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Transportation Impact Study

PROPOSED RESIDENTIAL DEVELOPMENT

150 Mohawk Road E
HAMILTON, ONTARIO

November 2022
Project No: NT-22-022

520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

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nexTrans CONSULTING ENGINEERS
NextEng Consulting Group Inc.

November 20, 2022

Attention: David Horwood

Effort Trust Co.
242 Main Street East
Hamilton, ON L8N 1H5

Re: Transportation Impact Study
Proposed Residential Development
150 Mohawk Road E, City of Hamilton
Our Project No. NT-22-022

Nextrans Consulting Engineers (a Division of NextEng Consulting Group Inc.) is pleased to present the enclosed Transportation Impact Study for the above noted site in support of a Zoning By-law Amendment Application for a proposed residential development.

The subject site is located at 150 Mohawk Road E, at the south-west corner of Mohawk Road E and Upper Wellington Street, in the City of Hamilton. The subject site consists of an existing 12-storey apartment building and a parking structure with 203 residential dwelling units. The proposed site addition consists of one 11-storey with 161 residential dwelling units to be constructed at the existing parking structure to the west of the existing apartment building. Both existing full moves accesses onto Mohawk Road E and Upper Wellington Street will be retained to service both the existing building and the future building. The proposed development will provide a total of 387 vehicle parking spaces, including resident and visitor spaces for both existing and proposed residential buildings, as well as 5 short-term bicycle parking spaces to accommodate the proposed development visitors.

The transportation impact study concludes that the proposed development can adequately be accommodated by the existing transportation network, existing Hamilton Transit service, as well as the recommended Transportation Demand Management measures and incentives recommended in this report.

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

Yours truly,

Nextrans Consulting Engineers
A Division of NextEng Consulting Group Inc.

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Report Submission Record

Identification	Date	Description of issued and/or revision
Final Report	November 20, 2022	For ZLBA Submission

EXECUTIVE SUMMARY

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained by Effort Trust Co. (the 'Client') to undertake a Transportation Impact Study in support of a Zoning By-law Amendment Application for a proposed residential development. The subject site is located at 150 Mohawk Road E, at the south-west corner of Mohawk Road E and Upper Wellington Street, in the City of Hamilton.

Proposed Development

The subject site consists of an existing 12-storey apartment building and a parking structure with 203 residential dwelling units. The proposed site addition consists of one 11-storey with 161 residential dwelling units to be constructed at the existing parking structure to the west of the existing apartment building

Proposed Development Access

Under the existing conditions, the existing site has two full moves access, one onto Mohawk Road E and one onto Upper Wellington Street. As part of the proposed redevelopment of the site, both existing full moves accesses will be retained to service both the existing building and the future building.

Based on the findings of this Study and Nextrans' assessment, the existing access arrangement and lane configuration are reasonable and acceptable as it is optimized the developable lands and consistent with the context of the area. The analysis indicates the existing site accesses are expected to operate at acceptable levels of service with negligible delays or queues. The existing lane configurations are sufficient and no improvements are required.

Capacity Analysis

The proposed development is expected to generate a total of 29 two-way auto trips (6 inbound and 23 outbound) during the morning peak hour, and 53 two-way auto trips (34 inbound and 19 outbound) during the afternoon peak hour.

Auto Mode Assessment

Based on the intersection capacity analysis, under the existing, 2030 future background and future total traffic conditions, all intersections considered in the analysis are expected to operate at acceptable levels of service with no critical movements. No signal timing optimization or physical improvements are required to accommodate the proposed development. It should be noted that the proposed development only adds at most one second to the overall boundary road intersection delay, which means that the proposed development has negligible impacts on the existing transportation network. The analysis also indicates that the existing accesses are expected to operate at acceptable levels of service and can accommodate the proposed development without any physical improvements to these accesses. Therefore, the existing access lane configurations are similar to the existing conditions.

Active Transportation Mode Assessment

Walking

As indicated in Section 2 of this Study, under the existing conditions, sidewalks are available on both sides of Mohawk Road E, Upper Wellington Street, Luscombe Street/Meadowlark Drive, as well as other public roads in the area. The intersection of Mohawk Road E/Upper Wellington Street is also treated with ladder pavement markings to enhance pedestrian crossing at all legs of this intersection. The existing sidewalks are also in good shape, therefore, no improvements are required at this time. As part of the proposed development, sidewalk will be provided along the east side of the new building that will connect the main entrance directly to Mohawk Road E.

Cycling

Currently, there are no dedicated cycling routes on Upper Wellington Street, Mohawk Road E and other local roads in the

area. However, there is dedicated cycling lanes along West 5th Street and signed routes along South Bend, Manning Avenue, Clarendon Avenue and Limeridge Road E. It is Nextrans' opinion that the cycling network can be improved in the area, especially along Mohawk Road E and Upper Wellington Street in the future. These cycling facilities can be implemented as part of the future City of Hamilton capital projects. These facilities are beyond the scope of this Study. As part of the proposed development, bicycle parking spaces will be provided to meet the applicable Zoning By-law requirements.

Transit Mode Assessment

If a 10% transit modal split is applied to the site trip generation, the proposed development is expected to generate 3 two-way transit trips (1 inbound and 2 outbound) and 5 two-way transit trips (3 inbound and 2 outbound) during the morning and afternoon peak hours, respectively. The proposed development is located adjacent to Bus Routes 41/41A Mohawk and 26 Upper Wellington stops located at the Mohawk Road E/Upper Wellington Street intersection. It is Nextrans' opinion that the proposed development potential transit ridership (maximum of 5 customers) can be accommodated by the existing transit service in the area and no improvements are required to the existing transit network to accommodate the proposed development.

Vehicle Parking Review

Based on the current City's By-Law No. 6593, a total of 455 vehicle parking spaces are required for the proposed development. However, if the City-wide Zoning By-law No. 05-200 rates applied, the proposed development only requires to provide a total of 346 parking spaces (152 spaces for proposed residential development and 194 spaces for the existing residential building). The proposed development will provide a total of 387 vehicle parking spaces, which has a decrease of 99 vehicle parking spaces from the existing Zoning By-law No. 6593 requirement. Therefore, it is Nextrans' opinion that the existing Zoning By-law No. 6593 should be amended to have similar parking rates as the City-wide Zoning By-law No. 05-200, or amended to have a parking rate of 1.06 spaces/unit instead of 1.25 spaces/unit in order to support TDM and sustainable objectives. It is Nextrans' opinion that the proposed development only requires to provide a maximum of 387 vehicle parking spaces (or 1.06 spaces/unit).

Bicycle Parking Review

It is Nextrans' understanding that, based on the Zoning By-law No. 05-200 Sections 5.7, 5 short-term bicycle parking spaces are required for the proposed development. The proposed development will provide a total of 5 bicycle parking spaces at a convenient location, which meets the minimum Zoning By-law requirement.

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 the new residential building. AutoTURN software was used generate turning movement templates and to demonstrate the turning movement requirements for garbage pick-up and delivery vehicles at the proposed loading area and access onto the existing driveway.

Study Conclusions and Recommendations

Based on the findings of this Study, the following recommendations are provided:

- The proposed development implements the TDM measures and incentives identified in this report to support active transportation and transit and to reduce the numbers of single-occupant-vehicle trips to and from the proposed development;

- The proposed development adopts the City-wide Zoning By-law No. 05-200 parking rates, or reduce the parking rate to 1.06 spaces/unit instead of 1.25 spaces/unit as per Zoning By-law No. 6593, or maximum of 387 vehicle parking spaces for the proposed development;

- The proposed development provides concrete sidewalk along the frontage of the proposed new residential building to connect to Mohawk Road E; and

- No additional physical improvements for the area at this time to accommodate the proposed development, under the future background and future total conditions.

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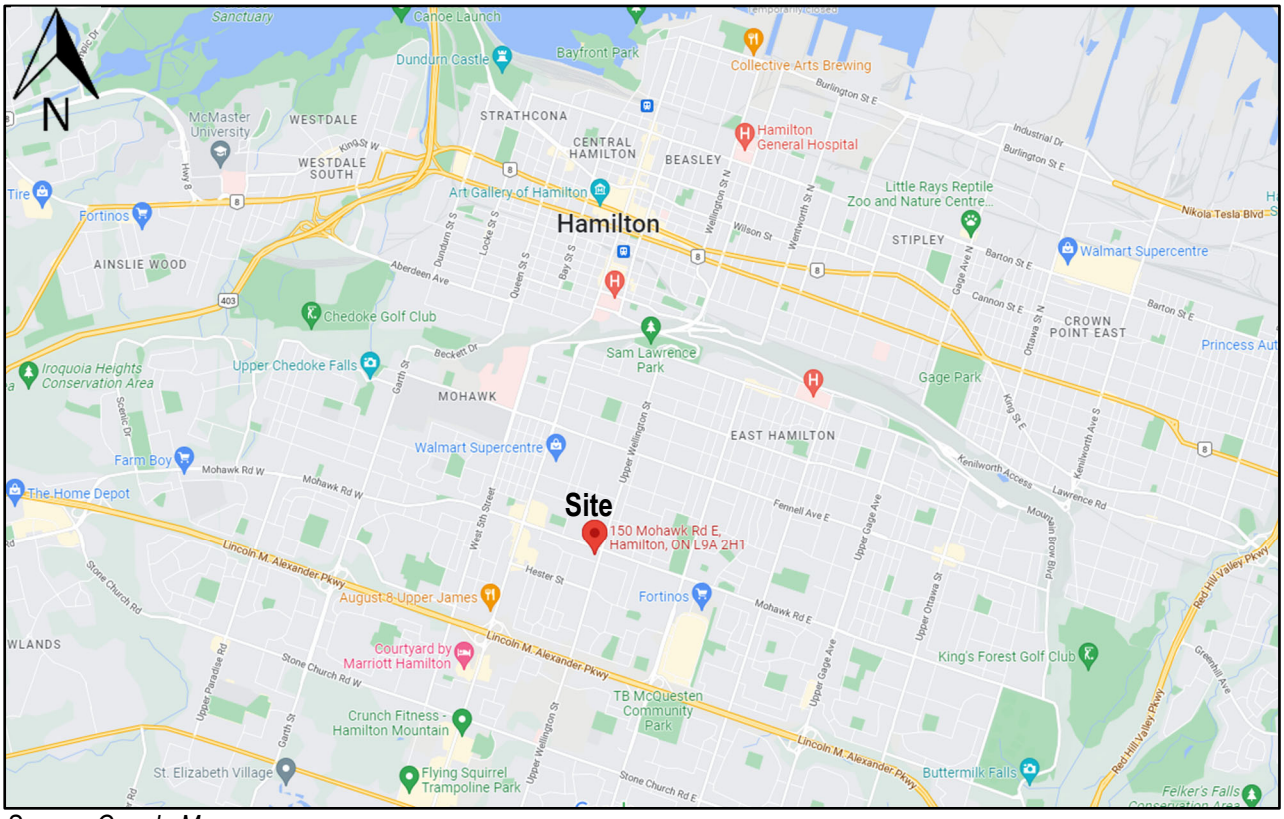
1.0 INTRODUCTION

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained by Effort Trust Co. (the 'Client') to undertake a Transportation Impact Study in support of a Zoning By-law Amendment Application for a proposed residential development. The subject site is located at 150 Mohawk Road E, at the south-west corner of Mohawk Road E and Upper Wellington Street, in the City of Hamilton.

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

Figure 1 – Proposed Development Location



Source: Google Map

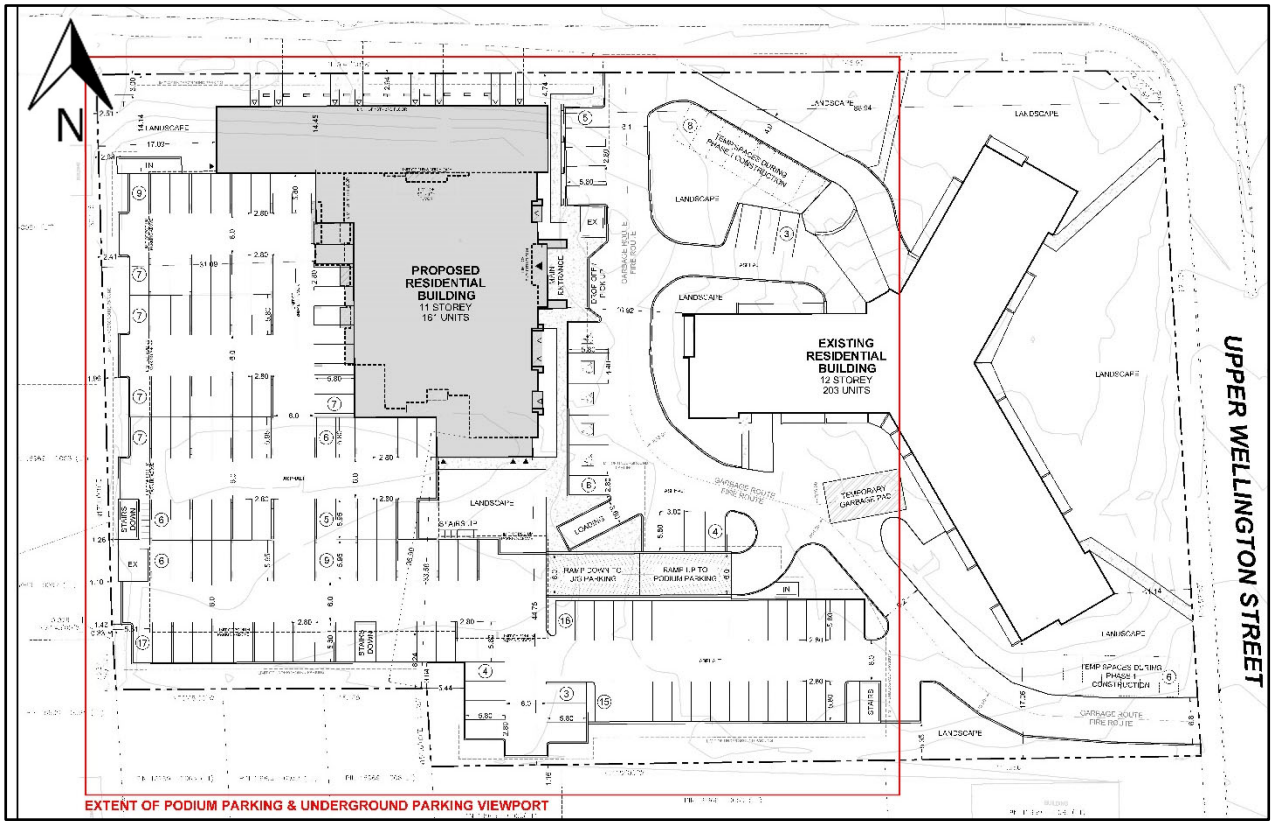
The subject site is located at 150 Mohawk Road E, at the south-west corner of Mohawk Road E and Upper Wellington Street, in the City of Hamilton. The subject site consists of an existing 12-storey apartment building and a parking structure with 203 residential dwelling units. The proposed site addition consists of one 11-storey with 161 residential dwelling units to be constructed at the existing parking structure to the west of the existing apartment building.

Under the existing conditions, the existing site has two full moves access, one onto Mohawk Road E and one onto Upper Wellington Street. As part of the proposed redevelopment of the site, both existing full moves accesses will be retained to service both the existing building and the future building.

The proposed development will provide a total of 387 vehicle parking spaces, including resident and visitor spaces for both the existing residential building with 203 units and the proposed new residential development with 161 residential dwelling units. The proposed development will also provide a total of 5 short-term bicycle parking spaces to accommodate visitors to the proposed development, based on the recommendations of this Study.

Figure 2 illustrates the proposed development site plan.

Figure 2 – Proposed Site Plan



2.0 EXISTING TRAFFIC CONDITIONS

2.1. Existing Road Network

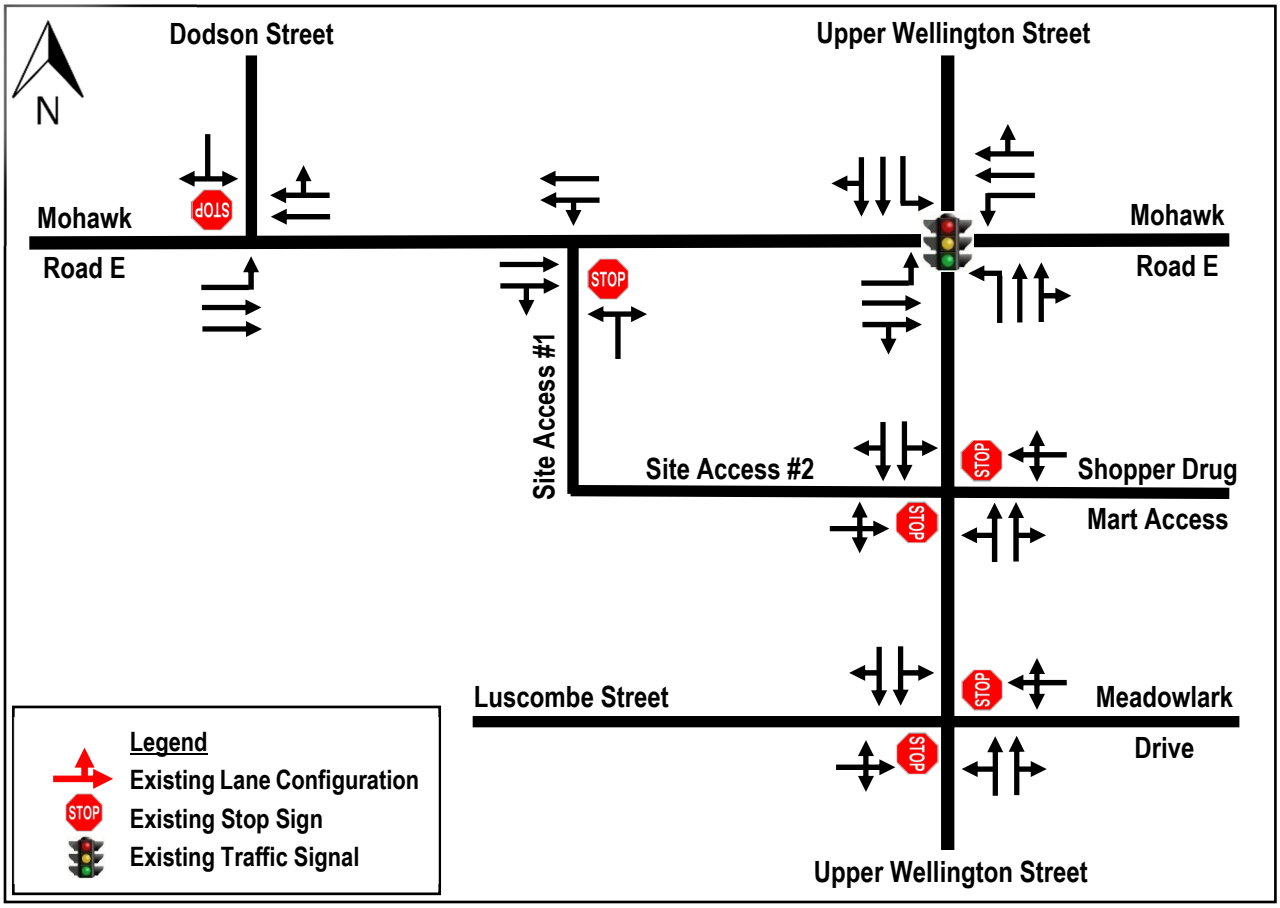
As indicated, the subject site is located at 150 Mohawk Road E, at the south-west corner of Mohawk Road E and Upper Wellington Street, in the City of Hamilton. The description of the existing road network in the study area is summarizes in **Table 1** below.

Table 1 – Summary of the Existing Road Network in the Study Area

Road Name	Jurisdiction	Number of Lanes	Speed	Road Type	Sidewalk/Cycling
Mohawk Road East	City of Hamilton	5	50 km/h (unposted)	Major Arterial	Sidewalk on both sides of the road
Upper Wellington Street	City of Hamilton	4	50 km/h (unposted)	Major Arterial	Sidewalk on both sides of the street
Luscombe Street	City of Hamilton	2	40 km/h (unposted)	Local	Sidewalk on both sides of the street
Dodson Street	City of Hamilton	2	40 km/h (posted)	Local	Sidewalk on both sides of the street

Figure 3 illustrates the existing lane configurations and traffic control devices for the intersections considered in the analysis.

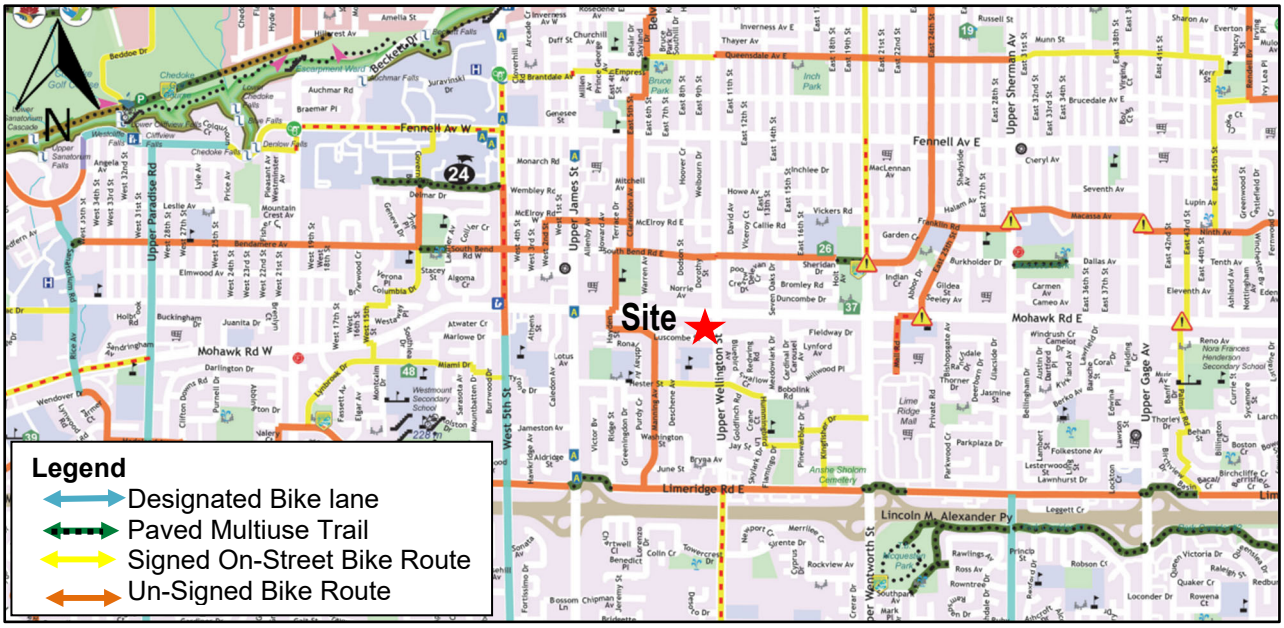
Figure 3 – Existing Lane Configuration and Traffic Control



2.2. Existing Active Transportation Network

Figure 4 illustrates the existing active transportation network in the study area.

Figure 4 – Existing Active Transportation Network in the Study Area



Source: Google Map/City of Hamilton Cycling Map

2.3. Existing Active Transportation Assessment

Walking

Under the existing conditions, sidewalks are available on both sides of Mohawk Road E, Upper Wellington Street, Luscombe Street/Meadowlark Drive, as well as other public roads in the area. The intersection of Mohawk Road E/Upper Wellington Street is also treated with ladder pavement markings to enhance pedestrian crossing at all legs of this intersection. The existing sidewalks are also in good shape, therefore, no improvements are required at this time.

Cycling

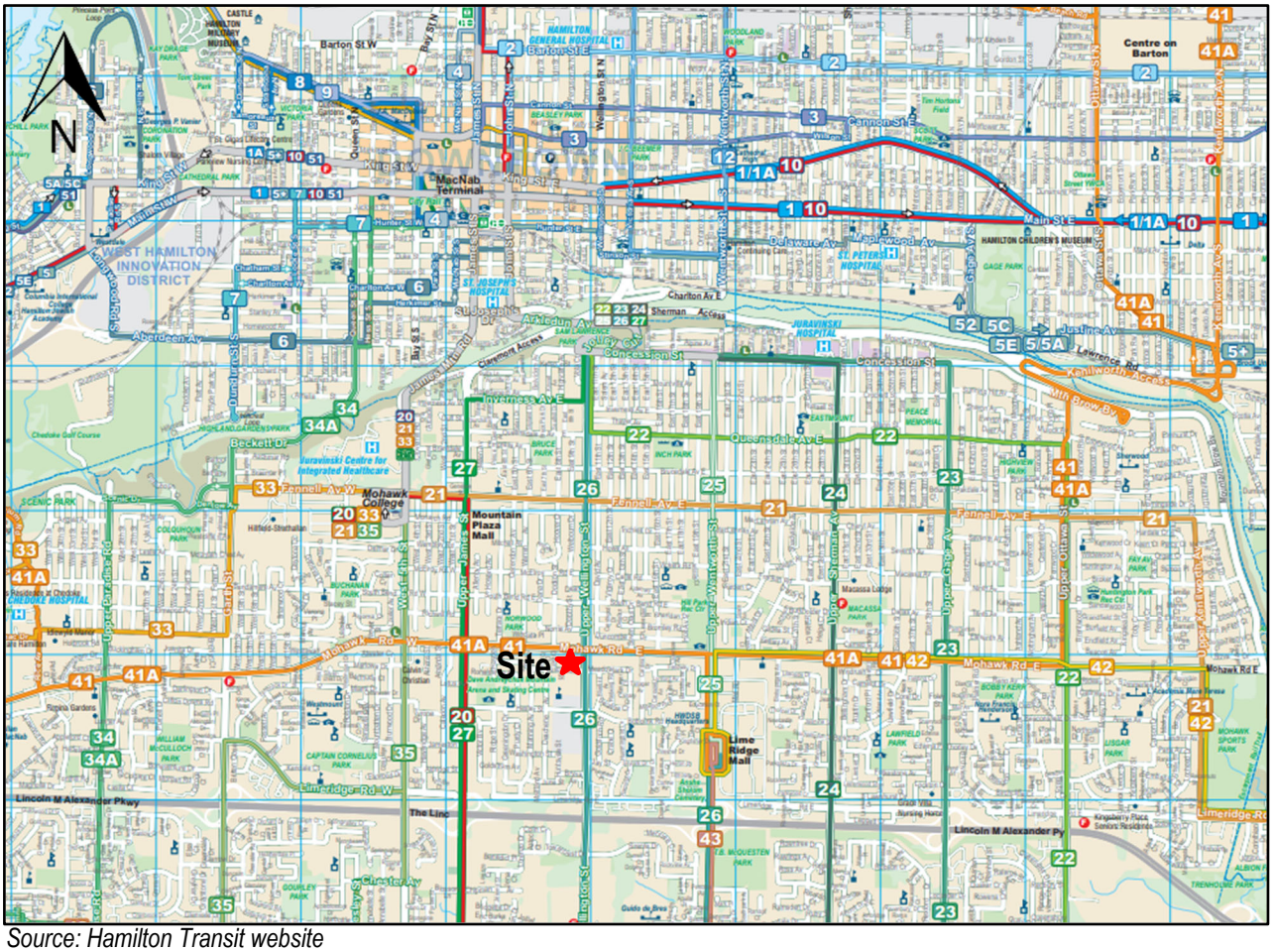
Currently, there are no dedicated cycling routes on Upper Wellington Street, Mohawk Road E and other local roads in the area. However, there is dedicated cycling lanes along West 5th Street and signed routes along South Bend, Manning Avenue, Clarendon Avenue and Limeridge Road E.

It is Nextrans' opinion that the cycling network can be improved in the area, especially along Mohawk Road E and Upper Wellington Street in the future. These cycling facilities can be implemented as part of the future City of Hamilton capital projects. These facilities are beyond the scope of this Study.

2.4. Existing Hamilton Transit (HSR) System

The area is current serviced by two existing HSR Transit Bus Routes 26 Upper Wellington and 41/41A Mohawk. **Figure 5** illustrates the existing HSR Transit Bus Routes in the study area.

Figure 5 – Existing Hamilton Transit Network in the Study Area



Source: Hamilton Transit website

The proposed development is located adjacent to Bus Routes 41/41A Mohawk and 26 Upper Wellington stops located at the Mohawk Road E/Upper Wellington Street intersection.

It is Nextrans' opinion that the proposed development will contribute a healthy transit ridership for the existing Hamilton transit system in the area. Below are the bus route descriptions based on the information provided on the Hamilton Transit Website (https://www.hamilton.ca/hsr-bus-schedules-fares):

- **Route 41 Mohawk** – The MOHAWK route travels both east - west and north - south from downtown Hamilton at Gage/ Industrial to the Meadowlands Terminal. This service runs 7 days a week from the early morning until after midnight. The service frequency is approximately 13-minute during the weekday peak periods and approximately 20-minute during the weekend peak periods.

- **Route 26 Upper Wellington** – The UPPER WELLINGTON route travels north - south from the MacNab Terminal Platform #4 to Limeridge Mall Terminal Platform #4. This service runs 7 days a week from the early morning until after midnight. The service frequency is approximately 12-minute during the weekday peak periods and approximately 30-minute during the weekend peak periods.

2.3. Existing Area Context

Nextrans has conducted a comprehensive review of the area. The proposed development is located about 1 km west of the existing CF Limeridge Shopping Centre, and 1 km east of the existing commercial areas along Upper James Street (Canada Trust Square and Megha Plaza, etc.).

There are existing rental apartment buildings along Mohawk Road E to the east of the site. The proposed development is also surrounded by existing low-rise residential communities to the north and south of Mohawk Road E, east and west of Upper Wellington Street. There are several schools and community centres to the north east and north west of the site.

