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36 Years

70 Gloucester Street and 89-91 Nepean Street

Transportation Impact Assessment

70 Gloucester Street and 89-91 Nepean Street

Transportation Impact Assessment

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

June 2019

Novatech File: 111007
Ref No. R-2019-110

NOVATECH
Engineers, Planners & Landscape Architects

June 13th, 2019

City of Ottawa
Planning and Growth Management Branch
110 Laurier Ave. W., 4th Floor,
Ottawa, Ontario K1P 1J1

Attention: **Mr. Wally Dubyk**
Project Manager, Infrastructure Approvals

Dear Sir:

Reference: **70 Gloucester Street & 89-91 Nepean Street**
Transportation Impact Assessment
Our File No. : 111007

This Transportation Impact Assessment has been prepared on behalf of Claridge Homes in support of a Zoning By-law Amendment application for their approved mixed-use tower development that is currently under construction at 70 Gloucester Street and 89-91 Nepean Street.

The proposed Zoning By-law Amendment is required to add the "parking garage" as a permitted use. No changes are proposed to the previously approved buildings.

The structure and format of this report is in accordance with the City of Ottawa Transportation Impact Assessment Guidelines (June 2017).

If you have any questions or comments regarding this report, please feel free to contact the undersigned.

Yours truly,

NOVATECH

B. Byvelds

Brad Byvelds, P. Eng.
Project Coordinator | Transportation/Traffic

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TIA Plan Reports

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

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

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

CERTIFICATION

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

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

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Infrastructure Services and Community Sustainability
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Dated at Ottawa (City) this 13th day of June, 2019.

Name: Brad Byvelds
(Please Print)

Professional Title: P. Eng. - Project Coordinator

B. Byvelds
Signature of Individual certifier that s/he meets the above four criteria

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TABLE OF CONTENTS

Figures

Tables

Appendices

EXECUTIVE SUMMARY

This Transportation Impact Assessment has been prepared on behalf of Claridge Homes in support of a Zoning By-law Amendment application for their approved mixed-use tower development that is currently under construction at 70 Gloucester Street and 89-91 Nepean Street.

The proposed Zoning By-law Amendment is required to add the "parking garage" as a permitted use. No changes are proposed to the previously approved buildings.

The subject site is bounded by the following:

- to the south, two public parking lots and an apartment building (88, 96 Nepean Street and 180 Metcalfe Street),
- to the east, a commercial/office building, a restaurant and a chiropractic clinic (170 Metcalfe Street & 160-162 Metcalfe Street),
- to the west, a public parking lot and apartment building (84 Gloucester Street & 171 O'Connor Street),
- to the north, a church and ancillary dwelling unit (152 Metcalfe Street).

The subject sites are currently zoned Residential Fifth Density – R5B [1811] and [1834]. The subject sites were previously approved through separate Zoning By-law Amendment and Site Plan Control applications. The current development proposal conforms to the previous approvals, with the exception of a new amendment to add the "parking garage" land use to the properties.

The approved development consists of two residential towers. The residential tower at 70 Gloucester Street consists of 231 dwelling units and 1,300ft^2 of retail gross floor area (GFA) on the ground floor. The tower at 89-91 Nepean Street consists of 257 dwelling units and 1,050ft^2 of retail GFA on the ground floor. Access to the approved development is located on Gloucester Street. A total of 502 parking spaces will be provided in an underground parking garage containing five levels.

No changes to the approved development are proposed. The proposed Zoning By-law amendment will permit parking in the underground parking garage to be used as a public parking lot. For the purposes of this analysis, it has been assumed that 253 of the parking spaces within the underground parking garage could be offered for public use. This represents all proposed parking in excess of the minimum zoning requirement.

The approved development is currently being constructed in two phases, commencing with the full underground parking lot, and the mixed-use tower located at 70 Gloucester Street. The second phase includes the 89-91 Nepean Street mixed-use tower.

Based on the TIA Screening Form, the proposed development meets the trip generation, and a TIA is required.

The main conclusions and recommendations of this report are as follows:

Development Design and Parking

- No changes to the approved site plan are proposed as part of this application. Pedestrian connections will be provided between adjacent sidewalks and the main building entrances to the residential towers and the commercial floor space. The sidewalk will be depressed and continuous across the proposed underground parking access, in accordance with City standards.

- The proposed underground parking garage will contain 502 parking spaces. The proposed parking adheres to the requirements of the City's Zoning By-law.

- Bicycle parking will be provided in accordance with the Zoning By-law.

Boundary Street MMLOS

- Both Nepean Street and Gloucester Street meet the target BLOS and Auto LOS, however they do not meet the target PLOS. To achieve the target PLOS along Nepean Street, either an increased boulevard width of 2.0m, or an increased sidewalk width of 2m and a boulevard width greater than 0.5m is required. To achieve the target PLOS along Gloucester Street, either a reduction in the Average Annual Daily Traffic or operating speed is required.

- As part of the approved Site Plan, street trees will be provided behind the existing sidewalk and unit paver connections will be provided to the main building entrances along these roadways. The above alternatives are identified for the City's consideration as funding permits.

Access Design

- Access to the underground parking garage will be provided through a 6.0 metre ramp located along Gloucester Street. The proposed underground access is located approximately 8m from the western property line, and 26m from the eastern property line. The access for this development was approved as part of the previous Site Plan Control application.

- Depressed curb and a continuous concrete sidewalk shall be provided across the full width of the access.

Neighbourhood Traffic Management and Transit

- Speed humps are currently provided on Gloucester Street and Nepean Street adjacent to the site in an effort to limit area travel speeds to approximately 30km/hr.

- The subject site is located midblock between two arterial roadways (Metcalfe Street and O'Connor Street). As such, the development proposal is not anticipated to have a significant impact on the adjacent communities.

- Supplementary parking for public use will be provided in the underground parking lot, alleviating the demand for on-street parking along the adjacent roadways. As such, parking infiltration onto area roadways is not anticipated.

- The proposed parking garage use is not anticipated to generate transit trips and is not anticipated to impact transit operations in the vicinity of the subject site.

Intersection MMLOS

- The signalized study area intersections meet the target BLOS, TkLOS and Auto LOS. However these intersections do not meet the target PLOS.

- To achieve the target PLOS at the signalized study area intersections a reduction in the east-west crossing distance is required. A reduction in the number of travel lanes along O'Connor Street and Metcalfe Street is not recommended due to the high northbound/southbound traffic volumes during peak hours.

- The unsignalized O'Connor Street/Nepean Street intersection is currently operating with a LOS F during the weekday AM and PM peak hours.

- The failing conditions and extensive delays on the eastbound approaches to the Nepean Street/O'Connor Street intersection is likely a contributing factor to the near-miss collisions observed in December 2016 and the high collision history at this intersection. Drivers that experience lengthy delays at a stop sign may become frustrated and are more likely to accept smaller gaps in cross traffic. The implementation of the separated bi-directional bikeway on the east side of O'Connor Street has increased the driver workload by introducing cyclists approaching from both directions.

- Traffic signal justification warrants in accordance with Ontario Traffic Manual (OTM) *Book* 12 were completed for the O'Connor Street/Nepean Street intersection. The warrant suggests this intersection is currently 76% justified.

- Signalization of the O'Connor Street/Nepean Street intersection would create acceptable operating conditions for all approaches and help alleviate potential collisions. As O'Connor Street is an arterial road and signalization is required as a result of heavy traffic on O'Connor Street, it is recommended that the installation of traffic control signals be considered by the City as funding permits.

Background Traffic

- Critical movements at the signalized intersections within the study area are anticipated to operate with a LOS A the weekday AM and PM peak hours.

- The O'Connor Street/Nepean Street intersection is anticipated to continue to operate with a LOS F during the weekday AM and PM peak hours under side street stop control. Signalization of the O'Connor Street/Nepean Street intersection would create acceptable operating conditions for all approaches and help alleviate potential collisions.

Total Traffic

- Critical movements at the signalized intersections within the study area are anticipated to operate with a LOS C or better the weekday AM and PM peak hours.

- The access along Gloucester Street is anticipated to operate with a LOS C during the weekday AM and PM peak hours.

- The unsignalized O'Connor Street/Nepean Street intersection is anticipated to deteriorate further and continue to operate with a LOS F during the weekday AM and PM peak hours.

Signalization of the O'Connor Street/Nepean Street intersection would create acceptable operating conditions for all approaches and help alleviate potential collisions.

