional capital projects, which are costly to construct and maintain.

5.3. Site Trip Generation

The trip generation forecasts were undertaken using the information contained in the *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE). For the purposes of this assessment, the ITE Land Use Code LUC 222 "Multifamily High-Rise General Urban/Suburban" fitted curve equations have been utilized for the proposed development. The site trip generation based on this land use code is summarized in Table 7.

Table 7 – Site Traffic Trip Generation

ITE Land Use	Magnitude (units)	Parameters	Morning Peak Hour			Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
Multifamily Housing (High-Rise) LUC 222 General Urban/Suburban	597 multiple dwelling units	Trip Rates AM - T = 0.28(X) + 12.86 PM - T = 0.34(X) + 8.56	0.07	0.23	0.30	0.22	0.14	0.36
		Total Trips	*43*	*137*	*180*	*129*	*83*	*212*

Based on the site trip generation analysis noted above, the proposed development is expected to generate 180 total two-way trips (43 inbound and 137 outbound) and 212 total two-way trips (129 inbound and 83 outbound) during the morning and afternoon peak hours, respectively.

5.4. Site Trip Distribution and Assignment

The 2016 Transportation Tomorrow Survey (TTS) data was reviewed for Traffic Zones 5117, 5120, 5148 and 5151 in order to estimate the general trip distribution for the proposed development. Table 8 summarizes the planning district/traffic zones distribution based on the 2016 TTS data for the proposed development.

Table 8 – Trip Distribution for Traffic Zones 5117, 5120, 5148 and 5151

Category	Toronto	Peel Region	Halton Region	City of Hamilton	Niagara Region	Stoney Creek	Others
Auto	4%	6%	23%	53%	0%	7%	7%
Transit	12%	0%	0%	88%	0%	0%	0%

Tables 9 and 10 summarize the site trip distribution for auto and transit modes, respectively, based on the 2016 TTS and existing transportation network in the area for the proposed development.

Table 9 – Site Trip Distribution for Auto Mode

Direction	Auto
North via Red Hill Valley Parkway and Parkdale Avenue N	38%
South via Red Hill Valley Parkway	6%
East via Queenston Road, Barton Road and Hill Valley Parkway	19%
West via Queenston Road	37%
Total	*100%*

Table 10 – Site Trip Distribution for Transit Mode

Direction	Transit
North	18%
South	5%
East	3%
West	74%
Total	*100%*

Figure 10 illustrates the site traffic volumes. It should be noted that the auto site trip distribution and assignment have been taken into consideration existing traffic patterns and logical routes, where appropriate.

6.0 FUTURE TOTAL CONDITIONS

6.1. Future Total Traffic Assessment for Auto Mode

The estimated future total traffic volumes (future background traffic volumes plus site generated traffic volumes) are illustrated in Figure 11, and were analyzed using Synchro v.10 software. The detailed calculations are provided in Appendix F and summarized in Table 11.

The main development access is provided via a private condominium road that connects to Roxanne Drive (Street A) and Hayes Avenue. The internal condominium road has been approved as part of Block 5 approval. Roxanne Drive (Street A) is an east-west to north-south road connecting Reid Avenue S and Bingham Road, which will be constructed as part of this proposed development. Roxanne Drive will also facilitate development accesses from various blocks. To be conservative, the majority of the site traffic has been assigned to Roxanne Drive in order to assess any potential impact and road improvements, especially the assessment for a potential exclusive southbound left turn at the Reid Avenue S/Roxanne Drive intersection.

Given that Hayes Avenue is a local road that connects with Bingham Road, Armstrong Avenue, Ayr Avenue and Glengrove Avenue that serve approximately 200 low-rise residential homes, there are very little traffic that will be using Hayes Avenue.

The analysis indicates that under the future total traffic conditions, similar to the existing and future background conditions, all signalized intersections are expected to continue to operate at acceptable levels of service during the morning and afternoon peak periods, with the exception of the eastbound left turn at the Queenston Road/Reid Avenue S intersection during the afternoon peak hour. This is due to the fact that this movement currently does not have an advance left turn phase. Given that this is a busy intersection located adjacent to the Red Hill Valley Parkway interchange, this is a typical condition for any major intersection and therefore it is Nextrans' opinion that it is acceptable and no physical improvements are required.

Nextrans has provide a potential mitigation measure such as the traffic signal timing optimization for this intersection during the afternoon peak hour. The analysis indicates that with only additional 10 s green time to be added to the east-west movement, the intersection is expected to operate at acceptable levels of service. The potential signal timing plan is included below for the City's consideration.

Table 11 – 2029 Future Total Levels of Service

Intersection	Key Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	95th Queue (m)	LOS (v/c)	Delay (s)	95th Queue (m)
Queenston Rd/ Parkdale Ave S (signalized)	Overall	B (0.67)	18		B (0.74)	19	
	EB – L	B (0.38)	19	22	C (0.34)	20	20
	EB – T	B (0.42)	12	62	B (0.71)	19	130
	WB – L	B (0.19)	13	13	C (0.31)	24	14
	WB – T	B (0.57)	14	91	B (0.57)	16	92
	NB – L	D (0.46)	39	27	D (0.42)	40	16
	NB – T	D (0.67)	36	46	C (0.35)	24	26
	SB – L	B (0.31)	20	13	B (0.50)	17	33
	SB – T	B (0.25)	15	12	C (0.74)	21	61
Queenston Rd/ Reid Ave S (signalized)	Overall	B (0.94)	19		C (1.05)	21	
	EB – L	B (0.33)	16	13	F (1.05)	120	38
	EB – T	B (0.45)	10	55	B (0.68)	14	104
	WB – L	A (0.00)	0	0	A (0.04)	8	2
	WB – T	B (0.63)	13	85	B (0.71)	14	104
	NB – LTR	B (0.01)	18	3	A (0.02)	3	1
	SB – LTR	E (0.94)	65	111	D (0.78)	44	85
Queenston Rd/ Reid Ave S (signalized)	Overall	Not required	Not Required	Not Required	B (0.90)	19	
	EB – L				E (0.90)	72	61
	EB – T				B (0.64)	12	101
	WB – L				A (0.03)	7	2
	WB – T				B (0.67)	13	102
	NB – LTR				A (0.03)	4	2
	SB – LTR				E (0.87)	60	100
Parkdale Ave N/ Main Street E (signalized)	Overall	B (0.51)	14		B (0.61)	14	
	EB – LTR	C (0.51)	33	37	C (0.45)	31	37
	WB – LTR	C (0.34)	21	27	C (0.26)	20	22
	NB – LTR	B (0.28)	14	44	A (0.24)	9	30
	SB – LTR	A (0.18)	5	13	B (0.61)	12	83
Parkdale Ave N/ Roxborough Ave (signalized)	Overall	A (0.39)	9		B (0.79)	16	
	EB – LTR	B (0.16)	18	17	B (0.16)	14	16
	WB – LTR	B (0.16)	13	15	B (0.18)	15	18
	NB – LTR	A (0.39)	6	21	A (0.31)	7	20
	SB – LTR	B (0.22)	10	23	C (0.79)	20	123
Queenston Rd/ Red Hill Parkway West Ramp (signalized)	Overall	A (0.60)	10		B (0.73)	13	
	EB – L	A (0.47)	7	15	B (0.48)	13	32
	EB – T	A (0.27)	4	27	A (0.37)	4	36
	WB – T	B (0.54)	13	92	B (0.73)	21	130
	WB – R	A (0.19)	2	9	A (0.35)	2	12
	SB – L	D (0.16)	41	11	D (0.27)	43	17
	SB – R	B (0.60)	20	25	B (0.47)	15	18
Queenston Rd/ Red Hill Parkway East Ramp (signalized)	Overall	B (0.65)	13		C (0.81)	21	
	EB – L	A (0.60)	9	26	D (0.81)	37	68
	EB – T	A (0.21)	5	22	A (0.37)	9	49
	WB – T	B (0.39)	13	58	C (0.65)	22	101
	NB – L	D (0.51)	38	29	C (0.42)	30	32
	NB – R	B (0.65)	18	30	D (0.79)	39	64
Main Street E/ Reid Ave (unsignalized)	EB – LR	A (0.10)	8	0	A (0.16)	8	0
	NB – TL	A (0.26)	9	0	A (0.34)	10	0
	SB – TR	A (0.23)	9	0	A (0.23)	9	0
Reid Ave N/ Ayr Ave (unsignalized)	WB – LR	A (0.20)	9	0	A (0.11)	8	0
	NB – TR	A (0.20)	9	0	A (0.26)	9	0
	SB – TL	A (0.20)	9	0	A (0.28)	9	0
Reid Ave S/ Street A (unsignalized)	WB – LR	C (0.54)	18	24	C (0.30)	17	10
	NB – TR	A (0.14)	0	0	A (0.28)	0	0
	SB – TL	A (0.01)	1	0	A (0.03)	2	1

Potential Signal Timing Plan Optimization for the PM Peak Hour (Queenston Road/Reid Avenue S intersection)

Splits and Phases: 6: Reid Avenue S & Queenston Road

The analysis indicates that the Reid Avenue S/Roxanne Drive intersection is expected to operate at acceptable levels of service under the morning and afternoon peak periods. The proposed lane configuration includes: one inbound and one outbound lane for the Roxanne Drive, northbound shared through/right and southbound shared through/left on Reid Avenue S. No exclusive left or right turn lanes are required based on this intersection operational capacity analysis. A separate left turn warrant analysis for the Reid Avenue S/Roxanne Drive intersection will be provided in Section 6.3 below, based on the methodology outlined in Ontario Ministry of Transportation (MTO) Geometric Design Manual Part 3.

The analysis is also indicated that the Reid Avenue N/Ayr Avenue intersection is expected to operate at acceptable levels of service due to low traffic volumes at this intersection. The required lane configurations are similar to the existing conditions with no turning lanes are required.

As indicated, the expected traffic volumes at the Hayes Avenue/approved condominium road intersection will be much lower than the Reid Avenue N/Ayr Avenue intersection, it is expected that this intersection will operate with better levels of service than the Reid Avenue N/Ayr Avenue intersection. In addition, given that the approved condominium road is located within the outside curb of Hayes Avenue/Armstrong Avenue, similar to the existing access configuration today, it is expected that there will be no sightline or safety issue. The lane configurations include: one in bound and outbound lane, shared eastbound through/right and a shared westbound through/left on Hayes Avenue.

6.2. Queuing Analysis

In order to assess the queueing impact at the Reid Avenue S/Roxanne Drive intersection, SimTraffic microsimulation analysis was undertaken. Nextrans has conducted SimTraffic simulations with 10 runs for each peak period, 15 minutes seeding and 60 minutes run time. Table 12 summarizes the queue lengths based on 10 runs for morning and afternoon peak periods, for a total of 20 runs. SimTraffic reports for the morning and afternoon peak periods are included in Appendix G.

Table 12 – SimTraffic Microsimulation Analysis Summary

Intersection	Key Movement	Weekday AM Peak Hour		Weekday PM Peak Hour		Available Storage Length (m)
		Average Queue (m)	95th Queue (m)	Average Queue (m)	95th Queue (m)	
Reid Ave S/ Roxanne Drive (unsignalized)	WB – LR NB – TR SB – TL	17 1 2	33 8 11	14 2 5	23 9 13	~50 ~115 ~75
Reid Ave S/ Queenston Road (unsignalized)	SB – LTR	57	91	56	89	~115

Based on the SimTraffic analysis with 10 runs as summarized in the table above, the following observations are made:

- The 95th percentile queue length for the westbound queue length at the Reid Avenue S/Roxanne Drive intersection is expected to be 33 m (or about 5 car length), which less than the available storage of approximately 50 m between Reid Avenue S and first driveway access. Therefore, there will be no potential blockage.
- The 95th percentile queue length for the southbound queue length at the Reid Avenue S/Roxanne Drive intersection is expected to be 13 m (or about 2 car length), which less than the available storage of approximately 75 m between Roxanne Drive and Main Street E. Therefore, there will be no potential blockage.
- The 95th percentile queue length for the northbound queue length at the Reid Avenue S/Roxanne Drive intersection is expected to be 9 m (or about 2 car length), which less than the available storage of approximately 115 m between Roxanne Drive and Queenston Road. Therefore, there will be no potential blockage.
- The 95th percentile queue length for the southbound queue length at the Queenston Road/Reid Avenue S intersection is expected to be 91 m (or about 13 car length), which less than the available storage of approximately 115 m between Roxanne Drive and Queenston Road. Therefore, there will be no potential blockage.

Based on the queuing assessment indicated above, it is Nextrans' opinion that the 95th queue length at the proposed Reid Avenue S/Roxanne Drive intersection is sufficient to accommodate the expected queues for the 2029 horizon year. No turning lanes are required on Reid Avenue S and Roxanne Drive as indicated in the intersection capacity analysis, left turn warrant analysis and queuing analysis.

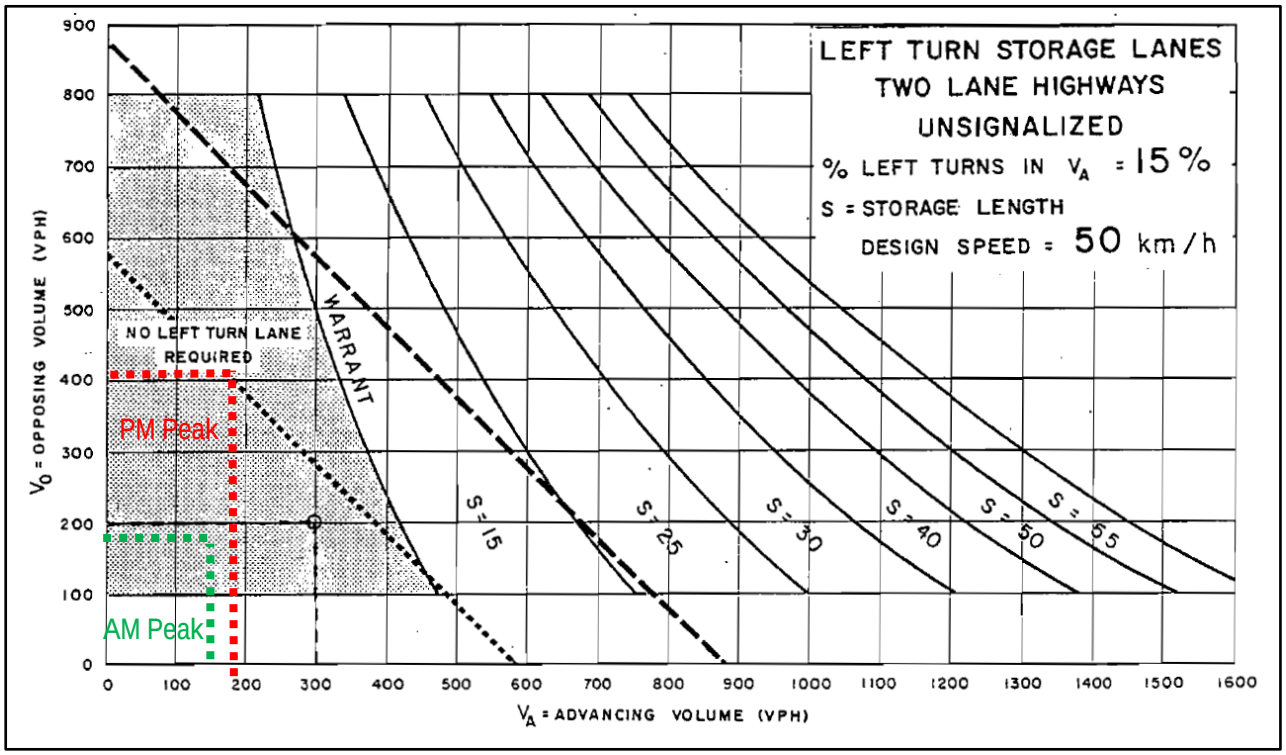
6.3. Left Turn Warrant Analysis

The Ontario Ministry of Transportation (MTO) Left Turn Warrant analysis for at grade intersection was conducted to examine the need for an exclusive southbound left turn from Reid Avenue S to the proposed Roxanne Drive/Street A.

Figure 12 illustrates the MTO warrant guidelines. It should be noted that the left turning volume is about 9% for the morning peak and 21% for the afternoon peak hour (11 left turns x 100% / 141 advancing traffic volumes = 8% and 32 left turns x 100% / 191 advancing traffic volumes = 17%) of the advancing traffic volumes on Reid Avenue S.

Based on the analysis, it is anticipated that the westbound left turn volumes onto the proposed development Roxanne Drive/Street A does not numerically meet the MTO warrant guidelines under the 2029 horizon.

Figure 12 – MTO Left Turn Storage Warrant Analysis



6.4. Future Total Traffic Assessment for Transit Mode

If a moderate 14% transit modal split (the existing PM transit modal split based on 2016 TTS data) is applied to the total trips generated by the proposed development, the proposed development would generate 25 two-way transit trips (6 inbound and 19 outbound) and 30 two-way transit trips (18 inbound and 12 outbound) during the morning and afternoon peak hours. The area is currently well serviced by the existing Hamilton transit network. The proposed development is located adjacent to four HSR Transit Bus Routes 1 King, 3 Cannon, 11 Parkdale and 10 B Line Express.

Table 12 below summarizes the transit existing service frequency, with Table 13 summarizing trip assignment for the proposed development based on the existing transit services and transit trip distribution outlined in Table 10.

It should be noted that the majority of residents will be destined to the west (i.e. toward the Downtown area) based on the 2016 TTS information outlined in Table 9 above. For this reason, the majority of the residents from the proposed development will be using Route 1 King or 10 B Line Express to connect to other bus routes, as these two bus routes are destined to Downtown Hamilton Transit/GO Terminal and may potentially be replaced by the future LRT with more frequent services.

Given that the transit ridership generated by the proposed development is quite low, for the purposes of this assessment and to be conservative, it is assumed that all residents that take transit will use Route 1 King.

Table 13 – Existing Transit Service Frequency

Transit Route	Weekday AM Peak Hour		Weekday PM Peak Hour	
	Headway	No. transit veh/hr	Headway	No. transit veh/hr
1 King	15 mins	4	15 mins	4
3 Cannon	30 mins	2	30 mins	2
11 Parkdale	30 mins	2	30 mins	2
10 B Line Express	10 mins	6	10 mins	6

Table 14 – Future Transit Passenger Demand from the Proposed Development

Transit Route	Weekday AM Peak Hour		Weekday PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
Total Riders	6	19	18	12
Route 1 King	6/4 = 2 riders per bus	19/4 = 5 riders per bus	18/4 = 5 riders per bus	12/4 = 3 riders per bus

As indicated in Table 13, the transit passenger demands generated by the proposed development per transit vehicle is low (at most 5 passengers per transit vehicle per hour). Therefore, the proposed development impact on transit service is negligible and no improvements are required. In reality, some passengers could be bunched together during the peak 15 minutes, instead of spreading during the entire peak hour. Even if this is the case, our estimates indicate that the demand per vehicle is extremely low and can be accommodated without the need for additional transit vehicles or improvements during both the morning and afternoon peak periods

6.5. Hamilton Future High Order Transit

Previously, the City of Hamilton and Metrolinx considered building Hamilton High Order Transit, a new 11-kilometre LRT line that would run through downtown Hamilton along Main and King Streets, which scheduled for completion in 2024, with major construction starting in 2019. The original Hamilton LRT proposal would connect McMaster in the west to East Gate Mall in the east, and protect for future growth through segregated LRT lines. The LRT would also connect to the existing Hamilton Centre GO Station through a high-order pedestrian connection.

In light of the recent announcement from the Province it is our understanding that Metrolinx and Hamilton may consider a High Order Transit option instead of LRT. Although the LRT could accommodate higher ridership, however, the Future Rapid Transit Corridor will be a significant improvement from the existing conditions. It is Nextrans' opinion that the proposed development will contribute a healthy transit ridership for both the existing conventional transit system and the future High Order Transit system.

6.6. Future Active Transportation Mode Assessment

Walking

The area is currently well served by a complete network of sidewalks as sidewalks are available on both sides of Queenston Road, Reid Avenue S, Main Street E, among other public streets in the area. The sidewalks are generally in good condition and reasonably maintained on the public streets. It is Nextrans' opinion that no improvements are required for the sidewalk network under the existing conditions on the public streets.

It is Nextrans' understanding that the proposed development will provide direct shared pedestrian and cycling connections

from the proposed development to Reid Avenue S, Street A, Ayr Avenue and interconnections with surrounding developments. In addition, sidewalks will be provided for all internal streets, along the frontage of the proposed building blocks, to accommodate pedestrians and encourage residents to take active mode of transportation.

Cycling

Under the existing conditions, there are some bicycle facilities available in the area such as the existing Red Hill Valley Trail located to the east of the proposed development and along the western edge of the Red Hill Valley Parkway. However, there are no on-street bicycle facilities available in the immediate area. It is our opinion that the bicycle network could be improved in the future in coordination with the City's capital projects, reconstruction or resurfacing projects especially along Reid Avenue S/Roxborough Avenue, Queenston Road and Parkdale Avenue South. Better bicycle network will help increase cycling trips in the area and reduce the numbers of single-occupant-vehicle trips to and from the area.

It is Nextrans' understanding that the proposed development will provide direct shared pedestrian and cycling connections from the proposed development to Reid Avenue S, Street A and interconnections with surrounding developments. In addition, the proposed development will also meet or exceed the bicycle parking requirements as per the applicable Zoning By-law.

6.7. Traffic Calming Measures

Traffic calming assessment and measures have been provided in the Traffic Calming Assessment Letter, dated August 24, 2020, which have been approved by the City of Hamilton. Therefore, additional assessment is not required at this time.

7.0 SITE PLAN REVIEW

7.1. Loading Requirement

It is Nextrans' understanding the proposed development will provide one loading space for each building with the dimensions of: 3 m in width, 10 m in length and no vertical restriction. AutoTURN software will be used to generate the vehicle turning templates to demonstrate the turning movements of the servicing vehicles in and out of the proposed loading spaces. The turning movement templates are can be provided at the site plan stage.

7.2. Proposed Development Access Location

The main development access is provided via Roxanne Drive (Street A) and Hayes Avenue. Roxanne Drive (Street A) is an east-west to north-south road connecting Reid Avenue S and Bingham Road, which will be constructed as part of this proposed development. Roxanne Drive will also facilitate development accesses from various blocks.

To be conservative, the majority of the site traffic has been assigned to Roxanne Drive in order to assess any potential impact and road improvements, especially the assessment for a potential exclusive southbound left turn at the Reid Avenue S/Roxanne Drive intersection.

The analysis indicates that under the future total traffic conditions, the Reid Avenue S/Roxanne Drive intersection is expected to operate at acceptable levels of service under the morning and afternoon peak periods. The proposed lane configuration includes: one inbound and one outbound lane for Roxanne Drive, northbound shared through/right and southbound shared through/left on Reid Avenue S. No exclusive left or right turn lanes are required based on this intersection operational capacity and left turn warrant analysis.

Similarly, the analysis indicates that the proposed access onto Hayes Avenue is expected to operate at acceptable levels of service with the following lane configurations: one inbound lane, one outbound lane, shared eastbound through/right and one shared westbound through/left on Hayes Avenue.

8.0 PARKING ASSESSMENT

8.1. Vehicle Parking

In accordance with the applicable Zoning By-law for the proposed development, the following vehicle parking are required for Block 6 of the proposed Roxborough Park Development:

- Resident: 0.80 spaces/unit x 597 units = 478 vehicle parking spaces
- Visitor: 0.25 spaces/unit x 597 units = 149 vehicle parking spaces

Therefore, the proposed development is required to provide a total of 627 parking spaces, inclusive of resident, visitor and barrier free parking spaces. The proposed development will provide a total of 568 vehicle parking spaces based on the recommendations of this Addendum Study, which has a technical shortfall of 59 parking spaces or 9% reduction. This is equivalent to a recommended residential parking rate of 0.7 spaces/unit.

It is Nextrans' opinion that the proposed parking reduction is reasonable for the following reasons:

- 2016 TTS Data - currently, the existing transit modal split for the area is 22% during the morning peak period and 14% during the afternoon peak hour. As the recommended parking rate reduction is only 9%, it is reasonable and justified based on the existing trend. It is expected that with the future higher order transit corridor along Queenston Road, the transit modal split will be much higher than it is today;

- Housing Affordability Crisis - the Greater Toronto and Hamilton Area in general, is currently facing a housing shortage and affordability crisis. Demand for new housing is high and vacancy rates for rental are extremely low; especially during the COVID-19 pandemic. Once the pandemic is over, housing availability and affordability are expected to further decline. One component that increases the cost of new units in multi-storey buildings, is the requirement to provide a minimum rate of parking; even in areas well serviced by transit with historically low vehicle ownership rates. For example, the City of Toronto notes that the cost of providing one underground parking is in the range of $48,000 to $160,000 per space due to the aggregate impact of land costs, constructability, site constraints and other factors leading to high construction costs (*Source: City of Toronto Presentation: Review of Parking Requirements for New Development - Sept 2021*). Furthermore, the more residential or visitor parking spaces that a proposed development has to provide, the more expensive the maintenance costs will be for the owners. Monthly maintenance cost for a parking space could be up to $100 per month, on top of the capital costs of a parking space. The provision of less parking can reduce overall maintenance costs and result in lower housing costs.

- Existing Transit Options – The area is currently well-served by four HSR Transit Bus Routes 1 King, 3 Cannon, 11 Parkdale and 10 B Line Express. Therefore, the future residents have other options to travel instead of driving private vehicles. As parking management is the best TDM measure, the provision of less parking spaces will encourage residents to use other modes of transportation.

- Existing Active Transportation Network – As indicated, the area is currently well served by a complete network of sidewalks as sidewalks are available on both sides of Queenston Road, Reid Avenue S, Main Street E, among other public streets in the area. The sidewalks are generally in good condition and reasonably maintained on the public streets. It is Nextrans opinion that no improvements to the existing sidewalk network on public streets at this time. Under the existing conditions, there are some bicycle facilities available in the area such as the existing Red Hill Valley Trail located to the east of the proposed development and along the western edge of the Red Hill Valley Parkway. Therefore, the future residents have other options to travel instead of driving private vehicles. Again, as parking management is the best TDM measure, the provision of less parking spaces will encourage residents to use other modes of transportation.

- Increase Bicycle Parking Spaces – The proposed development will provide a total of 304 bicycle parking spaces, which include 5 short-term and 299 long-term spaces. This provision will encourage residents to use bicycle instead of driving private vehicles.

- Supporting Transportation Demand Management – Based on Nextrans' working experience across many jurisdictions in the Greater Toronto and Hamilton Area, we notice that parking management is the best TDM measure because without a parking space readily available, residents will make other choices to travel. The provision of reduce parking spaces will encourage residents to use other modes of transportation such as walking, cycling and public transit, which is available in the area.

The reasons noted above, it is Nextrans' opinion that the current Zoning By-law requirements of 627 vehicle parking spaces is excessive and should be reduced to support active transportation, public transit, housing affordability and combating climate change. The recommended parking rates of 0.7 spaces/unit instead of 0.8 spaces/unit as per the current Zoning By-law requirements are reasonable and justified based on the reasons noted above.

8.2. Bicycle Parking

To support and encourage the future residents to take active mode of transportation instead of driving private vehicles, Nextrans recommends that the proposed development meet or provide close to the bicycle parking requirements based on the consolidated Zoning By-law No. 05-200. Table 14 summarizes the bicycle parking requirements based on the Zoning By-law No. 05-200 Sections 5.7.

Table 15 – Zoning By-law No. 05-200 Bicycle Parking Requirement

Type	Number of Unit	Short-Term Bicycle Parking Requirement	Long-Term Bicycle Parking Requirement	Required
Residential - Condominium	597 units	5 spaces	0.5 space/unit = 299	304 spaces

Based on the Zoning By-law No. 05-200, the proposed development should consider providing a total of 304 bicycle parking spaces, which include 5 short-term and 299 long-term spaces.

9.0 TRANSPORTATION DEMAND MANAGEMENT

9.1. City of Hamilton's TDM for Development (June, 2015)

The City of Hamilton's TDM for Development Report (June, 2015) has been reviewed and consulted to prepare the TDM requirement for the proposed development. In order to address the City's requirements, the following TDM recommendations are provided to support the proposed development.

Transportation Demand Management (TDM) is a coordinated series of actions aimed at maximizing the people moving capability of the transportation system. According to the City's TDM Report, the main objectives of TDM are:

- Shifting travel modes (e.g. walking, cycling, taking transit or carpooling instead of driving alone);
- Reducing the number of trips people must make (e.g. destinations and activities such as work and shopping, near each other); and,
- Travelling more efficiently (e.g. making trips outside of peak hours).

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.

9.1.1. Increase Density and Compact Site Design

As indicated in previous sections of this report, the proposed development is very compact which includes the proposed 597multiple dwelling units. This type of compact housing is required to support affordable housing and small family.

9.1.2. Site Design Elements

It is Nextrans' understanding that the proposed development has been designed to include the following design elements:

- The proposed development access will meet the City's minimum width requirement with continuous sidewalks;
- Direct pedestrian access to Reid Avenue S, Roxanne Drive, Ayr Avenue and Hayes Avenue in the future; and
- Bicycle parking will be provided at secured and convenient locations

It is Nextrans' opinion that these compact design elements will help facilitate the pedestrian and cyclist movements in efficient and safe manner.

9.1.3. Sidewalks and Pathways

The proposed development provides continuous sidewalks internally and direction connections to Reid Avenue S, Roxanne Drive, Ayr Avenue and Hayes Avenue. In addition, sidewalks will be provided for all internal streets, along the frontage of the proposed building blocks.

9.1.4. Bicycle Parking (Long-term and Short-term)

Based on the Zoning By-law No. 05-200, the proposed development should consider providing a total of 304 bicycle parking spaces, which include 5 short-term and 299 long-term spaces. The proposed development will meet this requirement to support reduced vehicle parking spaces.

9.1.5. Direct Connections to Transit

As indicated, the area is currently well serviced by the existing Hamilton transit network. The proposed development is located adjacent to four HSR Transit Bus Routes 1 King, 3 Cannon, 11 Parkdale and 10 B Line Express. It is Nextrans' opinion that given the existing transit frequency is excellent at this location, transit mode would be one of the best travel options for young persons and families to save the cost of living and the environment. It is Nextrans' opinion that the proposed development will contribute a healthy transit ridership for the existing transit system.

9.1.6. Opportunities for Reduced Parking Requirements

Based on the applicable Zoning By-law, the proposed development is required to provide a total of 627 parking spaces, inclusive of resident, visitor and barrier free parking spaces. The proposed development will provide a total of 568 vehicle parking spaces based on the recommendations of this Addendum Study, which will reduce the parking rate by 9%. This is equivalent to a recommended residential parking rate of 0.7 spaces/unit.

Based on the comprehensive justifications and reasons provided in Section 8 of this Addendum Study, this recommended rate is reasonable and will be required to support Transportation Demand Management and encourage residents to use other sustainable modes of transportation instead of driving private vehicle, which will cause more traffic congestion, pollution and green house gas that will contribute to climate change.

9.1.7. Unbundle Parking

As parking is the best TDM incentive for resident to take alternative mode of transportation, it is recommended that the proposed development unbundle the parking rental from the unit.

9.1.8. On-Site Carshare Vehicle(s) and Parking Spot(s)

It is Nextrans' opinion that this requirement is more appropriate for larger scale high-rise development in the Downtown setting where carshare is economically viable. It is not appropriate for this area apartment development. Therefore, it is Nextrans' opinion that this requirement is not appropriate or necessary for the proposed development given the proposed development context. However, if possible, Nextrans suggest the proposed development protect for at least two carshare spaces, where appropriate.

9.1.9. On-Site Bikeshare

Given the small scale of the proposed development and that the proposed development will meet the bicycle parking requirements based on the applicable Zoning By-law, it is Nextrans' opinion that on-site bikeshare is not required at this time.

9.1.10. Wayfinding Signage

Given that the proposed development is an infill development, smaller scale and located on a main corridor (Queenston Road), it is Nextrans' opinion that wayfinding signage is not required for the proposed development.

9.1.11. Travel Planning Tools and Support for Development of a School Travel Plan

It is recommended that the proposed development contact and coordinate with the Hamilton-Wentworth District School Board for any potential school travel plan in the area.

9.1.12. Opportunities for Transit Passes, Carshare Memberships, or Bikeshare Memberships

Given the context of the proposed development and its strategic location, this provision is not required.

9.1.13. Proposed Monitoring Evaluation of TDM Measures

Based on our previous experience, monitoring and evaluation of TDM measure are important but very onerous for the Applicant. When project is completed and the Applicant transfers the ownership to Condominium Board, the Board will have the full control of the proposed development and there are certain conditions and requirements the City Housing Hamilton may not agree with.

It is Nextrans' opinion that TDM measures and incentives provided in this report are sufficient and appropriate, as such, monitoring for the proposed development is not required.

9.2. Recommended TDM Measures and Incentives for the Proposed Development

Based on the review of the context of the proposed development in relation to the TDM requirements by the City of Hamilton, a number of TDM measures and incentives are identified for the proposed development to consider, given the limited transit service and active transportation network in the area. Table 15 summarizes the recommended TDM measures and incentives.

Table 16 – Recommended TDM Measures for the Proposed Development

Category	TDM Initiative required by the City or suggested by Nextrans	Recommended Actions	Responsibility
Cycling	• Visible, well-lit, short-term bicycle parking for visitors (above minimum provisions or recommendations) • Secure, indoor bicycle parking storage spaces for tenants/residents • Ensure development connects to bicycle network	• No bicycle parking is required for proposed townhouse development • The proposed development provides a total of 5 short-term spaces and 299 long-term spaces for both buildings	Applicant
Walking	• Safe, attractive and direct walkways for pedestrians linking building entrances with public sidewalks and with key destinations such as schools • Enhanced pedestrian amenities on-site (benches, landscaping, lighting)	• Provide direct shared pedestrian and cycling connections from the proposed development to Reid Avenue S, Roxanne Drive, Hayes Avenue and Ayr Avenue	Applicant
Transit	• Enhance walking routes between main building entrance(s) and transit stops/stations • Bicycle parking located at or near transit stops • Implement transit priority measures (queue jump lanes, traffic signal priority, bus only lanes)	• Not required at this time	Applicant
Parking	• Reduced minimum parking requirements based on proximity to transit • Shared parking with nearby developments or on-street spaces • Unbundle parking costs from unit costs	• Consider unbundle parking rental with the unit; • Reduce parking requirements as per recommendations of this Addendum Study (0.7 spaces/unit instead of 0.8 spaces/unit)	Applicant
Information Brochure/ Letter	• Provide an information brochure/letter for each residential unit that include HSR Transit System schedules, GO Transit schedules, cycling maps and community maps.	• Provide a brochure (or a letter) to new residents that include all website links to Hamilton Transit System schedules, community maps and cycling maps. The information package can be distributed at the sale office.	Applicant
Transit Incentive	• Provide Transit Incentives to encourage residents to take public transit	• Not required for the reasons noted in this Addendum Study	Applicant

10.0 CONCLUSIONS / RECOMMENDATIONS

10.1. Study Conclusions

The findings and conclusions of the analysis are as follows:

- Based on the site trip generation analysis noted above, the proposed development is expected to generate 180 total two-way trips (43 inbound and 137 outbound) and 212 total two-way trips (129 inbound and 83 outbound) during the morning and afternoon peak hours, respectively.

- The intersection capacity analysis indicates that, under the existing and future background conditions, all intersections considered are expected to operate at acceptable levels of service.

- The analysis indicates that under the existing and future background traffic conditions, similar to the existing and future background conditions, all signalized intersections are expected to continue to operate at acceptable levels of service during the morning and afternoon peak periods. This is consistent with the previous assessment that was submitted to the City of Hamilton.

- The analysis indicates that under the future total traffic conditions, similar to the existing and future background conditions, all signalized intersections are expected to continue to operate at acceptable levels of service during the morning and afternoon peak periods, with the exception of the eastbound left turn at the Queenston Road/Reid Avenue S intersection during the afternoon peak hour. This is due to the fact that this movement currently does not have an advance left turn phase. Given that this is a busy intersection located adjacent to

the Red Hill Valley Parkway interchange, this is a typical condition for any major intersection and therefore it is Nextrans' opinion that it is acceptable and no physical improvements are required.

Nextrans has provided a potential mitigation measure such as the traffic signal timing optimization for this intersection during the afternoon peak hour. The analysis indicates that with only additional 10 s green time to be added to the east-west movement, the intersection is expected to operate at acceptable levels of service. The potential signal timing plan is included in the analysis for the City's consideration.

It is Nextrans' opinion that signal timing plan optimization is the most responsible way to address intersection capacity need while saving tax payer monies because this provision is fast and cost-effective. Physical improvements are not only unnecessary but also expensive to build and maintain, especially with the construction costs having increased two folds during the COVID-19 pandemic. It is strongly encouraged for the City to consider the signal timing optimization as suggested in this Addendum Study.

- The analysis indicates that the Reid Avenue S/Roxanne Drive intersection is expected to operate at acceptable levels of service under the morning and afternoon peak periods. The proposed lane configuration includes: one inbound and one outbound lane for the Roxanne Drive, northbound shared through/right and southbound shared through/left on Reid Avenue S. No exclusive left or right turn lanes are required based on this intersection operational capacity analysis. A separate left turn warrant analysis for the Reid Avenue S/Roxanne Drive intersection will be provided in Section 6.2 below, based on the methodology outlined in Ontario Ministry of Transportation (MTO) Geometric Design Manual Part 3.

- The analysis is also indicated that the Reid Avenue N/Ayr Avenue intersection is expected to operate at acceptable levels of service due to low traffic volumes at this intersection. The required lane configurations are similar to the existing conditions with no turning lanes are required.

- Based on the queuing assessment conducted using SimTraffic microsimulation, it is Nextrans' opinion that the 95th queue length at the proposed Reid Avenue S/Roxanne Drive intersection is sufficient to accommodate the expected queues for the 2029 horizon year. No turning lanes are required on Reid Avenue S and Roxanne Drive as indicated in the intersection capacity analysis, left turn warrant analysis and queuing analysis.

- The analysis indicates that the transit passenger demands generated by the proposed development per transit vehicle is low (at most five passenger per transit vehicle). Therefore, the proposed development impact on transit service is negligible and no improvements are required. In reality, some passengers could be bunched together during the peak 15 minutes, instead of spreading during the entire peak hour. Even if this is the case, our estimates indicate that the demand per vehicle is low and can be accommodated without the need for additional transit vehicles or improvements during both the morning and afternoon peak periods.

- Based on the applicable Zoning By-law, the proposed development is required to provide a total of 627 parking spaces, inclusive of resident, visitor and barrier free parking spaces. The proposed development will provide a total of 568 vehicle parking spaces or 9% reduction based on the recommendations and comprehensive justifications provided in this Addendum Study. This is equivalent to a recommended residential parking rate of 0.7 spaces/unit. It is Nextrans' opinion that this recommended rate is reasonable for the context of the proposed development.

- Based on the Zoning By-law No. 05-200, the proposed development should consider providing a total of 304 bicycle parking spaces, which include 5 short-term and 299 long-term spaces. The proposed development will meet these requirements to support vehicle parking reduction and Transportation Demand Management.

- The analysis indicates that the Reid Avenue S/Roxanne Drive intersection is expected to operate at acceptable levels of service under the morning and afternoon peak periods. The proposed lane configuration includes: one inbound and one outbound lane for the Roxanne Drive, northbound shared through/right and southbound shared through/left on Reid Avenue S. No exclusive left or right turn lanes are required based on this intersection operational capacity analysis. A separate left turn warrant analysis for the Reid Avenue S/Roxanne Drive

intersection will be provided in Section 6.2 below, based on the methodology outlined in Ontario Ministry of Transportation (MTO) Geometric Design Manual Part 3.

- The analysis is also indicated that the Reid Avenue N/Ayr Avenue intersection is expected to operate at acceptable levels of service due to low traffic volumes at this intersection. The required lane configurations are similar to the existing conditions with no turning lanes are required.

- As indicated, the expected traffic volumes at the Hayes Avenue/approved condominium road intersection will be much lower than the Reid Avenue N/Ayr Avenue intersection, it is expected that this intersection will operate with better levels of service than the Reid Avenue N/Ayr Avenue intersection. In addition, given that the approved condominium road is located within the outside curb of Hayes Avenue/Armstrong Avenue, similar to the existing access configuration today, it is expected that there will be no sightline or safety issue. The lane configurations include: one in bound and outbound lane, shared eastbound through/right and a shared westbound through/left on Hayes Avenue.

- The proposed development will provide one loading space for each building with the dimensions of: 3 m in width, 10 m in length and no vertical restriction. AutoTURN software was used to generate the vehicle turning templates to demonstrate the turning movements of the servicing vehicles in and out of the proposed loading spaces. These turning movement templates are illustrated in Figure 13 of this Addendum Study.

10.2. Study Recommendations

Based on the assessment, the Report recommends that:

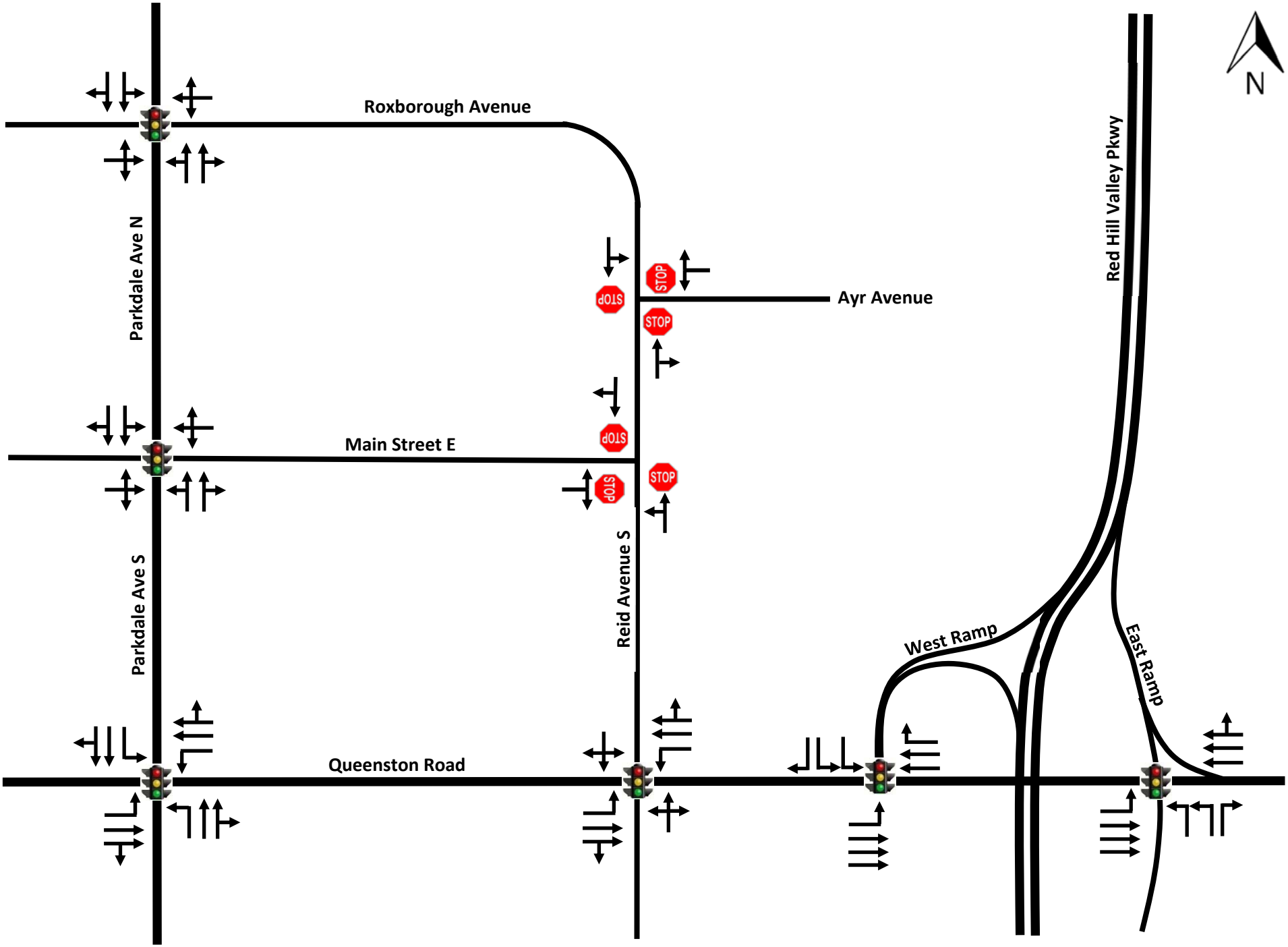
- The proposed development to implement the Transportation Demand Management (TDM) measures and incentives identified in Section 9 of this report to support active transportation and public transit, to meet the objectives and requirements by the City of Hamilton's TDM for Development (June, 2015);

- The proposed development provides the following lane configuration for Reid Avenue S/Roxanne Drive intersection: one inbound and one outbound lane for Roxanne Drive, northbound shared through/right and southbound shared through/left on Reid Avenue S. No exclusive left or right turn lanes are required based on this intersection operational capacity and left turn warrant analysis.

- The proposed development provides the following lane configuration for Hayes Avenue/Site Access intersection: one inbound lane, one outbound lane, shared eastbound through/right and one shared westbound through/left on Hayes Avenue.

- The City of Hamilton to consider signal timing plan optimization suggested in this Addendum Study for the intersection of Queenston Road/Reid Avenue S during the afternoon peak hour.

- No physical improvements are required to the boundary roadway intersections to accommodate the proposed development and background development traffic.



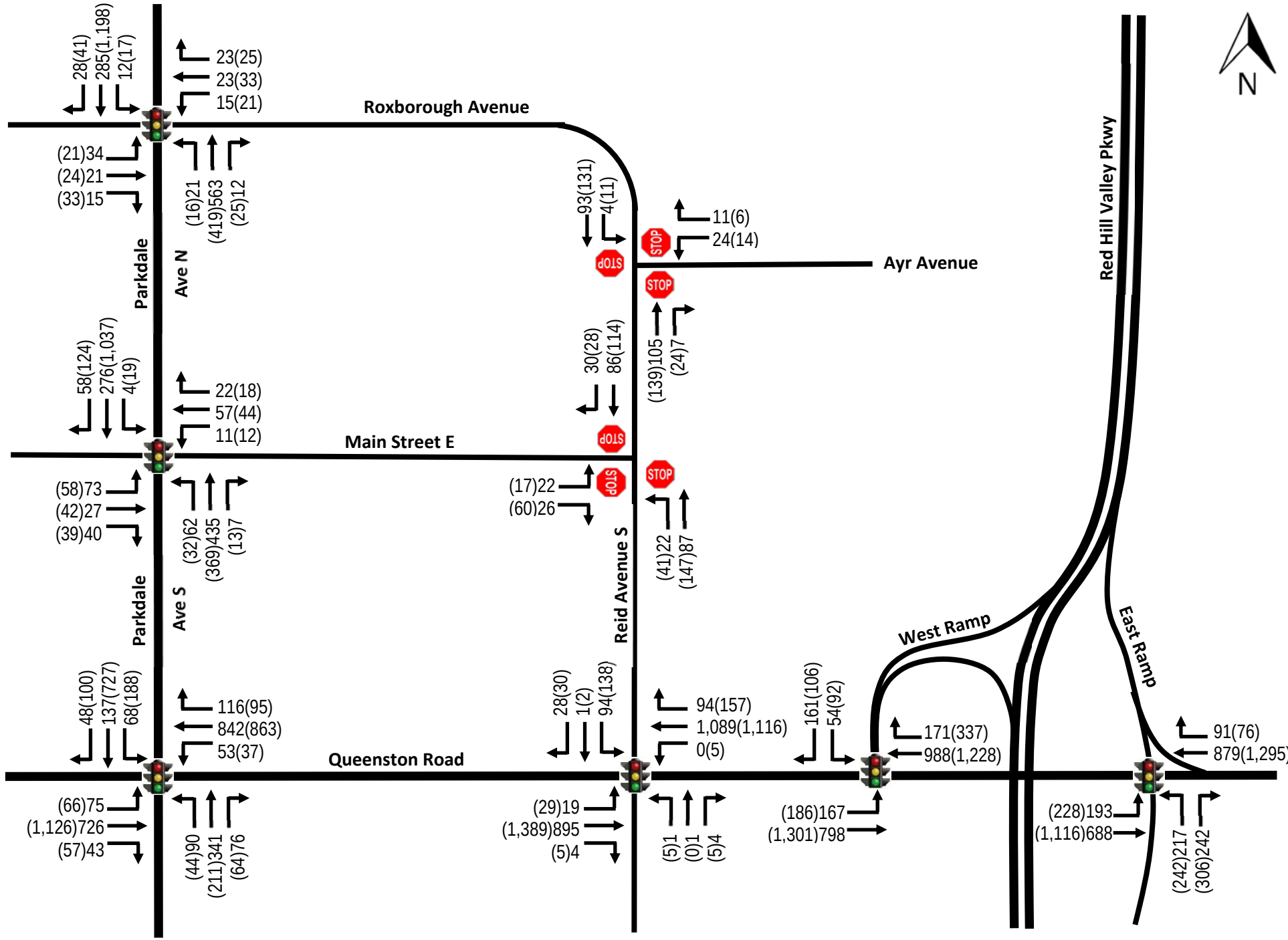
Not to Scale

nexTrans CONSULTING ENGINEERS

Legend

Existing Lane Configuration | Existing Stop Sign | Existing Signalized Intersection

Figure 3 Existing Lane Configurations



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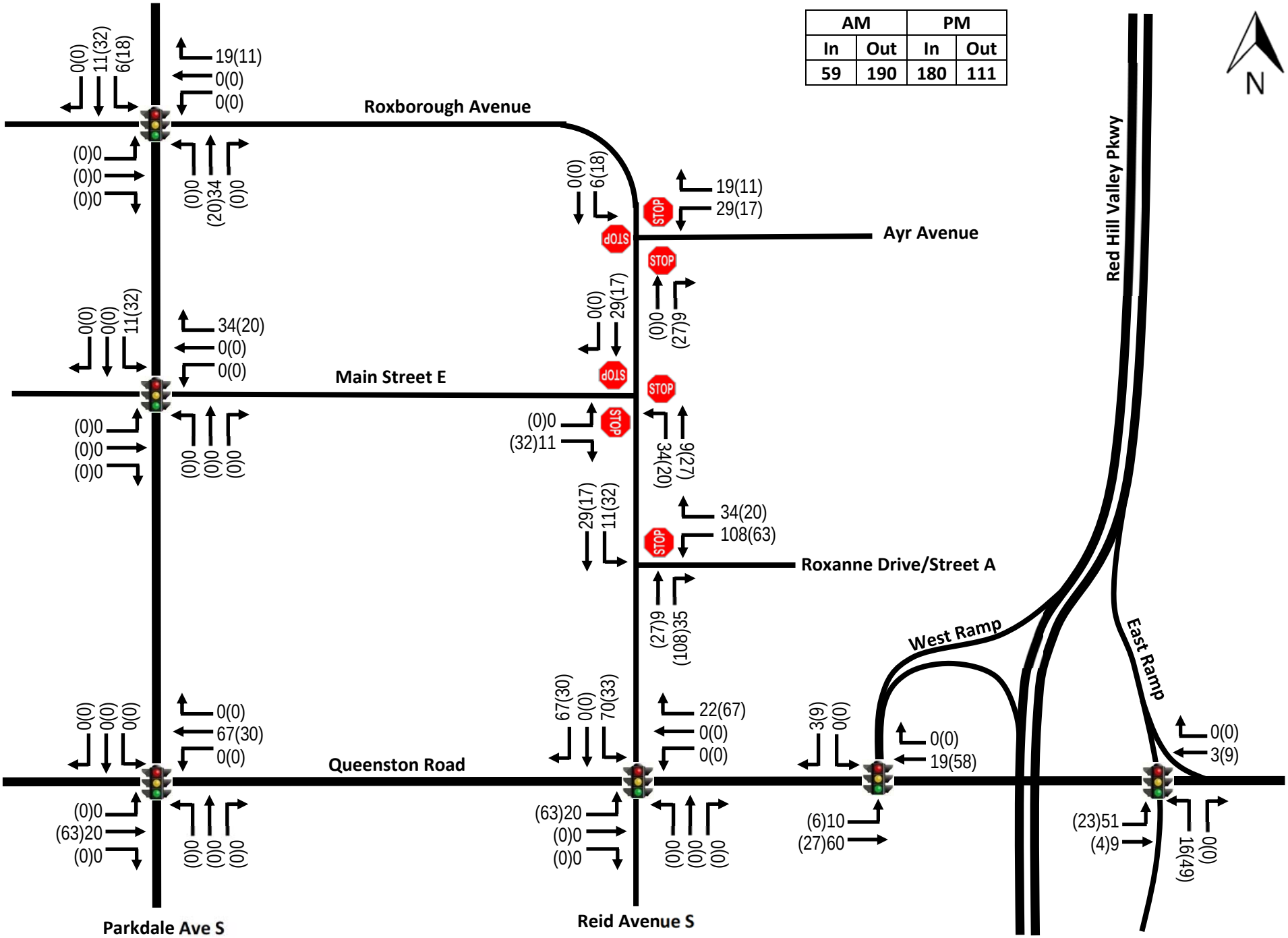
Legend
XX AM Peak Hour (XX) PM Peak Hour STOP Stop Sign Signalized Intersection