2.4. Existing Traffic Volumes

Existing traffic volumes at the study area intersections were undertaken by Spectrum on Thursday March 10, 2022 and Wednesday April 13, 2022 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 for the following intersections:

- Mohawk Road E/Upper Wellington Street (count date Thursday March 10, 2022)
- Mohawk Road E/Dodson Street (count date Thursday March 10, 2022)
- Mohawk Road E/existing site access (count date Wednesday April 13, 2022)
- Upper Wellington Street/existing site access (count date Wednesday April 13, 2022)
- Upper Wellington Street/210 Mohawk Road E (count date Wednesday April 13, 2022)
- Upper Wellington Street/Luscombe Street/Meadowlark Drive (count date Thursday March 10, 2022)

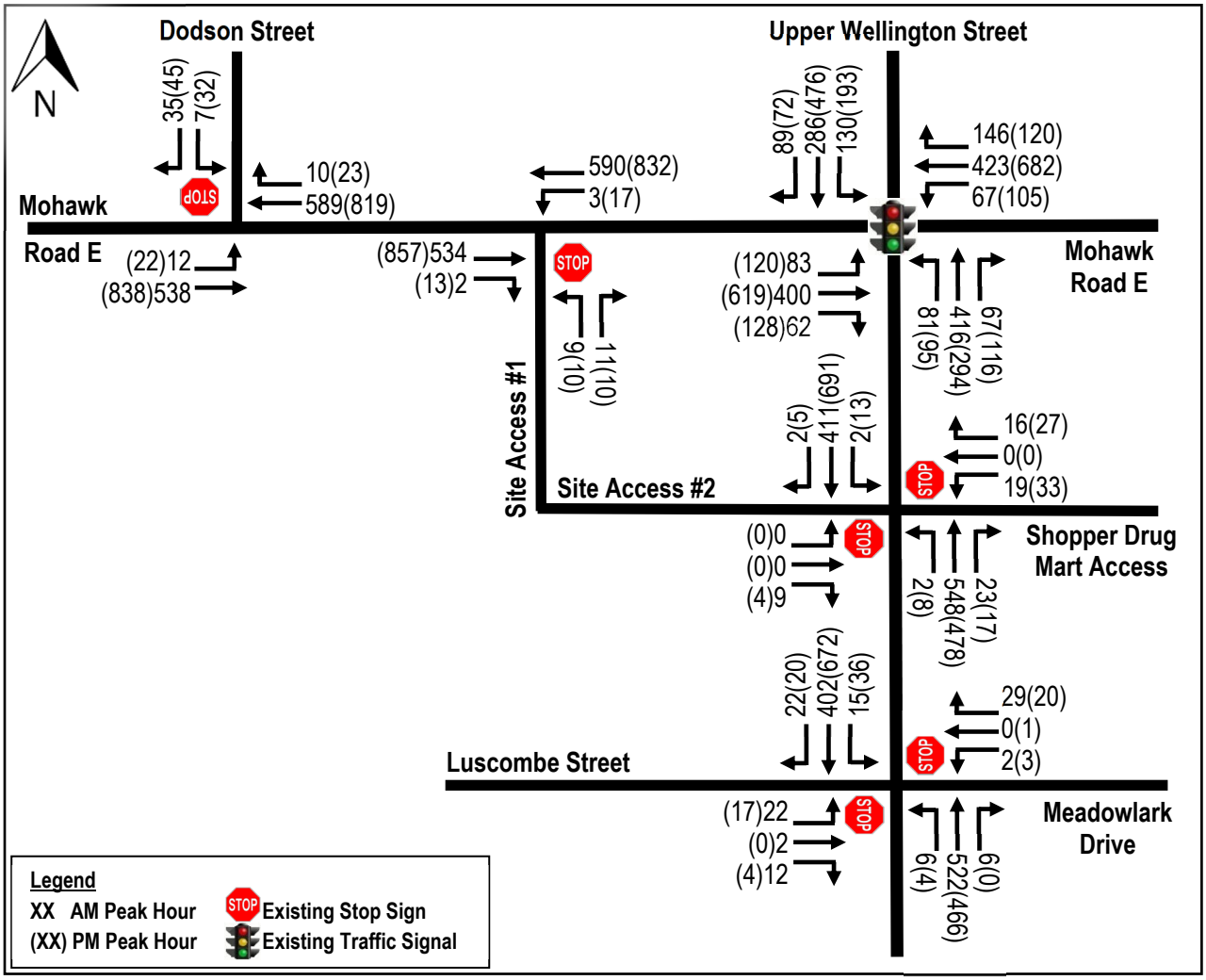
The Turning movement counts are summarized in **Appendix A**. The existing volumes are illustrated in **Figure 6.**

2.5. Existing Traffic Assessment

The existing volumes in **Figure 6** were analyzed using Synchro Version 11 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 signal timing plans for the signalized intersections were obtained from the City of Hamilton and incorporated into the analysis. The results are provided in **Appendix B** and summarized in **Table 2**.

Figure 6 – Existing Traffic Volumes (Balanced)



Based on the intersection capacity analysis, under the existing traffic conditions, all intersections considered in the analysis are operating at acceptable levels of service with no critical movements. No signal timing optimization or physical improvements are required at this time.

Table 2 – Existing Levels of Service

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
		LOS (v/c)	Delay (s)	95th Queue (m)	LOS (v/c)	Delay (s)	95th Queue (m)	
Mohawk Road E/ Upper Wellington Street (signalized)	**Overall**	**C (0.69)**	**23**		**C (0.80)**	**25**		
	EB – L	B (0.35)	20	18	C (0.50)	21	23	~75
	EB – TR	C (0.59)	31	53	C (0.70)	30	82	~90
	WB – L	B (0.23)	18	15	B (0.39)	18	20	~70
	WB – TR	C (0.69)	31	63	C (0.80)	34	90	~280
	NB – L	C (0.25)	23	25	C (0.35)	27	29	~30
	NB – TR	C (0.38)	20	54	B (0.35)	19	39	~110
	SB – L	B (0.28)	12	24	B (0.40)	16	35	~30
	SB – TR	B (0.23)	11	30	B (0.35)	16	47	~120
Mohawk Road E/ Dodson Street (unsignalized)	EB – L	A (0.01)	9	0	A (0.02)	9	1	15
	EB – T	A (0.19)	0	0	A (0.26)	0	0	~200
	WB – TR	A (0.27)	0	0	A (0.34)	0	0	~115
	SB – LR	A (0.06)	10	2	B (0.13)	12	4	~115
Upper Wellington Street/ Luscombe Street/ Meadowlark Drive (unsignalized)	EB – LTR	C (0.15)	21	4	C (0.10)	22	3	~100
	WB – LTR	B (0.06)	11	2	B (0.05)	12	1	~85
	NB – LTR	A (0.01)	0	0	A (0.00)	0	0	~250
	SB – LTR	A (0.02)	1	0	A (0.03)	1	1	~25
Mohawk Road E/ Existing Site Access (unsignalized)	EB – TR	A (0.24)	0	0	A (0.36)	0	0	~115
	WB – TL	A (0.26)	0	0	A (0.02)	1	1	~70
	NB – LR	B (0.04)	12	1	B (0.05)	14	1	~15
Upper Wellington Street/ Existing Site Access/ Shopper Drug Mart (unsignalized)	EB – LTR	A (0.01)	10	0	A (0.00)	9	0	~30
	WB – LTR	C (0.12)	18	3	A (0.16)	16	4	~15
	NB – LTR	A (0.00)	0	0	A (0.01)	0	0	~25
	SB – LTR	A (0.00)	0	0	A (0.01)	0	0	~80

3.0 TRANSPORTATION PLANNING CONTEXT IN THE AREA

3.1. Existing Land Use Context and Amenities

The subject site is located at the intersection of two busy arterial roads, Mohawk Road E and Upper Wellington Street. Both of these arterials accommodate both residential traffic and commercial traffic that services the existing commercial plazas and shopping centres along these two corridors.

In general, the area is currently surrounded by many amenities such as shopping centre, grocery stores, banks, restaurants, automotive services, schools, places of worship and employment.

It is Nextrans' opinion that the proposed development is suitable for area given the complete transportation context, community amenities and maximizing the potential of the existing under-utilized land use that will help addressing housing shortage in the City of Hamilton.

3.2. Transportation Planning Context

As the existing area today is developed based on the traditional urban sprawl planning with low-rise residential and big box shopping centre where residents will have to drive to school, work, or shopping. It is anticipated that the majority of the mode of transportation in this area would be driving private cars even though there is a great existing transit system servicing by HSR Transit System.

It is Nextrans' opinion that the proposed development, a compact development that is different from traditional urban sprawl, will contribute a healthy transit ridership for the existing Hamilton transit system in the area and provide more housing options for the residents. This type of development should be encouraged and embraced in the City of Hamilton. As part of this Study, Nextrans will provide appropriate recommendations that the proposed development can implement to continue to contribute positively to the area and community.

4.0 FUTURE BACKGROUND CONDITIONS

4.1. Analysis Horizon

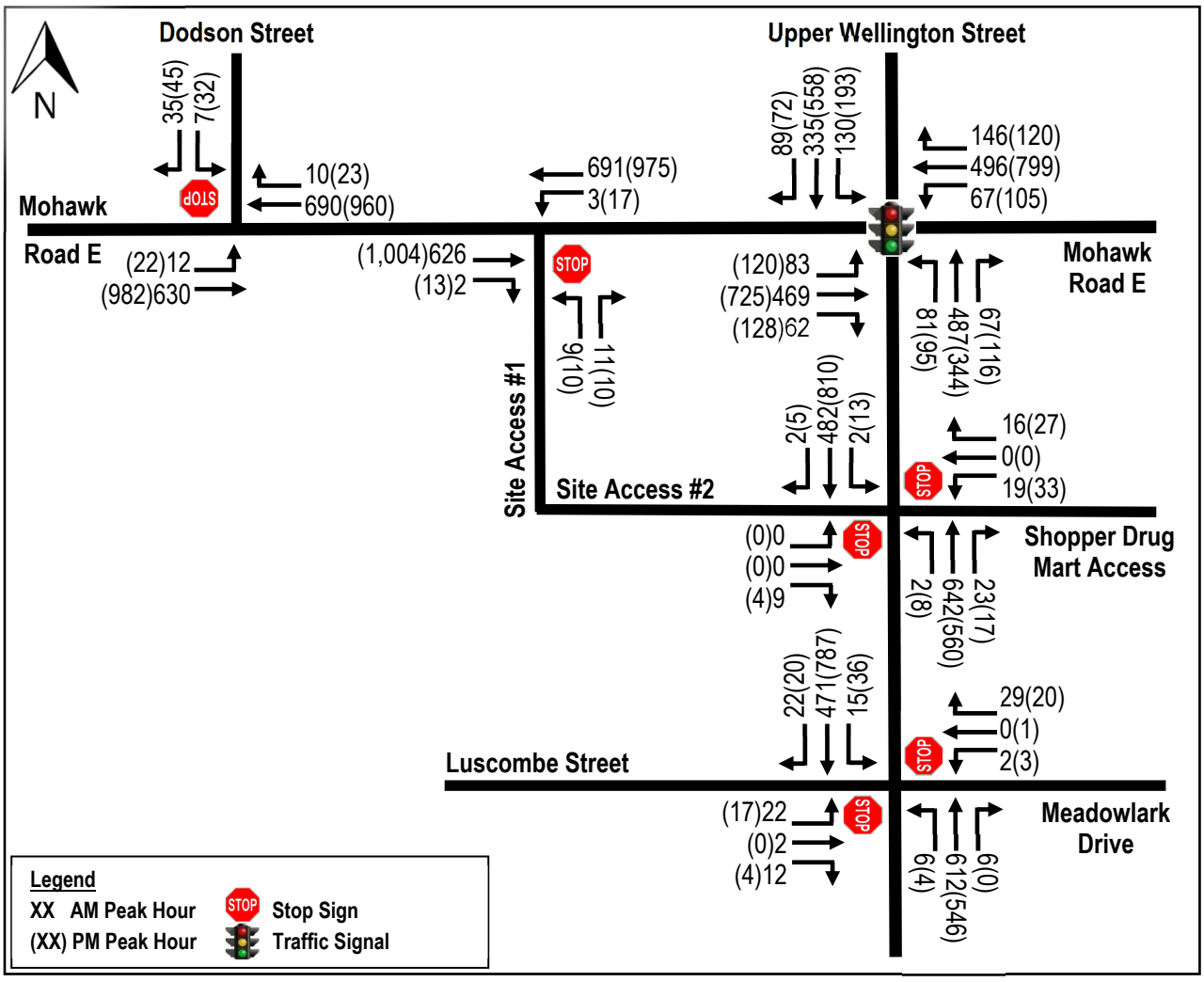
For the purposes of this assessment, it is assumed that the proposed development will be completed by 2025 and therefore a five-year horizon (2030) has been carried out for the study analysis. This provision is consistent with the City of Hamilton's Traffic Impact Study Guidelines.

4.2. Future Background Corridor Growth

Based on the City of Hamilton's requirement, a 2% per annum compounded growth rate will be applied to through movements for the horizon year indicated above. This is equivalent to 16% total growth from 2022 to 2030 for the through traffic on Mohawk Road E and Upper Wellington Street.

Figure 7 illustrates the 2030 future background traffic volumes based on the background through traffic growth noted above.

Figure 7 – 2030 Future Background Traffic Volumes



4.3. Background Development Applications

A comprehensive review of the active developments located within the study area was conducted based on the information extracted from the City of Hamilton development application portal (https://www.hamilton.ca/develop-property/planning-applications/development-applications-mapping). This review indicates that there are no major active development applications in the immediate area. There are some minor committee of adjustment applications, however, these are minor in nature and are not expected to generate any trips. It is anticipated that the 2% background compounded growth rate (or total of 16%) would capture all, or if any, from these minor variance applications.

4.4. Future Background Traffic Assessment

The estimated 2030 future background traffic volumes are illustrated in **Figure 7** and were analyzed using Synchro Version 11 software. The detailed calculations are provided in **Appendix C** and summarized in **Table 3**.

Table 3 – 2030 Future Background Levels of Service

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
		LOS (v/c)	Delay (s)	95th Queue (m)	LOS (v/c)	Delay (s)	95th Queue (m)	
Mohawk Road E/ Upper Wellington Street (signalized)	**Overall**	**C (0.74)**	**24**		**C (0.86)**	**27**		
	EB – L	B (0.37)	19	17	C (0.51)	21	23	~75
	EB – TR	C (0.63)	30	60	C (0.75)	31	97	~90
	WB – L	B (0.24)	17	15	B (0.42)	18	20	~70
	WB – TR	C (0.74)	32	72	D (0.86)	37	108	~280
	NB – L	C (0.27)	24	25	C (0.39)	29	29	~30
	NB – TR	C (0.45)	22	63	C (0.41)	22	45	~110
	SB – L	B (0.32)	14	25	B (0.45)	17	35	~30
	SB – TR	B (0.26)	13	36	B (0.41)	17	55	~120
Mohawk Road E/ Dodson Street (unsignalized)	EB – L	A (0.02)	9	0	A (0.03)	9	1	15
	EB – T	A (0.22)	0	0	A (0.30)	0	0	~200
	WB – TR	A (0.32)	0	0	A (0.40)	0	0	~115
	SB – LR	A (0.06)	10	2	B (0.15)	13	4	~115
Upper Wellington Street/ Luscombe Street/ Meadowlark Drive (unsignalized)	EB – LTR	C (0.17)	24	5	D (0.12)	27	3	~100
	WB – LTR	B (0.06)	12	2	B (0.05)	13	1	~85
	NB – LTR	A (0.01)	0	0	A (0.00)	0	0	~250
	SB – LTR	A (0.02)	1	1	A (0.04)	1	1	~25
Mohawk Road E/ Existing Site Access (unsignalized)	EB – TR	A (0.28)	0	0	A (0.42)	0	0	~115
	WB – TL	A (0.31)	0	0	A (0.03)	1	1	~70
	NB – LR	B (0.04)	12	1	C (0.06)	16	2	~15
Upper Wellington Street/ Existing Site Access/ Shopper Drug Mart (unsignalized)	EB – LTR	A (0.01)	10	0	A (0.00)	9	0	~30
	WB – LTR	C (0.15)	20	4	A (0.18)	18	5	~15
	NB – LTR	A (0.00)	0	0	A (0.01)	0	0	~25
	SB – LTR	A (0.00)	0	0	A (0.01)	0	0	~80

Based on the intersection capacity analysis, under the 2030 future background traffic conditions, all intersections considered in the analysis are expected to operate at acceptable levels of service with no critical movements. No signal timing optimization or physical improvements are required under this horizon year.

5.0 SITE TRAFFIC

5.1. Proposed Development

As indicated, the subject site currently consists of an existing 12-storey apartment building and a parking structure with 203 residential dwelling units. The proposed site addition consists of one 11-storey with 161 residential dwelling units to be constructed at the existing parking structure to the west of the existing apartment building.

Nextrans has conducted auto trip generation survey at the existing site accesses onto Mohawk Road E and Upper Wellington Street. For the purposes of this assessment, the *Trip Generation Manual, 11th Edition* published by the

Institute of Transportation Engineers (ITE) and information will be reviewed and compared with the existing site trip generation.

5.2. Existing Site Trip Generation

The existing site trip distribution was conducted on Wednesday April 13, 2022 at the existing site accesses from 150 Mohawk Road E to Mohawk Road E and Upper Wellington Street by Spectrum. **Table 4** summarizes the existing site trip generation.

Table 4 – Existing Site Traffic Trip Generation (Based on Actual Survey)

ITE Land Use	Magnitude (units)	Parameters	Morning Peak Hour			Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
Multifamily Housing (High-Rise) LUC 222 Not Close to Transit - General Urban/Suburban	203	Actual Survey Trip Rates	0.04	0.14	0.18	0.21	0.12	0.33
		Total Trips	**9**	**29**	**38**	**43**	**24**	**67**

Under the existing land use and conditions, the existing site is currently generating a total of 38 two-way auto trips (9 inbound and 29 outbound) during the morning peak hour, and 67 two-way auto trips (43 inbound and 24 outbound) during the afternoon peak hour.

For comparison purposes, the ITE Trip Generation Manual 11th Edition Land Use Codes (LUC) 222 "Multifamily Housing (High-Rise) Not Close to Transit General Urban/Suburban" fitted curve equations have been utilized for the proposed development. The site trip generation is summarized in **Table 5**.

Table 5 – Site Traffic Trip Generation Based on ITE Trip Rates (11th Edition)

ITE Land Use	Magnitude (units)	Parameters	Morning Peak Hour			Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
Multifamily Housing (High-Rise) LUC 222 Not Close to Transit - General Urban/Suburban	203	Trip Rates AM - T = 0.22(X) + 18.85 PM - T = 0.26(X) + 23.12	0.09	0.23	0.32	0.21	0.16	0.37
		Total Trips	**17**	**47**	**64**	**43**	**33**	**76**

Based on the analysis noted above, it appears that the ITE Trip Rates (11th Edition) are significantly higher than the actual surveyed rates. On of the possible explanations is that the ITE Trip Rates do not taken into consideration of the specific local transit and neighbourhood characteristics such as the subject site. If a 10-15% non-auto modal split is applied to the ITE Trip Rates, the trip generation comparison between the existing surveys and the adjusted ITE Trip Rates are much closer.

For the purposes of this assessment, the actual survey trip rates will be utilized for this Study and to be consistent with the characteristic of the existing residential development on the subject site today. **Table 6** summarizes the proposed development site generated traffic.

Table 6 – Proposed Development Site Traffic Trip Generation (Based on Actual Survey Trip Rates)

ITE Land Use	Magnitude (units)	Parameters	Morning Peak Hour			Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
Multifamily Housing (High-Rise) LUC 222 Not Close to Transit - General Urban/Suburban	161	Actual Survey Trip Rates	0.04	0.14	0.18	0.21	0.12	0.33
		Total Trips	**6**	**23**	**29**	**34**	**19**	**53**

The proposed development is expected to generate a total of 29 two-way auto trips (6 inbound and 23 outbound) during the morning peak hour, and 53 two-way auto trips (34 inbound and 19 outbound) during the afternoon peak hour.

5.3. Site Trip Distribution Based on Existing Site

Typically, Nextrans would review the 2016 Transportation Tomorrow Survey (TTS) data for Traffic Zones 5069, 5075, 5092 and 5097 in order to estimate the general trip distribution for the proposed development. However, given that actual site access surveys were conducted as part of this Study, this information will be utilized in this Study to depict the existing site resident travel pattern. On this basis, **Figure 8** illustrates site traffic assignment based on the existing traffic turning movement counts at the existing site accesses.

Figure 8 – Site Traffic Assignment Based on Actual Surveys

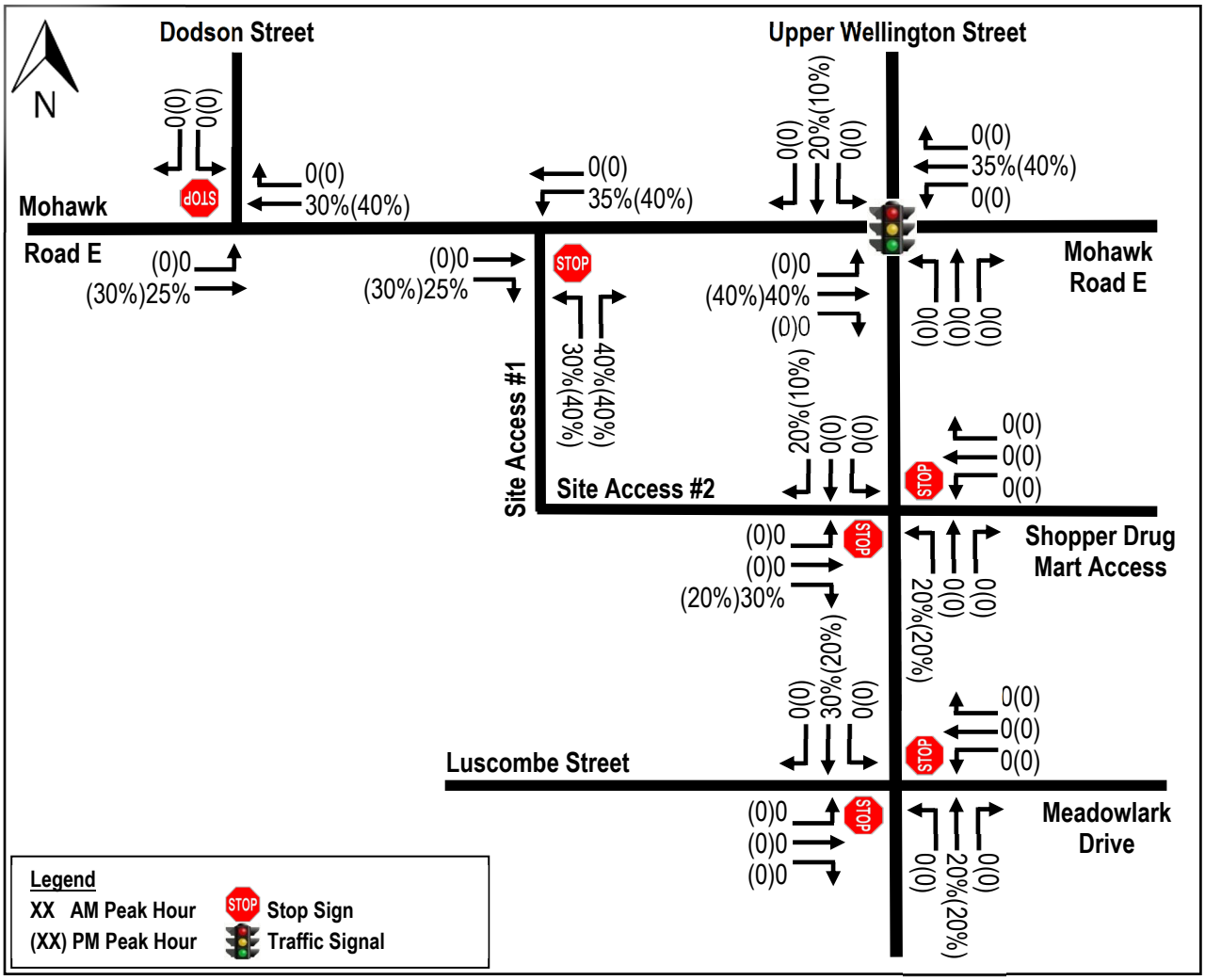
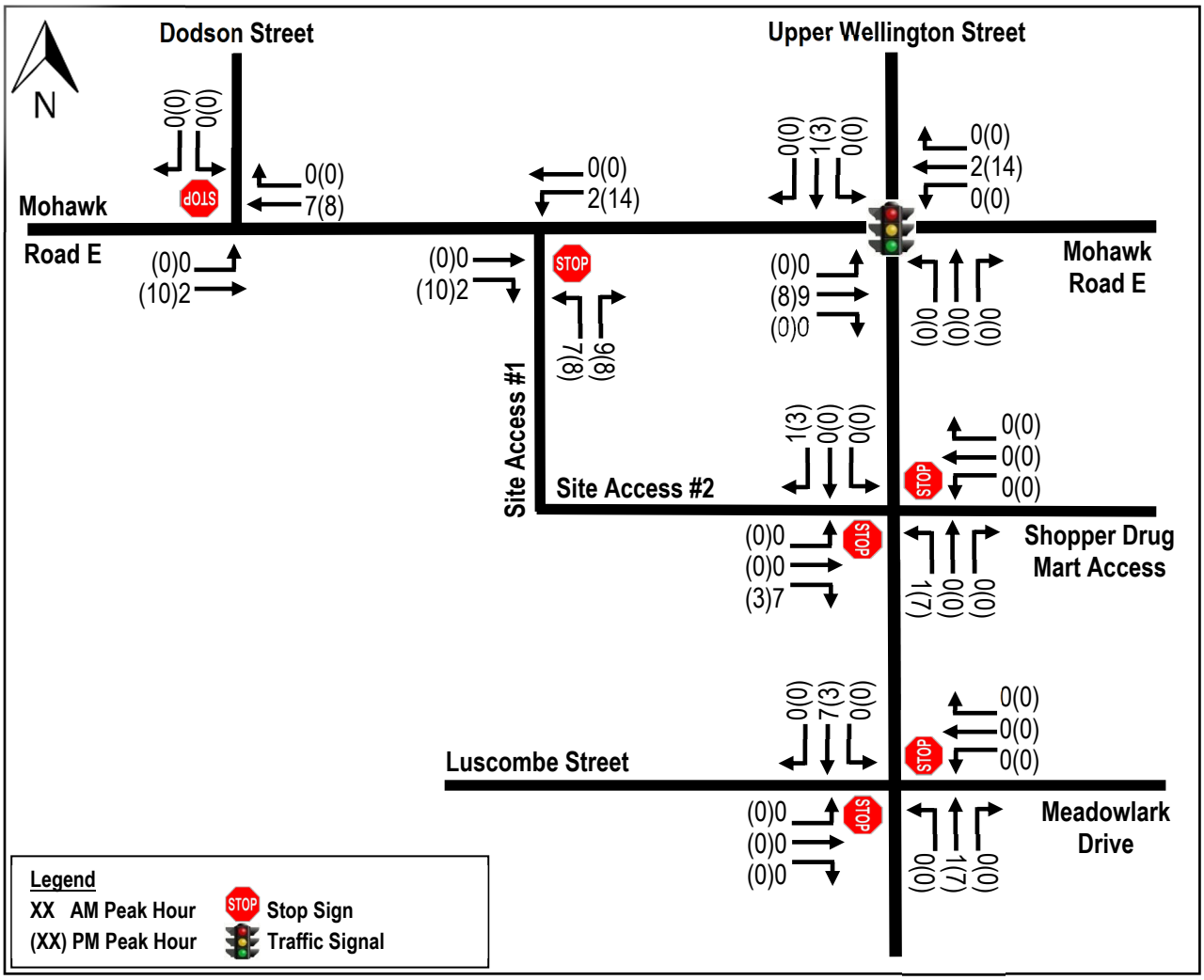


Figure 9 illustrates the proposed development generated traffic volumes for the proposed development.

Figure 9 – Site Traffic Volumes



6.0 FUTURE TOTAL TRAFFIC CONDITIONS

6.1. Future Total Traffic Assessment for Auto Mode

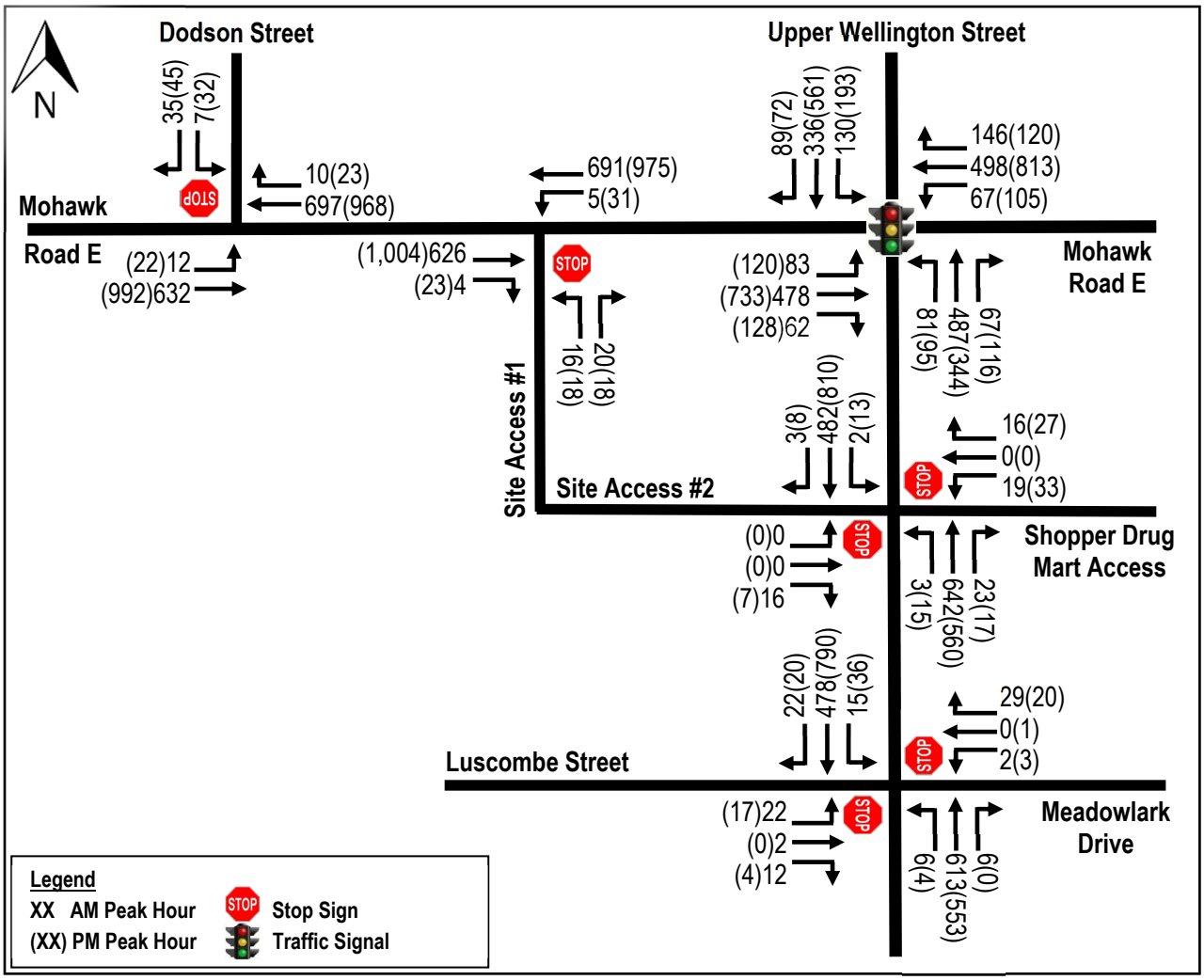
The estimated future total traffic volumes (future background traffic volumes plus site generated traffic volumes) are illustrated in **Figure 10**, and were analyzed using Synchro Version 11 software. The detailed calculations are provided in **Appendix D** and summarized in **Table 7**.