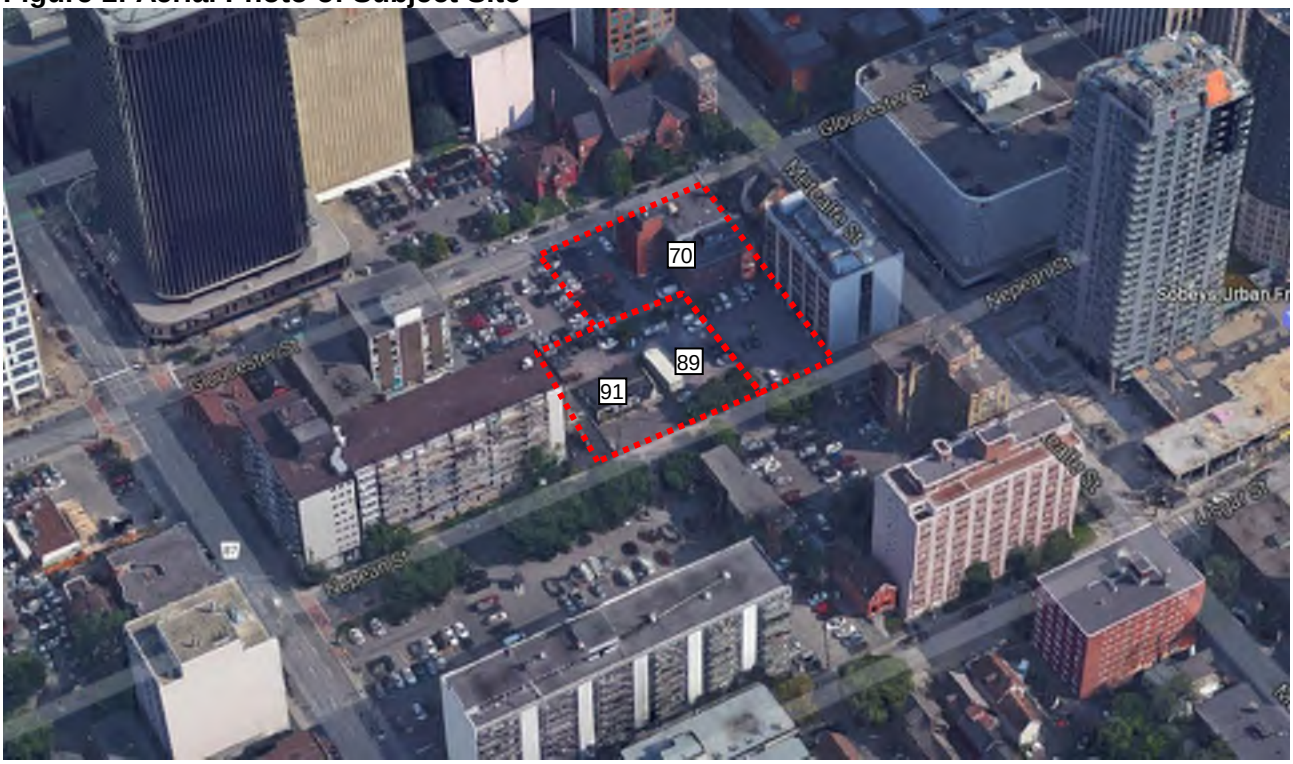
1.0 INTRODUCTION

This Transportation Impact Assessment has been prepared on behalf of Claridge Homes in support of a Zoning By-law Amendment application for their approved mixed-use tower development that is currently under construction at 70 Gloucester Street and 89-91 Nepean Street.

The proposed Zoning By-law Amendment is required to add the "parking garage" as a permitted use. No changes are proposed to the previously approved buildings.

The subject properties are located south of Gloucester Street and north of Nepean Street, mid-block between O'Connor Street and Metcalfe Street as shown in **Figure 1**.

Figure 1: Aerial Photo of Subject Site



The subject site is bounded by the following:

- to the south, two public parking lots and an apartment building (88, 96 Nepean Street and 180 Metcalfe Street),
- to the east, a commercial/office building, a restaurant and a chiropractic clinic (170 Metcalfe Street & 160-162 Metcalfe Street),
- to the west, a public parking lot and apartment building (84 Gloucester Street & 171 O'Connor Street),
- to the north, a church and ancillary dwelling unit (152 Metcalfe Street).

The subject sites are currently zoned Residential Fifth Density – R5B [1811] and [1834]. The subject sites were previously approved through separate Zoning By-law Amendment and Site Plan Control applications. The current development proposal conforms to the previous approvals, with the exception of a new amendment to add the "parking garage" land use to the properties.

2.0 PROPOSED DEVELOPMENT

The approved development consists of two residential towers. The residential tower at 70 Gloucester Street consists of 231 dwelling units and 1,300ft^2 of retail gross floor area (GFA) on the ground floor. The tower at 89-91 Nepean Street consists of 257 dwelling units and 1,050ft^2 of retail GFA on the ground floor. Access to the approved development is located on Gloucester Street. A total of 502 parking spaces will be provided in an underground parking garage containing five levels.

No changes to the approved development are proposed. The proposed Zoning By-law amendment will permit parking in the underground parking garage to be used as a public parking lot. For the purposes of this analysis, it has been assumed that 253 of the parking spaces within the underground parking garage could be offered for public use. This represents all proposed parking in excess of the minimum zoning requirement.

The approved site plan is included in **Appendix A**. The approved development is currently being constructed in two phases, commencing with the full underground parking lot, and the mixed-use tower located at 70 Gloucester Street. The second phase includes the 89-91 Nepean Street mixed-use tower.

Full build-out of the proposed development is anticipated to be completed by 2023.

3.0 SCREENING AND SCOPING

3.1 Screening Form

The City's 2017 TIA Guidelines identify three triggers for completing a TIA report, including trip generation, location, and safety. The criteria for each trigger are outlined in the City's TIA Screening Form. A copy of the TIA Screening Form is included in **Appendix B**.

Based on the TIA Screening Form, the proposed development meets the trip generation, and a TIA is required.

3.2 Existing Conditions

3.2.1 Roadways

Metcalfe Street is a one-way arterial roadway, carrying northbound traffic. In the vicinity of the subject site, Metcalfe Street consists of three travel lanes. On-street parking is permitted on the east side of the roadway with restrictions between 7:00-9:00AM and 3:30-5:30PM on weekdays. On-street parking is also permitted on the west side of the roadway with parking restrictions between 9:00AM and 3:30PM, and stopping restrictions between 7:00-9:00AM and 3:30-5:30PM. Between Laurier Avenue and Somerset Street, Metcalfe Street is a designated truck route with restricted loads. Metcalfe Street has a regulatory speed limit of 50km/hr under the *Ontario Highway Traffic Act*.

Nepean Street is a one-way local roadway, carrying eastbound traffic. Through lane delineation is not provided, however the existing roadway width is sufficient for one lane of traffic with on-street parking along both sides. In the vicinity of the subject site, two hour on-street pay and display parking is provided during peak hours (7:00AM – 7:00PM) on the both sides of Nepean Street. On-street parking is permitted free of charge during off-peak hours (7:00 PM – 7:00 AM). Nepean Street has a regulatory speed limit of 50km/hr under the *Ontario Highway Traffic Act*.

Gloucester Street is a one-way local roadway, carrying westbound traffic. As with Nepean Street, through lane delineation is not provided, however the existing roadway width is sufficient for one lane of traffic with on-street parking along both sides. In the vicinity of the subject site, one hour on-street pay and display parking is provided on both sides of Gloucester Street. On-street parking is permitted free of charge during off-peak hours (7:00 PM – 7:00 AM). Gloucester Street has a regulatory speed limit of 50km/hr under the *Ontario Highway Traffic Act*.

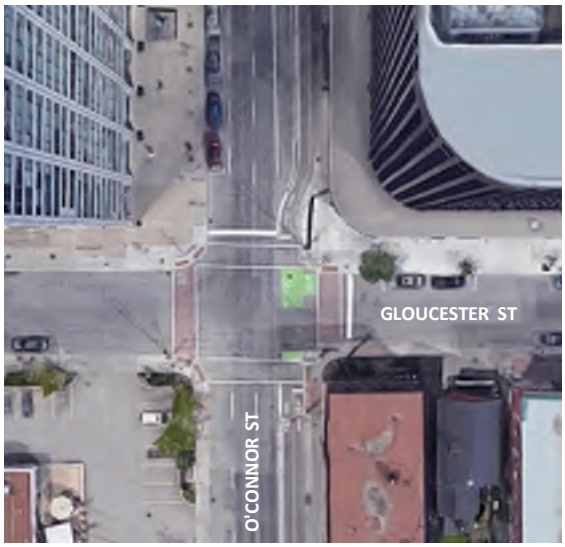
O'Connor Street is a one-way arterial roadway, carrying southbound traffic. O'Connor Street has two travel lanes and a parking lane on the west side in the vicinity of the subject site. O'Connor Street has a regulatory speed limit of 50km/hr under the *Ontario Highway Traffic* Act and is a designated truck route with no restrictions in the vicinity of the subject site.

3.2.2 Intersections

A review of the existing lane configurations and traffic control at the study area intersections is provided below.

O'Connor Street/Gloucester Street

- Signalized intersection
- Southbound: two through lane and one shared through/right turn lane
- Westbound: One approach lane; left turn on red restriction
- Separated bi-directional north-south cycling facility on the east side of the roadway
- Textured (unit paver) crosswalks are provided on east and west legs
- Standard crosswalks are provided on the north and south legs



Metcalfe Street/Gloucester Street

- Signalized intersection
- Northbound: two through lanes and one shared through/left turn lane
- Westbound: one approach lane
- Standard crosswalks are provided on all legs

Metcalfe Street/Nepean Street

- Signalized intersection
- Northbound: two through lanes and one shared through/right turn lane
- Eastbound: one approach lane
- Standard crosswalks are provided on all legs

O'Connor Street/Nepean Street

- Unsignalized intersection; stop control on Nepean Street
- Southbound: One through lane and one shared through/left turn lane
- Eastbound: One approach lane
- Textured (unit paver) crosswalk is provided on the east leg
- Standard crosswalk is provided on the west leg

3.2.3 Driveways

A review of adjacent driveways along Gloucester Street is summarized below:

Gloucester Street

North Side:

- Driveway to St Peter and St Paul's Anglican Church at 152 Metcalfe Street
- Two driveways to public parking lot at 97-99 Gloucester Street
- Driveway to commercial/office development at 234 Laurier Avenue

South Side:

- Driveway to mixed-use development at 100 Gloucester Street
- Driveway to public parking lot at 84 Gloucester Street
- Driveway to restaurant development at 160 Metcalfe Street

Nepean Street

North Side:

- Driveway to residential development at 171 O'Connor Street

South Side:

- Driveway to public parking lot at 108 Nepean Street and residential development at 257 Lisgar Street
- Two driveways to public parking lot at 180 Metcalfe Street

3.2.4 Existing Pedestrian Facilities

Sidewalks are provided along both sides of Metcalfe Street, Nepean Street, Gloucester Street, and O'Connor Street. Within the study area, the sidewalk is primarily of concrete construction. Unit pavers are used on the east side of Metcalfe Street between Gloucester Street and Nepean Street, and in localized areas on O'Connor Street. A unit paver boulevard with tree planters and a 2.4m concrete sidewalk is provided along the west side of Metcalfe Street between Nepean Street and Gloucester Street. Extra wide sidewalks (in excess of 3m) are provided along the following roadway sections within the study area:

- on the east side of Metcalfe Street, north of Nepean Street;
- the west side of O'Connor Street, north of Gloucester Street; and
- on the north side of Gloucester Street east of O'Connor Street, close to the Gloucester/O'Connor intersection.