Figure 7 – Background Corridor Growth Traffic Volumes



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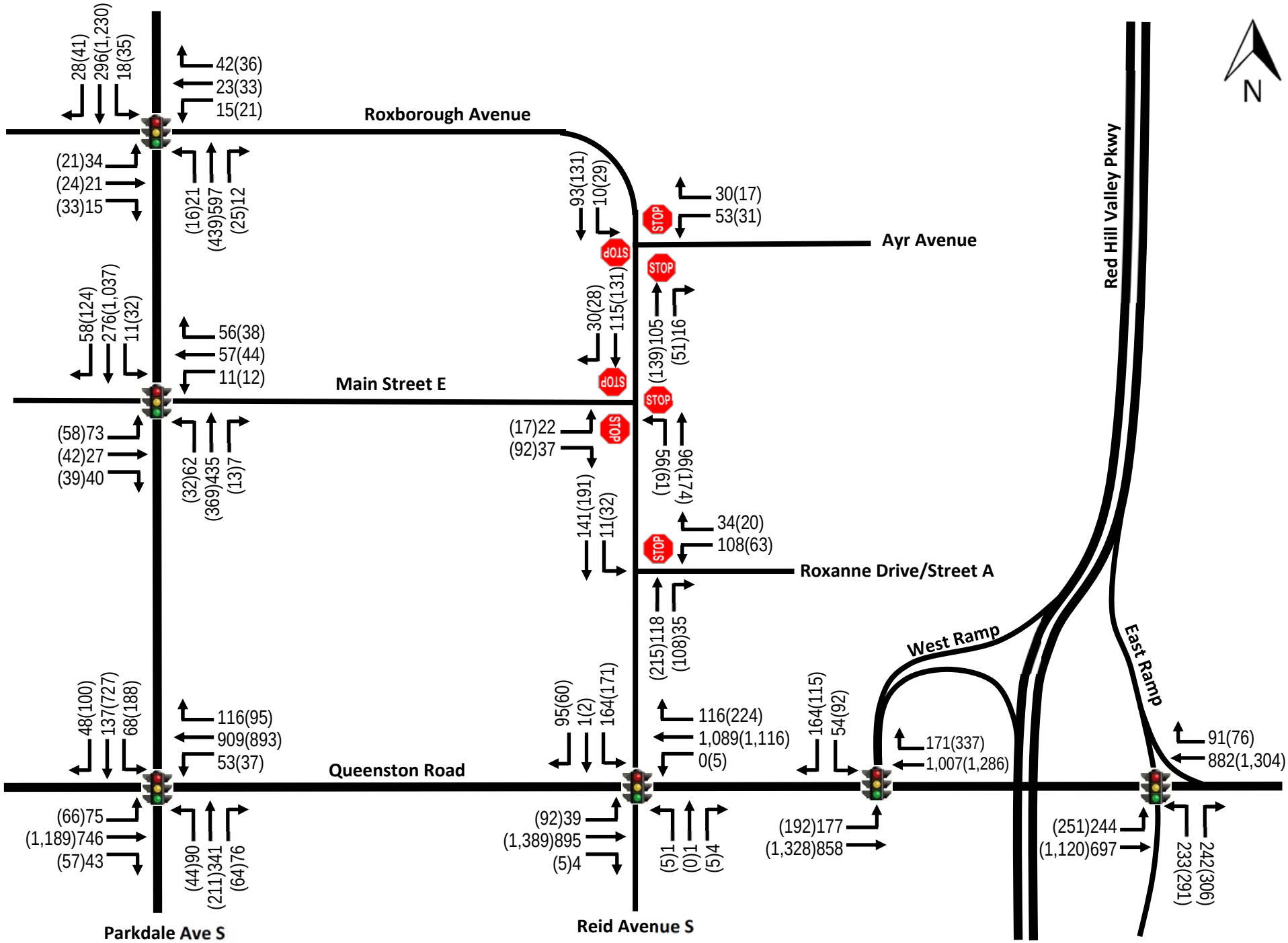
Legend
XX AM Peak Hour (XX) PM Peak Hour STOP Stop Sign Signalized Intersection

Figure 8 – Background Development Traffic Volumes



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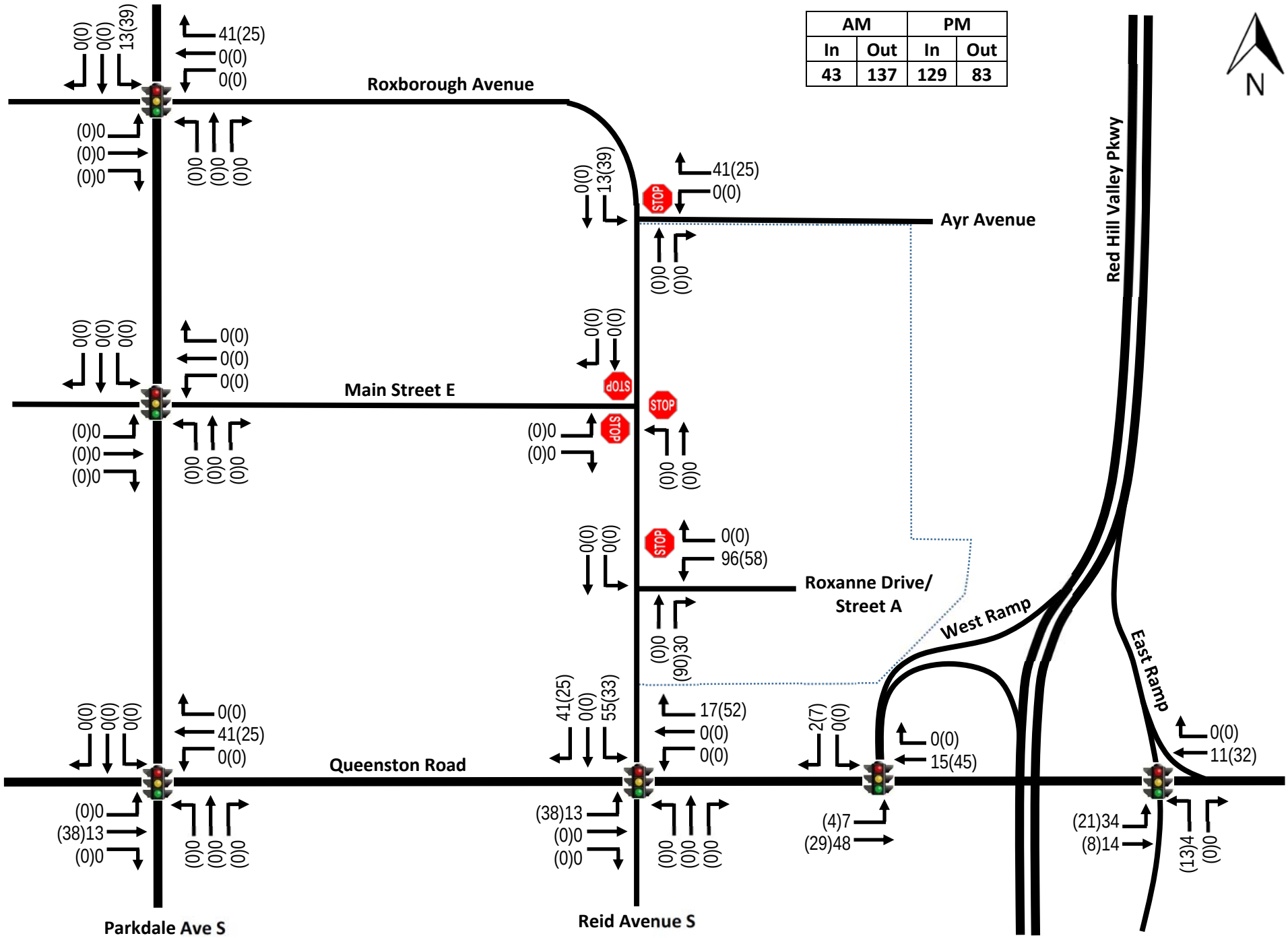
Legend
XX AM Peak Hour (XX) PM Peak Hour STOP Stop Sign Signalized Intersection

Figure 9 – 2029 Future Background Traffic Volumes



Not to Scale

nexTrans CONSULTING ENGINEERS

Legend
XX AM Peak Hour (XX) PM Peak Hour STOP Stop Sign Signalized Intersection

Figure 10 - Site Traffic Volumes

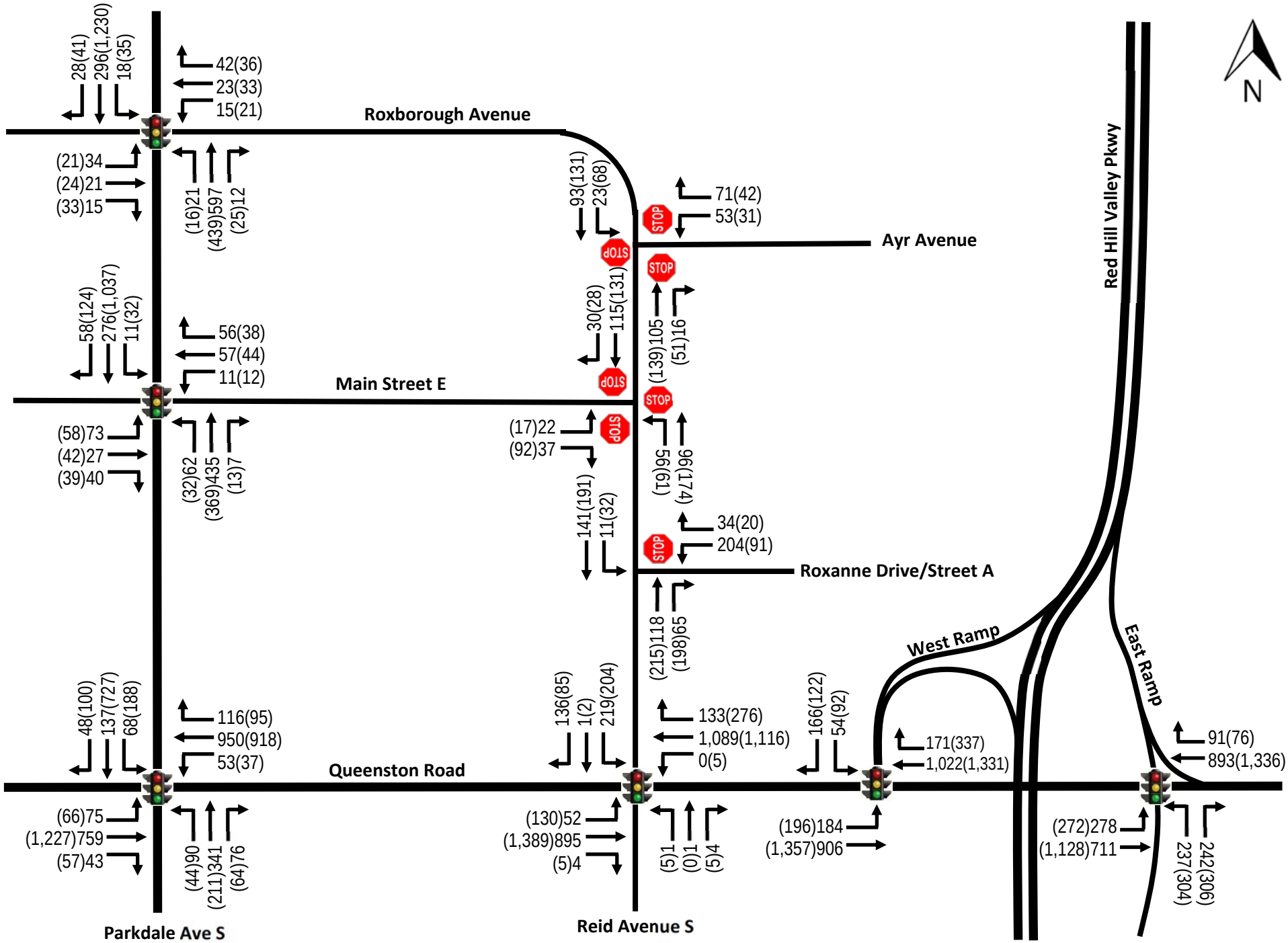
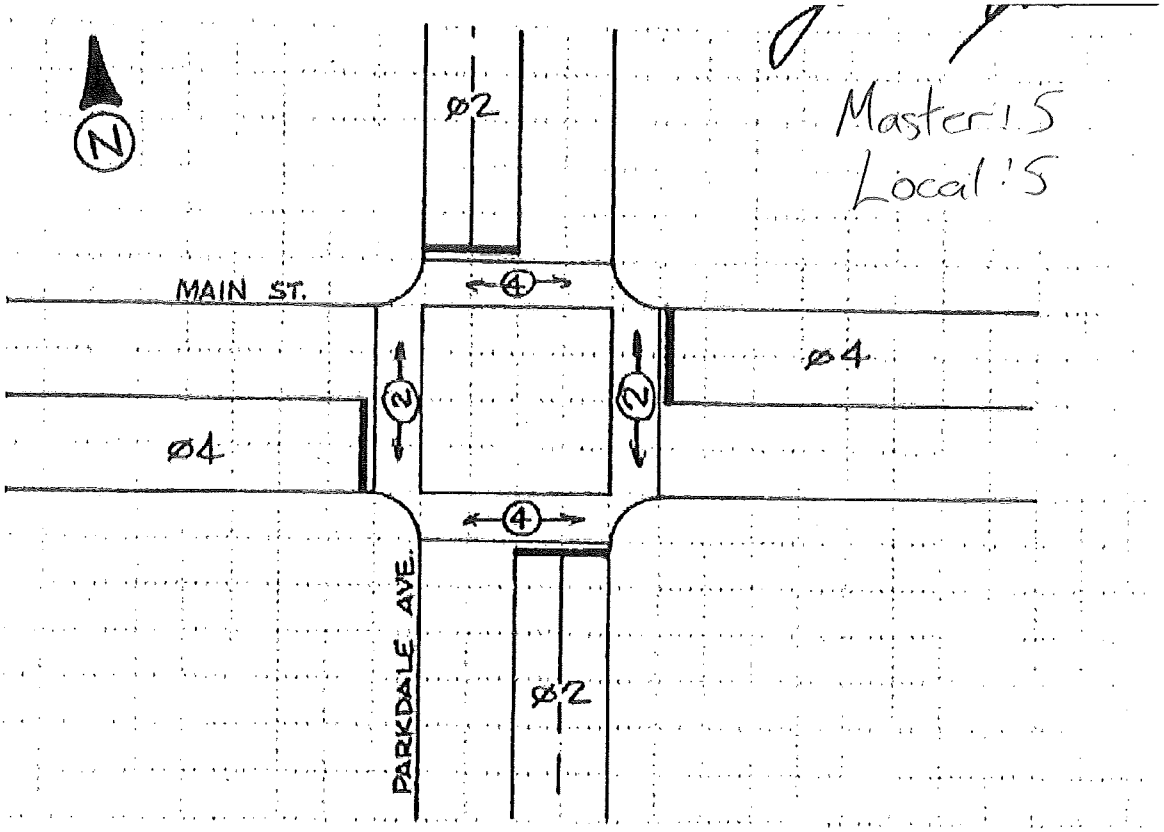


Figure 10 – 2029 Future Total Traffic Volumes

Appendix A
Existing Traffic Data and Signal Timing Plans

City of Hamilton - Traffic
Traffic Signal Controller Timing Data

Intersection: **Parkdale Ave N & Main St E (Int# 147)**
Controller Type: **LMD** Page 1 of 8
Programmed By: JBI - NM Installed By:
Date: Mar 20/13 Date:



Master 1.5
Local 1.5

ø2 PARKDALE NB/SB E+W X-WALKS

ø4 MAIN EB/WB N+S X-WALKS

INTERSECTION:	Parkdale Ave N & Main St E (Int# 147)
DATE:	

DETECTOR COORDINATION SETTINGS

COORDINATION PARAMETERS		
FLASH	OFF	ON = on OFF = off 1-8 = Manual 9 = TimeClock 10 = Interconnect 11 = Comm 12 = Auto
SYSTEM	ON	
CYCLE	11	
SPLIT	11	
OFFSET	11	

OFFSET SEEKING MODE	
SEEKING MODE	1
0 = RESYNC; 1 = DWELL; 2 = SHORTWAY; 3 = INTERRUPTER	

FORCE-OFF RELATIONSHIPS		
FORCE-OFF	PHASES	
1		
2	2	
3		
4	4	
5		
6		
7		
8		

PERMISSIVE RELATIONSIHPS		
PERMISSIVE	PHASES	
1		
2		
3		
4	4	
5		
6		
7		
8		

CYCLE LENGTH/DWELL/OFFSETS								
CYCLE	1	2	3	4	5	6	7	8
LENGTH	90	90	90	70				
MAX DWELL								
OFFSET 1	13	69	71	29				
OFFSET 2								
OFFSET 3								
OFFSET 4								
OFFSET 5								

COORD PHASES & SERVICE/MAX PLANS								
	CYCLE 1				CYCLE 2			
SPLIT	S1	S2	S3	S4	S1	S2	S3	S4
COORD PH.								
SERVICE	1				2			
MAX	1				2			
	CYCLE 3				CYCLE 4			
SPLIT	S1	S2	S3	S4	S1	S2	S3	S4
COORD PH.								
SERVICE	3				4			
MAX	3				4			
	CYCLE 5				CYCLE 6			
SPLIT	S1	S2	S3	S4	S1	S2	S3	S4
COORD PH.								
SERVICE								
MAX PLAN								
	CYCLE 7				CYCLE 8			
SPLIT	S1	S2	S3	S4	S1	S2	S3	S4
COORD PH.								
SERVICE								
MAX PLAN								

Note:
Pedestrian Permissive window must be Automatically controlled.

FORCE-OFF TIMES									
C	S	1	2	3	4	5	6	7	8
1	1				84				
	2								
	3								
	4								
2	1				84				
	2								
	3								
	4								
3	1				84				
	2								
	3								
	4								
4	1				64				
	2								
	3								
	4								
5	1								
	2								
	3								
	4								
6	1								
	2								
	3								
	4								
7	1								
	2								
	3								
	4								
8	1								
	2								
	3								
	4								

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INTERSECTION:	Parkdale Ave N & Main St E (Int# 147)
DATE:	

PERMISSIVE SETTINGS

			PERMISSIVE #							
CYC	SPLIT		1	2	3	4	5	6	7	8
1	1	ST				35				
		END				48				
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								
2	1	ST				31				
		END				44				
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								
3	1	ST				39				
		END				52				
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								
4	1	ST				21				
		END				34				
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								

			PERMISSIVE #							
CYC	SPLIT		1	2	3	4	5	6	7	8
5	1	ST								
		END								
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								
6	1	ST								
		END								
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								
7	1	ST								
		END								
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								
8	1	ST								
		END								
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								

INTERSECTION:	Parkdale Ave N & Main St E (Int# 147)
DATE:	

SERVICE PLANS AND MAX PLANS

SERVICE PLAN #1

PHASE	1	2	3	4	5	6	7	8
CALL MODE		2	0	6				
MIN GRN		10	0	10				
PASSAGE		0		0				
WALK		7		19				
PED CLR		12		12				

SERVICE PLAN #2

PHASE	1	2	3	4	5	6	7	8
CALL MODE		2	0	6				
MIN GRN		10	0	10				
PASSAGE		0		0				
WALK		7		23				
PED CLR		12		12				

SERVICE PLAN #3

PHASE	1	2	3	4	5	6	7	8
CALL MODE		2	0	6				
MIN GRN		10	0	10				
PASSAGE		0		0				
WALK		7		15				
PED CLR		12		12				

SERVICE PLAN #4

PHASE	1	2	3	4	5	6	7	8
CALL MODE		2	0	6				
MIN GRN		10	0	10				
PASSAGE		0		0				
WALK		7		13				
PED CLR		12		12				

SERVICE PLAN CALL MODES

0 = OMIT
1 = ACTUATED
2 = NON-ACTUATED
3 = EXTENDABLE RECALL
4 = MAX RECALL
5 = SOFT RECALL
6 = PED RECALL
7 = PED OMIT (PHASE ACTUATED)

Note: Service Plans are called by C/S or Time Clock, C/S overrides clock

SERVICE PLAN NOTES

1. Enter all parameters for each used phase in each Service Plan in use. A blank in call mode is read as 0, which calls for phase omit. A blank in WALK interval results in 0 seconds being assigned to the WALK interval.

2. Program service plan calls in C/S programming or in Time Clock day plan, not both. Normal mode for controllers in system is to use C/S programming.

MAX PLANS

PLAN	PHASE							
	1	2	3	4	5	6	7	8
1 NORM		48		32				
1 FAIL		48		32				
2 NORM		44		36				
2 FAIL		44		36				
3 NORM		52		28				
3 FAIL		52		28				
4 NORM		34		26				
4 FAIL		34		26				

NORM = NORMAL MAX; FAIL = DETECTOR FAIL MAX

MAX PLAN NOTES

1. MAX plans are not used in non-actuated controllers. Walk Time is extended in Service Plan to achieve desired green time.

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INTERSECTION:	Parkdale Ave N & Main St E (Int# 147)
DATE:	

TIME CLOCK SETTINGS

DAYLIGHT SAVINGS TIME (ON/OFF)			ON
CLOCK RESET TIME	13	00	00
MSD CIRCUIT OUTPUTS			
SYNC REFERENCE MODE			3
ALL CYCLES ZERO AT 00:00:00			

YEAR PROGRAMS		
FROM	TO	USE WEEK PROGRAM

WEEK PROGRAM							
#	SUN	MON	TUE	WED	THU	FRI	SAT
1	1	2	2	2	2	2	1

EXCEPTION DAYS						
#	EX DAY	DOW	WOM	DOM	MOY	DAY

	TIME			CSO	CKT		DESCRIP.
DAY PROG	HR	MIN	SEC		NO.		
1	00	00	00		13	ON	System
	00	00	00	411			
2	00	00	00		13	ON	System
	00	00	00	111			
	06	30	00	211			
	10	00	00	111			
	14	30	00	311			
	18	30	00	111			

	TIME			CSO	CKT		DESCRIP.
DAY PROG	HR	MIN	SEC		NO.		

5/8

INTERSECTION:	Parkdale Ave N & Main St E (Int# 147)
DATE:	

	PHASE							
	1	2	3	4	5	6	7	8
PHASE MOVEMENT								
USE PHASE		X		X				
MEMORY								
EXT RECALL								
MAX RECALL		X		X				
PED RECALL		X		X				
CALL NON ACT 1		X						
CALL NON ACT 2								
FLASH WALK								
SOFT RECALL								
WALK REST								
COND PED								
FWTPCL								

SEQUENCE	1	1 = SEQ, 2 = DUAL RING, 3-7 = SPECIAL				
RED REVERT		0	+2sec	ENHANCED PED	N	Y/N
FDW THRU YELLOW		OFF	ON/OFF	INCREASE YEL & RED CL	0	%
FAST FLASH RATE		3	CODE	TEST B INPUT		CODE
CODE: 0 = 60, 1 = 120, 2 = 150, 3 = 180 FL/MIN				CODE 0 = DIM, 1 = FREE, 2= FREE W/180 DEL		

BASIC CONTROLLER TIMING

	PHASE TIMINGS (0-12.7 OR 127)							
	1	2	3	4	5	6	7	8
MIN GREEN	0	10	0	10				
PASSAGE	0	0	0	0	0	0	0	0
YELLOW	0	3.3	0	3.3				
RED CL	0	2	0	2				
MAX GREEN 1	0	52	0	36	0	0	0	0
MAX GREEN 2								
WALK	0	7	0	19				
PED CLEAR	0	12	0	12				
S/A								
TBR								
LTR								
MIN GAP								
MAX VI								
MAX EXT								
AUTO MAX								
AMR								

INITIALIZE/FLASH				
	INITIALIZE	ENTER FLASH	EXIT FLASH	INTERVAL CODES
RING 1 PHASE	2	4	2	1 = RED
RING 2 PHASE				2 = YELLOW
INTERVAL	3	1	3	3 = GREEN
POWER UP/RESTART TIMINGS				
MINIMUM FLASH		10	(0-127 SECONDS)	
FIRST ALL RED AFTER FLASH		0	(0-127 SECONDS)	

6/8

INTERSECTION:	Parkdale Ave N & Main St E (Int# 147)
DATE:	

DETECTOR PROGRAMMING DATA

DETECTOR #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
MEMORY																									ON/OFF
CALL PHASE																									1-8
EXT/SWITCH	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1-8/1-8
DELAY																									0-9.9 or 127 secs
STR/DIS																									0-9.9 or 127 secs
MODE																									0-9
DETECTOR FAIL MONITOR																									
DET MON MODE																									
								DETECTOR FAIL SAMPLING PERIOD								(0-255 Minutes)								
DETECTOR FAIL PARAMETERS																									
PHASE																									placed on Fail Max Recall
MINIMUM																									Minimum counts required
MAXIMUM																									Maximum counts required
DETECTOR SIMULATION MODE																									
MODE			0 = OFF, 1 = INPUT AND SYSTEM LEVEL, 2 = SYSTEM LEVEL ONLY																						
DETECTOR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
SAT FLOW																									VEHICLES/HOUR
% SATURATION																									0-100%
TOTAL VOLUME																									(NOT PROGRAMMABLE)
PULSE WIDTH																									MILLISECONDS
GATE PHASE																									PHASE 1-12
QUEUE DET																									DETECTOR 1-24

MEMORY - memory can be programmed ON/OFF at input level, i.e., a phase could have memory on or off depending on detector. To do input level memory, phase level memory must be off.

CALL PHASE - Phase called by input.

EXT/SWITCH - EXT phase gets extended if green. Switch phase gets extended if it is green, but the extend phase is not. Set Ext/switch the same for normal operation (i.e., 1/1, 2/2, 3/3, etc.). Set Ext/switch to 0/0 for calling only.

DELAY - If "MODE" = 0, delay anytime phase is red. If "MODE" = 1-8 (Delay enabled), then delay ONLY if call phase red and mode phase is green.

STRETCH/DISCONNECT - If "MODE" = 0-8, detector operates in stretch mode, i.e., call input stretched by amount programmed when EXT phase is green. If mode = 9, detector operates in "DISCONNECT MODE", i.e., value acts like passage timer, except the detector disconnects when it gaps-outs.

MODE - 0 = normal (delay anytime phase is red), 1-8 = Delay enable phase (see delay), 9 = Detector disconnect; stretch/disconnect value operates in disconnect mode.

DETECTOR FAIL MONITOR - ON = detector fail diagnostics enabled, OFF = No detector fail diagnostics.

DET FAIL PHASE - Assign 1-8 if failed detector is to put phase in "max fail recall" (must use max plans with max fail recall time assigned), enter 0 if no max fail recall.

DET MIN/MAX - Under/over ranges for detector diagnostics (over sample period), assign MIN = 1 for no activity monitor, Min = 0 inhibits no activity. Constant call monitor enabled automatically when DET MON ENABLED (see LOW THRESHOLD and CONSTANT CALL inhibit clock circuits).

SATURATION FLOW RATE = In vehicles per hour, during green, the number of vehicles that could pass the detector if flow was uninhibited.

PERCENT SATURATION = The percentage of the SATURATION FLOW RATE that will be used during simulated operation.

TOTAL VOLUME = This is not a programmable entry, it is a calculation of the above two entries. For example, SATURATION FLOW RATE entered as 1,800 VPH, PERCENT SATURATION entered as 10%, the resulting TOTAL VOLUME would be 180 VPH.

PULSE = The PULSE WIDTH in milliseconds of each simulated detector input. This would simulate how long (msec) the detector zone is occupied, for simulation of computed speed.

GATE PHASE = The phase or overlap, which when red, builds up simulated calls and then discharges calls (vehicles) at saturation flow rate when phase is green.

QUEUE DETECTOR = An upstream detector input (1-24) that would be used to count vehicles on their way to the stop bar. This detector input enters counts during red.

QUEUE COUNT = Number of calls (vehicles) counted on QUEUE DETECTOR before input reports full occupancy (steady on). The above two entries would be used to simulate ADAPTIVE SPLIT OPERATION.

7/8

INTERSECTION:	Parkdale Ave N & Main St E (Int# 147)
DATE:	

TIME CLOCK CIRCUIT MODE SET

1 = ON; 2 = OFF; 3 = AUTO

DEFAULT IS AUTO (TIME CLOCK CONTROLLED)

1			26	VEH CALL 7		51	PED OMIT 8	
2			27	VEH CALL 8		52	CONDITIONAL SERVICE ENABLE	
3			28	PED CALL 1		53	SIMUL GAP-OUT INHIBIT	
4			29	PED CALL 2		54	INTERCONNECT INHIBIT	
5			30	PED CALL 3		55	SYNCH OUTPUT INHIBIT	
6			31	PED CALL 4		56	WALK REST MODIFY ENABLE	1
7			32	PED CALL 5		57	DUAL ENTRY ENABLE	
8	FLASH		33	PED CALL 6		58	RED REST ENABLE RING 1	
9	AUX 1		34	PED CALL 7		59	RED REST ENABLE RING 2	
10	AUX 2		35	PED CALL 8		60	OMIT RED CLEAR RING 1	
11	AUX 3		36	VEH OMIT 1		61	OMIT RED CLEAR RING 2	
12	AUX 4		37	VEH OMIT 2		62	PED RECYCLE ENABLE RING 1	
13	SYSTEM ENABLE		38	VEH OMIT 3		63	PED RECYCLE ENABLE RING 2	
14	MAX 2		39	VEH OMIT 4		64	DETECTOR LOW THRESH INHIBIT	
15	MAX 2 INHIBIT RING 1		40	VEH OMIT 5		65	DETECTOR PRESENCE INHIBIT	
16	MAX 2 INHIBIT RING 2		41	VEH OMIT 6		66	PREEMPT CALL 1	
17	CALL NON ACT 1	1	42	VEH OMIT 7		67	PREEMPT CALL 2	
18	CALL NON ACT 2		43	VEH OMIT 8		68	PREEMPT CALL 3	
19	MIN RECALL ALL		44	PED OMIT 1		69	PREEMPT CALL 4	
20	VEH CALL 1		45	PED OMIT 2		70	PREEMPT CALL 5	
21	VEH CALL 2		46	PED OMIT 3		71	PREEMPT CALL 6	
22	VEH CALL 3		47	PED OMIT 4		72	MAX PLAN 1	
23	VEH CALL 4		48	PED OMIT 5		73	MAX PLAN 2	
24	VEH CALL 5		49	PED OMIT 6		74	MAX PLAN 3	
25	VEH CALL 6		50	PED OMIT 7		75	MAX PLAN 4	

8/8

NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

Turning Movement Count (6 . MAIN ST E & PARKDALE AVE S / PARKDALE AVE N)

Start Time	N Approach PARKDALE AVE N						E Approach MAIN ST E						S Approach PARKDALE AVE S						W Approach MAIN ST E						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	1	38	2	0	0	41	3	3	0	0	0	6	0	74	10	0	2	84	5	1	11	0	2	17	148	
07:15:00	10	36	1	0	1	47	3	6	1	0	1	10	1	111	2	0	0	114	6	5	15	0	1	26	197	
07:30:00	6	23	1	0	0	30	6	6	2	0	2	14	2	90	3	0	1	95	5	2	16	0	2	23	162	
07:45:00	5	24	1	0	0	30	6	14	0	0	0	20	5	134	6	0	1	145	10	4	14	0	2	28	223	730
08:00:00	5	34	2	0	0	41	3	5	1	0	1	9	2	117	15	0	0	134	5	1	12	0	0	18	202	784
08:15:00	15	52	0	0	1	67	6	12	2	0	1	20	1	97	17	0	1	115	5	5	21	0	1	31	233	820
08:30:00	17	57	1	0	3	75	7	13	8	0	2	28	2	82	15	0	0	99	7	6	17	0	3	30	232	890
08:45:00	14	54	0	0	6	68	4	21	1	0	4	26	2	93	19	0	3	114	17	9	21	0	5	47	255	922
09:00:00	12	56	3	0	1	71	5	11	0	0	2	16	2	73	11	0	2	86	11	7	14	0	2	32	205	925
09:15:00	12	42	1	0	4	55	8	5	0	0	2	13	3	70	9	0	0	82	4	6	8	0	0	18	168	860
09:30:00	8	51	1	0	1	60	2	8	2	0	1	12	5	55	9	0	0	69	9	6	5	0	5	20	161	789
09:45:00	7	58	4	0	2	69	2	1	3	0	2	6	2	69	7	0	0	78	6	5	13	0	0	24	177	711
BREAK																										
16:00:00	24	142	7	0	1	173	6	21	2	0	4	29	3	82	2	0	2	87	8	9	13	0	2	30	319	
16:15:00	25	128	7	0	5	160	5	19	7	0	2	31	4	94	8	0	0	106	13	7	18	0	3	38	335	
16:30:00	29	210	7	0	0	246	2	13	3	0	2	18	0	80	8	0	0	88	10	9	15	0	1	34	386	
16:45:00	25	192	2	0	1	219	6	11	2	0	4	19	5	84	8	0	3	97	12	17	11	0	8	40	375	1415
17:00:00	42	218	6	0	3	266	6	8	2	0	2	16	6	67	9	0	0	82	11	11	17	0	2	39	403	1499
17:15:00	28	203	4	0	3	235	4	12	5	0	8	21	2	62	7	0	1	71	6	5	15	0	4	26	353	1517
17:30:00	31	186	4	0	2	221	5	7	2	0	5	14	5	70	9	0	0	84	7	8	8	0	2	23	342	1473
17:45:00	32	138	4	0	2	174	8	10	5	0	4	23	5	77	12	0	0	94	10	2	12	0	6	24	315	1413
18:00:00	14	102	1	0	0	117	1	2	3	0	2	6	2	67	3	0	0	72	10	7	12	0	2	29	224	1234
18:15:00	9	85	3	0	0	97	5	5	4	0	2	14	4	73	13	0	1	90	12	9	10	0	3	31	232	1113
18:30:00	13	79	2	0	3	94	4	8	1	0	1	13	3	61	11	0	0	75	18	4	12	0	2	34	216	987
18:45:00	11	56	2	0	1	69	5	5	2	0	1	12	4	64	14	0	1	82	7	5	12	0	1	24	187	859
Grand Total	395	2264	66	0	40	2725	112	226	58	0	55	396	70	1946	227	0	18	2243	214	150	322	0	59	686	**6050**	-
Approach%	14.5%	83.1%	2.4%	0%		-	28.3%	57.1%	14.6%	0%		-	3.1%	86.8%	10.1%	0%		-	31.2%	21.9%	46.9%	0%		-	-	-
Totals %	6.5%	37.4%	1.1%	0%		45%	1.9%	3.7%	1%	0%		6.5%	1.2%	32.2%	3.8%	0%		37.1%	3.5%	2.5%	5.3%	0%		11.3%	-	-
Heavy	6	58	1	0		-	1	3	3	0		-	5	60	3	0		-	4	2	13	0		-	-	-
Heavy %	1.5%	2.6%	1.5%	0%		-	0.9%	1.3%	5.2%	0%		-	7.1%	3.1%	1.3%	0%		-	1.9%	1.3%	4%	0%		-	-	-
Bicycles	0	1	0	0		-	0	0	0	0		-	0	0	0	0		-	0	0	0	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	-	-

NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

Peak Hour: 08:15 AM - 09:15 AM Weather: Partly Cloudy (-7 °C)

Start Time	N Approach PARKDALE AVE N						E Approach MAIN ST E						S Approach PARKDALE AVE S						W Approach MAIN ST E						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	
08:15:00	15	52	0	0	1	67	6	12	2	0	1	20	1	97	17	0	1	115	5	5	21	0	1	31	233
08:30:00	17	57	1	0	3	75	7	13	8	0	2	28	2	82	15	0	0	99	7	6	17	0	3	30	232
08:45:00	14	54	0	0	6	68	4	21	1	0	4	26	2	93	19	0	3	114	17	9	21	0	5	47	255
09:00:00	12	56	3	0	1	71	5	11	0	0	2	16	2	73	11	0	2	86	11	7	14	0	2	32	205
Grand Total	58	219	4	0	11	281	22	57	11	0	9	90	7	345	62	0	6	414	40	27	73	0	11	140	**925**
Approach%	20.6%	77.9%	1.4%	0%		-	24.4%	63.3%	12.2%	0%		-	1.7%	83.3%	15%	0%		-	28.6%	19.3%	52.1%	0%		-	**-**
Totals %	6.3%	23.7%	0.4%	0%		30.4%	2.4%	6.2%	1.2%	0%		9.7%	0.8%	37.3%	6.7%	0%		44.8%	4.3%	2.9%	7.9%	0%		15.1%	**-**
PHF	0.85	0.96	0.33	0		0.94	0.79	0.68	0.34	0		0.8	0.88	0.89	0.82	0		0.9	0.59	0.75	0.87	0		0.74	**-**
Heavy	1	14	0	0		15	0	1	3	0		4	2	17	1	0		20	2	0	4	0		6	**-**
Heavy %	1.7%	6.4%	0%	0%		5.3%	0%	1.8%	27.3%	0%		4.4%	28.6%	4.9%	1.6%	0%		4.8%	5%	0%	5.5%	0%		4.3%	**-**
Lights	57	205	4	0		266	22	56	8	0		86	5	328	61	0		394	38	27	69	0		134	**-**
Lights %	98.3%	93.6%	100%	0%		94.7%	100%	98.2%	72.7%	0%		95.6%	71.4%	95.1%	98.4%	0%		95.2%	95%	100%	94.5%	0%		95.7%	**-**
Single-Unit Trucks	0	6	0	0		6	0	0	0	0		0	0	10	1	0		11	0	0	3	0		3	**-**
Single-Unit Trucks %	0%	2.7%	0%	0%		2.1%	0%	0%	0%	0%		0%	0%	2.9%	1.6%	0%		2.7%	0%	0%	4.1%	0%		2.1%	**-**
Buses	1	6	0	0		7	0	1	3	0		4	2	7	0	0		9	2	0	1	0		3	**-**
Buses %	1.7%	2.7%	0%	0%		2.5%	0%	1.8%	27.3%	0%		4.4%	28.6%	2%	0%	0%		2.2%	5%	0%	1.4%	0%		2.1%	**-**
Articulated Trucks	0	2	0	0		2	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0.9%	0%	0%		0.7%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	11	-	-	-	-	-	8	-	-	-	-	-	6	-	-	-	-	-	11	-	**-**
Pedestrians%	-	-	-	-	29.7%		-	-	-	-	21.6%		-	-	-	-	16.2%		-	-	-	-	29.7%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	2.7%		-	-	-	-	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	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (-3 °C)

Start Time	N Approach PARKDALE AVE N						E Approach MAIN ST E						S Approach PARKDALE AVE S						W Approach MAIN ST E						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	29	210	7	0	0	246	2	13	3	0	2	18	0	80	8	0	0	88	10	9	15	0	1	34	386
16:45:00	25	192	2	0	1	219	6	11	2	0	4	19	5	84	8	0	3	97	12	17	11	0	8	40	375
17:00:00	42	218	6	0	3	266	6	8	2	0	2	16	6	67	9	0	0	82	11	11	17	0	2	39	403
17:15:00	28	203	4	0	3	235	4	12	5	0	8	21	2	62	7	0	1	71	6	5	15	0	4	26	353
Grand Total	124	823	19	0	7	966	18	44	12	0	16	74	13	293	32	0	4	338	39	42	58	0	15	139	**1517**
Approach%	12.8%	85.2%	2%	0%		-	24.3%	59.5%	16.2%	0%		-	3.8%	86.7%	9.5%	0%		-	28.1%	30.2%	41.7%	0%		-	-
Totals %	8.2%	54.3%	1.3%	0%		63.7%	1.2%	2.9%	0.8%	0%		4.9%	0.9%	19.3%	2.1%	0%		22.3%	2.6%	2.8%	3.8%	0%		9.2%	-
PHF	0.74	0.94	0.68	0		0.91	0.75	0.85	0.6	0		0.88	0.54	0.87	0.89	0		0.87	0.81	0.62	0.85	0		0.87	-
Heavy	0	7	0	0		7	0	0	0	0		0	0	6	0	0		6	0	0	1	0		1	-
Heavy %	0%	0.9%	0%	0%		0.7%	0%	0%	0%	0%		0%	0%	2%	0%	0%		1.8%	0%	0%	1.7%	0%		0.7%	-
Lights	124	816	19	0		959	18	44	12	0		74	13	287	32	0		332	39	42	57	0		138	-
Lights %	100%	99.1%	100%	0%		99.3%	100%	100%	100%	0%		100%	100%	98%	100%	0%		98.2%	100%	100%	98.3%	0%		99.3%	-
Single-Unit Trucks	0	4	0	0		4	0	0	0	0		0	0	2	0	0		2	0	0	1	0		1	-
Single-Unit Trucks %	0%	0.5%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.6%	0%	0%	1.7%	0%		0.7%	-
Buses	0	3	0	0		3	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	-
Buses %	0%	0.4%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	1.4%	0%	0%		1.2%	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	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	16	-	-	-	-	-	4	-	-	-	-	-	15	-	-
Pedestrians%	-	-	-	-	16.7%		-	-	-	-	38.1%		-	-	-	-	9.5%		-	-	-	-	35.7%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	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	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 08:15 AM - 09:15 AM **Weather: Partly Cloudy (-7 °C)**

	Bicycles on Crosswalk	Pedestrians
N	0	11
S	0	6
E	1	8
W	0	11

Peak Hour: 04:30 PM - 05:30 PM **Weather: Partly Cloudy (-3 °C)**

	Bicycles on Crosswalk	Pedestrians
N	0	7
S	0	4
E	0	16
W	0	15

NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

Turning Movement Count (2 . MAIN ST E & REID AVE S / REID AVE N)

Start Time	N Approach REID AVE N					S Approach REID AVE S					W Approach MAIN ST E					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	U-Turn N:N	Peds N:	Approach Total	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	1	7	0	0	8	4	2	0	1	6	3	0	0	1	3	17	
07:15:00	2	6	0	0	8	10	4	0	0	14	4	2	0	3	6	28	
07:30:00	4	7	0	0	11	11	5	0	1	16	6	3	0	1	9	36	
07:45:00	6	19	0	1	25	14	10	0	0	24	4	4	0	2	8	57	138
08:00:00	1	13	0	3	14	6	7	0	0	13	6	1	0	1	7	34	155
08:15:00	8	11	0	1	19	28	4	0	0	32	7	4	0	2	11	62	189
08:30:00	6	28	0	0	34	13	7	0	2	20	4	3	0	0	7	61	214
08:45:00	12	20	0	1	32	24	7	0	1	31	10	12	0	0	22	85	242
09:00:00	4	13	0	1	17	8	4	0	2	12	5	3	0	1	8	37	245
09:15:00	4	12	0	0	16	18	6	0	0	24	8	1	0	1	9	49	232
09:30:00	4	12	0	0	16	9	6	0	0	15	10	3	0	1	13	44	215
09:45:00	0	11	0	3	11	15	4	0	1	19	7	2	0	2	9	39	169
BREAK																	
16:00:00	6	23	0	0	29	26	13	0	0	39	16	3	0	1	19	87	
16:15:00	13	14	0	0	27	31	11	0	3	42	14	1	0	3	15	84	
16:30:00	6	30	0	0	36	35	13	0	0	48	14	4	0	2	18	102	
16:45:00	5	25	0	0	30	30	10	0	0	40	8	6	0	2	14	84	357
17:00:00	4	27	0	0	31	28	7	0	0	35	24	6	0	3	30	96	366
17:15:00	3	20	0	1	23	23	10	0	2	33	10	2	0	2	12	68	350
17:30:00	5	24	0	0	29	12	7	0	0	19	13	5	0	1	18	66	314
17:45:00	4	13	0	1	17	26	11	0	0	37	7	1	0	1	8	62	292
18:00:00	1	23	0	0	24	19	6	0	0	25	2	6	0	2	8	57	253
18:15:00	1	18	0	0	19	16	4	0	0	20	12	5	0	4	17	56	241
18:30:00	5	19	0	0	24	16	8	0	0	24	4	6	0	2	10	58	233

18:45:00	2	19	0	0	21	13	9	0	2	22	3	2	0	5	5	48	219
Grand Total	107	414	0	12	521	435	175	0	15	610	201	85	0	43	286	**1417**	-
Approach%	20.5%	79.5%	0%		-	71.3%	28.7%	0%		-	70.3%	29.7%	0%		-	**-**	-
Totals %	7.6%	29.2%	0%		36.8%	30.7%	12.4%	0%		43%	14.2%	6%	0%		20.2%	**-**	-
Heavy	2	14	0		-	12	4	0		-	2	4	0		-	**-**	-
Heavy %	1.9%	3.4%	0%		-	2.8%	2.3%	0%		-	1%	4.7%	0%		-	**-**	-
Bicycles	1	0	0		-	0	2	0		-	3	0	0		-	**-**	-
Bicycle %	0.9%	0%	0%		-	0%	1.1%	0%		-	1.5%	0%	0%		-	**-**	-

NexTrans
4261-A14 Highway 7 East
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Markham ON, CANADA, L3R 9W6

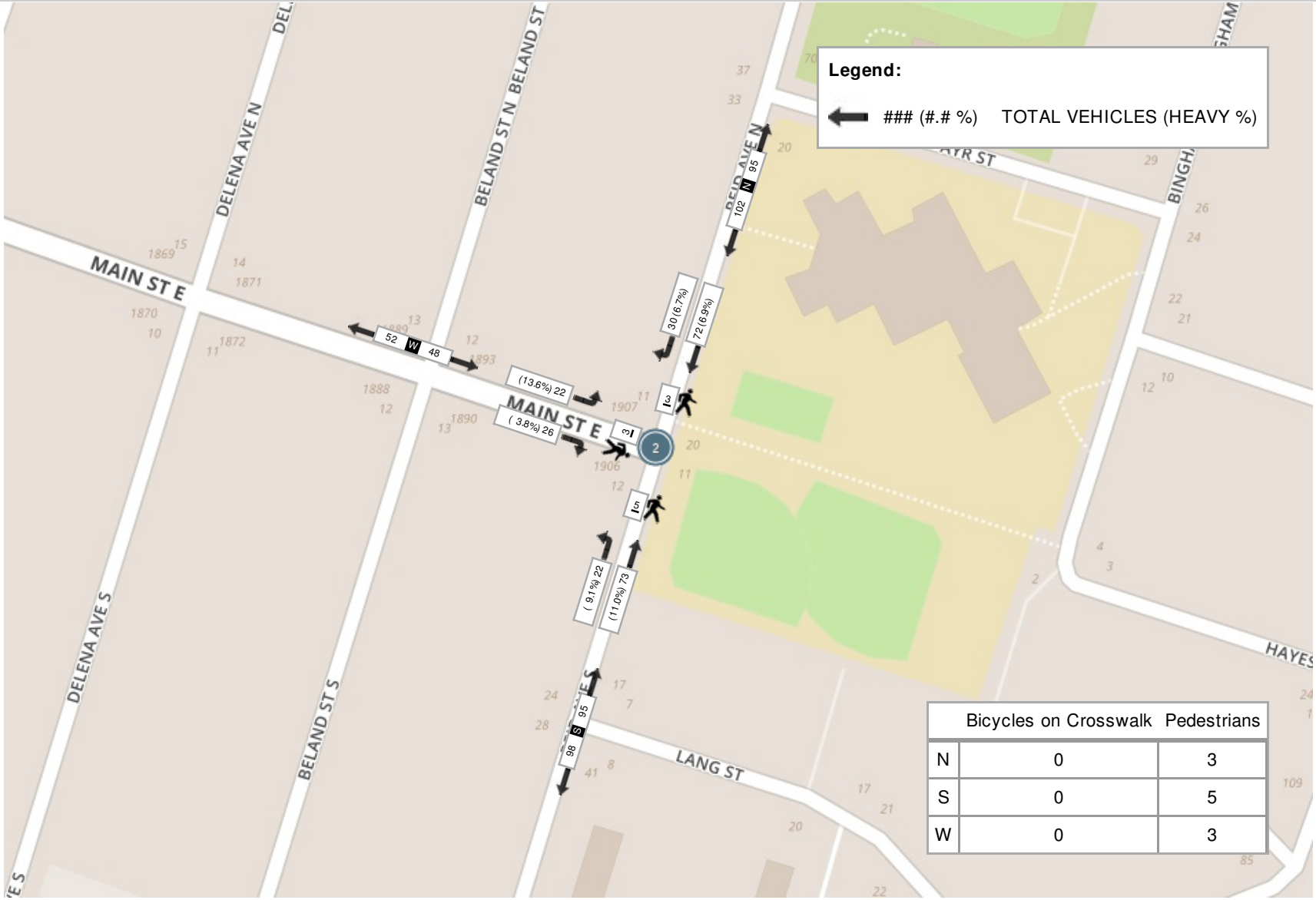
Peak Hour: 08:15 AM - 09:15 AM Weather: Partly Cloudy (-7 °C)

Start Time	N Approach REID AVE N					S Approach REID AVE S					W Approach MAIN ST E					Int. Total (15 min)
	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	
08:15:00	8	11	0	1	19	28	4	0	0	32	7	4	0	2	11	62
08:30:00	6	28	0	0	34	13	7	0	2	20	4	3	0	0	7	61
08:45:00	12	20	0	1	32	24	7	0	1	31	10	12	0	0	22	85
09:00:00	4	13	0	1	17	8	4	0	2	12	5	3	0	1	8	37
Grand Total	30	72	0	3	102	73	22	0	5	95	26	22	0	3	48	**245**
Approach%	29.4%	70.6%	0%		-	76.8%	23.2%	0%		-	54.2%	45.8%	0%		-	-
Totals %	12.2%	29.4%	0%		41.6%	29.8%	9%	0%		38.8%	10.6%	9%	0%		19.6%	-
PHF	0.63	0.64	0		0.75	0.65	0.79	0		0.74	0.65	0.46	0		0.55	-
Heavy	2	5	0		7	8	2	0		10	1	3	0		4	-
Heavy %	6.7%	6.9%	0%		6.9%	11%	9.1%	0%		10.5%	3.8%	13.6%	0%		8.3%	-
Lights	28	67	0		95	65	20	0		85	25	19	0		44	-
Lights %	93.3%	93.1%	0%		93.1%	89%	90.9%	0%		89.5%	96.2%	86.4%	0%		91.7%	-
Single-Unit Trucks	0	3	0		3	3	0	0		3	0	0	0		0	-
Single-Unit Trucks %	0%	4.2%	0%		2.9%	4.1%	0%	0%		3.2%	0%	0%	0%		0%	-
Buses	2	2	0		4	5	2	0		7	1	3	0		4	-
Buses %	6.7%	2.8%	0%		3.9%	6.8%	9.1%	0%		7.4%	3.8%	13.6%	0%		8.3%	-
Pedestrians	-	-	-	3	-	-	-	-	5	-	-	-	-	3	-	-
Pedestrians%	-	-	-	27.3%		-	-	-	45.5%		-	-	-	27.3%		-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-
Bicycles on Road	0	0	0	0	-	0	1	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

Peak Hour: 04:15 PM - 05:15 PM Weather: Partly Cloudy (-3 °C)

Start Time	N Approach REID AVE N					S Approach REID AVE S					W Approach MAIN ST E					Int. Total (15 min)
	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	
16:15:00	13	14	0	0	27	31	11	0	3	42	14	1	0	3	15	84
16:30:00	6	30	0	0	36	35	13	0	0	48	14	4	0	2	18	102
16:45:00	5	25	0	0	30	30	10	0	0	40	8	6	0	2	14	84
17:00:00	4	27	0	0	31	28	7	0	0	35	24	6	0	3	30	96
Grand Total	28	96	0	0	124	124	41	0	3	165	60	17	0	10	77	**366**
Approach%	22.6%	77.4%	0%		-	75.2%	24.8%	0%		-	77.9%	22.1%	0%		-	-
Totals %	7.7%	26.2%	0%		33.9%	33.9%	11.2%	0%		45.1%	16.4%	4.6%	0%		21%	-
PHF	0.54	0.8	0		0.86	0.89	0.79	0		0.86	0.63	0.71	0		0.64	-
Heavy	0	2	0		2	0	0	0		0	0	0	0		0	-
Heavy %	0%	2.1%	0%		1.6%	0%	0%	0%		0%	0%	0%	0%		0%	-
Lights	28	94	0		122	124	41	0		165	60	17	0		77	-
Lights %	100%	97.9%	0%		98.4%	100%	100%	0%		100%	100%	100%	0%		100%	-
Single-Unit Trucks	0	1	0		1	0	0	0		0	0	0	0		0	-
Single-Unit Trucks %	0%	1%	0%		0.8%	0%	0%	0%		0%	0%	0%	0%		0%	-
Buses	0	1	0		1	0	0	0		0	0	0	0		0	-
Buses %	0%	1%	0%		0.8%	0%	0%	0%		0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	9	-	-
Pedestrians%	-	-	-	0%		-	-	-	23.1%		-	-	-	69.2%		-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	7.7%		-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

Peak Hour: 08:15 AM - 09:15 AM Weather: Partly Cloudy (-7 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	3
S	0	5
W	0	3