Based on the intersection capacity analysis, similar to the 2030 future background conditions, under the 2030 future total traffic conditions, all intersections considered in the analysis are expected to operate at acceptable levels of service with no critical movements. No signal timing optimization or physical improvements are required to accommodate the proposed development.

It should be noted that the proposed development only adds at most one second to the overall boundary road intersection delay, which means that the proposed development has negligible impacts on the existing transportation network.

The analysis also indicates that the existing accesses are expected to operate at acceptable levels of service and can accommodate the proposed development without any physical improvements to these accesses. Therefore, the existing access lane configurations are similar to the existing conditions.

Figure 10 – 2030 Future Total Traffic Volumes



6.2. Active Transportation Mode Assessment

Walking

As indicated in Section 2 of this Study, under the existing conditions, sidewalks are available on both sides of Mohawk Road E, Upper Wellington Street, Luscombe Street/Meadowlark Drive, as well as other public roads in the area. The intersection of Mohawk Road E/Upper Wellington Street is also treated with ladder pavement markings to enhance pedestrian crossing at all legs of this intersection. The existing sidewalks are also in good shape, therefore, no improvements are required at this time.

As part of the proposed development, sidewalk will be provided along the east side of the new building that will connect the main entrance directly to Mohawk Road E.

Cycling

Currently, there are no dedicated cycling routes on Upper Wellington Street, Mohawk Road E and other local roads in the area. However, there is dedicated cycling lanes along West 5th Street and signed routes along South Bend, Manning Avenue, Clarendon Avenue and Limeridge Road E. It is Nextrans' opinion that the cycling network can be improved in the area, especially along Mohawk Road E and Upper Wellington Street in the future. These cycling facilities can be implemented as part of the future City of Hamilton capital projects. These facilities are beyond the scope of this Study.

As part of the proposed development, bicycle parking spaces will be provided to meet the applicable Zoning By-law requirements.

Table 7 – 2030 Future Total Levels of Service

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
		LOS (v/c)	Delay (s)	95th Queue (m)	LOS (v/c)	Delay (s)	95th Queue (m)	
Mohawk Road E/ Upper Wellington Street (signalized)	**Overall**	**C (0.74)**	**24**		**C (0.87)**	**27**		
	EB – L	B (0.37)	19	17	C (0.51)	21	23	~75
	EB – TR	C (0.64)	31	61	C (0.76)	31	99	~90
	WB – L	B (0.24)	17	15	B (0.42)	18	20	~70
	WB – TR	C (0.74)	32	72	D (0.87)	38	112	~280
	NB – L	C (0.27)	24	25	C (0.40)	29	29	~30
	NB – TR	C (0.45)	22	63	C (0.41)	22	45	~110
	SB – L	B (0.32)	14	25	B (0.45)	17	35	~30
	SB – TR	B (0.26)	13	36	B (0.42)	17	55	~120
Mohawk Road E/ Dodson Street (unsignalized)	EB – L	A (0.02)	9	0	A (0.03)	9	1	15
	EB – T	A (0.22)	0	0	A (0.31)	0	0	~200
	WB – TR	A (0.32)	0	0	A (0.40)	0	0	~115
	SB – LR	A (0.06)	10	2	B (0.15)	13	4	~115
Upper Wellington Street/ Luscombe Street/ Meadowlark Drive (unsignalized)	EB – LTR	C (0.18)	24	5	D (0.12)	27	3	~100
	WB – LTR	B (0.06)	12	2	B (0.05)	13	1	~85
	NB – LTR	A (0.01)	0	0	A (0.00)	0	0	~250
	SB – LTR	A (0.02)	1	1	A (0.04)	1	1	~25
Mohawk Road E/ Existing Site Access (unsignalized)	EB – TR	A (0.28)	0	0	A (0.42)	0	0	~115
	WB – TL	A (0.31)	0	0	A (0.05)	2	1	~70
	NB – LR	B (0.08)	13	2	C (0.11)	17	3	~15
Upper Wellington Street/ Existing Site Access/ Shopper Drug Mart (unsignalized)	EB – LTR	A (0.02)	10	1	A (0.01)	9	0	~30
	WB – LTR	C (0.15)	21	4	A (0.19)	19	6	~15
	NB – LTR	A (0.00)	0	0	A (0.02)	0	0	~25
	SB – LTR	A (0.00)	0	0	A (0.01)	0	0	~80

6.3. Transit Mode Assessment

If a 10% transit modal split is applied to the site trip generation, the proposed development is expected to generate 3 two-way transit trips (1 inbound and 2 outbound) and 5 two-way transit trips (3 inbound and 2 outbound) during the morning and afternoon peak hours, respectively.

The proposed development is located adjacent to Bus Routes 41/41A Mohawk and 26 Upper Wellington stops located at the Mohawk Road E/Upper Wellington Street intersection. It is Nextrans' opinion that the proposed development potential transit ridership (maximum of 5 customers) can be accommodated by the existing transit service in the area and no improvements are required to the existing transit network to accommodate the proposed development.

7.0 SITE PLAN REVIEW

7.1. Loading Requirement

As indicated, the proposed site addition consists of one 11-storey with 161 residential dwelling units to be constructed at the existing parking structure to the west of the existing apartment building. One loading space located at the south-west corner of the proposed new building will be provided to accommodate the proposed development.

AutoTURN software was used to generate the turning movement templates and demonstrate the turning movement requirements for garbage pick-up and delivery vehicles at the proposed loading area access onto the existing laneway. The turning templates are illustrated in **Figures 11**, **12** and **13** for various garbage truck access options.

7.2. Driveway Location and Configuration

Under the existing conditions, the existing site has two full moves access, one onto Mohawk Road E and one onto Upper Wellington Street. As part of the proposed redevelopment of the site, both existing full moves accesses will be retained to service both the existing building and the future building.

Based on the findings of this Study and Nextrans' assessment, the existing access arrangement and lane configuration are reasonable and acceptable as it is optimized the developable lands and consistent with the context of the area.

The analysis indicates the existing site accesses are expected to operate at acceptable levels of service with negligible delays or queues. The existing lane configurations are sufficient and no improvements are required.

7.3. Traffic Calming

Nextrans has reviewed the context of the area and conditions along Mohawk Road E and Upper Wellington Street adjacent to the site. This review has indicated that the signalized intersection of Mohawk Road E/Upper Wellington is already equipped with ladder crossing pavement markings. Given the context and functionality of both Mohawk Road E and Upper Wellington (arterial roads), it is Nextrans' opinion that no traffic calming measures are required. It should be noted that Nextrans' review indicates that there are no other traffic calming measures installed in the general area.

8.0 PARKING ASSESSMENT

8.1. Vehicle Parking Requirement

It is Nextrans' understanding that the proposed development is subject to Zoning By-law No. 6593. **Table 8** summarizes the vehicle parking requirement, based on the City's Zoning By-law No. 6593.

Table 8 – Zoning By-law No. 6593 Vehicle Parking Requirement

Type	No. Unit Greater than 50 m²	Ratio	Total Parking Requirement
Existing Residential	203 existing residential units	1.25 space/unit	254 spaces
Proposed Residential	161 new residential units	1.25 spaces/unit	201 spaces
Total			***455 parking spaces***

Based on the City's By-Law No. 6593, a total of 455 vehicle parking spaces are required for the proposed development.

For comparison purposes, Nextrans has provided the parking requirement based on City-wide Zoning By-law No. 05-200 Section 5.6. **Table 9** summarizes the vehicle parking requirements for the existing and proposed development based on City-wide Zoning By-law 05-200.

Table 9 – Zoning By-law No. 05-200 Vehicle Parking Requirement

Type	No. Unit Greater than 50 m²	Ratio	Required
Existing Residential	1-14 units 15-50 units 50+ units	0.70 space/unit = 14 x 0 = 10 spaces 0.85 spaces/unit = 35 x 0.3 = 30 spaces 1.00 space/unit = 154 x 1.0 = 154 spaces	194 spaces
Proposed Residential	1-14 units 15-50 units 50+ units	0.70 space/unit = 14 x 0 = 10 spaces 0.85 spaces/unit = 35 x 0.3 = 30 spaces 1.00 space/unit = 112 x 1.0 = 112 spaces	152 spaces
Total			***346***

Based on the City-wide Zoning By-law 05-200 Section 5.6, the proposed development only requires to provide a total of 346 vehicle parking spaces.

The analysis above indicates that there is a significant discrepancy between the existing Zoning By-law 6593 and City-wide Zoning By-law 05-200. It is Nextrans' recommendations that, in order to support Transportation Demand Management, sustainability objectives of the Official Plan, as well as minimize the single-occupant-vehicle trips to and from the proposed development, the City-wide Zoning By-law 05-200 parking rates should be applied to the proposed development.

Based on the recommendations noted above, the proposed development will provide the following vehicle parking supply for the entire site (existing residential plus proposed residential development):

- 70 vehicle parking spaces upper level
- 150 vehicle parking spaces on the ground level
- 168 parking spaces underground
- Total 387 vehicle parking spaces for the entire site with 364 residential dwelling units (161 new plus 203 existing)
- The minimum Zoning By-law No. 05-200 requirements for vehicle parking requirements for two buildings are 346 parking spaces.

Therefore, the proposed development meets the minimum Zoning By-law No. 05-200 vehicle parking requirements.

8.2. Bicycle Parking

It is Nextrans' understanding that, based on the Zoning By-law No. 05-200 Sections 5.7, bicycle parking is not required for the development located outside the Downtown Zones. However, to support active transportation and Transportation Demand Management, 5 short-term bicycle parking spaces will be provided for the proposed development to be located at a convenient location, for example, in front of the building main entrance. It is Nextrans' opinion that this provision will encourage future residents to take active modes of transportation instead of driving private vehicles.

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, currently, the subject site consists of an existing 12-storey apartment building and a parking structure with 203 residential dwelling units. The proposed site addition consists of one 11-storey with 161 residential dwelling units to be constructed at the existing parking structure to the west of the existing apartment building. It is Nextrans' opinion that this is a very compact residential development and design that meet the City's

requirements because it does not include low-rise housing units. It also displaces and fully utilized the existing parking structure.

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 will provide sidewalk connection to Mohawk Road E; and
- Provide bicycle parking spaces for visitors at a convenient location;

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 in front of the new building and connect to Mohawk Road E, as illustrated the proposed site plan.

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

It is Nextrans' understanding that, based on the Zoning By-law No. 05-200 Sections 5.7, bicycle parking is not required for the development located outside the Downtown Zones. However, to support active transportation and Transportation Demand Management, 5 short-term bicycle parking spaces will be provided for the proposed development to be located at a convenient location, for example, in front of the building main entrance. It is Nextrans' opinion that this provision will encourage future residents to take active modes of transportation instead of driving private vehicles.

9.1.5. Direct Connections to Transit

The proposed development is located adjacent to Bus Routes 41/41A Mohawk and 26 Upper Wellington stops located at the Mohawk Road E/Upper Wellington Street intersection. Currently, the site has direct paved path connections to Mohawk Road E and Upper Wellington Street. These connections will be maintained in the future. As the new building will provide sidewalk in the front of the building that connect directly to Mohawk Road E, residents will be able to walk from the main building entrance to Mohawk Road E and connect with both bus routes.

9.1.6. Opportunities for Reduced Parking Requirements

Based on the current City's By-Law No. 6593, a total of 455 vehicle parking spaces are required for the proposed development. However, if the City-wide Zoning By-law No. 05-200 rates applied, the proposed development only requires to provide a total of 346 parking spaces (152 spaces for proposed residential development and 194 spaces for the existing residential building). The proposed development will provide a total of 387 vehicle parking spaces, which has a decrease of 99 vehicle parking spaces from the existing Zoning By-law No. 6593 requirement. Therefore, it is Nextrans' opinion that the existing Zoning By-law No. 6593 should be amended to have similar parking rates as the City-wide Zoning By-law No. 05-200, or amended to have a parking rate of 1.06 spaces/unit instead of 1.25 spaces/unit in order to support TDM and sustainable objectives. It is Nextrans' opinion that the proposed development only requires to provide a maximum of 387 vehicle parking spaces (or 1.06 spaces/unit).

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 sale 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 development in the Downtown or Transit

Oriented Corridor setting where carshare is economically viable. It is not appropriate for the small development like this and without other high-rise/mid-rise buildings near-by to share the use or carrying costs. As such, it is Nextrans' opinion that this requirement is not appropriate or necessary for the proposed development given the proposed development context and location.

9.1.9. On-Site Bikeshare

It is Nextrans' opinion that bikeshare is more appropriate in the downtown setting surrounded by more mid-rise and high-rise uses, as well as other office and retail uses, in order to share the use and carrying costs to make bikeshare more economically feasible. It is Nextrans' opinion that bikeshare is not appropriate for this proposed development.

9.1.10. Wayfinding Signage

Given that the proposed development is an infill development located at the corner of two arterial roads, Mohawk Road E and Upper Wellington Street, it is Nextrans' opinion that wayfinding signage is not required for the proposed development as it is visible to the public, visitors and future residents living in the buildings.

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

It is Nextrans' opinion that this incentive is not required for this area given the existing context. In addition, as the proposed development is a compact and efficient housing unit design, it will attract young professionals and young family that will use active mode of transportation to make housing more affordable as they can work from home and do not need to drive that often.

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 Condominium Board 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 10** summarizes the recommended TDM measures and incentives.

Table 10 – 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	• Provide 5 short-term bicycle parking spaces at a convenient and secured location	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 sidewalk connection to Mohawk Road E	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)	• Maintain the existing paved connections to Mohawk Road E and Upper Wellington Street	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 sell with the 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	• Not required	Applicant

10.0 CONCLUSIONS / FINDINGS

10.1. Study Conclusions

The findings and conclusions of the analysis are as follows:

- The proposed development is expected to generate a total of 29 two-way auto trips (6 inbound and 23 outbound) during the morning peak hour, and 53 two-way auto trips (34 inbound and 19 outbound) during the afternoon peak hour.

- Based on the intersection capacity analysis, under the existing, 2030 future background and future total traffic conditions, all intersections considered in the analysis are expected to operate at acceptable levels of service with no critical movements. No signal timing optimization or physical improvements are required to accommodate the proposed development.

  It should be noted that the proposed development only adds at most one second to the overall boundary road intersection delay, which means that the proposed development has negligible impacts on the existing transportation network.

  The analysis also indicates that the existing accesses are expected to operate at acceptable levels of service and can accommodate the proposed development without any physical improvements to these accesses. Therefore, the existing access lane configurations are similar to the existing conditions.

- If a 10% transit modal split is applied to the site trip generation, the proposed development is expected to generate 3 two-way transit trips (1 inbound and 2 outbound) and 5 two-way transit trips (3 inbound and 2 outbound) during the morning and afternoon peak hours, respectively.

  The proposed development is located adjacent to Bus Routes 41/41A Mohawk and 26 Upper Wellington stops located at the Mohawk Road E/Upper Wellington Street intersection. It is Nextrans' opinion that the proposed development potential transit ridership (maximum of 5 customers) can be accommodated by the existing transit service in the area and no improvements are required to the existing transit network to accommodate the proposed development.

- Based on the current City's By-Law No. 6593, a total of 455 vehicle parking spaces are required for the proposed development. However, if the City-wide Zoning By-law No. 05-200 rates applied, the proposed development only requires to provide a total of 346 parking spaces (152 spaces for proposed residential development and 194 spaces for the existing residential building). The proposed development will provide a total of 387 vehicle parking spaces, which has a decrease of 99 vehicle parking spaces from the existing Zoning By-law No. 6593 requirement. Therefore, it is Nextrans' opinion that the existing Zoning By-law No. 6593 should be amended to have similar parking rates as the City-wide Zoning By-law No. 05-200, or amended to have a parking rate of 1.06 spaces/unit instead of 1.25 spaces/unit in order to support TDM and sustainable objectives. It is Nextrans' opinion that the proposed development only requires to provide a maximum of 387 vehicle parking spaces (or 1.06 spaces/unit).

- It is Nextrans' understanding that, based on the Zoning By-law No. 05-200 Sections 5.7, 5 short-term bicycle parking spaces are required for the proposed development. The proposed development will provide a total of 5 bicycle parking spaces at a convenient location, which meets the minimum Zoning By-law requirement.

- The proposed development will provide one loading space for the new residential building. AutoTURN software was used generate turning movement templates and to demonstrate the turning movement requirements for garbage pick-up and delivery vehicles at the proposed loading area and access onto the existing driveway.

10.2. Study Recommendations

Based on the findings of this Study, the following recommendations are provided:

- The proposed development implements the TDM measures and incentives identified in this report to support active transportation and transit and to reduce the numbers of single-occupant-vehicle trips to and from the proposed development;

- The proposed development adopts the City-wide Zoning By-law No. 05-200 parking rates, or reduce the parking rate to 1.06 spaces/unit instead of 1.25 spaces/unit as per Zoning By-law No. 6593, or maximum of 387 vehicle parking spaces for the proposed development;

- The proposed development provides concrete sidewalk along the frontage of the proposed new residential building to connect to Mohawk Road E; and

- No additional physical improvements for the area at this time to accommodate the proposed development, under the future background and future total conditions.

KEY PLAN

BENCHMARK

REVISONS

NO	REVISION	DATE	BY

STAMP

nextrans
CONSULTING ENGINEERS
Suite 201, 520 Industrial Parkway South
Aurora ON L4G 6W8
Tel: 905-503-2563
Web: www.nextrans.ca

PROJECT NAME:
RESIDENTIAL DEVELOPMENT
150 Mohawk Road East
(City of Hamilton)

DRAWING TITLE:
AutoTURN Analysis
(HSU TAC-2017)
Loading Configuration 1

DESIGN BY: K.A.	DATE: May 18, 2022
CHECKED BY: R.P.	PROJECT NO. NT-22-022
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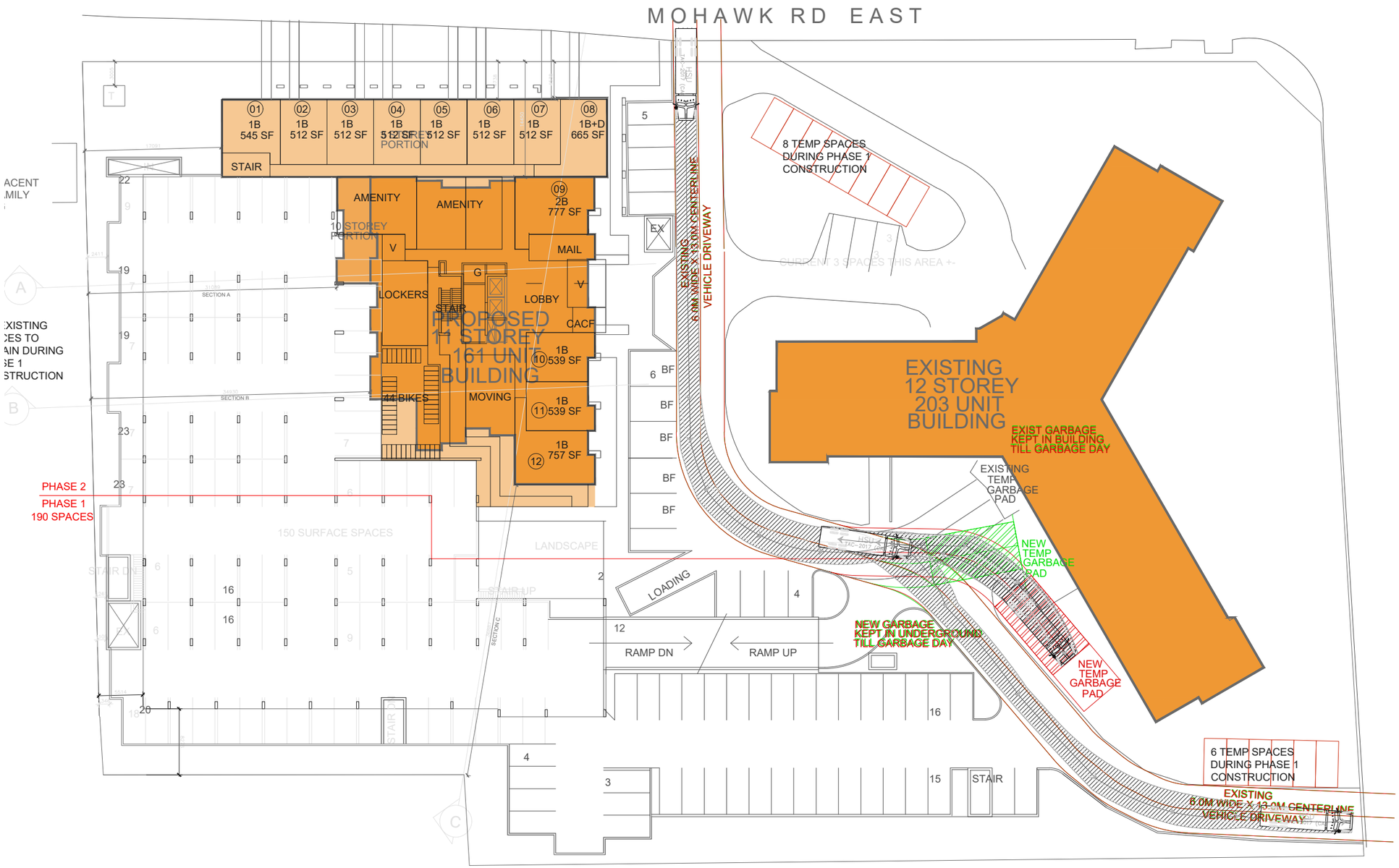
SCALE: NTS	DRAWING NO. Figure 11



KEY PLAN

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PROJECT NAME:
RESIDENTIAL DEVELOPMENT
150 Mohawk Road East
(City of Hamilton)

DRAWING TITLE:
AutoTURN Analysis
(HSU TAC-2017)
Loading Configuration 2

DESIGN BY: K.A.	DATE: May 18, 2022
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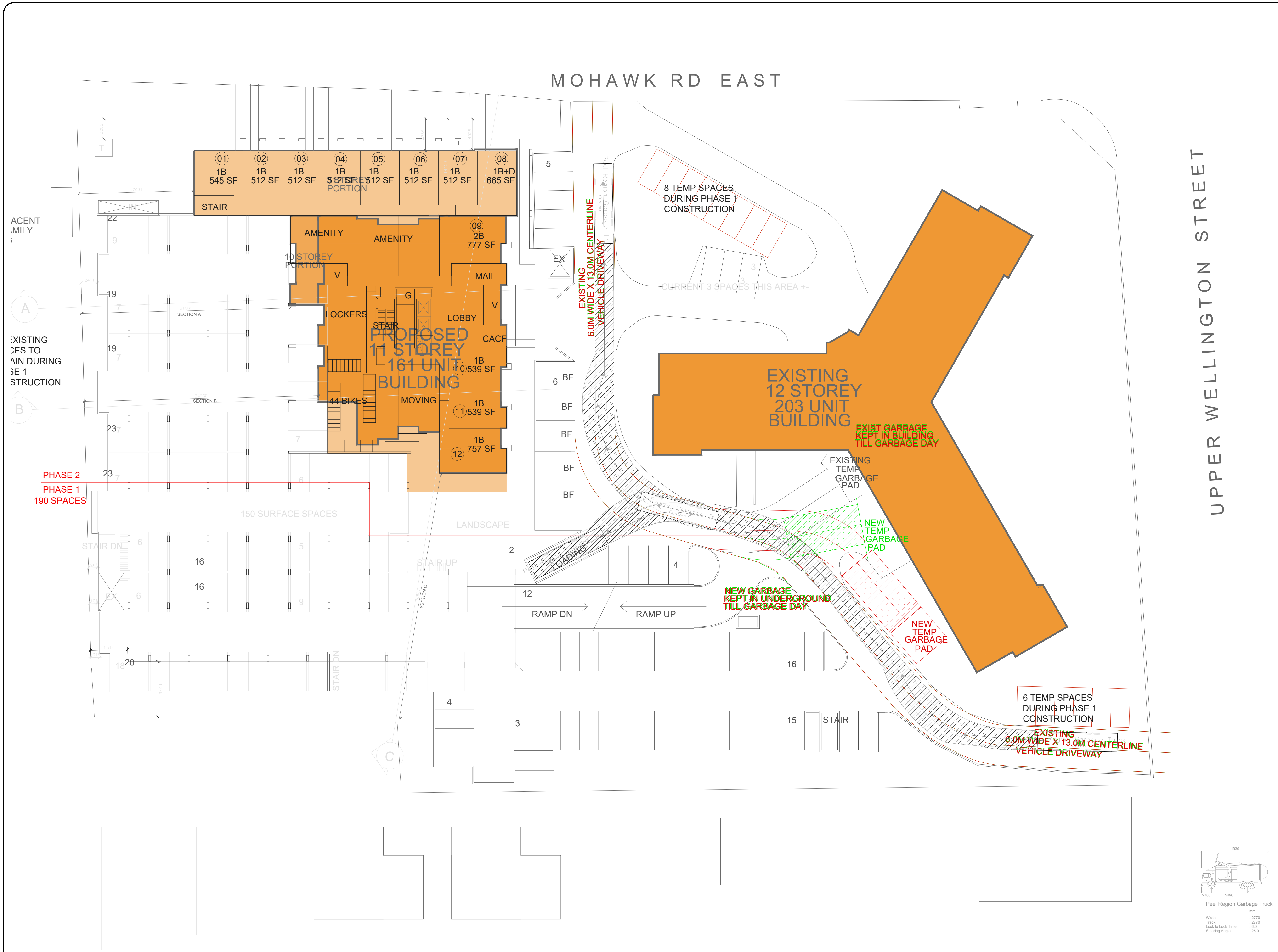
DRAWN BY: K.A.	
SCALE: NTS	DRAWING NO. Figure 12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UPPER WELLINGTON STREET
PROPOSED 11 STOREY 161 UNIT BUILDING
EXISTING 12 STOREY 203 UNIT BUILDING
10 STOREY PORTION
STAIR
AMENITY
AMENITY
LOCKERS
LOBBY
MAIL
CACF
MOVING
44 BIKES
01 1B 545 SF
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03 1B 512 SF
04 1B 512 SF
05 1B 512 SF
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07 1B 512 SF
08 1B+D 665 SF
09 2B 777 SF
10 1B 539 SF
11 1B 539 SF
12 1B 757 SF
8 TEMP SPACES DURING PHASE 1 CONSTRUCTION
EXISTING 6.0M WIDE X 13.0M CENTERLINE VEHICLE DRIVEWAY
EXIST GARBAGE KEPT IN BUILDING TILL GARBAGE DAY
EXISTING TEMP GARBAGE PAD
NEW TEMP GARBAGE PAD
NEW GARBAGE KEPT IN UNDERGROUND TILL GARBAGE DAY
NEW TEMP GARBAGE PAD
6 TEMP SPACES DURING PHASE 1 CONSTRUCTION
EXISTING 6.0M WIDE X 13.0M CENTERLINE VEHICLE DRIVEWAY
PHASE 2
PHASE 1 190 SPACES
150 SURFACE SPACES
LANDSCAPE
LOADING
RAMP DN
RAMP UP
STAIR UP
STAIR
BF
EX
Peel Region Garbage Truck

KEY PLAN

BENCHMARK

REVISIONS

NO	REVISION	DATE	BY

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AutoTURN Analysis
(HSU TAC-2017)
Loading Configuration 2

DESIGN BY:	K.A.	DATE:	May 18, 2022
CHECKED BY:	R.P.	PROJECT NO.	NT-22-022
DRAWN BY:	K.A.		
SCALE:	NTS	DRAWING NO.	Figure 13

Appendix A
Existing Traffic Data and Signal Timing Plans

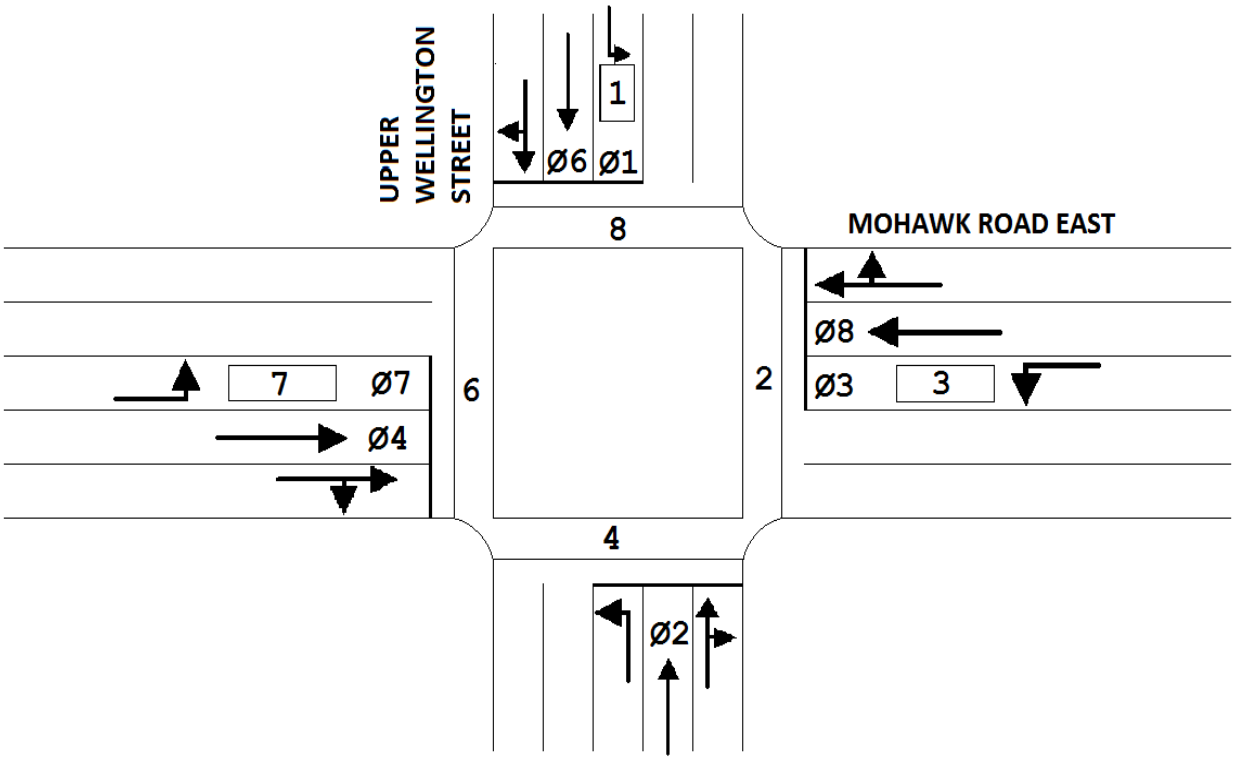
City of Hamilton - Traffic
Traffic Signal Controller Timing Data