3.2.5 Existing Bicycle Facilities

A bi-directional cycling facility is currently provided on the east side of O'Connor Street. The O'Connor Street bikeway extends from Laurier Avenue in the north to Fifth Avenue in the south. The O'Connor Street bikeway is a combination of separated bike lanes, painted bike lanes and shared use lanes. Cycling facilities along O'Connor Street are shown in **Appendix C**, and can be summarized as follows:

- Laurier to Pretoria: A separated bi-directional bikeway on the east side of the roadway;
- Pretoria to Strathcona: A uni-directional bike lane on the west side and a contraflow bike lane on the east side of the roadway;
- Strathcona to Patterson: A painted bike lane on each side of the roadway;
- Patterson to Monkland: A painted bike lane on the west side and a shared use lane on the east side of the roadway;
- Monkland to Glebe: A painted bike lane on each side of the roadway;
- Glebe to First: A painted bike lane on the west side and shared use lane on the east side of the roadway;
- First to Fifth: A shared use lane on each side of the roadway.

The following observations regarding the O'Connor Street bikeway were noted during traffic counts on Wednesday December 14th, 2016.

- Two conflicts between eastbound drivers proceeding straight on Nepean Street at O'Connor Street and cyclists in the dedicated bike lane.
    - Cyclist applied brakes to avoid the collision with vehicle.
- One 'near miss' at 5:40PM when a driver proceeding eastbound on Nepean Street missed striking a cyclist in the dedicated bike lane.

    - Neither driver or cyclist applied brakes, but cyclist came approximately 1m from colliding with the vehicle.
- Visibility of cyclists in the cycling lanes is impeded by queued vehicles during the PM peak hours.

Metcalfe Street and O'Connor Street are designated as Spine Cycling Routes in the City of Ottawa's Ultimate Cycling Network. No cycling facilities are provided along the other study area roadways in the vicinity of the subject site.

3.2.6 Existing Transit Facilities

A copy of the OC Transpo system map for the study area is included in **Appendix D**. This report describes all existing transit facilities within a five-minute walk of the subject site, which equates to a distance of 400 metres.

OC Transpo bus stop #3001 and #3008 are located on Albert Street and Slater Street east of Metcalfe Street, at a walking distance of approximately 370 metres and 280 metres respectively. These stations provide service to numerous transit routes, providing comprehensive transit coverage across the City.

OC Transpo bus stops #8465 and #7675 are located at the northwest and southeast corners of the Elgin Street/Nepean Street intersection respectively, at a walking distance of approximately 250 metres from the subject site. These stops provide service to regular routes 5 and 14. Route details are provided in **Appendix D**.

OC Transpo bus stops #2486 and #2484 are located at the northwest and southeast corners of the Bank Street/Gloucester Street intersection respectively, at a walking distance of approximately 300 metres from the subject site. These stops are served by regular routes 6, 7 and 11. Route details are provided in **Appendix D**.

3.2.7 Area Traffic Management

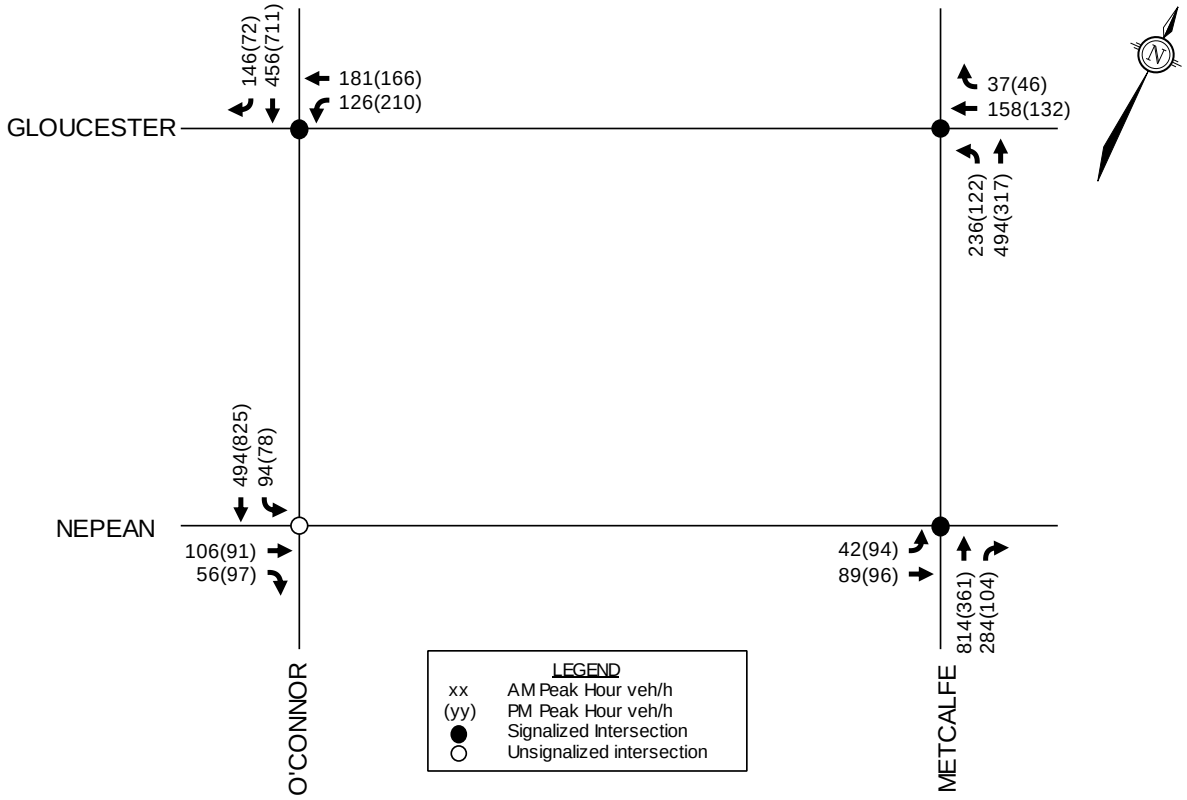
A midblock speed hump is currently provided along Gloucester Street and Nepean Street between O'Connor Street and Metcalfe Street. Curb bulb-outs are currently along Nepean Street at the O'Connor Street and Metcalfe Street intersections.

3.2.8 Existing Traffic Volumes

An eight-hour traffic count was completed by the City of Ottawa at the Gloucester Street/Metcalfe Street intersection in August 2014. Eight-hour traffic counts were coordinated by Novatech at the Gloucester Street/O'Connor Street, Nepean Street/O'Connor Street and Nepean Street/Metcalfe Street intersections in December 2016.

Existing traffic volumes are shown in **Figure 2**. Peak hour summary sheets for the above traffic counts are included in **Appendix E**.

Figure 2: Existing Traffic Volumes



3.2.9 Collision Records

Historical collision data from the last five years was obtained from the City's Public Works and Service Department for all study area intersections. Copies of the collision summary reports are included in **Appendix F**. The following table summarizes the number of collisions reported at each intersection from January 1, 2013 to December 31, 2017.

Table 1: Reported Collisions

Intersection	Number of Collision					
	SMV[1]/ Other	Rear-End	Angle	Turning Mvmt	Side-swipe	Total
O'Connor Street/ Gloucester Street	4	1	1	0	2	8
Metcalfe Street/ Gloucester Street	2	1	0	1	3	7
O'Connor Street/ Nepean Street	1	2	11	4	2	20
Metcalfe Street/ Nepean Street	2	0	5	0	0	7

1. SMV = Single Motor Vehicle

O'Connor Street/Gloucester Street

A total of eight collisions were reported at the O'Connor Street/Gloucester Street intersection over the last five years. Four of the collisions were single vehicle impacts, two were sideswipe impacts, one was a rear-end impact and one was an angle impact. All four of the single vehicle impacts

involved pedestrians and resulted in non-fatal injuries. All other collisions resulted in property damage only.

Metcalfe Street/Gloucester Street
A total of seven collisions were reported at the Metcalfe Street/Gloucester Street intersection over the last five years. Three of the collisions were sideswipe impacts, two were single vehicle impacts, one was a rear-end impact and one was a turning movement impact. The single vehicle impact involved a pedestrian, occurred under clear conditions, and resulted in non-fatal injuries. All other collisions resulted in property damage only.

O'Connor Street/Nepean Street
A total of 20 collisions were reported at the O'Connor Street/Nepean Street intersection over the last five years. Eleven of the collisions were angle impacts, four were turning movement impacts, two were rear-end impacts, two were sideswipe impacts, and one was a single vehicle impact. Five of the angle impacts occurred under either wet or snowy surface conditions, while four resulted in non-fatal injuries. One of the angle impacts and one of the turning movement impacts involved cyclists. One of the collisions involved a pedestrian.

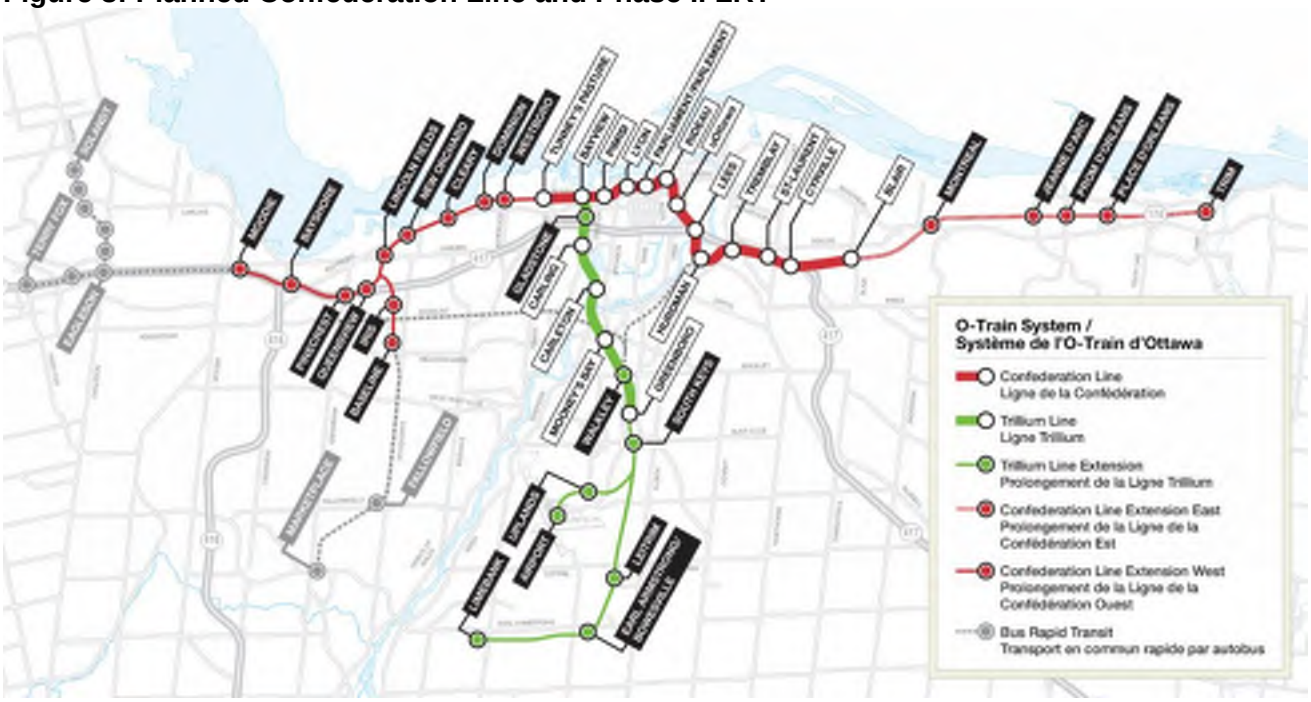
Metcalfe Street/Nepean Street
A total of seven collisions were reported at the Metcalfe Street/Nepean Street intersection over the last five years. Five of the collisions were angle impacts and two were single vehicle impacts. One of the angle impacts involved a cyclist, and all angle impacts resulted in property damage only. One of the single vehicle impacts involved a pedestrian, while the other involved an unattended vehicle.