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Suite 489
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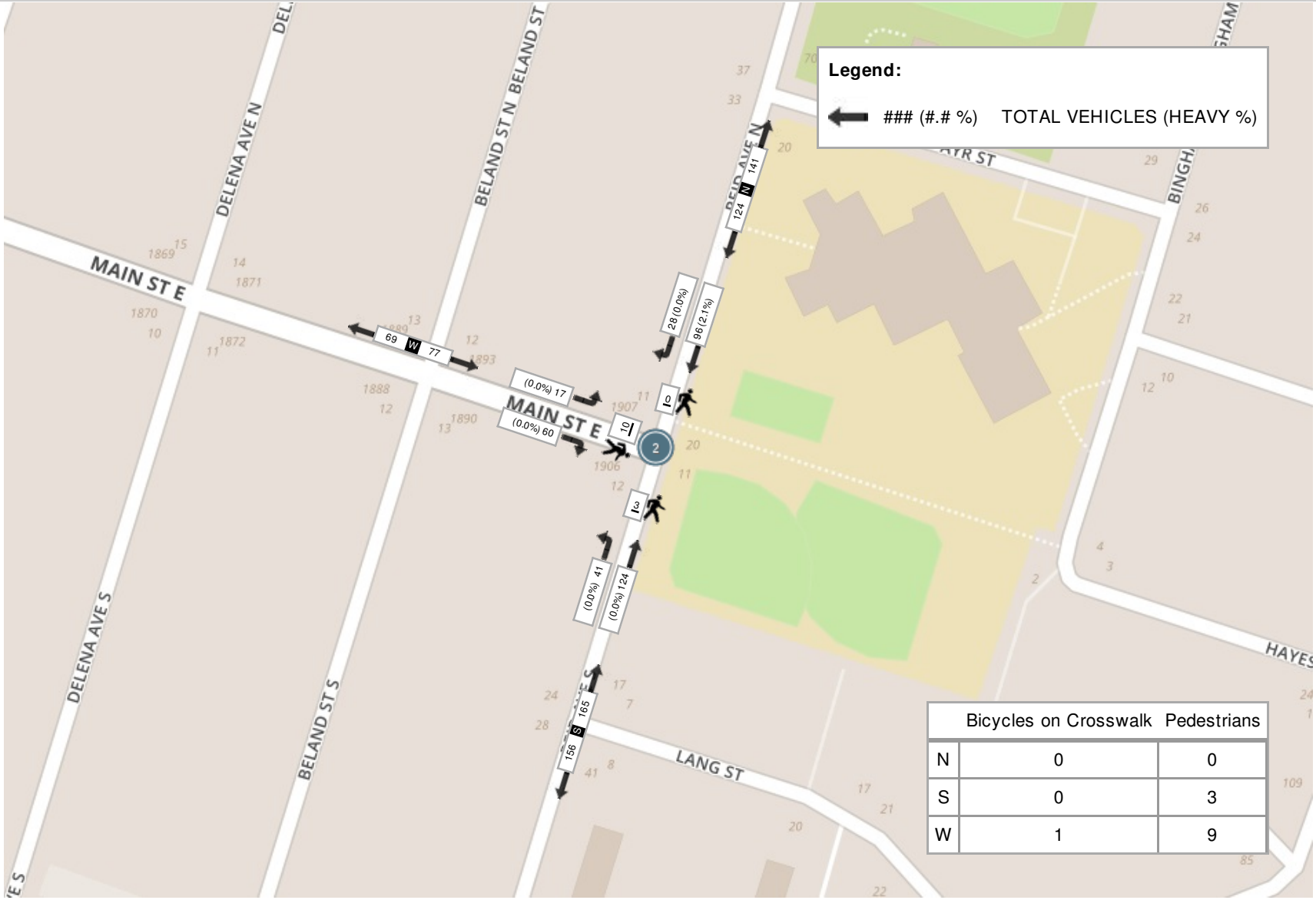
Peak Hour: 04:15 PM - 05:15 PM Weather: Partly Cloudy (-3 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	3
W	1	9

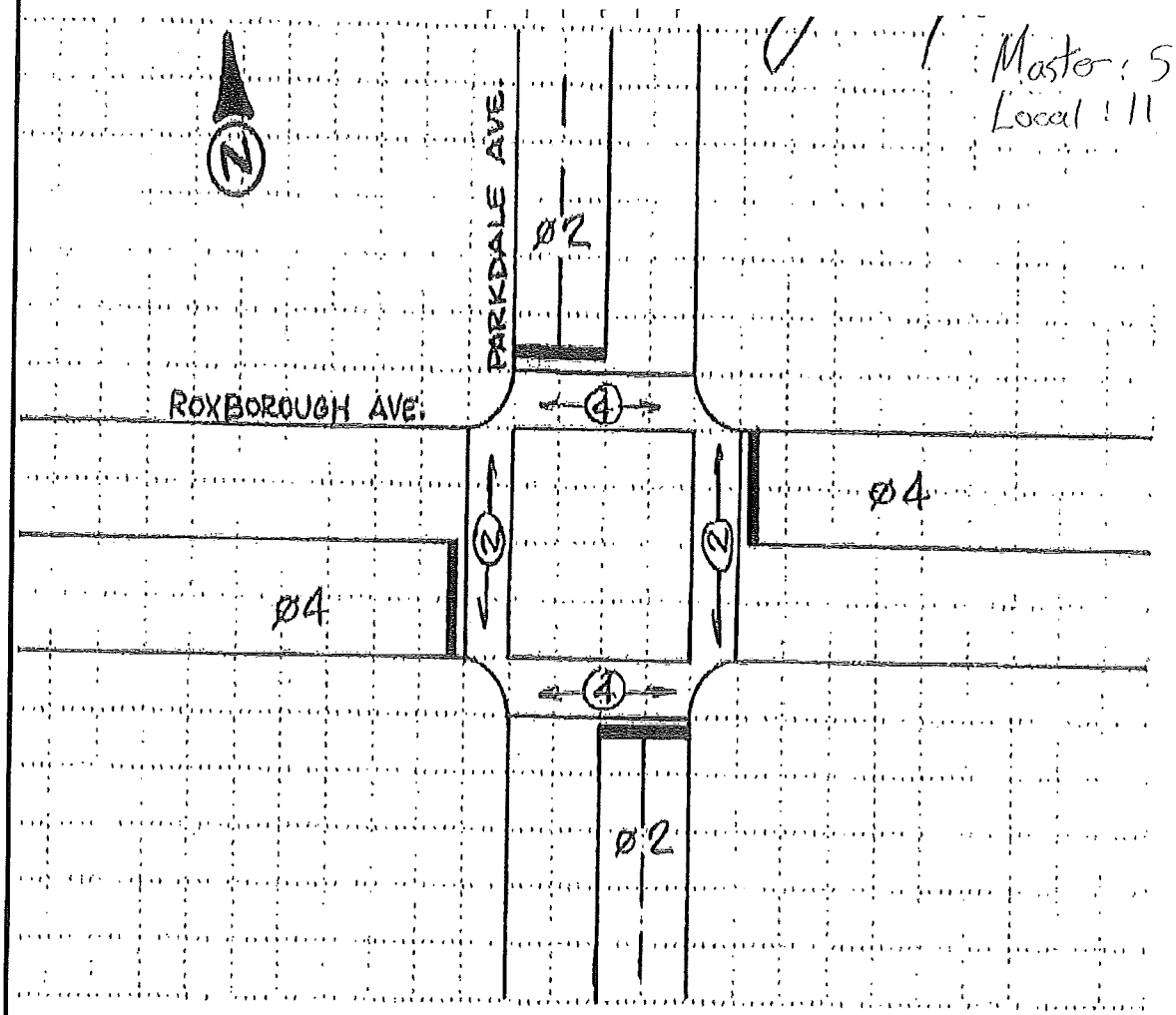
City of Hamilton - Traffic
Traffic Signal Controller Timing Data

Intersection: **Parkdale Ave N & Roxborough Ave (Int# 175)**

Controller Type: **LMD** Page 1 of 8

Programmed By: IBI - NM Installed By: _____

Date: Mar 20/13 Date: _____



Master: 5
Local: 11

ø2 PARKDALE NB/SB E+W X-WALKS

ø4 ROXBOROUGH EB/WB N+S X-WALKS

INTERSECTION:	Parkdale Ave N & Roxborough Ave (Int# 175)
DATE:	

DETECTOR COORDINATION SETTINGS

COORDINATION PARAMETERS		
FLASH	OFF	ON = on OFF = off 1-8 = Manual 9 = TimeClock 10 = Interconnect 11 = Comm 12 = Auto
SYSTEM	ON	
CYCLE	9	
SPLIT	9	
OFFSET	9	

OFFSET SEEKING MODE	
SEEKING MODE	1
0 = RESYNC; 1 = DWELL; 2 = SHORTWAY; 3 = INTERRUPTER	

FORCE-OFF RELATIONSHIPS		
FORCE-OFF	PHASES	
1		
2	2	
3		
4	4	
5		
6		
7		
8		

PERMISSIVE RELATIONSIHPS		
PERMISSIVE	PHASES	
1		
2		
3		
4	4	
5		
6		
7		
8		

CYCLE LENGTH/DWELL/OFFSETS								
CYCLE	1	2	3	4	5	6	7	8
LENGTH	90	90	90	70				
MAX DWELL								
OFFSET 1	11	20	52	1				
OFFSET 2								
OFFSET 3								
OFFSET 4								
OFFSET 5								

COORD PHASES & SERVICE/MAX PLANS								
	CYCLE 1				CYCLE 2			
SPLIT	S1	S2	S3	S4	S1	S2	S3	S4
COORD PH								
SERVICE	1				2			
MAX	1				2			
	CYCLE 3				CYCLE 4			
SPLIT	S1	S2	S3	S4	S1	S2	S3	S4
COORD PH								
SERVICE	3				4			
MAX	3				4			
	CYCLE 5				CYCLE 6			
SPLIT	S1	S2	S3	S4	S1	S2	S3	S4
COORD PH								
SERVICE								
MAX PLAN								
	CYCLE 7				CYCLE 8			
SPLIT	S1	S2	S3	S4	S1	S2	S3	S4
COORD PH								
SERVICE								
MAX PLAN								

Note:
Pedestrian Permissive window must be Automatically controlled

FORCE-OFF TIMES									
C	S	1	2	3	4	5	6	7	8
1	1				84				
	2								
	3								
	4								
2	1				84				
	2								
	3								
	4								
3	1				84				
	2								
	3								
	4								
4	1				64				
	2								
	3								
	4								
5	1								
	2								
	3								
	4								
6	1								
	2								
	3								
	4								
7	1								
	2								
	3								
	4								
8	1								
	2								
	3								
	4								

2/8

INTERSECTION:	Parkdale Ave N & Roxborough Ave (Int# 175)
DATE:	

PERMISSIVE SETTINGS

CYC	SPLIT		PERMISSIVE # 1	2	3	4	5	6	7	8
1	1	ST				36				
		END				49				
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								
2	1	ST				35				
		END				48				
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								
3	1	ST				42				
		END				55				
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								
4	1	ST				21				
		END				34				
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								

CYC	SPLIT		PERMISSIVE # 1	2	3	4	5	6	7	8
5	1	ST								
		END								
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								
6	1	ST								
		END								
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								
7	1	ST								
		END								
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								
8	1	ST								
		END								
	2	ST								
		END								
	3	ST								
		END								
	4	ST								
		END								

INTERSECTION:	Parkdale Ave N & Roxborough Ave (Int# 175)
DATE:	

SERVICE PLANS AND MAX PLANS

SERVICE PLAN #1

PHASE	1	2	3	4	5	6	7	8
CALL MODE	0	2	0	6				
MIN GRN	0	10	0	10				
PASSAGE								
WALK		7		17				
PED CLR		12		13				

SERVICE PLAN #2

PHASE	1	2	3	4	5	6	7	8
CALL MODE	0	2	0	6				
MIN GRN	0	10	0	10				
PASSAGE								
WALK		7		18				
PED CLR		12		13				

SERVICE PLAN #3

PHASE	1	2	3	4	5	6	7	8
CALL MODE	0	2	0	6				
MIN GRN	0	10	0	10				
PASSAGE								
WALK		7		11				
PED CLR		12		13				

SERVICE PLAN #4

PHASE	1	2	3	4	5	6	7	8
CALL MODE	0	2	0	6				
MIN GRN	0	10	0	10				
PASSAGE								
WALK		7		12				
PED CLR		12		13				

SERVICE PLAN CALL MODES

0 = OMIT
1 = ACTUATED
2 = NON-ACTUATED
3 = EXTENDABLE RECALL
4 = MAX RECALL
5 = SOFT RECALL
6 = PED RECALL
7 = PED OMIT (PHASE ACTUATED)

Note: Service Plans are called by C/S or Time Clock, C/S overrides clock

SERVICE PLAN NOTES

1. Enter all parameters for each used phase in each Service Plan in use. A blank in call mode is read as 0, which calls for phase omit. A blank in WALK interval results in 0 seconds being assigned to the WALK interval.

2. Program service plan calls in C/S programming or in Time Clock day plan, not both. Normal mode for controllers in system is to use C/S programming.

MAX PLANS

PLAN	PHASE 1	2	3	4	5	6	7	8
1 NORM		49		31				
1 FAIL		49		31				
2 NORM		48		32				
2 FAIL		48		32				
3 NORM		55		25				
3 FAIL		55		25				
4 NORM		34		26				
4 FAIL		34		26				

NORM = NORMAL MAX; FAIL = DETECTOR FAIL MAX

MAX PLAN NOTES

1. MAX plans are not used in non-actuated controllers. Walk Time is extended in Service Plan to achieve desired green time.

INTERSECTION:	Parkdale Ave N & Roxborough Ave (Int# 175)
DATE:	

TIME CLOCK SETTINGS

DAYLIGHT SAVINGS TIME (ON/OFF)			ON
CLOCK RESET TIME	13	00	00
MSD CIRCUIT OUTPUTS			
SYNC REFERENCE MODE			3
ALL CYCLES ZERO AT 00:00:00			

YEAR PROGRAMS		
FROM	TO	USE WEEK PROGRAM

WEEK PROGRAM							
#	SUN	MON	TUE	WED	THU	FRI	SAT
1	1	2	2	2	2	2	1

EXCEPTION DAYS						
#	EXCDAY	DOW	WOM	DOM	MOY	DAY

	TIME				CKT		
DAY PROG	HR	MIN	SEC	CSO	NO		DESCRIP
1	00	00	00		13	ON	System
	00	00	00	411			
2	00	00	00		13	ON	System
	00	00	00	111			
	06	30	00	211			
	10	00	00	111			
	14	30	00	311			
	18	30	00	111			

	TIME				CKT		
DAY PROG	HR	MIN	SEC	CSO	NO		DESCRIP

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INTERSECTION:	Parkdale Ave N & Roxborough Ave (Int# 175)
DATE:	

	PHASE							
	1	2	3	4	5	6	7	8
PHASE MOVEMENT								
USE PHASE		X		X				
MEMORY								
EXT RECALL								
MAX RECALL		X		X				
PED RECALL		X		X				
CALL NON ACT 1		X						
CALL NON ACT 2								
FLASH WALK								
SOFT RECALL								
WALK REST								
COND PED								
FWTPCL								

SEQUENCE	1	1 = SEQ, 2 = DUAL RING, 3-7 = SPECIAL				
RED REVERT		0	+2sec	ENHANCED PED	N	Y/N
FDW THRU YELLOW		OFF	ON/OFF	INCREASE YEL & RED CL	0	%
FAST FLASH RATE		3	CODE	TEST B INPUT		CODE
CODE: 0 = 60, 1 = 120, 2 = 150, 3 = 180 FL/MIN				CODE 0 = DIM, 1 = FREE, 2= FREE W/180 DEL		

BASIC CONTROLLER TIMING

	PHASE TIMINGS (0-12.7 OR 127)							
	1	2	3	4	5	6	7	8
MIN GREEN	0	10	0	10				
PASSAGE	0	3	0	3	0	0	0	0
YELLOW CL	0	3.3	0	3.3				
RED CL	0	2	0	2				
MAX GREEN 1	0	55	0	32	0	0	0	0
MAX GREEN 2								
WALK	0	7	0	17				
PED CLEAR	0	12	0	13				
S/A								
TBR								
TFR								
MIN GAP								
MAX VI								
MAX EXT								
AUTO MAX								
AMR								

INITIALIZE/FLASH				
	INITIALIZE	ENTER FLASH	EXIT FLASH	INTERVAL CODES
RING 1 PHASE	2	4	2	1 = RED
RING 2 PHASE				2 = YELLOW
INTERVAL	3	1	3	3 = GREEN
POWER UP/RESTART TIMINGS				
MINIMUM FLASH		10	(0-127 SECONDS)	
FIRST ALL RED AFTER FLASH		0	(0-127 SECONDS)	

INTERSECTION:	Parkdale Ave N & Roxborough Ave (Int# 175)
DATE:	

DETECTOR PROGRAMMING DATA

DETECTOR #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
MEMORY																									ON/OFF
CALL PHASE																									1-8
EXT/SWITCH	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1-8/1-8
DELAY																									0-9.9 or 127 secs
STR/DIS																									0-9.9 or 127 secs
MODE																									0-9

DETECTOR FAIL MONITOR

DET MON MODE																									

DETECTOR FAIL SAMPLING PERIOD (0-255 Minutes)

DETECTOR FAIL PARAMETERS

PHASE																									placed on Fail Max Recall
MINIMUM																									Minimum counts required
MAXIMUM																									Maximum counts required

DETECTOR SIMULATION MODE

MODE	0 = OFF, 1 = INPUT AND SYSTEM LEVEL, 2 = SYSTEM LEVEL ONLY																								
DETECTOR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
SAT. FLOW																									VEHICLES/HOUR
% SATURATION																									0-100%
TOTAL VOLUME																									(NOT PROGRAMMABLE)
PULSE WIDTH																									MILLISECONDS
GATE PHASE																									PHASE 1-12
QUEUE DET																									DETECTOR 1-24

MEMORY - memory can be programmed ON/OFF at input level, i.e., a phase could have memory on or off depending on detector. To do input level memory, phase level memory must be off.

CALL PHASE - Phase called by input.

EXT/SWITCH - EXT phase gets extended if green. Switch phase gets extended if it is green, but the extend phase is not. Set Ext/switch the same for normal operation (i.e., 1/1, 2/2, 3/3, etc.). Set Ext/switch to 0/0 for calling only.

DELAY - if "MODE" = 0, delay anytime phase is red. If "MODE" = 1-3 (Delay enabled), then delay ONLY if call phase red and mode phase is green.

STRETCH/DISCONNECT - if "MODE" = 0-8, detector operates in stretch mode, i.e., call input stretched by amount programmed when EXT phase is green. If mode = 9, detector operates in "DISCONNECT MODE", i.e., value acts like passage timer, except the detector disconnects when it gaps-outs.

MODE - 0 = normal (delay anytime phase is red), 1-3 = Delay enable phase (see delay), 9 = Detector disconnect; stretch/disconnect value operates in disconnect mode.

DETECTOR FAIL MONITOR - ON = detector fail diagnostics enabled, OFF = No detector fail diagnostics.

DET FAIL PHASE - Assign 1-8 if failed detector is to put phase in "max fail recall" (must use max plans with max fail recall time assigned), enter 0 if no max fail recall.

DET MIN/MAX - Undef/over ranges for detector diagnostics (over sample period), assign MIN = 1 for no activity monitor, Min = 0 inhibits no activity. Constant call monitor enabled automatically when DET MON ENABLED (see LOW THRESHOLD and CONSTANT CALL inhibit clock circuits).

SATURATION FLOW RATE = In vehicles per hour, during green, the number of vehicles that could pass the detector if flow were uninhibited.

PERCENT SATURATION = The percentage of the SATURATION FLOW RATE that will be used during simulated operation.

TOTAL VOLUME = This is not a programmable entry, it is a calculation of the above two entries. For example, SATURATION FLOW RATE entered as 1,800 VPH, PERCENT SATURATION entered as 10%, the resulting TOTAL VOLUME would be 180 VPH.

PULSE = The PULSE WIDTH in milliseconds of each simulated detector input. This would simulate hovering (msec) the detector zone is occupied, for simulation of computed speed.

GATE PHASE = The phase or overlap, which when red, builds up simulated calls and then discharges calls (vehicles) at saturation flow rate when phase is green.

QUEUE DETECTOR = An upstream detector input (1-24) that would be used to count vehicles on their way to the stop bar. This detector input enters counts during red.

QUEUE COUNT = Number of calls (vehicles) counted on QUEUE DETECTOR before input reports full occupancy (steady on). The above two entries would be used to simulate ADAPTIVE SPLIT OPERATION.

7/8

INTERSECTION:	Parkdale Ave N & Roxborough Ave (Int# 175)
DATE:	

TIME CLOCK CIRCUIT MODE SET
1 = ON; 2 = OFF; 3 = AUTO

DEFAULT IS AUTO (TIME CLOCK CONTROLLED)

1			26	VEH CALL 7		51	PED OMIT 8	
2			27	VEH CALL 8		52	CONDITIONAL SERVICE ENABLE	
3			28	PED CALL 1		53	SIMUL GAP-OUT INHIBIT	
4			29	PED CALL 2		54	INTERCONNECT INHIBIT	
5			30	PED CALL 3		55	SYNCH OUTPUT INHIBIT	
6			31	PED CALL 4		56	WALK REST MODIFY ENABLE	1
7			32	PED CALL 5		57	DUAL ENTRY ENABLE	
8	FLASH		33	PED CALL 6		58	RED REST ENABLE RING 1	
9	AUX 1		34	PED CALL 7		59	RED REST ENABLE RING 2	
10	AUX 2		35	PED CALL 8		60	OMIT RED CLEAR RING 1	
11	AUX 3		36	VEH OMIT 1		61	OMIT RED CLEAR RING 2	
12	AUX 4		37	VEH OMIT 2		62	PED RECYCLE ENABLE RING 1	
13	SYSTEM ENABLE		38	VEH OMIT 3		63	PED RECYCLE ENABLE RING 2	
14	MAX 2		39	VEH OMIT 4		64	DETECTOR LOW THRESH INHIBIT	
15	MAX 2 INHIBIT RING 1		40	VEH OMIT 5		65	DETECTOR PRESENCE INHIBIT	
16	MAX 2 INHIBIT RING 2		41	VEH OMIT 6		66	PREEMPT CALL 1	
17	CALL NON ACT 1	1	42	VEH OMIT 7		67	PREEMPT CALL 2	
18	CALL NON ACT 2		43	VEH OMIT 8		68	PREEMPT CALL 3	
19	MIN RECALL ALL		44	PED OMIT 1		69	PREEMPT CALL 4	
20	VEH CALL 1		45	PED OMIT 2		70	PREEMPT CALL 5	
21	VEH CALL 2		46	PED OMIT 3		71	PREEMPT CALL 6	
22	VEH CALL 3		47	PED OMIT 4		72	MAX PLAN 1	
23	VEH CALL 4		48	PED OMIT 5		73	MAX PLAN 2	
24	VEH CALL 5		49	PED OMIT 6		74	MAX PLAN 3	
25	VEH CALL 6		50	PED OMIT 7		75	MAX PLAN 4	

[redacted]

8/8

NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

Turning Movement Count (7 . PARKDALE AVE N & ROXBOROUGH AVE)

Start Time	N Approach PARKDALE AVE N						E Approach ROXBOROUGH AVE						S Approach PARKDALE AVE N						W Approach ROXBOROUGH AVE						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	3	33	3	0	0	39	3	1	4	0	1	8	4	96	2	0	1	102	3	2	5	0	1	10	159	
07:15:00	1	43	0	0	0	44	4	5	1	0	1	10	0	128	1	0	5	129	1	2	8	0	2	11	194	
07:30:00	0	27	1	0	0	28	6	4	2	0	2	12	1	112	2	0	0	115	2	3	5	0	1	10	165	
07:45:00	4	27	1	0	3	32	9	4	0	0	0	13	4	146	2	0	0	152	2	2	6	0	2	10	207	725
08:00:00	1	40	2	0	1	43	7	4	2	0	0	13	1	124	4	0	1	129	1	4	3	0	2	8	193	759
08:15:00	3	60	3	0	7	66	5	4	1	0	3	10	6	116	6	0	3	128	3	4	11	0	1	18	222	787
08:30:00	9	60	4	0	9	73	6	4	9	0	0	19	0	96	4	0	5	100	5	2	5	0	9	12	204	826
08:45:00	15	66	3	0	37	84	5	11	3	0	10	19	5	111	7	0	10	123	6	11	15	0	5	32	258	877
09:00:00	2	63	2	0	1	67	6	2	2	0	0	10	2	83	1	0	3	86	4	3	11	0	0	18	181	865
09:15:00	6	48	0	0	3	54	4	4	2	0	3	10	1	86	2	0	0	89	1	3	2	0	1	6	159	802
09:30:00	3	54	6	0	1	63	4	2	0	0	1	6	1	58	3	0	0	62	6	1	7	0	2	14	145	743
09:45:00	5	68	1	0	0	74	13	3	1	0	2	17	4	74	3	0	1	81	4	1	5	0	0	10	182	667
BREAK																										
16:00:00	7	162	8	0	4	177	11	3	5	0	1	19	4	88	2	0	5	94	9	4	3	0	3	16	306	
16:15:00	14	162	10	0	4	186	10	9	3	0	5	22	6	108	4	0	4	118	3	4	4	0	3	11	337	
16:30:00	15	242	3	0	3	260	8	15	7	0	5	30	2	108	2	0	2	112	7	9	5	0	1	21	423	
16:45:00	11	219	3	0	12	233	5	5	3	0	2	13	4	83	8	0	0	95	8	7	6	0	1	21	362	1428
17:00:00	5	264	3	0	2	272	8	8	6	0	7	22	11	77	3	0	6	91	11	5	6	0	3	22	407	1529
17:15:00	10	225	8	0	2	243	4	5	5	0	4	14	8	65	3	0	2	76	7	3	4	0	2	14	347	1539
17:30:00	9	192	10	0	2	211	6	4	2	0	5	12	2	70	3	0	2	75	5	8	4	0	0	17	315	1431
17:45:00	7	163	6	0	1	176	3	6	7	0	5	16	3	78	5	0	4	86	6	5	2	0	2	13	291	1360
18:00:00	7	105	3	0	5	115	3	6	2	0	0	11	6	78	2	0	0	86	4	7	5	0	0	16	228	1181
18:15:00	7	81	2	0	0	90	3	6	2	0	2	11	1	68	2	0	1	71	8	5	8	0	0	21	193	1027
18:30:00	9	90	0	0	3	99	10	5	2	0	5	17	6	69	0	0	0	75	4	3	10	0	7	17	208	920
18:45:00	9	64	5	0	3	78	2	2	1	0	3	5	4	63	3	0	0	70	4	3	5	0	4	12	165	794
Grand Total	162	2558	87	0	103	2807	145	122	72	0	67	339	86	2185	74	0	55	2345	114	101	145	0	52	360	**5851**	-
Approach%	5.8%	91.1%	3.1%	0%		-	42.8%	36%	21.2%	0%		-	3.7%	93.2%	3.2%	0%		-	31.7%	28.1%	40.3%	0%		-	-	-
Totals %	2.8%	43.7%	1.5%	0%		48%	2.5%	2.1%	1.2%	0%		5.8%	1.5%	37.3%	1.3%	0%		40.1%	1.9%	1.7%	2.5%	0%		6.2%	-	-
Heavy	4	65	4	0		-	3	23	0	0		-	5	66	2	0		-	1	23	6	0		-	-	-
Heavy %	2.5%	2.5%	4.6%	0%		-	2.1%	18.9%	0%	0%		-	5.8%	3%	2.7%	0%		-	0.9%	22.8%	4.1%	0%		-	-	-
Bicycles	0	1	0	0		-	0	0	0	0		-	0	1	0	0		-	0	0	0	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	-	-

NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

Peak Hour: 08:00 AM - 09:00 AM Weather: Partly Cloudy (-7 °C)

Start Time	N Approach PARKDALE AVE N						E Approach ROXBOROUGH AVE						S Approach PARKDALE AVE N						W Approach ROXBOROUGH AVE						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	40	2	0	1	43	7	4	2	0	0	13	1	124	4	0	1	129	1	4	3	0	2	8	193
08:15:00	3	60	3	0	7	66	5	4	1	0	3	10	6	116	6	0	3	128	3	4	11	0	1	18	222
08:30:00	9	60	4	0	9	73	6	4	9	0	0	19	0	96	4	0	5	100	5	2	5	0	9	12	204
08:45:00	15	66	3	0	37	84	5	11	3	0	10	19	5	111	7	0	10	123	6	11	15	0	5	32	258
Grand Total	28	226	12	0	54	266	23	23	15	0	13	61	12	447	21	0	19	480	15	21	34	0	17	70	**877**
Approach%	10.5%	85%	4.5%	0%		-	37.7%	37.7%	24.6%	0%		-	2.5%	93.1%	4.4%	0%		-	21.4%	30%	48.6%	0%		-	**-**
Totals %	3.2%	25.8%	1.4%	0%		30.3%	2.6%	2.6%	1.7%	0%		7%	1.4%	51%	2.4%	0%		54.7%	1.7%	2.4%	3.9%	0%		8%	**-**
PHF	0.47	0.86	0.75	0		0.79	0.82	0.52	0.42	0		0.8	0.5	0.9	0.75	0		0.93	0.63	0.48	0.57	0		0.55	**-**
Heavy	2	16	1	0		19	1	4	0	0		5	0	17	1	0		18	1	4	1	0		6	**-**
Heavy %	7.1%	7.1%	8.3%	0%		7.1%	4.3%	17.4%	0%	0%		8.2%	0%	3.8%	4.8%	0%		3.8%	6.7%	19%	2.9%	0%		8.6%	**-**
Lights	26	210	11	0		247	22	19	15	0		56	12	430	20	0		462	14	17	33	0		64	**-**
Lights %	92.9%	92.9%	91.7%	0%		92.9%	95.7%	82.6%	100%	0%		91.8%	100%	96.2%	95.2%	0%		96.3%	93.3%	81%	97.1%	0%		91.4%	**-**
Single-Unit Trucks	0	8	0	0		8	0	1	0	0		1	0	8	1	0		9	1	0	1	0		2	**-**
Single-Unit Trucks %	0%	3.5%	0%	0%		3%	0%	4.3%	0%	0%		1.6%	0%	1.8%	4.8%	0%		1.9%	6.7%	0%	2.9%	0%		2.9%	**-**
Buses	2	7	1	0		10	1	3	0	0		4	0	9	0	0		9	0	4	0	0		4	**-**
Buses %	7.1%	3.1%	8.3%	0%		3.8%	4.3%	13%	0%	0%		6.6%	0%	2%	0%	0%		1.9%	0%	19%	0%	0%		5.7%	**-**
Articulated Trucks	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0.4%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	54	-	-	-	-	-	12	-	-	-	-	-	19	-	-	-	-	-	17	-	**-**
Pedestrians%	-	-	-	-	52.4%		-	-	-	-	11.7%		-	-	-	-	18.4%		-	-	-	-	16.5%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	1%		-	-	-	-	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	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (-3 °C)

Start Time	N Approach PARKDALE AVE N						E Approach ROXBOROUGH AVE						S Approach PARKDALE AVE N						W Approach ROXBOROUGH AVE						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	15	242	3	0	3	260	8	15	7	0	5	30	2	108	2	0	2	112	7	9	5	0	1	21	423
16:45:00	11	219	3	0	12	233	5	5	3	0	2	13	4	83	8	0	0	95	8	7	6	0	1	21	362
17:00:00	5	264	3	0	2	272	8	8	6	0	7	22	11	77	3	0	6	91	11	5	6	0	3	22	407
17:15:00	10	225	8	0	2	243	4	5	5	0	4	14	8	65	3	0	2	76	7	3	4	0	2	14	347
Grand Total	41	950	17	0	19	1008	25	33	21	0	18	79	25	333	16	0	10	374	33	24	21	0	7	78	**1539**
Approach%	4.1%	94.2%	1.7%	0%		-	31.6%	41.8%	26.6%	0%		-	6.7%	89%	4.3%	0%		-	42.3%	30.8%	26.9%	0%		-	**-**
Totals %	2.7%	61.7%	1.1%	0%		65.5%	1.6%	2.1%	1.4%	0%		5.1%	1.6%	21.6%	1%	0%		24.3%	2.1%	1.6%	1.4%	0%		5.1%	**-**
PHF	0.68	0.9	0.53	0		0.93	0.78	0.55	0.75	0		0.66	0.57	0.77	0.5	0		0.83	0.75	0.67	0.88	0		0.89	**-**
Heavy	0	9	0	0		9	0	5	0	0		5	0	9	0	0		9	0	5	1	0		6	**-**
Heavy %	0%	0.9%	0%	0%		0.9%	0%	15.2%	0%	0%		6.3%	0%	2.7%	0%	0%		2.4%	0%	20.8%	4.8%	0%		7.7%	**-**
Lights	41	941	17	0		999	25	28	21	0		74	25	324	16	0		365	33	19	20	0		72	**-**
Lights %	100%	99.1%	100%	0%		99.1%	100%	84.8%	100%	0%		93.7%	100%	97.3%	100%	0%		97.6%	100%	79.2%	95.2%	0%		92.3%	**-**
Single-Unit Trucks	0	6	0	0		6	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	0.6%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	0.9%	0%	0%		0.8%	0%	0%	0%	0%		0%	**-**
Buses	0	3	0	0		3	0	5	0	0		5	0	6	0	0		6	0	5	1	0		6	**-**
Buses %	0%	0.3%	0%	0%		0.3%	0%	15.2%	0%	0%		6.3%	0%	1.8%	0%	0%		1.6%	0%	20.8%	4.8%	0%		7.7%	**-**
Articulated Trucks	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%	**-**
Pedestrians	-	-	-	-	19	-	-	-	-	-	18	-	-	-	-	-	9	-	-	-	-	-	7	-	**-**
Pedestrians%	-	-	-	-	35.2%		-	-	-	-	33.3%		-	-	-	-	16.7%		-	-	-	-	13%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	1.9%		-	-	-	-	0%		**-**
Bicycles on Road	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%		**-**

Peak Hour: 08:00 AM - 09:00 AM **Weather: Partly Cloudy (-7 °C)**

	Bicycles on Crosswalk	Pedestrians
N	0	54
S	0	19
E	1	12
W	0	17

Peak Hour: 04:30 PM - 05:30 PM **Weather: Partly Cloudy (-3 °C)**

	Bicycles on Crosswalk	Pedestrians
N	0	19
S	1	9
E	0	18
W	0	7

CITY OF HAMILTON TRAFFIC DEPARTMENT
TRAFFIC SIGNAL CONTROLLER TIMING DATA

INTERSECTION QUEENSTON & REID

CONTROLLER TYPE 3000E

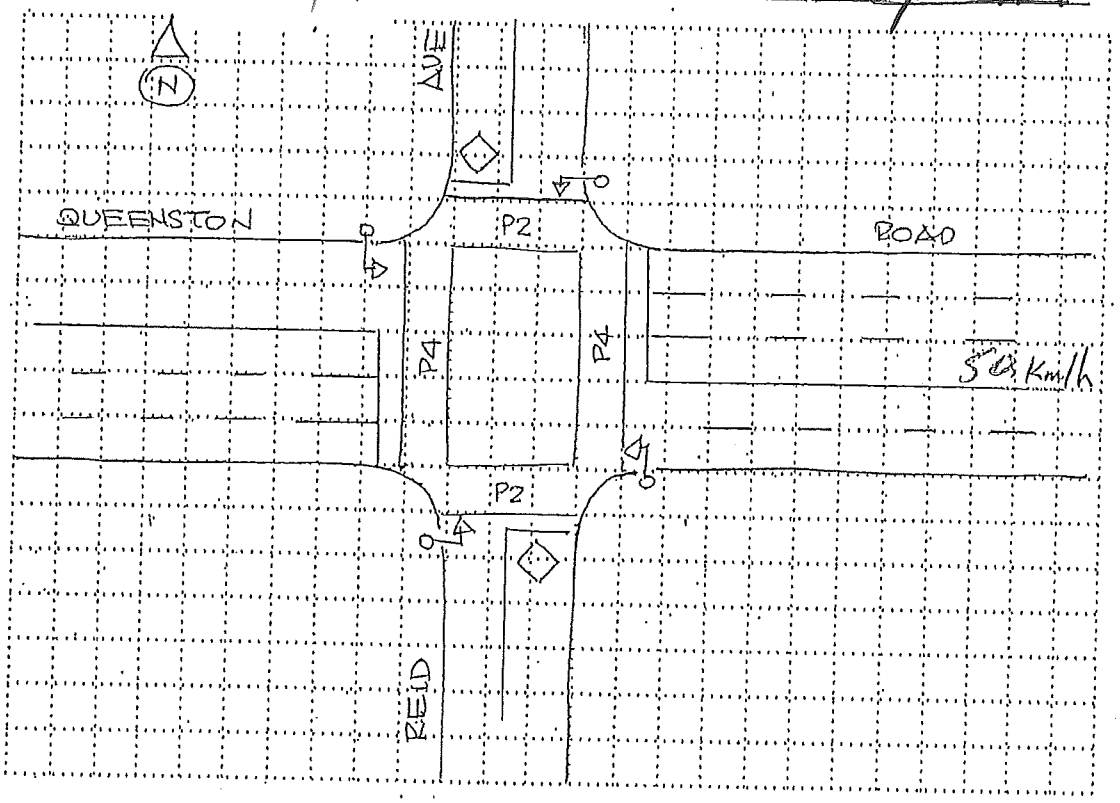
PAGE 1 OF 14

PROGRAMMED BY RD

INSTALLED RD

DATE May 12/14

DATE May 12/14



PHASE 2 - EAST/WEST NON ACTUATED

PHASE 4 NORTH/SOUTH VEHICLE & PED ACTUATED (LOOP & P.B)

AUDIBLE PED SIGNAL ON PHASE 4

RED/RED FLASH.

SEQUENCE/START-UP (MM-3-1-1)

START-UP PHASES/INTERVAL/SEQUENCE

(X = Enable for start-up phases. Must be compatible if more than one)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
START-UP	Phases		X														
	Interval	0	(0=Red, 1=Yel, 2= Grn, determines color of selected phases above on start-up)														
	Flash	10	(0-255 seconds start-up flash time)														
	Red	0	(0-25.5 secs = length of first red after start-up if start-up in yellow or red)														
	Sequence	2	(2=single ring, 3=dual ring, 4=123/567+48, 5=12/56+3478, 6=1234/56+78, 7=1234/5678, 8=dual quad, 9=12ph														

PHASE RING ASSIGNMENTS

X = Phase assigned to ring (if used). Phases in different rings but same co-phase group can time together.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
RING	Ring 1		X		X												
	Ring 2																
	Ring 3																
	Ring 4																

CO-PHASE GRP 1-4 ASSIGNMENTS

X = phase assigned to co-phase group. All ph's assigned to rings must be assigned to co-phase group.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CO-PHASE	CO PH 1		X														
	CO PH 2				X												
	CO PH 3																
	CO PH 4																

CONTROLLER DATA

PHASE RECALLS/MODES; MIN, MAX, etc. (MM-3-1-2-1-PGDN, etc.) USE 1 TO ALL 4 TIMING PLANS

TP1 PHASE RECALLS

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK				X												
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

TP2 PHASE RECALLS

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK				X												
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

TP3 PHASE RECALLS

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK				X												
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

PHASE RECALLS/MODES; CNA, INH MAX, PED OPTIONS, etc. (MM-3-1-2-2) ONLY 1 PLAN PER UNIT

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	CNA 1		X														
	CNA 2																
	CNA 3																
	CNA 4																
	WRM		X														
	INH MAX																
	PED RECY																
	FL WALK																
	FDW->YEL																
	FDW->RED																
	COND PED																

Queenston at Reid

PHASE TIMES (MM-3-1-3-PGDN, etc.)

CONTROLLER DATA
USE 1 TO ALL 4 TIMING PLANS

14-05-13

		TP1															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		**20**		**15**												
	Passage				**3.0**												
	Yellow		**3.7**		**3.3**												
	Red		**1.7**		**2.4**												
	Walk		**7**		**7**												
	Ped Clr		**9**		**17**												
	Max 1		**62**		**28**												
	Max 2		**62**		**28**												
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

TP2

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		**20**		**15**												
	Passage				**3.0**												
	Yellow		**3.7**		**3.3**												
	Red		**1.7**		**2.4**												
	Walk		**7**		**7**												
	Ped Clr		**9**		**17**												
	Max 1		**60**		**30**												
	Max 2		**60**		**30**												
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	Al/Act																
	Max In																

TP3

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		**20**		**15**												
	Passage				**3.0**												
	Yellow		**3.7**		**3.3**												
	Red		**1.7**		**2.4**												
	Walk		**7**		**7**												
	Ped Clr		**9**		**17**												
	Max 1		**63**		**27**												
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	Al/Act																
	Max In																

Queenston at Reid

CONTROLLER DATA

14-05-13

		TP4															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		**20**		**15**												
	Passage				**3.0**												
	Yellow		**3.7**		**3.3**												
	Red		**1.7**		**2.4**												
	Walk		**7**		**7**												
	Ped Clr		**9**		**17**												
	Max 1		**64**		**26**												
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	Al/Act																
	Max In																

SELECTION SOURCE (MM-3-2-2)

Entries determine how parameters get selected

Cycle Source:	1	0=TOD, 1=CL, 2=INT
Split Source:	1	0=TOD, 1=CL, 2=INT
Offset Source:	1	0=TOD, 1=CL, 2=INT

Free Source:	1	0=TOD, 1=CL, 2=INT
Flash Source:	0	0=TOD, 1=CL, 2=INT
Inter-TOD Revert:	255	0-255 SECS

TOD = Time of day control by internal clock, CL = Closed loop (comm), INT = Interconnect. Inter-TOD Revert is time allowed after failed interconnect before unit reverts to TOD (Time Base) control.

COORD BASIC OPTIONS (MM-3-2-3)

Reference to End (vs. begin) of Main St.:	N	Y/N: Y = Offset references to end of main st. green. N = Beginning of Main st. green.
Use % (vs. secs) for Phase Allocation:	N	Y/N: Y = Phase allocations loaded as percent of 100. N = Allocations in seconds.
Use % (vs. secs) for Offset Entry:	N	Y/N: Y = Offset loaded as percent of 100. N = Offset loaded in seconds.
Use Fixed (vs. floating) Force Offs:	Y	Y/N: Y = Force offs are fixed to cycle. N=Force offs like max times, begin with green.
Permissive Type:	0	0-2: 0=Yield, 1= Single, 2= Multiple. See Permissives note below

C/S TO TIMING PLAN (MM-3-2-9-6)

USE THIS CHART WHEN 4 SPLITS/CYCLE = Y

	CYCLE	1	2	3	4	5	6
SPLIT TO TIME PLAN	SPLIT 1	**1**	**2**	**3**	**4**		
	SPLIT 2						
	SPLIT 3						
	SPLIT 4						

(0-4 = TIME PLAN IMPLEMENTED WHEN SPLIT IN EFFECT)

CYCLES & OFFSETS (MM-3-2-4)

NOTE: FIRST SPECIFY OFSET SEEKING MODE AND 4 SPLITS CYCLE MODE (ENHANCED OPTIONS, OPERATING MODES)

	Cycle #	1/1	2/1	3/1	4/1		
CYCLE & OFFSETS	Length	**100**	**100**	**100**	**100**		
	Offset 1	**25**	**57**	**99**	**91**		
	Offset 2						
	Offset 3						
	Offset 4						
	Offset 5						
	Max Dwell	**32**	**32**	**32**	**32**		

COORD PHASES (MM-3-2-5)

	CYCLE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COORD PHASES	**1-1**		**X**														
	2-1		**X**														
	3-1		**X**														

OFFSET SEEKING MODE (MM-3-2-7)

Offset Seeking Mode:	1

Mode

0 Add only, cycle times 20% slow only to get in sync
1 Dwell, cycle timer stops at cycle 0 up to max dwell time to get in step
2 Short Route, cycle times 20% fast or slow--whichever gets in step fastest

ENHANCED OPTIONS

OPERATING OPTIONS (MM-3-2-9-1)

Enhanced Perm:	Y	Y/N: See note	Invert Free In:	N	Y/N: See note
Central Override:	N	Y/N: See note	Split Matrix:	N	Y/N: See note
No PCL Offset Adjust:	N	Y/N: See note	4 Splits/Cycle:	Y	Y/N: See note
			No Early Coord Ped:	N	Y/N: See note

Yeil Percent	1	0-10%: See note
EGB%	0	0-100%: See note
RGB%	10	0-100%: See note
# Cycles to out of step:	0	0-255: 0=Disable

CYCLE SYNC OPTIONS (MM-3-2-9-2)

Sync Source:	0	0-2, 0=TOD/CL/Interconnect, 1= City Zero, 2= Absolute

Charts below only For City Zero offfsets or Absolute (0's). These are not daily reference times for Sync Source Option 0 (see TOD).

Cycle 1:	0	Cycle 2:	0	Cycle 3:	0
Cycle 4:	0	Cycle 5:	0	Cycle 6:	0

MANUAL/AUTO FORCE OFFS & PERMS

SET MANUAL MODE (MM-3-2-9-3-1)

Auto Perm and FO:	Y	Y/N: Y = Perms & Force offs auto-calculated from phase allocations. N = Manually entered
Ped Perm:	0	0-255: 0 = Auto calculated. 1-255 = secs each ped perm, starting with vehicle permissives

PHASE ALLOCATION (MM-3-2-6)

	ENTRY IN:	Secs	% or Secs: Not a controller entry--for reference only. Controller entry is under basic options.														
PHASE ALLO-CATION	PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	C1 S1		67		33												
	C1 S2																
	C1 S3																
	C1 S4																
	C2 S1		64		36												
	C2 S2																
	C2 S3																
	C2 S4																
	C3 S1		67		33												
	C3 S2																
	C3 S3																
	C3 S4																
	C4 S1		68		32												
	C4 S2																
	C4 S3																
	C4 S4																

DAY PLANS (MM-3-3-1-#)

	HH	MM	CIRCUIT PLAN	C	O	S	CKT	ON/OFF
1	00	00					11(FRE)	OFF
	00	00		4	1	1		
2	00	00					11(FRE)	OFF
	00	00		1	1	1		
	06	30		2	1	1		
	10	00		1	1	1		
	14	30		3	1	1		
	18	30		1	1	1		

WEEK PLANS (MM-3-3-3)

Plan	SUN	MON	TUE	WED	THU	FRI	SAT
1	1	2	2	2	2	2	1
2							
3							
4							
5							

CIRCUIT OVERRIDES (MM-3-3-6)

For each ciruit specify TOD (time of day controlled), or manually ON or OFF. Default = TOD

CIRCUIT OVER-RIDES	Circuit	65	66	67	68	69	70	71	72
	Function	LL1	LL2	LL3	LL4	LL5	LL6	LL7	LL8
	State								
	Circuit	**73**	74	75	76	**77**	78	79	80
	Function	**CN1**	CN2	CN3	CN4	**WRM**	MIN	DIM	CVS
	State	**ON**				**ON**			
CIRCUIT OVER-RIDES	Circuit	113	114	115	116	117	118	119	120
	Function	UD1	UD2	UD3	UD4	UD5	UD6	UD7	UD8
	State								
	Circuit	121	122	123	124	**125**	**126**	127	128
	Function	PH2	DP2	DP3	3CD	**EVL**	**EML**	ASC	DCP
	State					**ON**	**ON**		

DAYLIGHT SAVINGS (MM-3-3-7)

DAY LIGHT SAVINGS	Spring		Fall	
	(0-12)	(0-5)	(0-12)	(0-5)
	Month	WOM	Month	WOM
	3	**2**	**11**	**1**

Enter Month and Week of Month for Spring Forward and Fall Back days (typical 4 - 1 and 10 - 5). Unit will adjust at 2AM on Sunday of week specified. Enter zero (or leave blank) if Daylight Savings not used.

SYNC REFERENCE MODE (MM-3-3-8)

Mode:	**0**	0 = Time dependent, 1 = C/O/S Event

	HH	MM	
Time Clock Reset:	**00**	**00**	TOD clock reset to by TBC input
Interrupter:		**N**	Y/N; Y = Interrupter pulses provided
Pulses:		**0**	0-6 = Number of interrupter pulses

TIME DEPENDENT CYCLE REFERENCES

	HH	MM
CYC 1:	**00**	**00**
CYC 4:		

	HH	MM
CYC 2:	**00**	**00**
CYC 5:		

	HH	MM
CYC 3:	**00**	**00**
CYC 6:		

When mode = Time dependent, enter reference times of day for each cycle. Default = 00:00 = midnight = most commonly used reference.
When mode = C/O/S Event, cycle restarts on each COS change. Only use this mode for specific reasons. Time dependent most common used mode.

CLOSED LOOP ID (MM-3-5-1)

CLOSED LOOP ID	Master Type:	1	0 = None, 1 = 3000 Series Master, 2 = 3800 EL master
	Intersection ID	8	0-255
	Master Identification	5	0-255
	Allow Comm Xfer Between Ports 2 & 3		Y/N: Y = Incoming signal on Master port (2 or 3), gets echo'd on other port

COMM SET-UP (MM-3-5-2)

PG1 PORT ASSIGN	Master (CL) Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used to receive Master Comm)
	Monitor Port		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Monitor Data Upload)
	Central Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Direct Dial-up Modem)

PG2 PORT 2 SETUP	Data Rate:		1200, 2400, 4800, 9600, 14400, 19200
	Parity		0 = None, 1 = Odd, 2=Even
	Data bits		0 = 7 bits, 1 = 8 bits

PG3 PORT 3 SETUP	Data Rate:		1200, 2400, 4800, 9600, 14400, 19200
	Parity		0 = None, 1 = Odd, 2=Even
	Data bits		0 = 7 bits, 1 = 8 bits

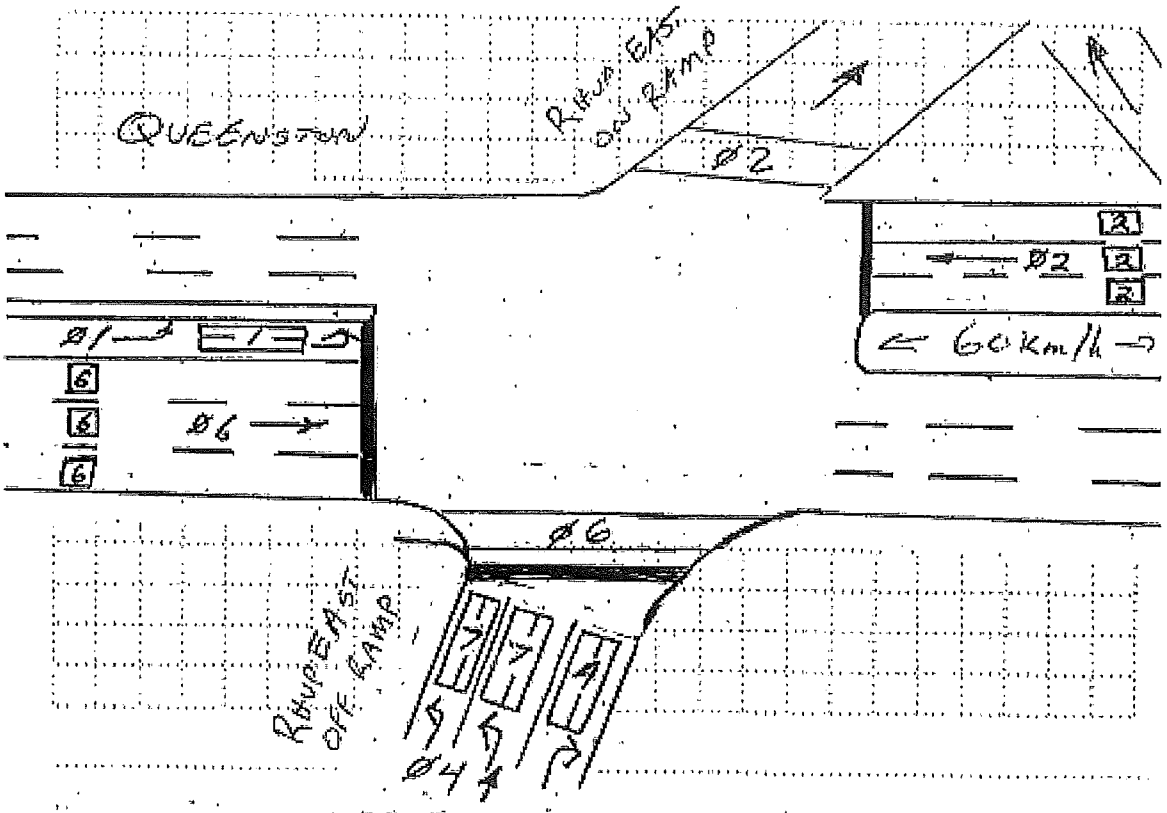
PG4	Modem Set-up String:		Up to 40 charaters; A-Z, or # @ = , ! ; % \ &

PHONE NUMBERS (MM-3-5-3)

PHONE NUM-BERS	Tone:		Y/N
	Phone 1:		Number & control characters (W , ; # ' / T P) if used
	Phone 2:		Number & control characters (W , ; # ' / T P) if used

City of Hamilton - Traffic
Traffic Signal Controller Timing Data

Intersection: **Queenston Rd & Red Hill Valley Parkway E (Int # 508)**
Controller Type: **3000E** Page 1 of 22
Programmed By: JBI NM Installed By: _____
Date: Mar 20/13 Date: _____



Ø1 - EBLT

Ø2 - WB AND NORTH X-WALK

Ø4 - OFF RAMP

Ø6 - EB

- LOOPS AND PB's

- FLASHING OPERATION IS: YELLOW ON QUEENSTON
RED ON RAMP

SEQUENCE/START-UP (MM-3-1-1)

START-UP PHASES/INTERVAL/SEQUENCE

(X = Enable for start-up phases. Must be compatible if more than one)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
START-UP	Phases		X				X										
	Interval	0	(0=Red, 1=Yel, 2= Grn, determines color of selected phases above on start-up)														
	Flash	10	(0-255 seconds start-up flash time)														
	Red	0	(0-25.5 secs = length of first red after start-up if start-up in yellow or red)														
	Sequence	3	(2=single ring, 3=dual ring, 4=123/567+48, 5=12/56+3478, 6=1234/56+78, 7=1234/5678, 8=dual quad, 9=12ph														

PHASE RING ASSIGNMENTS

X = Phase assigned to ring (if used). Phases in different rings but same co-phase group can time together.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
RING	Ring 1	X	X		X												
	Ring 2						X										
	Ring 3																
	Ring 4																

CO-PHASE GRP 1-4 ASSIGNMENTS

X = phase assigned to co-phase group. All ph's assigned to rings must be assigned to co-phase group.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CO-PHASE	CO PH 1	X	X				X										
	CO PH 2				X												
	CO PH 3																
	CO PH 4																

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Street 1 / Street 2

CONTROLLER DATA

3/20/2013

PHASE RECALLS/MODES; MIN, MAX, etc. (MM-3-1-2-1-PGDN, etc.) USE 1 TO ALL 4 TIMING PLANS

TP1 PHASE RECALLS

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL		X				X										
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK	X			X												
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

TP2 PHASE RECALLS

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL		X				X										
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK	X			X												
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

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CONTROLLER DATA

TP3 PHASE RECALLS

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL		X				X										
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK	X			X												
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

TP4 PHASE RECALLS

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL		X				X										
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK	X			X												
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

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Street 1 / Street 2

CONTROLLER DATA

3/20/2013

PHASE RECALLS/MODES; CNA, INH MAX, PED OPTIONS, etc. (MM-3-1-2-2)

ONLY 1 PLAN PER UNIT

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	CNA 1																
	CNA 2																
	CNA 3																
	CNA 4																
	WRM																
	INH MAX																
	PED RECY		X				X										
	FL WALK																
	FDW->YEL																
	FDW->RED																
	COND PED																

PHASE TIMES (MM-3-1-3-PGDN, etc.)