Intersection: **Mohawk Rd. E @ Upper Wellington St.**

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

Programmed By: **JC** Installed By: **JC**

Date: **June 23/16** Date: **June 23/16**



ϕ1: **Upper Wellington - SBLT**
ϕ2: **Upper Wellington - NB, East Xwalk**
ϕ3: **Mohawk - WBLT**
ϕ4: **Mohawk - EB, South Xwalk**

ϕ6: **Upper Wellington - SB, West Xwalk**
ϕ7: **Mohawk - EBLT**
ϕ8: **Mohawk - WB, North Xwalk**

Flash Operation: **Red: Upper Wellington**
Red: Mohawk

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	**5**	(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**	**X**												
	Ring 2						**X**	**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**				**X**										
	CO PH 2			**X**	**X**			**X**	**X**								
	CO PH 3																
	CO PH 4																

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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			X				X									
	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		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																
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK	X		X				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		X		X		X								
	CNA 2																
	CNA 3																
	CNA 4																
	WRM		X		X		X		X								
	INH MAX																
	PED RECY																
	FL WALK																
	FDW->YEL																
	FDW->RED																
	COND PED																

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Mohawk / Upper Wellington

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

CONTROLLER DATA
USE 1 TO ALL 4 TIMING PLANS

4/3/2020

		TP1															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial	**5**	**20**		**20**		**20**		**20**								
	Passage	**2.0**															
	Yellow	**3.0**	**3.3**		**3.3**		**3.3**		**3.3**								
	Red	**0.0**	**3.0**		**3.0**		**3.0**		**3.0**								
	Walk		**7**		**9**		**12**		**8**								
	Ped Clr		**20**		**20**		**20**		**21**								
	Max 1	**10**	**30**		**35**		**40**		**35**								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

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Mohawk / Upper Wellington

CONTROLLER DATA

4/3/2020

TP2

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial	**5**	**20**	**5**	**20**		**20**	**5**	**20**								
	Passage	**2.0**		**2.0**				**2.0**									
	Yellow	**3.0**	**3.3**	**3.0**	**3.3**		**3.3**	**3.0**	**3.3**								
	Red	**0.0**	**3.0**	**0.0**	**3.0**		**3.0**	**0.0**	**3.0**								
	Walk		**7**		**8**		**12**		**8**								
	Ped Clr		**20**		**20**		**20**		**21**								
	Max 1	**10**	**30**	**10**	**35**		**40**	**10**	**35**								
	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	**5**	**20**	**5**	**20**		**20**	**5**	**20**								
	Passage	**2.0**		**2.0**				**2.0**									
	Yellow	**3.0**	**3.3**	**3.0**	**3.3**		**3.3**	**3.0**	**3.3**								
	Red	**0.0**	**3.0**	**0.0**	**3.0**		**3.0**	**0.0**	**3.0**								
	Walk		**7**		**8**		**12**		**8**								
	Ped Clr		**20**		**20**		**20**		**21**								
	Max 1	**10**	**30**	**10**	**35**		**40**	**10**	**35**								
	Max 2																
	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	1	X															
DET	2																
ASSIGN-	3			X													
MENTS	4																
	5																
	6																
	7							X									
	8																

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	Mode	0		0				0									
MODES																	

DUAL ENTRY (MM-3-1-6)

DUAL ENTRY ENABLE:	Y	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	1						X										
ENTRY	2						X										
ASSIGN-	3								X								
MENTS	4								X								
	5																
	6		X														
	7				X												
	8				X												

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

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CONTROLLER DATA

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

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**			
	SPLIT 2						
	SPLIT 3						
	SPLIT 4						

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

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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			
CYCLE & OFFSETS	Length	**80**	**90**	**90**			
	Offset 1	**42**	**46**	**19**			
	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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PHASE ALLOCATION (MM-3-2-6)

ENTRY IN:	Secs	% or Secs: Not a controller entry--for reference only. Controller entry is under b

	PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE ALLO-CATION	**C1 S1**	**10**	**34**		**36**		**44**		**36**								
	C1 S2																
	C1 S3																
	C1 S4																
	C2 S1	**9**	**35**	**9**	**37**		**44**	**9**	**37**								
	C2 S2																
	C2 S3																
	C2 S4																
	C3 S1	**11**	**34**	**9**	**36**		**45**	**9**	**36**								
	C3 S2																
	C3 S3																
	C3 S4																
	C4 S1																
	C4 S2																
	C4 S3																
	C4 S4																

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

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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**

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

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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		1	1	1		
	08	00		2	1	1		
	21	00		1	1	1		
2	00	00					11(FRE)	OFF
	00	00		1	1	1		
	06	30		2	1	1		
	15	30		3	1	1		
	18	00		2	1	1		
	21	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**		

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		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

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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NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (1 . MOHAWK RD E & 150 MOHAWK RD E)

Start Time	E Approach MOHAWK RD E					S Approach 150 MOHAWK RD E					W Approach MOHAWK RD E					SE Approach CONDO DRIVEWAY					Int. Total (15 min)	Int. Total (1 hr)
	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	UTurn W:W	Peds W:	Approach Total	Hard Right SE:E	Bear Left SE:W	Hard Left SE:S	UTurn SE:SE	Approach Total		
07:00:00	53	0	0	0	53	1	1	0	5	2	0	52	0	0	52	0	0	2	0	2	109	
07:15:00	61	1	0	0	62	2	1	0	1	3	1	54	0	0	55	2	0	0	0	2	122	
07:30:00	80	1	0	0	81	4	1	0	2	5	0	59	0	0	59	1	0	0	0	1	146	
07:45:00	107	2	0	0	109	1	1	0	1	2	2	85	0	0	87	2	0	0	0	2	200	577
08:00:00	100	0	0	0	100	1	0	0	2	1	0	99	0	0	99	0	0	0	0	0	200	668
08:15:00	154	0	0	0	154	2	2	0	1	4	1	105	0	0	106	0	1	0	0	1	265	811
08:30:00	187	2	0	0	189	0	3	0	6	3	0	153	0	0	153	0	0	0	0	0	345	1010
08:45:00	156	1	0	0	157	3	2	0	1	5	1	137	0	0	138	1	1	0	0	2	302	1112
09:00:00	93	0	0	0	93	4	0	0	1	4	0	139	0	0	139	1	0	0	0	1	237	1149
09:15:00	88	1	0	0	89	1	0	0	2	1	1	113	0	0	114	0	0	0	0	0	204	1088
09:30:00	89	2	0	0	91	2	1	0	2	3	0	110	2	0	112	1	0	1	0	2	208	951
09:45:00	120	1	1	0	122	5	0	0	2	5	1	110	0	0	111	1	1	0	0	2	240	889
BREAK																						
16:00:00	183	0	0	0	183	2	1	0	6	3	0	189	0	0	189	1	0	0	0	1	376	
16:15:00	207	1	0	2	208	1	1	0	0	2	3	160	0	0	163	0	2	0	0	2	375	
16:30:00	224	3	0	0	227	0	2	0	2	2	2	194	2	0	198	2	0	1	0	3	430	
16:45:00	213	9	0	0	222	0	2	0	2	2	2	199	0	0	201	0	2	0	0	2	427	1608
17:00:00	211	3	0	0	214	0	2	0	5	2	7	222	0	0	229	3	0	1	0	4	449	1681
17:15:00	184	2	0	0	186	2	2	0	0	4	2	202	0	0	204	3	0	0	0	3	397	1703
17:30:00	167	1	0	0	168	4	2	0	3	6	4	189	0	0	193	1	0	1	0	2	369	1642
17:45:00	203	0	0	0	203	1	0	0	6	1	3	172	0	0	175	0	2	1	0	3	382	1597
18:00:00	152	4	1	0	157	2	1	0	3	3	5	163	0	0	168	3	1	3	0	7	335	1483
18:15:00	194	1	0	0	195	1	3	0	0	4	2	133	0	0	135	2	1	1	0	4	338	1424
18:30:00	146	3	0	0	149	0	0	0	3	0	2	163	0	0	165	1	0	1	0	2	316	1371
18:45:00	147	4	0	0	151	2	2	0	3	4	3	144	0	0	147	2	0	0	0	2	304	1293
Grand Total	3519	42	2	2	3563	41	30	0	59	71	42	3346	4	0	3392	27	11	12	0	50	**7076**	-
Approach%	98.8%	1.2%	0.1%		-	57.7%	42.3%	0%		-	1.2%	98.6%	0.1%		-	54%	22%	24%	0%	-	**-**	-
Totals %	49.7%	0.6%	0%		50.4%	0.6%	0.4%	0%		1%	0.6%	47.3%	0.1%		47.9%	0.4%	0.2%	0.2%	0%	0.7%	**-**	-
Heavy	74	1	0		-	0	0	0		-	1	87	0		-	2	0	0	0	-	**-**	-
Heavy %	2.1%	2.4%	0%		-	0%	0%	0%		-	2.4%	2.6%	0%		-	7.4%	0%	0%	0%	-	**-**	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-	-	-	-	**-**	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-	-	-	-	**-**	-

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (8.85 °C)

Start Time	E Approach MOHAWK RD E					S Approach 150 MOHAWK RD E					W Approach MOHAWK RD E					SE Approach CONDO DRIVEWAY					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Hard Right	Bear Left	Hard Left	UTurn	Approach Total	
08:15:00	154	0	0	0	154	2	2	0	1	4	1	105	0	0	106	0	1	0	0	1	265
08:30:00	187	2	0	0	189	0	3	0	6	3	0	153	0	0	153	0	0	0	0	0	345
08:45:00	156	1	0	0	157	3	2	0	1	5	1	137	0	0	138	1	1	0	0	2	302
09:00:00	93	0	0	0	93	4	0	0	1	4	0	139	0	0	139	1	0	0	0	1	237
Grand Total	590	3	0	0	593	9	7	0	9	16	2	534	0	0	536	2	2	0	0	4	**1149**
Approach%	99.5%	0.5%	0%		-	56.3%	43.8%	0%		-	0.4%	99.6%	0%		-	50%	50%	0%	0%	-	**-**
Totals %	51.3%	0.3%	0%		51.6%	0.8%	0.6%	0%		1.4%	0.2%	46.5%	0%		46.6%	0.2%	0.2%	0%	0%	0.3%	**-**
PHF	0.79	0.38	0		0.78	0.56	0.58	0		0.8	0.5	0.87	0		0.88	0.5	0.5	0	0	0.5	**-**
Heavy	24	1	0		25	0	0	0		0	0	35	0		35	1	0	0	0	1	**-**
Heavy %	4.1%	33.3%	0%		4.2%	0%	0%	0%		0%	0%	6.6%	0%		6.5%	50%	0%	0%	0%	25%	**-**
Lights	566	2	0		568	9	7	0		16	2	499	0		501	1	2	0	0	3	**-**
Lights %	95.9%	66.7%	0%		95.8%	100%	100%	0%		100%	100%	93.4%	0%		93.5%	50%	100%	0%	0%	75%	**-**
Single-Unit Trucks	5	0	0		5	0	0	0		0	0	15	0		15	0	0	0	0	0	**-**
Single-Unit Trucks %	0.8%	0%	0%		0.8%	0%	0%	0%		0%	0%	2.8%	0%		2.8%	0%	0%	0%	0%	0%	**-**
Buses	15	1	0		16	0	0	0		0	0	17	0		17	1	0	0	0	1	**-**
Buses %	2.5%	33.3%	0%		2.7%	0%	0%	0%		0%	0%	3.2%	0%		3.2%	50%	0%	0%	0%	25%	**-**
Articulated Trucks	4	0	0		4	0	0	0		0	0	3	0		3	0	0	0	0	0	**-**
Articulated Trucks %	0.7%	0%	0%		0.7%	0%	0%	0%		0%	0%	0.6%	0%		0.6%	0%	0%	0%	0%	0%	**-**
Pedestrians	-	-	-	0	-	-	-	-	9	-	-	-	-	0	-	-	-	-	-	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	100%		-	-	-	0%		-	-	-	-		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-	-	-	-		**-**

Spectrum

Turning Movement Count
Location Name: MOHAWK RD E & 150 MOHAWK RD E
Date: Wed, Apr 13, 2022 Deployment Lead: Tasos Issaaakidis

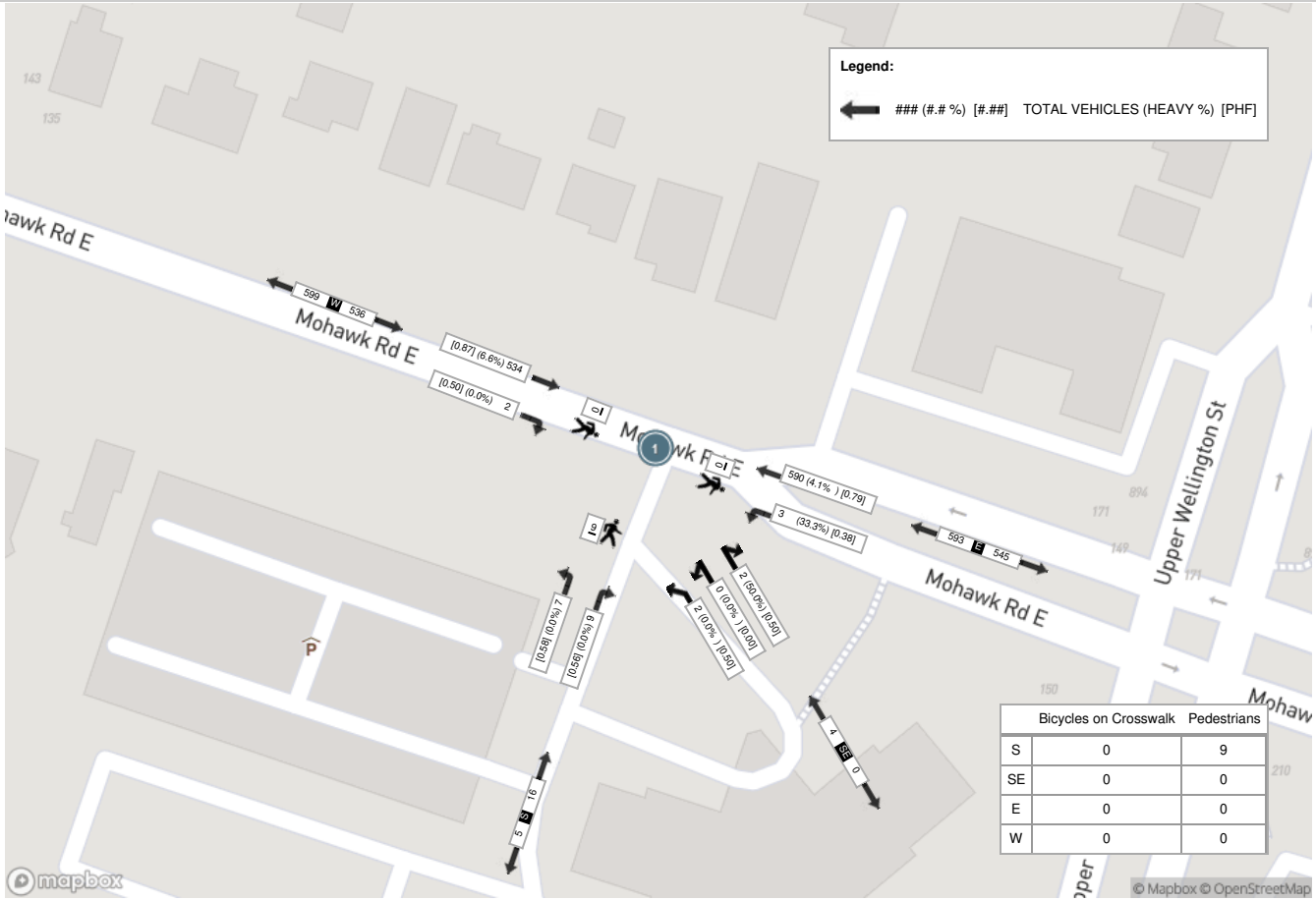
NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (20.68 °C)

Start Time	E Approach MOHAWK RD E					S Approach 150 MOHAWK RD E					W Approach MOHAWK RD E					SE Approach CONDO DRIVEWAY					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Hard Right	Bear Left	Hard Left	UTurn	Approach Total	
16:30:00	224	3	0	0	227	0	2	0	2	2	2	194	2	0	198	2	0	1	0	3	430
16:45:00	213	9	0	0	222	0	2	0	2	2	2	199	0	0	201	0	2	0	0	2	427
17:00:00	211	3	0	0	214	0	2	0	5	2	7	222	0	0	229	3	0	1	0	4	449
17:15:00	184	2	0	0	186	2	2	0	0	4	2	202	0	0	204	3	0	0	0	3	397
Grand Total	832	17	0	0	849	2	8	0	9	10	13	817	2	0	832	8	2	2	0	12	**1703**
Approach%	98%	2%	0%		-	20%	80%	0%		-	1.6%	98.2%	0.2%		-	66.7%	16.7%	16.7%	0%	-	**-**
Totals %	48.9%	1%	0%		49.9%	0.1%	0.5%	0%		0.6%	0.8%	48%	0.1%		48.9%	0.5%	0.1%	0.1%	0%	0.7%	**-**
PHF	0.93	0.47	0		0.94	0.25	1	0		0.63	0.46	0.92	0.25		0.91	0.67	0.25	0.5	0	0.75	**-**
Heavy	6	0	0		6	0	0	0		0	0	8	0		8	0	0	0	0	0	**-**
Heavy %	0.7%	0%	0%		0.7%	0%	0%	0%		0%	0%	1%	0%		1%	0%	0%	0%	0%	0%	**-**
Lights	826	17	0		843	2	8	0		10	13	809	2		824	8	2	2	0	12	**-**
Lights %	99.3%	100%	0%		99.3%	100%	100%	0%		100%	100%	99%	100%		99%	100%	100%	100%	0%	100%	**-**
Single-Unit Trucks	2	0	0		2	0	0	0		0	0	3	0		3	0	0	0	0	0	**-**
Single-Unit Trucks %	0.2%	0%	0%		0.2%	0%	0%	0%		0%	0%	0.4%	0%		0.4%	0%	0%	0%	0%	0%	**-**
Buses	4	0	0		4	0	0	0		0	0	5	0		5	0	0	0	0	0	**-**
Buses %	0.5%	0%	0%		0.5%	0%	0%	0%		0%	0%	0.6%	0%		0.6%	0%	0%	0%	0%	0%	**-**
Articulated Trucks	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%	**-**
Pedestrians	-	-	-	0	-	-	-	-	9	-	-	-	-	0	-	-	-	-	-	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	100%		-	-	-	0%		-	-	-	-		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-	-	-	-		**-**

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

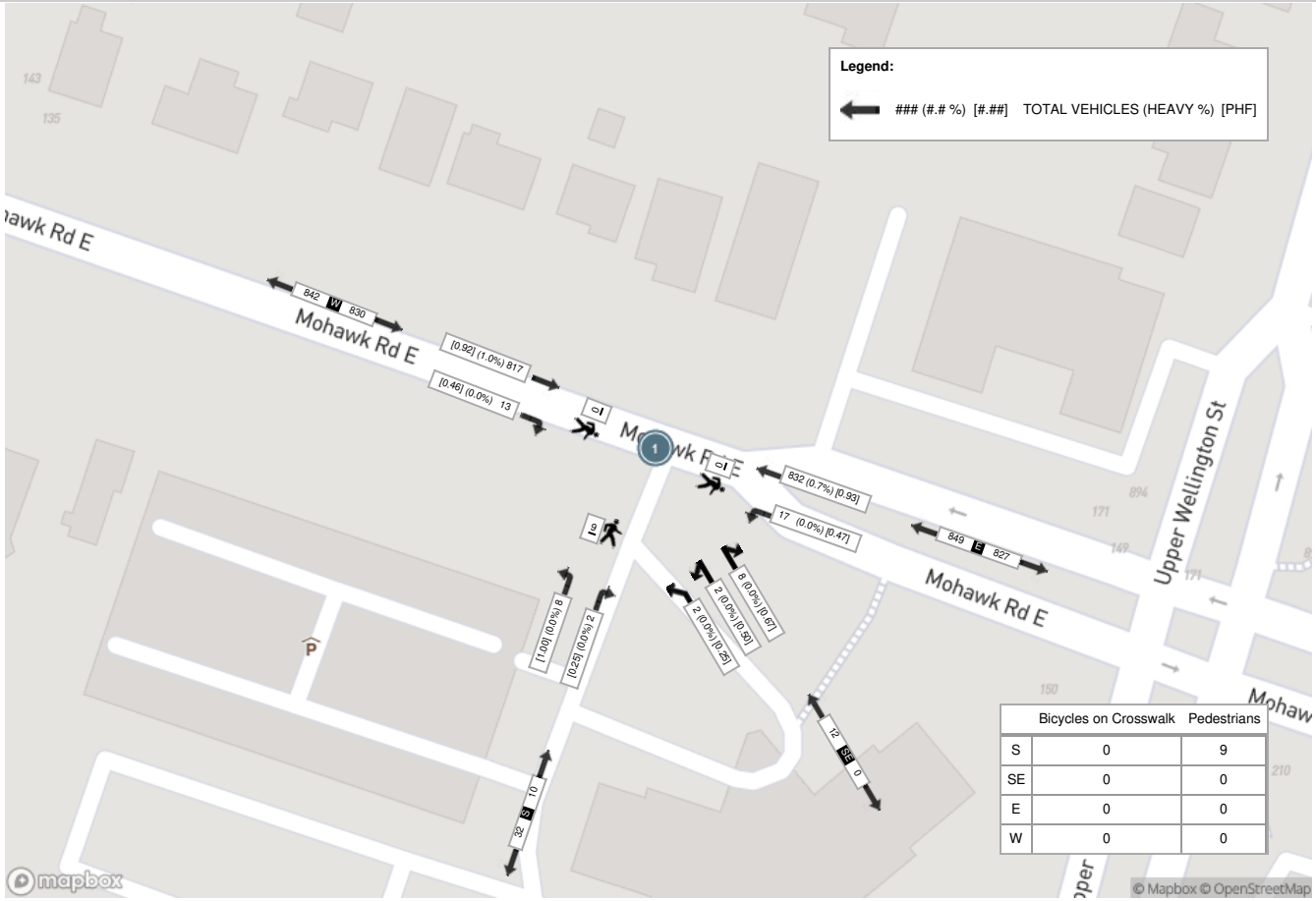
Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (8.85 °C)



	Bicycles on Crosswalk	Pedestrians
S	0	9
SE	0	0
E	0	0
W	0	0

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (20.68 °C)



	Bicycles on Crosswalk	Pedestrians
S	0	9
SE	0	0
E	0	0
W	0	0

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (3 . MOHAWK RD E & DODSON ST)

Start Time	N Approach DODSON ST					E Approach MOHAWK RD E					W Approach MOHAWK RD E					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	UTurn E:E	Peds E:	Approach Total	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	4	1	0	2	5	0	55	0	1	55	41	0	0	1	41	101	
07:15:00	3	0	0	1	3	0	72	0	0	72	56	1	0	1	57	132	
07:30:00	3	0	0	0	3	1	78	0	0	79	64	0	0	1	64	146	
07:45:00	10	2	0	2	12	3	102	0	0	105	77	0	0	1	77	194	573
08:00:00	0	1	0	0	1	0	105	0	0	105	96	6	0	2	102	208	680
08:15:00	9	0	0	0	9	1	141	0	0	142	108	3	0	0	111	262	810
08:30:00	10	3	0	1	13	3	171	0	0	174	161	1	0	1	162	349	1013
08:45:00	11	2	0	3	13	2	139	0	0	141	131	3	0	0	134	288	1107
09:00:00	3	0	0	1	3	1	107	0	0	108	119	4	0	0	123	234	1133
09:15:00	11	2	0	1	13	4	115	0	0	119	127	4	0	0	131	263	1134
09:30:00	3	1	0	1	4	1	109	0	0	110	105	0	0	0	105	219	1004
09:45:00	3	0	0	0	3	2	114	0	0	116	88	1	0	0	89	208	924
BREAK																	
16:00:00	5	2	0	7	7	3	174	0	0	177	157	0	0	0	157	341	
16:15:00	8	5	0	3	13	5	178	0	0	183	180	2	0	0	182	378	
16:30:00	16	9	0	2	25	9	179	0	0	188	196	4	1	0	201	414	
16:45:00	9	12	0	3	21	3	156	0	0	159	223	3	0	0	226	406	1539
17:00:00	4	5	0	3	9	5	175	0	0	180	209	8	0	0	217	406	1604
17:15:00	16	6	0	3	22	6	154	0	0	160	206	7	0	0	213	395	1621
17:30:00	5	5	0	3	10	2	151	0	0	153	167	5	0	2	172	335	1542
17:45:00	4	3	0	5	7	3	174	0	1	177	155	5	0	2	160	344	1480
18:00:00	7	5	0	2	12	8	138	0	0	146	155	0	1	0	156	314	1388
18:15:00	7	2	0	2	9	4	156	0	0	160	119	4	0	0	123	292	1285
18:30:00	3	4	0	6	7	1	131	0	0	132	149	5	0	2	154	293	1243
18:45:00	7	3	0	2	10	1	114	0	0	115	123	4	0	0	127	252	1151
Grand Total	161	73	0	53	234	68	3188	0	2	3256	3212	70	2	13	3284	**6774**	-
Approach%	68.8%	31.2%	0%		-	2.1%	97.9%	0%		-	97.8%	2.1%	0.1%		-	**-**	-
Totals %	2.4%	1.1%	0%		3.5%	1%	47.1%	0%		48.1%	47.4%	1%	0%		48.5%	**-**	-
Heavy	1	0	0		-	1	72	0		-	82	0	0		-	**-**	-
Heavy %	0.6%	0%	0%		-	1.5%	2.3%	0%		-	2.6%	0%	0%		-	**-**	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 08:30 AM - 09:30 AM Weather: Broken Clouds (-3.73 °C)

Start Time	N Approach DODSON ST					E Approach MOHAWK RD E					W Approach MOHAWK RD E					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
08:30:00	10	3	0	1	13	3	171	0	0	174	161	1	0	1	162	349
08:45:00	11	2	0	3	13	2	139	0	0	141	131	3	0	0	134	288
09:00:00	3	0	0	1	3	1	107	0	0	108	119	4	0	0	123	234
09:15:00	11	2	0	1	13	4	115	0	0	119	127	4	0	0	131	263
Grand Total	35	7	0	6	42	10	532	0	0	542	538	12	0	1	550	**1134**
Approach%	83.3%	16.7%	0%		-	1.8%	98.2%	0%		-	97.8%	2.2%	0%		-	**-**
Totals %	3.1%	0.6%	0%		3.7%	0.9%	46.9%	0%		47.8%	47.4%	1.1%	0%		48.5%	**-**
PHF	0.8	0.58	0		0.81	0.63	0.78	0		0.78	0.84	0.75	0		0.85	**-**
Heavy	0	0	0		0	0	14	0		14	24	0	0		24	**-**
Heavy %	0%	0%	0%		0%	0%	2.6%	0%		2.6%	4.5%	0%	0%		4.4%	**-**
Lights	35	7	0		42	10	518	0		528	514	12	0		526	**-**
Lights %	100%	100%	0%		100%	100%	97.4%	0%		97.4%	95.5%	100%	0%		95.6%	**-**
Single-Unit Trucks	0	0	0		0	0	2	0		2	8	0	0		8	**-**
Single-Unit Trucks %	0%	0%	0%		0%	0%	0.4%	0%		0.4%	1.5%	0%	0%		1.5%	**-**
Buses	0	0	0		0	0	11	0		11	14	0	0		14	**-**
Buses %	0%	0%	0%		0%	0%	2.1%	0%		2%	2.6%	0%	0%		2.5%	**-**
Articulated Trucks	0	0	0		0	0	1	0		1	2	0	0		2	**-**
Articulated Trucks %	0%	0%	0%		0%	0%	0.2%	0%		0.2%	0.4%	0%	0%		0.4%	**-**
Pedestrians	-	-	-	6	-	-	-	-	0	-	-	-	-	1	-	**-**
Pedestrians%	-	-	-	85.7%		-	-	-	0%		-	-	-	14.3%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (4.19 °C)

Start Time	N Approach DODSON ST					E Approach MOHAWK RD E					W Approach MOHAWK RD E					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	16	9	0	2	25	9	179	0	0	188	196	4	1	0	201	414
16:45:00	9	12	0	3	21	3	156	0	0	159	223	3	0	0	226	406
17:00:00	4	5	0	3	9	5	175	0	0	180	209	8	0	0	217	406
17:15:00	16	6	0	3	22	6	154	0	0	160	206	7	0	0	213	395
Grand Total	45	32	0	11	77	23	664	0	0	687	834	22	1	0	857	**1621**
Approach%	58.4%	41.6%	0%		-	3.3%	96.7%	0%		-	97.3%	2.6%	0.1%		-	**-**
Totals %	2.8%	2%	0%		4.8%	1.4%	41%	0%		42.4%	51.4%	1.4%	0.1%		52.9%	**-**
PHF	0.7	0.67	0		0.77	0.64	0.93	0		0.91	0.93	0.69	0.25		0.95	**-**
Heavy	0	0	0		0	0	7	0		7	9	0	0		9	**-**
Heavy %	0%	0%	0%		0%	0%	1.1%	0%		1%	1.1%	0%	0%		1.1%	**-**
Lights	45	32	0		77	23	657	0		680	825	22	1		848	**-**
Lights %	100%	100%	0%		100%	100%	98.9%	0%		99%	98.9%	100%	100%		98.9%	**-**
Single-Unit Trucks	0	0	0		0	0	3	0		3	5	0	0		5	**-**
Single-Unit Trucks %	0%	0%	0%		0%	0%	0.5%	0%		0.4%	0.6%	0%	0%		0.6%	**-**
Buses	0	0	0		0	0	4	0		4	4	0	0		4	**-**
Buses %	0%	0%	0%		0%	0%	0.6%	0%		0.6%	0.5%	0%	0%		0.5%	**-**
Articulated Trucks	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%	**-**
Pedestrians	-	-	-	10	-	-	-	-	0	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	90.9%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	9.1%		-	-	-	0%		-	-	-	0%		**-**