3.3 Planned Network Changes

The City of Ottawa is currently constructing Phase I of Light Rail Transit (LRT), also known as the Confederation Line. The Confederation Line will convert the existing transitway between the Tunney's Pasture and Blair Stations to LRT, improving transit in the vicinity of the subject site. Phase II of the LRT has been approved by City Council, and is anticipated to commence construction in 2019-2020. Phase II of the LRT will extend the Trillium Line south from Greenboro to Limebank Road in Riverside South, along with an additional three-kilometre spur line to provide a connection to the Macdonald-Cartier International Airport. It will also extend the Confederation Line east from Blair Road to Trim Road and west from Tunney's Pasture to Moodie and Baseline Stations. Phase II of the LRT is anticipated to further improve transit in the vicinity of the subject site. The following figure illustrates the planned Confederation Line and Phase II LRT within the City of Ottawa.

For the purposes of this analysis, no reduction in vehicular background traffic has been applied to account for the modal shift from cars/buses to LRT. This will provide a conservative and robust analysis of the operating conditions along the study area roadways.

Figure 3: Planned Confederation Line and Phase II LRT



3.4 Other Area Developments

A review of the City's Development Application Search Tool was conducted to determine other area developments in the vicinity of the subject site, and are summarized below.

- 96 Nepean Street – Community Transportation Study/Transportation Impact Study, dated March 2012, prepared by Novatech in support of Zoning By-law Amendment and Site Plan Control applications. Development consists of 201 residential units.
- 180 Metcalfe Street – Transportation Impact Assessment, dated September 2018, prepared by Parsons in support of a Site Plan Control application. Development consists of 303 residential units and 5,275ft^2 GFA of retail.

3.5 Study Area and Time Periods

The study area for this report includes the proposed access on Gloucester Street as well as the following intersections:

- Nepean Street/Metcalfe Street
- Nepean Street/O'Connor Street
- Gloucester Street/Metcalfe Street
- Gloucester Street/O'Connor Street

The selected time periods for analysis are the weekday AM and PM peak hours. The weekday AM and PM peak hours are considered to represent the 'worst-case' combination of site-generated traffic and adjacent street traffic. Existing traffic conditions within the study area have been examined, along with background and total traffic conditions.

3.6 Exemptions Review

This module reviews possible exemptions from the final TIA, as outlined in the TIA Guidelines. The applicable exemptions for the subject lands are shown in **Table 3**.

Table 2: TIA Exemptions

Module	Element	Exemption Criteria	Exemption Applies
Design Review Component			
4.1 Development Design	*4.1.2* Circulation and Access	• Only required for site plans	Yes
	4.1.3 New Street Networks	• Only required for plans of subdivision	Yes
4.2 Parking	*4.2.1* Parking Supply	• Only required for site plans	No
	4.2.2 Spillover Parking	• Only required for site plans where parking supply is 15% below unconstrained demand	Yes
Network Impact Component			
4.5 Transportation Demand Management	*All elements*	• Not required for non-residential site plans expected to have fewer than 60 employees and/or students on location at any given time	Yes
4.6 Neighbourhood Traffic Management	*4.6.1* Adjacent Neighbourhoods	• Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	No
4.8 Network Concept	*All elements*	• Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by the established zoning	Yes

4.0 FORECASTING

4.1 Development-Generated Traffic

4.1.1 Trip Generation

Trips generated by the previously approved development have been estimated using relevant land use codes in the ITE *Trip Generation Manual, 10th Edition*. For comparison, trips generated by the residential units have also been estimated using the City's *2009 TRANS Trip Generation Manual*.

Trips generated by the previously approved retail development have been estimated using the ITE Convenience Market Land Use Code 851. Trips generated by the residential units have been estimated using the ITE Multi-Family Housing (High-Rise) Land Use Code 222 which uses data from apartments, townhouses and condominiums that have more than 10 levels (floors). For comparison, trips generated by the residential development have also been estimated using the TRANS recommended rates for high rise apartments.

The number of vehicle trips generated by the proposed public parking use has been estimated using typical peak hour rates presented in the ITE *Traffic Engineering Handbook, 5th Edition*. An excerpt from the ITE Handbook is included in **Appendix G**.

Trips generated using ITE rates have been converted to person trips using a 1.28 ITE trip to person trip adjustment factor. Trips generated using the TRANS rates have been converted to person trips using the assumed modal shares in the *2009 TRANS Trip Generation Manual*. Trips generated by the previously approved development and proposed parking garage are summarized in the following table. For the purposes of this analysis the vehicle trips generated by the parking garage use are considered person trips.

Table 3: Person Trip Generation

Land Use	ITE Code	Units/ GFA	AM Peak			PM Peak		
			IN	OUT	TOT	IN	OUT	TOT
ITE Trip Generation								
Multi-Family Housing (High Rise)	222	488 units	46	146	192	136	87	223
Convenience Market	851	2,350 ft^2	94	94	188	75	72	147
Public Parking	-	253 spaces	152	51	203	76	152	228
		Total	**292**	**291**	**583**	**287**	**311**	**598**
TRANS Trip Generation								
High-Rise Apartments	-	488 units	74	233	307	207	132	339
Convenience Market	851	2,350 ft^2	94	94	188	75	72	147
Public Parking	-	253 spaces	152	51	203	76	152	228
		Total	**320**	**378**	**698**	**358**	**356**	**714**

It is recognized that use of the *2009 TRANS Trip Generation Manual* is preferred by the City of Ottawa to estimate the trip generation of residential developments. However, person trip generation using the TRANS rates are approximately 50%-60% higher than the ITE rates during the AM and PM peak hours respectively. The TRANS rates are based on local data from 2009, using Origin-Destination survey data from 2005, and have a smaller sample size. The person trip conversion has not been as thoroughly tested as the conversion of ITE rates using a person trip adjustment factor of 1.28. Based on the foregoing, the ITE rates for residential developments have been carried forward for the residential scenario. As such, trip generation based on the ITE rates has been carried forward in this analysis.

The modal shares for the previously approved residential and retail developments have been developed based on the City's modal share targets for Transit Oriented Developments, and have been tailored based on the specific land uses to reflect existing modal shares associated with the Central Area. All trips generated by the proposed public parking use have been assumed to be vehicle trips. A full breakdown of the projected person trips by modal share are shown in the below table.

Table 4: Person Trips by Modal Share

Travel Mode	Modal Share	AM Peak			PM Peak		
		IN	OUT	TOT	IN	OUT	TOT
	Residential Trips	*46*	*146*	*192*	*136*	*87*	*223*
Auto Driver	15%	7	22	29	20	13	33
Auto Passenger	5%	2	7	9	7	4	11
Transit	65%	30	95	125	89	57	146
Non-Auto	15%	7	22	29	20	13	33
	Retail Person Trips	*94*	*94*	*188*	*75*	*72*	*147*
Auto Driver	15%	14	14	28	11	11	22
Auto Passenger	5%	5	5	10	3	4	7
Transit	30%	28	28	56	23	21	44
Non-Auto	50%	47	47	94	38	36	74
	Public Parking Person Trips	*152*	*51*	*203*	*76*	*152*	*228*
Auto Driver	100%	152	51	203	76	152	228
	Total Person Trips	**292**	**291**	**583**	**287**	**311**	**598**
	Auto Driver	173	87	260	107	176	283
	Auto Passenger	7	12	19	10	8	18
	Transit	58	123	181	112	78	190
	Non-Auto	54	69	123	58	49	107

Based on the foregoing, the proposed public parking garage is anticipated to generate an additional 203 vehicle trips during the AM peak hour and 228 vehicle trips during the PM peak hour. The overall development (previously approved development and proposed parking garage) is anticipated to generate a total of 260 vehicle trips during the AM peak hour and 283 vehicle trips during the PM peak hour.