USE 1 TO ALL 4 TIMING PLANS

		TP1															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial	5	20		10		20		10								
	Passage	1	3		1		3		1								
	Yellow	3	3.7		3.3		3.7		3.3								
	Red	0	2.2		3.1		2.2		3.1								
	Walk	0	7		0		7		0								
	Ped Clr	0	2		0		13		0								
	Max 1	18	35		33		56		33								
	Max 2	18	35		33		56		33								
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

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Street 1 / Street 2

CONTROLLER DATA

3/20/2013

TP2

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial	5	20		10		20		10								
	Passage	1	3		1		3										
	Yellow	3	3.7		3.3		3.7		3.3								
	Red	0	2.2		3.1		2.2		3.1								
	Walk	0	7		0		7		0								
	Ped Clr	0	2		0		13		0								
	Max 1	17	36		33		56		33								
	Max 2	17	36		33		56		33								
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

TP3

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial	5	20		10		20		10								
	Passage	1	3		1		3		1								
	Yellow	3	3.7		3.3		3.7		3.3								
	Red	0	2.2		3.1		2.2		3.1								
	Walk	0	7		0		7		0								
	Ped Clr	0	2		0		13		0								
	Max 1	21	37		28		61		28								
	Max 2	21	37		28		61		28								
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

CONT-7

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CONTROLLER DATA

		TP4															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial	5	20		10		20		10								
	Passage	1	3		1		3		1								
	Yellow	3	3.7		3.3		3.7		3.3								
	Red	0	2.2		3.1		2.2		3.1								
	Walk	0	7		0		7		0								
	Ped Clr	0	2		0		13		0								
	Max 1	17	39		30		59		30								
	Max 2	17	39		30		59		30								
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

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CONTROLLER DATA

VEHICLE DETECTOR ASSIGNMENTS (MM-3-1-4-1, PGDN etc.)

(X = ASSIGN VEH DETECTOR TO THAT PHASE)

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
VEH DET ASSIGN-MENTS	1	X															
	2		X														
	3																
	4				X												
	5																
	6						X										
	7				X												
	8																

PED DETECTOR ASSIGNMENTS (MM-3-1-4-2)

(X = ASSIGN PED DETECTOR TO THAT PHASE)

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PED DET ASSIGN-MENTS	1																
	2		X														
	3																
	4																
	5																
	6						X										
	7																
	8																

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DETECTOR MODES (MM-3-1-4-3)

	DET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
VEH DET MODES	Mode	0	0		2		0	0									

MODE 0 = Normal call and extend (default mode)
MODE 1 = Call only, no extend
MODE 2 = Stretch & Delay. Stretches call when phase is green, delays call when phase is red--see DET TIMES
MODE 3 = Stop Bar 1. Detector disconnects if any gap in stop bar detector demand. Used when passage time based on loops set farther back
MODE 4 = Stop Bar 2. Detector disconnects if stop bar timer times out. Similar to SB1 except it can be used with shorter stop bar loops

	DET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
VEH DET LOCKS	Lock																

DETECTOR TIMES (MM-3-1-4-4) USE 1 TO ALL 3 DETECTOR TIMING PLANS

		TP1							
	DET	1	2	3	4	5	6	7	8
DET TIMES	Delay				3				
	Str/Stp				0				

Detector Plans selected by TOD or cycle/split association. Plan 1 = default

DELAY = Amount of time during phase red that phase call is delayed before it is registered.
STR/STP = If DET mode = 2, this value is stretch time. If DET mode = 4, this is stop bar disconnect time (I.e. passage for stop bar)

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SIMULTANEOUS GAP-OUT ENABLES (MM-3-1-9-4)

Simultaneous Gap-Out Enable:		Y/N; Y= Unit-Wide Enable for all enabled phases

(X = ENABLE)

	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SGO	Sim Gap																

Applies to dual ring operation for barrier phases (typically 2 & 6, 4 & 8). When SGO is not enabled, the phase's passage timer cannot restart once it times out (gaps out). For example, if the phase is 4, then 4 will remain gapped-out and 4 and 8 will clear as soon as 8 gaps out. When SGO is enabled, the passge timer can restart after timing out. In this case, passge timers can keep restarting and barrier phases can't clear unless both Simultaneously Gap Out. SGO = OFF = snappier operation.
SGO = Enabled = More generous timing to enabled phases.

DETECTOR SWITCH AND COPY (MM-3-1-4-6-PGDN, etc.)

Detector Switching Enable	Y	Y/N; Y= Enable, detector switching per plans 1-16 is enabled
Detector Copy Group 1 Enable	N	Y/N; Y = Enable, detector copy per plans 1-16 is enabled
Detector Copy Group 2 Input Eneble	N	Y/N; Y = Enable, the goupr 2 input is enabled. GP2 will then become selected copy group if input is active

Detector switching disconnects calls from the "From" phase and transfers them to the "To" phase when "To" phase is green.
Detector copy simply copies calls from the "From" phase to the "To" phase, still retaining calls on "From" phase

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DET SWITCH & COPY 1 of 16	Ph Grns																
	Switch (TS1)																
	G1 Copy																
	G2 Copy																

	Swtch	G1C	G2C
From Ph:	1		
To Ph:	6		

Notes:
1. Phase greens on "Switch" row apply to TS1 only, do not use for TS2
   TS2 Det Switching requires "From" and "To" phases only –>
2. Det switch and copy operates at phase level and applies all calls from all detectors assigned to "From" phase

Switch Ph Grns = Required for TS1 only. Specify desired pattern of greens that must be active for switch to occur (typ. = Swtch "To Ph" green)
G1 copy = Required for TS1/2. Specify desired pattern of greens that must be active for copy to occur (typically = G1C "To Ph" green)
G2 copy = Required for TS1/2. Specify desired pattern of greens that must be active for copy to occur (typically = G2C "To Ph" green)
From/To phases = Specify the phases from which and to which calls get switched or copied for Switch, Group 1, and Group 2 copy.

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Street 1 / Street 2 **CONTROLLER DATA** 3/20/2013

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DET SWITCH & COPY **3 of 16**	Ph Grns																
	Switch (TS1)																
	G1 Copy																
	G2 Copy																

	Swtch	G1C	G2C
From Ph:	3		
To Ph:	8		

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DET SWITCH & COPY **5 of 16**	Ph Grns																
	Switch (TS1)																
	G1 Copy																
	G2 Copy																

	Swtch	G1C	G2C
From Ph:	5		
To Ph:	2		

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DET SWITCH & COPY **7 of 16**	Ph Grns																
	Switch (TS1)																
	G1 Copy																
	G2 Copy																

	Swtch	G1C	G2C
From Ph:	7		
To Ph:	4		

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DUAL ENTRY (MM-3-1-6)

DUAL ENTRY ENABLE:		Y/N: Y=Enable Dual Entry. Note this is only one setting even though it appears on each controller screen.

PG1	PH/CALLS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DUAL ENTRY ASSIGN-MENTS	1						X										
	2						X										
	3																
	4																
	5																
	6		X														
	7																
	8																

Dual Entry = Left column phase automatically places call on selected phase(s) if no other real calls within selected phases ring and co-phase group

ENHANCED OPTIONS

DYNAMIC OMITS (MM-3-1-9-1-1)

DYNAM OMITS GP1 ENABLE:	Y	Y/N: Y=Enable. Note: This is one setting but appears on each screen. No input rquired for GP1.

(X = ENABLE)

GRP1-1	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM-OMITS ASSIGN-MENTS	OMIT PHS	X															
	IF PH ON		X				X										
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

Select phases to be dynamically omitted from OMIT PHS row. Select the PH-ONs and/or O/L GRNs that will cause those omits. Phases are omitted when controller state matches IF PH ON row or O/L GRN row.
Note that there are 2 groups of dynamic omits, each with 8 patterns. Group 1 is the default group and group 2 can be selected by input or TOD ckt 96. When a group is active, any one or all of the pattterns within that group may be true depending on the controller state.

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GRP1-2	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM. OMITS ASSIGN-MENTS	OMIT PHS																
	IF PH ON																
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

GRP1-3	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM. OMITS ASSIGN-MENTS	OMIT PHS																
	IF PH ON																
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

GRP1-4	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM. OMITS ASSIGN-MENTS	OMIT PHS																
	IF PH ON																
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

DYNAMIC RECALLS (MM-3-1-9-1-2)

DYN. RECALL GP1 ENABLE:	Y	Y/N: Y=Enable. Note: This is one setting but appears on each screen. No input rquired for GP1.

(X = ENABLE)

GRP1-1	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM. RECALLS ASSIGN-MENTS	RCL PHS		X				X										
	IF PH ON	X															
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

Select phases to be dynamically recalled from RCL PHS row. Select the PH-ONs and/or O/L GRNs that will cause those recalls. Phases are recalled when controller state matches PH ON row or O/L GRN row.

Note that there are 2 groups of dynamic recalls, each with 8 patterns. Group 1 is the default group and group 2 can be selected by input or TOD ckt 96. When a group is active, any one or all of the pattterns within that group may be true depending on the controller state.

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CONTROLLER DATA

GRP1-2	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM.	RCL PHS		X				X										
RECALLS	IF PH ON	X															
ASSIGN-	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MENTS	GRN																

GRP1-3	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM.	RCL PHS																
RECALLS	IF PH ON																
ASSIGN-	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MENTS	GRN																

GRP1-4	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM.	RCL PHS																
RECALLS	IF PH ON																
ASSIGN-	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MENTS	GRN																

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SELECTION SOURCE (MM-3-2-2)

Entries determine how parameters get selected

Cycle Source:	1	0=TOD, 1=CL, 2=INT
Split Source:	1	0=TOD, 1=CL, 2=INT
Offset Source:	1	0=TOD, 1=CL, 2=INT

Free Source:	1	0=TOD, 1=CL, 2=INT
Flash Source:	0	0=TOD, 1=CL, 2=INT
Inter-TOD Revert:	255	0-255 SECS

TOD = Time of day control by internal clock, CL = Closed loop (comm), INT = Interconnect. Inter-TOD Revert is time allowed after failed interconnect before unit reverts to TOD (Time Base) control.

COORD BASIC OPTIONS (MM-3-2-3)

Reference to End (vs. begin) of Main St:	N	Y/N: Y = Offset references to end of main st. green. N = Beginning of Main st. green.
Use % (vs. secs) for Phase Allocation:	N	Y/N: Y = Phase allocations loaded as percent of 100. N = Allocations in seconds.
Use % (vs. secs) for Offset Entry:	N	Y/N: Y = Offset loaded as percent of 100. N = Offset loaded in seconds.
Use Fixed (vs. floating) Force Offs:	Y	Y/N: Y = Force offs are fixed to cycle. N=Force offs like max times, begin with green.
Permissive Type:	1	0-2: 0=Yield, 1= Single, 2= Multiple. See Permissives note below

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C/S TO TIMING PLAN (MM-3-2-9-6)

USE THIS CHART WHEN 4 SPLITS/CYCLE = Y

	CYCLE	1	2	3	4	5	6
SPLIT TO TIME PLAN	SPLIT 1	1	2	3	4		
	SPLIT 2						
	SPLIT 3						
	SPLIT 4						

(0-4 = TIME PLAN IMPLEMENTED WHEN SPLIT IN EFFECT)

CYCLES & OFFSETS (MM-3-2-4)

NOTE: FIRST SPECIFY OFSET SEEKING MODE AND 4 SPLITS CYCLE MODE (ENHANCED OPTIONS, OPERATING MODES)

	Cycle #	1/1	2/1	3/1	4/1		
CYCLE & OFFSETS	Length	100	100	100	100		
	Offset 1	32	61	11	26		
	Offset 2						
	Offset 3						
	Offset 4						
	Offset 5						
	Max Dwell	32	32	32	32		

COORD PHASES (MM-3-2-5)

	CYCLE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COORD PHASES	1-1		X				X										
	2-1		X				X										
	3-1		X				X										
	4-1		X				X										

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OFFSET SEEKING MODE (MM-3-2-7)

Offset Seeeling Mode:	1

Mode

0 Add only, cycle times 20% slow only to get in sync
1 Dwell, cycle timer stops at cycle 0 up to max dwell time to get in step
2 Short Route, cycle times 20% fast or slow--whichever gets in step fastest

ENHANCED OPTIONS

OPERATING OPTIONS (MM-3-2-9-1)

Enhanced Perm:	Y	Y/N: See note
Central Override:	N	Y/N: See note
No PCL Offset Adjust:	N	Y/N: See note

Invert Free In:	N	Y/N: See note
Split Matrix:	N	Y/N: See note
4 Splits/Cycle:	Y	Y/N: See note
No Early Coord Ped:	N	Y/N: See note

Yeil Percent	0	0-10%: See note
EGB%	0	0-100%: See note
RGB%	0	0-100%: See note
# Cycles to out of step:	0	0-255: 0=Disable

CYCLE SYNC OPTIONS (MM-3-2-9-2)

Sync Source:	0	0-2, 0=TOD/CL/Interconnect, 1= City Zero, 2= Absolute

Charts below only For City Zero offfsets or Absolute (0's). These are not daily reference times for Sync Source Option 0 (see TOD).

Cycle 1:	0	Cycle 2:	0	Cycle 3:	0
Cycle 4:	0	Cycle 5:	0	Cycle 6:	0

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MANUAL/AUTO FORCE OFFS & PERMS

SET MANUAL MODE (MM-3-2-9-3-1)

Auto Perm and FO:	N	Y/N: Y = Perms & Force offs auto-calculated from phase allocations. N = Manually entered
Ped Perm:	0	0-255: 0 = Auto calculated. 1-255 = secs each ped perm, starting with vehicle permissives

LOAD MANUAL PERMISSIVES (MM-3-2-9-3-2) ONLY USED IF AUTO PERM & FO MODE = N

Cycle 1	Split 1/PH	1	2	3	4	5	6	7	8
MANUAL PERMS	Start	35			35				35
	End	74			57				57
	Split 2/PH	1	2	3	4	5	6	7	8
	Start								
	End								

Cycle 2	Split 1/PH	1	2	3	4	5	6	7	8
MANUAL PERMS	Start	36			36				36
	End	75			58				58
	Split 2/PH	1	2	3	4	5	6	7	8
	Start								
	End								

Cycle 3	Split 1/PH	1	2	3	4	5	6	7	8
MANUAL PERMS	Start	37			37				37
	End	71			54				54
	Split 2/PH	1	2	3	4	5	6	7	8
	Start								
	End								

Cycle 4	Split 1/PH	1	2	3	4	5	6	7	8
MANUAL PERMS	Start	39			39				39
	End	75			58				58
	Split 2/PH	1	2	3	4	5	6	7	8
	Start								
	End								

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LOAD MANUAL FORCE OFFS (MM-3-2-9-3-3) ONLY USED IF AUTO PERM & FO MODE = N

Cycle 1	PHASE	1	2	3	4	5	6	7	8
	SPLIT 1	97	35		73		35		73
FO's	PHASE	1	2	3	4	5	6	7	8
	SPLIT 2								

Cycle 2	PHASE	1	2	3	4	5	6	7	8
	SPLIT 1	97	36		74		36		74
FO's	PHASE	1	2	3	4	5	6	7	8
	SPLIT 2								

Cycle 3	PHASE	1	2	3	4	5	6	7	8
	SPLIT 1	97	37		70		37		70
FO's	PHASE	1	2	3	4	5	6	7	8
	SPLIT 2								

Cycle 4	PHASE	1	2	3	4	5	6	7	8
	SPLIT 1	97	39		74		39		74
FO's	PHASE	1	2	3	4	5	6	7	8
	SPLIT 2								

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CONTROLLER DATA

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CLOSED LOOP ID (MM-3-5-1)

CLOSED LOOP ID	Master Type:	1	0 = None, 1 = 3000 Series Master, 2 = 3800 EL master
	Intersection ID	17	0-255
	Master Identification	7	0-255
	Allow Comm Xfer Between Ports 2 & 3		Y/N: Y = Incoming signal on Master port (2 or 3), gets echo'd on other port

COMM SET-UP (MM-3-5-2)

PG1 PORT ASSIGN	Master (CL) Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used to receive Master Comm)
	Monitor Port		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Monitor Data Upload)
	Central Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Direct Dial-up Modem)

PG2 PORT 2 SETUP	Data Rate:	1200	1200, 2400, 4800, 9600, 14400, 19200
	Parity	0	0 = None, 1 = Odd, 2=Even
	Data bits	1	0 = 7 bits, 1 = 8 bits

PG3 PORT 3 SETUP	Data Rate:	1200	1200, 2400, 4800, 9600, 14400, 19200
	Parity	0	0 = None, 1 = Odd, 2=Even
	Data bits	1	0 = 7 bits, 1 = 8 bits

PG4	Modem Set-up String:		Up to 40 charaters; A-Z, or # @ = , ! ; % \ &

PHONE NUMBERS (MM-3-5-3)

PHONE NUM-BERS	Tone:		Y/N
	Phone 1:		Number & control characters (W , ; # ' / T P) if used
	Phone 2:		Number & control characters (W , ; # ' / T P) if used

LOG DATA (MM-3-5-5)

PG1 SAMPLE	Volume Log Sample period:	60	0, 6, 10, 15, 20, 30, 60 minutes, Enabled by TOD Ckt. 125 (EVL)
	MOE Log Sample period:	60	0, 6, 10, 15, 20, 30, 60 minutes, Enabled by TOD Ckt. 126 (EML)

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DAY PLANS (MM-3-3-1-#)

	HH	MM	CIRCUIT PLAN	C	O	S	CKT	ON/OFF
1	00	00					11(FRE)	OFF
	00	00		4	1	1		
2								
	00	00					11(FRE)	OFF
	00	00		1	1	1		
	06	30		2	1	1		
	10	00		1	1	1		
	14	30		3	1	1		
	18	30		1	1	1		

WEEK PLANS (MM-3-3-3)

Plan	SUN	MON	TUE	WED	THU	FRI	SAT
1	1	2	2	2	2	2	1
2							
3							
4							
5							

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CIRCUIT OVERRIDES (MM-3-3-6)

For each ciruit specify TOD (time of day controlled), or manually ON or OFF. Default = TOD

CIRCUIT OVER-RIDES	Circuit	65	66	67	68	69	70	71	72
	Function	LL1	LL2	LL3	LL4	LL5	LL6	LL7	LL8
	State								
	Circuit	73	74	75	76	77	78	79	80
	Function	**CN1**	CN2	CN3	CN4	**WRM**	MIN	DIM	CVS
	State								
CIRCUIT OVER-RIDES	Circuit	81	82	83	84	85	86	87	88
	Function	TIA	TIB	TIC	N/U	N/U	N/U	**PR1**	**PR2**
	State								
	Circuit	89	90	91	92	93	94	95	96
	Function	OR1	OR2	RR1	RR2	M21	M22	DM3	GR2
	State								
CIRCUIT OVER-RIDES	Circuit	113	114	115	116	117	118	119	120
	Function	UD1	UD2	UD3	UD4	UD5	UD6	UD7	UD8
	State								
	Circuit	121	122	123	124	**125**	**126**	127	128
	Function	PH2	DP2	DP3	3CD	**EVL**	**EML**	ASC	DCP
	State					**ON**	**ON**		

DAYLIGHT SAVINGS (MM-3-3-7)

DAY LIGHT SAVINGS	Spring		Fall	
	(0-12)	(0-5)	(0-12)	(0-5)
	Month	WOM	Month	WOM
	3	**2**	**11**	**1**

Enter Month and Week of Month for Spring Forward and Fall Back days (typical 4 - 1 and 10 - 5). Unit will adjust at 2AM on Sunday of week specified. Enter zero (or leave blank) if Daylight Savings not used.

SYNC REFERENCE MODE (MM-3-3-8)

Mode:	**0**	0 = Time dependent, 1 = C/O/S Event

	HH	MM	
Time Clock Reset:	**00**	**00**	TOD clock reset to by TBC input
Interrupter:		**N**	Y/N; Y = Interrupter pulses provided
Pulses:		**0**	0-6 = Number of interrupter pulses

TIME DEPENDENT CYCLE REFERENCES		HH	MM		HH	MM		HH	MM
	CYC 1:	**00**	**00**	CYC 2:	**00**	**00**	CYC 3:	**00**	**00**
	CYC 4:			CYC 5:			CYC 6:		

When mode = Time dependent, enter reference times of day for each cycle. Default = 00:00 = midnight = most commonly used reference.
When mode = C/O/S Event, cycle restarts on each COS change. Only use this mode for specific reasons. Time dependent most common used mode.

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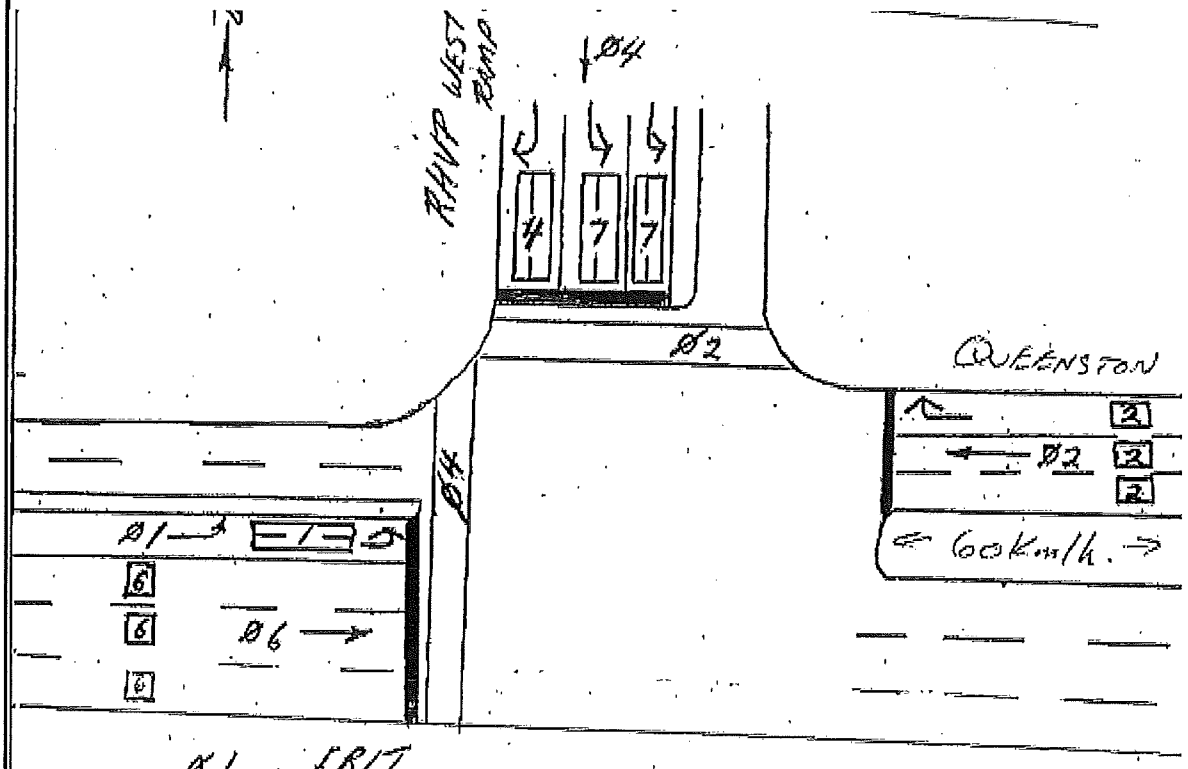
City of Hamilton - Traffic
Traffic Signal Controller Timing Data

Intersection: **Queenston Rd & Red Hill Valley W Ramp (Int # 509)**

Controller Type: **3000E** Page 1 of 22

Programmed By: IBI - NM Installed By: _____

Date: Mar 20/13 Date: _____



Ø1 - EBLT

Ø2 - WB AND NORTH X-WALK

Ø4 - OFF RAMP

Ø6 - EB

- LOOPS AND PB's

- FLASHING OPERATION IS: YELLOW ON QUEENSTON
  RED ON RAMP

SEQUENCE/START-UP (MM-3-1-1)

START-UP PHASES/INTERVAL/SEQUENCE

(X = Enable for start-up phases. Must be compatible if more than one)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
START-UP	Phases		X				X										
	Interval	2	(0=Red, 1=Yel, 2= Grn, determines color of selected phases above on start-up)														
	Flash	10	(0-255 seconds start-up flash time)														
	Red	0	(0-25.5 secs = length of first red after start-up if start-up in yellow or red)														
	Sequence	3	(2=single ring, 3=dual ring, 4=123/567+48, 5=12/56+3478, 6=1234/56+78, 7=1234/5678, 8=dual quad, 9=12ph														

PHASE RING ASSIGNMENTS

X = Phase assigned to ring (if used). Phases in different rings but same co-phase group can time together.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
RING	Ring 1	X	X		X												
	Ring 2						X										
	Ring 3																
	Ring 4																

CO-PHASE GRP 1-4 ASSIGNMENTS

X = phase assigned to co-phase group. All ph's assigned to rings must be assigned to co-phase group.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CO-PHASE	CO PH 1	X	X				X										
	CO PH 2				X												
	CO PH 3																
	CO PH 4																

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PHASE RECALLS/MODES; MIN, MAX, etc. (MM-3-1-2-1-PGDN, etc.) USE 1 TO ALL 4 TIMING PLANS

(X = ENABLE) **TP1 PHASE RECALLS**

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL		X				X										
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK	X			X												
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

(X = ENABLE) **TP2 PHASE RECALLS**

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL		X				X										
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK	X			X												
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

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TP3 PHASE RECALLS

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL		X				X										
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK	X			X												
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

TP4 PHASE RECALLS

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL		X				X										
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK	X			X												
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

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PHASE RECALLS/MODES; CNA, INH MAX, PED OPTIONS, etc. (MM-3-1-2-2)

ONLY 1 PLAN PER UNIT

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	CNA 1																
	CNA 2																
	CNA 3																
	CNA 4																
	WRM																
	INH MAX																
	PED RECY		X														
	FL WALK																
	FDW->YEL																
	FDW->RED																
	COND PED																

PHASE TIMES (MM-3-1-3-PGDN, etc.)

USE 1 TO ALL 4 TIMING PLANS

		TP1															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial	5	20		10		20		10								
	Passage	1	3		1		3		1								
	Yellow	3	3.7		3.3		3.7		3.3								
	Red	0	3		3.6		3		3.6								
	Walk	0	7		7		7		7								
	Ped Clr	0	29		24		29		24								
	Max 1	8	45		32		56		32								
	Max 2	8	45		32		56		32								
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

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CONTROLLER DATA

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TP2

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial	5	20		10		20		10								
	Passage	1	3		1		3		1								
	Yellow	3	3.7		3.3		3.7		3.3								
	Red	0	3		3.6		3		3.6								
	Walk	0	7		7		7		7								
	Ped Clr	0	29		24		29		24								
	Max 1	11	42		32		56		32								
	Max 2	11	42		32		56		32								
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

TP3

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial	5	20		10		20		10								
	Passage	1	3		1		3		1								
	Yellow	3	3.7		3.3		3.7		3.3								
	Red	0	3		3.6		3		3.6								
	Walk	0	7		7		7		7								
	Ped Clr	0	29		24		29		24								
	Max 1	11	42		32		56		32								
	Max 2	11	42		32		56		32								
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

CONT-7

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		TP4															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial	5	20		10		20		10								
	Passage	1	3		1		3		1								
	Yellow	3	3.7		3.3		3.7		3.3								
	Red	0	3		3.6		3		3.6								
	Walk	0	7		7		7		7								
	Ped Clr	0	29		24		29		24								
	Max 1	11	42		32		56		32								
	Max 2	11	42		32		56		32								
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

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VEHICLE DETECTOR ASSIGNMENTS (MM-3-1-4-1, PGDN etc.)

(X = ASSIGN VEH DETECTOR TO THAT PHASE)

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
VEH DET ASSIGN-MENTS	1	X															
	2		X														
	3																
	4				X												
	5																
	6						X										
	7				X												
	8																

PED DETECTOR ASSIGNMENTS (MM-3-1-4-2)

(X = ASSIGN PED DETECTOR TO THAT PHASE)

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PED DET ASSIGN-MENTS	1																
	2		X														
	3																
	4				X												
	5																
	6																
	7																
	8																

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DETECTOR MODES (MM-3-1-4-3)

	DET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
VEH DET MODES	Mode				2												

MODE 0 = Normal call and extend (default mode)
MODE 1 = Call only, no extend
MODE 2 = Stretch & Delay. Stretches call when phase is green, delays call when phase is red--see DET TIMES
MODE 3 = Stop Bar 1. Detector disconnects if any gap in stop bar detector demand. Used when passage time based on loops set farther back
MODE 4 = Stop Bar 2. Detector disconnects if stop bar timer times out. Similar to SB1 except it can be used with shorter stop bar loops

	DET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
VEH DET LOCKS	Lock																

DETECTOR TIMES (MM-3-1-4-4) USE 1 TO ALL 3 DETECTOR TIMING PLANS

	TP1								
	DET	1	2	3	4	5	6	7	8
DET TIMES	Delay				3				
	Str/Stp				0				

Detector Plans selected by TOD or cycle/split association. Plan 1 = default

DELAY = Amount of time during phase red that phase call is delayed before it is registered.
STR/STP = If DET mode = 2, this value is stretch time. If DET mode = 4, this is stop bar disconnect time (I.e. passage for stop bar)

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SIMULTANEOUS GAP-OUT ENABLES (MM-3-1-9-4)

Simultaneous Gap-Out Enable:		Y/N; Y= Unit-Wide Enable for all enabled phases

(X = ENABLE)

	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SGO	Sim Gap																

Applies to dual ring operation for barrier phases (typically 2 & 6, 4 & 8). When SGO is not enabled, the phase's passage timer cannot restart once it times out (gaps out). For example, if the phase is 4, then 4 will remain gapped-out and 4 and 8 will clear as soon as 8 gaps out. When SGO is enabled, the passge timer can restart after timing out. In this case, passge timers can keep restarting and barrier phases can't clear unless both Simultaneously Gap Out. SGO = OFF = snappier operation.
SGO = Enabled = More generous timing to enabled phases.

DETECTOR SWITCH AND COPY (MM-3-1-4-6-PGDN, etc.)

Detector Switching Enable	Y	Y/N; Y= Enable, detector switching per plans 1-16 is enabled
Detector Copy Group 1 Enable	N	Y/N; Y = Enable, detector copy per plans 1-16 is enabled
Detector Copy Group 2 Input Eneble	N	Y/N; Y = Enable, the goupr 2 input is enabled. GP2 will then become selected copy group if input is active

Detector switching disconnects calls from the "From" phase and transfers them to the "To" phase when "To" phase is green.
Detector copy simply copies calls from the "From" phase to the "To" phase, still retaining calls on "From" phase

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DET SWITCH & COPY 1 of 16	Ph Grns																
	Switch (TS1)																
	G1 Copy																
	G2 Copy																

	Swtch	G1C	G2C
From Ph:	1		
To Ph:	6		

Notes:
1. Phase greens on "Switch" row apply to TS1 only, do not use for TS2
TS2 Det Switching requires "From" and "To" phases only -->

2. Det switch and copy operates at phase level and applies all calls from all detectors assigned to "From" phase

Switch Ph Grns = Required for TS1 only. Specify desired pattern of greens that must be active for switch to occur (typ. = Swtch "To Ph" green)
G1 copy = Required for TS1/2. Specify desired pattern of greens that must be active for copy to occur (typically = G1C "To Ph" green)
G2 copy = Required for TS1/2. Specify desired pattern of greens that must be active for copy to occur (typically = G2C "To Ph" green)
From/To phases = Specify the phases from which and to which calls get switched or copied for Switch, Group 1, and Group 2 copy.

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	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DET SWITCH & COPY **3 of 16**	Ph Grns																
	Switch (TS1)																
	G1 Copy																
	G2 Copy																

	Swtch	G1C	G2C
From Ph:	3		
To Ph:	8		

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DET SWITCH & COPY **5 of 16**	Ph Grns																
	Switch (TS1)																
	G1 Copy																
	G2 Copy																

	Swtch	G1C	G2C
From Ph:	5		
To Ph:	2		

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DET SWITCH & COPY **7 of 16**	Ph Grns																
	Switch (TS1)																
	G1 Copy																
	G2 Copy																

	Swtch	G1C	G2C
From Ph:	7		
To Ph:	4		

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DUAL ENTRY ENABLE:		Y/N: Y=Enable Dual Entry. Note this is only one setting even though it appears on each controller screen.

PG1	PH/CALLS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DUAL ENTRY ASSIGN-MENTS	1						X										
	2						X										
	3																
	4																
	5																
	6		X														
	7																
	8																

Dual Entry = Left column phase automatically places call on selected phase(s) if no other real calls within selected phases ring and co-phase group

ENHANCED OPTIONS

DYNAMIC OMITS (MM-3-1-9-1-1)

DYNAM OMITS GP1 ENABLE:		Y/N: Y=Enable. Note: This is one setting but appears on each screen. No input rquired for GP1.

(X = ENABLE)

GRP1-1	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM OMITS ASSIGN-MENTS	OMIT PHS	X															
	IF PH ON		X				X										
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

Select phases to be dynamically omitted from OMIT PHS row. Select the PH-ONs and/or O/L GRNs that will cause those omits. Phases are omitted when controller state matches IF PH ON row or O/L GRN row.
Note that there are 2 groups of dynamic omits, each with 8 patterns. Group 1 is the default group and group 2 can be selected by input or TOD ckt 96. When a group is active, any one or all of the pattterns within that group may be true depending on the controller state.

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GRP1-2	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM. OMITS ASSIGN-MENTS	OMIT PHS																
	IF PH ON																
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

GRP1-3	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM. OMITS ASSIGN-MENTS	OMIT PHS																
	IF PH ON																
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

GRP1-4	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM. OMITS ASSIGN-MENTS	OMIT PHS																
	IF PH ON																
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

DYNAMIC RECALLS (MM-3-1-9-1-2)

DYN. RECALL GP1 ENABLE:	Y	Y/N: Y=Enable. Note: This is one setting but appears on each screen. No input rquired for GP1.

(X = ENABLE)

GRP1-1	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM. RECALLS ASSIGN-MENTS	RCL PHS		X				X										
	IF PH ON	X															
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

Select phases to be dynamically recalled from RCL PHS row. Select the PH-ONs and/or O/L GRNs that will cause those recalls. Phases are recalled when controller state matches PH ON row or O/L GRN row.

Note that there are 2 groups of dynamic recalls, each with 8 patterns. Group 1 is the default group and group 2 can be selected by input or TOD ckt 96. When a group is active, any one or all of the pattterns within that group may be true depending on the controller state.

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CONTROLLER DATA

GRP1-2	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM.	RCL PHS																
RECALLS	IF PH ON																
ASSIGN-	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MENTS	GRN																

GRP1-3	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM.	RCL PHS																
RECALLS	IF PH ON																
ASSIGN-	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MENTS	GRN																

GRP1-4	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM.	RCL PHS																
RECALLS	IF PH ON																
ASSIGN-	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MENTS	GRN																

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SELECTION SOURCE (MM-3-2-2)

Entries determine how parameters get selected

Cycle Source:	1	0=TOD, 1=CL, 2=INT
Split Source:	1	0=TOD, 1=CL, 2=INT
Offset Source:	1	0=TOD, 1=CL, 2=INT

Free Source:	1	0=TOD, 1=CL, 2=INT
Flash Source:	1	0=TOD, 1=CL, 2=INT
Inter-TOD Revert:	255	0-255 SECS

TOD = Time of day control by internal clock, CL = Closed loop (comm), INT = Interconnect. Inter-TOD Revert is time allowed after failed interconnect before unit reverts to TOD (Time Base) control.

COORD BASIC OPTIONS (MM-3-2-3)

Reference to End (vs. begin) of Main St.:	N	Y/N: Y = Offset references to end of main st. green. N = Beginning of Main st. green.
Use % (vs. secs) for Phase Allocation:	N	Y/N: Y = Phase allocations loaded as percent of 100. N = Allocations in seconds.
Use % (vs. secs) for Offset Entry:	N	Y/N: Y = Offset loaded as percent of 100. N = Offset loaded in seconds.
Use Fixed (vs. floating) Force Offs:	Y	Y/N: Y = Force offs are fixed to cycle. N=Force offs like max times, begin with green.
Permissive Type:	1	0-2: 0=Yield, 1= Single, 2= Multiple. See Permissives note below

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C/S TO TIMING PLAN (MM-3-2-9-6)

USE THIS CHART WHEN 4 SPLITS/CYCLE = Y

	CYCLE	1	2	3	4	5	6
SPLIT TO TIME PLAN	SPLIT 1	1	2	3	4		
	SPLIT 2						
	SPLIT 3						
	SPLIT 4						

(0-4 = TIME PLAN IMPLEMENTED WHEN SPLIT IN EFFECT)

CYCLES & OFFSETS (MM-3-2-4)

NOTE: FIRST SPECIFY OFSET SEEKING MODE AND 4 SPLITS CYCLE MODE (ENHANCED OPTIONS, OPERATING MODES)

	Cycle #	1/1	2/1	3/1	4/1		
CYCLE & OFFSETS	Length	100.3	100	100.3	100		
	Offset 1	13	79	8	31		
	Offset 2						
	Offset 3						
	Offset 4						
	Offset 5						
	Max Dwell	32	32	32	32		

COORD PHASES (MM-3-2-5)

	CYCLE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COORD PHASES	1-1		X				X										
	2-1		X				X										
	3-1		X				X										
	4-1		X				X										

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OFFSET SEEKING MODE (MM-3-2-7)

Offset Seeeling Mode:	1

Mode

0 Add only, cycle times 20% slow only to get in sync
1 Dwell, cycle timer stops at cycle 0 up to max dwell time to get in step
2 Short Route, cycle times 20% fast or slow--whichever gets in step fastest

ENHANCED OPTIONS

OPERATING OPTIONS (MM-3-2-9-1)

Enhanced Perm:	Y	Y/N: See note	Invert Free In:	N	Y/N: See note
Central Override:	N	Y/N: See note	Split Matrix:	N	Y/N: See note
No PCL Offset Adjust:	N	Y/N: See note	4 Splits/Cycle:	Y	Y/N: See note
			No Early Coord Ped:	N	Y/N: See note

Yeil Percent	0	0-10%: See note
EGB%	0	0-100%: See note
RGB%	0	0-100%: See note
# Cycles to out of step:	0	0-255: 0=Disable

CYCLE SYNC OPTIONS (MM-3-2-9-2)

Sync Source:	0	0-2, 0=TOD/CL/Interconnect, 1= City Zero, 2= Absolute

Charts below only For City Zero offfsets or Absolute (0's). These are not daily reference times for Sync Source Option 0 (see TOD).

Cycle 1:	0	Cycle 2:	0	Cycle 3:	0
Cycle 4:	0	Cycle 5:	0	Cycle 6:	0

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SET MANUAL MODE (MM-3-2-9-3-1)

Auto Perm and FO:	N	Y/N: Y = Perms & Force offs auto-calculated from phase allocations. N = Manually entered
Ped Perm:	0	0-255: 0 = Auto calculated. 1-255 = secs each ped perm, starting with vehicle permissives

LOAD MANUAL PERMISSIVES (MM-3-2-9-3-2) ONLY USED IF AUTO PERM & FO MODE = N

Cycle 1	Split 1/PH	1	2	3	4	5	6	7	8
MANUAL PERMS	Start	45			45				45
	End	84			66				66
	Split 2/PH	1	2	3	4	5	6	7	8
	Start								
	End								

Cycle 2	Split 1/PH	1	2	3	4	5	6	7	8
MANUAL PERMS	Start	42			42				42
	End	81			63				63
	Split 2/PH	1	2	3	4	5	6	7	8
	Start								
	End								

Cycle 3	Split 1/PH	1	2	3	4	5	6	7	8
MANUAL PERMS	Start	42			42				42
	End	81			63				63
	Split 2/PH	1	2	3	4	5	6	7	8
	Start								
	End								

Cycle 4	Split 1/PH	1	2	3	4	5	6	7	8
MANUAL PERMS	Start	32			32				32
	End	81			63				63
	Split 2/PH	1	2	3	4	5	6	7	8
	Start								
	End								

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LOAD MANUAL FORCE OFFS (MM-3-2-9-3-3) ONLY USED IF AUTO PERM & FO MODE = N

Cycle 1	PHASE	1	2	3	4	5	6	7	8
FO's	SPLIT 1	97	45		83		45		83
	PHASE	1	2	3	4	5	6	7	8
	SPLIT 2								

Cycle 2	PHASE	1	2	3	4	5	6	7	8
FO's	SPLIT 1	97	42		80		42		80
	PHASE	1	2	3	4	5	6	7	8
	SPLIT 2								

Cycle 3	PHASE	1	2	3	4	5	6	7	8
FO's	SPLIT 1	97	42		80		42		80
	PHASE	1	2	3	4	5	6	7	8
	SPLIT 2								

Cycle 4	PHASE	1	2	3	4	5	6	7	8
FO's	SPLIT 1	97	42		80		42		80
	PHASE	1	2	3	4	5	6	7	8
	SPLIT 2								

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Street 1 / Street 2

CONTROLLER DATA

3/20/2013

CLOSED LOOP ID (MM-3-5-1)

CLOSED LOOP ID	Master Type:	1	0 = None, 1 = 3000 Series Master, 2 = 3800 EL master
	Intersection ID	16	0-255
	Master Identification	7	0-255
	Allow Comm Xfer Between Ports 2 & 3		Y/N: Y = Incoming signal on Master port (2 or 3), gets echo'd on other port

COMM SET-UP (MM-3-5-2)

PG1 PORT ASSIGN	Master (CL) Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used to receive Master Comm)
	Monitor Port		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Monitor Data Upload)
	Central Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Direct Dial-up Modem)

PG2 PORT 2 SETUP	Data Rate:	1200	1200, 2400, 4800, 9600, 14400, 19200
	Parity	0	0 = None, 1 = Odd, 2=Even
	Data bits	1	0 = 7 bits, 1 = 8 bits

PG3 PORT 3 SETUP	Data Rate:	1200	1200, 2400, 4800, 9600, 14400, 19200
	Parity	0	0 = None, 1 = Odd, 2=Even
	Data bits	1	0 = 7 bits, 1 = 8 bits

PG4	Modem Set-up String:		Up to 40 charaters; A-Z, or # @ = , ! ; % \ &

PHONE NUMBERS (MM-3-5-3)

PHONE NUM-BERS	Tone:		Y/N
	Phone 1:		Number & control characters (W , ; # ' / T P) if used
	Phone 2:		Number & control characters (W , ; # ' / T P) if used

LOG DATA (MM-3-5-5)

PG1 SAMPLE	Volume Log Sample period:	60	0, 6, 10, 15, 20, 30, 60 minutes, Enabled by TOD Ckt. 125 (EVL)
	MOE Log Sample period:	60	0, 6, 10, 15, 20, 30, 60 minutes, Enabled by TOD Ckt. 126 (EML)

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DAY PLANS (MM-3-3-1-#)

	HH	MM	CIRCUIT PLAN	C	O	S	CKT	ON/OFF
1	00	00					11(FRE)	OFF
	00	00		4	1	1		
2	00	00					11(FRE)	OFF
	00	00		1	1	1		
	06	30		2	1	1		
	10	00		1	1	1		
	14	30		3	1	1		
	18	30		1	1	1		

WEEK PLANS (MM-3-3-3)

Plan	SUN	MON	TUE	WED	THU	FRI	SAT
1	1	2	2	2	2	2	1
2							
3							
4							
5							

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CIRCUIT OVERRIDES (MM-3-3-6)

For each ciruit specify TOD (time of day controlled), or manually ON or OFF. Default = TOD

CIRCUIT OVER-RIDES	Circuit	65	66	67	68	69	70	71	72
	Function	LL1	LL2	LL3	LL4	LL5	LL6	LL7	LL8
	State								
	Circuit	73	74	75	76	77	78	79	80
	Function	**CN1**	CN2	CN3	CN4	**WRM**	MIN	DIM	CVS
	State								
CIRCUIT OVER-RIDES	Circuit	81	82	83	84	85	86	87	88
	Function	TIA	TIB	TIC	N/U	N/U	N/U	**PR1**	**PR2**
	State								
	Circuit	89	90	91	92	93	94	95	96
	Function	OR1	OR2	RR1	RR2	M21	M22	DM3	GR2
	State								
CIRCUIT OVER-RIDES	Circuit	113	114	115	116	117	118	119	120
	Function	UD1	UD2	UD3	UD4	UD5	UD6	UD7	UD8
	State								
	Circuit	121	122	123	124	125	126	127	128
	Function	PH2	DP2	DP3	3CD	**EVL**	**EML**	ASC	DCP
	State					**ON**	**ON**		

DAYLIGHT SAVINGS (MM-3-3-7)

DAY LIGHT SAVINGS	Spring		Fall	
	(0-12)	(0-5)	(0-12)	(0-5)
	Month	WOM	Month	WOM
	3	**2**	**11**	**1**

Enter Month and Week of Month for Spring Forward and Fall Back days (typical 4 - 1 and 10 - 5). Unit will adjust at 2AM on Sunday of week specified. Enter zero (or leave blank) if Daylight Savings not used.

SYNC REFERENCE MODE (MM-3-3-8)

Mode:	**0**	0 = Time dependent, 1 = C/O/S Event

	HH	MM	
Time Clock Reset:	**00**	**00**	TOD clock reset to by TBC input
Interrupter:		**N**	Y/N; Y = Interrupter pulses provided
Pulses:		**0**	0-6 = Number of interrupter pulses

TIME DEPENDENT CYCLE REFERENCES

	HH	MM
CYC 1:	**00**	**00**
CYC 2:	**00**	**00**
CYC 3:	**00**	**00**
CYC 4:		
CYC 5:		
CYC 6:		

When mode = Time dependent, enter reference times of day for each cycle. Default = 00:00 = midnight = most commonly used reference.
When mode = C/O/S Event, cycle restarts on each COS change. Only use this mode for specific reasons. Time dependent most common used mode.

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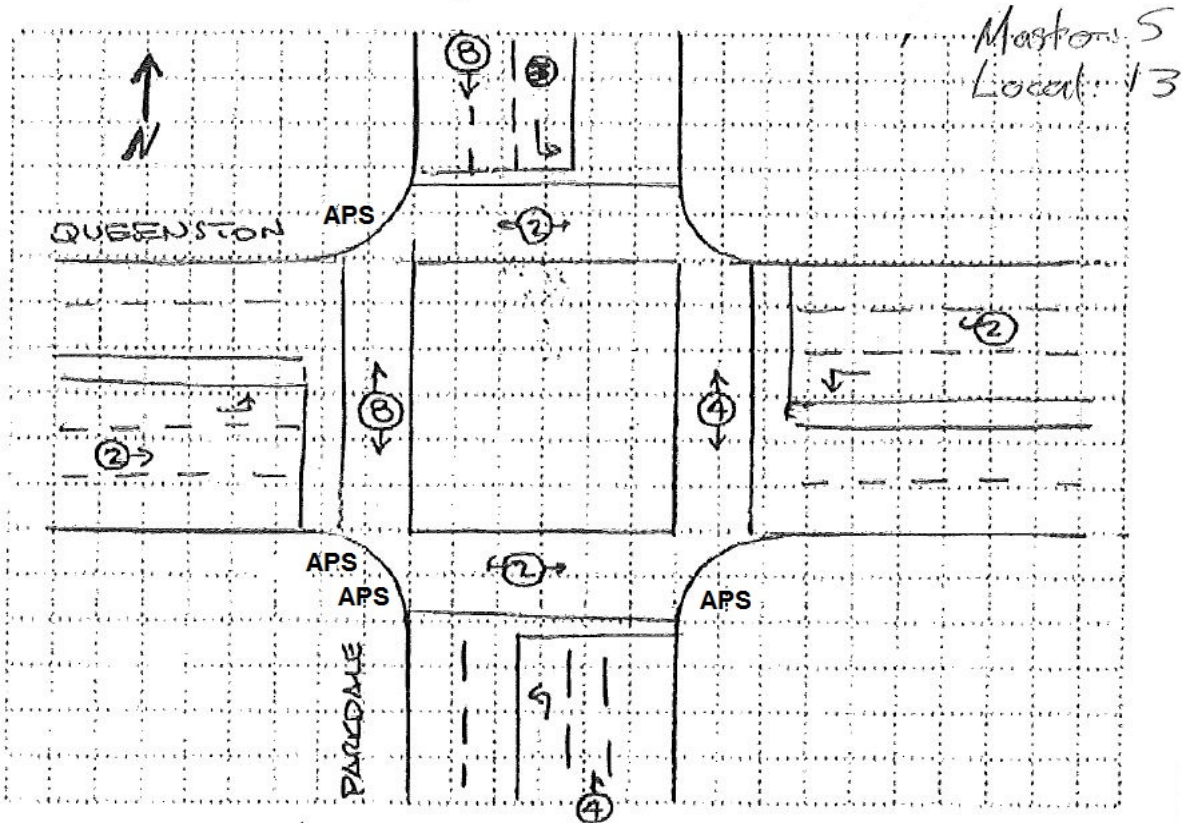
City of Hamilton - Traffic
Traffic Signal Controller Timing Data

Intersection: **Parkdale Ave N @ Queenston Rd (Int# 58)**

Controller Type: **3000E** Page **1** of **14**

Programmed By: _____ Installed By: _____

Date: _____ Date: _____



Timings from field timmer - April 28, 2015

ϕ1:
ϕ2: **Queenston - EB/WB, North & South Xwalks**
ϕ3: **Parkdale - SBLT**
ϕ4: **Parkdale - NB, East Xwalk**
ϕ5:
ϕ6: **No Outputs**
ϕ7:
ϕ8: **Parkdale - SB, West Xwalk**

Flash Operation: **Red: Queenston**
Red: Parkdale

SEQUENCE/START-UP (MM-3-1-1)

START-UP PHASES/INTERVAL/SEQUENCE

(X = Enable for start-up phases. Must be compatible if more than one)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
START-UP	Phases		X				X										
	Interval	0	(0=Red, 1=Yel, 2= Grn, determines color of selected phases above on start-up)														
	Flash	10	(0-255 seconds start-up flash time)														
	Red	0	(0-25.5 secs = length of first red after start-up if start-up in yellow or red)														
	Sequence	3	(2=single ring, 3=dual ring, 4=123/567+48, 5=12/56+3478, 6=1234/56+78, 7=1234/5678, 8=dual quad, 9=12ph														

PHASE RING ASSIGNMENTS

X = Phase assigned to ring (if used). Phases in different rings but same co-phase group can time together.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
RING	Ring 1		X	X	X												
	Ring 2						X		X								
	Ring 3																
	Ring 4																

CO-PHASE GRP 1-4 ASSIGNMENTS

X = phase assigned to co-phase group. All ph's assigned to rings must be assigned to co-phase group.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CO-PHASE	CO PH 1		X				X										
	CO PH 2			X	X				X								
	CO PH 3																
	CO PH 4																

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Queenston at Parkdale

CONTROLLER DATA

4/29/15

PHASE RECALLS/MODES; MIN, MAX, etc. (MM-3-1-2-1-PGDN, etc.) USE 1 TO ALL 4 TIMING PLANS

(X = ENABLE)

TP1 PHASE RECALLS

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL				X				X								
	SOFT REC																
	NON-LOCK																
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

(X = ENABLE)

TP2 PHASE RECALLS

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL				X				X								
	SOFT REC																
	NON-LOCK																
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

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Queenston at Parkdale

CONTROLLER DATA

4/29/15

TP3 PHASE RECALLS

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL				X				X								
	SOFT REC																
	NON-LOCK																
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

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Queenston at Parkdale **CONTROLLER DATA** 4/29/15

PHASE RECALLS/MODES; CNA, INH MAX, PED OPTIONS, etc. (MM-3-1-2-2) **ONLY 1 PLAN PER UNIT**

(X = ENABLE)																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	CNA 1		X														
	CNA 2																
	CNA 3																
	CNA 4																
	WRM		X														
	INH MAX																
	PED RECY																
	FL WALK																
	FDW->YEL																
	FDW->RED																
	COND PED																

PHASE TIMES (MM-3-1-3-PGDN, etc.) **USE 1 TO ALL 4 TIMING PLANS**

		TP1															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		**10**		**10**		**10**		**10**								
	Passage																
	Yellow		**3.3**		**3.3**		**3.3**		**3.3**								
	Red		**2.6**		**2.6**		**2.6**		**2.6**								
	Walk		**7**		**7**		**7**		**7**								
	Ped Clr		**17**		**17**		**17**		**17**								
	Max 1		**31**		**27**		**31**		**27**								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

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Queenston at Parkdale

CONTROLLER DATA

4/29/15

TP2

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		10	5	10		10		10								
	Passage																
	Yellow		3.3		3.3		3.3		3.3								
	Red		2.6		2.6		2.6		2.6								
	Walk		7		7		7		7								
	Ped Clr		17		17		17		17								
	Max 1		44		34		44		34								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

TP3

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		10	5	10		10		10								
	Passage																
	Yellow		3.3	3.0	3.3		3.3		3.3								
	Red		2.6		2.6		2.6		2.6								
	Walk		7		7		7		7								
	Ped Clr		17		17		17		17								
	Max 1		37	9	28		37		28								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

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SELECTION SOURCE (MM-3-2-2)

Entries determine how parameters get selected

Cycle Source:	**1**	0=TOD, 1=CL, 2=INT
Split Source:	**1**	0=TOD, 1=CL, 2=INT
Offset Source:	**1**	0=TOD, 1=CL, 2=INT

Free Source:	**1**	0=TOD, 1=CL, 2=INT
Flash Source:	**0**	0=TOD, 1=CL, 2=INT
0	**255**	0-255 SECS

TOD = Time of day control by internal clock, CL = Closed loop (comm), INT = Interconnect. Inter-TOD Revert is time allowed after failed interconnect before unit reverts to TOD (Time Base) control.