Peak Hour: 08:30 AM - 09:30 AM Weather: Broken Clouds (-3.73 °C)

	Bicycles on Crosswalk	Pedestrians
N	0	6
E	0	0
W	0	1

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (4.19 °C)

	Bicycles on Crosswalk	Pedestrians
N	1	10
E	0	0
W	0	0

Spectrum

Turning Movement Count
Location Name: MOHAWK RD E & UPPER WELLINGTON ST
Date: Thu, Mar 10, 2022 Deployment Lead: Tasos Issaaakidis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (1 . MOHAWK RD E & UPPER WELLINGTON ST)

Start Time	N Approach UPPER WELLINGTON ST						E Approach MOHAWK RD E						S Approach UPPER WELLINGTON ST						W Approach MOHAWK RD E						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	12	27	23	0	2	62	21	39	7	0	2	67	2	41	6	0	1	49	1	31	10	0	3	42	220	
07:15:00	16	34	26	0	2	76	28	46	7	0	5	81	5	53	5	0	15	63	5	42	7	0	13	54	274	
07:30:00	17	42	38	0	9	97	43	55	11	0	8	109	14	67	7	0	4	88	6	47	16	0	9	69	363	
07:45:00	22	51	29	0	0	102	35	62	15	0	5	112	17	106	18	0	3	141	8	57	17	0	3	82	437	1294
08:00:00	25	48	33	0	3	106	31	65	10	0	3	106	15	107	16	0	2	138	10	60	19	0	3	89	439	1513
08:15:00	27	33	31	0	4	91	39	89	22	0	5	150	13	117	25	0	15	155	8	73	22	0	6	103	499	1738
08:30:00	24	64	33	0	2	121	41	122	22	0	2	185	21	78	24	0	17	123	23	117	21	0	4	161	590	1965
08:45:00	20	61	28	0	2	109	42	95	13	0	4	150	18	104	24	0	5	146	19	100	19	0	6	138	543	2071
09:00:00	18	62	38	0	5	118	24	82	10	0	9	116	15	65	8	0	5	88	12	99	21	0	6	132	454	2086
09:15:00	27	39	33	0	2	99	22	73	15	0	7	110	15	64	16	0	9	95	10	93	19	0	9	122	426	2013
09:30:00	10	26	25	0	8	61	13	89	8	0	11	110	16	56	12	0	1	84	6	90	18	0	4	114	369	1792
09:45:00	13	43	31	0	0	87	26	84	23	0	3	133	13	62	17	0	3	92	5	70	12	0	1	87	399	1648
BREAK																										
16:00:00	16	87	30	0	3	133	22	138	33	0	3	193	31	58	21	0	7	110	15	132	21	0	9	168	604	
16:15:00	19	84	45	0	4	148	29	147	24	0	8	200	22	55	19	0	6	96	24	130	21	0	9	175	619	
16:30:00	20	76	41	0	6	137	29	141	24	0	6	194	23	62	26	0	7	111	33	138	31	0	7	202	644	
16:45:00	16	87	56	0	1	159	35	120	26	0	6	181	30	70	22	0	3	122	35	163	32	0	2	230	692	2559
17:00:00	16	96	52	0	4	164	29	139	33	0	5	201	31	68	20	0	6	119	29	164	19	0	8	212	696	2651
17:15:00	20	90	44	0	5	154	27	120	22	0	6	169	32	57	27	0	5	116	31	154	38	0	1	223	662	2694
17:30:00	16	81	47	0	1	144	43	124	20	0	3	187	20	58	11	0	4	89	22	129	18	0	3	169	589	2639
17:45:00	24	91	48	0	5	163	25	132	23	0	8	180	28	57	16	0	14	101	20	118	22	0	8	160	604	2551
18:00:00	13	64	34	0	9	111	24	114	15	0	10	153	15	63	18	0	6	96	16	105	30	0	5	151	511	2366
18:15:00	21	70	32	0	7	123	30	116	20	0	12	166	17	52	22	0	8	91	10	86	16	0	6	112	492	2196
18:30:00	18	62	39	0	7	119	29	101	24	0	9	154	19	57	13	0	1	89	22	122	22	0	3	166	528	2135
18:45:00	21	62	43	0	6	126	21	80	22	0	5	123	23	56	14	0	6	93	23	87	17	0	2	127	469	2000
Grand Total	451	1480	879	0	97	2810	708	2373	449	0	145	3530	455	1633	407	0	153	2495	393	2407	488	0	130	3288	**12123**	-
Approach%	16%	52.7%	31.3%	0%		-	20.1%	67.2%	12.7%	0%		-	18.2%	65.5%	16.3%	0%		-	12%	73.2%	14.8%	0%		-	**-**	-
Totals %	3.7%	12.2%	7.3%	0%		23.2%	5.8%	19.6%	3.7%	0%		29.1%	3.8%	13.5%	3.4%	0%		20.6%	3.2%	19.9%	4%	0%		27.1%	**-**	-
Heavy	4	25	6	0		-	7	56	8	0		-	12	36	14	0		-	13	58	13	0		-	**-**	-
Heavy %	0.9%	1.7%	0.7%	0%		-	1%	2.4%	1.8%	0%		-	2.6%	2.2%	3.4%	0%		-	3.3%	2.4%	2.7%	0%		-	**-**	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

Spectrum

Turning Movement Count
Location Name: MOHAWK RD E & UPPER WELLINGTON ST
Date: Thu, Mar 10, 2022 Deployment Lead: Tasos Issaaakidis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 08:15 AM - 09:15 AM Weather: Broken Clouds (-3.73 °C)

Start Time	N Approach UPPER WELLINGTON ST						E Approach MOHAWK RD E						S Approach UPPER WELLINGTON ST						W Approach MOHAWK RD E						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:15:00	27	33	31	0	4	91	39	89	22	0	5	150	13	117	25	0	15	155	8	73	22	0	6	103	499
08:30:00	24	64	33	0	2	121	41	122	22	0	2	185	21	78	24	0	17	123	23	117	21	0	4	161	590
08:45:00	20	61	28	0	2	109	42	95	13	0	4	150	18	104	24	0	5	146	19	100	19	0	6	138	543
09:00:00	18	62	38	0	5	118	24	82	10	0	9	116	15	65	8	0	5	88	12	99	21	0	6	132	454
Grand Total	89	220	130	0	13	439	146	388	67	0	20	601	67	364	81	0	42	512	62	389	83	0	22	534	**2086**
Approach%	20.3%	50.1%	29.6%	0%		-	24.3%	64.6%	11.1%	0%		-	13.1%	71.1%	15.8%	0%		-	11.6%	72.8%	15.5%	0%		-	**-**
Totals %	4.3%	10.5%	6.2%	0%		21%	7%	18.6%	3.2%	0%		28.8%	3.2%	17.4%	3.9%	0%		24.5%	3%	18.6%	4%	0%		25.6%	**-**
PHF	0.82	0.86	0.86	0		0.91	0.87	0.8	0.76	0		0.81	0.8	0.78	0.81	0		0.83	0.67	0.83	0.94	0		0.83	**-**
Heavy	0	4	1	0		5	0	15	1	0		16	4	11	5	0		20	7	21	7	0		35	**-**
Heavy %	0%	1.8%	0.8%	0%		1.1%	0%	3.9%	1.5%	0%		2.7%	6%	3%	6.2%	0%		3.9%	11.3%	5.4%	8.4%	0%		6.6%	**-**
Lights	89	216	129	0		434	146	373	66	0		585	63	353	76	0		492	55	368	76	0		499	**-**
Lights %	100%	98.2%	99.2%	0%		98.9%	100%	96.1%	98.5%	0%		97.3%	94%	97%	93.8%	0%		96.1%	88.7%	94.6%	91.6%	0%		93.4%	**-**
Single-Unit Trucks	0	0	1	0		1	0	0	1	0		1	2	1	2	0		5	3	7	2	0		12	**-**
Single-Unit Trucks %	0%	0%	0.8%	0%		0.2%	0%	0%	1.5%	0%		0.2%	3%	0.3%	2.5%	0%		1%	4.8%	1.8%	2.4%	0%		2.2%	**-**
Buses	0	4	0	0		4	0	15	0	0		15	2	10	2	0		14	4	12	5	0		21	**-**
Buses %	0%	1.8%	0%	0%		0.9%	0%	3.9%	0%	0%		2.5%	3%	2.7%	2.5%	0%		2.7%	6.5%	3.1%	6%	0%		3.9%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	1	0		1	0	2	0	0		2	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	1.2%	0%		0.2%	0%	0.5%	0%	0%		0.4%	**-**
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%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	13	-	-	-	-	-	20	-	-	-	-	-	42	-	-	-	-	-	22	-	**-**
Pedestrians%	-	-	-	-	13.4%		-	-	-	-	20.6%		-	-	-	-	43.3%		-	-	-	-	22.7%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

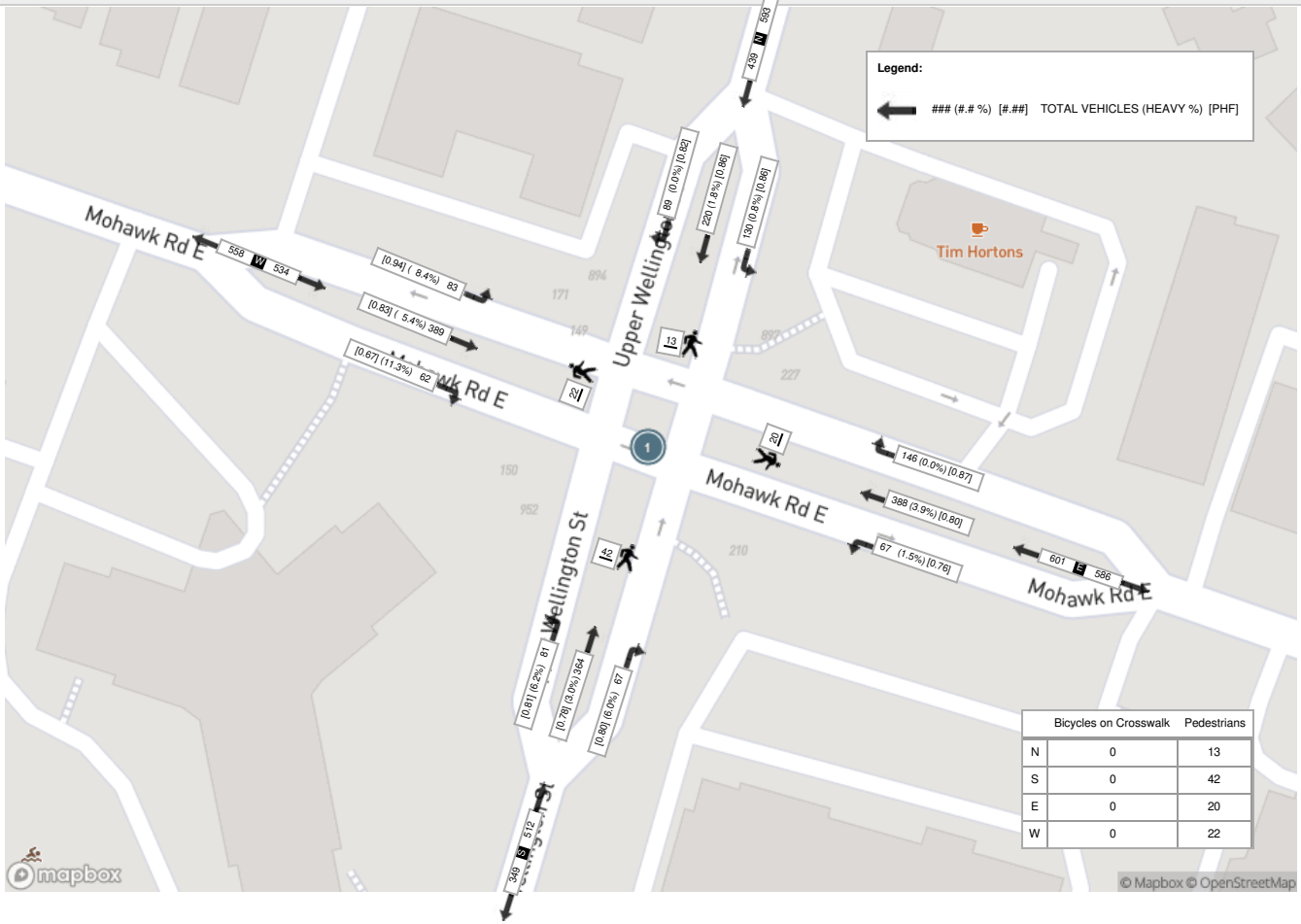
Turning Movement Count
Location Name: MOHAWK RD E & UPPER WELLINGTON ST
Date: Thu, Mar 10, 2022 Deployment Lead: Tasos Issaaakidis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

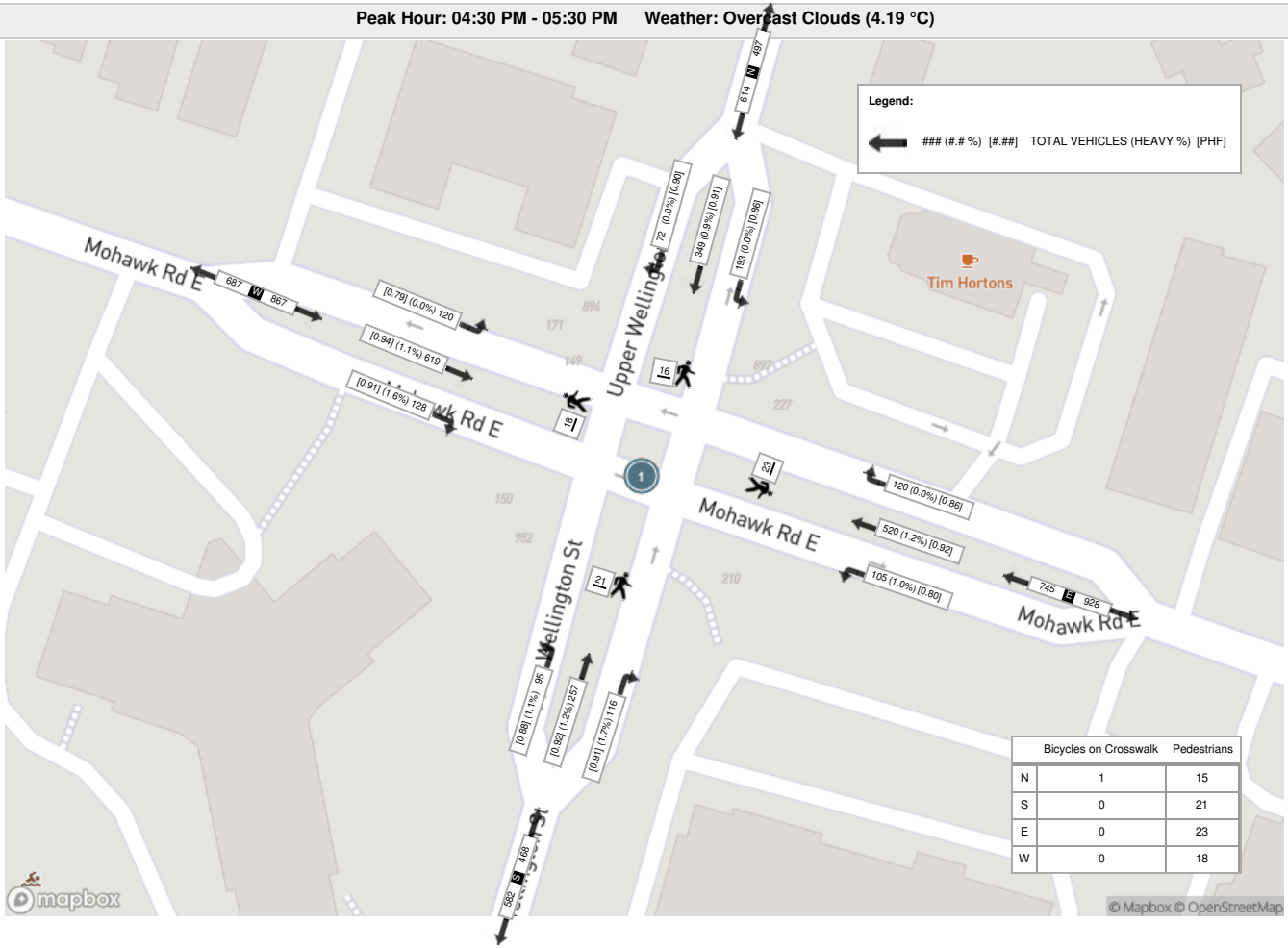
Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (4.19 °C)

Start Time	N Approach UPPER WELLINGTON ST						E Approach MOHAWK RD E						S Approach UPPER WELLINGTON ST						W Approach MOHAWK RD E						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	20	76	41	0	6	137	29	141	24	0	6	194	23	62	26	0	7	111	33	138	31	0	7	202	644
16:45:00	16	87	56	0	1	159	35	120	26	0	6	181	30	70	22	0	3	122	35	163	32	0	2	230	692
17:00:00	16	96	52	0	4	164	29	139	33	0	5	201	31	68	20	0	6	119	29	164	19	0	8	212	696
17:15:00	20	90	44	0	5	154	27	120	22	0	6	169	32	57	27	0	5	116	31	154	38	0	1	223	662
Grand Total	72	349	193	0	16	614	120	520	105	0	23	745	116	257	95	0	21	468	128	619	120	0	18	867	**2694**
Approach%	11.7%	56.8%	31.4%	0%		-	16.1%	69.8%	14.1%	0%		-	24.8%	54.9%	20.3%	0%		-	14.8%	71.4%	13.8%	0%		-	**-**
Totals %	2.7%	13%	7.2%	0%		22.8%	4.5%	19.3%	3.9%	0%		27.7%	4.3%	9.5%	3.5%	0%		17.4%	4.8%	23%	4.5%	0%		32.2%	**-**
PHF	0.9	0.91	0.86	0		0.94	0.86	0.92	0.8	0		0.93	0.91	0.92	0.88	0		0.96	0.91	0.94	0.79	0		0.94	**-**
Heavy	0	3	0	0		3	0	6	1	0		7	2	3	1	0		6	2	7	0	0		9	**-**
Heavy %	0%	0.9%	0%	0%		0.5%	0%	1.2%	1%	0%		0.9%	1.7%	1.2%	1.1%	0%		1.3%	1.6%	1.1%	0%	0%		1%	**-**
Lights	72	346	193	0		611	120	514	104	0		738	114	254	94	0		462	126	612	120	0		858	**-**
Lights %	100%	99.1%	100%	0%		99.5%	100%	98.8%	99%	0%		99.1%	98.3%	98.8%	98.9%	0%		98.7%	98.4%	98.9%	100%	0%		99%	**-**
Single-Unit Trucks	0	0	0	0		0	0	2	1	0		3	2	1	1	0		4	1	3	0	0		4	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.4%	1%	0%		0.4%	1.7%	0.4%	1.1%	0%		0.9%	0.8%	0.5%	0%	0%		0.5%	**-**
Buses	0	3	0	0		3	0	4	0	0		4	0	2	0	0		2	1	4	0	0		5	**-**
Buses %	0%	0.9%	0%	0%		0.5%	0%	0.8%	0%	0%		0.5%	0%	0.8%	0%	0%		0.4%	0.8%	0.6%	0%	0%		0.6%	**-**
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%	**-**
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%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	15	-	-	-	-	-	23	-	-	-	-	-	21	-	-	-	-	-	18	-	**-**
Pedestrians%	-	-	-	-	19.2%		-	-	-	-	29.5%		-	-	-	-	26.9%		-	-	-	-	23.1%		**-**
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	1.3%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 08:15 AM - 09:15 AM **Weather: Broken Clouds (-3.73 °C)**



Peak Hour: 04:30 PM - 05:30 PM **Weather: Overcast Clouds (4.19 °C)**



NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (3 . UPPER WELLINGTON ST & 150 MOHAWK RD E)

Start Time	N Approach UPPER WELLINGTON ST					S Approach UPPER WELLINGTON ST					W Approach 150 MOHAWK RD E					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	UTurn N:N	Peds N:	Approach Total	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	0	44	0	0	44	57	0	0	1	57	2	1	0	1	3	104	
07:15:00	0	50	0	0	50	87	1	0	0	88	1	0	0	1	1	139	
07:30:00	0	50	0	0	50	100	2	0	0	102	3	0	0	1	3	155	
07:45:00	0	98	0	0	98	129	1	0	0	130	0	1	0	0	1	229	627
08:00:00	0	73	0	0	73	138	0	0	0	138	1	0	0	5	1	212	735
08:15:00	0	95	0	0	95	139	1	0	0	140	0	0	0	9	0	235	831
08:30:00	1	113	0	0	114	156	0	0	0	156	5	0	0	21	5	275	951
08:45:00	1	96	0	1	97	146	1	0	0	147	1	0	0	12	1	245	967
09:00:00	0	123	0	0	123	107	0	0	1	107	3	0	0	3	3	233	988
09:15:00	1	76	0	0	77	83	2	0	0	85	3	0	0	4	3	165	918
09:30:00	1	82	0	0	83	96	1	0	0	97	0	0	0	1	0	180	823
09:45:00	1	75	0	0	76	100	0	0	0	100	1	0	0	1	1	177	755
BREAK																	
16:00:00	3	153	1	1	157	123	0	0	1	123	2	0	0	3	2	282	
16:15:00	1	137	0	1	138	116	0	0	0	116	0	0	0	4	0	254	
16:30:00	0	172	0	1	172	114	2	0	0	116	1	0	0	4	1	289	
16:45:00	1	185	0	0	186	117	1	0	0	118	0	0	0	1	0	304	1129
17:00:00	4	176	0	0	180	132	2	0	0	134	2	0	0	0	2	316	1163
17:15:00	0	184	0	0	184	115	3	0	0	118	1	0	0	2	1	303	1212
17:30:00	2	138	0	0	140	112	4	0	0	116	1	0	0	3	1	257	1180
17:45:00	1	147	0	1	148	94	3	0	0	97	3	0	0	3	3	248	1124
18:00:00	2	126	0	0	128	103	6	0	0	109	4	0	0	5	4	241	1049
18:15:00	4	122	0	2	126	109	0	0	0	109	0	1	0	2	1	236	982
18:30:00	0	112	0	1	112	110	0	0	0	110	2	1	0	1	3	225	950
18:45:00	0	117	0	1	117	88	1	0	0	89	1	0	0	2	1	207	909
Grand Total	23	2744	1	9	2768	2671	31	0	3	2702	37	4	0	89	41	**5511**	-
Approach%	0.8%	99.1%	0%		-	98.9%	1.1%	0%		-	90.2%	9.8%	0%		-	**-**	-
Totals %	0.4%	49.8%	0%		50.2%	48.5%	0.6%	0%		49%	0.7%	0.1%	0%		0.7%	**-**	-
Heavy	0	62	0		-	79	0	0		-	0	0	0		-	**-**	-
Heavy %	0%	2.3%	0%		-	3%	0%	0%		-	0%	0%	0%		-	**-**	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (8.85 °C)

Start Time	N Approach UPPER WELLINGTON ST					S Approach UPPER WELLINGTON ST					W Approach 150 MOHAWK RD E					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
08:15:00	0	95	0	0	95	139	1	0	0	140	0	0	0	9	0	235
08:30:00	1	113	0	0	114	156	0	0	0	156	5	0	0	21	5	275
08:45:00	1	96	0	1	97	146	1	0	0	147	1	0	0	12	1	245
09:00:00	0	123	0	0	123	107	0	0	1	107	3	0	0	3	3	233
Grand Total	2	427	0	1	429	548	2	0	1	550	9	0	0	45	9	**988**
Approach%	0.5%	99.5%	0%		-	99.6%	0.4%	0%		-	100%	0%	0%		-	**-**
Totals %	0.2%	43.2%	0%		43.4%	55.5%	0.2%	0%		55.7%	0.9%	0%	0%		0.9%	**-**
PHF	0.5	0.87	0		0.87	0.88	0.5	0		0.88	0.45	0	0		0.45	**-**
Heavy	0	29	0		29	25	0	0		25	0	0	0		0	**-**
Heavy %	0%	6.8%	0%		6.8%	4.6%	0%	0%		4.5%	0%	0%	0%		0%	**-**
Lights	2	398	0		400	522	2	0		524	9	0	0		9	**-**
Lights %	100%	93.2%	0%		93.2%	95.3%	100%	0%		95.3%	100%	0%	0%		100%	**-**
Single-Unit Trucks	0	12	0		12	7	0	0		7	0	0	0		0	**-**
Single-Unit Trucks %	0%	2.8%	0%		2.8%	1.3%	0%	0%		1.3%	0%	0%	0%		0%	**-**
Buses	0	14	0		14	16	0	0		16	0	0	0		0	**-**
Buses %	0%	3.3%	0%		3.3%	2.9%	0%	0%		2.9%	0%	0%	0%		0%	**-**
Articulated Trucks	0	3	0		3	2	0	0		2	0	0	0		0	**-**
Articulated Trucks %	0%	0.7%	0%		0.7%	0.4%	0%	0%		0.4%	0%	0%	0%		0%	**-**
Bicycles on Road	0	0	0		0	1	0	0		1	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%		0%	0.2%	0%	0%		0.2%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	1	-	-	-	-	1	-	-	-	-	45	-	**-**
Pedestrians%	-	-	-	2.1%		-	-	-	2.1%		-	-	-	95.7%		**-**

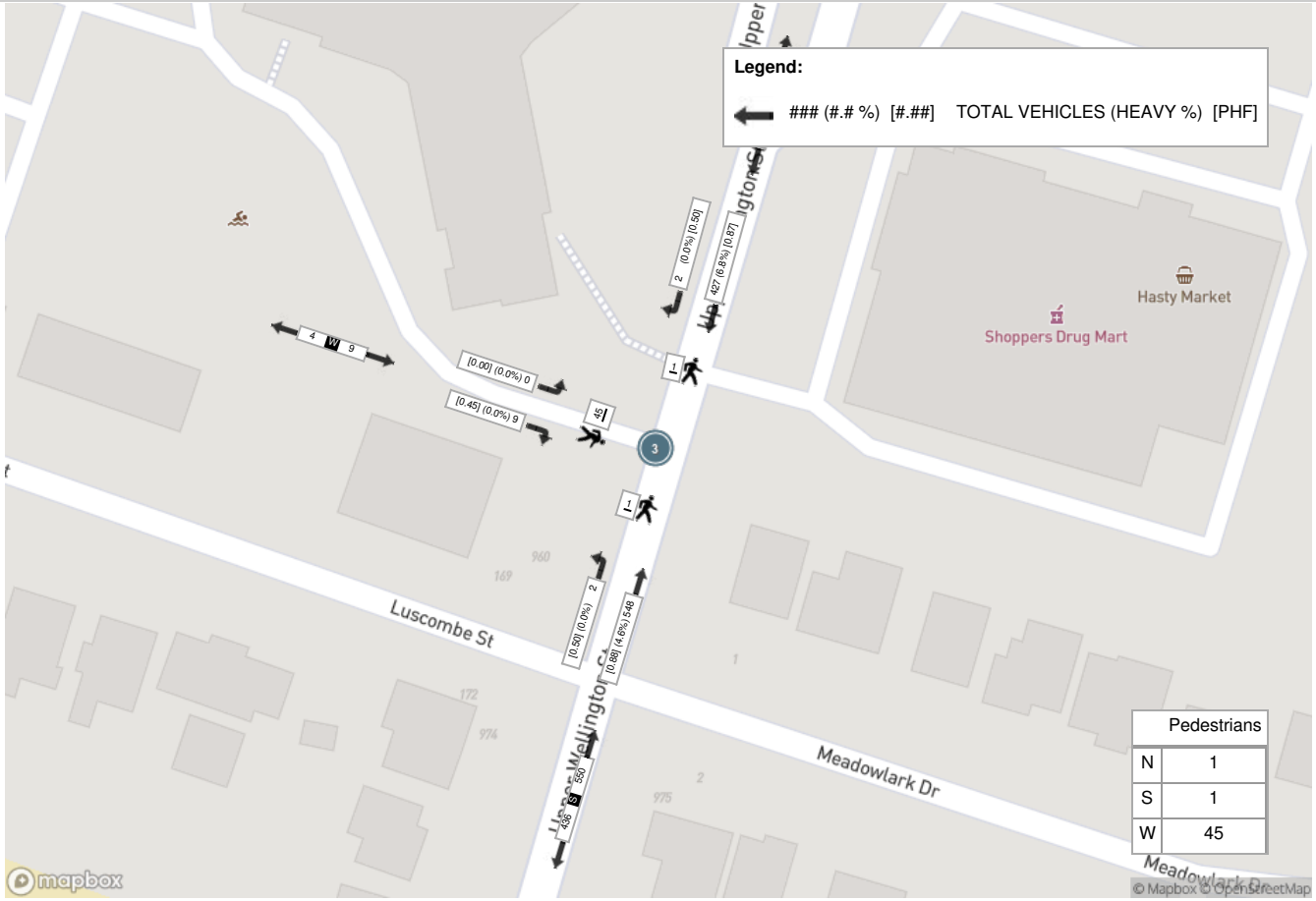
NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (20.68 °C)