4.1.2 Trip Distribution

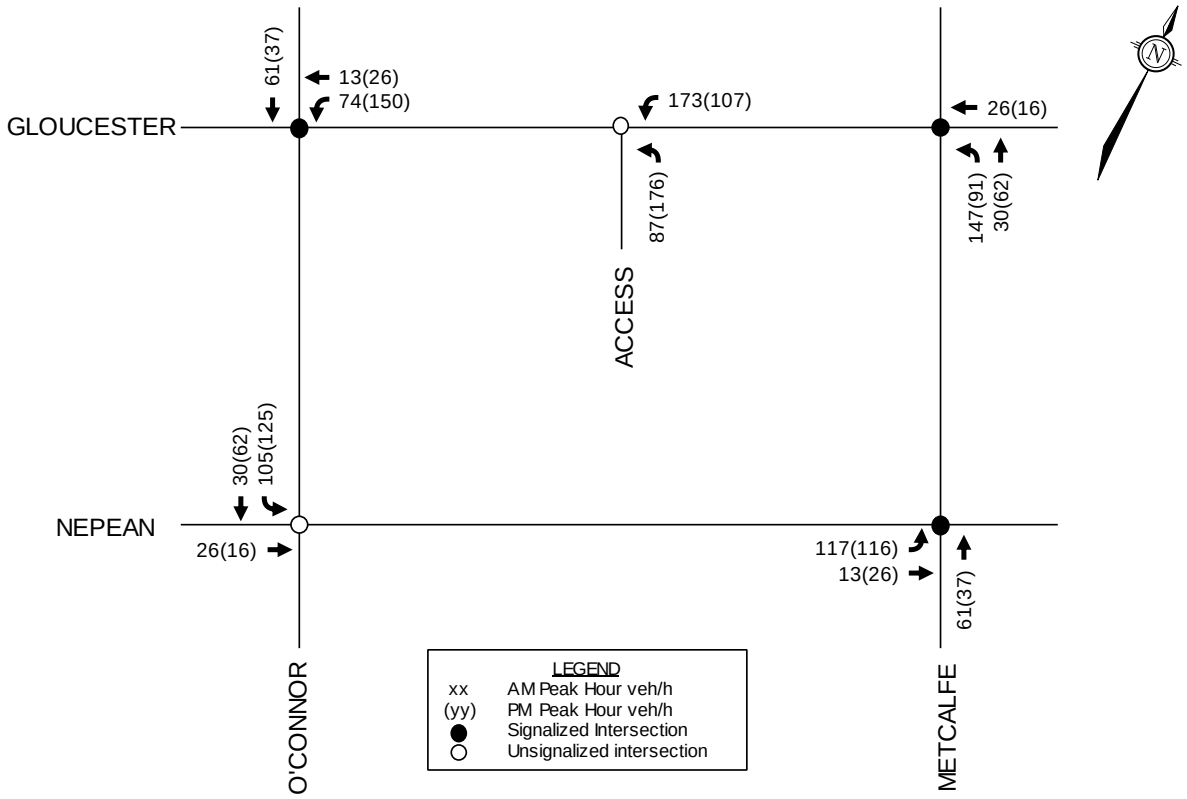
The distribution of primary trips generated by the overall development was determined based on the existing traffic patterns and the location of the site access with respect to the adjacent roadway system. The trip distribution used in this report is consistent with the previously approved report.

The distribution of primary trips is summarized as follows:

- 35% to/from the north,
- 35% to/from the south,
- 15% to/from the west,
- 15% to/from the east.

Trips generated by the proposed development are shown in **Figure 4**.

Figure 4: Site Generated Traffic



4.2 Background Traffic

4.2.1 General Background Growth

With the opening of the Confederation Line, traffic within the study area is not anticipated to grow significantly within the horizon year. For the purposes of this analysis, traffic within the study area is anticipated to remain generally consistent with the existing condition. No growth rate has been applied to the existing traffic volumes within the study area.

4.2.2 Other Area Development Traffic

As identified in Section 3.4, the following developments are proposed in the vicinity of the subject site:

- 96 Nepean Street;
- 180 Metcalfe Street;

Traffic generated by these developments have been added to the study area roadways under the 2023 and 2028 background traffic conditions. Relevant excerpts from other developments are included in **Appendix H**.

Background traffic volumes within the study area are shown in **Figure 5**. Total traffic volumes within the study area are shown in **Figure 6**.

Figure 5: 2023 and 2028 Background Traffic

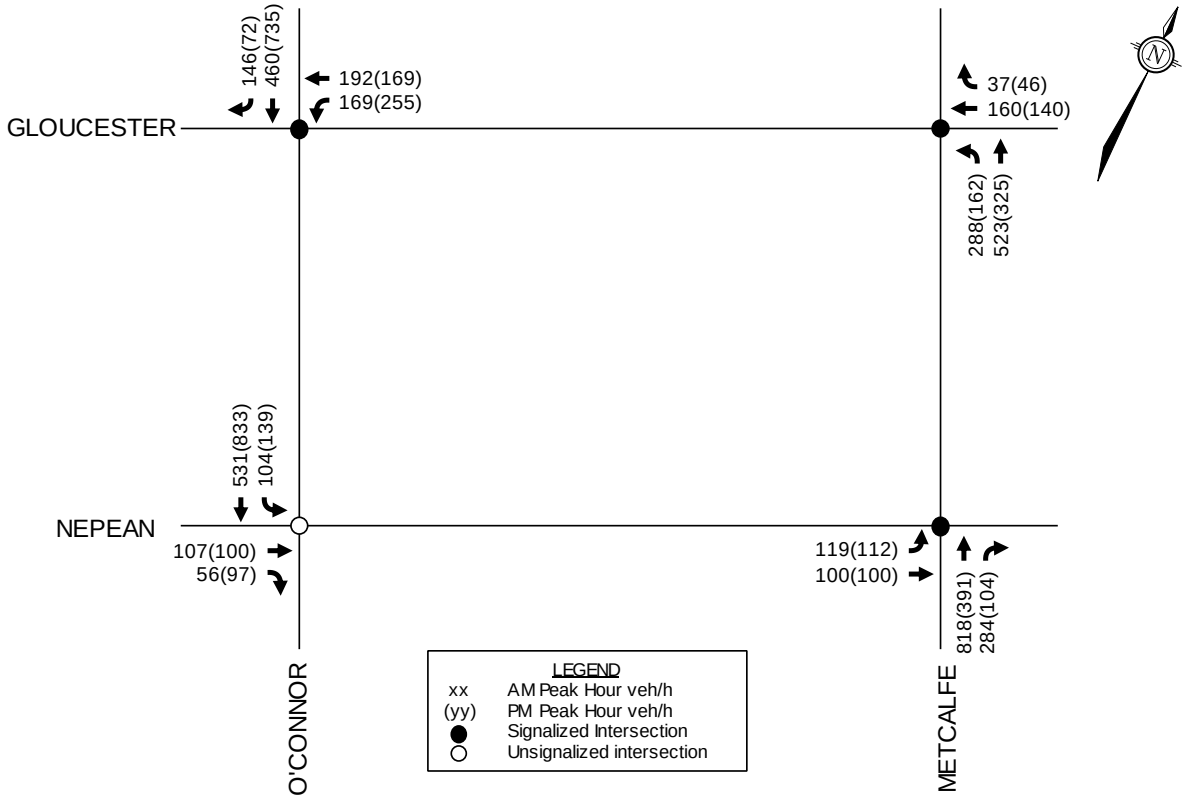
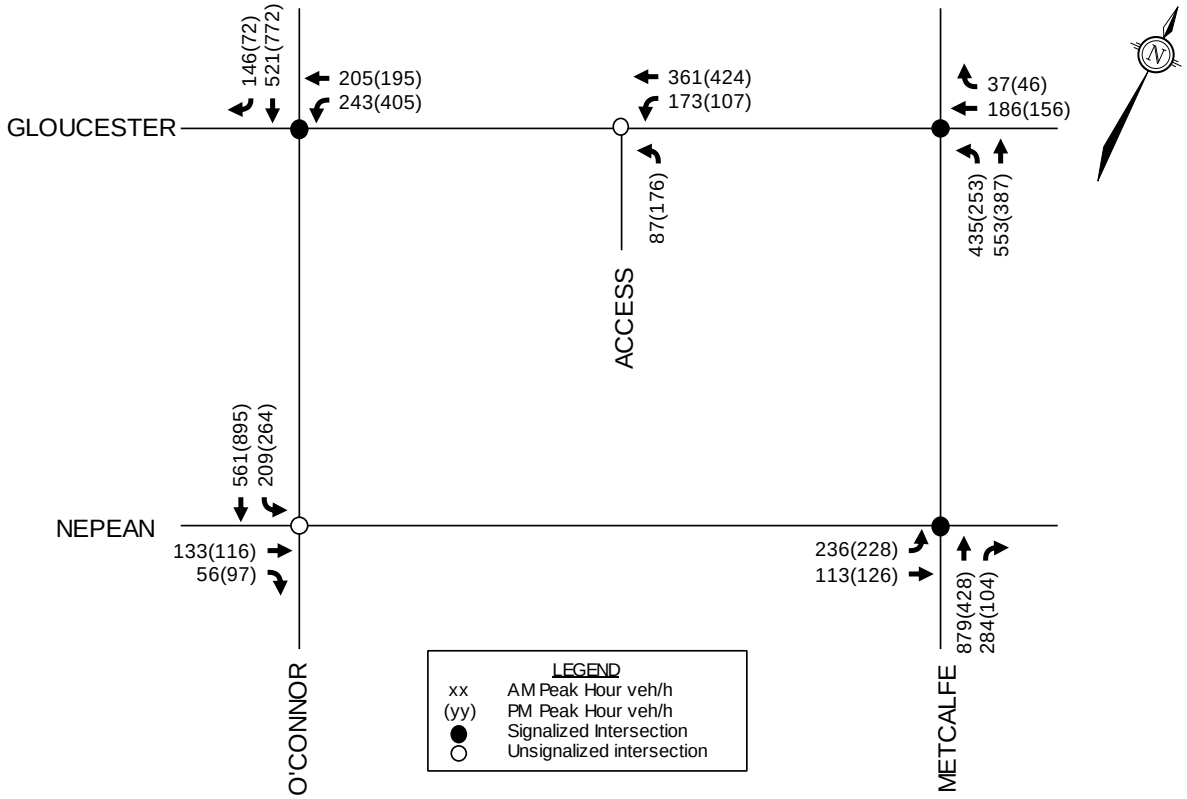


Figure 6: 2023 and 2028 Total Traffic



5.0 ANALYSIS

5.1 Development Design

No changes to the approved site plan are proposed as part of this application. Pedestrian connections will be provided between adjacent sidewalks and the main building entrances to the residential towers and the commercial floor space. The sidewalk will be depressed and continuous across the proposed underground parking access, in accordance with City standards.

Bicycle parking will be provided in accordance with the requirements of the Zoning By-law. The minimum requirements are outlined in Section 7.0 below.

OC Transpo bus stops #3001, #3008, #8465, #7675, #2486 and #2484 are located within a 400m walking distance of the of the site.

5.2 Parking

The subject site is located in Area X of Schedule 1A and Area B of Schedule 1 to the Zoning By-law and is located within 600m of a rapid transit station. Based on the Zoning By-law, a minimum of 0.5 resident parking spaces are required for all units in excess of 12. Based on the Zoning By-law Zone Exception [1834], a minimum of 0.09 visitor parking spaces per unit are required for a mid/high rise apartment at 70 Gloucester Street. Based on Zoning By-law Zone Exception [1811], a minimum of 0.077 visitor parking spaces per unit are required for a mid/high rise apartment at 89-91 Nepean Street.