COORD BASIC OPTIONS (MM-3-2-3)

Reference to End (vs. begin) of Main St.:	**N**	Y/N: Y = Offset references to end of main st. green. N = Beginning of Main st. green.
Use % (vs. secs) for Phase Allocation:	**N**	Y/N: Y = Phase allocations loaded as percent of 100. N = Allocations in seconds.
Use % (vs. secs) for Offset Entry:	**N**	Y/N: Y = Offset loaded as percent of 100. N = Offset loaded in seconds.
Use Fixed (vs. floating) Force Offs:	**Y**	Y/N: Y = Force offs are fixed to cycle. N=Force offs like max times, begin with green.
Permissive Type:	**1**	0-2: 0=Yield, 1= Single, 2= Multiple. See Permissives note below

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C/S TO TIMING PLAN (MM-3-2-9-6)

X

USE THIS CHART WHEN 4 SPLITS/CYCLE = Y

	CYCLE	1	2	3	4	5	6
SPLIT TO TIME PLAN	SPLIT 1	**1**	**2**	**3**			
	SPLIT 2						
	SPLIT 3						
	SPLIT 4						

(0-4 = TIME PLAN IMPLEMENTED WHEN SPLIT IN EFFECT)

CYCLES & OFFSETS (MM-3-2-4)

NOTE: FIRST SPECIFY OFSET SEEKING MODE AND 4 SPLITS CYCLE MODE (ENHANCED OPTIONS, OPERATING MODES)

	Cycle #	1/1	2/1	3/1	4/1		
CYCLE & OFFSETS	Length	**70**	**90**	**90**			
	Offset 1	**43**	**52**	**86**			
	Offset 2						
	Offset 3						
	Offset 4						
	Offset 5						
	Max Dwell	**32**	**32**	**32**			

COORD PHASES (MM-3-2-5)

	CYCLE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COORD PHASES	**1-1**		**X**				**X**										
	2-1		**X**				**X**										
	3-1		**X**				**X**										

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OFFSET SEEKING MODE (MM-3-2-7)

Offset Seeeling Mode:	**1**

Mode

0 Add only, cycle times 20% slow only to get in sync

1 Dwell, cycle timer stops at cycle 0 up to max dwell time to get in step

2 Short Route, cycle times 20% fast or slow--whichever gets in step fastest

ENHANCED OPTIONS

OPERATING OPTIONS (MM-3-2-9-1)

Enhanced Perm:	**Y**	Y/N: See note	Invert Free In:	**N**	Y/N: See note
Central Override:	**N**	Y/N: See note	Split Matrix:	**N**	Y/N: See note
No PCL Offset Adjust:	**N**	Y/N: See note	4 Splits/Cycle:	**Y**	Y/N: See note
			No Early Coord Ped:	**N**	Y/N: See note

Yeil Percent	**0**	0-10%: See note
EGB%	**0**	0-100%: See note
RGB%	**0**	0-100%: See note
# Cycles to out of step:	**0**	0-255: 0=Disable

CYCLE SYNC OPTIONS (MM-3-2-9-2)

Sync Source:	**0**	0-2, 0=TOD/CL/Interconnect, 1= City Zero, 2= Absolute

Charts below only For City Zero offfsets or Absolute (0's). These are not daily reference times for Sync Source Option 0 (see TOD).

Cycle 1:	**0**	Cycle 2:	**0**	Cycle 3:	**0**
Cycle 4:	**0**	Cycle 5:	**0**	Cycle 6:	**0**

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MANUAL/AUTO FORCE OFFS & PERMS

SET MANUAL MODE (MM-3-2-9-3-1)

Auto Perm and FO:	**N**	Y/N: Y = Perms & Force offs auto-calculated from phase allocations. N = Manually entered
Ped Perm:	**24**	0-255: 0 = Auto calculated. 1-255 = secs each ped perm, starting with vehicle permissives

LOAD MANUAL PERMISSIVES (MM-3-2-9-3-2) ONLY USED IF AUTO PERM & FO MODE = N

Cycle 1	Split 1/PH	1	2	3	4	5	6	7	8
	Start				**14**				**14**
MANUAL	End				**38**				**38**
PERMS	Split 2/PH	1	2	3	4	5	6	7	8
	Start								
	End								

Cycle 2	Split 1/PH	1	2	3	4	5	6	7	8
	Start				**27**				**27**
MANUAL	End				**51**				**51**
PERMS	Split 2/PH	1	2	3	4	5	6	7	8
	Start								
	End								

Cycle 3	Split 1/PH	1	2	3	4	5	6	7	8
	Start			**38**	**38**				**21**
MANUAL	End			**45**	**65**				**45**
PERMS	Split 2/PH	1	2	3	4	5	6	7	8
	Start								
	End								

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LOAD MANUAL FORCE OFFS (MM-3-2-9-3-3) ONLY USED IF AUTO PERM & FO MODE = N

Cycle 1	PHASE	1	2	3	4	5	6	7	8
FO's	SPLIT 1				**65**				
	PHASE	1	2	3	4	5	6	7	8
	SPLIT 2								

Cycle 2	PHASE	1	2	3	4	5	6	7	8
FO's	SPLIT 1				**85**				
	PHASE	1	2	3	4	5	6	7	8
	SPLIT 2								

Cycle 3	PHASE	1	2	3	4	5	6	7	8
FO's	SPLIT 1				**85**				
	PHASE	1	2	3	4	5	6	7	8
	SPLIT 2								

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DAY PLANS (MM-3-3-1-#)

	HH	MM	CIRCUIT PLAN	C	O	S	CKT	ON/OFF
1	00	00					11(FRE)	ON
	00	00		1	1	1		
2	00	00					11(FRE)	ON
	06	30					11(FRE)	OFF
	06	30		2	1	1		
	09	30		1	1	1		
	15	30		3	1	1		
	18	00		1	1	1		

WEEK PLANS (MM-3-3-3)

Plan	SUN	MON	TUE	WED	THU	FRI	SAT
1	1	2	2	2	2	2	1
2							
3							
4							
5							

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CIRCUIT OVERRIDES (MM-3-3-6)

For each ciruit specify TOD (time of day controlled), or manually ON or OFF. Default = TOD

CIRCUIT OVER-RIDES	Circuit	65	66	67	68	69	70	71	72
	Function	LL1	LL2	LL3	LL4	LL5	LL6	LL7	LL8
	State								
	Circuit	**73**	74	75	76	**77**	78	79	80
	Function	**CN1**	CN2	CN3	CN4	**WRM**	MIN	DIM	CVS
	State	**ON**				**ON**			
CIRCUIT OVER-RIDES	Circuit	113	114	115	116	117	118	119	120
	Function	UD1	UD2	UD3	UD4	UD5	UD6	UD7	UD8
	State								
	Circuit	121	122	123	124	**125**	**126**	127	128
	Function	PH2	DP2	DP3	3CD	**EVL**	**EML**	ASC	DCP
	State					**ON**	**ON**		

LOG DATA (MM-3-5-5)

Volume Long Sample Period :	**60**
MOE Long Sample Period:	**60**

DAYLIGHT SAVINGS (MM-3-3-7)

DAY LIGHT SAVINGS	Spring		Fall	
	(0-12)	(0-5)	(0-12)	(0-5)
	Month	WOM	Month	WOM
	3	**2**	**11**	**1**

Enter Month and Week of Month for Spring Forward and Fall Back days
(typical 4 - 1 and 10 - 5). Unit will adjust at 2AM on Sunday of week specified.
Enter zero (or leave blank) if Daylight Savings not used.

SYNC REFERENCE MODE (MM-3-3-8)

Mode:	**0**	0 = Time dependent, 1 = C/O/S Event

	HH	MM	
Time Clock Reset:	**00**	**00**	TOD clock reset to by TBC input
Interrupter:		**N**	Y/N; Y = Interrupter pulses provided
Pulses:		**0**	0-6 = Number of interrupter pulses

TIME DEPENDENT CYCLE REFERENCES		HH	MM		HH	MM		HH	MM
	CYC 1:	**00**	**00**	CYC 2:	**00**	**00**	CYC 3:	**00**	**00**
	CYC 4:			CYC 5:			CYC 6:		

When mode = Time dependent, enter reference times of day for each cycle. Default = 00:00 = midnight = most commonly used reference.
When mode = C/O/S Event, cycle restarts on each COS change. Only use this mode for specific reasons. Time dependent most common used mode.

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CLOSED LOOP ID (MM-3-5-1)

CLOSED LOOP ID	Master Type:	**1**	0 = None, 1 = 3000 Series Master, 2 = 3800 EL master
	Intersection ID		0-255
	Master Identification		0-255
	Allow Comm Xfer Between Ports 2 & 3		0

COMM SET-UP (MM-3-5-2)

PG1 PORT ASSIGN	Master (CL) Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used to receive Master Comm)
	Monitor Port		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Monitor Data Upload)
	Central Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Direct Dial-up Modem)

PG2 PORT 2 SETUP	Data Rate:		1200, 2400, 4800, 9600, 14400, 19200
	Parity		X
	Data bits		0 = 7 bits, 1 = 8 bits

PG3 PORT 3 SETUP	Data Rate:		1200, 2400, 4800, 9600, 14400, 19200
	Parity		0 = None, 1 = Odd, 2=Even
	Data bits		0 = 7 bits, 1 = 8 bits

PG4	Modem Set-up String:		Up to 40 charaters; A-Z, or # @ = , ! ; % \ &

PHONE NUMBERS (MM-3-5-3)

PHONE NUM-BERS	Tone:		Y/N
	Phone 1:		Number & control characters (W , ; # ' / T P) if used
	Phone 2:		Number & control characters (W , ; # ' / T P) if used

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Turning Movement Count (5 . QUEENSTON RD & PARKDALE AVE S)

Start Time	N Approach PARKDALE AVE S						E Approach QUEENSTON RD						S Approach PARKDALE AVE S						W Approach QUEENSTON RD						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	7	25	11	0	0	43	14	95	5	0	1	114	3	54	7	0	3	64	3	93	18	0	2	114	335	
07:15:00	7	18	14	0	3	39	14	126	3	0	3	143	9	79	8	0	22	96	8	107	21	0	18	136	414	
07:30:00	5	12	14	0	6	31	21	161	2	0	3	184	6	54	15	0	10	75	6	139	17	0	3	162	452	
07:45:00	5	10	11	0	2	26	32	148	10	0	2	190	11	94	11	0	24	116	15	141	24	0	29	180	512	1713
08:00:00	7	21	13	0	3	41	29	164	6	0	4	199	8	82	15	0	9	105	11	133	19	0	4	163	508	1886
08:15:00	14	23	14	0	15	51	30	169	9	0	3	208	19	69	26	0	26	114	5	146	23	0	35	174	547	2019
08:30:00	15	32	20	0	14	67	27	184	14	0	10	225	19	52	31	0	21	102	13	146	16	0	24	175	569	2136
08:45:00	12	32	21	0	5	65	30	151	24	0	11	205	30	67	18	0	15	115	14	151	17	0	18	182	567	2191
09:00:00	13	30	30	0	3	73	20	128	6	0	2	154	12	53	13	0	7	78	9	156	13	0	6	178	483	2166
09:15:00	12	17	17	0	6	46	19	122	9	0	1	150	13	49	12	0	19	74	7	123	13	0	19	143	413	2032
09:30:00	11	28	25	0	4	64	22	121	3	0	2	146	14	40	16	0	8	70	8	122	9	0	7	139	419	1882
09:45:00	8	23	28	0	8	59	28	103	9	0	0	140	19	36	13	1	19	69	5	148	17	0	18	170	438	1753
BREAK																										
16:00:00	21	89	39	0	6	149	34	152	12	0	9	198	20	44	14	0	22	78	19	224	12	0	24	255	680	
16:15:00	15	108	34	0	6	157	33	174	12	0	13	219	20	51	13	0	14	84	16	206	22	0	15	244	704	
16:30:00	21	151	51	0	4	223	28	176	8	0	5	212	17	48	10	0	12	75	9	229	15	0	9	253	763	
16:45:00	24	129	51	0	6	204	33	176	11	0	9	220	15	47	13	0	12	75	17	231	15	0	16	263	762	2909
17:00:00	26	148	48	0	4	222	15	161	8	0	2	184	14	41	10	0	10	65	12	238	21	0	6	271	742	2971
17:15:00	29	149	38	0	3	216	19	171	10	0	6	200	18	32	11	0	6	61	19	195	15	0	17	229	706	2973
17:30:00	25	131	39	0	1	195	22	164	8	0	4	194	14	43	8	0	13	65	20	211	12	0	11	243	697	2907
17:45:00	16	95	40	0	1	151	17	142	14	0	1	173	19	51	16	0	13	86	11	177	18	0	7	206	616	2761
18:00:00	14	79	31	0	9	124	25	154	14	0	7	193	17	42	18	0	9	77	15	167	6	0	8	188	582	2601
18:15:00	8	61	37	0	5	106	34	127	7	0	4	168	15	39	13	0	10	67	15	153	15	0	6	183	524	2419
18:30:00	12	46	34	0	3	92	23	157	6	0	2	186	10	41	6	0	3	57	10	149	15	0	5	174	509	2231
18:45:00	8	35	25	0	6	68	28	122	10	0	8	160	12	27	13	0	3	52	9	160	20	0	7	189	469	2084
Grand Total	335	1492	685	0	123	2512	597	3548	220	0	112	4365	354	1235	330	1	310	1920	276	3945	393	0	314	4614	**13411**	-
Approach%	13.3%	59.4%	27.3%	0%		-	13.7%	81.3%	5%	0%		-	18.4%	64.3%	17.2%	0.1%		-	6%	85.5%	8.5%	0%		-	-	-
Totals %	2.5%	11.1%	5.1%	0%		18.7%	4.5%	26.5%	1.6%	0%		32.5%	2.6%	9.2%	2.5%	0%		14.3%	2.1%	29.4%	2.9%	0%		34.4%	-	-
Heavy	4	42	17	0		-	14	157	6	0		-	5	45	8	0		-	9	150	12	0		-	-	-
Heavy %	1.2%	2.8%	2.5%	0%		-	2.3%	4.4%	2.7%	0%		-	1.4%	3.6%	2.4%	0%		-	3.3%	3.8%	3.1%	0%		-	-	-
Bicycles	0	2	0	0		-	0	1	0	0		-	0	1	0	0		-	0	3	0	0		-	-	-
Bicycle %	0%	0.1%	0%	0%		-	0%	0%	0%	0%		-	0%	0.1%	0%	0%		-	0%	0.1%	0%	0%		-	-	-

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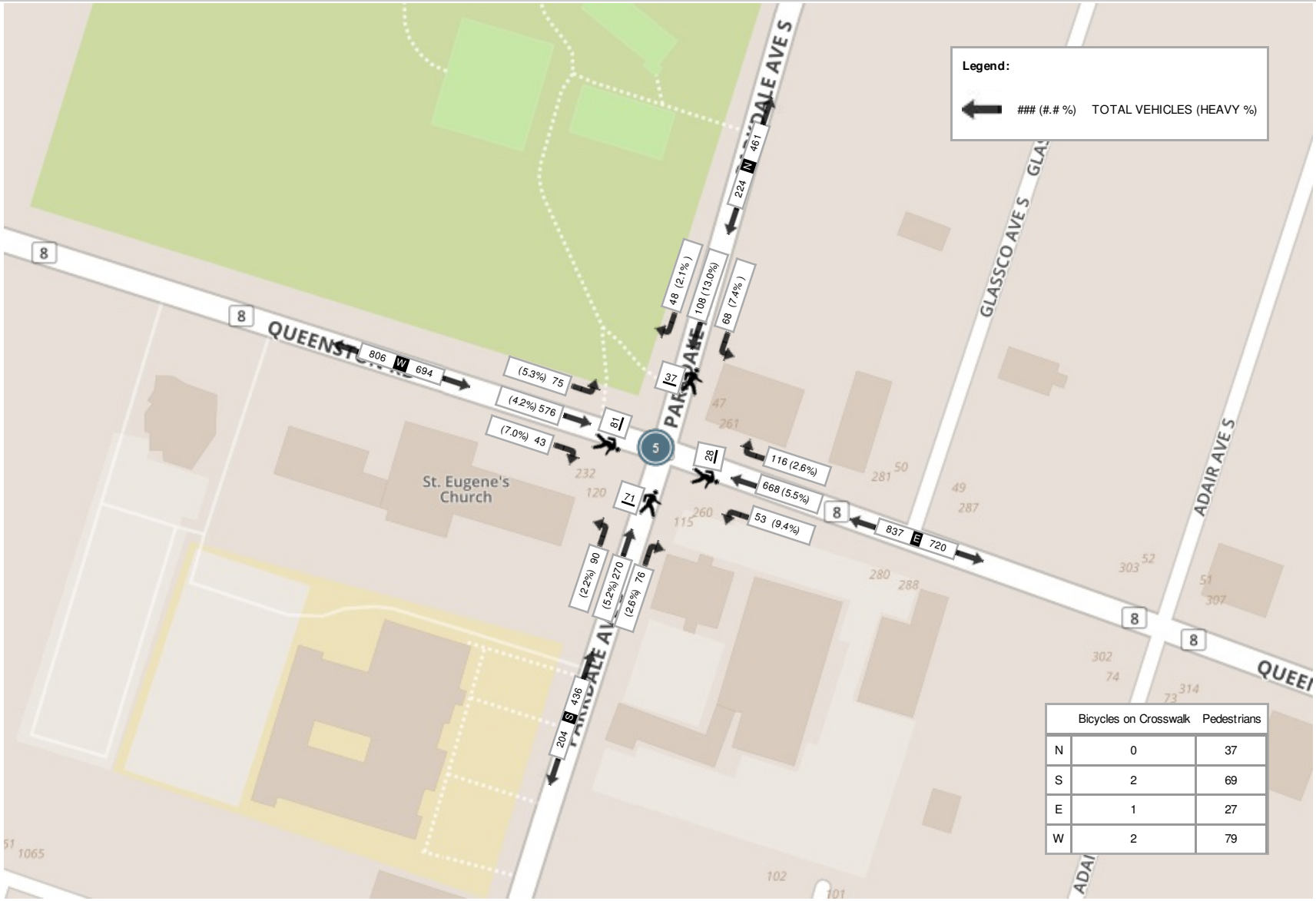
Peak Hour: 08:00 AM - 09:00 AM Weather: Partly Cloudy (-7 °C)

Start Time	N Approach PARKDALE AVE S						E Approach QUEENSTON RD						S Approach PARKDALE AVE S						W Approach QUEENSTON RD						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	7	21	13	0	3	41	29	164	6	0	4	199	8	82	15	0	9	105	11	133	19	0	4	163	508
08:15:00	14	23	14	0	15	51	30	169	9	0	3	208	19	69	26	0	26	114	5	146	23	0	35	174	547
08:30:00	15	32	20	0	14	67	27	184	14	0	10	225	19	52	31	0	21	102	13	146	16	0	24	175	569
08:45:00	12	32	21	0	5	65	30	151	24	0	11	205	30	67	18	0	15	115	14	151	17	0	18	182	567
Grand Total	48	108	68	0	37	224	116	668	53	0	28	837	76	270	90	0	71	436	43	576	75	0	81	694	**2191**
Approach%	21.4%	48.2%	30.4%	0%		-	13.9%	79.8%	6.3%	0%		-	17.4%	61.9%	20.6%	0%		-	6.2%	83%	10.8%	0%		-	**-**
Totals %	2.2%	4.9%	3.1%	0%		10.2%	5.3%	30.5%	2.4%	0%		38.2%	3.5%	12.3%	4.1%	0%		19.9%	2%	26.3%	3.4%	0%		31.7%	**-**
PHF	0.8	0.84	0.81	0		0.84	0.97	0.91	0.55	0		0.93	0.63	0.82	0.73	0		0.95	0.77	0.95	0.82	0		0.95	**-**
Heavy	1	14	5	0		20	3	37	5	0		45	2	14	2	0		18	3	24	4	0		31	**-**
Heavy %	2.1%	13%	7.4%	0%		8.9%	2.6%	5.5%	9.4%	0%		5.4%	2.6%	5.2%	2.2%	0%		4.1%	7%	4.2%	5.3%	0%		4.5%	**-**
Lights	47	94	63	0		204	113	631	48	0		792	74	256	88	0		418	40	552	71	0		663	**-**
Lights %	97.9%	87%	92.6%	0%		91.1%	97.4%	94.5%	90.6%	0%		94.6%	97.4%	94.8%	97.8%	0%		95.9%	93%	95.8%	94.7%	0%		95.5%	**-**
Single-Unit Trucks	1	1	5	0		7	1	10	1	0		12	1	4	1	0		6	2	9	4	0		15	**-**
Single-Unit Trucks %	2.1%	0.9%	7.4%	0%		3.1%	0.9%	1.5%	1.9%	0%		1.4%	1.3%	1.5%	1.1%	0%		1.4%	4.7%	1.6%	5.3%	0%		2.2%	**-**
Buses	0	12	0	0		12	2	27	4	0		33	1	10	1	0		12	1	15	0	0		16	**-**
Buses %	0%	11.1%	0%	0%		5.4%	1.7%	4%	7.5%	0%		3.9%	1.3%	3.7%	1.1%	0%		2.8%	2.3%	2.6%	0%	0%		2.3%	**-**
Articulated Trucks	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0.9%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	37	-	-	-	-	-	27	-	-	-	-	-	69	-	-	-	-	-	79	-	**-**
Pedestrians%	-	-	-	-	17.1%		-	-	-	-	12.4%		-	-	-	-	31.8%		-	-	-	-	36.4%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	2	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0.5%		-	-	-	-	0.9%		-	-	-	-	0.9%		**-**
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (-3 °C)

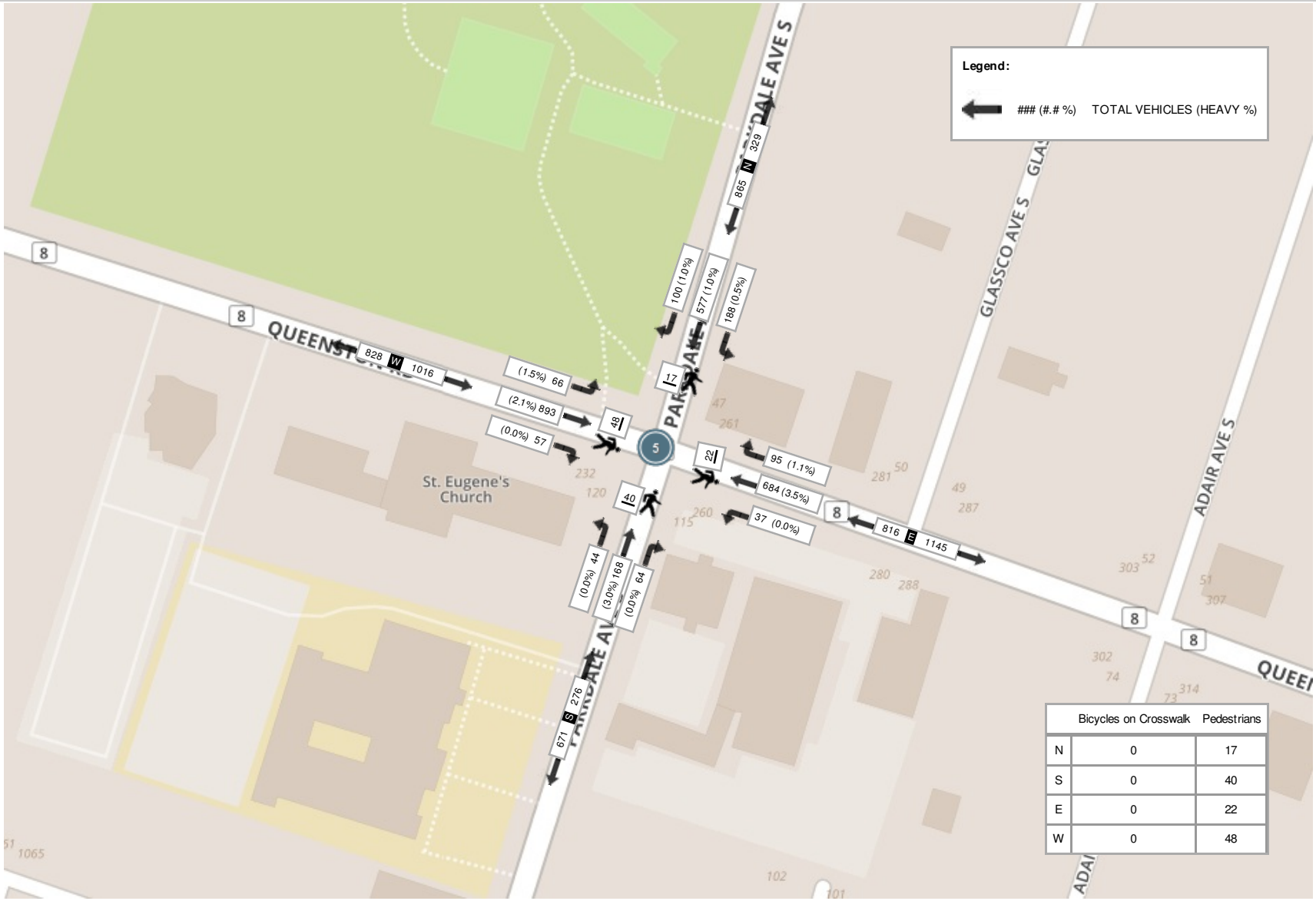
Start Time	N Approach PARKDALE AVE S						E Approach QUEENSTON RD						S Approach PARKDALE AVE S						W Approach QUEENSTON RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	21	151	51	0	4	223	28	176	8	0	5	212	17	48	10	0	12	75	9	229	15	0	9	253	763
16:45:00	24	129	51	0	6	204	33	176	11	0	9	220	15	47	13	0	12	75	17	231	15	0	16	263	762
17:00:00	26	148	48	0	4	222	15	161	8	0	2	184	14	41	10	0	10	65	12	238	21	0	6	271	742
17:15:00	29	149	38	0	3	216	19	171	10	0	6	200	18	32	11	0	6	61	19	195	15	0	17	229	706
Grand Total	100	577	188	0	17	865	95	684	37	0	22	816	64	168	44	0	40	276	57	893	66	0	48	1016	**2973**
Approach%	11.6%	66.7%	21.7%	0%		-	11.6%	83.8%	4.5%	0%		-	23.2%	60.9%	15.9%	0%		-	5.6%	87.9%	6.5%	0%		-	**-**
Totals %	3.4%	19.4%	6.3%	0%		29.1%	3.2%	23%	1.2%	0%		27.4%	2.2%	5.7%	1.5%	0%		9.3%	1.9%	30%	2.2%	0%		34.2%	**-**
PHF	0.86	0.96	0.92	0		0.97	0.72	0.97	0.84	0		0.93	0.89	0.88	0.85	0		0.92	0.75	0.94	0.79	0		0.94	**-**
Heavy	1	6	1	0		8	1	24	0	0		25	0	5	0	0		5	0	19	1	0		20	**-**
Heavy %	1%	1%	0.5%	0%		0.9%	1.1%	3.5%	0%	0%		3.1%	0%	3%	0%	0%		1.8%	0%	2.1%	1.5%	0%		2%	**-**
Lights	99	571	187	0		857	94	660	37	0		791	64	163	44	0		271	57	874	65	0		996	**-**
Lights %	99%	99%	99.5%	0%		99.1%	98.9%	96.5%	100%	0%		96.9%	100%	97%	100%	0%		98.2%	100%	97.9%	98.5%	0%		98%	**-**
Single-Unit Trucks	1	3	0	0		4	1	3	0	0		4	0	1	0	0		1	0	4	1	0		5	**-**
Single-Unit Trucks %	1%	0.5%	0%	0%		0.5%	1.1%	0.4%	0%	0%		0.5%	0%	0.6%	0%	0%		0.4%	0%	0.4%	1.5%	0%		0.5%	**-**
Buses	0	3	1	0		4	0	21	0	0		21	0	4	0	0		4	0	15	0	0		15	**-**
Buses %	0%	0.5%	0.5%	0%		0.5%	0%	3.1%	0%	0%		2.6%	0%	2.4%	0%	0%		1.4%	0%	1.7%	0%	0%		1.5%	**-**
Articulated Trucks	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%	**-**
Pedestrians	-	-	-	-	17	-	-	-	-	-	22	-	-	-	-	-	40	-	-	-	-	-	48	-	**-**
Pedestrians%	-	-	-	-	13.4%		-	-	-	-	17.3%		-	-	-	-	31.5%		-	-	-	-	37.8%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	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	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 08:00 AM - 09:00 AM **Weather: Partly Cloudy (-7 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	37
S	2	69
E	1	27
W	2	79

Peak Hour: 04:30 PM - 05:30 PM **Weather: Partly Cloudy (-3 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	17
S	0	40
E	0	22
W	0	48

NexTrans
4261-A14 Highway 7 East
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Markham ON, CANADA, L3R 9W6

Turning Movement Count (3 . QUEENSTON RD & RED HILL PKWY NB ON / OFF RAMPS)

Start Time	N Approach RED HILL PKWY NB ON RAMPS						E Approach QUEENSTON RD						S Approach NB RED HILL PKWY OFF RAMP						W Approach QUEENSTON RD						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	0	0	0	0	1	0	29	117	0	0	0	146	30	0	27	0	0	57	0	67	41	0	0	108	311	
07:15:00	0	0	0	0	0	0	24	143	0	0	0	167	48	0	23	0	0	71	0	71	38	0	0	109	347	
07:30:00	0	0	0	0	1	0	32	189	0	0	0	221	58	1	34	0	0	93	0	94	50	0	0	144	458	
07:45:00	0	0	0	0	0	0	19	175	0	0	0	194	43	0	56	0	0	99	0	111	49	0	0	160	453	1569
08:00:00	0	0	0	0	0	0	21	175	0	0	1	196	42	0	52	0	0	94	0	108	39	0	0	147	437	1695
08:15:00	0	0	0	0	0	0	25	177	0	0	0	202	59	0	60	0	8	119	0	130	53	0	0	183	504	1852
08:30:00	0	0	0	0	0	0	21	184	0	0	0	205	57	0	61	0	2	118	0	111	50	0	0	161	484	1878
08:45:00	0	0	0	0	0	0	24	182	0	0	0	206	77	0	57	0	2	134	0	148	51	0	0	199	539	1964
09:00:00	0	0	0	0	0	0	21	154	0	0	0	175	49	0	39	0	1	88	0	157	39	0	0	196	459	1986
09:15:00	0	0	0	0	1	0	15	166	0	0	0	181	56	0	40	0	0	96	0	123	31	0	0	154	431	1913
09:30:00	0	0	0	0	1	0	24	173	0	0	0	197	48	0	43	0	3	91	0	136	38	0	0	174	462	1891
09:45:00	0	0	0	0	1	0	13	144	0	0	0	157	57	0	41	0	0	98	0	140	33	1	0	174	429	1781
BREAK																										
16:00:00	0	0	0	0	2	0	19	230	0	0	0	249	56	0	51	0	5	107	0	241	58	1	0	300	656	
16:15:00	0	0	0	0	4	0	11	299	0	0	0	310	72	0	46	0	0	118	0	209	56	0	0	265	693	
16:30:00	0	0	0	0	1	0	17	249	0	0	0	266	76	1	87	0	3	164	0	244	49	0	0	293	723	
16:45:00	0	0	0	0	1	0	26	259	0	0	0	285	74	0	50	0	5	124	0	219	50	0	0	269	678	2750
17:00:00	0	0	0	0	1	0	22	220	0	0	0	242	84	0	59	0	6	143	0	213	73	1	0	287	672	2766
17:15:00	0	0	0	0	4	0	23	272	0	0	0	295	68	0	41	0	7	109	0	198	53	1	0	252	656	2729
17:30:00	0	0	0	0	3	0	19	217	0	0	0	236	81	0	57	0	3	138	0	221	44	0	0	265	639	2645
17:45:00	0	0	0	0	2	0	13	187	0	0	0	200	72	0	59	0	1	131	0	196	41	0	0	237	568	2535
18:00:00	0	0	0	0	3	0	25	205	0	0	0	230	65	0	45	0	1	110	0	191	34	0	0	225	565	2428
18:15:00	0	0	0	0	0	0	18	223	0	0	0	241	68	0	43	0	1	111	0	191	34	0	0	225	577	2349
18:30:00	0	0	0	0	0	0	21	240	0	0	0	261	57	0	38	0	2	95	0	159	34	0	0	193	549	2259
18:45:00	0	0	0	0	4	0	18	176	0	0	0	194	36	0	33	0	1	69	0	163	28	0	0	191	454	2145
Grand Total	0	0	0	0	30	0	500	4756	0	0	1	5256	1433	2	1142	0	51	2577	0	3841	1066	4	0	4911	**12744**	-
Approach%	0%	0%	0%	0%		-	9.5%	90.5%	0%	0%		-	55.6%	0.1%	44.3%	0%		-	0%	78.2%	21.7%	0.1%		-	-	-
Totals %	0%	0%	0%	0%		0%	3.9%	37.3%	0%	0%		41.2%	11.2%	0%	9%	0%		20.2%	0%	30.1%	8.4%	0%		38.5%	-	-
Heavy	0	0	0	0		-	16	185	0	0		-	38	0	21	0		-	0	145	11	0		-	-	-
Heavy %	0%	0%	0%	0%		-	3.2%	3.9%	0%	0%		-	2.7%	0%	1.8%	0%		-	0%	3.8%	1%	0%		-	-	-
Bicycles	0	0	0	0		-	0	2	0	0		-	0	0	0	0		-	0	5	0	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0.1%	0%	0%		-	-	-

NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

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Peak Hour: 08:15 AM - 09:15 AM Weather: Partly Cloudy (-7 °C)

Start Time	N Approach RED HILL PKWY NB ON RAMPS						E Approach QUEENSTON RD						S Approach NB RED HILL PKWY OFF RAMP						W Approach QUEENSTON RD						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	
08:15:00	0	0	0	0	0	0	25	177	0	0	0	202	59	0	60	0	8	119	0	130	53	0	0	183	504
08:30:00	0	0	0	0	0	0	21	184	0	0	0	205	57	0	61	0	2	118	0	111	50	0	0	161	484
08:45:00	0	0	0	0	0	0	24	182	0	0	0	206	77	0	57	0	2	134	0	148	51	0	0	199	539
09:00:00	0	0	0	0	0	0	21	154	0	0	0	175	49	0	39	0	1	88	0	157	39	0	0	196	459
Grand Total	0	0	0	0	0	0	91	697	0	0	0	788	242	0	217	0	13	459	0	546	193	0	0	739	**1986**
Approach%	0%	0%	0%	0%		-	11.5%	88.5%	0%	0%		-	52.7%	0%	47.3%	0%		-	0%	73.9%	26.1%	0%		-	**-**
Totals %	0%	0%	0%	0%		0%	4.6%	35.1%	0%	0%		39.7%	12.2%	0%	10.9%	0%		23.1%	0%	27.5%	9.7%	0%		37.2%	**-**
PHF	0	0	0	0		0	0.91	0.95	0	0		0.96	0.79	0	0.89	0		0.86	0	0.87	0.91	0		0.93	**-**
Heavy	0	0	0	0		0	6	50	0	0		56	12	0	5	0		17	0	28	3	0		31	**-**
Heavy %	0%	0%	0%	0%		0%	6.6%	7.2%	0%	0%		7.1%	5%	0%	2.3%	0%		3.7%	0%	5.1%	1.6%	0%		4.2%	**-**
Lights	0	0	0	0		0	85	647	0	0		732	230	0	212	0		442	0	518	190	0		708	**-**
Lights %	0%	0%	0%	0%		0%	93.4%	92.8%	0%	0%		92.9%	95%	0%	97.7%	0%		96.3%	0%	94.9%	98.4%	0%		95.8%	**-**
Single-Unit Trucks	0	0	0	0		0	4	19	0	0		23	7	0	3	0		10	0	8	2	0		10	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	4.4%	2.7%	0%	0%		2.9%	2.9%	0%	1.4%	0%		2.2%	0%	1.5%	1%	0%		1.4%	**-**
Buses	0	0	0	0		0	2	27	0	0		29	4	0	2	0		6	0	19	1	0		20	**-**
Buses %	0%	0%	0%	0%		0%	2.2%	3.9%	0%	0%		3.7%	1.7%	0%	0.9%	0%		1.3%	0%	3.5%	0.5%	0%		2.7%	**-**
Articulated Trucks	0	0	0	0		0	0	4	0	0		4	1	0	0	0		1	0	1	0	0		1	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.5%	0.4%	0%	0%	0%		0.2%	0%	0.2%	0%	0%		0.1%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	13	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	100%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	4	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

Peak Hour: 04:15 PM - 05:15 PM Weather: Partly Cloudy (-3 °C)

Start Time	N Approach RED HILL PKWY NB ON RAMPS						E Approach QUEENSTON RD						S Approach NB RED HILL PKWY OFF RAMP						W Approach QUEENSTON RD						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	
16:15:00	0	0	0	0	4	0	11	299	0	0	0	310	72	0	46	0	0	118	0	209	56	0	0	265	693
16:30:00	0	0	0	0	1	0	17	249	0	0	0	266	76	1	87	0	3	164	0	244	49	0	0	293	723
16:45:00	0	0	0	0	1	0	26	259	0	0	0	285	74	0	50	0	5	124	0	219	50	0	0	269	678
17:00:00	0	0	0	0	1	0	22	220	0	0	0	242	84	0	59	0	6	143	0	213	73	1	0	287	672
Grand Total	0	0	0	0	7	0	76	1027	0	0	0	1103	306	1	242	0	14	549	0	885	228	1	0	1114	**2766**
Approach%	0%	0%	0%	0%		-	6.9%	93.1%	0%	0%		-	55.7%	0.2%	44.1%	0%		-	0%	79.4%	20.5%	0.1%		-	**-**
Totals %	0%	0%	0%	0%		0%	2.7%	37.1%	0%	0%		39.9%	11.1%	0%	8.7%	0%		19.8%	0%	32%	8.2%	0%		40.3%	**-**
PHF	0	0	0	0		0	0.73	0.86	0	0		0.89	0.91	0.25	0.7	0		0.84	0	0.91	0.78	0.25		0.95	**-**
Heavy	0	0	0	0		0	0	23	0	0		23	4	0	2	0		6	0	21	2	0		23	**-**
Heavy %	0%	0%	0%	0%		0%	0%	2.2%	0%	0%		2.1%	1.3%	0%	0.8%	0%		1.1%	0%	2.4%	0.9%	0%		2.1%	**-**
Lights	0	0	0	0		0	76	1004	0	0		1080	302	1	240	0		543	0	864	226	1		1091	**-**
Lights %	0%	0%	0%	0%		0%	100%	97.8%	0%	0%		97.9%	98.7%	100%	99.2%	0%		98.9%	0%	97.6%	99.1%	100%		97.9%	**-**
Single-Unit Trucks	0	0	0	0		0	0	1	0	0		1	4	0	2	0		6	0	3	2	0		5	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	1.3%	0%	0.8%	0%		1.1%	0%	0.3%	0.9%	0%		0.4%	**-**
Buses	0	0	0	0		0	0	21	0	0		21	0	0	0	0		0	0	18	0	0		18	**-**
Buses %	0%	0%	0%	0%		0%	0%	2%	0%	0%		1.9%	0%	0%	0%	0%		0%	0%	2%	0%	0%		1.6%	**-**
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	7	-	-	-	-	-	0	-	-	-	-	-	14	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	33.3%		-	-	-	-	0%		-	-	-	-	66.7%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

NexTrans
4261-A14 Highway 7 East
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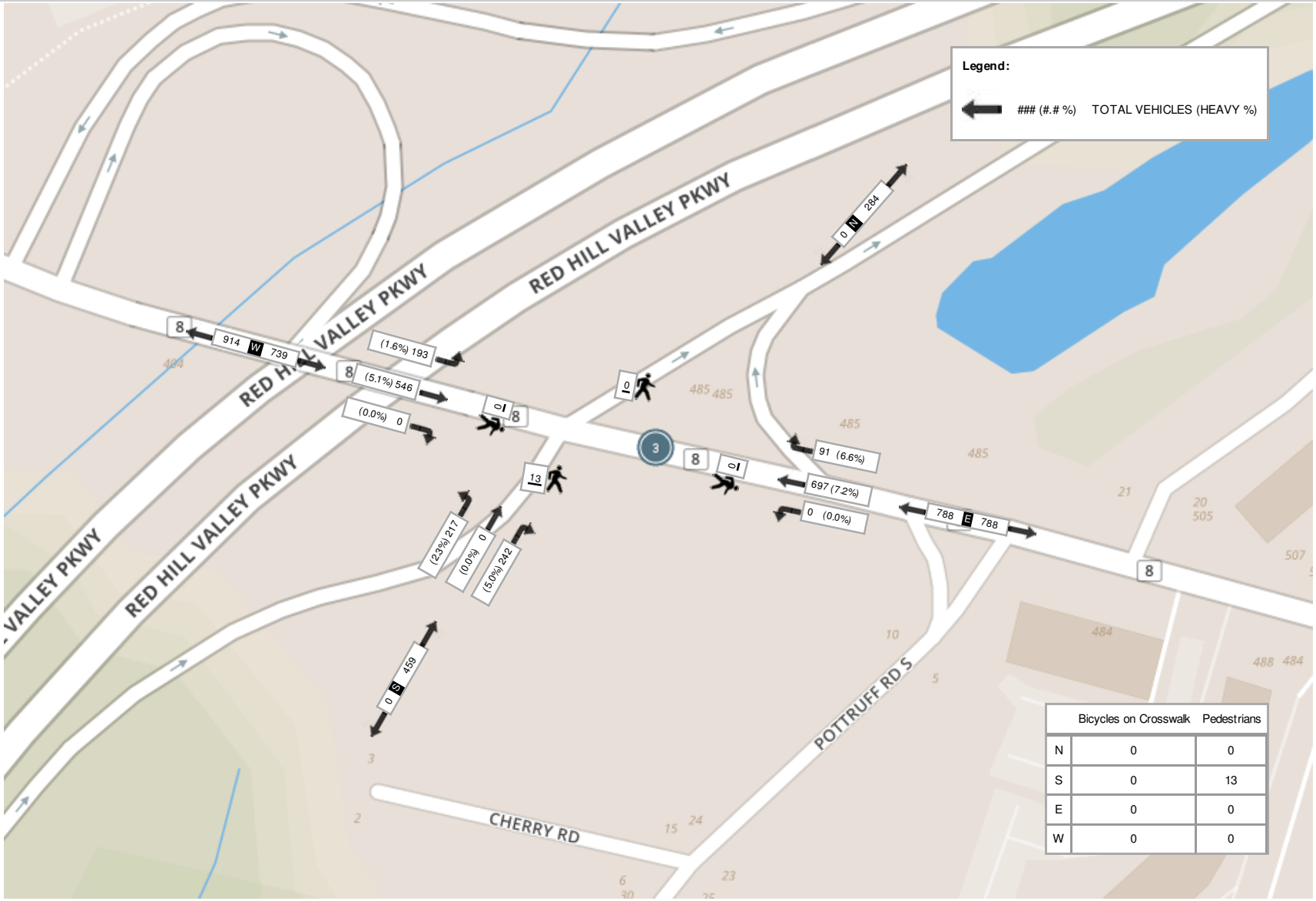
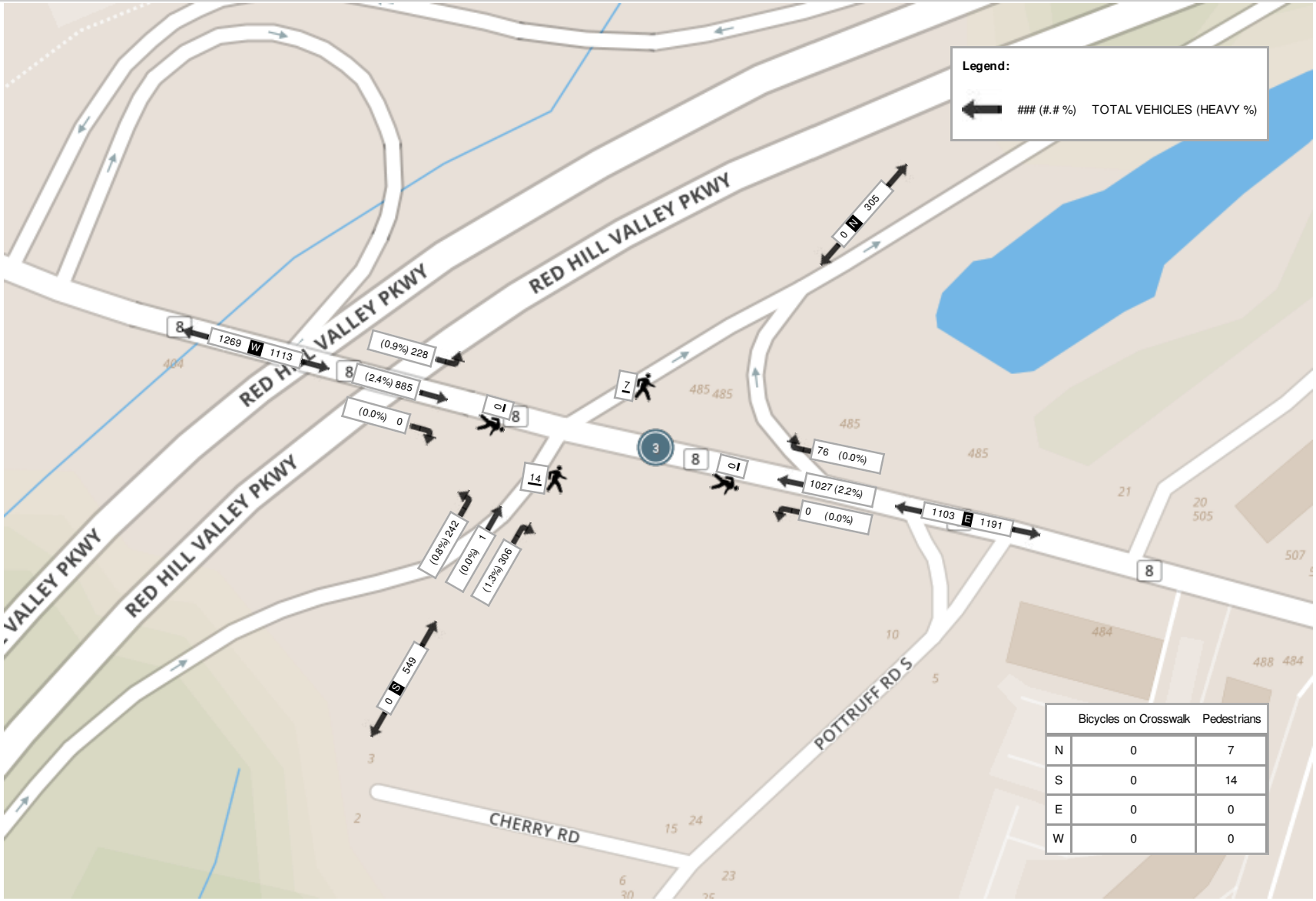
Markham ON, CANADA, L3R 9W6

Peak Hour: 08:15 AM - 09:15 AM **Weather: Partly Cloudy (-7 °C)**



Peak Hour: 04:15 PM - 05:15 PM **Weather: Partly Cloudy (-3 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	7
S	0	14
E	0	0
W	0	0

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Turning Movement Count (4 . QUEENSTON RD & RED HILL PKWY SB ON / OFF RAMPS)

Start Time	N Approach RED HILL PKWY SB ON / OFF RAMPS					E Approach QUEENSTON RD					W Approach QUEENSTON RD					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	16	10	0	1	26	36	114	0	0	150	104	24	0	1	128	304	
07:15:00	21	12	0	0	33	47	113	0	0	160	96	43	0	0	139	332	
07:30:00	23	14	0	1	37	52	172	0	0	224	131	42	0	0	173	434	
07:45:00	39	13	0	0	52	41	194	0	0	235	152	45	0	0	197	484	1554
08:00:00	40	17	0	0	57	37	184	0	0	221	131	46	0	2	177	455	1705
08:15:00	45	15	0	1	60	39	189	0	0	228	166	37	0	0	203	491	1864
08:30:00	40	11	0	0	51	51	209	0	0	260	153	45	0	0	198	509	1939
08:45:00	36	11	0	0	47	44	202	0	0	246	183	39	0	0	222	515	1970
09:00:00	21	15	0	0	36	32	157	0	0	189	177	42	0	0	219	444	1959
09:15:00	24	15	0	1	39	47	162	0	0	209	146	38	0	0	184	432	1900
09:30:00	26	12	1	1	39	60	157	0	0	217	164	33	1	1	198	454	1845
09:45:00	26	16	0	1	42	38	150	0	0	188	160	38	0	0	198	428	1758
BREAK																	
16:00:00	32	25	1	3	58	71	226	0	0	297	270	45	0	1	315	670	
16:15:00	28	38	0	3	66	100	247	0	0	347	239	38	0	1	277	690	
16:30:00	24	17	0	3	41	85	258	0	0	343	269	53	0	0	322	706	
16:45:00	22	12	0	1	34	81	243	0	0	324	254	50	0	1	304	662	2728
17:00:00	28	4	0	1	32	73	207	0	0	280	286	54	0	1	340	652	2710
17:15:00	18	13	0	4	31	73	229	0	0	302	248	33	0	0	281	614	2634
17:30:00	21	16	0	3	37	58	223	0	0	281	245	53	0	3	298	616	2544
17:45:00	29	22	0	1	51	62	189	0	0	251	211	34	0	1	245	547	2429
18:00:00	35	23	0	4	58	70	178	0	0	248	213	47	0	0	260	566	2343
18:15:00	37	34	0	1	71	63	187	1	0	251	183	49	0	0	232	554	2283
18:30:00	22	22	0	2	44	71	199	0	0	270	171	55	0	0	226	540	2207

18:45:00	31	16	0	2	47	60	151	0	0	211	175	42	0	1	217	475	2135
Grand Total	684	403	2	34	1089	1391	4540	1	0	5932	4527	1025	1	13	5553	**12574**	-
Approach%	62.8%	37%	0.2%		-	23.4%	76.5%	0%		-	81.5%	18.5%	0%		-	**-**	-
Totals %	5.4%	3.2%	0%		8.7%	11.1%	36.1%	0%		47.2%	36%	8.2%	0%		44.2%	**-**	-
Heavy	14	12	1		-	42	176	0		-	149	29	0		-	**-**	-
Heavy %	2%	3%	50%		-	3%	3.9%	0%		-	3.3%	2.8%	0%		-	**-**	-
Bicycles	0	0	0		-	0	2	0		-	4	0	0		-	**-**	-
Bicycle %	0%	0%	0%		-	0%	0%	0%		-	0.1%	0%	0%		-	**-**	-

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Peak Hour: 08:00 AM - 09:00 AM Weather: Partly Cloudy (-7 °C)

Start Time	N Approach RED HILL PKWY SB ON / OFF RAMPS					E Approach QUEENSTON RD					W Approach QUEENSTON RD					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	
08:00:00	40	17	0	0	57	37	184	0	0	221	131	46	0	2	177	455
08:15:00	45	15	0	1	60	39	189	0	0	228	166	37	0	0	203	491
08:30:00	40	11	0	0	51	51	209	0	0	260	153	45	0	0	198	509
08:45:00	36	11	0	0	47	44	202	0	0	246	183	39	0	0	222	515
Grand Total	161	54	0	1	215	171	784	0	0	955	633	167	0	2	800	**1970**
Approach%	74.9%	25.1%	0%		-	17.9%	82.1%	0%		-	79.1%	20.9%	0%		-	**-**
Totals %	8.2%	2.7%	0%		10.9%	8.7%	39.8%	0%		48.5%	32.1%	8.5%	0%		40.6%	**-**
PHF	0.89	0.79	0		0.9	0.84	0.94	0		0.92	0.86	0.91	0		0.9	**-**
Heavy	7	3	0		10	12	50	0		62	24	9	0		33	**-**
Heavy %	4.3%	5.6%	0%		4.7%	7%	6.4%	0%		6.5%	3.8%	5.4%	0%		4.1%	**-**
Lights	154	51	0		205	159	734	0		893	609	158	0		767	**-**
Lights %	95.7%	94.4%	0%		95.3%	93%	93.6%	0%		93.5%	96.2%	94.6%	0%		95.9%	**-**
Single-Unit Trucks	6	1	0		7	10	14	0		24	9	6	0		15	**-**
Single-Unit Trucks %	3.7%	1.9%	0%		3.3%	5.8%	1.8%	0%		2.5%	1.4%	3.6%	0%		1.9%	**-**
Buses	1	0	0		1	1	36	0		37	15	2	0		17	**-**
Buses %	0.6%	0%	0%		0.5%	0.6%	4.6%	0%		3.9%	2.4%	1.2%	0%		2.1%	**-**
Articulated Trucks	0	2	0		2	1	0	0		1	0	1	0		1	**-**
Articulated Trucks %	0%	3.7%	0%		0.9%	0.6%	0%	0%		0.1%	0%	0.6%	0%		0.1%	**-**
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	66.7%		**-**
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	33.3%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	2	0	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