Start Time	N Approach UPPER WELLINGTON ST					S Approach UPPER WELLINGTON ST					W Approach 150 MOHAWK RD E					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
16:30:00	0	172	0	1	172	114	2	0	0	116	1	0	0	4	1	289
16:45:00	1	185	0	0	186	117	1	0	0	118	0	0	0	1	0	304
17:00:00	4	176	0	0	180	132	2	0	0	134	2	0	0	0	2	316
17:15:00	0	184	0	0	184	115	3	0	0	118	1	0	0	2	1	303
Grand Total	5	717	0	1	722	478	8	0	0	486	4	0	0	7	4	**1212**
Approach%	0.7%	99.3%	0%		-	98.4%	1.6%	0%		-	100%	0%	0%		-	**-**
Totals %	0.4%	59.2%	0%		59.6%	39.4%	0.7%	0%		40.1%	0.3%	0%	0%		0.3%	**-**
PHF	0.31	0.97	0		0.97	0.91	0.67	0		0.91	0.5	0	0		0.5	**-**
Heavy	0	6	0		6	9	0	0		9	0	0	0		0	**-**
Heavy %	0%	0.8%	0%		0.8%	1.9%	0%	0%		1.9%	0%	0%	0%		0%	**-**
Lights	5	711	0		716	469	8	0		477	4	0	0		4	**-**
Lights %	100%	99.2%	0%		99.2%	98.1%	100%	0%		98.1%	100%	0%	0%		100%	**-**
Single-Unit Trucks	0	2	0		2	4	0	0		4	0	0	0		0	**-**
Single-Unit Trucks %	0%	0.3%	0%		0.3%	0.8%	0%	0%		0.8%	0%	0%	0%		0%	**-**
Buses	0	4	0		4	5	0	0		5	0	0	0		0	**-**
Buses %	0%	0.6%	0%		0.6%	1%	0%	0%		1%	0%	0%	0%		0%	**-**
Articulated Trucks	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%	**-**
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	7	-	**-**
Pedestrians%	-	-	-	12.5%		-	-	-	0%		-	-	-	87.5%		**-**

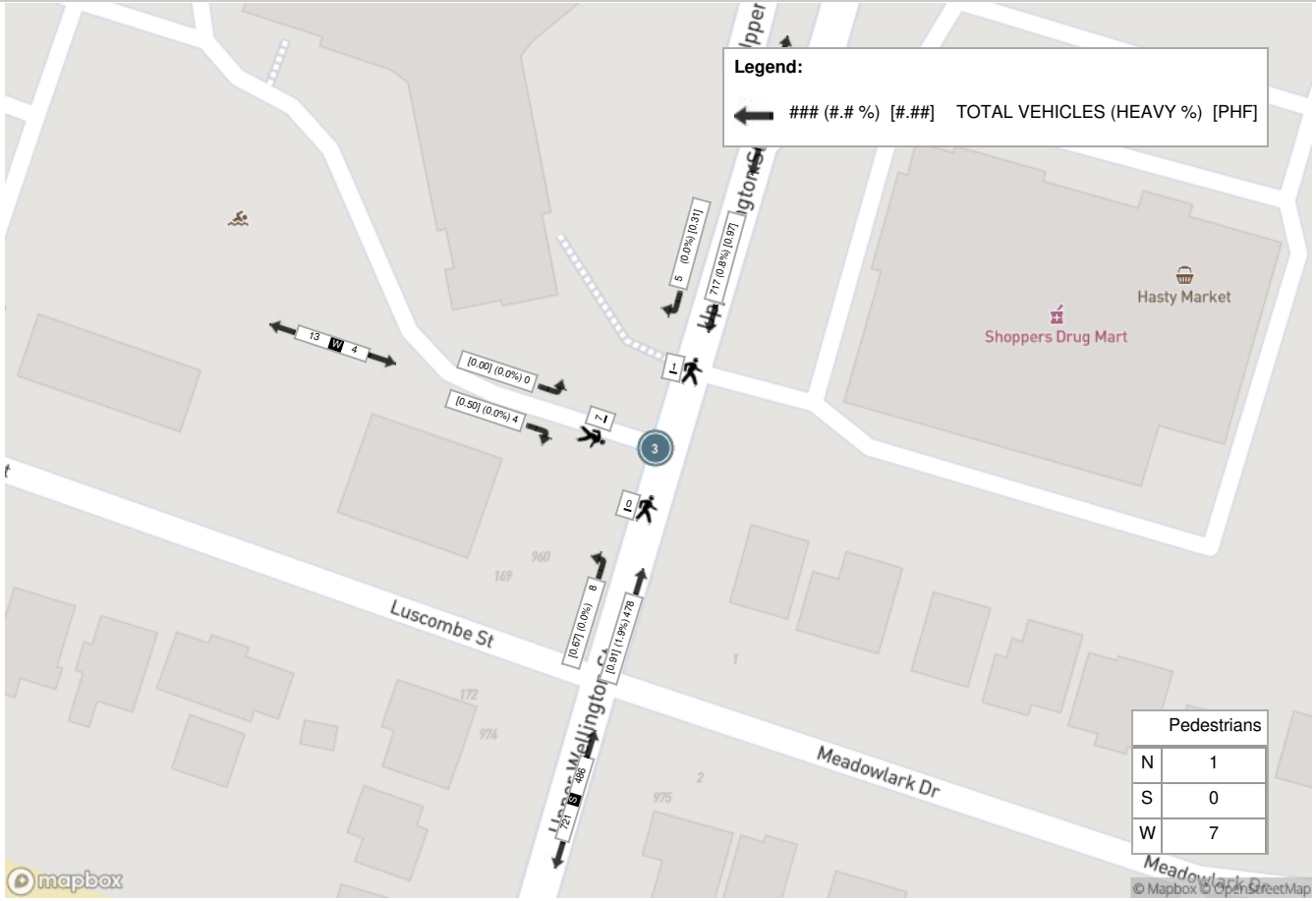
NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (8.85 °C)



NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (20.68 °C)



NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (2 . UPPER WELLINGTON ST & 210 MOHAWK RD E)

Start Time	N Approach UPPER WELLINGTON ST					E Approach 210 MOHAWK RD E					S Approach UPPER WELLINGTON ST					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	UTurn S:S	Peds S:	Approach Total		
07:00:00	42	0	0	0	42	0	2	0	2	2	1	60	0	1	61	105	
07:15:00	51	0	0	0	51	0	0	0	1	0	0	87	0	0	87	138	
07:30:00	48	2	0	0	50	0	1	0	1	1	3	96	0	0	99	150	
07:45:00	97	1	0	0	98	2	3	0	6	5	4	122	0	0	126	229	622
08:00:00	71	0	0	0	71	1	2	0	1	3	4	134	0	0	138	212	729
08:15:00	92	0	0	0	92	4	3	0	1	7	3	141	0	0	144	243	834
08:30:00	115	0	0	0	115	4	2	0	4	6	6	150	0	1	156	277	961
08:45:00	89	2	0	1	91	3	6	0	0	9	8	137	0	0	145	245	977
09:00:00	115	0	0	0	115	5	8	0	1	13	6	97	0	1	103	231	996
09:15:00	71	3	0	0	74	2	6	0	2	8	8	77	0	0	85	167	920
09:30:00	77	1	0	0	78	8	4	0	1	12	7	88	0	1	95	185	828
09:45:00	72	0	0	0	72	5	5	0	1	10	12	88	0	0	100	182	765
BREAK																	
16:00:00	145	2	1	0	148	5	10	0	6	15	6	117	0	1	123	286	
16:15:00	133	1	0	1	134	6	5	0	6	11	10	107	0	1	117	262	
16:30:00	162	3	0	0	165	4	10	0	3	14	3	110	0	0	113	292	
16:45:00	179	5	0	0	184	5	7	0	0	12	8	109	0	0	117	313	1153
17:00:00	173	2	0	0	175	11	10	0	0	21	1	132	0	0	133	329	1196
17:15:00	177	3	0	0	180	7	6	0	4	13	5	110	0	0	115	308	1242
17:30:00	135	2	0	0	137	7	6	0	3	13	7	106	0	0	113	263	1213
17:45:00	137	1	0	0	138	5	9	0	3	14	4	91	0	1	95	247	1147
18:00:00	125	4	0	0	129	3	4	0	4	7	8	94	0	1	102	238	1056
18:15:00	120	2	0	0	122	7	6	0	4	13	6	104	0	1	110	245	993
18:30:00	106	2	0	1	108	7	6	0	3	13	4	108	0	0	112	233	963
18:45:00	112	1	0	0	113	9	5	0	2	14	9	78	0	1	87	214	930
Grand Total	2644	37	1	3	2682	110	126	0	59	236	133	2543	0	10	2676	**5594**	-
Approach%	98.6%	1.4%	0%		-	46.6%	53.4%	0%		-	5%	95%	0%		-	**-**	-
Totals %	47.3%	0.7%	0%		47.9%	2%	2.3%	0%		4.2%	2.4%	45.5%	0%		47.8%	**-**	-
Heavy	63	1	0		-	3	2	0		-	2	76	0		-	**-**	-
Heavy %	2.4%	2.7%	0%		-	2.7%	1.6%	0%		-	1.5%	3%	0%		-	**-**	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (8.85 °C)

Start Time	N Approach UPPER WELLINGTON ST					E Approach 210 MOHAWK RD E					S Approach UPPER WELLINGTON ST					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
08:15:00	92	0	0	0	92	4	3	0	1	7	3	141	0	0	144	243
08:30:00	115	0	0	0	115	4	2	0	4	6	6	150	0	1	156	277
08:45:00	89	2	0	1	91	3	6	0	0	9	8	137	0	0	145	245
09:00:00	115	0	0	0	115	5	8	0	1	13	6	97	0	1	103	231
Grand Total	411	2	0	1	413	16	19	0	6	35	23	525	0	2	548	**996**
Approach%	99.5%	0.5%	0%		-	45.7%	54.3%	0%		-	4.2%	95.8%	0%		-	**-**
Totals %	41.3%	0.2%	0%		41.5%	1.6%	1.9%	0%		3.5%	2.3%	52.7%	0%		55%	**-**
PHF	0.89	0.25	0		0.9	0.8	0.59	0		0.67	0.72	0.88	0		0.88	**-**
Heavy	29	0	0		29	2	1	0		3	2	23	0		25	**-**
Heavy %	7.1%	0%	0%		7%	12.5%	5.3%	0%		8.6%	8.7%	4.4%	0%		4.6%	**-**
Lights	382	2	0		384	14	18	0		32	21	501	0		522	**-**
Lights %	92.9%	100%	0%		93%	87.5%	94.7%	0%		91.4%	91.3%	95.4%	0%		95.3%	**-**
Single-Unit Trucks	13	0	0		13	1	0	0		1	2	5	0		7	**-**
Single-Unit Trucks %	3.2%	0%	0%		3.1%	6.3%	0%	0%		2.9%	8.7%	1%	0%		1.3%	**-**
Buses	13	0	0		13	0	1	0		1	0	16	0		16	**-**
Buses %	3.2%	0%	0%		3.1%	0%	5.3%	0%		2.9%	0%	3%	0%		2.9%	**-**
Articulated Trucks	3	0	0		3	1	0	0		1	0	2	0		2	**-**
Articulated Trucks %	0.7%	0%	0%		0.7%	6.3%	0%	0%		2.9%	0%	0.4%	0%		0.4%	**-**
Bicycles on Road	0	0	0		0	0	0	0		0	0	1	0		1	**-**
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0.2%	0%		0.2%	**-**
Pedestrians	-	-	-	1	-	-	-	-	6	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	11.1%		-	-	-	66.7%		-	-	-	22.2%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

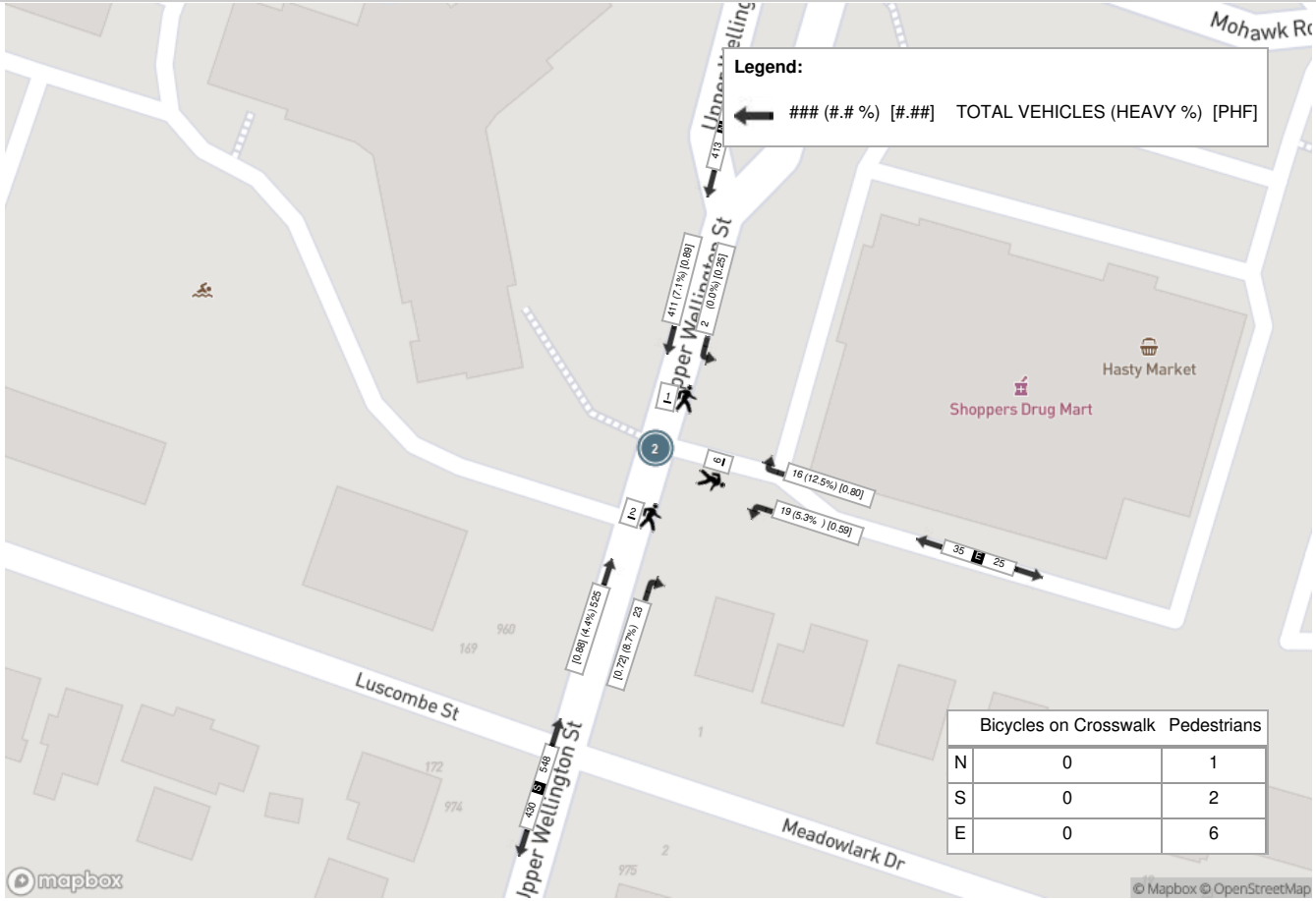
NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (20.68 °C)

Start Time	N Approach UPPER WELLINGTON ST					E Approach 210 MOHAWK RD E					S Approach UPPER WELLINGTON ST					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
16:30:00	162	3	0	0	165	4	10	0	3	14	3	110	0	0	113	292
16:45:00	179	5	0	0	184	5	7	0	0	12	8	109	0	0	117	313
17:00:00	173	2	0	0	175	11	10	0	0	21	1	132	0	0	133	329
17:15:00	177	3	0	0	180	7	6	0	4	13	5	110	0	0	115	308
Grand Total	691	13	0	0	704	27	33	0	7	60	17	461	0	0	478	**1242**
Approach%	98.2%	1.8%	0%		-	45%	55%	0%		-	3.6%	96.4%	0%		-	**-**
Totals %	55.6%	1%	0%		56.7%	2.2%	2.7%	0%		4.8%	1.4%	37.1%	0%		38.5%	**-**
PHF	0.97	0.65	0		0.96	0.61	0.83	0		0.71	0.53	0.87	0		0.9	**-**
Heavy	7	0	0		7	0	0	0		0	0	8	0		8	**-**
Heavy %	1%	0%	0%		1%	0%	0%	0%		0%	0%	1.7%	0%		1.7%	**-**
Lights	684	13	0		697	27	33	0		60	17	453	0		470	**-**
Lights %	99%	100%	0%		99%	100%	100%	0%		100%	100%	98.3%	0%		98.3%	**-**
Single-Unit Trucks	3	0	0		3	0	0	0		0	0	3	0		3	**-**
Single-Unit Trucks %	0.4%	0%	0%		0.4%	0%	0%	0%		0%	0%	0.7%	0%		0.6%	**-**
Buses	4	0	0		4	0	0	0		0	0	5	0		5	**-**
Buses %	0.6%	0%	0%		0.6%	0%	0%	0%		0%	0%	1.1%	0%		1%	**-**
Articulated Trucks	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%	**-**
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	0	-	-	-	-	4	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	57.1%		-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	42.9%		-	-	-	0%		**-**

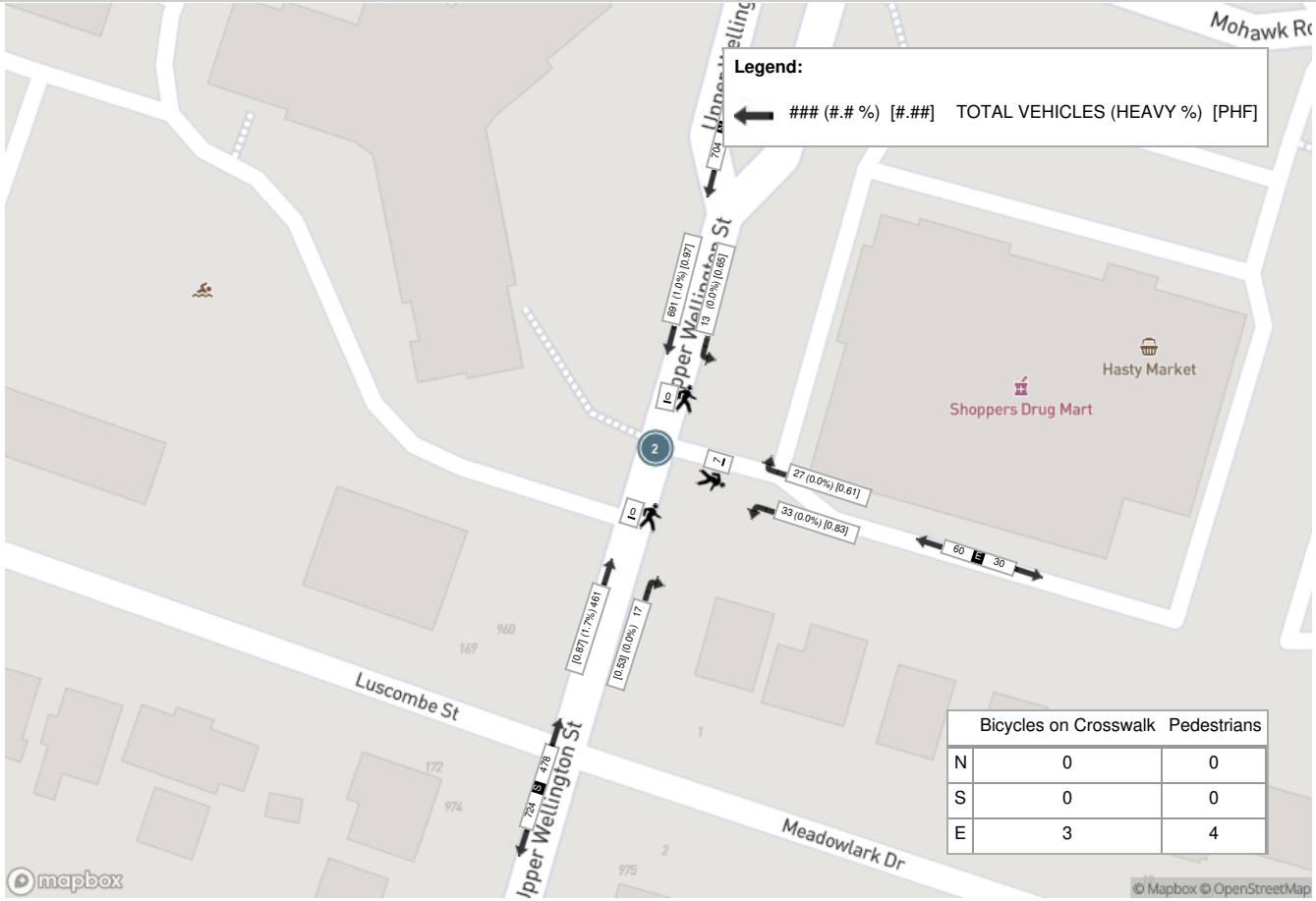
NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (8.85 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	1
S	0	2
E	0	6

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (20.68 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	0
E	3	4

Spectrum

Turning Movement Count
Location Name: UPPER WELLINGTON ST & LUSCOMBE ST / MEADOWLARK DR
Date: Thu, Mar 10, 2022 Deployment Lead: Tasos Issaaakidis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (2 . UPPER WELLINGTON ST & LUSCOMBE ST / MEADOWLARK DR)

Start Time	N Approach UPPER WELLINGTON ST						E Approach MEADOWLARK DR						S Approach UPPER WELLINGTON ST						W Approach LUSCOMBE ST						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	2	33	0	0	0	35	4	1	0	0	0	5	0	42	0	0	0	42	0	0	3	0	1	3	85	
07:15:00	2	40	5	0	0	47	2	1	1	0	1	4	1	56	0	0	0	57	1	0	2	0	0	3	111	
07:30:00	3	56	2	0	0	61	7	0	0	0	0	7	0	85	0	0	0	85	0	0	0	0	0	0	153	
07:45:00	2	70	2	0	0	74	11	0	0	0	0	11	0	129	0	0	0	129	0	0	6	0	2	6	220	569
08:00:00	4	65	3	0	0	72	8	0	0	0	1	8	3	129	0	0	0	132	1	1	3	0	0	5	217	701
08:15:00	7	60	0	0	0	67	6	0	0	0	5	6	0	144	2	0	1	146	2	0	5	0	8	7	226	816
08:30:00	10	97	5	0	2	112	8	0	1	0	3	9	2	110	3	0	1	115	4	1	7	0	7	12	248	911
08:45:00	1	88	7	0	0	96	7	0	1	0	1	8	1	123	1	0	1	125	5	0	7	0	3	12	241	932
09:00:00	5	80	1	0	0	86	7	1	0	0	3	8	1	90	2	0	1	93	2	0	3	0	2	5	192	907
09:15:00	3	68	1	0	4	72	10	1	0	0	6	11	0	82	1	0	1	83	1	0	4	0	3	5	171	852
09:30:00	0	39	3	0	2	42	4	0	1	0	4	5	1	76	1	0	0	78	0	0	3	0	0	3	128	732
09:45:00	3	71	3	0	0	77	4	0	0	0	0	4	1	90	1	0	0	92	0	0	1	0	0	1	174	665
BREAK																										
16:00:00	4	132	10	0	0	146	6	0	0	0	3	6	1	107	1	0	0	109	4	0	1	0	4	5	266	
16:15:00	6	128	7	0	3	141	3	0	1	0	5	4	1	88	0	0	0	89	0	0	5	0	3	5	239	
16:30:00	4	123	8	0	0	135	4	0	0	0	1	4	0	106	1	0	0	107	2	0	4	0	3	6	252	
16:45:00	2	133	13	0	4	148	8	0	1	0	1	9	0	110	0	0	0	110	0	0	3	0	5	3	270	1027
17:00:00	9	143	9	0	2	161	5	1	0	0	0	6	0	103	2	0	2	105	1	0	6	0	4	7	279	1040
17:15:00	5	135	6	0	2	146	3	0	2	0	2	5	0	103	1	0	1	104	1	0	4	0	1	5	260	1061
17:30:00	2	116	11	0	2	129	4	0	0	0	2	4	2	83	0	0	0	85	0	0	2	0	2	2	220	1029
17:45:00	8	120	10	0	0	138	7	1	2	0	8	10	0	91	1	0	0	92	0	0	4	0	1	4	244	1003
18:00:00	4	87	9	0	0	100	6	0	0	0	6	6	0	89	1	0	0	90	0	0	5	0	1	5	201	925
18:15:00	4	96	7	0	1	107	5	0	1	0	5	6	0	88	0	0	0	88	4	0	1	0	1	5	206	871
18:30:00	4	98	6	0	0	108	4	0	3	0	1	7	1	82	0	0	0	83	3	0	5	0	0	8	206	857
18:45:00	4	101	4	0	0	109	6	0	0	0	0	6	0	82	0	0	0	82	0	0	5	0	0	5	202	815
Grand Total	98	2179	132	0	22	2409	139	6	14	0	58	159	15	2288	18	0	8	2321	31	2	89	0	51	122	**5011**	-
Approach%	4.1%	90.5%	5.5%	0%		-	87.4%	3.8%	8.8%	0%		-	0.6%	98.6%	0.8%	0%		-	25.4%	1.6%	73%	0%		-	**-**	-
Totals %	2%	43.5%	2.6%	0%		48.1%	2.8%	0.1%	0.3%	0%		3.2%	0.3%	45.7%	0.4%	0%		46.3%	0.6%	0%	1.8%	0%		2.4%	**-**	-
Heavy	2	42	1	0		-	2	0	0	0		-	1	58	0	0		-	0	2	1	0		-	**-**	-
Heavy %	2%	1.9%	0.8%	0%		-	1.4%	0%	0%	0%		-	6.7%	2.5%	0%	0%		-	0%	100%	1.1%	0%		-	**-**	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 08:00 AM - 09:00 AM Weather: Broken Clouds (-3.73 °C)

Start Time	N Approach UPPER WELLINGTON ST						E Approach MEADOWLARK DR						S Approach UPPER WELLINGTON ST						W Approach LUSCOMBE ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	4	65	3	0	0	72	8	0	0	0	1	8	3	129	0	0	0	132	1	1	3	0	0	5	217
08:15:00	7	60	0	0	0	67	6	0	0	0	5	6	0	144	2	0	1	146	2	0	5	0	8	7	226
08:30:00	10	97	5	0	2	112	8	0	1	0	3	9	2	110	3	0	1	115	4	1	7	0	7	12	248
08:45:00	1	88	7	0	0	96	7	0	1	0	1	8	1	123	1	0	1	125	5	0	7	0	3	12	241
Grand Total	22	310	15	0	2	347	29	0	2	0	10	31	6	506	6	0	3	518	12	2	22	0	18	36	**932**
Approach%	6.3%	89.3%	4.3%	0%		-	93.5%	0%	6.5%	0%		-	1.2%	97.7%	1.2%	0%		-	33.3%	5.6%	61.1%	0%		-	**-**
Totals %	2.4%	33.3%	1.6%	0%		37.2%	3.1%	0%	0.2%	0%		3.3%	0.6%	54.3%	0.6%	0%		55.6%	1.3%	0.2%	2.4%	0%		3.9%	**-**
PHF	0.55	0.8	0.54	0		0.77	0.91	0	0.5	0		0.86	0.5	0.88	0.5	0		0.89	0.6	0.5	0.79	0		0.75	**-**
Heavy	1	9	1	0		11	1	0	0	0		1	1	16	0	0		17	0	2	1	0		3	**-**
Heavy %	4.5%	2.9%	6.7%	0%		3.2%	3.4%	0%	0%	0%		3.2%	16.7%	3.2%	0%	0%		3.3%	0%	100%	4.5%	0%		8.3%	**-**
Lights	21	301	14	0		336	28	0	2	0		30	5	490	6	0		501	12	0	21	0		33	**-**
Lights %	95.5%	97.1%	93.3%	0%		96.8%	96.6%	0%	100%	0%		96.8%	83.3%	96.8%	100%	0%		96.7%	100%	0%	95.5%	0%		91.7%	**-**
Single-Unit Trucks	1	2	0	0		3	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	**-**
Single-Unit Trucks %	4.5%	0.6%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	0.8%	0%	0%		0.8%	0%	0%	0%	0%		0%	**-**
Buses	0	7	1	0		8	1	0	0	0		1	1	11	0	0		12	0	2	1	0		3	**-**
Buses %	0%	2.3%	6.7%	0%		2.3%	3.4%	0%	0%	0%		3.2%	16.7%	2.2%	0%	0%		2.3%	0%	100%	4.5%	0%		8.3%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	2	-	-	-	-	-	10	-	-	-	-	-	3	-	-	-	-	-	18	-	**-**
Pedestrians%	-	-	-	-	6.1%		-	-	-	-	30.3%		-	-	-	-	9.1%		-	-	-	-	54.5%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

Turning Movement Count
Location Name: UPPER WELLINGTON ST & LUSCOMBE ST / MEADOWLARK DR
Date: Thu, Mar 10, 2022 Deployment Lead: Tasos Issaaakidis

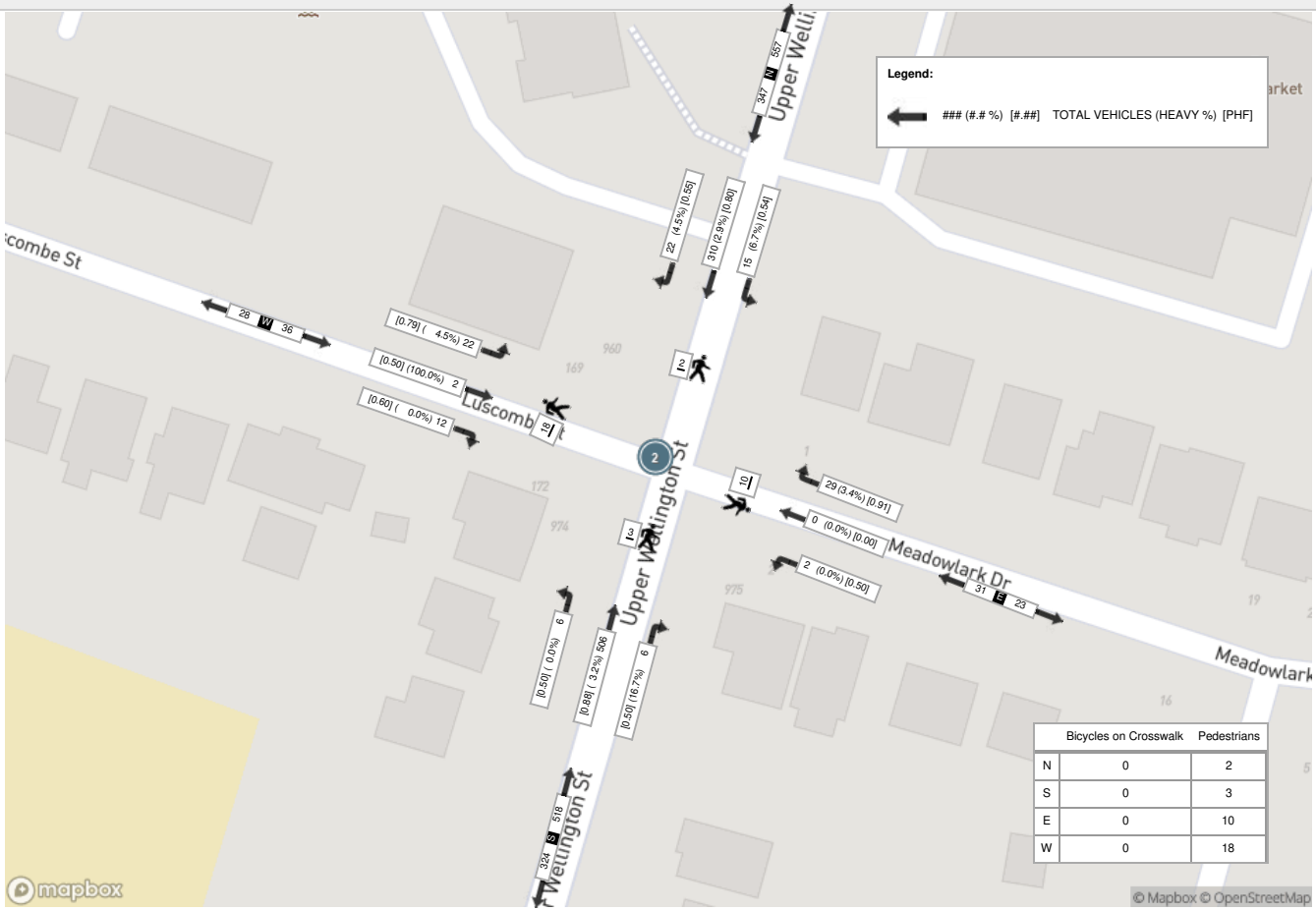
NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (4.19 °C)