Section 101(6)(c) of the Zoning By-law suggests where all parking spaces provided or required for a permitted land use are located below grade in the same building as that land use, the parking required may be reduced by the lesser of: 10% of the required spaces; or 20 parking spaces.

Based on the foregoing, the Zoning By-law identifies a minimum requirement of 99 tenant parking spaces and 20 visitor parking spaces for the 70 Gloucester Street tower, and 111 tenant parking spaces and 19 visitor parking spaces for the 89-91 Nepean Street tower. As such, a total of 257 parking spaces are required for the two towers combined. It is noteworthy that the Zoning By-law identifies a maximum parking restriction of 1.75 spaces per dwelling unit (combined total of resident and visitor parking), which equates to 854 parking spaces.

The proposed underground parking garage will contain 502 parking spaces. The proposed parking adheres to the requirements of the City's Zoning By-law. For the purposes of this analysis, it has been assumed that all parking beyond the minimum required by the Zoning By-Law will be utilized for public parking purposes. This equates to approximately 245 public parking spaces in the underground parking garage.

The ZBL identifies a minimum of 0.5 bicycle parking spaces per dwelling unit for the proposed residential land use and 1 bicycle parking space per 250m^2 for the proposed convenience store. Bicycle parking will be provided in accordance with the Zoning By-law.

5.3 Boundary Streets

This section provides a review of the boundary streets using complete streets principles. The Multi-Modal Level of Service (MMLOS) guidelines produced by IBI Group in 2015 were used to evaluate the Level of Service (LOS) of the boundary roadways for each mode of transportation. Schedule B of the City of Ottawa's Official Plan indicates Nepean Street is in the General Urban Area, while

Gloucester Street is in the Central Area. Both Nepean Street and Gloucester Street are also located within 600m of the Parliament LRT Station. Photos of the boundary Streets (provided by Google Streetview) are provided below.

Figure 7: Nepean Street (Looking East)

Figure 8: Gloucester Street (Looking East)

Target Pedestrian LOS (PLOS), Bicycle LOS (BLOS), Transit LOS (TLOS), Truck LOS (TkLOS) and Auto LOS for the study area roadways are based on the targets within 600m of a rapid transit station, as identified in Exhibit 22 of the MMLOS guidelines. The following table summarizes the findings of the MMLOS segment analysis. Detailed segment MMLOS calculations are included in **Appendix I**.

Table 5: Segment MMLOS Summary

Segment	PLOS	BLOS	TLOS	TkLOS	Auto LOS
Nepean Street	E	B	-	-	A
Target	**A**	**D**	**-**	**-**	**E**
Gloucester Street	E	B	-	-	E
Target	**A**	**D**	**-**	**-**	**E**

Both Nepean Street and Gloucester Street meet the target BLOS and Auto LOS, however they do not meet the target PLOS. To achieve the target PLOS along Nepean Street, either an increased boulevard width of 2.0m, or an increased sidewalk width of 2m and a boulevard width greater than 0.5m is required. To achieve the target PLOS along Gloucester Street, either a reduction in the Average Annual Daily Traffic or operating speed is required.

As part of the approved Site Plan, street trees will be provided behind the existing sidewalk and unit paver connections will be provided to the main building entrances along these roadways. The above alternatives are identified for the City's consideration as funding permits.

5.4 Access Intersection Design

Access to the underground parking garage will be provided through a 6.0 metre ramp located along Gloucester Street. The proposed underground access is located approximately 8m from the western property line, and 26m from the eastern property line. The access for this development was approved as part of the previous Site Plan Control application.

Depressed curb and a continuous concrete sidewalk shall be provided across the full width of the access.

5.5 Transportation Demand Management

As identified in Section 3.6, this module is exempt.

5.6 Neighbourhood Traffic Management

The site is surrounded by high density residential buildings, office/commercial developments, a church, and several surface parking lots. Speed humps are currently provided on Gloucester Street and Nepean Street adjacent to the site in an effort to limit area travel speeds to approximately 30km/hr.

The subject site is located midblock between two arterial roadways (Metcalfe Street and O'Connor Street). As such, the development proposal is not anticipated to have a significant impact on the adjacent communities.

On-site underground parking will be provided in accordance with the requirements of the Zoning By-law. Supplementary parking for public use will be provided in the underground parking lot, alleviating the demand for on-street parking along the adjacent roadways. As such, parking infiltration onto area roadways is not anticipated.

5.7 Transit

The overall development is anticipated to generate a total of 181 transit trips during the AM peak hour and 190 transit trips during the PM peak hour. However, the proposed parking garage use is not anticipated to generate transit trips and is not anticipated to impact transit operations in the vicinity of the subject site.

5.8 Review of Network Concept

As identified in Section 3.6, this module is exempt.

5.9 Intersection Design

5.9.1 Existing Intersection MMLOS Analysis

This section provides a review of the signalized study area intersections using complete streets principles. The MMLOS guidelines produced by IBI Group in October 2015 were used to evaluate the LOS of all signalized study area intersections for each mode of transportation. Schedule B of the City of Ottawa's Official Plan indicates all signalized study area intersections fall within the Central Area. All intersections are also located within 600m of the Parliament LRT Station.

As all intersections within the study area do not serve public transit, the TLOS is exempt from the MMLOS analysis. The following table summarized the findings of the MMLOS intersection analysis. Detailed intersection MMLOS calculations are included in **Appendix J**.

Table 6: Intersection MMLOS Summary

Segment	PLOS	BLOS	TLOS	TkLOS	Auto LOS
O'Connor Street/ Gloucester Street	C	B	-	D	A
Target	**A**	**C**	**-**	**D**	**E**
Metcalfe Street/ Gloucester Street	B	B	-	D	A
Target	**A**	**C**	**-**	**D**	**E**
Metcalfe Street/ Nepean Street	C	B	-	D	A
Target	**A**	**C**	**-**	**D**	**E**

O'Connor Street/Gloucester Street
The O'Connor Street/Gloucester Street intersection meets the target BLOS, TkLOS and Auto LOS. However, this intersection does not meet the target PLOS.

To achieve the target PLOS at this intersection, a reduction in the east-west crossing distance is required. A reduction in the number of travel lanes along O'Connor Street is not recommended due to the high southbound traffic volumes during the PM peak hour.

Metcalfe Street/Gloucester Street
The Metcalfe Street/Gloucester Street intersection meets the target BLOS, TkLOS and Auto LOS. However, this intersection does not meet the target PLOS.

To achieve the target PLOS at this intersection a reduction in the east-west crossing distance is required. A reduction in the number of travel lanes along Metcalfe Street is not recommended due to the high northbound traffic volumes during the AM peak hour.

Metcalfe Street/Nepean Street
The Metcalfe Street/Nepean Street intersection meets the target BLOS, TkLOS and Auto LOS. However this intersection does not meet the target PLOS.

To achieve the target PLOS at this intersection a reduction in the east-west crossing distance is required. A reduction in the number of travel lanes along Metcalfe Street is not recommended due to the high northbound traffic volumes during the AM peak hour.

O'Connor Street/Nepean Street (Unsignalized Intersection)
The unsignalized O'Connor Street/Nepean Street intersection is currently operating with a LOS F during the weekday AM and PM peak hours.

The 95th percentile eastbound queue along Nepean Street at O'Connor Street is approximately 45m and 70m during the weekday AM and PM peak hours respectively. The failing conditions and extensive delays on the eastbound approaches to the Nepean Street/O'Connor Street intersection is likely a contributing factor to the near-miss collisions observed in December 2016 and the high collision history at this intersection, as described in **Sections 3.2.5** and **3.2.9**. Drivers that experience lengthy delays at a stop sign may become frustrated and are more likely to accept smaller gaps in cross traffic. The implementation of the separated bi-directional bikeway on the east side of O'Connor Street has increased the driver workload by introducing cyclists approaching from both directions.

Traffic signal justification warrants in accordance with Ontario Traffic Manual (OTM) *Book* 12 were completed for the O'Connor Street/Nepean Street intersection. The warrant suggests this intersection is currently 76% justified. Traffic signal warrant forms are included in **Appendix K**.

Additional analysis has been completed to show the operating conditions at the O'Connor Street/Nepean Street intersection if unwarranted traffic signals are installed with pre-timed signal timing. The results of the analysis are summarized in the following table.

Table 7: Intersection Analysis – Existing Traffic (Mitigated)

Intersection	AM Peak			PM Peak		
	Max V/C or Delay	LOS	Movement	Max V/C or Delay	LOS	Movement
O'Connor Street/ Nepean Street[1]	0.41	A	SBT/R	0.65	B	SBT/R

1. Signalized

Signalization of the O'Connor Street/Nepean Street intersection would create acceptable operating conditions for all approaches and help alleviate potential collisions. As O'Connor Street is an arterial road and signalization is required as a result of heavy traffic on O'Connor Street, it is recommended that the installation of traffic control signals be considered by the City as funding permits.

5.9.2 Background Traffic Intersection Operations

Intersection capacity analysis has been completed for the 2023 and 2028 background traffic conditions. The intersection parameters used in the analysis are consistent with the TIA guidelines (saturation flow rate: 1800vphpl, PHF: 1.0). The lane configurations at the study area intersections are consistent with the existing intersection analysis presented in the MMLOS review above. The results of the analysis are summarized in the following table for the weekday AM and PM peak hours. Detailed reports are included in **Appendix L**.

Table 8: Intersection Analysis – Background Traffic

Intersection	AM Peak			PM Peak		
	Max V/C or Delay	LOS	Movement	Max V/C or Delay	LOS	Movement
O'Connor Street/ Gloucester Street[1]	0.39	A	SBT/R	0.50	A	WBL
Metcalfe Street/ Gloucester Street[1]	0.48	A	WBT/R	0.33	A	WBT/R
Metcalfe Street/ Nepean Street[1]	0.42	A	NBT/R	0.23	A	NBT/R
O'Connor Street/ Nepean Street[2]	52 sec	F	EBT/R	127 sec	F	EBT/R

1. Signalized
2. Unsignalized Intersection

Critical movements at the signalized intersections within the study area are anticipated to operate with a LOS A the weekday AM and PM peak hours. The O'Connor Street/Nepean Street intersection is anticipated to continue to operate with a LOS F during the weekday AM and PM peak hours under side street stop control.