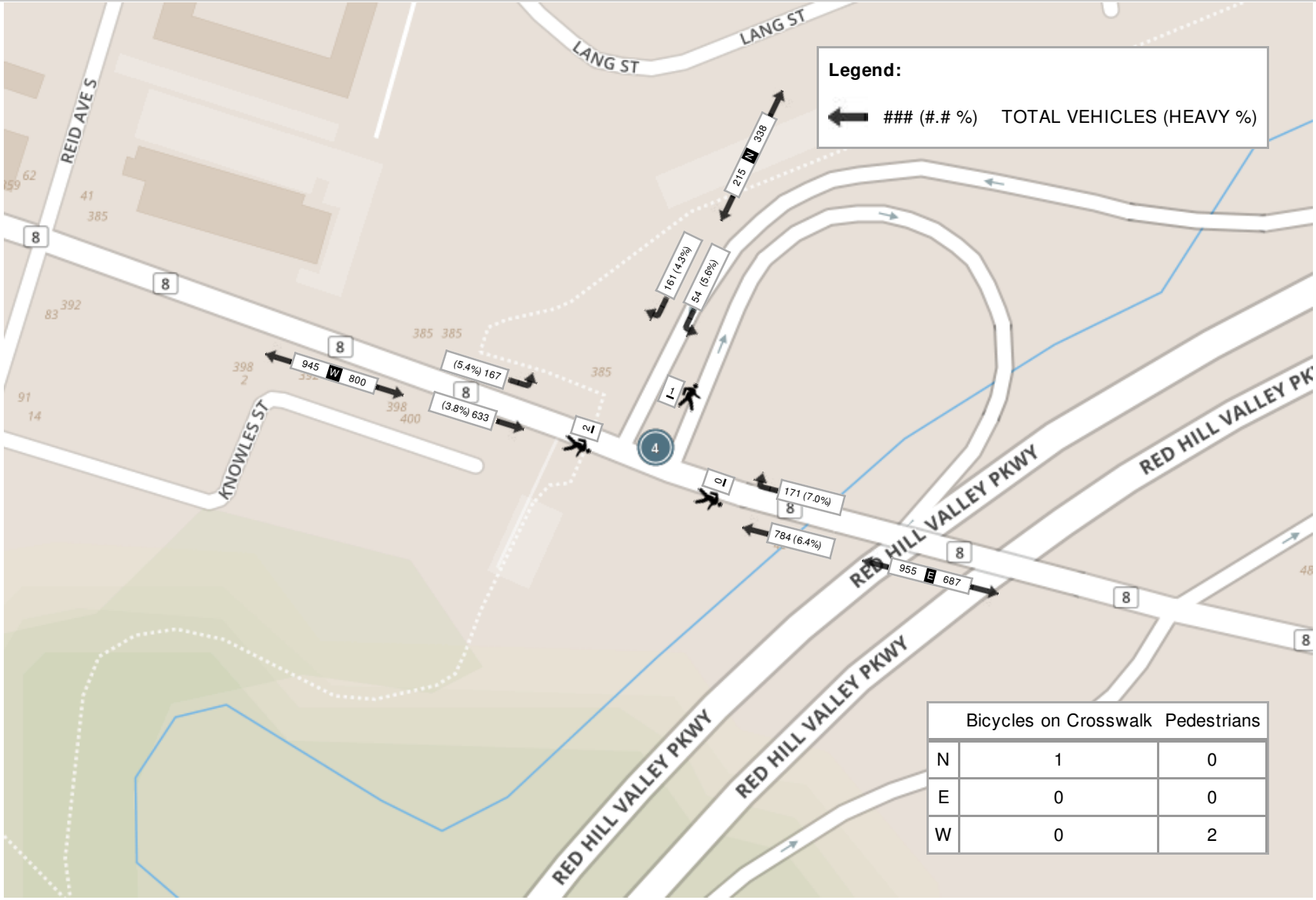
NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

Peak Hour: 04:00 PM - 05:00 PM Weather: Partly Cloudy (-3 °C)

Start Time	N Approach RED HILL PKWY SB ON / OFF RAMPS					E Approach QUEENSTON RD					W Approach QUEENSTON RD					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	
16:00:00	32	25	1	3	58	71	226	0	0	297	270	45	0	1	315	670
16:15:00	28	38	0	3	66	100	247	0	0	347	239	38	0	1	277	690
16:30:00	24	17	0	3	41	85	258	0	0	343	269	53	0	0	322	706
16:45:00	22	12	0	1	34	81	243	0	0	324	254	50	0	1	304	662
Grand Total	106	92	1	10	199	337	974	0	0	1311	1032	186	0	3	1218	**2728**
Approach%	53.3%	46.2%	0.5%		-	25.7%	74.3%	0%		-	84.7%	15.3%	0%		-	**-**
Totals %	3.9%	3.4%	0%		7.3%	12.4%	35.7%	0%		48.1%	37.8%	6.8%	0%		44.6%	**-**
PHF	0.83	0.61	0.25		0.75	0.84	0.94	0		0.94	0.96	0.88	0		0.95	**-**
Heavy	1	1	1		3	3	27	0		30	25	2	0		27	**-**
Heavy %	0.9%	1.1%	100%		1.5%	0.9%	2.8%	0%		2.3%	2.4%	1.1%	0%		2.2%	**-**
Lights	105	91	0		196	334	947	0		1281	1007	184	0		1191	**-**
Lights %	99.1%	98.9%	0%		98.5%	99.1%	97.2%	0%		97.7%	97.6%	98.9%	0%		97.8%	**-**
Single-Unit Trucks	1	1	1		3	1	5	0		6	4	0	0		4	**-**
Single-Unit Trucks %	0.9%	1.1%	100%		1.5%	0.3%	0.5%	0%		0.5%	0.4%	0%	0%		0.3%	**-**
Buses	0	0	0		0	2	22	0		24	21	1	0		22	**-**
Buses %	0%	0%	0%		0%	0.6%	2.3%	0%		1.8%	2%	0.5%	0%		1.8%	**-**
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%	0.5%	0%		0.1%	**-**
Pedestrians	-	-	-	10	-	-	-	-	0	-	-	-	-	3	-	**-**
Pedestrians%	-	-	-	76.9%		-	-	-	0%		-	-	-	23.1%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	-	0	1	0	0	-	1	0	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

Peak Hour: 08:00 AM - 09:00 AM Weather: Partly Cloudy (-7 °C)



	Bicycles on Crosswalk	Pedestrians
N	1	0
E	0	0
W	0	2

NexTrans
4261-A14 Highway 7 East
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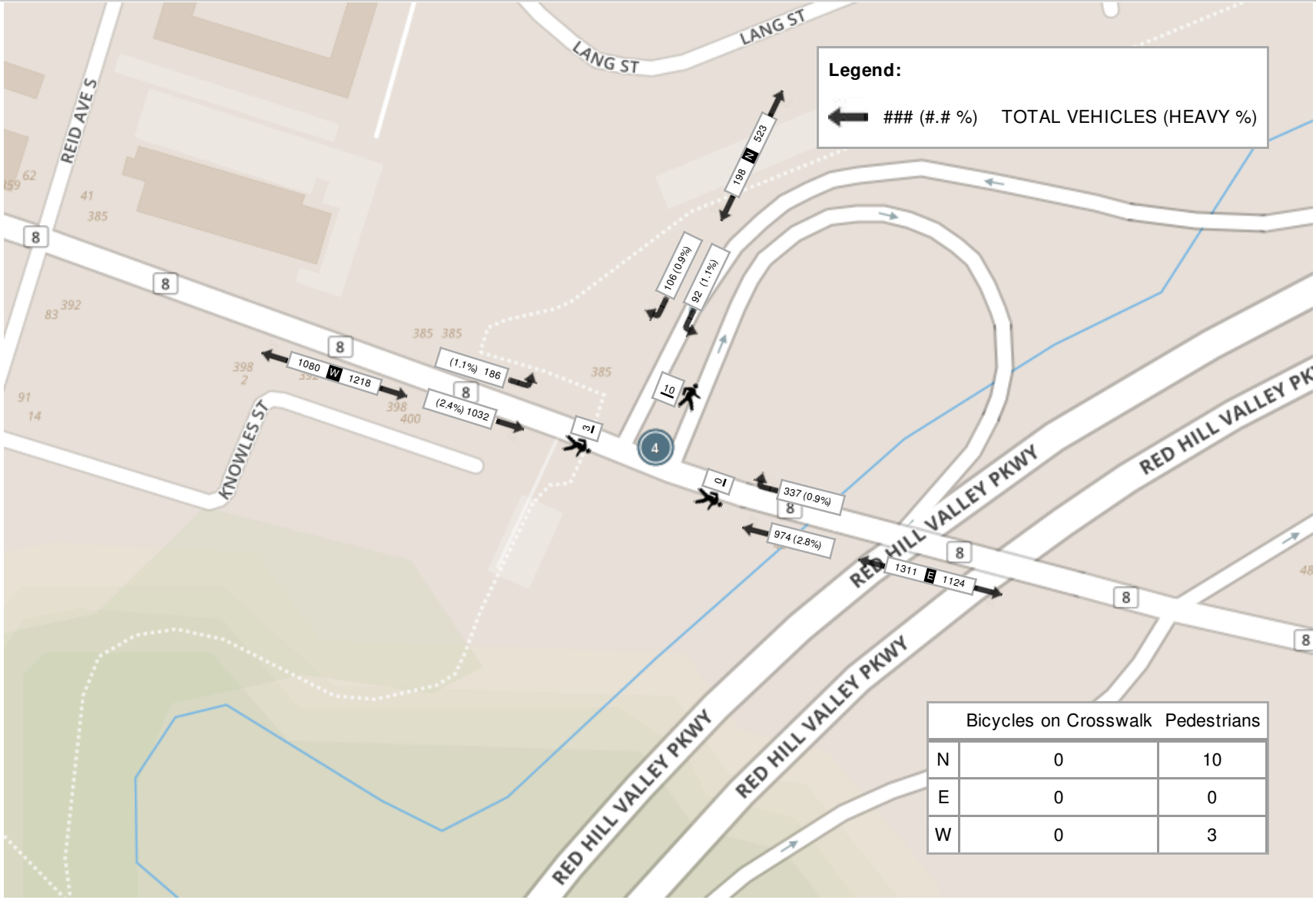
Peak Hour: 04:00 PM - 05:00 PM Weather: Partly Cloudy (-3 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	10
E	0	0
W	0	3

NexTrans
4261-A14 Highway 7 East
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Markham ON, CANADA, L3R 9W6

Turning Movement Count (1 . QUEENSTON RD & REID AVE S)

Start Time	N Approach REID AVE S						E Approach QUEENSTON RD						S Approach REID AVE S						W Approach QUEENSTON RD						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	0	11	0	2	13	8	112	2	0	0	122	1	0	0	0	1	1	0	113	1	0	2	114	250	
07:15:00	4	0	8	0	0	12	9	133	1	0	0	143	0	0	0	0	3	0	0	129	2	0	1	131	286	
07:30:00	3	0	15	0	2	18	17	173	1	0	0	191	2	0	0	0	1	2	0	161	2	0	6	163	374	
07:45:00	2	0	24	0	0	26	23	199	0	0	0	222	1	0	1	0	2	2	1	167	2	0	3	170	420	1330
08:00:00	5	0	18	0	3	23	18	215	0	0	0	233	0	0	0	0	0	0	0	159	1	0	1	160	416	1496
08:15:00	4	0	21	0	8	25	31	205	0	0	1	236	3	0	1	0	1	4	2	181	4	0	1	187	452	1662
08:30:00	12	0	25	0	5	37	16	230	0	0	0	246	0	1	0	0	2	1	1	176	6	0	4	183	467	1755
08:45:00	7	1	30	0	1	38	29	214	0	0	0	243	1	0	0	0	2	1	1	194	8	0	0	203	485	1820
09:00:00	4	0	16	0	2	20	10	167	2	0	0	179	2	0	0	0	2	2	1	195	4	0	2	200	401	1805
09:15:00	0	0	23	0	4	23	27	157	1	0	1	185	1	1	1	0	0	3	0	159	3	0	2	162	373	1726
09:30:00	2	0	23	0	0	25	17	166	2	1	2	186	1	0	1	0	2	2	0	173	3	0	2	176	389	1648
09:45:00	2	0	18	0	3	20	22	153	3	0	0	178	1	0	1	0	0	2	1	175	4	0	2	180	380	1543
BREAK																										
16:00:00	5	0	32	0	5	37	41	223	3	0	2	267	6	0	2	0	4	8	2	275	6	0	4	283	595	
16:15:00	4	0	29	0	5	33	41	230	3	0	3	274	1	0	1	0	9	2	0	250	11	0	13	261	570	
16:30:00	10	0	40	0	2	50	46	225	1	0	1	272	0	0	0	0	4	0	1	282	5	0	6	288	610	
16:45:00	8	0	27	0	6	35	38	225	1	0	1	264	2	0	1	0	2	3	1	276	6	0	7	283	585	2360
17:00:00	8	2	42	0	5	52	32	205	0	0	2	237	2	0	3	0	8	5	3	294	7	0	6	304	598	2363
17:15:00	5	0	25	0	5	30	33	212	2	0	2	247	3	0	0	0	1	3	0	251	6	0	2	257	537	2330
17:30:00	4	1	36	0	3	41	19	223	3	0	5	245	1	0	0	0	5	1	1	256	4	0	1	261	548	2268
17:45:00	5	0	22	0	1	27	34	178	1	0	0	213	0	0	2	0	1	2	0	226	7	0	2	233	475	2158
18:00:00	2	1	22	0	8	25	26	189	2	0	2	217	2	0	3	0	3	5	1	233	8	0	6	242	489	2049
18:15:00	9	0	36	0	3	45	20	201	1	0	1	222	2	1	0	0	2	3	0	192	3	0	1	195	465	1977
18:30:00	7	0	24	0	3	31	24	196	1	0	0	221	2	0	0	0	2	2	0	200	8	0	3	208	462	1891
18:45:00	5	0	21	0	9	26	23	159	1	0	0	183	2	0	0	0	1	2	1	192	2	0	9	195	406	1822
Grand Total	119	5	588	0	85	712	604	4590	31	1	23	5226	36	3	17	0	58	56	17	4909	113	0	86	5039	**11033**	-
Approach%	16.7%	0.7%	82.6%	0%		-	11.6%	87.8%	0.6%	0%		-	64.3%	5.4%	30.4%	0%		-	0.3%	97.4%	2.2%	0%		-	-	-
Totals %	1.1%	0%	5.3%	0%		6.5%	5.5%	41.6%	0.3%	0%		47.4%	0.3%	0%	0.2%	0%		0.5%	0.2%	44.5%	1%	0%		45.7%	-	-
Heavy	7	0	11	0		-	19	162	1	0		-	0	0	0	0		-	0	171	6	0		-	-	-
Heavy %	5.9%	0%	1.9%	0%		-	3.1%	3.5%	3.2%	0%		-	0%	0%	0%	0%		-	0%	3.5%	5.3%	0%		-	-	-
Bicycles	0	0	0	0		-	1	2	0	0		-	0	0	0	0		-	0	4	0	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0.2%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0.1%	0%	0%		-	-	-

NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

Peak Hour: 08:00 AM - 09:00 AM Weather: Partly Cloudy (-7 °C)

Start Time	N Approach REID AVE S						E Approach QUEENSTON RD						S Approach REID AVE S						W Approach QUEENSTON RD						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	5	0	18	0	3	23	18	215	0	0	0	233	0	0	0	0	0	0	0	159	1	0	1	160	416
08:15:00	4	0	21	0	8	25	31	205	0	0	1	236	3	0	1	0	1	4	2	181	4	0	1	187	452
08:30:00	12	0	25	0	5	37	16	230	0	0	0	246	0	1	0	0	2	1	1	176	6	0	4	183	467
08:45:00	7	1	30	0	1	38	29	214	0	0	0	243	1	0	0	0	2	1	1	194	8	0	0	203	485
Grand Total	28	1	94	0	17	123	94	864	0	0	1	958	4	1	1	0	5	6	4	710	19	0	6	733	**1820**
Approach%	22.8%	0.8%	76.4%	0%		-	9.8%	90.2%	0%	0%		-	66.7%	16.7%	16.7%	0%		-	0.5%	96.9%	2.6%	0%		-	**-**
Totals %	1.5%	0.1%	5.2%	0%		6.8%	5.2%	47.5%	0%	0%		52.6%	0.2%	0.1%	0.1%	0%		0.3%	0.2%	39%	1%	0%		40.3%	**-**
PHF	0.58	0.25	0.78	0		0.81	0.76	0.94	0	0		0.97	0.33	0.25	0.25	0		0.38	0.5	0.91	0.59	0		0.9	**-**
Heavy	3	0	3	0		6	12	41	0	0		53	0	0	0	0		0	0	32	2	0		34	**-**
Heavy %	10.7%	0%	3.2%	0%		4.9%	12.8%	4.7%	0%	0%		5.5%	0%	0%	0%	0%		0%	0%	4.5%	10.5%	0%		4.6%	**-**
Lights	25	1	91	0		117	82	823	0	0		905	4	1	1	0		6	4	678	17	0		699	**-**
Lights %	89.3%	100%	96.8%	0%		95.1%	87.2%	95.3%	0%	0%		94.5%	100%	100%	100%	0%		100%	100%	95.5%	89.5%	0%		95.4%	**-**
Single-Unit Trucks	0	0	2	0		2	2	12	0	0		14	0	0	0	0		0	0	15	1	0		16	**-**
Single-Unit Trucks %	0%	0%	2.1%	0%		1.6%	2.1%	1.4%	0%	0%		1.5%	0%	0%	0%	0%		0%	0%	2.1%	5.3%	0%		2.2%	**-**
Buses	3	0	1	0		4	10	29	0	0		39	0	0	0	0		0	0	16	1	0		17	**-**
Buses %	10.7%	0%	1.1%	0%		3.3%	10.6%	3.4%	0%	0%		4.1%	0%	0%	0%	0%		0%	0%	2.3%	5.3%	0%		2.3%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	**-**
Pedestrians	-	-	-	-	17	-	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	6	-	**-**
Pedestrians%	-	-	-	-	58.6%		-	-	-	-	0%		-	-	-	-	17.2%		-	-	-	-	20.7%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	3.4%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	2	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

NexTrans
4261-A14 Highway 7 East
Suite 489
Markham ON, CANADA, L3R 9W6

Peak Hour: 04:15 PM - 05:15 PM Weather: Partly Cloudy (-3 °C)

Start Time	N Approach REID AVE S						E Approach QUEENSTON RD						S Approach REID AVE S						W Approach QUEENSTON RD						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	
16:15:00	4	0	29	0	5	33	41	230	3	0	3	274	1	0	1	0	9	2	0	250	11	0	13	261	570
16:30:00	10	0	40	0	2	50	46	225	1	0	1	272	0	0	0	0	4	0	1	282	5	0	6	288	610
16:45:00	8	0	27	0	6	35	38	225	1	0	1	264	2	0	1	0	2	3	1	276	6	0	7	283	585
17:00:00	8	2	42	0	5	52	32	205	0	0	2	237	2	0	3	0	8	5	3	294	7	0	6	304	598
Grand Total	30	2	138	0	18	170	157	885	5	0	7	1047	5	0	5	0	23	10	5	1102	29	0	32	1136	**2363**
Approach%	17.6%	1.2%	81.2%	0%		-	15%	84.5%	0.5%	0%		-	50%	0%	50%	0%		-	0.4%	97%	2.6%	0%		-	-
Totals %	1.3%	0.1%	5.8%	0%		7.2%	6.6%	37.5%	0.2%	0%		44.3%	0.2%	0%	0.2%	0%		0.4%	0.2%	46.6%	1.2%	0%		48.1%	-
PHF	0.75	0.25	0.82	0		0.82	0.85	0.96	0.42	0		0.96	0.63	0	0.42	0		0.5	0.42	0.94	0.66	0		0.93	-
Heavy	0	0	2	0		2	1	26	0	0		27	0	0	0	0		0	0	22	0	0		22	-
Heavy %	0%	0%	1.4%	0%		1.2%	0.6%	2.9%	0%	0%		2.6%	0%	0%	0%	0%		0%	0%	2%	0%	0%		1.9%	-
Lights	30	2	136	0		168	156	859	5	0		1020	5	0	5	0		10	5	1080	29	0		1114	-
Lights %	100%	100%	98.6%	0%		98.8%	99.4%	97.1%	100%	0%		97.4%	100%	0%	100%	0%		100%	100%	98%	100%	0%		98.1%	-
Single-Unit Trucks	0	0	1	0		1	0	6	0	0		6	0	0	0	0		0	0	4	0	0		4	-
Single-Unit Trucks %	0%	0%	0.7%	0%		0.6%	0%	0.7%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.4%	-
Buses	0	0	1	0		1	1	20	0	0		21	0	0	0	0		0	0	18	0	0		18	-
Buses %	0%	0%	0.7%	0%		0.6%	0.6%	2.3%	0%	0%		2%	0%	0%	0%	0%		0%	0%	1.6%	0%	0%		1.6%	-
Articulated Trucks	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%	-
Pedestrians	-	-	-	-	18	-	-	-	-	-	7	-	-	-	-	-	19	-	-	-	-	-	31	-	-
Pedestrians%	-	-	-	-	22.5%		-	-	-	-	8.8%		-	-	-	-	23.8%		-	-	-	-	38.8%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	5%		-	-	-	-	1.3%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 08:00 AM - 09:00 AM Weather: Partly Cloudy (-7 °C)

	Bicycles on Crosswalk	Pedestrians
N	0	17
S	0	5
E	1	0
W	0	6

Peak Hour: 04:15 PM - 05:15 PM Weather: Partly Cloudy (-3 °C)

Appendix B

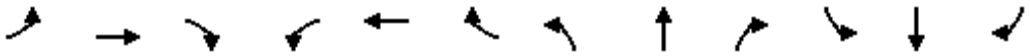
Trip Generation for Existing Ayr Avenue Residential Area

Trip Generation for Ayr Avenue Existing Residential Area

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	200	Trip Rates AM - Ln(T) = 0.95Ln(X) - 0.51 PM - Ln(T) = 0.89Ln(X) - 0.02	0.11	0.35	0.46	0.35	0.2	0.55
		Total Trips	21	71	92	69	40	109

Appendix C

Existing Traffic Level of Service Calculations

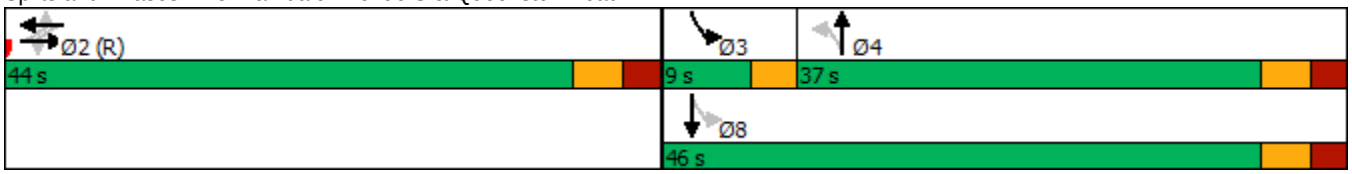


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	611	43	53	709	116	90	287	76	68	115	48
Future Volume (vph)	75	611	43	53	709	116	90	287	76	68	115	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	50.0		0.0	35.0		0.0	70.0		0.0	80.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1700	3372	0	1638	3286	0	1750	3278	0	1668	2683	0
Flt Permitted	0.291			0.369			0.643			0.340		
Satd. Flow (perm)	516	3372	0	619	3286	0	1099	3278	0	587	2683	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			25			40			51	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		88.6			409.1			175.9			215.1	
Travel Time (s)		6.4			29.5			12.7			15.5	
Confl. Peds. (#/hr)	37		71	71		37	81		28	28		81
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	4%	7%	9%	6%	3%	2%	5%	3%	7%	13%	48%
Bus Blockages (#/hr)	0	0	6	0	0	0	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	79	643	45	56	746	122	95	302	80	72	121	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	688	0	56	868	0	95	382	0	72	172	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			4		3	8	
Permitted Phases	2			2			4			8		
Detector Phase	2	2		2	2		4	4		3	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		3.5	10.0	
Minimum Split (s)	29.9	29.9		29.9	29.9		29.9	29.9		8.0	30.1	
Total Split (s)	44.0	44.0		44.0	44.0		37.0	37.0		9.0	46.0	
Total Split (%)	48.9%	48.9%		48.9%	48.9%		41.1%	41.1%		10.0%	51.1%	
Maximum Green (s)	38.1	38.1		38.1	38.1		31.1	31.1		6.0	40.1	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.0	3.3	
All-Red Time (s)	2.6	2.6		2.6	2.6		2.6	2.6		0.0	2.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		3.0	5.9	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		17.0	17.0			17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	55.6	55.6		55.6	55.6		15.4	15.4		25.5	22.6	
Actuated g/C Ratio	0.62	0.62		0.62	0.62		0.17	0.17		0.28	0.25	
v/c Ratio	0.25	0.33		0.15	0.43		0.51	0.64		0.30	0.24	
Control Delay	12.6	9.7		10.7	10.5		42.3	35.5		22.4	14.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.6	9.7		10.7	10.5		42.3	35.5		22.4	14.2	
LOS	B	A		B	B		D	D		C	B	
Approach Delay		10.0			10.6			36.9			16.6	
Approach LOS		B			B			D			B	
Queue Length 50th (m)	5.9	28.1		3.9	37.6		15.2	29.4		7.3	2.6	
Queue Length 95th (m)	16.8	46.1		11.5	60.9		27.7	40.1		13.9	10.9	
Internal Link Dist (m)		64.6			385.1			151.9			191.1	
Turn Bay Length (m)	50.0			35.0			70.0			80.0		
Base Capacity (vph)	318	2085		382	2038		379	1158		238	1223	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.25	0.33		0.15	0.43		0.25	0.33		0.30	0.14	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 3 (3%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 16.2		Intersection LOS: B	
Intersection Capacity Utilization 79.3%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Parkdale Avenue S & Queenston Road

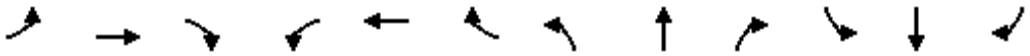


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	753	4	0	917	94	1	1	4	94	1	28
Future Volume (vph)	19	753	4	0	917	94	1	1	4	94	1	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	36.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1608	3397	0	1879	3308	0	0	1681	0	0	1666	0
Flt Permitted	0.224							0.972			0.773	
Satd. Flow (perm)	376	3397	0	1879	3308	0	0	1646	0	0	1336	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			22			4			16	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		409.1			206.6			96.1			221.3	
Travel Time (s)		29.5			14.9			8.6			19.9	
Confl. Peds. (#/hr)	17		5	5		17	6		1	1		6
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	5%	0%	0%	5%	13%	0%	0%	0%	3%	0%	11%
Bus Blockages (#/hr)	0	0	6	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	20	776	4	0	945	97	1	1	4	97	1	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	780	0	0	1042	0	0	6	0	0	127	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	25.4	25.4		25.4	25.4		29.7	29.7		29.7	29.7	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.6	54.6		54.6	54.6		24.3	24.3		24.3	24.3	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.7	1.7		1.7	1.7		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	5.4	5.4		5.4	5.4			5.7			5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	54.6	54.6			54.6			24.3			24.3	
Actuated g/C Ratio	0.61	0.61			0.61			0.27			0.27	
v/c Ratio	0.09	0.38			0.52			0.01			0.34	
Control Delay	8.6	9.7			11.0			18.0			26.1	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	8.6	9.7			11.0			18.0			26.1	
LOS	A	A			B			B			C	
Approach Delay		9.7			11.0			18.0			26.1	
Approach LOS		A			B			B			C	
Queue Length 50th (m)	1.3	33.0			48.5			0.3			15.3	
Queue Length 95th (m)	4.4	43.9			63.4			3.1			30.6	
Internal Link Dist (m)		385.1			182.6			72.1			197.3	
Turn Bay Length (m)	36.0											
Base Capacity (vph)	228	2061			2015			447			372	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.09	0.38			0.52			0.01			0.34	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 11.5		Intersection LOS: B	
Intersection Capacity Utilization 57.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Reid Avenue S & Queenston Road

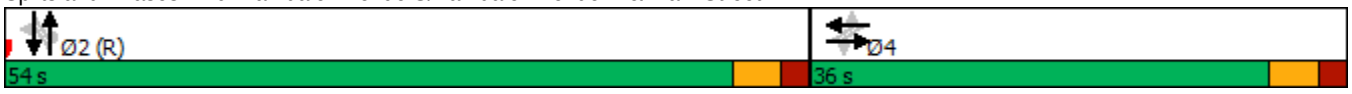


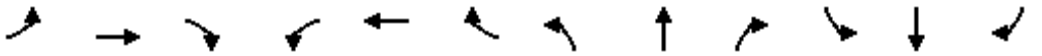
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	27	40	11	57	22	62	366	7	4	232	58
Future Volume (vph)	73	27	40	11	57	22	62	366	7	4	232	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	0	1674	0	0	1716	0	0	3370	0	0	3267	0
Flt Permitted		0.806			0.957			0.855			0.951	
Satd. Flow (perm)	0	1374	0	0	1651	0	0	2897	0	0	3110	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			19			3			52	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		98.4			406.7			215.1			404.3	
Travel Time (s)		8.9			36.6			15.5			29.1	
Confl. Peds. (#/hr)	11		6	6		11	11		9	9		11
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	0%	5%	27%	2%	0%	2%	5%	29%	0%	6%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	78	29	43	12	61	23	66	389	7	4	247	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	150	0	0	96	0	0	462	0	0	313	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.3	24.3		24.3	24.3		36.3	36.3		36.3	36.3	
Total Split (s)	36.0	36.0		36.0	36.0		54.0	54.0		54.0	54.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Maximum Green (s)	30.7	30.7		30.7	30.7		48.7	48.7		48.7	48.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		19.0	19.0		19.0	19.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.2			19.2			60.2			60.2	
Actuated g/C Ratio		0.21			0.21			0.67			0.67	
v/c Ratio		0.48			0.26			0.24			0.15	
Control Delay		31.7			25.7			12.2			4.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		31.7			25.7			12.2			4.3	
LOS		C			C			B			A	
Approach Delay		31.7			25.7			12.2			4.3	
Approach LOS		C			C			B			A	
Queue Length 50th (m)		19.1			11.1			27.4			6.3	
Queue Length 95th (m)		36.7			23.8			35.4			11.0	
Internal Link Dist (m)		74.4			382.7			191.1			380.3	
Turn Bay Length (m)												
Base Capacity (vph)		484			575			1938			2096	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.31			0.17			0.24			0.15	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 13 (14%), Referenced to phase 2:NBSB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 13.9		Intersection LOS: B	
Intersection Capacity Utilization 80.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 9: Parkdale Avenue S/Parkdale Avenue N & Main Street E



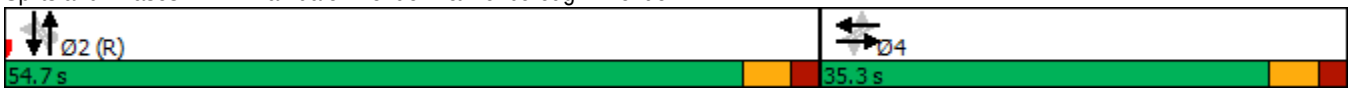


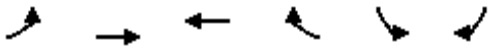
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	21	15	15	23	23	21	474	12	12	240	28
Future Volume (vph)	34	21	15	15	23	23	21	474	12	12	240	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	0	1630	0	0	1595	0	0	3410	0	0	3259	0
Flt Permitted		0.862			0.940			0.933			0.928	
Satd. Flow (perm)	0	1409	0	0	1512	0	0	3184	0	0	3029	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			25			4			21	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		109.1			399.4			404.3			153.9	
Travel Time (s)		9.8			35.9			29.1			11.1	
Confl. Peds. (#/hr)	54		19	19		54	17		13	13		17
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	19%	7%	0%	17%	4%	5%	4%	0%	8%	7%	7%
Bus Blockages (#/hr)	0	0	2	0	0	2	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	37	23	16	16	25	25	23	510	13	13	258	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	76	0	0	66	0	0	546	0	0	301	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.3	35.3		35.3	35.3		24.3	24.3		24.3	24.3	
Total Split (s)	35.3	35.3		35.3	35.3		54.7	54.7		54.7	54.7	
Total Split (%)	39.2%	39.2%		39.2%	39.2%		60.8%	60.8%		60.8%	60.8%	
Maximum Green (s)	30.0	30.0		30.0	30.0		49.4	49.4		49.4	49.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		30.0			30.0			49.4			49.4	
Actuated g/C Ratio		0.33			0.33			0.55			0.55	
v/c Ratio		0.16			0.13			0.31			0.18	
Control Delay		18.3			15.2			5.2			9.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		18.3			15.2			5.2			9.7	
LOS		B			B			A			A	
Approach Delay		18.3			15.2			5.2			9.7	
Approach LOS		B			B			A			A	
Queue Length 50th (m)		7.2			4.8			10.6			11.8	
Queue Length 95th (m)		16.9			13.7			12.1			18.3	
Internal Link Dist (m)		85.1			375.4			380.3			129.9	
Turn Bay Length (m)												
Base Capacity (vph)		480			520			1749			1672	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.16			0.13			0.31			0.18	

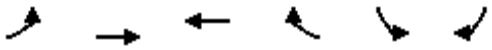
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 11 (12%), Referenced to phase 2:NBSB and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.31			
Intersection Signal Delay: 8.2		Intersection LOS: A	
Intersection Capacity Utilization 62.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 12: Parkdale Avenue N & Roxborough Avenue





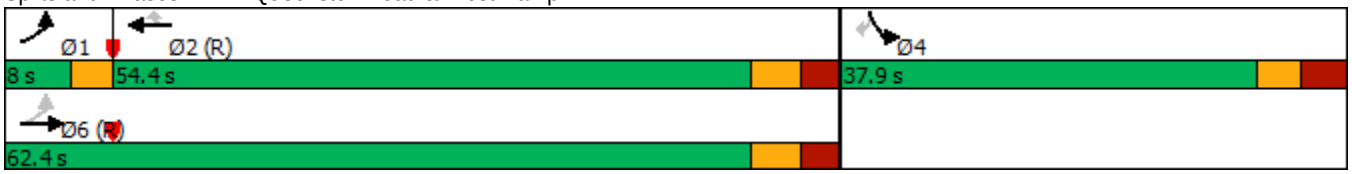
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	167	672	832	171	54	161
Future Volume (vph)	167	672	832	171	54	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%	0%		0%	
Storage Length (m)	130.0			0.0	0.0	45.0
Storage Lanes	1			1	2	1
Taper Length (m)	2.5				2.5	
Satd. Flow (prot)	1700	4932	3368	1493	3267	1536
Flt Permitted	0.274				0.950	
Satd. Flow (perm)	490	4932	3368	1461	3267	1514
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				186		175
Link Speed (k/h)		40	40		40	
Link Distance (m)		206.6	178.2		162.1	
Travel Time (s)		18.6	16.0		14.6	
Confl. Peds. (#/hr)	1			1		2
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	4%	6%	7%	6%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Adj. Flow (vph)	182	730	904	186	59	175
Shared Lane Traffic (%)						
Lane Group Flow (vph)	182	730	904	186	59	175
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Detector Phase	1	6	2	2	4	4
Switch Phase						
Minimum Initial (s)	5.0	20.0	20.0	20.0	10.0	10.0
Minimum Split (s)	8.0	42.7	42.7	42.7	37.9	37.9
Total Split (s)	8.0	62.4	54.4	54.4	37.9	37.9
Total Split (%)	8.0%	62.2%	54.2%	54.2%	37.8%	37.8%
Maximum Green (s)	5.0	55.7	47.7	47.7	31.0	31.0
Yellow Time (s)	3.0	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	0.0	3.0	3.0	3.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0

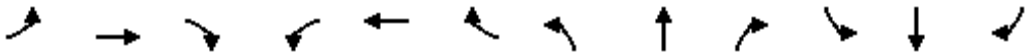


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Lost Time (s)	3.0	6.7	6.7	6.7	6.9	6.9
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	C-Max	C-Max	None	None
Walk Time (s)		7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		29.0	29.0	29.0	24.0	24.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	79.8	76.1	65.1	65.1	10.6	10.6
Actuated g/C Ratio	0.80	0.76	0.65	0.65	0.11	0.11
v/c Ratio	0.37	0.20	0.41	0.18	0.17	0.55
Control Delay	4.7	3.6	9.4	1.7	41.7	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	3.6	9.4	1.7	41.7	13.6
LOS	A	A	A	A	D	B
Approach Delay		3.8	8.1		20.7	
Approach LOS		A	A		C	
Queue Length 50th (m)	6.0	11.6	39.0	0.0	5.5	0.0
Queue Length 95th (m)	12.1	17.5	59.5	7.8	11.1	18.4
Internal Link Dist (m)		182.6	154.2		138.1	
Turn Bay Length (m)	130.0					45.0
Base Capacity (vph)	486	3742	2185	1013	1009	588
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.20	0.41	0.18	0.06	0.30

Intersection Summary			
Area Type:	Other		
Cycle Length: 100.3			
Actuated Cycle Length: 100.3			
Offset: 13 (13%), Referenced to phase 2:WBT and 6:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 7.7		Intersection LOS: A	
Intersection Capacity Utilization 63.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 14: Queenston Road & West Ramp



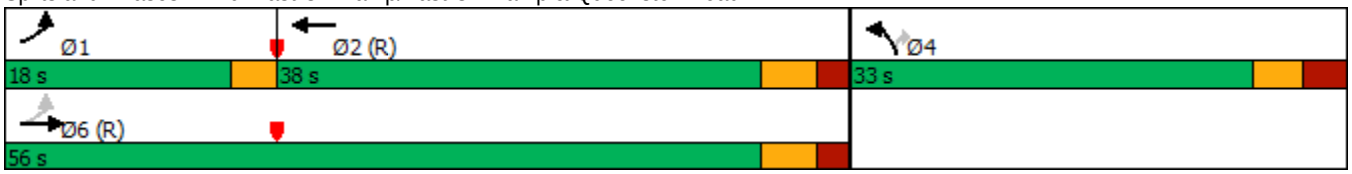


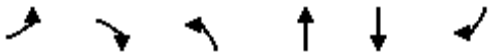
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	579	0	0	740	91	217	0	242	0	0	0
Future Volume (vph)	193	579	0	0	740	91	217	0	242	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	70.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	2		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1750	4885	0	0	4717	0	3395	0	1521	0	0	0
Flt Permitted	0.289						0.950					
Satd. Flow (perm)	532	4885	0	0	4717	0	3395	0	1521	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					27				252			
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		178.2			95.9			90.0			130.6	
Travel Time (s)		16.0			8.6			8.1			11.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	5%	0%	0%	7%	7%	2%	0%	5%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	201	603	0	0	771	95	226	0	252	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	201	603	0	0	866	0	226	0	252	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA			NA		Prot		Perm			
Protected Phases	1	6			2		4					
Permitted Phases	6								4			
Detector Phase	1	6			2		4		4			
Switch Phase												
Minimum Initial (s)	5.0	20.0			20.0		10.0		10.0			
Minimum Split (s)	8.0	25.9			25.9		24.4		24.4			
Total Split (s)	18.0	56.0			38.0		33.0		33.0			
Total Split (%)	20.2%	62.9%			42.7%		37.1%		37.1%			
Maximum Green (s)	15.0	50.1			32.1		26.6		26.6			
Yellow Time (s)	3.0	3.7			3.7		3.3		3.3			
All-Red Time (s)	0.0	2.2			2.2		3.1		3.1			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	3.0	5.9			5.9		6.4		6.4			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Minimum Gap (s)	3.0	3.0			3.0		3.0		3.0			
Time Before Reduce (s)	0.0	0.0			0.0		0.0		0.0			
Time To Reduce (s)	0.0	0.0			0.0		0.0		0.0			
Recall Mode	None	C-Max			C-Max		None		None			
Walk Time (s)		7.0			7.0		7.0		7.0			
Flash Dont Walk (s)		13.0			2.0		0.0		0.0			
Pedestrian Calls (#/hr)		0			0		0		0			
Act Effct Green (s)	67.8	64.9			53.5		11.8		11.8			
Actuated g/C Ratio	0.76	0.73			0.60		0.13		0.13			
v/c Ratio	0.39	0.17			0.30		0.50		0.60			
Control Delay	5.4	4.0			9.2		39.5		11.1			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	5.4	4.0			9.2		39.5		11.1			
LOS	A	A			A		D		B			
Approach Delay		4.4			9.2			24.5				
Approach LOS		A			A			C				
Queue Length 50th (m)	7.1	9.4			22.6		18.9		0.0			
Queue Length 95th (m)	15.2	15.3			36.3		28.2		19.3			
Internal Link Dist (m)		154.2			71.9			66.0			106.6	
Turn Bay Length (m)	70.0											
Base Capacity (vph)	610	3560			2846		1014		631			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	0.33	0.17			0.30		0.22		0.40			

Intersection Summary			
Area Type:	Other		
Cycle Length: 89			
Actuated Cycle Length: 89			
Offset: 32 (36%), Referenced to phase 2:WBT and 6:EBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 10.8		Intersection LOS: B	
Intersection Capacity Utilization 45.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 16: East On-Ramp/East Off-Ramp & Queenston Road

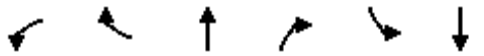




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	22	26	22	73	72	30
Future Volume (vph)	22	26	22	73	72	30
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	29	35	29	97	96	40

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	64	126	136
Volume Left (vph)	29	29	0
Volume Right (vph)	35	0	40
Hadj (s)	-0.09	0.23	-0.06
Departure Headway (s)	4.4	4.4	4.1
Degree Utilization, x	0.08	0.15	0.16
Capacity (veh/h)	763	793	853
Control Delay (s)	7.8	8.2	7.9
Approach Delay (s)	7.8	8.2	7.9
Approach LOS	A	A	A

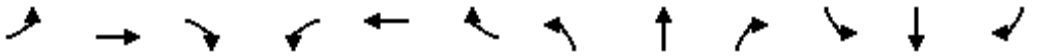
Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	24	11	88	7	4	78
Future Volume (vph)	24	11	88	7	4	78
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	32	15	117	9	5	104

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	47	126	109
Volume Left (vph)	32	0	5
Volume Right (vph)	15	9	0
Hadj (s)	-0.06	0.13	0.12
Departure Headway (s)	4.4	4.3	4.3
Degree Utilization, x	0.06	0.15	0.13
Capacity (veh/h)	780	825	829
Control Delay (s)	7.6	8.0	7.9
Approach Delay (s)	7.6	8.0	7.9
Approach LOS	A	A	A

Intersection Summary			
Delay	7.9		
Level of Service	A		
Intersection Capacity Utilization	20.3%	ICU Level of Service	A
Analysis Period (min)	15		

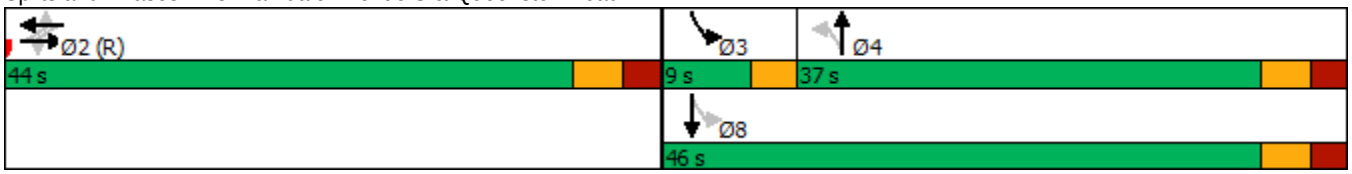


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	948	57	37	726	95	44	178	64	188	612	100
Future Volume (vph)	66	948	57	37	726	95	44	178	64	188	612	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	50.0		0.0	35.0		0.0	70.0		0.0	80.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1750	3461	0	1785	3373	0	1785	3321	0	1767	3429	0
Flt Permitted	0.292			0.220			0.317			0.508		
Satd. Flow (perm)	535	3461	0	410	3373	0	583	3321	0	930	3429	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			20			61			26	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		88.6			409.1			175.9			215.1	
Travel Time (s)		6.4			29.5			12.7			15.5	
Confl. Peds. (#/hr)	17		40	40		17	48		22	22		48
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	0%	0%	4%	1%	0%	3%	0%	1%	1%	1%
Bus Blockages (#/hr)	0	0	6	0	0	0	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	68	977	59	38	748	98	45	184	66	194	631	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	1036	0	38	846	0	45	250	0	194	734	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			4		3	8	
Permitted Phases	2			2			4			8		
Detector Phase	2	2		2	2		4	4		3	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		3.5	10.0	
Minimum Split (s)	29.9	29.9		29.9	29.9		29.9	29.9		8.0	30.1	
Total Split (s)	44.0	44.0		44.0	44.0		37.0	37.0		9.0	46.0	
Total Split (%)	48.9%	48.9%		48.9%	48.9%		41.1%	41.1%		10.0%	51.1%	
Maximum Green (s)	38.1	38.1		38.1	38.1		31.1	31.1		6.0	40.1	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.0	3.3	
All-Red Time (s)	2.6	2.6		2.6	2.6		2.6	2.6		0.0	2.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		3.0	5.9	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		17.0	17.0			17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	52.1	52.1		52.1	52.1		17.1	17.1		29.0	26.1	
Actuated g/C Ratio	0.58	0.58		0.58	0.58		0.19	0.19		0.32	0.29	
v/c Ratio	0.22	0.52		0.16	0.43		0.41	0.37		0.55	0.73	
Control Delay	13.5	13.4		13.1	12.1		41.2	24.1		19.2	22.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.5	13.4		13.1	12.1		41.2	24.1		19.2	22.3	
LOS	B	B		B	B		D	C		B	C	
Approach Delay		13.4			12.1			26.7			21.6	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	5.3	52.2		2.8	39.0		6.9	14.8		14.6	33.6	
Queue Length 95th (m)	15.5	82.4		9.8	63.2		16.0	22.9		28.2	43.3	
Internal Link Dist (m)		64.6			385.1			151.9			191.1	
Turn Bay Length (m)	50.0			35.0			70.0			80.0		
Base Capacity (vph)	309	2007		237	1960		201	1187		355	1542	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.22	0.52		0.16	0.43		0.22	0.21		0.55	0.48	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 3 (3%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 16.6		Intersection LOS: B	
Intersection Capacity Utilization 85.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 3: Parkdale Avenue S & Queenston Road

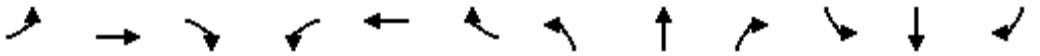


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	1169	5	5	939	157	5	0	5	138	2	30
Future Volume (vph)	29	1169	5	5	939	157	5	0	5	138	2	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	36.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1785	3495	0	1785	3365	0	0	1692	0	0	1734	0
Flt Permitted	0.192			0.169				0.891			0.759	
Satd. Flow (perm)	358	3495	0	315	3365	0	0	1526	0	0	1361	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			38			29			12	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		409.1			206.6			96.1			221.3	
Travel Time (s)		29.5			14.9			8.6			19.9	
Confl. Peds. (#/hr)	18		23	23		18	32		7	7		32
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	0%	3%	1%	0%	0%	0%	1%	0%	0%
Bus Blockages (#/hr)	0	0	6	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	30	1218	5	5	978	164	5	0	5	144	2	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	1223	0	5	1142	0	0	10	0	0	177	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	25.4	25.4		25.4	25.4		29.7	29.7		29.7	29.7	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.6	54.6		54.6	54.6		24.3	24.3		24.3	24.3	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.7	1.7		1.7	1.7		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	5.4	5.4		5.4	5.4			5.7			5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	54.6	54.6		54.6	54.6			24.3			24.3	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.14	0.58		0.03	0.56			0.02			0.47	
Control Delay	9.6	12.1		7.6	11.4			2.7			30.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	9.6	12.1		7.6	11.4			2.7			30.4	
LOS	A	B		A	B			A			C	
Approach Delay		12.0			11.4			2.7			30.4	
Approach LOS		B			B			A			C	
Queue Length 50th (m)	2.0	61.4		0.3	54.2			0.0			23.7	
Queue Length 95th (m)	6.2	78.8		1.7	70.8			1.3			43.1	
Internal Link Dist (m)		385.1			182.6			72.1			197.3	
Turn Bay Length (m)	36.0			15.0								
Base Capacity (vph)	217	2120		191	2056			433			376	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.14	0.58		0.03	0.56			0.02			0.47	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 12.9		Intersection LOS: B	
Intersection Capacity Utilization 61.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Reid Avenue S & Queenston Road

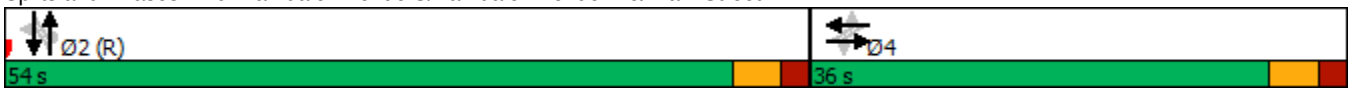


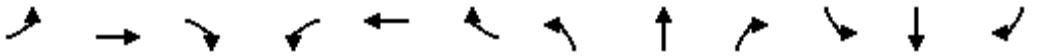
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	42	39	12	44	18	32	311	13	19	873	124
Future Volume (vph)	58	42	39	12	44	18	32	311	13	19	873	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	0	1748	0	0	1793	0	0	3472	0	0	3455	0
Flt Permitted		0.851			0.944			0.810			0.944	
Satd. Flow (perm)	0	1512	0	0	1705	0	0	2822	0	0	3264	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			20			6			26	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		98.4			406.7			215.1			404.3	
Travel Time (s)		8.9			36.6			15.5			29.1	
Confl. Peds. (#/hr)	7		4	4		7	15		16	16		15
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	0%	2%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	64	46	43	13	48	20	35	342	14	21	959	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	153	0	0	81	0	0	391	0	0	1116	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.3	24.3		24.3	24.3		36.3	36.3		36.3	36.3	
Total Split (s)	36.0	36.0		36.0	36.0		54.0	54.0		54.0	54.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Maximum Green (s)	30.7	30.7		30.7	30.7		48.7	48.7		48.7	48.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		19.0	19.0		19.0	19.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.0			19.0			60.4			60.4	
Actuated g/C Ratio		0.21			0.21			0.67			0.67	
v/c Ratio		0.45			0.22			0.21			0.51	
Control Delay		30.9			24.6			8.3			8.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		30.9			24.6			8.3			8.4	
LOS		C			C			A			A	
Approach Delay		30.9			24.6			8.3			8.4	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		19.4			8.7			16.5			32.7	
Queue Length 95th (m)		37.6			20.6			23.7			57.6	
Internal Link Dist (m)		74.4			382.7			191.1			380.3	
Turn Bay Length (m)												
Base Capacity (vph)		531			594			1895			2199	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.29			0.14			0.21			0.51	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 13 (14%), Referenced to phase 2:NBSB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 11.1		Intersection LOS: B	
Intersection Capacity Utilization 66.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 9: Parkdale Avenue S/Parkdale Avenue N & Main Street E



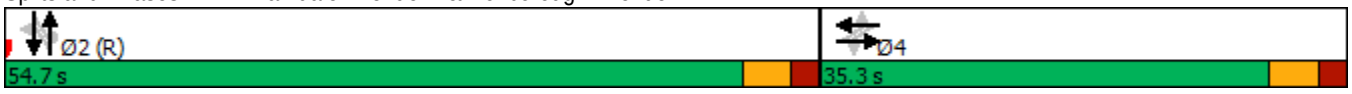


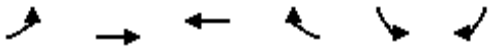
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	24	33	21	33	25	16	353	25	17	1008	41
Future Volume (vph)	21	24	33	21	33	25	16	353	25	17	1008	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	0	1607	0	0	1656	0	0	3421	0	0	3507	0
Flt Permitted		0.923			0.924			0.893			0.945	
Satd. Flow (perm)	0	1498	0	0	1547	0	0	3061	0	0	3316	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			27			12			7	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		109.1			399.4			404.3			153.9	
Travel Time (s)		9.8			35.9			29.1			11.1	
Confl. Peds. (#/hr)	19		10	10		19	7		18	18		7
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	21%	0%	0%	15%	0%	0%	3%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	2	0	0	2	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	23	26	35	23	35	27	17	380	27	18	1084	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	84	0	0	85	0	0	424	0	0	1146	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.3	35.3		35.3	35.3		24.3	24.3		24.3	24.3	
Total Split (s)	35.3	35.3		35.3	35.3		54.7	54.7		54.7	54.7	
Total Split (%)	39.2%	39.2%		39.2%	39.2%		60.8%	60.8%		60.8%	60.8%	
Maximum Green (s)	30.0	30.0		30.0	30.0		49.4	49.4		49.4	49.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		30.0			30.0			49.4			49.4	
Actuated g/C Ratio		0.33			0.33			0.55			0.55	
v/c Ratio		0.16			0.16			0.25			0.63	
Control Delay		14.4			16.1			5.6			15.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		14.4			16.1			5.6			15.8	
LOS		B			B			A			B	
Approach Delay		14.4			16.1			5.6			15.8	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		5.8			6.9			8.4			67.0	
Queue Length 95th (m)		15.7			17.0			10.5			86.7	
Internal Link Dist (m)		85.1			375.4			380.3			129.9	
Turn Bay Length (m)												
Base Capacity (vph)		522			533			1685			1823	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.16			0.16			0.25			0.63	