Start Time	N Approach UPPER WELLINGTON ST						E Approach MEADOWLARK DR						S Approach UPPER WELLINGTON ST						W Approach LUSCOMBE ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	4	123	8	0	0	135	4	0	0	0	1	4	0	106	1	0	0	107	2	0	4	0	3	6	252
16:45:00	2	133	13	0	4	148	8	0	1	0	1	9	0	110	0	0	0	110	0	0	3	0	5	3	270
17:00:00	9	143	9	0	2	161	5	1	0	0	0	6	0	103	2	0	2	105	1	0	6	0	4	7	279
17:15:00	5	135	6	0	2	146	3	0	2	0	2	5	0	103	1	0	1	104	1	0	4	0	1	5	260
Grand Total	20	534	36	0	8	590	20	1	3	0	4	24	0	422	4	0	3	426	4	0	17	0	13	21	**1061**
Approach%	3.4%	90.5%	6.1%	0%		-	83.3%	4.2%	12.5%	0%		-	0%	99.1%	0.9%	0%		-	19%	0%	81%	0%		-	**-**
Totals %	1.9%	50.3%	3.4%	0%		55.6%	1.9%	0.1%	0.3%	0%		2.3%	0%	39.8%	0.4%	0%		40.2%	0.4%	0%	1.6%	0%		2%	**-**
PHF	0.56	0.93	0.69	0		0.92	0.63	0.25	0.38	0		0.67	0	0.96	0.5	0		0.97	0.5	0	0.71	0		0.75	**-**
Heavy	0	6	0	0		6	0	0	0	0		0	0	6	0	0		6	0	0	0	0		0	**-**
Heavy %	0%	1.1%	0%	0%		1%	0%	0%	0%	0%		0%	0%	1.4%	0%	0%		1.4%	0%	0%	0%	0%		0%	**-**
Lights	20	528	36	0		584	20	1	3	0		24	0	416	4	0		420	4	0	17	0		21	**-**
Lights %	100%	98.9%	100%	0%		99%	100%	100%	100%	0%		100%	0%	98.6%	100%	0%		98.6%	100%	0%	100%	0%		100%	**-**
Single-Unit Trucks	0	3	0	0		3	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	0.6%	0%	0%		0.5%	0%	0%	0%	0%		0%	0%	0.9%	0%	0%		0.9%	0%	0%	0%	0%		0%	**-**
Buses	0	3	0	0		3	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	**-**
Buses %	0%	0.6%	0%	0%		0.5%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.5%	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%	**-**
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%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	8	-	-	-	-	-	4	-	-	-	-	-	3	-	-	-	-	-	13	-	**-**
Pedestrians%	-	-	-	-	28.6%		-	-	-	-	14.3%		-	-	-	-	10.7%		-	-	-	-	46.4%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

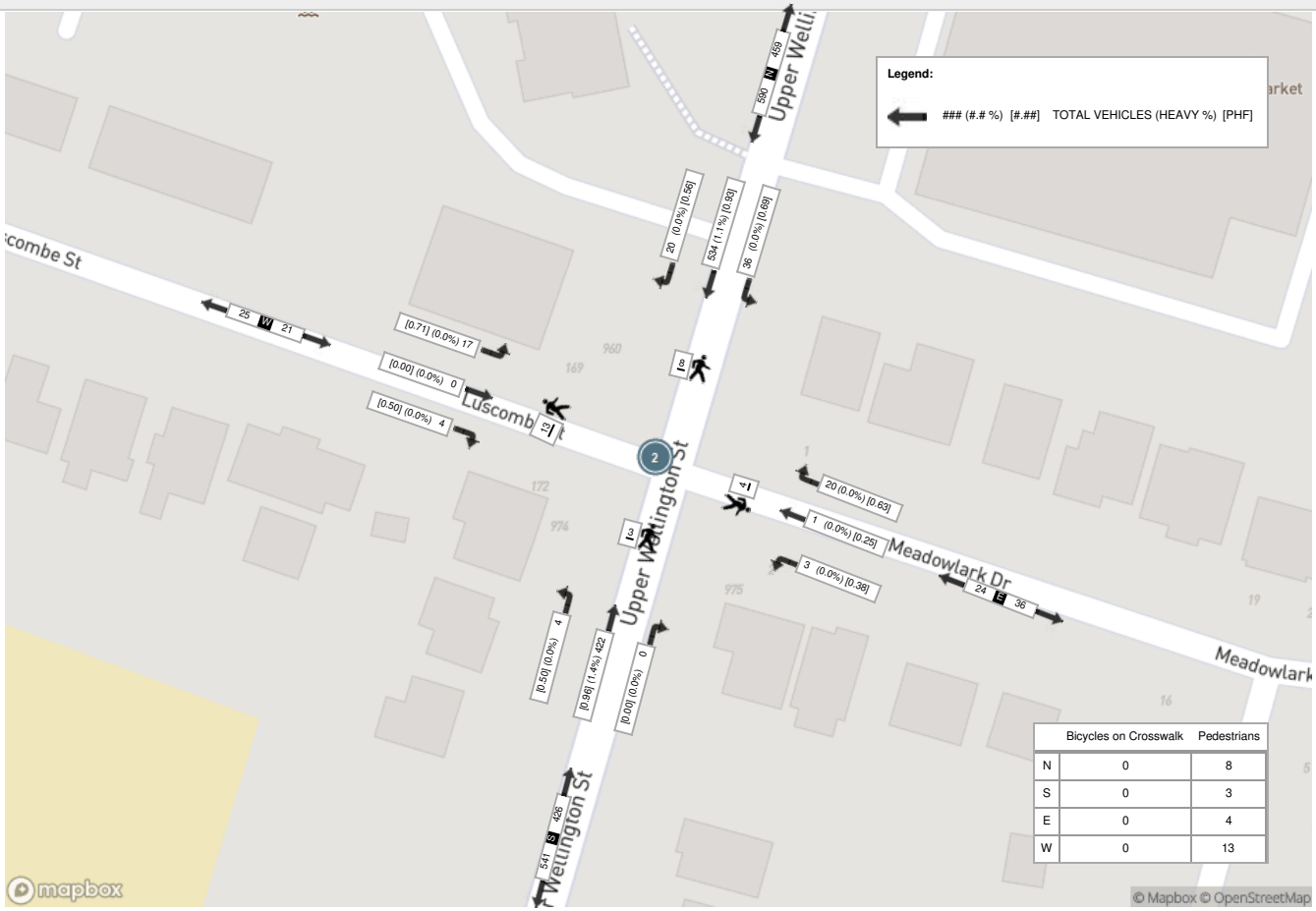
Peak Hour: 08:00 AM - 09:00 AM **Weather: Broken Clouds (-3.73 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	2
S	0	3
E	0	10
W	0	18

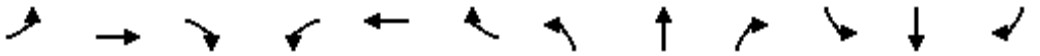
NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:30 PM - 05:30 PM **Weather: Overcast Clouds (4.19 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	8
S	0	3
E	0	4
W	0	13

Appendix B
Existing Traffic Level of Service Calculations

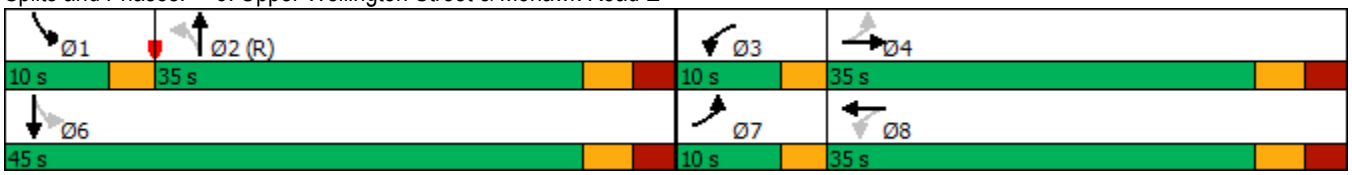


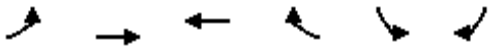
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	400	62	67	423	146	81	416	67	130	286	89
Future Volume (vph)	83	400	62	67	423	146	81	416	67	130	286	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (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)	75.0		0.0	70.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1653	3284	0	1750	3314	0	1684	3365	0	1767	3363	0
Flt Permitted	0.245			0.339			0.510			0.375		
Satd. Flow (perm)	424	3284	0	613	3314	0	893	3365	0	692	3363	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			57			22			59	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		89.0			277.7			109.1			118.3	
Travel Time (s)		6.4			20.0			7.9			8.5	
Confl. Peds. (#/hr)	13		42	42		13	22		20	20		22
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 (%)	8%	5%	11%	2%	4%	0%	6%	3%	6%	1%	2%	0%
Bus Blockages (#/hr)	0	0	4	0	0	4	0	0	4	0	0	4
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	508	0	74	625	0	89	531	0	143	412	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)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
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)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0		20.0	20.0		5.0	20.0	
Minimum Split (s)	8.0	34.3		8.0	34.3		33.3	33.3		8.0	33.3	
Total Split (s)	10.0	35.0		10.0	35.0		35.0	35.0		10.0	45.0	
Total Split (%)	11.1%	38.9%		11.1%	38.9%		38.9%	38.9%		11.1%	50.0%	
Maximum Green (s)	7.0	28.7		7.0	28.7		28.7	28.7		7.0	38.7	
Yellow Time (s)	3.0	3.3		3.0	3.3		3.3	3.3		3.0	3.3	
All-Red Time (s)	0.0	3.0		0.0	3.0		3.0	3.0		0.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	2.0	5.3		2.0	5.3		5.3	5.3		2.0	5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		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	None	None		None	None		C-Max	C-Max		None	Max	
Walk Time (s)		8.0			8.0		7.0	7.0			7.0	
Flash Dont Walk (s)		20.0			20.0		20.0	20.0			20.0	
Pedestrian Calls (#/hr)		0			0		0	0			0	
Act Effct Green (s)	33.1	23.4		33.0	23.4		36.7	36.7		51.3	48.0	
Actuated g/C Ratio	0.37	0.26		0.37	0.26		0.41	0.41		0.57	0.53	
v/c Ratio	0.35	0.59		0.23	0.69		0.25	0.38		0.28	0.23	
Control Delay	20.0	30.5		17.6	31.4		22.8	20.4		12.0	10.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.0	30.5		17.6	31.4		22.8	20.4		12.0	10.8	
LOS	B	C		B	C		C	C		B	B	
Approach Delay		28.9			29.9			20.8			11.1	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	10.5	41.7		8.4	50.4		10.6	34.0		11.5	16.7	
Queue Length 95th (m)	18.1	53.1		15.3	63.3		25.0	53.5		24.3	29.5	
Internal Link Dist (m)		65.0			253.7			85.1			94.3	
Turn Bay Length (m)	75.0			70.0			30.0			30.0		
Base Capacity (vph)	265	1097		326	1131		363	1383		508	1822	
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	0.46		0.23	0.55		0.25	0.38		0.28	0.23	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 46 (51%), Referenced to phase 2:NBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 81.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Upper Wellington Street & Mohawk Road E

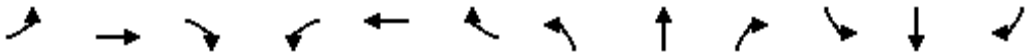




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	538	589	10	7	35
Future Volume (Veh/h)	12	538	589	10	7	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	14	633	693	12	8	41
Pedestrians		1			6	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			211			
pX, platoon unblocked	0.90				0.90	0.90
vC, conflicting volume	711				1050	360
vC1, stage 1 conf vol					705	
vC2, stage 2 conf vol					344	
vCu, unblocked vol	457				833	66
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	95
cM capacity (veh/h)	998				480	886

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	14	316	316	462	243	49
Volume Left	14	0	0	0	0	8
Volume Right	0	0	0	0	12	41
cSH	998	1700	1700	1700	1700	779
Volume to Capacity	0.01	0.19	0.19	0.27	0.14	0.06
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0	1.6
Control Delay (s)	8.7	0.0	0.0	0.0	0.0	9.9
Lane LOS	A					A
Approach Delay (s)	0.2			0.0		9.9
Approach LOS						A

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	2	12	2	0	29	6	522	6	15	402	22
Future Volume (Veh/h)	22	2	12	2	0	29	6	522	6	15	402	22
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	25	2	13	2	0	33	7	587	7	17	452	25
Pedestrians		18			10			3			2	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											149	
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	859	1134	260	892	1144	309	495			604		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	836	1114	230	869	1124	309	468			604		
tC, single (s)	7.6	8.5	6.9	7.5	6.5	7.0	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	5.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	89	98	98	99	100	95	99			98		
cM capacity (veh/h)	228	96	757	228	195	677	1076			929		

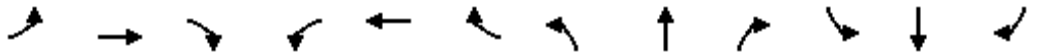
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	40	35	300	300	243	251
Volume Left	25	2	7	0	17	0
Volume Right	13	33	0	7	0	25
cSH	271	609	1076	1700	929	1700
Volume to Capacity	0.15	0.06	0.01	0.18	0.02	0.15
Queue Length 95th (m)	4.1	1.5	0.2	0.0	0.4	0.0
Control Delay (s)	20.6	11.3	0.3	0.0	0.8	0.0
Lane LOS	C	B	A		A	
Approach Delay (s)	20.6	11.3	0.1		0.4	
Approach LOS	C	B				

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	38.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	534	2	3	590	9	11
Future Volume (Veh/h)	534	2	3	590	9	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	607	2	3	670	10	12
Pedestrians					9	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				89		
pX, platoon unblocked					0.86	
vC, conflicting volume			618		958	314
vC1, stage 1 conf vol					617	
vC2, stage 2 conf vol					341	
vCu, unblocked vol			618		628	314
tC, single (s)			4.8		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.5		3.5	3.3
p0 queue free %			100		98	98
cM capacity (veh/h)			769		482	683

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	405	204	226	447	22
Volume Left	0	0	3	0	10
Volume Right	0	2	0	0	12
cSH	1700	1700	769	1700	575
Volume to Capacity	0.24	0.12	0.00	0.26	0.04
Queue Length 95th (m)	0.0	0.0	0.1	0.0	1.0
Control Delay (s)	0.0	0.0	0.2	0.0	11.5
Lane LOS			A		B
Approach Delay (s)	0.0		0.1		11.5
Approach LOS					B

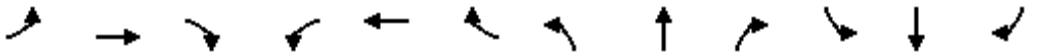
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	28.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	9	19	0	16	2	548	23	2	411	2
Future Volume (Veh/h)	0	0	9	19	0	16	2	548	23	2	411	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	10	22	0	18	2	623	26	2	467	2
Pedestrians		45			6			1			1	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		4			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											109	
pX, platoon unblocked	0.97	0.97	0.97	0.97	0.97		0.97					
vC, conflicting volume	852	1176	280	894	1164	332	514			655		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	788	1122	200	832	1110	332	441			655		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	7.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	100	100	99	91	100	97	100			100		
cM capacity (veh/h)	250	193	761	236	196	629	1058			937		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	10	40	314	338	236	236
Volume Left	0	22	2	0	2	0
Volume Right	10	18	0	26	0	2
cSH	761	328	1058	1700	937	1700
Volume to Capacity	0.01	0.12	0.00	0.20	0.00	0.14
Queue Length 95th (m)	0.3	3.3	0.0	0.0	0.1	0.0
Control Delay (s)	9.8	17.5	0.1	0.0	0.1	0.0
Lane LOS	A	C	A		A	
Approach Delay (s)	9.8	17.5	0.0		0.0	
Approach LOS	A	C				

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	32.9%	ICU Level of Service	A	
Analysis Period (min)	15			

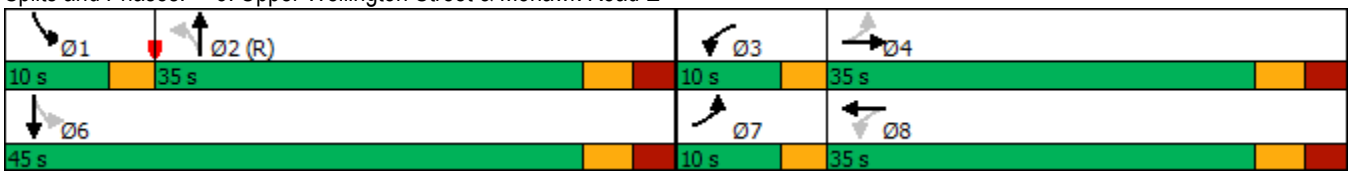


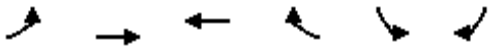
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	619	128	105	682	120	95	294	116	193	476	72
Future Volume (vph)	120	619	128	105	682	120	95	294	116	193	476	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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)	75.0		0.0	70.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1785	3418	0	1767	3448	0	1767	3340	0	1785	3455	0
Flt Permitted	0.148			0.209			0.437			0.426		
Satd. Flow (perm)	277	3418	0	387	3448	0	806	3340	0	791	3455	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			24			69			24	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		89.0			277.7			109.1			118.3	
Travel Time (s)		6.4			20.0			7.9			8.5	
Confl. Peds. (#/hr)	16		21	21		16	18		23	23		18
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%	1%	2%	1%	1%	0%	1%	1%	2%	0%	1%	0%
Bus Blockages (#/hr)	0	0	4	0	0	4	0	0	4	0	0	4
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	778	0	109	835	0	99	427	0	201	571	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)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
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)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0		20.0	20.0		5.0	20.0	
Minimum Split (s)	8.0	34.3		8.0	34.3		33.3	33.3		8.0	33.3	
Total Split (s)	10.0	35.0		10.0	35.0		35.0	35.0		10.0	45.0	
Total Split (%)	11.1%	38.9%		11.1%	38.9%		38.9%	38.9%		11.1%	50.0%	
Maximum Green (s)	7.0	28.7		7.0	28.7		28.7	28.7		7.0	38.7	
Yellow Time (s)	3.0	3.3		3.0	3.3		3.3	3.3		3.0	3.3	
All-Red Time (s)	0.0	3.0		0.0	3.0		3.0	3.0		0.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	2.0	5.3		2.0	5.3		5.3	5.3		2.0	5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		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	None	None		None	None		C-Max	C-Max		None	Max	
Walk Time (s)		8.0			8.0		7.0	7.0			7.0	
Flash Dont Walk (s)		20.0			20.0		20.0	20.0			20.0	
Pedestrian Calls (#/hr)		0			0		0	0			0	
Act Effct Green (s)	38.5	28.8		38.0	26.8		31.7	31.7		45.9	42.6	
Actuated g/C Ratio	0.43	0.32		0.42	0.30		0.35	0.35		0.51	0.47	
v/c Ratio	0.50	0.70		0.39	0.80		0.35	0.35		0.40	0.35	
Control Delay	21.2	29.8		18.0	34.4		27.2	19.4		15.7	15.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.2	29.8		18.0	34.4		27.2	19.4		15.7	15.6	
LOS	C	C		B	C		C	B		B	B	
Approach Delay		28.6			32.5			20.9			15.6	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	12.8	63.2		11.0	69.8		13.6	25.5		19.8	32.4	
Queue Length 95th (m)	22.6	82.1		20.1	89.9		28.6	38.5		34.8	46.8	
Internal Link Dist (m)		65.0			253.7			85.1			94.3	
Turn Bay Length (m)	75.0			70.0			30.0			30.0		
Base Capacity (vph)	252	1155		286	1153		283	1221		502	1648	
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	0.50	0.67		0.38	0.72		0.35	0.35		0.40	0.35	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 46 (51%), Referenced to phase 2:NBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 25.3		Intersection LOS: C	
Intersection Capacity Utilization 85.5%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 3: Upper Wellington Street & Mohawk Road E





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	838	819	23	32	45
Future Volume (Veh/h)	22	838	819	23	32	45
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	23	882	862	24	34	47
Pedestrians					11	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			211			
pX, platoon unblocked	0.81				0.81	0.81
vC, conflicting volume	897				1372	454
vC1, stage 1 conf vol					885	
vC2, stage 2 conf vol					487	
vCu, unblocked vol	417				1001	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				92	95
cM capacity (veh/h)	930				418	880

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	23	441	441	575	311	81
Volume Left	23	0	0	0	0	34
Volume Right	0	0	0	0	24	47
cSH	930	1700	1700	1700	1700	602
Volume to Capacity	0.02	0.26	0.26	0.34	0.18	0.13
Queue Length 95th (m)	0.6	0.0	0.0	0.0	0.0	3.7
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	11.9
Lane LOS	A					B
Approach Delay (s)	0.2			0.0		11.9
Approach LOS						B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	0	4	3	1	20	4	466	0	36	672	20
Future Volume (Veh/h)	17	0	4	3	1	20	4	466	0	36	672	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	18	0	4	3	1	21	4	480	0	37	693	21
Pedestrians		13			4			3			8	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			0			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											149	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	1068	1282	373	920	1293	252	727			484		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	906	1139	153	745	1150	252	537			484		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	100	99	99	99	97	100			97		
cM capacity (veh/h)	198	178	794	268	175	746	951			1086		

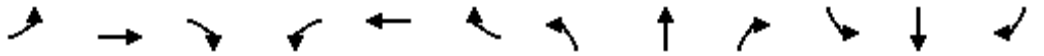
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	22	25	244	240	384	368
Volume Left	18	3	4	0	37	0
Volume Right	4	21	0	0	0	21
cSH	229	555	951	1700	1086	1700
Volume to Capacity	0.10	0.05	0.00	0.14	0.03	0.22
Queue Length 95th (m)	2.5	1.1	0.1	0.0	0.8	0.0
Control Delay (s)	22.4	11.8	0.2	0.0	1.1	0.0
Lane LOS	C	B	A		A	
Approach Delay (s)	22.4	11.8	0.1		0.6	
Approach LOS	C	B				

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	49.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	857	13	17	832	10	10
Future Volume (Veh/h)	857	13	17	832	10	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	912	14	18	885	11	11
Pedestrians					9	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)	122			89		
pX, platoon unblocked					0.79	
vC, conflicting volume			935		1406	472
vC1, stage 1 conf vol					928	
vC2, stage 2 conf vol					478	
vCu, unblocked vol			935		989	472
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		97	98
cM capacity (veh/h)			735		331	540

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	608	318	313	590	22
Volume Left	0	0	18	0	11
Volume Right	0	14	0	0	11
cSH	1700	1700	735	1700	411
Volume to Capacity	0.36	0.19	0.02	0.35	0.05
Queue Length 95th (m)	0.0	0.0	0.6	0.0	1.4
Control Delay (s)	0.0	0.0	0.9	0.0	14.3
Lane LOS			A		B
Approach Delay (s)	0.0		0.3		14.3
Approach LOS					B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

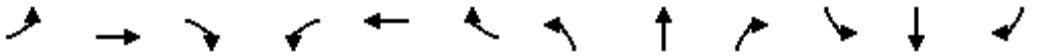


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	4	33	0	27	8	478	17	13	691	5
Future Volume (Veh/h)	0	0	4	33	0	27	8	478	17	13	691	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	4	34	0	28	8	493	18	13	712	5
Pedestrians		7			7			1			1	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								40			109	
pX, platoon unblocked	0.91	0.91	0.91	0.91	0.91		0.91					
vC, conflicting volume	1039	1282	366	912	1275	264	724			518		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	851	1117	114	712	1110	264	506			518		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	88	100	96	99			99		
cM capacity (veh/h)	219	185	837	285	187	736	970			1052		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	4	62	254	264	369	361
Volume Left	0	34	8	0	13	0
Volume Right	4	28	0	18	0	5
cSH	837	394	970	1700	1052	1700
Volume to Capacity	0.00	0.16	0.01	0.16	0.01	0.21
Queue Length 95th (m)	0.1	4.4	0.2	0.0	0.3	0.0
Control Delay (s)	9.3	15.8	0.4	0.0	0.4	0.0
Lane LOS	A	C	A		A	
Approach Delay (s)	9.3	15.8	0.2		0.2	
Approach LOS	A	C				

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	45.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Appendix C
Future Background Level of Service Calculations

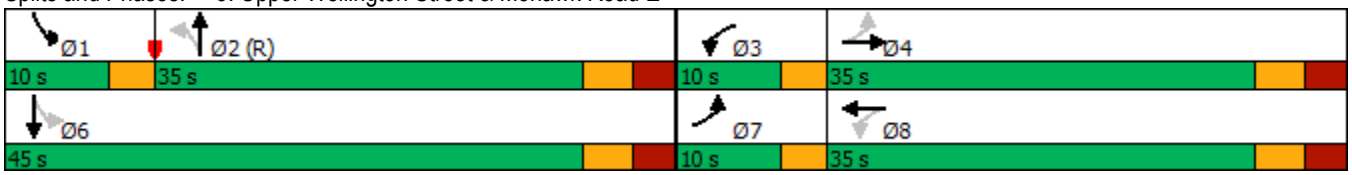


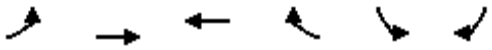
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	469	62	67	496	146	81	487	67	130	335	89
Future Volume (vph)	83	469	62	67	496	146	81	487	67	130	335	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (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)	75.0		0.0	70.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1653	3300	0	1750	3327	0	1684	3378	0	1767	3378	0
Flt Permitted	0.206			0.293			0.484			0.323		
Satd. Flow (perm)	357	3300	0	531	3327	0	847	3378	0	597	3378	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			45			18			48	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		89.0			277.7			109.1			118.3	
Travel Time (s)		6.4			20.0			7.9			8.5	
Confl. Peds. (#/hr)	13		42	42		13	22		20	20		22
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 (%)	8%	5%	11%	2%	4%	0%	6%	3%	6%	1%	2%	0%
Bus Blockages (#/hr)	0	0	4	0	0	4	0	0	4	0	0	4
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	583	0	74	705	0	89	609	0	143	466	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)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
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)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0		20.0	20.0		5.0	20.0	
Minimum Split (s)	8.0	34.3		8.0	34.3		33.3	33.3		8.0	33.3	
Total Split (s)	10.0	35.0		10.0	35.0		35.0	35.0		10.0	45.0	
Total Split (%)	11.1%	38.9%		11.1%	38.9%		38.9%	38.9%		11.1%	50.0%	
Maximum Green (s)	7.0	28.7		7.0	28.7		28.7	28.7		7.0	38.7	
Yellow Time (s)	3.0	3.3		3.0	3.3		3.3	3.3		3.0	3.3	
All-Red Time (s)	0.0	3.0		0.0	3.0		3.0	3.0		0.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	2.0	5.3		2.0	5.3		5.3	5.3		2.0	5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		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	None	None		None	None		C-Max	C-Max		None	Max	
Walk Time (s)		8.0			8.0		7.0	7.0			7.0	
Flash Dont Walk (s)		20.0			20.0		20.0	20.0			20.0	
Pedestrian Calls (#/hr)		0			0		0	0			0	
Act Effct Green (s)	34.7	25.0		34.7	25.0		35.5	35.5		49.7	46.4	
Actuated g/C Ratio	0.39	0.28		0.39	0.28		0.39	0.39		0.55	0.52	
v/c Ratio	0.37	0.63		0.24	0.74		0.27	0.45		0.32	0.26	
Control Delay	19.2	30.4		16.5	32.3		24.2	22.4		13.6	12.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.2	30.4		16.5	32.3		24.2	22.4		13.6	12.5	
LOS	B	C		B	C		C	C		B	B	
Approach Delay		28.9			30.8			22.6			12.8	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	9.8	47.2		7.8	57.3		11.5	43.6		12.6	22.1	
Queue Length 95th (m)	17.4	60.1		14.7	72.0		25.3	62.6		25.3	36.0	
Internal Link Dist (m)		65.0			253.7			85.1			94.3	
Turn Bay Length (m)	75.0			70.0			30.0			30.0		
Base Capacity (vph)	252	1100		313	1128		334	1342		448	1765	
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	0.53		0.24	0.63		0.27	0.45		0.32	0.26	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 46 (51%), Referenced to phase 2:NBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 24.3		Intersection LOS: C	
Intersection Capacity Utilization 81.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Upper Wellington Street & Mohawk Road E

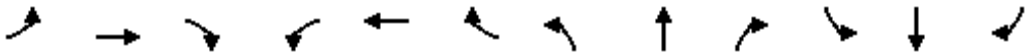




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	630	690	10	7	35
Future Volume (Veh/h)	12	630	690	10	7	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	14	741	812	12	8	41
Pedestrians		1			6	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			211			
pX, platoon unblocked	0.87				0.87	0.87
vC, conflicting volume	830				1222	419
vC1, stage 1 conf vol					824	
vC2, stage 2 conf vol					398	
vCu, unblocked vol	493				946	18
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				98	96
cM capacity (veh/h)	931				436	915

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	14	370	370	541	283	49
Volume Left	14	0	0	0	0	8
Volume Right	0	0	0	0	12	41
cSH	931	1700	1700	1700	1700	776
Volume to Capacity	0.02	0.22	0.22	0.32	0.17	0.06
Queue Length 95th (m)	0.4	0.0	0.0	0.0	0.0	1.6
Control Delay (s)	8.9	0.0	0.0	0.0	0.0	10.0
Lane LOS	A					A
Approach Delay (s)	0.2			0.0		10.0
Approach LOS						A