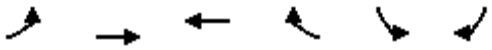
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 11 (12%), Referenced to phase 2:NBSB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 13.3		Intersection LOS: B	
Intersection Capacity Utilization 75.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 12: Parkdale Avenue N & Roxborough Avenue





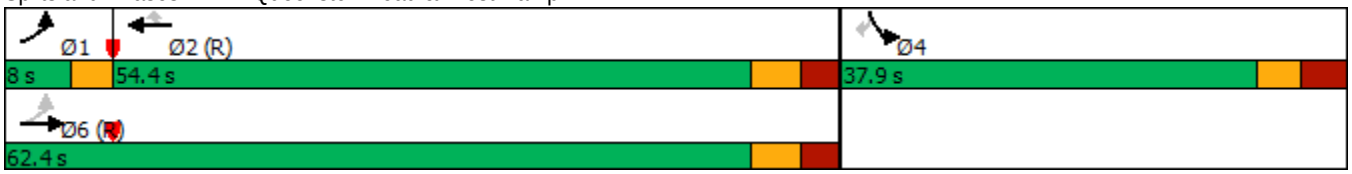
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	186	1095	1034	337	92	106
Future Volume (vph)	186	1095	1034	337	92	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%	0%		0%	
Storage Length (m)	130.0			0.0	0.0	45.0
Storage Lanes	1			1	2	1
Taper Length (m)	2.5				2.5	
Satd. Flow (prot)	1767	5029	3466	1581	3429	1581
Flt Permitted	0.213				0.950	
Satd. Flow (perm)	395	5029	3466	1528	3419	1581
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				355		112
Link Speed (k/h)		40	40		40	
Link Distance (m)		206.6	178.2		162.1	
Travel Time (s)		18.6	16.0		14.6	
Confl. Peds. (#/hr)	10			10	3	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	2%	3%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Adj. Flow (vph)	196	1153	1088	355	97	112
Shared Lane Traffic (%)						
Lane Group Flow (vph)	196	1153	1088	355	97	112
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Detector Phase	1	6	2	2	4	4
Switch Phase						
Minimum Initial (s)	5.0	20.0	20.0	20.0	10.0	10.0
Minimum Split (s)	8.0	42.7	42.7	42.7	37.9	37.9
Total Split (s)	8.0	62.4	54.4	54.4	37.9	37.9
Total Split (%)	8.0%	62.2%	54.2%	54.2%	37.8%	37.8%
Maximum Green (s)	5.0	55.7	47.7	47.7	31.0	31.0
Yellow Time (s)	3.0	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	0.0	3.0	3.0	3.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0

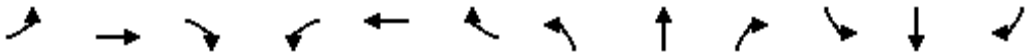


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Lost Time (s)	3.0	6.7	6.7	6.7	6.9	6.9
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	C-Max	C-Max	None	None
Walk Time (s)		7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		29.0	29.0	29.0	24.0	24.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	80.2	76.5	64.8	64.8	10.2	10.2
Actuated g/C Ratio	0.80	0.76	0.65	0.65	0.10	0.10
v/c Ratio	0.45	0.30	0.49	0.32	0.28	0.43
Control Delay	5.7	3.9	10.3	1.7	43.9	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	3.9	10.3	1.7	43.9	13.7
LOS	A	A	B	A	D	B
Approach Delay		4.2	8.2		27.7	
Approach LOS		A	A		C	
Queue Length 50th (m)	6.5	20.3	51.5	0.0	9.1	0.0
Queue Length 95th (m)	11.3	26.1	72.3	9.9	16.7	15.2
Internal Link Dist (m)		182.6	154.2		138.1	
Turn Bay Length (m)	130.0					45.0
Base Capacity (vph)	435	3836	2238	1112	1059	566
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.30	0.49	0.32	0.09	0.20

Intersection Summary			
Area Type:	Other		
Cycle Length: 100.3			
Actuated Cycle Length: 100.3			
Offset: 13 (13%), Referenced to phase 2:WBT and 6:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 7.7		Intersection LOS: A	
Intersection Capacity Utilization 63.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 14: Queenston Road & West Ramp



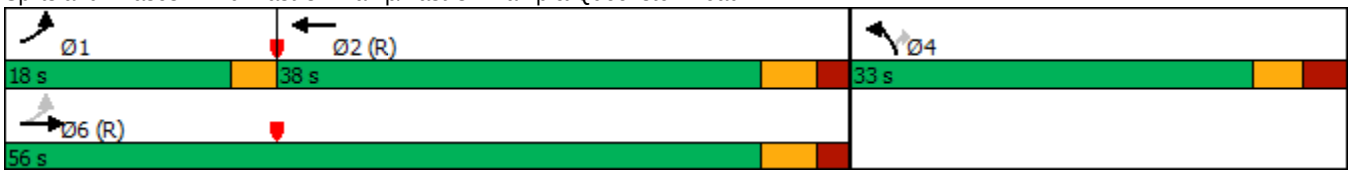


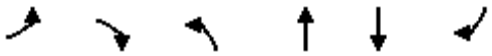
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	939	0	0	1090	76	242	0	306	0	0	0
Future Volume (vph)	228	939	0	0	1090	76	242	0	306	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	70.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	2		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1767	5029	0	0	4985	0	3429	0	1581	0	0	0
Flt Permitted	0.163						0.950					
Satd. Flow (perm)	303	5029	0	0	4985	0	3429	0	1581	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					14				107			
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		178.2			95.9			90.0			130.6	
Travel Time (s)		16.0			8.6			8.1			11.8	
Confl. Peds. (#/hr)	7											
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	2%	0%	0%	2%	0%	1%	0%	1%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	240	988	0	0	1147	80	255	0	322	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	240	988	0	0	1227	0	255	0	322	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA			NA		Prot		Perm			
Protected Phases	1	6			2		4					
Permitted Phases	6								4			
Detector Phase	1	6			2		4		4			
Switch Phase												
Minimum Initial (s)	5.0	20.0			20.0		10.0		10.0			
Minimum Split (s)	8.0	25.9			25.9		24.4		24.4			
Total Split (s)	18.0	56.0			38.0		33.0		33.0			
Total Split (%)	20.2%	62.9%			42.7%		37.1%		37.1%			
Maximum Green (s)	15.0	50.1			32.1		26.6		26.6			
Yellow Time (s)	3.0	3.7			3.7		3.3		3.3			
All-Red Time (s)	0.0	2.2			2.2		3.1		3.1			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	3.0	5.9			5.9		6.4		6.4			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Minimum Gap (s)	3.0	3.0			3.0		3.0		3.0			
Time Before Reduce (s)	0.0	0.0			0.0		0.0		0.0			
Time To Reduce (s)	0.0	0.0			0.0		0.0		0.0			
Recall Mode	None	C-Max			C-Max		None		None			
Walk Time (s)		7.0			7.0		7.0		7.0			
Flash Dont Walk (s)		13.0			2.0		0.0		0.0			
Pedestrian Calls (#/hr)		0			0		0		0			
Act Effct Green (s)	61.3	58.4			44.8		18.3		18.3			
Actuated g/C Ratio	0.69	0.66			0.50		0.21		0.21			
v/c Ratio	0.63	0.30			0.49		0.36		0.79			
Control Delay	15.2	7.6			16.9		30.5		35.2			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	15.2	7.6			16.9		30.5		35.2			
LOS	B	A			B		C		D			
Approach Delay		9.1			16.9			33.1				
Approach LOS		A			B			C				
Queue Length 50th (m)	12.8	23.4			46.5		19.3		35.2			
Queue Length 95th (m)	34.8	39.4			78.3		26.2		57.2			
Internal Link Dist (m)		154.2			71.9			66.0			106.6	
Turn Bay Length (m)	70.0											
Base Capacity (vph)	455	3300			2518		1024		547			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	0.53	0.30			0.49		0.25		0.59			

Intersection Summary			
Area Type:	Other		
Cycle Length: 89			
Actuated Cycle Length: 89			
Offset: 32 (36%), Referenced to phase 2:WBT and 6:EBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 16.8		Intersection LOS: B	
Intersection Capacity Utilization 53.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 16: East On-Ramp/East Off-Ramp & Queenston Road

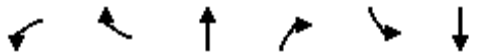




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	17	60	41	124	96	28
Future Volume (vph)	17	60	41	124	96	28
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	20	70	48	144	112	33

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	90	192	145
Volume Left (vph)	20	48	0
Volume Right (vph)	70	0	33
Hadj (s)	-0.42	0.05	-0.11
Departure Headway (s)	4.2	4.3	4.2
Degree Utilization, x	0.11	0.23	0.17
Capacity (veh/h)	785	811	833
Control Delay (s)	7.7	8.6	8.0
Approach Delay (s)	7.7	8.6	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay	8.2		
Level of Service	A		
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	14	6	117	24	11	110
Future Volume (vph)	14	6	117	24	11	110
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	16	7	136	28	13	128

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	23	164	141
Volume Left (vph)	16	0	13
Volume Right (vph)	7	28	0
Hadj (s)	-0.04	-0.10	0.05
Departure Headway (s)	4.5	4.0	4.2
Degree Utilization, x	0.03	0.18	0.16
Capacity (veh/h)	738	883	853
Control Delay (s)	7.6	7.9	8.0
Approach Delay (s)	7.6	7.9	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay	7.9		
Level of Service	A		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D
Future Background Level of Service Calculations

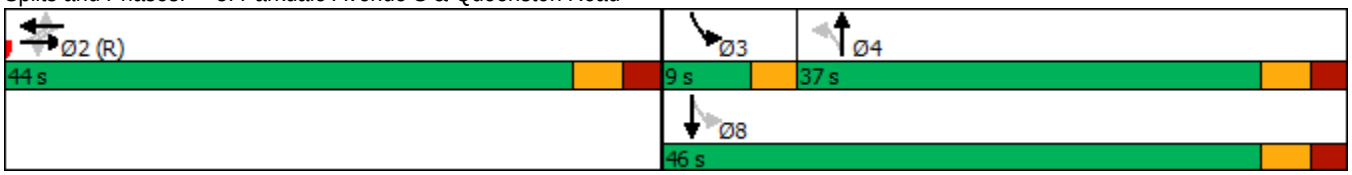
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	746	43	53	909	116	90	341	76	68	137	48
Future Volume (vph)	75	746	43	53	909	116	90	341	76	68	137	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	50.0		0.0	35.0		0.0	70.0		0.0	80.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1700	3383	0	1638	3301	0	1750	3294	0	1668	2734	0
Flt Permitted	0.209			0.301			0.629			0.306		
Satd. Flow (perm)	372	3383	0	509	3301	0	1077	3294	0	529	2734	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			19			32			41	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		88.6			409.1			175.9			215.1	
Travel Time (s)		6.4			29.5			12.7			15.5	
Confl. Peds. (#/hr)	37		71	71		37	81		28	28		81
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	4%	7%	9%	6%	3%	2%	5%	3%	7%	13%	48%
Bus Blockages (#/hr)	0	0	6	0	0	0	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	830	0	56	1079	0	95	439	0	72	195	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			4		3	8	
Permitted Phases	2			2			4			8		
Detector Phase	2	2		2	2		4	4		3	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		3.5	10.0	
Minimum Split (s)	29.9	29.9		29.9	29.9		29.9	29.9		8.0	30.1	
Total Split (s)	44.0	44.0		44.0	44.0		37.0	37.0		9.0	46.0	
Total Split (%)	48.9%	48.9%		48.9%	48.9%		41.1%	41.1%		10.0%	51.1%	
Maximum Green (s)	38.1	38.1		38.1	38.1		31.1	31.1		6.0	40.1	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.0	3.3	
All-Red Time (s)	2.6	2.6		2.6	2.6		2.6	2.6		0.0	2.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		3.0	5.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		17.0	17.0			17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	53.7	53.7		53.7	53.7		17.3	17.3		27.4	24.5	
Actuated g/C Ratio	0.60	0.60		0.60	0.60		0.19	0.19		0.30	0.27	
v/c Ratio	0.36	0.41		0.18	0.55		0.46	0.67		0.31	0.25	
Control Delay	17.9	11.5		12.6	13.2		38.5	35.8		20.0	14.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.9	11.5		12.6	13.2		38.5	35.8		20.0	14.2	
LOS	B	B		B	B		D	D		B	B	
Approach Delay		12.1			13.2			36.3			15.7	
Approach LOS		B			B			D			B	
Queue Length 50th (m)	6.9	39.1		4.3	56.3		14.6	34.4		6.5	2.4	
Queue Length 95th (m)	20.9	60.4		12.7	86.0		27.2	46.0		12.9	12.0	
Internal Link Dist (m)		64.6			385.1			151.9			191.1	
Turn Bay Length (m)	50.0			35.0			70.0			80.0		
Base Capacity (vph)	222	2022		303	1978		372	1159		236	1240	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.36	0.41		0.18	0.55		0.26	0.38		0.31	0.16	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 3 (3%), Referenced to phase 2:EBWB and 6:, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 17.4 Intersection LOS: B
Intersection Capacity Utilization 84.7% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 3: Parkdale Avenue S & Queenston Road



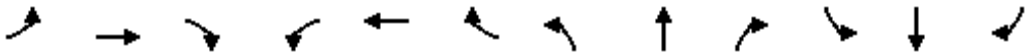
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	895	4	0	1089	116	1	1	4	164	1	95
Future Volume (vph)	39	895	4	0	1089	116	1	1	4	164	1	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	36.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1608	3397	0	1879	3306	0	0	1681	0	0	1624	0
Flt Permitted	0.164							0.962			0.805	
Satd. Flow (perm)	276	3397	0	1879	3306	0	0	1629	0	0	1348	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			23			4			32	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		409.1			206.6			96.1			110.9	
Travel Time (s)		29.5			14.9			8.6			10.0	
Confl. Peds. (#/hr)	17		5	5		17	6		1	1		6
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	5%	0%	0%	5%	13%	0%	0%	0%	3%	0%	11%
Bus Blockages (#/hr)	0	0	6	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	927	0	0	1243	0	0	6	0	0	268	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	25.4	25.4		25.4	25.4		29.7	29.7		29.7	29.7	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.6	54.6		54.6	54.6		24.3	24.3		24.3	24.3	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.7	1.7		1.7	1.7		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.4	5.4		5.4	5.4			5.7			5.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	54.6	54.6			54.6			24.3			24.3	
Actuated g/C Ratio	0.61	0.61			0.61			0.27			0.27	
v/c Ratio	0.24	0.45			0.62			0.01			0.69	
Control Delay	12.6	10.4			12.6			18.0			36.7	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	12.6	10.4			12.6			18.0			36.7	
LOS	B	B			B			B			D	
Approach Delay		10.5			12.6			18.0			36.7	
Approach LOS		B			B			B			D	
Queue Length 50th (m)	2.9	41.6			63.6			0.3			36.6	
Queue Length 95th (m)	9.0	54.5			82.5			3.1			#65.8	
Internal Link Dist (m)		385.1			182.6			72.1			86.9	
Turn Bay Length (m)	36.0											
Base Capacity (vph)	167	2061			2014			442			387	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.24	0.45			0.62			0.01			0.69	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 14.4		Intersection LOS: B	
Intersection Capacity Utilization 65.1%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 6: Reid Avenue S & Queenston Road

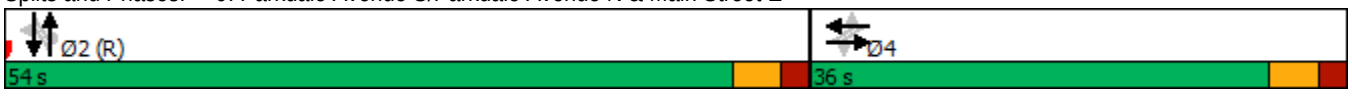


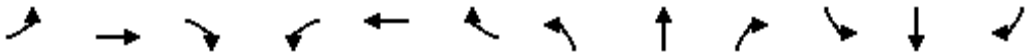
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	27	40	11	57	56	62	435	7	11	276	58
Future Volume (vph)	73	27	40	11	57	56	62	435	7	11	276	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	0	1674	0	0	1679	0	0	3373	0	0	3284	0
Flt Permitted		0.743			0.968			0.856			0.936	
Satd. Flow (perm)	0	1268	0	0	1631	0	0	2901	0	0	3080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			50			2			41	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		98.4			406.7			215.1			404.3	
Travel Time (s)		8.9			36.6			15.5			29.1	
Confl. Peds. (#/hr)	11		6	6		11	11		9	9		11
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	0%	5%	27%	2%	0%	2%	5%	29%	0%	6%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	150	0	0	133	0	0	536	0	0	368	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.3	24.3		24.3	24.3		36.3	36.3		36.3	36.3	
Total Split (s)	36.0	36.0		36.0	36.0		54.0	54.0		54.0	54.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Maximum Green (s)	30.7	30.7		30.7	30.7		48.7	48.7		48.7	48.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		19.0	19.0		19.0	19.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.5			19.5			59.9			59.9	
Actuated g/C Ratio		0.22			0.22			0.67			0.67	
v/c Ratio		0.51			0.34			0.28			0.18	
Control Delay		32.7			21.3			13.6			4.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		32.7			21.3			13.6			4.9	
LOS		C			C			B			A	
Approach Delay		32.7			21.3			13.6			4.9	
Approach LOS		C			C			B			A	
Queue Length 50th (m)		19.3			12.0			33.5			9.0	
Queue Length 95th (m)		36.6			26.5			44.4			13.4	
Internal Link Dist (m)		74.4			382.7			191.1			380.3	
Turn Bay Length (m)												
Base Capacity (vph)		448			589			1931			2063	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.33			0.23			0.28			0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 13 (14%), Referenced to phase 2:NBSB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 14.2		Intersection LOS: B	
Intersection Capacity Utilization 80.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 9: Parkdale Avenue S/Parkdale Avenue N & Main Street E



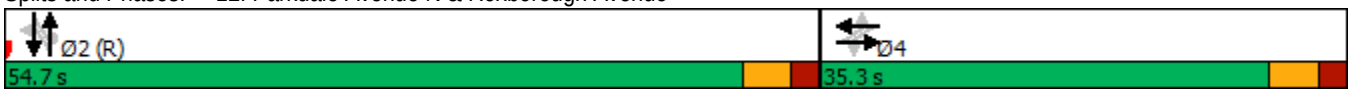


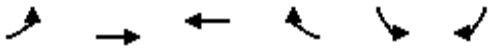
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	21	15	15	23	42	21	597	12	18	296	28
Future Volume (vph)	34	21	15	15	23	42	21	597	12	18	296	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	0	1630	0	0	1566	0	0	3414	0	0	3269	0
Flt Permitted		0.854			0.953			0.934			0.909	
Satd. Flow (perm)	0	1397	0	0	1501	0	0	3192	0	0	2979	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			45			3			16	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		109.1			399.4			404.3			153.9	
Travel Time (s)		9.8			35.9			29.1			11.1	
Confl. Peds. (#/hr)	54		19	19		54	17		13	13		17
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	19%	7%	0%	17%	4%	5%	4%	0%	8%	7%	7%
Bus Blockages (#/hr)	0	0	2	0	0	2	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	76	0	0	86	0	0	678	0	0	367	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.3	35.3		35.3	35.3		24.3	24.3		24.3	24.3	
Total Split (s)	35.3	35.3		35.3	35.3		54.7	54.7		54.7	54.7	
Total Split (%)	39.2%	39.2%		39.2%	39.2%		60.8%	60.8%		60.8%	60.8%	
Maximum Green (s)	30.0	30.0		30.0	30.0		49.4	49.4		49.4	49.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		30.0			30.0			49.4			49.4	
Actuated g/C Ratio		0.33			0.33			0.55			0.55	
v/c Ratio		0.16			0.16			0.39			0.22	
Control Delay		18.3			12.5			5.8			10.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		18.3			12.5			5.8			10.4	
LOS		B			B			A			B	
Approach Delay		18.3			12.5			5.8			10.4	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		7.2			4.8			15.0			15.3	
Queue Length 95th (m)		16.9			14.8			20.2			22.7	
Internal Link Dist (m)		85.1			375.4			380.3			129.9	
Turn Bay Length (m)												
Base Capacity (vph)		476			530			1753			1642	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.16			0.16			0.39			0.22	

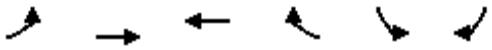
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 11 (12%), Referenced to phase 2:NBSB and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.39			
Intersection Signal Delay: 8.4		Intersection LOS: A	
Intersection Capacity Utilization 66.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 12: Parkdale Avenue N & Roxborough Avenue





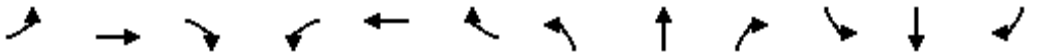
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	177	858	1007	171	54	164
Future Volume (vph)	177	858	1007	171	54	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%	0%		0%	
Storage Length (m)	130.0			0.0	0.0	45.0
Storage Lanes	1			1	2	1
Taper Length (m)	2.5				2.5	
Satd. Flow (prot)	1700	4932	3368	1493	3267	1536
Flt Permitted	0.205				0.950	
Satd. Flow (perm)	367	4932	3368	1461	3267	1514
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				186		148
Link Speed (k/h)		40	40		40	
Link Distance (m)		206.6	178.2		162.1	
Travel Time (s)		18.6	16.0		14.6	
Confl. Peds. (#/hr)	1			1		2
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	4%	6%	7%	6%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	192	933	1095	186	59	178
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Detector Phase	1	6	2	2	4	4
Switch Phase						
Minimum Initial (s)	5.0	20.0	20.0	20.0	10.0	10.0
Minimum Split (s)	8.0	42.7	42.7	42.7	37.9	37.9
Total Split (s)	8.0	62.4	54.4	54.4	37.9	37.9
Total Split (%)	8.0%	62.2%	54.2%	54.2%	37.8%	37.8%
Maximum Green (s)	5.0	55.7	47.7	47.7	31.0	31.0
Yellow Time (s)	3.0	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	0.0	3.0	3.0	3.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.7	6.7	6.7	6.9	6.9



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	C-Max	C-Max	None	None
Walk Time (s)		7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		29.0	29.0	29.0	24.0	24.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	79.3	75.6	62.7	62.7	11.1	11.1
Actuated g/C Ratio	0.79	0.75	0.63	0.63	0.11	0.11
v/c Ratio	0.46	0.25	0.52	0.19	0.16	0.60
Control Delay	6.3	4.1	12.1	2.0	40.7	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	4.1	12.1	2.0	40.7	19.2
LOS	A	A	B	A	D	B
Approach Delay		4.4	10.6		24.6	
Approach LOS		A	B		C	
Queue Length 50th (m)	6.4	15.7	54.3	0.0	5.5	5.5
Queue Length 95th (m)	14.4	25.1	87.8	8.9	10.9	24.4
Internal Link Dist (m)		182.6	154.2		138.1	
Turn Bay Length (m)	130.0					45.0
Base Capacity (vph)	421	3716	2105	983	1009	570
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.25	0.52	0.19	0.06	0.31

Intersection Summary			
Area Type:	Other		
Cycle Length: 100.3			
Actuated Cycle Length: 100.3			
Offset: 13 (13%), Referenced to phase 2:WBT and 6:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 63.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 14: Queenston Road & West Ramp

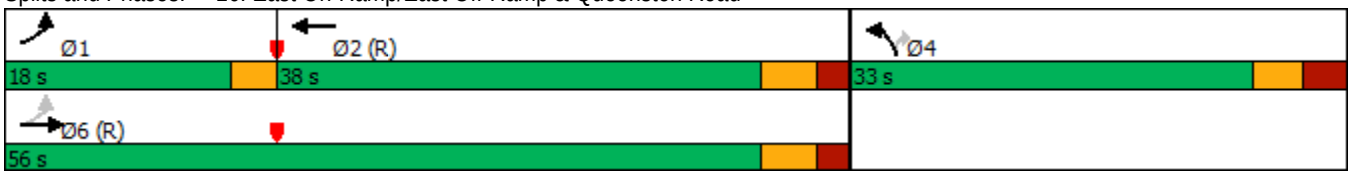


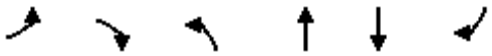
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	244	697	0	0	882	91	233	0	242	0	0	0
Future Volume (vph)	244	697	0	0	882	91	233	0	242	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	70.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	2		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1750	4885	0	0	4727	0	3395	0	1521	0	0	0
Flt Permitted	0.236						0.950					
Satd. Flow (perm)	435	4885	0	0	4727	0	3395	0	1521	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					22				202			
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		178.2			95.9			90.0			130.6	
Travel Time (s)		16.0			8.6			8.1			11.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	5%	0%	0%	7%	7%	2%	0%	5%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	254	726	0	0	1014	0	243	0	252	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA			NA		Prot		Perm			
Protected Phases	1	6			2		4					
Permitted Phases	6								4			
Detector Phase	1	6			2		4		4			
Switch Phase												
Minimum Initial (s)	5.0	20.0			20.0		10.0		10.0			
Minimum Split (s)	8.0	25.9			25.9		24.4		24.4			
Total Split (s)	18.0	56.0			38.0		33.0		33.0			
Total Split (%)	20.2%	62.9%			42.7%		37.1%		37.1%			
Maximum Green (s)	15.0	50.1			32.1		26.6		26.6			
Yellow Time (s)	3.0	3.7			3.7		3.3		3.3			
All-Red Time (s)	0.0	2.2			2.2		3.1		3.1			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	3.0	5.9			5.9		6.4		6.4			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Minimum Gap (s)	3.0	3.0			3.0		3.0		3.0			
Time Before Reduce (s)	0.0	0.0			0.0		0.0		0.0			
Time To Reduce (s)	0.0	0.0			0.0		0.0		0.0			
Recall Mode	None	C-Max			C-Max		None		None			
Walk Time (s)		7.0			7.0		7.0		7.0			
Flash Dont Walk (s)		13.0			2.0		0.0		0.0			
Pedestrian Calls (#/hr)		0			0		0		0			
Act Effct Green (s)	66.9	64.0			51.1		12.7		12.7			
Actuated g/C Ratio	0.75	0.72			0.57		0.14		0.14			
v/c Ratio	0.54	0.21			0.37		0.50		0.65			
Control Delay	8.0	4.6			11.4		38.4		17.0			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	8.0	4.6			11.4		38.4		17.0			
LOS	A	A			B		D		B			
Approach Delay		5.5			11.4			27.5				
Approach LOS		A			B			C				
Queue Length 50th (m)	9.5	11.8			29.2		20.3		7.8			
Queue Length 95th (m)	22.1	21.1			52.6		28.8		28.3			
Internal Link Dist (m)		154.2			71.9			66.0			106.6	
Turn Bay Length (m)	70.0											
Base Capacity (vph)	549	3514			2723		1014		596			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	0.46	0.21			0.37		0.24		0.42			

Intersection Summary			
Area Type:	Other		
Cycle Length: 89			
Actuated Cycle Length: 89			
Offset: 32 (36%), Referenced to phase 2:WBT and 6:EBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 12.3		Intersection LOS: B	
Intersection Capacity Utilization 50.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 16: East On-Ramp/East Off-Ramp & Queenston Road

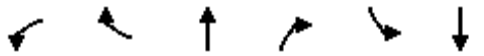




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	22	37	56	96	115	30
Future Volume (vph)	22	37	56	96	115	30
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	29	49	75	128	153	40

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	78	203	193
Volume Left (vph)	29	75	0
Volume Right (vph)	49	0	40
Hadj (s)	-0.17	0.25	-0.01
Departure Headway (s)	4.6	4.5	4.3
Degree Utilization, x	0.10	0.26	0.23
Capacity (veh/h)	712	770	805
Control Delay (s)	8.1	9.1	8.6
Approach Delay (s)	8.1	9.1	8.6
Approach LOS	A	A	A

Intersection Summary			
Delay	8.7		
Level of Service	A		
Intersection Capacity Utilization	31.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	53	30	105	16	10	93
Future Volume (vph)	53	30	105	16	10	93
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	71	40	140	21	13	124

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	111	161	137
Volume Left (vph)	71	0	13
Volume Right (vph)	40	21	0
Hadj (s)	-0.09	0.08	0.13
Departure Headway (s)	4.5	4.4	4.5
Degree Utilization, x	0.14	0.20	0.17
Capacity (veh/h)	745	789	771
Control Delay (s)	8.2	8.5	8.4
Approach Delay (s)	8.2	8.5	8.4
Approach LOS	A	A	A

Intersection Summary			
Delay	8.4		
Level of Service	A		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	108	34	118	35	11	141
Future Volume (Veh/h)	108	34	118	35	11	141
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	144	45	157	47	15	188
Pedestrians	10		10			10
Lane Width (m)	3.5		3.5			3.5
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			111			
pX, platoon unblocked						
vC, conflicting volume	418	200			214	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	418	200			214	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	75	95			99	
cM capacity (veh/h)	578	831			1356	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	189	204	203
Volume Left	144	0	15
Volume Right	45	47	0
cSH	623	1700	1356
Volume to Capacity	0.30	0.12	0.01
Queue Length 95th (m)	9.7	0.0	0.3
Control Delay (s)	13.3	0.0	0.7
Lane LOS	B		A
Approach Delay (s)	13.3	0.0	0.7
Approach LOS	B		

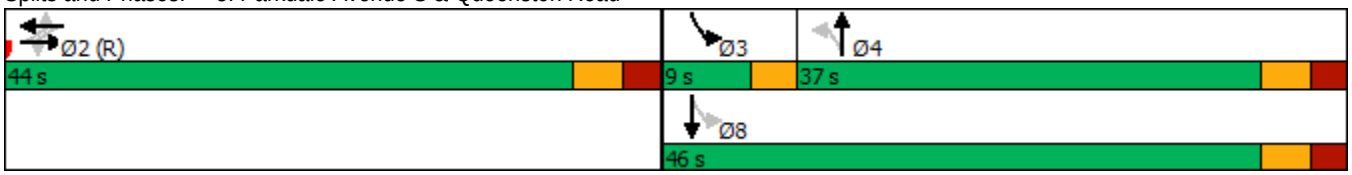
Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	32.9%	ICU Level of Service	A
Analysis Period (min)	15		

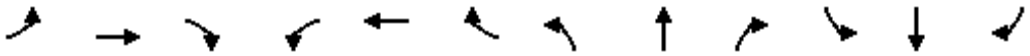
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	1189	57	37	893	95	44	211	64	188	727	100
Future Volume (vph)	66	1189	57	37	893	95	44	211	64	188	727	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	50.0		0.0	35.0		0.0	70.0		0.0	80.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1750	3470	0	1785	3384	0	1785	3339	0	1767	3444	0
Flt Permitted	0.213			0.131			0.250			0.495		
Satd. Flow (perm)	391	3470	0	246	3384	0	461	3339	0	906	3444	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			16			49			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		88.6			409.1			175.9			215.1	
Travel Time (s)		6.4			29.5			12.7			15.5	
Confl. Peds. (#/hr)	17		40	40		17	48		22	22		48
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	0%	0%	4%	1%	0%	3%	0%	1%	1%	1%
Bus Blockages (#/hr)	0	0	6	0	0	0	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	1285	0	38	1019	0	45	284	0	194	852	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			4		3	8	
Permitted Phases	2			2			4			8		
Detector Phase	2	2		2	2		4	4		3	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		3.5	10.0	
Minimum Split (s)	29.9	29.9		29.9	29.9		29.9	29.9		8.0	30.1	
Total Split (s)	44.0	44.0		44.0	44.0		37.0	37.0		9.0	46.0	
Total Split (%)	48.9%	48.9%		48.9%	48.9%		41.1%	41.1%		10.0%	51.1%	
Maximum Green (s)	38.1	38.1		38.1	38.1		31.1	31.1		6.0	40.1	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.0	3.3	
All-Red Time (s)	2.6	2.6		2.6	2.6		2.6	2.6		0.0	2.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		3.0	5.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		17.0	17.0			17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	48.5	48.5		48.5	48.5		20.7	20.7		32.6	29.7	
Actuated g/C Ratio	0.54	0.54		0.54	0.54		0.23	0.23		0.36	0.33	
v/c Ratio	0.32	0.69		0.29	0.56		0.42	0.35		0.50	0.74	
Control Delay	19.6	18.7		21.5	15.9		40.3	23.9		17.4	20.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.6	18.7		21.5	15.9		40.3	23.9		17.4	20.9	
LOS	B	B		C	B		D	C		B	C	
Approach Delay		18.7			16.2			26.1			20.3	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	6.2	80.6		3.4	56.9		6.6	17.7		17.7	40.2	
Queue Length 95th (m)	19.5	123.6		13.3	88.7		15.9	25.5		32.5	61.0	
Internal Link Dist (m)		64.6			385.1			151.9			191.1	
Turn Bay Length (m)	50.0			35.0			70.0			80.0		
Base Capacity (vph)	210	1872		132	1830		159	1185		385	1546	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.32	0.69		0.29	0.56		0.28	0.24		0.50	0.55	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 3 (3%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 19.1		Intersection LOS: B	
Intersection Capacity Utilization 94.9%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 3: Parkdale Avenue S & Queenston Road





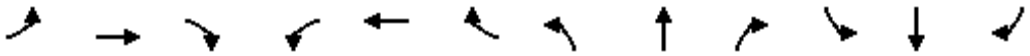
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	1389	5	5	1116	224	5	0	5	171	2	60
Future Volume (vph)	92	1389	5	5	1116	224	5	0	5	171	2	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	36.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1785	3496	0	1785	3351	0	0	1692	0	0	1716	0
Flt Permitted	0.126			0.113				0.877			0.778	
Satd. Flow (perm)	237	3496	0	212	3351	0	0	1503	0	0	1375	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			47			29			19	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		409.1			206.6			96.1			110.2	
Travel Time (s)		29.5			14.9			8.6			9.9	
Confl. Peds. (#/hr)	18		23	23		18	32		7	7		32
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	0%	3%	1%	0%	0%	0%	1%	0%	0%
Bus Blockages (#/hr)	0	0	6	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	1452	0	5	1396	0	0	10	0	0	243	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	25.4	25.4		25.4	25.4		29.7	29.7		29.7	29.7	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.6	54.6		54.6	54.6		24.3	24.3		24.3	24.3	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.7	1.7		1.7	1.7		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.4	5.4		5.4	5.4			5.7			5.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	54.6	54.6		54.6	54.6			24.3			24.3	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	0.67	0.68		0.04	0.68			0.02			0.63	
Control Delay	39.5	14.0		8.2	13.5			2.7			35.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	39.5	14.0		8.2	13.5			2.7			35.1	
LOS	D	B		A	B			A			D	
Approach Delay		15.6			13.5			2.7			35.1	
Approach LOS		B			B			A			D	
Queue Length 50th (m)	10.0	81.2		0.3	75.1			0.0			34.0	
Queue Length 95th (m)	#38.6	103.5		1.8	97.3			1.3			59.1	
Internal Link Dist (m)		385.1			182.6			72.1			86.2	
Turn Bay Length (m)	36.0			15.0								
Base Capacity (vph)	143	2121		128	2051			426			385	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.67	0.68		0.04	0.68			0.02			0.63	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 16.1		Intersection LOS: B	
Intersection Capacity Utilization 89.4%		ICU Level of Service E	
Analysis Period (min) 15			

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

Splits and Phases: 6: Reid Avenue S & Queenston Road

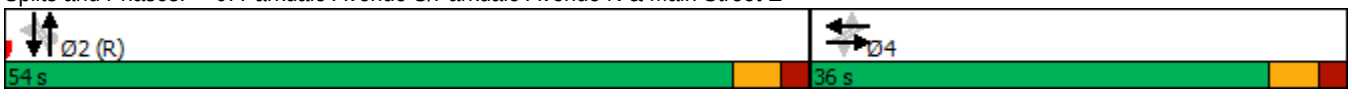


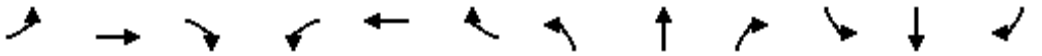
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	42	39	12	44	38	32	369	13	32	1037	124
Future Volume (vph)	58	42	39	12	44	38	32	369	13	32	1037	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	0	1748	0	0	1749	0	0	3471	0	0	3464	0
Flt Permitted		0.845			0.955			0.800			0.931	
Satd. Flow (perm)	0	1502	0	0	1680	0	0	2788	0	0	3227	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			42			5			21	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		98.4			406.7			215.1			404.3	
Travel Time (s)		8.9			36.6			15.5			29.1	
Confl. Peds. (#/hr)	7		4	4		7	15		16	16		15
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	0%	2%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	153	0	0	103	0	0	454	0	0	1311	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.3	24.3		24.3	24.3		36.3	36.3		36.3	36.3	
Total Split (s)	36.0	36.0		36.0	36.0		54.0	54.0		54.0	54.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Maximum Green (s)	30.7	30.7		30.7	30.7		48.7	48.7		48.7	48.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		19.0	19.0		19.0	19.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.2			19.2			60.2			60.2	
Actuated g/C Ratio		0.21			0.21			0.67			0.67	
v/c Ratio		0.45			0.26			0.24			0.61	
Control Delay		30.6			20.3			9.4			12.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		30.6			20.3			9.4			12.4	
LOS		C			C			A			B	
Approach Delay		30.6			20.3			9.4			12.4	
Approach LOS		C			C			A			B	
Queue Length 50th (m)		19.4			8.7			21.5			58.3	
Queue Length 95th (m)		37.1			21.7			29.5			82.8	
Internal Link Dist (m)		74.4			382.7			191.1			380.3	
Turn Bay Length (m)												
Base Capacity (vph)		528			600			1866			2165	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.29			0.17			0.24			0.61	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 13 (14%), Referenced to phase 2:NBSB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 80.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 9: Parkdale Avenue S/Parkdale Avenue N & Main Street E



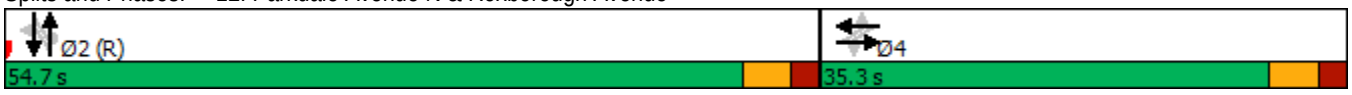


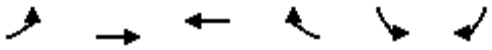
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	24	33	21	33	36	16	439	25	35	1230	41
Future Volume (vph)	21	24	33	21	33	36	16	439	25	35	1230	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	0	1607	0	0	1647	0	0	3429	0	0	3511	0
Flt Permitted		0.921			0.933			0.886			0.926	
Satd. Flow (perm)	0	1495	0	0	1552	0	0	3044	0	0	3253	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			39			10			6	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		109.1			399.4			404.3			153.9	
Travel Time (s)		9.8			35.9			29.1			11.1	
Confl. Peds. (#/hr)	19		10	10		19	7		18	18		7
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	21%	0%	0%	15%	0%	0%	3%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	2	0	0	2	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	84	0	0	97	0	0	516	0	0	1405	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.3	35.3		35.3	35.3		24.3	24.3		24.3	24.3	
Total Split (s)	35.3	35.3		35.3	35.3		54.7	54.7		54.7	54.7	
Total Split (%)	39.2%	39.2%		39.2%	39.2%		60.8%	60.8%		60.8%	60.8%	
Maximum Green (s)	30.0	30.0		30.0	30.0		49.4	49.4		49.4	49.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		30.0			30.0			49.4			49.4	
Actuated g/C Ratio		0.33			0.33			0.55			0.55	
v/c Ratio		0.16			0.18			0.31			0.79	
Control Delay		14.4			14.5			6.6			20.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		14.4			14.5			6.6			20.1	
LOS		B			B			A			C	
Approach Delay		14.4			14.5			6.6			20.1	
Approach LOS		B			B			A			C	
Queue Length 50th (m)		5.8			6.9			11.9			94.7	
Queue Length 95th (m)		15.7			17.5			19.7			123.1	
Internal Link Dist (m)		85.1			375.4			380.3			129.9	
Turn Bay Length (m)												
Base Capacity (vph)		521			543			1675			1788	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.16			0.18			0.31			0.79	

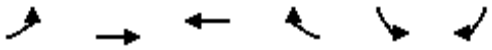
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 11 (12%), Referenced to phase 2:NBSB and 6:, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 16.3		Intersection LOS: B	
Intersection Capacity Utilization 90.4%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 12: Parkdale Avenue N & Roxborough Avenue





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	192	1328	1286	337	92	115
Future Volume (vph)	192	1328	1286	337	92	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%	0%		0%	
Storage Length (m)	130.0			0.0	0.0	45.0
Storage Lanes	1			1	2	1
Taper Length (m)	2.5				2.5	
Satd. Flow (prot)	1767	5029	3466	1581	3429	1581
Flt Permitted	0.115				0.950	
Satd. Flow (perm)	214	5029	3466	1528	3419	1581
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				355		121
Link Speed (k/h)		40	40		40	
Link Distance (m)		206.6	178.2		162.1	
Travel Time (s)		18.6	16.0		14.6	
Confl. Peds. (#/hr)	10			10	3	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	2%	3%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	202	1398	1354	355	97	121
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Detector Phase	1	6	2	2	4	4
Switch Phase						
Minimum Initial (s)	5.0	20.0	20.0	20.0	10.0	10.0
Minimum Split (s)	8.0	42.7	42.7	42.7	37.9	37.9
Total Split (s)	8.0	62.4	54.4	54.4	37.9	37.9
Total Split (%)	8.0%	62.2%	54.2%	54.2%	37.8%	37.8%
Maximum Green (s)	5.0	55.7	47.7	47.7	31.0	31.0
Yellow Time (s)	3.0	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	0.0	3.0	3.0	3.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.7	6.7	6.7	6.9	6.9



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	C-Max	C-Max	None	None
Walk Time (s)		7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		29.0	29.0	29.0	24.0	24.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	80.2	76.5	56.2	56.2	10.2	10.2
Actuated g/C Ratio	0.80	0.76	0.56	0.56	0.10	0.10
v/c Ratio	0.46	0.36	0.70	0.35	0.28	0.45
Control Delay	10.5	4.2	18.3	2.2	43.8	13.6
Queue Delay	0.0	0.0	1.0	0.0	0.0	0.0
Total Delay	10.5	4.2	19.3	2.2	43.8	13.6
LOS	B	A	B	A	D	B
Approach Delay		5.0	15.7		27.0	
Approach LOS		A	B		C	
Queue Length 50th (m)	6.7	26.3	89.7	0.0	9.1	0.0
Queue Length 95th (m)	26.8	33.7	120.2	11.8	16.7	15.8
Internal Link Dist (m)		182.6	154.2		138.1	
Turn Bay Length (m)	130.0					45.0
Base Capacity (vph)	439	3834	1940	1011	1059	572
Starvation Cap Reductn	0	0	317	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.36	0.83	0.35	0.09	0.21

Intersection Summary	
Area Type:	Other
Cycle Length: 100.3	
Actuated Cycle Length: 100.3	
Offset: 13 (13%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 11.6	Intersection LOS: B
Intersection Capacity Utilization 69.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 14: Queenston Road & West Ramp

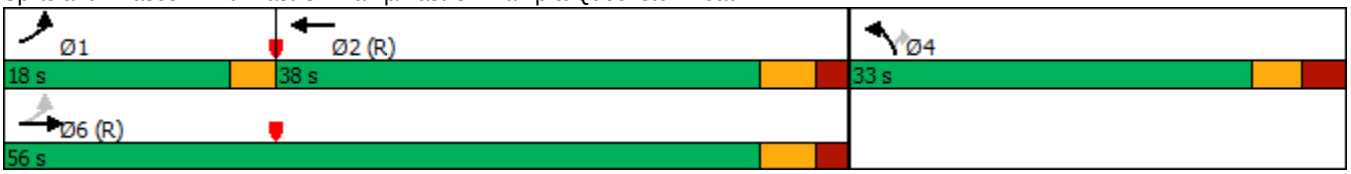
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	251	1120	0	0	1304	76	291	0	306	0	0	0
Future Volume (vph)	251	1120	0	0	1304	76	291	0	306	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	70.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	2		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1767	5029	0	0	4994	0	3429	0	1581	0	0	0
Flt Permitted	0.107						0.950					
Satd. Flow (perm)	199	5029	0	0	4994	0	3429	0	1581	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					11				72			
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		178.2			95.9			90.0			130.6	
Travel Time (s)		16.0			8.6			8.1			11.8	
Confl. Peds. (#/hr)	7											
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	2%	0%	0%	2%	0%	1%	0%	1%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	264	1179	0	0	1453	0	306	0	322	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA			NA		Prot		Perm			
Protected Phases	1	6			2		4					
Permitted Phases	6								4			
Detector Phase	1	6			2		4		4			
Switch Phase												
Minimum Initial (s)	5.0	20.0			20.0		10.0		10.0			
Minimum Split (s)	8.0	25.9			25.9		24.4		24.4			
Total Split (s)	18.0	56.0			38.0		33.0		33.0			
Total Split (%)	20.2%	62.9%			42.7%		37.1%		37.1%			
Maximum Green (s)	15.0	50.1			32.1		26.6		26.6			
Yellow Time (s)	3.0	3.7			3.7		3.3		3.3			
All-Red Time (s)	0.0	2.2			2.2		3.1		3.1			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	3.0	5.9			5.9		6.4		6.4			

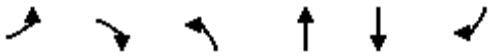
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Minimum Gap (s)	3.0	3.0			3.0		3.0		3.0			
Time Before Reduce (s)	0.0	0.0			0.0		0.0		0.0			
Time To Reduce (s)	0.0	0.0			0.0		0.0		0.0			
Recall Mode	None	C-Max			C-Max		None		None			
Walk Time (s)		7.0			7.0		7.0		7.0			
Flash Dont Walk (s)		13.0			2.0		0.0		0.0			
Pedestrian Calls (#/hr)		0			0		0		0			
Act Effct Green (s)	59.9	57.0			41.9		19.7		19.7			
Actuated g/C Ratio	0.67	0.64			0.47		0.22		0.22			
v/c Ratio	0.77	0.37			0.62		0.40		0.79			
Control Delay	30.4	8.7			20.7		30.1		39.0			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	30.4	8.7			20.7		30.1		39.0			
LOS	C	A			C		C		D			
Approach Delay		12.6			20.7			34.6				
Approach LOS		B			C			C				
Queue Length 50th (m)	23.0	31.3			65.7		23.0		40.7			
Queue Length 95th (m)	#53.6	48.5			97.8		30.9		63.7			
Internal Link Dist (m)		154.2			71.9			66.0			106.6	
Turn Bay Length (m)	70.0											
Base Capacity (vph)	401	3218			2358		1024		523			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	0.66	0.37			0.62		0.30		0.62			

Intersection Summary

Area Type: Other
Cycle Length: 89
Actuated Cycle Length: 89
Offset: 32 (36%), Referenced to phase 2:WBT and 6:EBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 19.9 Intersection LOS: B
Intersection Capacity Utilization 60.7% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 16: East On-Ramp/East Off-Ramp & Queenston Road

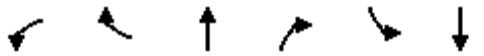




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	17	92	61	174	131	28
Future Volume (vph)	17	92	61	174	131	28
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	20	107	71	202	152	33

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	127	273	185
Volume Left (vph)	20	71	0
Volume Right (vph)	107	0	33
Hadj (s)	-0.47	0.05	-0.08
Departure Headway (s)	4.5	4.5	4.4
Degree Utilization, x	0.16	0.34	0.23
Capacity (veh/h)	734	782	775
Control Delay (s)	8.3	9.7	8.7
Approach Delay (s)	8.3	9.7	8.7
Approach LOS	A	A	A

Intersection Summary			
Delay	9.1		
Level of Service	A		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	31	17	139	51	29	131
Future Volume (vph)	31	17	139	51	29	131
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	36	20	162	59	34	152

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	56	221	186
Volume Left (vph)	36	0	34
Volume Right (vph)	20	59	0
Hadj (s)	-0.09	-0.16	0.06
Departure Headway (s)	4.7	4.1	4.3
Degree Utilization, x	0.07	0.25	0.22
Capacity (veh/h)	701	861	806
Control Delay (s)	8.1	8.4	8.6
Approach Delay (s)	8.1	8.4	8.6
Approach LOS	A	A	A

Intersection Summary			
Delay	8.4		
Level of Service	A		
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	63	20	215	108	32	191
Future Volume (Veh/h)	63	20	215	108	32	191
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	73	23	250	126	37	222
Pedestrians	10		10			10
Lane Width (m)	3.5		3.5			3.5
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			110			
pX, platoon unblocked						
vC, conflicting volume	629	333			386	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	629	333			386	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	97			97	
cM capacity (veh/h)	428	701			1173	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	96	376	259
Volume Left	73	0	37
Volume Right	23	126	0
cSH	472	1700	1173
Volume to Capacity	0.20	0.22	0.03
Queue Length 95th (m)	5.7	0.0	0.7
Control Delay (s)	14.6	0.0	1.4
Lane LOS	B		A
Approach Delay (s)	14.6	0.0	1.4
Approach LOS	B		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix E
2016 TTS Data Analysis

Modes of Travel - AM Peak Periods

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 5151 5148 5117 5120
and
Start time of trip - start_time In 600-900

Trip 2016
Table:

Modes of Transportation/Traffic Zones	5117	5120	5148	5151	Total	Percentage
Transit excluding GO rail	74	92	813	92	1071	19.9%
Auto driver	292	714	1013	1620	3639	67.5%
GO rail only	0	17	0	70	87	1.6%
Auto passenger	0	44	149	246	439	8.1%
Taxi passenger	0	0	89	0	89	1.7%
Walk	0	0	36	32	68	1.3%
Total	366	867	2100	2060	5393	100%

Modes of Travel - PM Peak Periods

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 5151 5148 5117 5120
and
Start time of trip - start_time In 1600-1900

Trip 2016
Table:

Modes of Transportation/Traffic Zones	5117	5120	5148	5151	Total	Percentage
Transit excluding GO rail	33	0	621	141	795	13%
Auto driver	390	818	1620	1761	4589	72%
GO rail only	0	17	0	70	87	1%
Auto passenger	0	64	503	283	850	13%
Taxi passenger	0	0	29	0	29	1%
Total	423	899	2773	2255	6350	100%

Auto Trip Distribution - External Hamilton

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 M P T U
and
2006 GTA zone of household - gta06_hhld In 5151 5148 5117 5120
and
Start time of trip - start_time In 600-900

Trip 2016
Table:

	PD 7 of Toronto	PD 10 of Toronto	Mississauga	Halton Hills	Milton	Oakville	Burlington	Ancaster	Glanbrook	Stoney Creek	Hamilton	Niagara Falls	Kitchener	Puslinch	Brantford	
5117	0	0	0	0	24	37	119	0	0	0	148	0	0	0	0	
5120	0	0	17	0	0	132	28	28	0	0	361	0	0	0	52	
5148	0	107	175	0	24	17	24	0	0	66	702	0	22	14	0	
5151	36	0	38	59	0	77	293	0	97	205	724	0	0	0	49	
	36	107	230	59	48	263	464	28	97	271	1935	0	22	14	101	3675
	1%	3%	6%	2%	1%	7%	13%	1%	3%	7%	53%	0%	1%	0%	3%	

Toronto	4%
Peel	6%
Halton	23%
City of Hamilton	53%
Other	7%
Niagara Region	0%
Stoney Creek	7%
Total	100%

Auto Trip Distribution - Internal Hamilton

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
Primary travel mode of trip - mode_prime In D M P T U
and
2006 GTA zone of household - gta06_hhld In 5151 5148 5117 5120
and
Start time of trip - start_time In 600-900
and
Ward number of destination - ward_dest In 171-185

Trip 2016
Table:

	5020	5052	5080	5087	5091	5092	5099	5108	5111	5113	5117	5120	5126	5129	5132	5133	5136	5145	5148	5150	5151	5153	5154	5161	5162	5169	5172	5174	5180	5181	5182	5183	5186	5188	5194	5198	5206	5208	5210	
5117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0	0	0	89	0	0	0	24	0	0	0	0	0	0	0	0	0	
5120	0	0	0	0	0	0	0	0	0	0	37	0	39	0	0	28	0	0	9	92	17	52	0	0	72	0	44	0	0	0	0	0	0	0	0	0	0	0	0	
5148	0	0	0	0	0	53	0	0	53	43	0	9	0	101	69	0	22	52	72	0	0	0	0	0	0	0	0	25	0	0	29	0	0	0	54	58	74	0	54	
5151	97	34	111	41	0	0	29	65	32	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	197	0	32	184	102	29	0	0	0	28	0	
	97	34	111	41	0	53	29	65	85	43	37	9	39	101	69	28	22	88	81	92	17	52	45	0	72	89	44	25	197	24	61	184	102	29	54	58	74	28	54	2333
	4%	1%	5%	2%	0%	2%	1%	3%	4%	2%	2%	0%	2%	4%	3%	1%	1%	4%	3%	4%	1%	2%	2%	0%	3%	4%	2%	1%	8%	1%	3%	8%	4%	1%	2%	2%	3%	1%	2%	100%

City of Hamilton			
Direction	East	22%	12%
	West	55%	29%
	North	10%	5%
	South	12%	6%
Total		100%	53%

Transit Trip Distribution - External Hamilton

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 B C G J W
and
2006 GTA zone of household - gta06_hhld In 5151 5148 5117 5120
and
Start time of trip - start_time In 600-900

Trip 2016
Table:

	PD 1 of Toronto	PD 10 of Toronto	Hamilton	
5117	0	0	74	
5120	17	0	92	
5148	0	51	768	
5151	70	0	125	
	87	51	1059	1197
	7%	4%	88%	

Toronto	12%
Hamilton	88%

Transit Trip Distribution - Internal Hamilton

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
Primary travel mode of trip - mode_prime In B C G J W
and
2006 GTA zone of household - gta06_hhld In 5151 5148 5117 5120
and
Start time of trip - start_time In 600-900
and
Ward number of destination - ward_dest In 171-185

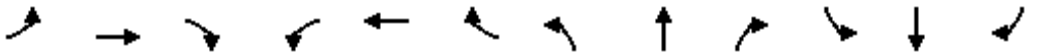
Trip 2016
Table:

	5087	5104	5123	5142	5148	5151	5159	5184	5192	5198	5199	5201	5204	
5117	0	0	0	0	0	0	0	41	33	0	0	0	0	
5120	0	92	0	0	0	0	0	0	0	0	0	0	0	
5148	51	201	36	101	0	36	51	20	0	107	87	30	49	
5151	0	0	0	92	0	32	0	0	0	0	0	0	0	
	51	293	36	193	0	68	51	61	33	107	87	30	49	1059
	5%	28%	3%	18%	0%	6%	5%	6%	3%	10%	8%	3%	5%	100%

East	3%	3%
West	85%	75%
North	6%	6%
South	5%	4%
	100%	88%

Appendix F

Future Total Level of Service Calculations



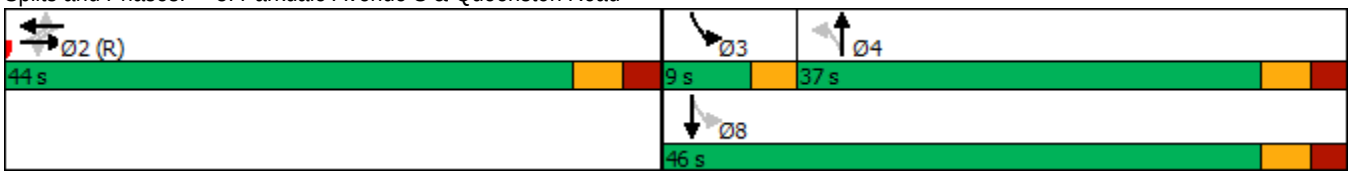
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	759	43	53	950	116	90	341	76	68	137	48
Future Volume (vph)	75	759	43	53	950	116	90	341	76	68	137	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	50.0		0.0	35.0		0.0	70.0		0.0	80.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1700	3384	0	1638	3305	0	1750	3294	0	1668	2734	0
Flt Permitted	0.196			0.296			0.629			0.306		
Satd. Flow (perm)	349	3384	0	501	3305	0	1077	3294	0	529	2734	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			18			32			36	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		88.6			409.1			175.9			215.1	
Travel Time (s)		6.4			29.5			12.7			15.5	
Confl. Peds. (#/hr)	37		71	71		37	81		28	28		81
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	4%	7%	9%	6%	3%	2%	5%	3%	7%	13%	48%
Bus Blockages (#/hr)	0	0	6	0	0	0	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	844	0	56	1122	0	95	439	0	72	195	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			4		3	8	
Permitted Phases	2			2			4			8		
Detector Phase	2	2		2	2		4	4		3	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		3.5	10.0	
Minimum Split (s)	29.9	29.9		29.9	29.9		29.9	29.9		8.0	30.1	
Total Split (s)	44.0	44.0		44.0	44.0		37.0	37.0		9.0	46.0	
Total Split (%)	48.9%	48.9%		48.9%	48.9%		41.1%	41.1%		10.0%	51.1%	
Maximum Green (s)	38.1	38.1		38.1	38.1		31.1	31.1		6.0	40.1	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.0	3.3	
All-Red Time (s)	2.6	2.6		2.6	2.6		2.6	2.6		0.0	2.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		3.0	5.9	

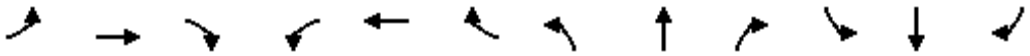
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		17.0	17.0			17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	53.7	53.7		53.7	53.7		17.3	17.3		27.4	24.5	
Actuated g/C Ratio	0.60	0.60		0.60	0.60		0.19	0.19		0.30	0.27	
v/c Ratio	0.38	0.42		0.19	0.57		0.46	0.67		0.31	0.25	
Control Delay	19.1	11.6		12.7	13.5		38.5	35.8		20.0	14.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.1	11.6		12.7	13.5		38.5	35.8		20.0	14.8	
LOS	B	B		B	B		D	D		B	B	
Approach Delay		12.2			13.5			36.3			16.2	
Approach LOS		B			B			D			B	
Queue Length 50th (m)	7.0	39.9		4.3	59.8		14.6	34.4		6.5	7.4	
Queue Length 95th (m)	22.0	61.5		12.7	91.0		27.2	46.0		12.9	12.3	
Internal Link Dist (m)		64.6			385.1			151.9			191.1	
Turn Bay Length (m)	50.0			35.0			70.0			80.0		
Base Capacity (vph)	208	2023		299	1979		372	1159		236	1238	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.38	0.42		0.19	0.57		0.26	0.38		0.31	0.16	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 3 (3%), Referenced to phase 2:EBWB and 6:, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 17.5 Intersection LOS: B
Intersection Capacity Utilization 85.9% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 3: Parkdale Avenue S & Queenston Road





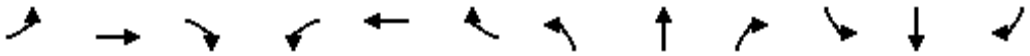
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	895	4	0	1089	133	1	1	4	219	1	136
Future Volume (vph)	52	895	4	0	1089	133	1	1	4	219	1	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	36.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1608	3397	0	1879	3294	0	0	1681	0	0	1619	0
Flt Permitted	0.159							0.954			0.809	
Satd. Flow (perm)	268	3397	0	1879	3294	0	0	1616	0	0	1350	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			26			4			34	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		409.1			206.6			96.1			110.9	
Travel Time (s)		29.5			14.9			8.6			10.0	
Confl. Peds. (#/hr)	17		5	5		17	6		1	1		6
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	5%	0%	0%	5%	13%	0%	0%	0%	3%	0%	11%
Bus Blockages (#/hr)	0	0	6	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	927	0	0	1260	0	0	6	0	0	367	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	25.4	25.4		25.4	25.4		29.7	29.7		29.7	29.7	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.6	54.6		54.6	54.6		24.3	24.3		24.3	24.3	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.7	1.7		1.7	1.7		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.4	5.4		5.4	5.4			5.7			5.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	54.6	54.6			54.6			24.3			24.3	
Actuated g/C Ratio	0.61	0.61			0.61			0.27			0.27	
v/c Ratio	0.33	0.45			0.63			0.01			0.94	
Control Delay	15.8	10.4			12.7			18.0			64.7	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	15.8	10.4			12.7			18.0			64.7	
LOS	B	B			B			B			E	
Approach Delay		10.7			12.7			18.0			64.7	
Approach LOS		B			B			B			E	
Queue Length 50th (m)	4.2	41.6			65.0			0.3			57.1	
Queue Length 95th (m)	12.9	54.5			84.5			3.1			#110.5	
Internal Link Dist (m)		385.1			182.6			72.1			86.9	
Turn Bay Length (m)	36.0											
Base Capacity (vph)	162	2061			2008			439			389	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.33	0.45			0.63			0.01			0.94	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 19.3		Intersection LOS: B	
Intersection Capacity Utilization 79.9%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 6: Reid Avenue S & Queenston Road

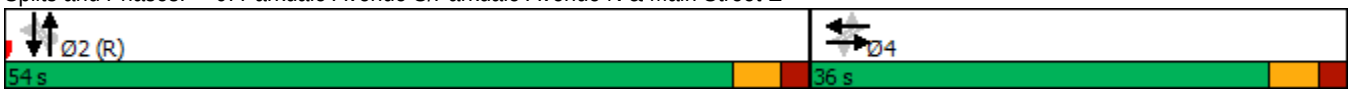


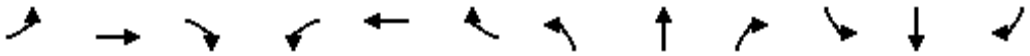
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	27	40	11	57	56	62	435	7	11	276	58
Future Volume (vph)	73	27	40	11	57	56	62	435	7	11	276	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	0	1674	0	0	1679	0	0	3373	0	0	3284	0
Flt Permitted		0.743			0.968			0.856			0.936	
Satd. Flow (perm)	0	1268	0	0	1631	0	0	2901	0	0	3080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			50			2			41	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		98.4			406.7			215.1			404.3	
Travel Time (s)		8.9			36.6			15.5			29.1	
Confl. Peds. (#/hr)	11		6	6		11	11		9	9		11
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	0%	5%	27%	2%	0%	2%	5%	29%	0%	6%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	150	0	0	133	0	0	536	0	0	368	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.3	24.3		24.3	24.3		36.3	36.3		36.3	36.3	
Total Split (s)	36.0	36.0		36.0	36.0		54.0	54.0		54.0	54.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Maximum Green (s)	30.7	30.7		30.7	30.7		48.7	48.7		48.7	48.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		19.0	19.0		19.0	19.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.5			19.5			59.9			59.9	
Actuated g/C Ratio		0.22			0.22			0.67			0.67	
v/c Ratio		0.51			0.34			0.28			0.18	
Control Delay		32.7			21.3			13.6			4.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		32.7			21.3			13.6			4.9	
LOS		C			C			B			A	
Approach Delay		32.7			21.3			13.6			4.9	
Approach LOS		C			C			B			A	
Queue Length 50th (m)		19.3			12.0			33.5			9.0	
Queue Length 95th (m)		36.6			26.5			44.3			13.4	
Internal Link Dist (m)		74.4			382.7			191.1			380.3	
Turn Bay Length (m)												
Base Capacity (vph)		448			589			1931			2063	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.33			0.23			0.28			0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 13 (14%), Referenced to phase 2:NBSB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 14.2		Intersection LOS: B	
Intersection Capacity Utilization 80.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 9: Parkdale Avenue S/Parkdale Avenue N & Main Street E



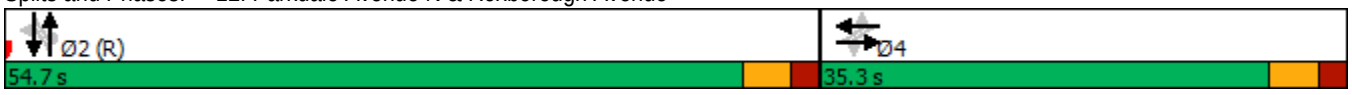


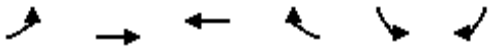
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	21	15	15	23	42	21	597	12	18	296	28
Future Volume (vph)	34	21	15	15	23	42	21	597	12	18	296	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	0	1630	0	0	1566	0	0	3414	0	0	3269	0
Flt Permitted		0.854			0.953			0.934			0.909	
Satd. Flow (perm)	0	1397	0	0	1501	0	0	3192	0	0	2979	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			45			3			16	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		109.1			399.4			404.3			153.9	
Travel Time (s)		9.8			35.9			29.1			11.1	
Confl. Peds. (#/hr)	54		19	19		54	17		13	13		17
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	19%	7%	0%	17%	4%	5%	4%	0%	8%	7%	7%
Bus Blockages (#/hr)	0	0	2	0	0	2	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	76	0	0	86	0	0	678	0	0	367	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.3	35.3		35.3	35.3		24.3	24.3		24.3	24.3	
Total Split (s)	35.3	35.3		35.3	35.3		54.7	54.7		54.7	54.7	
Total Split (%)	39.2%	39.2%		39.2%	39.2%		60.8%	60.8%		60.8%	60.8%	
Maximum Green (s)	30.0	30.0		30.0	30.0		49.4	49.4		49.4	49.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		30.0			30.0			49.4			49.4	
Actuated g/C Ratio		0.33			0.33			0.55			0.55	
v/c Ratio		0.16			0.16			0.39			0.22	
Control Delay		18.3			12.5			5.8			10.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		18.3			12.5			5.8			10.4	
LOS		B			B			A			B	
Approach Delay		18.3			12.5			5.8			10.4	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		7.2			4.8			15.0			15.3	
Queue Length 95th (m)		16.9			14.8			21.1			22.7	
Internal Link Dist (m)		85.1			375.4			380.3			129.9	
Turn Bay Length (m)												
Base Capacity (vph)		476			530			1753			1642	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.16			0.16			0.39			0.22	

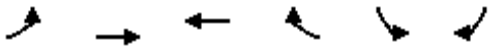
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 11 (12%), Referenced to phase 2:NBSB and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.39			
Intersection Signal Delay: 8.5		Intersection LOS: A	
Intersection Capacity Utilization 66.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 12: Parkdale Avenue N & Roxborough Avenue





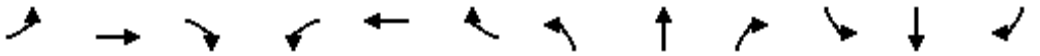
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	184	906	1022	171	54	166
Future Volume (vph)	184	906	1022	171	54	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%	0%		0%	
Storage Length (m)	130.0			0.0	0.0	45.0
Storage Lanes	1			1	2	1
Taper Length (m)	2.5				2.5	
Satd. Flow (prot)	1700	4932	3368	1493	3267	1536
Flt Permitted	0.198				0.950	
Satd. Flow (perm)	354	4932	3368	1461	3267	1514
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				186		146
Link Speed (k/h)		40	40		40	
Link Distance (m)		206.6	178.2		162.1	
Travel Time (s)		18.6	16.0		14.6	
Confl. Peds. (#/hr)	1			1		2
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	4%	6%	7%	6%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	200	985	1111	186	59	180
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Detector Phase	1	6	2	2	4	4
Switch Phase						
Minimum Initial (s)	5.0	20.0	20.0	20.0	10.0	10.0
Minimum Split (s)	8.0	42.7	42.7	42.7	37.9	37.9
Total Split (s)	8.0	62.4	54.4	54.4	37.9	37.9
Total Split (%)	8.0%	62.2%	54.2%	54.2%	37.8%	37.8%
Maximum Green (s)	5.0	55.7	47.7	47.7	31.0	31.0
Yellow Time (s)	3.0	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	0.0	3.0	3.0	3.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.7	6.7	6.7	6.9	6.9



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	C-Max	C-Max	None	None
Walk Time (s)		7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		29.0	29.0	29.0	24.0	24.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	79.1	75.4	61.7	61.7	11.3	11.3
Actuated g/C Ratio	0.79	0.75	0.62	0.62	0.11	0.11
v/c Ratio	0.47	0.27	0.54	0.19	0.16	0.60
Control Delay	6.6	4.2	12.9	2.1	40.5	19.9
Queue Delay	0.0	0.0	0.3	0.0	0.0	0.0
Total Delay	6.6	4.2	13.2	2.1	40.5	19.9
LOS	A	A	B	A	D	B
Approach Delay		4.6	11.6		25.0	
Approach LOS		A	B		C	
Queue Length 50th (m)	6.6	16.7	56.9	0.0	5.5	6.2
Queue Length 95th (m)	15.2	27.1	92.4	9.1	10.8	25.4
Internal Link Dist (m)		182.6	154.2		138.1	
Turn Bay Length (m)	130.0					45.0
Base Capacity (vph)	423	3709	2071	970	1009	568
Starvation Cap Reductn	0	0	388	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.27	0.66	0.19	0.06	0.32

Intersection Summary			
Area Type:	Other		
Cycle Length: 100.3			
Actuated Cycle Length: 100.3			
Offset: 13 (13%), Referenced to phase 2:WBT and 6:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 9.7		Intersection LOS: A	
Intersection Capacity Utilization 64.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 14: Queenston Road & West Ramp

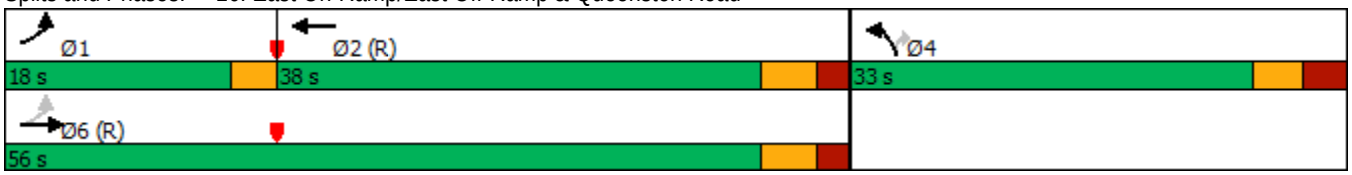


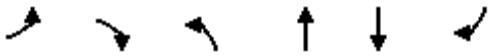
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	278	711	0	0	893	91	237	0	242	0	0	0
Future Volume (vph)	278	711	0	0	893	91	237	0	242	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	70.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	2		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1750	4885	0	0	4727	0	3395	0	1521	0	0	0
Flt Permitted	0.229						0.950					
Satd. Flow (perm)	422	4885	0	0	4727	0	3395	0	1521	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					21				194			
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		178.2			95.9			90.0			130.6	
Travel Time (s)		16.0			8.6			8.1			11.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	5%	0%	0%	7%	7%	2%	0%	5%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	290	741	0	0	1025	0	247	0	252	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA			NA		Prot		Perm			
Protected Phases	1	6			2		4					
Permitted Phases	6								4			
Detector Phase	1	6			2		4		4			
Switch Phase												
Minimum Initial (s)	5.0	20.0			20.0		10.0		10.0			
Minimum Split (s)	8.0	25.9			25.9		24.4		24.4			
Total Split (s)	18.0	56.0			38.0		33.0		33.0			
Total Split (%)	20.2%	62.9%			42.7%		37.1%		37.1%			
Maximum Green (s)	15.0	50.1			32.1		26.6		26.6			
Yellow Time (s)	3.0	3.7			3.7		3.3		3.3			
All-Red Time (s)	0.0	2.2			2.2		3.1		3.1			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	3.0	5.9			5.9		6.4		6.4			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Minimum Gap (s)	3.0	3.0			3.0		3.0		3.0			
Time Before Reduce (s)	0.0	0.0			0.0		0.0		0.0			
Time To Reduce (s)	0.0	0.0			0.0		0.0		0.0			
Recall Mode	None	C-Max			C-Max		None		None			
Walk Time (s)		7.0			7.0		7.0		7.0			
Flash Dont Walk (s)		13.0			2.0		0.0		0.0			
Pedestrian Calls (#/hr)		0			0		0		0			
Act Effct Green (s)	66.8	63.9			49.5		12.8		12.8			
Actuated g/C Ratio	0.75	0.72			0.56		0.14		0.14			
v/c Ratio	0.60	0.21			0.39		0.51		0.65			
Control Delay	9.3	4.7			12.7		38.3		18.1			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	9.3	4.7			12.7		38.3		18.1			
LOS	A	A			B		D		B			
Approach Delay		6.0			12.7			28.1				
Approach LOS		A			B			C				
Queue Length 50th (m)	11.2	12.2			30.8		20.6		9.1			
Queue Length 95th (m)	25.9	22.0			57.8		29.0		29.6			
Internal Link Dist (m)		154.2			71.9			66.0			106.6	
Turn Bay Length (m)	70.0											
Base Capacity (vph)	549	3506			2637		1014		590			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	0.53	0.21			0.39		0.24		0.43			

Intersection Summary			
Area Type:	Other		
Cycle Length: 89			
Actuated Cycle Length: 89			
Offset: 32 (36%), Referenced to phase 2:WBT and 6:EBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 13.0		Intersection LOS: B	
Intersection Capacity Utilization 53.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 16: East On-Ramp/East Off-Ramp & Queenston Road

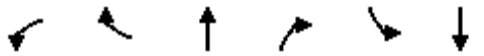




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	22	37	56	96	115	30
Future Volume (vph)	22	37	56	96	115	30
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	29	49	75	128	153	40

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	78	203	193
Volume Left (vph)	29	75	0
Volume Right (vph)	49	0	40
Hadj (s)	-0.17	0.25	-0.01
Departure Headway (s)	4.6	4.5	4.3
Degree Utilization, x	0.10	0.26	0.23
Capacity (veh/h)	712	770	805
Control Delay (s)	8.1	9.1	8.6
Approach Delay (s)	8.1	9.1	8.6
Approach LOS	A	A	A

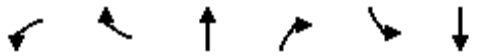
Intersection Summary			
Delay	8.7		
Level of Service	A		
Intersection Capacity Utilization	31.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	53	71	105	16	23	93
Future Volume (vph)	53	71	105	16	23	93
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	71	95	140	21	31	124

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	166	161	155
Volume Left (vph)	71	0	31
Volume Right (vph)	95	21	0
Hadj (s)	-0.26	0.08	0.14
Departure Headway (s)	4.4	4.6	4.6
Degree Utilization, x	0.20	0.20	0.20
Capacity (veh/h)	764	755	741
Control Delay (s)	8.5	8.7	8.8
Approach Delay (s)	8.5	8.7	8.8
Approach LOS	A	A	A

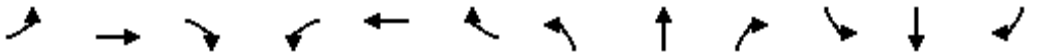
Intersection Summary			
Delay	8.7		
Level of Service	A		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	204	34	118	65	11	141
Future Volume (Veh/h)	204	34	118	65	11	141
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	272	45	157	87	15	188
Pedestrians	10		10			10
Lane Width (m)	3.5		3.5			3.5
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			111			
pX, platoon unblocked						
vC, conflicting volume	438	220			254	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	438	220			254	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	52	94			99	
cM capacity (veh/h)	563	810			1311	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	317	244	203
Volume Left	272	0	15
Volume Right	45	87	0
cSH	588	1700	1311
Volume to Capacity	0.54	0.14	0.01
Queue Length 95th (m)	24.4	0.0	0.3
Control Delay (s)	18.0	0.0	0.7
Lane LOS	C		A
Approach Delay (s)	18.0	0.0	0.7
Approach LOS	C		

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		



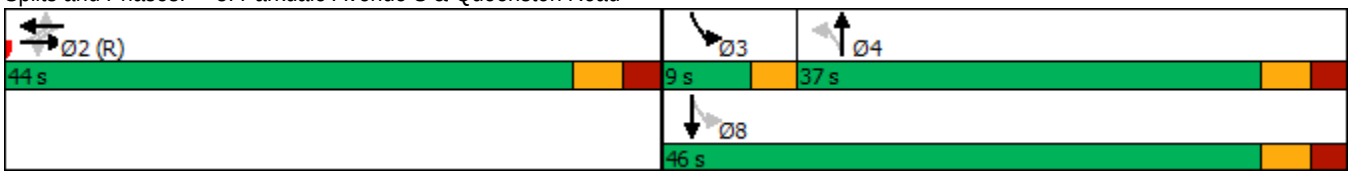
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	1227	57	37	918	95	44	211	64	188	727	100
Future Volume (vph)	66	1227	57	37	918	95	44	211	64	188	727	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	50.0		0.0	35.0		0.0	70.0		0.0	80.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1750	3470	0	1785	3384	0	1785	3339	0	1767	3444	0
Flt Permitted	0.205			0.120			0.250			0.495		
Satd. Flow (perm)	377	3470	0	225	3384	0	461	3339	0	906	3444	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			15			49			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		88.6			409.1			175.9			215.1	
Travel Time (s)		6.4			29.5			12.7			15.5	
Confl. Peds. (#/hr)	17		40	40		17	48		22	22		48
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	0%	0%	4%	1%	0%	3%	0%	1%	1%	1%
Bus Blockages (#/hr)	0	0	6	0	0	0	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	1324	0	38	1044	0	45	284	0	194	852	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			4		3	8	
Permitted Phases	2			2			4			8		
Detector Phase	2	2		2	2		4	4		3	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		3.5	10.0	
Minimum Split (s)	29.9	29.9		29.9	29.9		29.9	29.9		8.0	30.1	
Total Split (s)	44.0	44.0		44.0	44.0		37.0	37.0		9.0	46.0	
Total Split (%)	48.9%	48.9%		48.9%	48.9%		41.1%	41.1%		10.0%	51.1%	
Maximum Green (s)	38.1	38.1		38.1	38.1		31.1	31.1		6.0	40.1	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.0	3.3	
All-Red Time (s)	2.6	2.6		2.6	2.6		2.6	2.6		0.0	2.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		3.0	5.9	

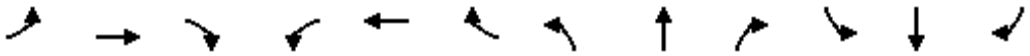
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		17.0	17.0			17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	48.5	48.5		48.5	48.5		20.7	20.7		32.6	29.7	
Actuated g/C Ratio	0.54	0.54		0.54	0.54		0.23	0.23		0.36	0.33	
v/c Ratio	0.34	0.71		0.31	0.57		0.42	0.35		0.50	0.74	
Control Delay	20.3	19.3		23.5	16.2		40.3	23.9		17.4	20.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.3	19.3		23.5	16.2		40.3	23.9		17.4	20.9	
LOS	C	B		C	B		D	C		B	C	
Approach Delay		19.3			16.5			26.1			20.3	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	6.3	84.8		3.5	59.0		6.6	17.7		17.7	40.2	
Queue Length 95th (m)	19.9	129.7		14.0	91.8		15.9	25.5		32.5	61.0	
Internal Link Dist (m)		64.6			385.1			151.9			191.1	
Turn Bay Length (m)	50.0			35.0			70.0			80.0		
Base Capacity (vph)	202	1871		121	1829		159	1185		385	1546	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.34	0.71		0.31	0.57		0.28	0.24		0.50	0.55	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 3 (3%), Referenced to phase 2:EBWB and 6:, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 19.4 Intersection LOS: B
Intersection Capacity Utilization 96.0% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 3: Parkdale Avenue S & Queenston Road





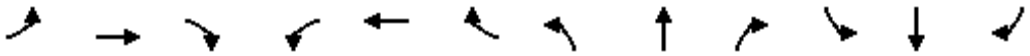
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	1389	5	5	1116	276	5	0	5	204	2	85
Future Volume (vph)	130	1389	5	5	1116	276	5	0	5	204	2	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	36.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1785	3496	0	1785	3328	0	0	1692	0	0	1706	0
Flt Permitted	0.113			0.113				0.864			0.785	
Satd. Flow (perm)	212	3496	0	212	3328	0	0	1483	0	0	1379	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			62			29			23	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		409.1			206.6			96.1			110.2	
Travel Time (s)		29.5			14.9			8.6			9.9	
Confl. Peds. (#/hr)	18		23	23		18	32		7	7		32
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	0%	3%	1%	0%	0%	0%	1%	0%	0%
Bus Blockages (#/hr)	0	0	6	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	135	1452	0	5	1451	0	0	10	0	0	304	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	25.4	25.4		25.4	25.4		29.7	29.7		29.7	29.7	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.6	54.6		54.6	54.6		24.3	24.3		24.3	24.3	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.7	1.7		1.7	1.7		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.4	5.4		5.4	5.4			5.7			5.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	54.6	54.6		54.6	54.6			24.3			24.3	
Actuated g/C Ratio	0.61	0.61		0.61	0.61			0.27			0.27	
v/c Ratio	1.05	0.68		0.04	0.71			0.02			0.78	
Control Delay	119.6	14.0		8.2	14.1			2.7			43.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	119.6	14.0		8.2	14.1			2.7			43.9	
LOS	F	B		A	B			A			D	
Approach Delay		23.0			14.0			2.7			43.9	
Approach LOS		C			B			A			D	
Queue Length 50th (m)	~25.7	81.2		0.3	79.7			0.0			45.0	
Queue Length 95th (m)	#38.4	103.5		1.8	103.6			1.3			#85.3	
Internal Link Dist (m)		385.1			182.6			72.1			86.2	
Turn Bay Length (m)	36.0			15.0								
Base Capacity (vph)	128	2121		128	2043			421			389	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	1.05	0.68		0.04	0.71			0.02			0.78	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.05
Intersection Signal Delay: 20.9 Intersection LOS: C
Intersection Capacity Utilization 94.5% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Reid Avenue S & Queenston Road

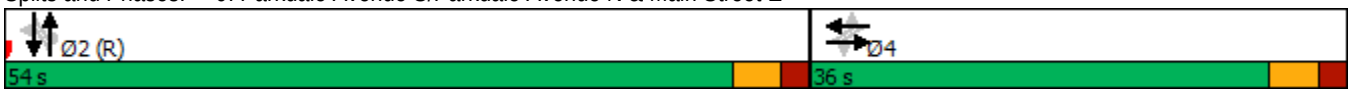


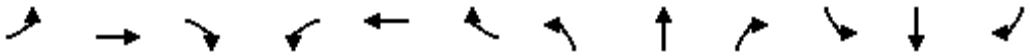
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	42	39	12	44	38	32	369	13	32	1037	124
Future Volume (vph)	58	42	39	12	44	38	32	369	13	32	1037	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	0	1748	0	0	1749	0	0	3471	0	0	3464	0
Flt Permitted		0.845			0.955			0.800			0.931	
Satd. Flow (perm)	0	1502	0	0	1680	0	0	2788	0	0	3227	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			42			5			21	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		98.4			406.7			215.1			404.3	
Travel Time (s)		8.9			36.6			15.5			29.1	
Confl. Peds. (#/hr)	7		4	4		7	15		16	16		15
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	0%	2%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	153	0	0	103	0	0	454	0	0	1311	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.3	24.3		24.3	24.3		36.3	36.3		36.3	36.3	
Total Split (s)	36.0	36.0		36.0	36.0		54.0	54.0		54.0	54.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Maximum Green (s)	30.7	30.7		30.7	30.7		48.7	48.7		48.7	48.7	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		19.0	19.0		19.0	19.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.2			19.2			60.2			60.2	
Actuated g/C Ratio		0.21			0.21			0.67			0.67	
v/c Ratio		0.45			0.26			0.24			0.61	
Control Delay		30.6			20.3			9.4			12.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		30.6			20.3			9.4			12.4	
LOS		C			C			A			B	
Approach Delay		30.6			20.3			9.4			12.4	
Approach LOS		C			C			A			B	
Queue Length 50th (m)		19.4			8.7			21.5			58.3	
Queue Length 95th (m)		37.1			21.7			29.5			82.8	
Internal Link Dist (m)		74.4			382.7			191.1			380.3	
Turn Bay Length (m)												
Base Capacity (vph)		528			600			1866			2165	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.29			0.17			0.24			0.61	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 13 (14%), Referenced to phase 2:NBSB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 80.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 9: Parkdale Avenue S/Parkdale Avenue N & Main Street E



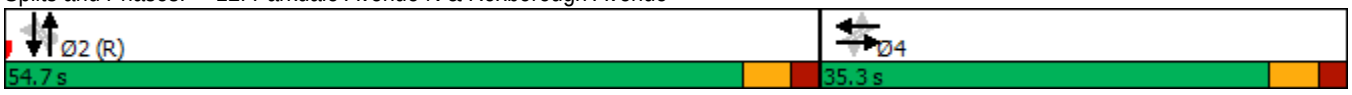


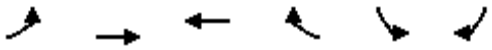
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	24	33	21	33	36	16	439	25	35	1230	41
Future Volume (vph)	21	24	33	21	33	36	16	439	25	35	1230	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	0	1607	0	0	1647	0	0	3429	0	0	3511	0
Flt Permitted		0.921			0.933			0.886			0.926	
Satd. Flow (perm)	0	1495	0	0	1552	0	0	3044	0	0	3253	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			39			10			6	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		109.1			399.4			404.3			153.9	
Travel Time (s)		9.8			35.9			29.1			11.1	
Confl. Peds. (#/hr)	19		10	10		19	7		18	18		7
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	21%	0%	0%	15%	0%	0%	3%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	2	0	0	2	0	0	2	0	0	2
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	84	0	0	97	0	0	516	0	0	1405	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.3	35.3		35.3	35.3		24.3	24.3		24.3	24.3	
Total Split (s)	35.3	35.3		35.3	35.3		54.7	54.7		54.7	54.7	
Total Split (%)	39.2%	39.2%		39.2%	39.2%		60.8%	60.8%		60.8%	60.8%	
Maximum Green (s)	30.0	30.0		30.0	30.0		49.4	49.4		49.4	49.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		30.0			30.0			49.4			49.4	
Actuated g/C Ratio		0.33			0.33			0.55			0.55	
v/c Ratio		0.16			0.18			0.31			0.79	
Control Delay		14.4			14.5			6.6			20.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		14.4			14.5			6.6			20.1	
LOS		B			B			A			C	
Approach Delay		14.4			14.5			6.6			20.1	
Approach LOS		B			B			A			C	
Queue Length 50th (m)		5.8			6.9			11.9			94.7	
Queue Length 95th (m)		15.7			17.5			20.1			123.1	
Internal Link Dist (m)		85.1			375.4			380.3			129.9	
Turn Bay Length (m)												
Base Capacity (vph)		521			543			1675			1788	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.16			0.18			0.31			0.79	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 11 (12%), Referenced to phase 2:NBSB and 6:, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 16.3		Intersection LOS: B	
Intersection Capacity Utilization 90.4%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 12: Parkdale Avenue N & Roxborough Avenue





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	196	1357	1331	337	92	122
Future Volume (vph)	196	1357	1331	337	92	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%	0%		0%	
Storage Length (m)	130.0			0.0	0.0	45.0
Storage Lanes	1			1	2	1
Taper Length (m)	2.5				2.5	
Satd. Flow (prot)	1767	5029	3466	1581	3429	1581
Flt Permitted	0.102				0.950	
Satd. Flow (perm)	190	5029	3466	1528	3419	1581
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				355		120
Link Speed (k/h)		40	40		40	
Link Distance (m)		206.6	178.2		162.1	
Travel Time (s)		18.6	16.0		14.6	
Confl. Peds. (#/hr)	10			10	3	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	2%	3%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	206	1428	1401	355	97	128
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Detector Phase	1	6	2	2	4	4
Switch Phase						
Minimum Initial (s)	5.0	20.0	20.0	20.0	10.0	10.0
Minimum Split (s)	8.0	42.7	42.7	42.7	37.9	37.9
Total Split (s)	8.0	62.4	54.4	54.4	37.9	37.9
Total Split (%)	8.0%	62.2%	54.2%	54.2%	37.8%	37.8%
Maximum Green (s)	5.0	55.7	47.7	47.7	31.0	31.0
Yellow Time (s)	3.0	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	0.0	3.0	3.0	3.0	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.7	6.7	6.7	6.9	6.9

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	C-Max	C-Max	None	None
Walk Time (s)		7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		29.0	29.0	29.0	24.0	24.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	80.0	76.3	55.5	55.5	10.4	10.4
Actuated g/C Ratio	0.80	0.76	0.55	0.55	0.10	0.10
v/c Ratio	0.48	0.37	0.73	0.35	0.27	0.47
Control Delay	13.3	4.4	19.5	2.3	43.4	15.4
Queue Delay	0.0	0.0	1.3	0.0	0.0	0.0
Total Delay	13.3	4.4	20.9	2.3	43.4	15.4
LOS	B	A	C	A	D	B
Approach Delay		5.5	17.1		27.5	
Approach LOS		A	B		C	
Queue Length 50th (m)	9.3	27.2	96.0	0.0	9.1	1.4
Queue Length 95th (m)	31.8	36.1	130.3	12.2	16.5	17.6
Internal Link Dist (m)		182.6	154.2		138.1	
Turn Bay Length (m)	130.0					45.0
Base Capacity (vph)	431	3826	1917	1004	1059	571
Starvation Cap Reductn	0	0	298	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.37	0.87	0.35	0.09	0.22

Intersection Summary			
Area Type:	Other		
Cycle Length: 100.3			
Actuated Cycle Length: 100.3			
Offset: 13 (13%), Referenced to phase 2:WBT and 6:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 12.5		Intersection LOS: B	
Intersection Capacity Utilization 70.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 14: Queenston Road & West Ramp

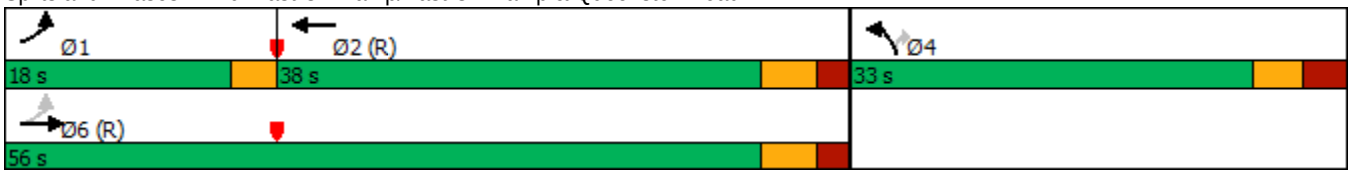
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	272	1128	0	0	1336	76	304	0	306	0	0	0
Future Volume (vph)	272	1128	0	0	1336	76	304	0	306	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	70.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	2		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1767	5029	0	0	4994	0	3429	0	1581	0	0	0
Flt Permitted	0.097						0.950					
Satd. Flow (perm)	180	5029	0	0	4994	0	3429	0	1581	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					11				72			
Link Speed (k/h)		40			40			40			40	
Link Distance (m)		178.2			95.9			90.0			130.6	
Travel Time (s)		16.0			8.6			8.1			11.8	
Confl. Peds. (#/hr)	7											
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	2%	0%	0%	2%	0%	1%	0%	1%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	286	1187	0	0	1486	0	320	0	322	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA			NA		Prot		Perm			
Protected Phases	1	6			2		4					
Permitted Phases	6								4			
Detector Phase	1	6			2		4		4			
Switch Phase												
Minimum Initial (s)	5.0	20.0			20.0		10.0		10.0			
Minimum Split (s)	8.0	25.9			25.9		24.4		24.4			
Total Split (s)	18.0	56.0			38.0		33.0		33.0			
Total Split (%)	20.2%	62.9%			42.7%		37.1%		37.1%			
Maximum Green (s)	15.0	50.1			32.1		26.6		26.6			
Yellow Time (s)	3.0	3.7			3.7		3.3		3.3			
All-Red Time (s)	0.0	2.2			2.2		3.1		3.1			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	3.0	5.9			5.9		6.4		6.4			

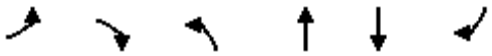
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Minimum Gap (s)	3.0	3.0			3.0		3.0		3.0			
Time Before Reduce (s)	0.0	0.0			0.0		0.0		0.0			
Time To Reduce (s)	0.0	0.0			0.0		0.0		0.0			
Recall Mode	None	C-Max			C-Max		None		None			
Walk Time (s)		7.0			7.0		7.0		7.0			
Flash Dont Walk (s)		13.0			2.0		0.0		0.0			
Pedestrian Calls (#/hr)		0			0		0		0			
Act Effct Green (s)	59.9	57.0			40.9		19.7		19.7			
Actuated g/C Ratio	0.67	0.64			0.46		0.22		0.22			
v/c Ratio	0.81	0.37			0.65		0.42		0.79			
Control Delay	36.7	8.7			21.8		30.3		39.0			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	36.7	8.7			21.8		30.3		39.0			
LOS	D	A			C		C		D			
Approach Delay		14.1			21.8			34.7				
Approach LOS		B			C			C				
Queue Length 50th (m)	29.1	31.6			70.4		24.2		40.7			
Queue Length 95th (m)	#68.4	48.9			100.8		32.2		63.7			
Internal Link Dist (m)		154.2			71.9			66.0			106.6	
Turn Bay Length (m)	70.0											
Base Capacity (vph)	397	3218			2301		1024		523			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	0.72	0.37			0.65		0.31		0.62			

Intersection Summary

Area Type: Other
Cycle Length: 89
Actuated Cycle Length: 89
Offset: 32 (36%), Referenced to phase 2:WBT and 6:EBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 21.0 Intersection LOS: C
Intersection Capacity Utilization 62.8% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 16: East On-Ramp/East Off-Ramp & Queenston Road

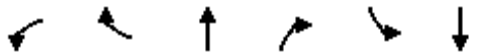




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	17	92	61	174	131	28
Future Volume (vph)	17	92	61	174	131	28
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	20	107	71	202	152	33

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	127	273	185
Volume Left (vph)	20	71	0
Volume Right (vph)	107	0	33
Hadj (s)	-0.47	0.05	-0.08
Departure Headway (s)	4.5	4.5	4.4
Degree Utilization, x	0.16	0.34	0.23
Capacity (veh/h)	734	782	775
Control Delay (s)	8.3	9.7	8.7
Approach Delay (s)	8.3	9.7	8.7
Approach LOS	A	A	A

Intersection Summary			
Delay	9.1		
Level of Service	A		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	31	42	139	51	68	131
Future Volume (vph)	31	42	139	51	68	131
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	36	49	162	59	79	152

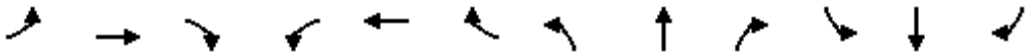
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	85	221	231
Volume Left (vph)	36	0	79
Volume Right (vph)	49	59	0
Hadj (s)	-0.26	-0.16	0.09
Departure Headway (s)	4.6	4.2	4.4
Degree Utilization, x	0.11	0.26	0.28
Capacity (veh/h)	706	830	785
Control Delay (s)	8.2	8.7	9.2
Approach Delay (s)	8.2	8.7	9.2
Approach LOS	A	A	A

Intersection Summary			
Delay	8.8		
Level of Service	A		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	91	20	215	198	32	191
Future Volume (Veh/h)	91	20	215	198	32	191
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	106	23	250	230	37	222
Pedestrians	10		10			10
Lane Width (m)	3.5		3.5			3.5
Walking Speed (m/s)	1.1		1.1			1.1
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			110			
pX, platoon unblocked	1.00	1.00			1.00	
vC, conflicting volume	681	385			490	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	678	381			486	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	73	96			97	
cM capacity (veh/h)	398	656			1074	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	129	480	259
Volume Left	106	0	37
Volume Right	23	230	0
cSH	428	1700	1074
Volume to Capacity	0.30	0.28	0.03
Queue Length 95th (m)	9.5	0.0	0.8
Control Delay (s)	17.0	0.0	1.5
Lane LOS	C		A
Approach Delay (s)	17.0	0.0	1.5
Approach LOS	C		

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	1389	5	5	1116	276	5	0	5	204	2	85
Future Volume (vph)	130	1389	5	5	1116	276	5	0	5	204	2	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	36.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Satd. Flow (prot)	1785	3496	0	1785	3325	0	0	1692	0	0	1704	0
Flt Permitted	0.124			0.124				0.860			0.785	
Satd. Flow (perm)	233	3496	0	233	3325	0	0	1476	0	0	1377	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			62			26			20	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		409.1			206.6			96.1			110.2	
Travel Time (s)		29.5			14.9			8.6			9.9	
Confl. Peds. (#/hr)	18		23	23		18	32		7	7		32
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	0%	3%	1%	0%	0%	0%	1%	0%	0%
Bus Blockages (#/hr)	0	0	6	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	135	1452	0	5	1451	0	0	10	0	0	304	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	25.4	25.4		25.4	25.4		29.7	29.7		29.7	29.7	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	64.6	64.6		64.6	64.6		24.3	24.3		24.3	24.3	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.7	1.7		1.7	1.7		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.4	5.4		5.4	5.4			5.7			5.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	64.6	64.6		64.6	64.6			24.3			24.3	
Actuated g/C Ratio	0.65	0.65		0.65	0.65			0.24			0.24	
v/c Ratio	0.90	0.64		0.03	0.67			0.03			0.87	
Control Delay	72.2	12.4		7.2	12.4			3.7			59.9	
Queue Delay	0.0	0.0		0.0	0.3			0.0			0.0	
Total Delay	72.2	12.4		7.2	12.7			3.7			59.9	
LOS	E	B		A	B			A			E	
Approach Delay		17.5			12.7			3.7			59.9	
Approach LOS		B			B			A			E	
Queue Length 50th (m)	19.9	81.2		0.3	79.8			0.0			53.3	
Queue Length 95th (m)	#60.7	101.4		1.7	101.5			1.6			#100.1	
Internal Link Dist (m)		385.1			182.6			72.1			86.2	
Turn Bay Length (m)	36.0			15.0								
Base Capacity (vph)	150	2258		150	2169			378			349	
Starvation Cap Reductn	0	0		0	223			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.90	0.64		0.03	0.75			0.03			0.87	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 19.2		Intersection LOS: B	
Intersection Capacity Utilization 94.5%		ICU Level of Service F	
Analysis Period (min) 15			

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

Splits and Phases: 6: Reid Avenue S & Queenston Road

Appendix G

Queuing Analysis (SimTraffic)

Intersection: 3: Parkdale Avenue S & Queenston Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	52.3	88.6	82.2	37.3	138.4	148.1	43.1	71.9	47.1	34.3	31.1	48.1
Average Queue (m)	22.7	50.0	31.2	16.0	70.4	79.8	19.3	40.7	26.2	13.7	8.5	19.7
95th Queue (m)	45.0	79.6	55.8	35.6	113.0	121.3	35.5	63.3	44.6	29.1	20.8	35.2
Link Distance (m)		78.2	78.2		393.5	393.5		165.6	165.6		199.6	199.6
Upstream Blk Time (%)		2	1									
Queuing Penalty (veh)		0	0									
Storage Bay Dist (m)	50.0			35.0			70.0			80.0		
Storage Blk Time (%)	3	6		0	24			0				
Queuing Penalty (veh)	10	5		0	13			0				

Intersection: 6: Reid Avenue S & Queenston Road

Movement	EB	EB	EB	WB	WB	NB	SB
Directions Served	L	T	TR	T	TR	LTR	LTR
Maximum Queue (m)	38.3	61.0	50.9	140.5	151.2	8.4	97.2
Average Queue (m)	10.0	33.6	28.9	52.6	58.0	1.0	56.9
95th Queue (m)	24.1	54.5	49.5	111.0	121.2	5.2	91.4
Link Distance (m)		393.5	393.5	192.5	192.5	82.1	93.7
Upstream Blk Time (%)							2
Queuing Penalty (veh)							7
Storage Bay Dist (m)	36.0						
Storage Blk Time (%)	0	6		21			
Queuing Penalty (veh)	0	3		0			

Intersection: 9: Parkdale Avenue S/Parkdale Avenue N & Main Street E

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (m)	43.3	32.9	58.6	59.1	27.3	27.9
Average Queue (m)	22.9	15.3	33.8	33.1	12.6	9.5
95th Queue (m)	40.8	26.6	53.8	53.9	25.1	23.3
Link Distance (m)	88.0	391.2	199.6	199.6	393.9	393.9
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 10: Reid Avenue S/Reid Avenue N & Main Street E

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (m)	20.6	22.2	27.5
Average Queue (m)	10.4	11.7	13.3
95th Queue (m)	18.1	18.3	21.8
Link Distance (m)	391.2	103.5	102.4
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 12: Parkdale Avenue N & Roxborough Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (m)	39.3	22.2	34.4	33.2	46.9	45.1
Average Queue (m)	14.1	11.5	17.1	17.9	21.3	13.1
95th Queue (m)	31.0	19.4	30.3	30.3	39.1	28.7
Link Distance (m)	100.5	385.7	393.9	393.9	148.8	148.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 14: Queenston Road & West Ramp

Movement	EB	EB	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	T	T	T	T	R	L	L	R
Maximum Queue (m)	54.2	52.8	29.4	33.9	114.1	110.5	45.5	34.1	7.4	46.0
Average Queue (m)	25.9	22.0	14.7	12.9	39.5	41.4	13.3	12.4	2.1	15.1
95th Queue (m)	46.5	46.5	29.0	28.6	82.0	85.2	31.8	25.3	7.1	28.1
Link Distance (m)		192.5	192.5	192.5	164.3	164.3	164.3	148.3	148.3	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	130.0									45.0
Storage Blk Time (%)										0
Queuing Penalty (veh)										0

Intersection: 16: East On-Ramp/East Off-Ramp & Queenston Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	T	T	TR	L	L	R
Maximum Queue (m)	51.1	28.2	40.8	34.9	84.2	73.5	60.7	53.0	47.1	41.1
Average Queue (m)	27.1	12.1	17.4	16.7	51.1	34.7	21.7	31.3	16.8	20.2
95th Queue (m)	46.4	26.5	31.4	33.3	75.0	62.5	47.2	47.6	33.9	33.1
Link Distance (m)		164.3	164.3	164.3	87.2	87.2	87.2	75.8	75.8	75.8
Upstream Blk Time (%)					0					
Queuing Penalty (veh)					0					
Storage Bay Dist (m)	70.0									
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 19: Reid Avenue N & Ayr Avenue

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (m)	16.5	27.2	20.6
Average Queue (m)	9.8	11.7	11.9
95th Queue (m)	14.8	19.4	18.2
Link Distance (m)	55.3	102.4	274.4
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 21: Reid Avenue S & Roxanne Drive/Street A

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (m)	46.1	15.9	16.4
Average Queue (m)	17.0	1.2	2.4
95th Queue (m)	32.5	7.6	10.8
Link Distance (m)	89.5	93.7	103.5
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 38

Intersection: 3: Parkdale Avenue S & Queenston Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	52.4	94.1	83.2	37.5	99.4	101.5	34.4	46.7	42.7	42.2	67.4	83.7
Average Queue (m)	32.4	83.0	71.5	28.7	66.1	66.2	11.7	24.0	14.6	23.8	43.4	51.1
95th Queue (m)	67.4	88.9	94.1	48.2	97.7	102.6	25.0	39.2	29.7	39.1	65.1	72.5
Link Distance (m)		78.2	78.2		393.5	393.5		165.6	165.6		199.6	199.6
Upstream Blk Time (%)		26	9									
Queuing Penalty (veh)		0	0									
Storage Bay Dist (m)	50.0			35.0			70.0			80.0		
Storage Blk Time (%)	1	36		37	22							
Queuing Penalty (veh)	4	24		171	8							

Intersection: 6: Reid Avenue S & Queenston Road

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (m)	38.4	228.0	202.0	9.1	58.1	61.2	8.4	92.9
Average Queue (m)	25.3	75.2	70.6	0.6	11.1	18.5	1.2	56.0
95th Queue (m)	41.3	161.2	153.1	4.3	33.5	45.3	6.0	88.5
Link Distance (m)		393.5	393.5		192.5	192.5	82.1	92.9
Upstream Blk Time (%)								0
Queuing Penalty (veh)								1
Storage Bay Dist (m)	36.0			15.0				
Storage Blk Time (%)	15	15		0	5			
Queuing Penalty (veh)	107	20		0	0			

Intersection: 9: Parkdale Avenue S/Parkdale Avenue N & Main Street E

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (m)	59.7	28.7	40.0	41.8	91.6	103.2
Average Queue (m)	21.1	13.7	23.8	24.3	61.8	66.9
95th Queue (m)	44.1	25.8	38.3	37.0	87.5	92.4
Link Distance (m)	88.0	391.2	199.6	199.6	393.9	393.9
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 10: Reid Avenue S/Reid Avenue N & Main Street E

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (m)	16.5	23.6	20.6
Average Queue (m)	10.1	13.3	10.9
95th Queue (m)	14.0	19.8	17.3
Link Distance (m)	391.2	104.2	103.0
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 12: Parkdale Avenue N & Roxborough Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (m)	41.2	41.6	40.1	34.8	116.8	118.5
Average Queue (m)	15.0	12.9	14.3	17.2	70.3	58.5
95th Queue (m)	31.6	26.9	26.6	31.4	103.2	93.7
Link Distance (m)	100.5	385.7	393.9	393.9	148.8	148.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 14: Queenston Road & West Ramp

Movement	EB	EB	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	T	T	T	T	R	L	L	R
Maximum Queue (m)	73.3	45.6	52.7	56.8	104.2	106.4	46.8	33.4	13.9	19.5
Average Queue (m)	27.3	23.7	27.0	26.9	51.1	49.9	20.1	18.5	2.0	10.9
95th Queue (m)	56.2	47.6	50.5	49.5	104.7	101.0	41.1	30.5	8.1	19.8
Link Distance (m)		192.5	192.5	192.5	164.3	164.3	164.3	148.3	148.3	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	130.0									45.0
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 16: East On-Ramp/East Off-Ramp & Queenston Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	T	T	TR	L	L	R
Maximum Queue (m)	71.0	46.7	51.6	53.8	95.6	91.2	78.6	48.3	46.9	54.3
Average Queue (m)	32.6	19.9	29.1	29.5	60.5	43.9	34.3	25.8	23.4	27.9
95th Queue (m)	55.9	37.9	49.7	54.9	90.5	72.8	64.5	44.1	40.1	45.0
Link Distance (m)		164.3	164.3	164.3	87.2	87.2	87.2	75.8	75.8	75.8
Upstream Blk Time (%)					1	0				
Queuing Penalty (veh)					0	0				
Storage Bay Dist (m)	70.0									
Storage Blk Time (%)	0									
Queuing Penalty (veh)	1									

Intersection: 19: Reid Avenue N & Ayr Avenue

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (m)	16.6	16.0	23.4
Average Queue (m)	8.4	10.1	13.7
95th Queue (m)	14.6	13.7	21.8
Link Distance (m)	55.4	103.0	273.9
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 21: Reid Avenue S & Roxanne Drive/Street A

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (m)	28.6	15.2	15.6
Average Queue (m)	13.5	1.7	4.7
95th Queue (m)	22.6	8.7	13.3
Link Distance (m)	94.9	92.9	104.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 335