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	2	12	2	0	29	6	612	6	15	471	22
Future Volume (Veh/h)	22	2	12	2	0	29	6	612	6	15	471	22
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	25	2	13	2	0	33	7	688	7	17	529	25
Pedestrians		18			10			3			2	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											149	
pX, platoon unblocked	0.97	0.97	0.97	0.97	0.97		0.97					
vC, conflicting volume	986	1312	298	1031	1322	360	572			705		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	920	1257	209	966	1266	360	492			705		
tC, single (s)	7.6	8.5	6.9	7.5	6.5	7.0	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	5.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	87	97	98	99	100	95	99			98		
cM capacity (veh/h)	192	72	764	188	157	628	1032			849		

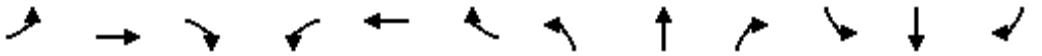
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	40	35	351	351	282	290
Volume Left	25	2	7	0	17	0
Volume Right	13	33	0	7	0	25
cSH	229	554	1032	1700	849	1700
Volume to Capacity	0.17	0.06	0.01	0.21	0.02	0.17
Queue Length 95th (m)	5.0	1.6	0.2	0.0	0.5	0.0
Control Delay (s)	24.0	11.9	0.2	0.0	0.8	0.0
Lane LOS	C	B	A		A	
Approach Delay (s)	24.0	11.9	0.1		0.4	
Approach LOS	C	B				

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	40.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	626	2	3	691	9	11
Future Volume (Veh/h)	626	2	3	691	9	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	711	2	3	785	10	12
Pedestrians					9	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				89		
pX, platoon unblocked					0.83	
vC, conflicting volume			722		1120	366
vC1, stage 1 conf vol					721	
vC2, stage 2 conf vol					398	
vCu, unblocked vol			722		744	366
tC, single (s)			4.8		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.5		3.5	3.3
p0 queue free %			100		98	98
cM capacity (veh/h)			693		426	633

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	474	239	265	523	22
Volume Left	0	0	3	0	10
Volume Right	0	2	0	0	12
cSH	1700	1700	693	1700	518
Volume to Capacity	0.28	0.14	0.00	0.31	0.04
Queue Length 95th (m)	0.0	0.0	0.1	0.0	1.1
Control Delay (s)	0.0	0.0	0.2	0.0	12.3
Lane LOS			A		B
Approach Delay (s)	0.0		0.1		12.3
Approach LOS					B

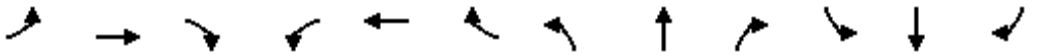
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	9	19	0	16	2	642	23	2	482	2
Future Volume (Veh/h)	0	0	9	19	0	16	2	642	23	2	482	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	10	22	0	18	2	730	26	2	548	2
Pedestrians		45			6			1			1	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		4			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											109	
pX, platoon unblocked	0.95	0.95	0.95	0.95	0.95		0.95					
vC, conflicting volume	986	1364	321	1042	1352	385	595			762		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	886	1283	188	944	1270	385	475			762		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	7.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	100	100	99	89	100	97	100			100		
cM capacity (veh/h)	208	152	760	192	154	580	1007			855		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	10	40	367	391	276	276
Volume Left	0	22	2	0	2	0
Volume Right	10	18	0	26	0	2
cSH	760	274	1007	1700	855	1700
Volume to Capacity	0.01	0.15	0.00	0.23	0.00	0.16
Queue Length 95th (m)	0.3	4.0	0.0	0.0	0.1	0.0
Control Delay (s)	9.8	20.4	0.1	0.0	0.1	0.0
Lane LOS	A	C	A		A	
Approach Delay (s)	9.8	20.4	0.0		0.0	
Approach LOS	A	C				

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	35.5%	ICU Level of Service	A	
Analysis Period (min)	15			

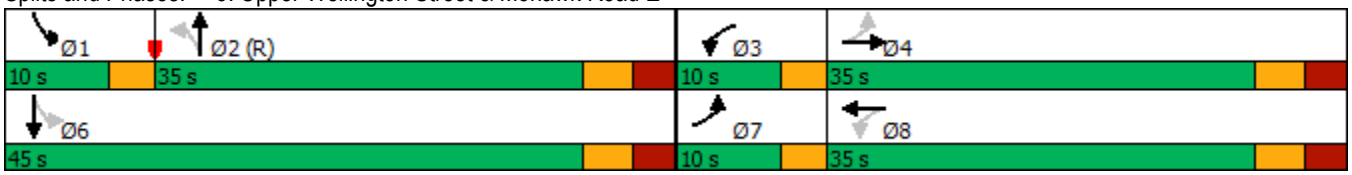


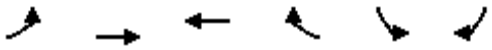
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	725	128	105	799	120	95	344	116	193	558	72
Future Volume (vph)	120	725	128	105	799	120	95	344	116	193	558	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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)	75.0		0.0	70.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1785	3435	0	1767	3456	0	1767	3362	0	1785	3467	0
Flt Permitted	0.131			0.165			0.402			0.381		
Satd. Flow (perm)	245	3435	0	306	3456	0	742	3362	0	708	3467	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			20			55			20	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		89.0			277.7			109.1			118.3	
Travel Time (s)		6.4			20.0			7.9			8.5	
Confl. Peds. (#/hr)	16		21	21		16	18		23	23		18
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%	1%	2%	1%	1%	0%	1%	1%	2%	0%	1%	0%
Bus Blockages (#/hr)	0	0	4	0	0	4	0	0	4	0	0	4
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	888	0	109	957	0	99	479	0	201	656	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)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
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)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0		20.0	20.0		5.0	20.0	
Minimum Split (s)	8.0	34.3		8.0	34.3		33.3	33.3		8.0	33.3	
Total Split (s)	10.0	35.0		10.0	35.0		35.0	35.0		10.0	45.0	
Total Split (%)	11.1%	38.9%		11.1%	38.9%		38.9%	38.9%		11.1%	50.0%	
Maximum Green (s)	7.0	28.7		7.0	28.7		28.7	28.7		7.0	38.7	
Yellow Time (s)	3.0	3.3		3.0	3.3		3.3	3.3		3.0	3.3	
All-Red Time (s)	0.0	3.0		0.0	3.0		3.0	3.0		0.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	2.0	5.3		2.0	5.3		5.3	5.3		2.0	5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		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	None	None		None	None		C-Max	C-Max		None	Max	
Walk Time (s)		8.0			8.0		7.0	7.0			7.0	
Flash Dont Walk (s)		20.0			20.0		20.0	20.0			20.0	
Pedestrian Calls (#/hr)		0			0		0	0			0	
Act Effct Green (s)	40.3	30.6		39.8	28.6		30.5	30.5		44.1	40.8	
Actuated g/C Ratio	0.45	0.34		0.44	0.32		0.34	0.34		0.49	0.45	
v/c Ratio	0.51	0.75		0.42	0.86		0.39	0.41		0.45	0.41	
Control Delay	21.1	30.7		18.3	37.2		29.1	21.5		17.2	17.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.1	30.7		18.3	37.2		29.1	21.5		17.2	17.3	
LOS	C	C		B	D		C	C		B	B	
Approach Delay		29.5			35.3			22.8			17.2	
Approach LOS		C			D			C			B	
Queue Length 50th (m)	12.3	73.7		10.6	82.1		13.8	30.9		20.7	40.4	
Queue Length 95th (m)	22.6	97.3		20.1	107.5		29.3	45.0		34.8	55.0	
Internal Link Dist (m)		65.0			253.7			85.1			94.3	
Turn Bay Length (m)	75.0			70.0			30.0			30.0		
Base Capacity (vph)	246	1189		265	1153		251	1176		446	1583	
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	0.51	0.75		0.41	0.83		0.39	0.41		0.45	0.41	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 46 (51%), Referenced to phase 2:NBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 27.2		Intersection LOS: C	
Intersection Capacity Utilization 88.5%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 3: Upper Wellington Street & Mohawk Road E

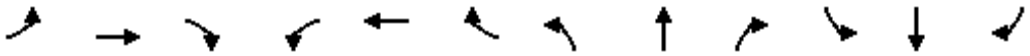




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	982	960	23	32	45
Future Volume (Veh/h)	22	982	960	23	32	45
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	23	1034	1011	24	34	47
Pedestrians					11	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			211			
pX, platoon unblocked	0.77				0.77	0.77
vC, conflicting volume	1046				1597	528
vC1, stage 1 conf vol					1034	
vC2, stage 2 conf vol					563	
vCu, unblocked vol	465				1180	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	97				91	94
cM capacity (veh/h)	845				367	834

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	23	517	517	674	361	81
Volume Left	23	0	0	0	0	34
Volume Right	0	0	0	0	24	47
cSH	845	1700	1700	1700	1700	543
Volume to Capacity	0.03	0.30	0.30	0.40	0.21	0.15
Queue Length 95th (m)	0.7	0.0	0.0	0.0	0.0	4.2
Control Delay (s)	9.4	0.0	0.0	0.0	0.0	12.8
Lane LOS	A					B
Approach Delay (s)	0.2			0.0		12.8
Approach LOS						B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	0	4	3	1	20	4	546	0	36	787	20
Future Volume (Veh/h)	17	0	4	3	1	20	4	546	0	36	787	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	18	0	4	3	1	21	4	563	0	37	811	21
Pedestrians		13			4			3			8	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			0			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											149	
pX, platoon unblocked	0.89	0.89	0.89	0.89	0.89		0.89					
vC, conflicting volume	1228	1484	432	1062	1494	294	845			567		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1016	1302	125	830	1314	294	587			567		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	100	100	99	99	97	100			96		
cM capacity (veh/h)	158	137	801	225	135	702	882			1012		

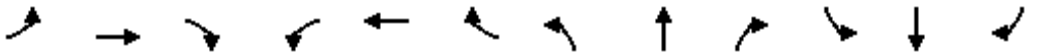
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	22	25	286	282	442	426
Volume Left	18	3	4	0	37	0
Volume Right	4	21	0	0	0	21
cSH	185	494	882	1700	1012	1700
Volume to Capacity	0.12	0.05	0.00	0.17	0.04	0.25
Queue Length 95th (m)	3.2	1.3	0.1	0.0	0.9	0.0
Control Delay (s)	27.0	12.7	0.2	0.0	1.1	0.0
Lane LOS	D	B	A		A	
Approach Delay (s)	27.0	12.7	0.1		0.6	
Approach LOS	D	B				

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	54.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1004	13	17	975	10	10
Future Volume (Veh/h)	1004	13	17	975	10	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1068	14	18	1037	11	11
Pedestrians					9	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				89		
pX, platoon unblocked					0.75	
vC, conflicting volume			1091		1638	550
vC1, stage 1 conf vol					1084	
vC2, stage 2 conf vol					554	
vCu, unblocked vol			1091		1192	550
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		96	98
cM capacity (veh/h)			642		274	480

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	712	370	364	691	22
Volume Left	0	0	18	0	11
Volume Right	0	14	0	0	11
cSH	1700	1700	642	1700	349
Volume to Capacity	0.42	0.22	0.03	0.41	0.06
Queue Length 95th (m)	0.0	0.0	0.7	0.0	1.6
Control Delay (s)	0.0	0.0	0.9	0.0	16.0
Lane LOS			A		C
Approach Delay (s)	0.0		0.3		16.0
Approach LOS					C

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

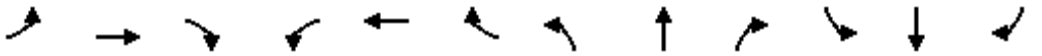


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	4	33	0	27	8	560	17	13	810	5
Future Volume (Veh/h)	0	0	4	33	0	27	8	560	17	13	810	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	4	34	0	28	8	577	18	13	835	5
Pedestrians		7			7			1			1	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											109	
pX, platoon unblocked	0.88	0.88	0.88	0.88	0.88		0.88					
vC, conflicting volume	1204	1488	428	1058	1482	306	847			602		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	971	1292	94	805	1285	306	567			602		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	86	100	96	99			99		
cM capacity (veh/h)	173	141	836	236	142	692	893			980		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	4	62	296	306	430	422
Volume Left	0	34	8	0	13	0
Volume Right	4	28	0	18	0	5
cSH	836	336	893	1700	980	1700
Volume to Capacity	0.00	0.18	0.01	0.18	0.01	0.25
Queue Length 95th (m)	0.1	5.3	0.2	0.0	0.3	0.0
Control Delay (s)	9.3	18.1	0.3	0.0	0.4	0.0
Lane LOS	A	C	A		A	
Approach Delay (s)	9.3	18.1	0.2		0.2	
Approach LOS	A	C				

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	48.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Appendix D
Future Total Level of Service Calculations

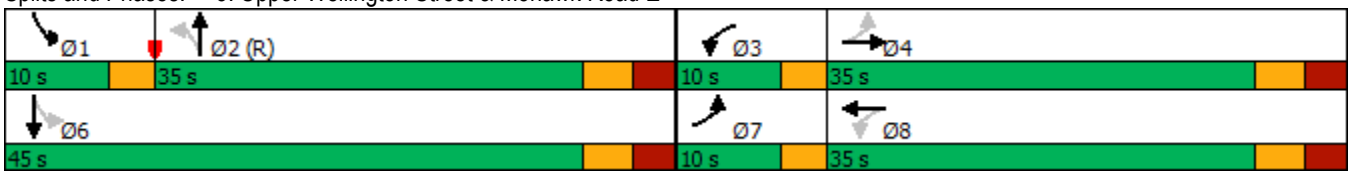


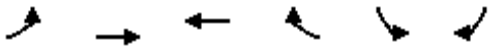
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	478	62	67	498	146	81	487	67	130	336	89
Future Volume (vph)	83	478	62	67	498	146	81	487	67	130	336	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (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)	75.0		0.0	70.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1653	3301	0	1750	3327	0	1684	3378	0	1767	3381	0
Flt Permitted	0.205			0.285			0.484			0.323		
Satd. Flow (perm)	355	3301	0	517	3327	0	848	3378	0	597	3381	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			45			18			47	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		89.0			277.7			109.1			118.3	
Travel Time (s)		6.4			20.0			7.9			8.5	
Confl. Peds. (#/hr)	13		42	42		13	22		20	20		22
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 (%)	8%	5%	11%	2%	4%	0%	6%	3%	6%	1%	2%	0%
Bus Blockages (#/hr)	0	0	4	0	0	4	0	0	4	0	0	4
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	593	0	74	707	0	89	609	0	143	467	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)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
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)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0		20.0	20.0		5.0	20.0	
Minimum Split (s)	8.0	34.3		8.0	34.3		33.3	33.3		8.0	33.3	
Total Split (s)	10.0	35.0		10.0	35.0		35.0	35.0		10.0	45.0	
Total Split (%)	11.1%	38.9%		11.1%	38.9%		38.9%	38.9%		11.1%	50.0%	
Maximum Green (s)	7.0	28.7		7.0	28.7		28.7	28.7		7.0	38.7	
Yellow Time (s)	3.0	3.3		3.0	3.3		3.3	3.3		3.0	3.3	
All-Red Time (s)	0.0	3.0		0.0	3.0		3.0	3.0		0.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	2.0	5.3		2.0	5.3		5.3	5.3		2.0	5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		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	None	None		None	None		C-Max	C-Max		None	Max	
Walk Time (s)		8.0			8.0		7.0	7.0			7.0	
Flash Dont Walk (s)		20.0			20.0		20.0	20.0			20.0	
Pedestrian Calls (#/hr)		0			0		0	0			0	
Act Effct Green (s)	34.7	25.0		34.7	25.0		35.5	35.5		49.7	46.4	
Actuated g/C Ratio	0.39	0.28		0.39	0.28		0.39	0.39		0.55	0.52	
v/c Ratio	0.37	0.64		0.24	0.74		0.27	0.45		0.32	0.26	
Control Delay	19.2	30.6		16.5	32.4		24.2	22.4		13.6	12.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.2	30.6		16.5	32.4		24.2	22.4		13.6	12.6	
LOS	B	C		B	C		C	C		B	B	
Approach Delay		29.1			30.9			22.6			12.8	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	9.8	48.2		7.8	57.4		11.5	43.6		12.6	22.2	
Queue Length 95th (m)	17.4	61.2		14.7	72.3		25.3	62.6		25.3	36.2	
Internal Link Dist (m)		65.0			253.7			85.1			94.3	
Turn Bay Length (m)	75.0			70.0			30.0			30.0		
Base Capacity (vph)	252	1100		308	1128		334	1342		447	1765	
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	0.54		0.24	0.63		0.27	0.45		0.32	0.26	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 46 (51%), Referenced to phase 2:NBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 24.4		Intersection LOS: C	
Intersection Capacity Utilization 81.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Upper Wellington Street & Mohawk Road E

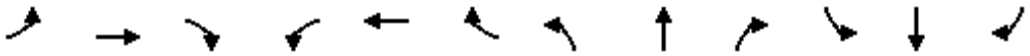




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	632	697	10	7	35
Future Volume (Veh/h)	12	632	697	10	7	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	14	744	820	12	8	41
Pedestrians		1			6	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			211			
pX, platoon unblocked	0.87				0.87	0.87
vC, conflicting volume	838				1232	423
vC1, stage 1 conf vol					832	
vC2, stage 2 conf vol					400	
vCu, unblocked vol	502				957	23
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				98	95
cM capacity (veh/h)	924				432	908

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	14	372	372	547	285	49
Volume Left	14	0	0	0	0	8
Volume Right	0	0	0	0	12	41
cSH	924	1700	1700	1700	1700	770
Volume to Capacity	0.02	0.22	0.22	0.32	0.17	0.06
Queue Length 95th (m)	0.4	0.0	0.0	0.0	0.0	1.6
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	10.0
Lane LOS	A					A
Approach Delay (s)	0.2			0.0		10.0
Approach LOS						A

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	2	12	2	0	29	6	613	6	15	478	22
Future Volume (Veh/h)	22	2	12	2	0	29	6	613	6	15	478	22
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	25	2	13	2	0	33	7	689	7	17	537	25
Pedestrians		18			10			3			2	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											149	
pX, platoon unblocked	0.97	0.97	0.97	0.97	0.97		0.97					
vC, conflicting volume	995	1322	302	1036	1330	360	580			706		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	929	1266	213	971	1275	360	500			706		
tC, single (s)	7.6	8.5	6.9	7.5	6.5	7.0	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	5.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	87	97	98	99	100	95	99			98		
cM capacity (veh/h)	189	71	760	186	155	628	1025			849		

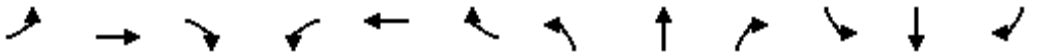
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	40	35	352	352	286	294
Volume Left	25	2	7	0	17	0
Volume Right	13	33	0	7	0	25
cSH	225	553	1025	1700	849	1700
Volume to Capacity	0.18	0.06	0.01	0.21	0.02	0.17
Queue Length 95th (m)	5.0	1.6	0.2	0.0	0.5	0.0
Control Delay (s)	24.4	12.0	0.2	0.0	0.8	0.0
Lane LOS	C	B	A		A	
Approach Delay (s)	24.4	12.0	0.1		0.4	
Approach LOS	C	B				

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	40.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	626	4	5	691	16	20
Future Volume (Veh/h)	626	4	5	691	16	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	711	5	6	785	18	23
Pedestrians					9	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				89		
pX, platoon unblocked					0.83	
vC, conflicting volume			725		1127	367
vC1, stage 1 conf vol					722	
vC2, stage 2 conf vol					404	
vCu, unblocked vol			725		750	367
tC, single (s)			4.8		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.5		3.5	3.3
p0 queue free %			99		96	96
cM capacity (veh/h)			691		425	631

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	474	242	268	523	41
Volume Left	0	0	6	0	18
Volume Right	0	5	0	0	23
cSH	1700	1700	691	1700	520
Volume to Capacity	0.28	0.14	0.01	0.31	0.08
Queue Length 95th (m)	0.0	0.0	0.2	0.0	2.0
Control Delay (s)	0.0	0.0	0.3	0.0	12.5
Lane LOS			A		B
Approach Delay (s)	0.0		0.1		12.5
Approach LOS					B

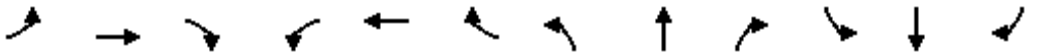
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	16	19	0	16	3	642	23	2	482	3
Future Volume (Veh/h)	0	0	16	19	0	16	3	642	23	2	482	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	0	18	22	0	18	3	730	26	2	548	3
Pedestrians		45			6			1			1	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		4			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											109	
pX, platoon unblocked	0.95	0.95	0.95	0.95	0.95		0.95					
vC, conflicting volume	988	1366	322	1052	1355	385	596			762		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	888	1285	187	954	1273	385	475			762		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	7.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	100	100	98	88	100	97	100			100		
cM capacity (veh/h)	207	151	760	186	153	580	1007			855		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	18	40	368	391	276	277
Volume Left	0	22	3	0	2	0
Volume Right	18	18	0	26	0	3
cSH	760	268	1007	1700	855	1700
Volume to Capacity	0.02	0.15	0.00	0.23	0.00	0.16
Queue Length 95th (m)	0.6	4.1	0.1	0.0	0.1	0.0
Control Delay (s)	9.8	20.8	0.1	0.0	0.1	0.0
Lane LOS	A	C	A		A	
Approach Delay (s)	9.8	20.8	0.0		0.0	
Approach LOS	A	C				

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	36.2%	ICU Level of Service	A	
Analysis Period (min)	15			

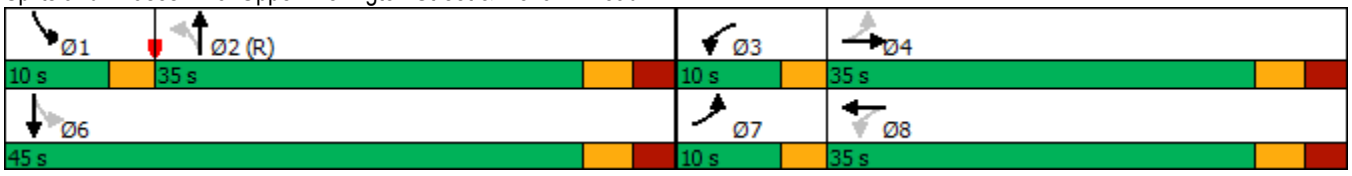


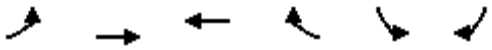
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	733	128	105	813	120	95	344	116	193	561	72
Future Volume (vph)	120	733	128	105	813	120	95	344	116	193	561	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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)	75.0		0.0	70.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1785	3435	0	1767	3460	0	1767	3362	0	1785	3467	0
Flt Permitted	0.130			0.161			0.401			0.381		
Satd. Flow (perm)	244	3435	0	298	3460	0	741	3362	0	708	3467	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			19			55			20	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		89.0			277.7			109.1			118.3	
Travel Time (s)		6.4			20.0			7.9			8.5	
Confl. Peds. (#/hr)	16		21	21		16	18		23	23		18
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%	1%	2%	1%	1%	0%	1%	1%	2%	0%	1%	0%
Bus Blockages (#/hr)	0	0	4	0	0	4	0	0	4	0	0	4
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	897	0	109	972	0	99	479	0	201	659	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)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
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)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0		20.0	20.0		5.0	20.0	
Minimum Split (s)	8.0	34.3		8.0	34.3		33.3	33.3		8.0	33.3	
Total Split (s)	10.0	35.0		10.0	35.0		35.0	35.0		10.0	45.0	
Total Split (%)	11.1%	38.9%		11.1%	38.9%		38.9%	38.9%		11.1%	50.0%	
Maximum Green (s)	7.0	28.7		7.0	28.7		28.7	28.7		7.0	38.7	
Yellow Time (s)	3.0	3.3		3.0	3.3		3.3	3.3		3.0	3.3	
All-Red Time (s)	0.0	3.0		0.0	3.0		3.0	3.0		0.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	2.0	5.3		2.0	5.3		5.3	5.3		2.0	5.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		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	None	None		None	None		C-Max	C-Max		None	Max	
Walk Time (s)		8.0			8.0		7.0	7.0			7.0	
Flash Dont Walk (s)		20.0			20.0		20.0	20.0			20.0	
Pedestrian Calls (#/hr)		0			0		0	0			0	
Act Effct Green (s)	40.4	30.7		39.9	28.8		30.4	30.4		44.0	40.7	
Actuated g/C Ratio	0.45	0.34		0.44	0.32		0.34	0.34		0.49	0.45	
v/c Ratio	0.51	0.76		0.42	0.87		0.40	0.41		0.45	0.42	
Control Delay	21.1	30.8		18.4	37.8		29.2	21.6		17.3	17.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.1	30.8		18.4	37.8		29.2	21.6		17.3	17.4	
LOS	C	C		B	D		C	C		B	B	
Approach Delay		29.6			35.9			22.9			17.3	
Approach LOS		C			D			C			B	
Queue Length 50th (m)	12.3	74.8		10.6	84.0		13.8	30.9		20.7	40.7	
Queue Length 95th (m)	22.6	98.8		20.1	#111.6		29.3	45.0		34.8	55.3	
Internal Link Dist (m)		65.0			253.7			85.1			94.3	
Turn Bay Length (m)	75.0			70.0			30.0			30.0		
Base Capacity (vph)	246	1191		263	1154		250	1173		444	1577	
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	0.51	0.75		0.41	0.84		0.40	0.41		0.45	0.42	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 46 (51%), Referenced to phase 2:NBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 27.4		Intersection LOS: C	
Intersection Capacity Utilization 88.9%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Upper Wellington Street & Mohawk Road E

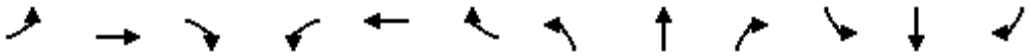




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	992	968	23	32	45
Future Volume (Veh/h)	22	992	968	23	32	45
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	23	1044	1019	24	34	47
Pedestrians					11	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			211			
pX, platoon unblocked	0.77				0.77	0.77
vC, conflicting volume	1054				1610	532
vC1, stage 1 conf vol					1042	
vC2, stage 2 conf vol					568	
vCu, unblocked vol	466				1190	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	97				91	94
cM capacity (veh/h)	842				364	830

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	23	522	522	679	364	81
Volume Left	23	0	0	0	0	34
Volume Right	0	0	0	0	24	47
cSH	842	1700	1700	1700	1700	540
Volume to Capacity	0.03	0.31	0.31	0.40	0.21	0.15
Queue Length 95th (m)	0.7	0.0	0.0	0.0	0.0	4.2
Control Delay (s)	9.4	0.0	0.0	0.0	0.0	12.8
Lane LOS	A					B
Approach Delay (s)	0.2			0.0		12.8
Approach LOS						B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	0	4	3	1	20	4	553	0	36	790	20
Future Volume (Veh/h)	17	0	4	3	1	20	4	553	0	36	790	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	18	0	4	3	1	21	4	570	0	37	814	21
Pedestrians		13			4			3			8	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			0			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											149	
pX, platoon unblocked	0.89	0.89	0.89	0.89	0.89		0.89					
vC, conflicting volume	1234	1494	434	1070	1504	297	848			574		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1021	1312	124	838	1324	297	589			574		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	100	100	99	99	97	100			96		
cM capacity (veh/h)	157	135	801	222	133	698	880			1006		

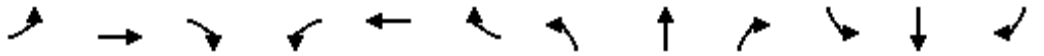
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	22	25	289	285	444	428
Volume Left	18	3	4	0	37	0
Volume Right	4	21	0	0	0	21
cSH	184	489	880	1700	1006	1700
Volume to Capacity	0.12	0.05	0.00	0.17	0.04	0.25
Queue Length 95th (m)	3.2	1.3	0.1	0.0	0.9	0.0
Control Delay (s)	27.3	12.8	0.2	0.0	1.1	0.0
Lane LOS	D	B	A		A	
Approach Delay (s)	27.3	12.8	0.1		0.6	
Approach LOS	D	B				

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	54.9%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1004	23	31	975	18	18
Future Volume (Veh/h)	1004	23	31	975	18	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1068	24	33	1037	19	19
Pedestrians					9	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					1	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				89		
pX, platoon unblocked					0.75	
vC, conflicting volume			1101		1674	555
vC1, stage 1 conf vol					1089	
vC2, stage 2 conf vol					584	
vCu, unblocked vol			1101		1226	555
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			95		93	96
cM capacity (veh/h)			637		271	477

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	712	380	379	691	38
Volume Left	0	0	33	0	19
Volume Right	0	24	0	0	19
cSH	1700	1700	637	1700	345
Volume to Capacity	0.42	0.22	0.05	0.41	0.11
Queue Length 95th (m)	0.0	0.0	1.3	0.0	2.9
Control Delay (s)	0.0	0.0	1.6	0.0	16.7
Lane LOS			A		C
Approach Delay (s)	0.0		0.6		16.7
Approach LOS					C

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	7	33	0	27	15	560	17	13	810	8
Future Volume (Veh/h)	0	0	7	33	0	27	15	560	17	13	810	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	7	34	0	28	15	577	18	13	835	8
Pedestrians		7			7			1			1	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											109	
pX, platoon unblocked	0.88	0.88	0.88	0.88	0.88		0.88					
vC, conflicting volume	1220	1504	430	1074	1499	306	850			602		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	986	1307	92	821	1302	306	567			602		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	85	100	96	98			99		
cM capacity (veh/h)	167	137	838	228	138	692	892			980		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	62	304	306	430	426
Volume Left	0	34	15	0	13	0
Volume Right	7	28	0	18	0	8
cSH	838	327	892	1700	980	1700
Volume to Capacity	0.01	0.19	0.02	0.18	0.01	0.25
Queue Length 95th (m)	0.2	5.5	0.4	0.0	0.3	0.0
Control Delay (s)	9.3	18.6	0.6	0.0	0.4	0.0
Lane LOS	A	C	A		A	
Approach Delay (s)	9.3	18.6	0.3		0.2	
Approach LOS	A	C				

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	48.8%	ICU Level of Service	A	
Analysis Period (min)	15			