As described above, the O'Connor Street/Nepean Street intersection does not currently meet OTM traffic signalization warrants. A sensitivity analysis has been completed to show the operating conditions at the O'Connor Street/Nepean Street intersection if unwarranted traffic signals are installed. The results of the analysis are summarized in the following table.

Table 9: Intersection Analysis – Background Traffic (Mitigated)

Intersection	AM Peak			PM Peak		
	Max V/C or Delay	LOS	Movement	Max V/C or Delay	LOS	Movement
O'Connor Street/ Nepean Street[1]	0.40	A	SBT/R	0.64	B	SBT/R

1. Signalized

Based on the foregoing analysis, signalization of the O'Connor Street/Nepean Street intersection would create acceptable operating conditions for all approaches and help alleviate potential collisions.

5.9.3 Total Traffic Intersection Operations

Intersection capacity analysis has been completed for the 2023 and 2028 total traffic conditions. The results of the analysis are summarized in the following table for the weekday AM and PM peak hours. Detailed reports are included in **Appendix L**.

Table 10: Intersection Analysis – Total Traffic

Intersection	AM Peak			PM Peak		
	Max V/C or Delay	LOS	Movement	Max V/C or Delay	LOS	Movement
O'Connor Street/ Gloucester Street[1]	0.50	A	WBL	0.79	C	WBL
Metcalfe Street/ Gloucester Street[1]	0.55	A	WBT/R	0.36	A	WBT/R
Metcalfe Street/ Nepean Street[1]	0.65	B	EBL	0.46	A	EBL
O'Connor Street/ Nepean Street[2]	202 sec	F	EBT/R	550 sec	F	EBT/R
Gloucester Street/ Access	18 sec	C	NBL	20 sec	C	NBL

1. Signalized
2. Unsignalized Intersection

Critical movements at the signalized intersections within the study area are anticipated to operate with a LOS C or better the weekday AM and PM peak hours. The access along Gloucester Street is anticipated to operate with a LOS C during the weekday AM and PM peak hours.

The unsignalized O'Connor Street/Nepean Street intersection is anticipated to deteriorate further and continue to operate with a LOS F during the weekday AM and PM peak hours. The results obtained from the Synchro analysis indicate that with the addition of site traffic, delay on the eastbound approach is anticipated to increase significantly. These results should be treated with caution as the Synchro software is unable to compute accurate results for intersections deteriorating to this extent.

Traffic signal justification warrants in accordance with OTM *Book* 12 were completed for the O'Connor Street/Nepean Street intersection under the 2023 total traffic conditions. The warrant used the Average Hourly Volumes (AHV = [AM + PM]/4). The warrant suggests the O'Connor Street/Nepean Street intersection will be 54% justified. The traffic signal justification warrant form is included in **Appendix K**.

A sensitivity analysis has been completed to show the operating conditions at the O'Connor Street/Nepean Street intersection if unwarranted traffic signals are installed. The results of the analysis are summarized in the following table.

Table 11: Intersection Analysis – Total Traffic (Mitigated)

Intersection	AM Peak			PM Peak		
	Max V/C or Delay	LOS	Movement	Max V/C or Delay	LOS	Movement
O'Connor Street/ Nepean Street[1]	0.49	A	SBT/R	0.77	C	SBT/R

1. Signalized

Based on the foregoing analysis, signalization of the O'Connor Street/Nepean Street intersection would create acceptable operating conditions for all approaches and help alleviate potential collisions.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the foregoing analysis, the main conclusions and recommendations of this report are as follows:

Development Design and Parking

- No changes to the approved site plan are proposed as part of this application. Pedestrian connections will be provided between adjacent sidewalks and the main building entrances to the residential towers and the commercial floor space. The sidewalk will be depressed and continuous across the proposed underground parking access, in accordance with City standards.

- The proposed underground parking garage will contain 502 parking spaces. The proposed parking adheres to the requirements of the City's Zoning By-law.

- Bicycle parking will be provided in accordance with the Zoning By-law.

Boundary Street MMLOS

- Both Nepean Street and Gloucester Street meet the target BLOS and Auto LOS, however they do not meet the target PLOS. To achieve the target PLOS along Nepean Street, either an increased boulevard width of 2.0m, or an increased sidewalk width of 2m and a boulevard width greater than 0.5m is required. To achieve the target PLOS along Gloucester Street, either a reduction in the Average Annual Daily Traffic or operating speed is required.

- As part of the approved Site Plan, street trees will be provided behind the existing sidewalk and unit paver connections will be provided to the main building entrances along these roadways. The above alternatives are identified for the City's consideration as funding permits.

Access Design

- Access to the underground parking garage will be provided through a 6.0 metre ramp located along Gloucester Street. The proposed underground access is located approximately 8m from the western property line, and 26m from the eastern property line. The access for this development was approved as part of the previous Site Plan Control application.

- Depressed curb and a continuous concrete sidewalk shall be provided across the full width of the access.

Neighbourhood Traffic Management and Transit

- Speed humps are currently provided on Gloucester Street and Nepean Street adjacent to the site in an effort to limit area travel speeds to approximately 30km/hr.

- The subject site is located midblock between two arterial roadways (Metcalfe Street and O'Connor Street). As such, the development proposal is not anticipated to have a significant impact on the adjacent communities.

- Supplementary parking for public use will be provided in the underground parking lot, alleviating the demand for on-street parking along the adjacent roadways. As such, parking infiltration onto area roadways is not anticipated.

- The proposed parking garage use is not anticipated to generate transit trips and is not anticipated to impact transit operations in the vicinity of the subject site.

Intersection MMLOS

- The signalized study area intersections meet the target BLOS, TkLOS and Auto LOS. However these intersections do not meet the target PLOS.

- To achieve the target PLOS at the signalized study area intersections a reduction in the east-west crossing distance is required. A reduction in the number of travel lanes along O'Connor Street and Metcalfe Street is not recommended due to the high northbound/southbound traffic volumes during peak hours.

- The unsignalized O'Connor Street/Nepean Street intersection is currently operating with a LOS F during the weekday AM and PM peak hours.

- The failing conditions and extensive delays on the eastbound approaches to the Nepean Street/O'Connor Street intersection is likely a contributing factor to the near-miss collisions observed in December 2016 and the high collision history at this intersection. Drivers that experience lengthy delays at a stop sign may become frustrated and are more likely to accept smaller gaps in cross traffic. The implementation of the separated bi-directional bikeway on the east side of O'Connor Street has increased the driver workload by introducing cyclists approaching from both directions.

- Traffic signal justification warrants in accordance with Ontario Traffic Manual (OTM) *Book* 12 were completed for the O'Connor Street/Nepean Street intersection. The warrant suggests this intersection is currently 76% justified.

- Signalization of the O'Connor Street/Nepean Street intersection would create acceptable operating conditions for all approaches and help alleviate potential collisions. As O'Connor Street is an arterial road and signalization is required as a result of heavy traffic on O'Connor Street, it is recommended that the installation of traffic control signals be considered by the City as funding permits.

Background Traffic

- Critical movements at the signalized intersections within the study area are anticipated to operate with a LOS A the weekday AM and PM peak hours.

- The O'Connor Street/Nepean Street intersection is anticipated to continue to operate with a LOS F during the weekday AM and PM peak hours under side street stop control. Signalization of the O'Connor Street/Nepean Street intersection would create acceptable operating conditions for all approaches and help alleviate potential collisions.

Total Traffic

- Critical movements at the signalized intersections within the study area are anticipated to operate with a LOS C or better the weekday AM and PM peak hours.

- The access along Gloucester Street is anticipated to operate with a LOS C during the weekday AM and PM peak hours.

- The unsignalized O'Connor Street/Nepean Street intersection is anticipated to deteriorate further and continue to operate with a LOS F during the weekday AM and PM peak hours.

Signalization of the O'Connor Street/Nepean Street intersection would create acceptable operating conditions for all approaches and help alleviate potential collisions.

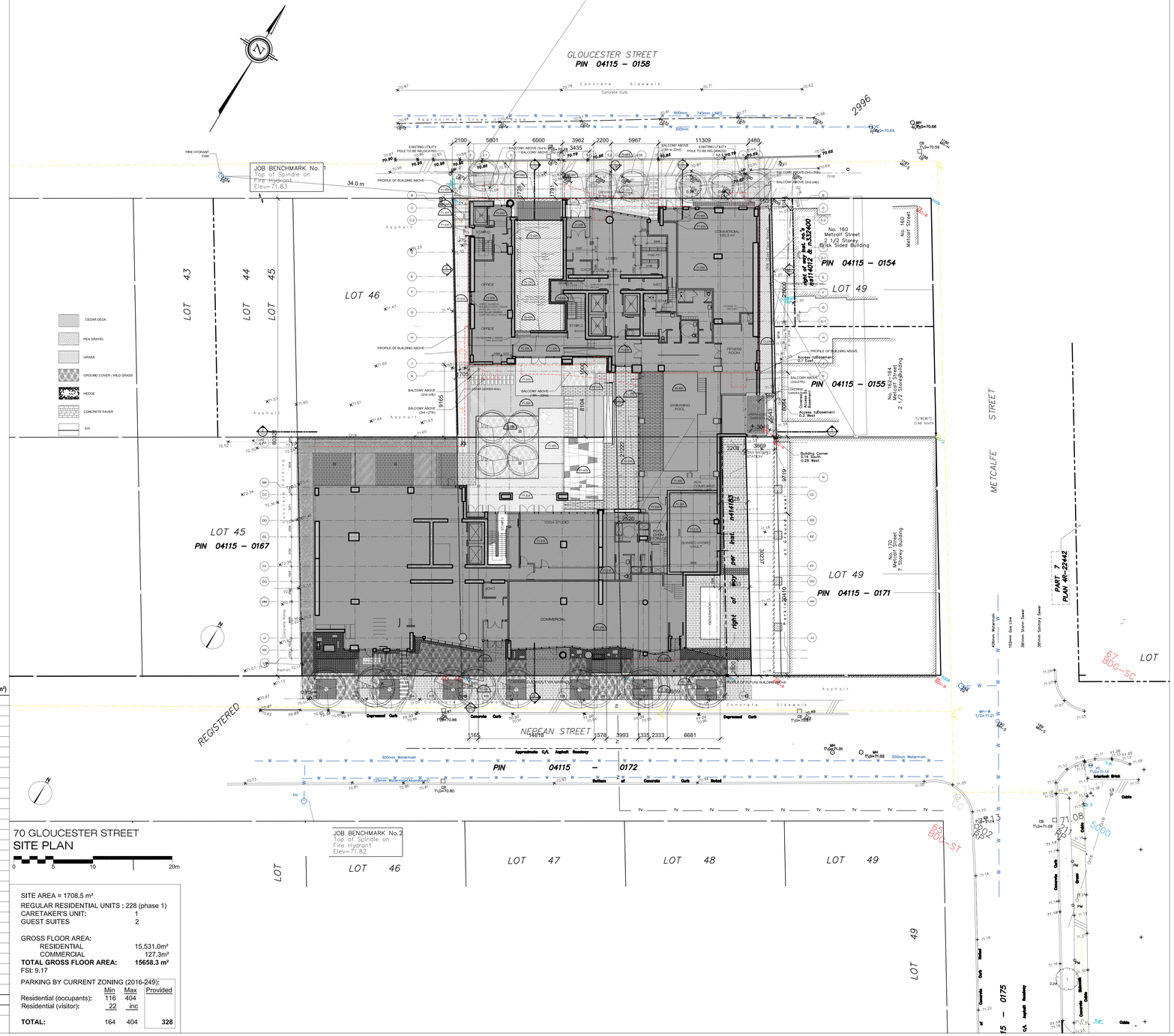
NOVATECH

Prepared by:

Brad Byvelds, P. Eng.
Project Coordinator | Transportation/Traffic

APPENDIX A

Approved Site Plan



Conway Architect Inc.
185 Mafeking Ave., Ottawa, ON, K1K 2V4
613 601 5689 ConwayArchitect@gmail.com

Project: 70 Gloucester St. Ottawa, ON
OBC Part 3 Building Code Matrix

Revision 01	Issued for Above Grade Permit Application	2017 05 23
Revision 00	Issued for Foundation Permit Application	2017 03 06
BUILDING CODE VERSION	O.Reg. 332/12	O. Reg. 191/14

G.D. CONWAY LICENCE 6435
G. D. Conway OAA, FRAIC, ia AIA, LEED AP

						OBC REFERENCE COMMENTS
1.0	PROJECT TYPE	New Construction				
2.0	DESCRIPTION	Mixed use development with Residential,				[A] 1.1.2.1.
3.0	MAJOR OCCUPANCIES	OCCUPANCY		USE		3.1.2.1.(1)
		C	Residential	Apartments		
		D	Business & Personal Services	Commercial		
		F2	Medium Hazard Industrial	Service Rooms		
		F3	Low Hazard Industrial	Parking		
4.0	SUPERIMPOSED MAJOR OCCUPANCIES	YES	C/F3(Parking):1.5Hr.			3.2.2.7.
	SEPARATION BETWEEN OCCUPANCIES	YES	C-F3(Parking): 1.5 Hr, D-C: 1 Hr, D-F3(Parking): 1.5Hr, F2-F3(Parking) 1.5Hr			Table 3.1.3.1.
5.0	BUILDING CLASSIFICATION	3.2.2.42.	Group C, Any Height, Any Area, Sprinklered			3.2.2.42.
		3.2.2.49.	Group D, Any Height, Any Area			3.2.2.49.
		3.2.2.67.	Group F, Division 2, Any Height, Any Area, Sprinklered			3.2.2.67.
		3.2.2.73.	Group F, Division 3, Any Height, Any Area			3.2.2.73.
7.0	IMPORTANCE CATEGORY	Normal				4.1.2.1.(3)
8.0	SEISMIC HAZARD INDEX (SHI=IEFaSa(0.2))	0.48	PG advised SHI is 0.4864 2017 02 06			4.1.8.18.(1)

		DESCRIPTION	EXISTING	NEW	TOTAL	OBC REFERENCE COMMENTS
9.0	BUILDING AREA (m²)	Typical Floor		765.00	765.00	[A] 1.4.1.2.
		Pool & Vault		295.00	295.00	
		Exit		20.00	20.00	
		TOTAL	0.00	1080.00	1080.00	
9.1	Below Grade FLOOR AREA (m²)	P5		2685.00	2685.00	[A] 1.4.1.2.
		P4 - P3		5370.00	5370.00	
		P2		2685.00	2685.00	
		P1		2685.00	2685.00	
		TOTAL	0.00	13425.00	13425.00	
9.2	GROSS AREA (m²)	Grd Fl.		1015.00	1015.00	[A] 1.4.1.2.
		2nd Fl.		710.00	710.00	
		3rd - 4th		1530.00	1530.00	
		5th		760.00	760.00	
		6th?		760.00	760.00	
		7th - 13th		5320.00	5320.00	
		16th - 17th + 23rd - 26th		4560.00	4560.00	
		18th - 22nd		3800.00	3800.00	
		27th		760.00	760.00	
		28th		310.00	310.00	
		Mech Penthouse 2		69.00	69.00	
		TOTAL	0.00	19594.00	19594.00	
10.0	MEZZANINE AREA (m²)	DESCRIPTION	EXISTING	NEW	TOTAL	3.2.1.1.
		NA			0.00	
		TOTAL	0.00	0.00	0.00	

							OBC REFERENCE COMMENTS
11.0	BUILDING HEIGHT	STOREYS ABOVE GRADE	28	HEIGHT (m)	83.1		[A] 1.4.1.2.
		STOREYS BELOW GRADE	5				3.2.1.1.
		HIGH RISE	YES	MEASURE	A Sprinklered Bldg.	CACF on Grd. Fl.; Fire Alarm with Voice Communication System; Pressurized Stair Vestibules below Exit Level Air Supply to run in 2Hr FRR Service Space; Stairways above Exit Level Vented by Exterior Doors at Grade; Separate Exit Stairs above and below Exit Level; Fire Fighters' Elevator; Emergency Power for all Elevators, Emergency Lighting, Fire Alarm System, Pumps for Water Supply for Fire Fighting. Elevators serving stories above lowest exit level have vestibules below grade have 2 Hr. FRR [3A(3)]	3.2.6.
		SMOKE CONTROL	Venting of Floor Areas via Windows				3.2.6.6.
12.0	NO. OF STREETS		1				3.2.2.10. &
	FIRE FIGHTER ACCESS		Balconies				3.2.5.
13.0	CONSTRUCTION TYPE	REQ.	NC	3.2.2.42.	3.2.2.49.	3.2.2.67.	3.2.2.73.
		PROV.	NC	HEAVY TIMBER	NO		

		ASSEMBLY	RATING (H) REQ. (PROV.)	SUPPORTING ASSEMBLY (H) REQ. (PROV.)	NONCOMBUSTIBLE IN LIEU OF RATING? N/A	OBC REFERENCE COMMENTS
14.0	FIRE RESISTANCE RATINGS	FLOORS OVER BSMT	2 (2)	2 (2)	N/A	3.2.2.20.-83, 3.2.1.4.
		FLOORS	2 (2)	2 (2)	N/A	
		MEZZANINE	1 (NA)	1 (NA)	N/A	
		ROOF	0 (0)	0 (0)	N/A	

		LOCATION	RATING (H) REQ. (PROV.)		OBC REFERENCE COMMENTS
15.0	SERVICE SPACES & SHAFTS				3.6.1.
		VERTICAL SHAFTS	1 (1)		Table 3.6.3.1.
		GARBAGE CHUTES	1 (1)	2 Hrs required if no closure provided	3.6.3.3.
		ELEVATOR SHAFT	1.5 (1.5)		Table 3.5.3.1.
		FIRE-FIGHTERS ELEV	Yes (Yes)		3.2.6.5.
		HORIZONTAL SPACES		Air for stairshafts to run in 2 hr enclosure without fire dampers.	3.6.4.
		SERVICE ROOMS	1 (1)		3.6.2.
		ELECTRICAL VAULTS	3 (3)		3.6.2.7.
		GARBAGE ROOMS	2 (2)		3.6.3.3.(9)
16.0	SPRINKLER SYSTEM	Entire Building	NFPA 13	Window Sprinklers E&W ULC/ORD C263.1 3.1.8.18.	3.2.1.5. 3.2.2.17.

17.0 SPATIAL SEPARATION (Fire Compartment Method) — 3.2.3.

COMPARTMENT - ORIENTATION	AEBF m²	LD m	ALLOWED UPO %	ACTUAL UPO %	REQUIRED FRR(HR)	CONSTR/ CLAD'G NC/NC, C-NC/NC, C-NC/C-NC	
Grd Fl West	81.5	1.6	16%	0%	1.0	C-NC/NC	
Grd Fl Pool West	80.9	7.1	100%	100%	0.0	C-NC/C-NC	
Grd Fl Com East UPC	82.0	3.2	31%	7%	0.75	C-NC/NC	
Grd Fl Com East EBF	82.0	1.8	17%	NA	1.0	C-NC/NC	
Grd Fl Pool East UPC	91.0	4.3	43%	15%	0.75	C-NC/NC	
Grd Fl Pool East EBF	91.0	2.0	18%	NA	1.0	C-NC/NC	
Grd Fl Vault(F2) East	32.8	3.3	27%	18%	1.0	C-NC/NC	
2-26 FL NE Unit	32.8	1.7	20%	18%	1.0	C-NC/NC	Window Sprinklers req. on NE Window
2-26 FL SE Units	32.2	2.0	24%	18%	1.0	C-NC/NC	Window Sprinklers req. on SE Window
27th East	75.0	2.0	19%	17%	1.0	C-NC/NC	Window Sprinklers req. on NE Windows
3 BR West	41.0	1.8	19%	17%	1.0	C-NC/NC	Window Sprinklers req. on NW Windows & Door Sidelites
1 BR West	21.6	1.8	25%	19%	1.0	C-NC/NC	Window Sprinklers req. on SW Windows
2 BR West	31.4	1.8	21%	19%	1.0	C-NC/NC	Window Sprinklers req. on NW & SW Windows
Mech. F2 West	97.3	1.8	8%	8%	2.0	NC/NC	Intake/Exhaust louvers require Fire Dampers
					1.0	NC/NC	
Grd FL Vault(F2) Sou	32.0	0.0	0%	0%	2.0	NC/NC	
South	< 100	8.0	100%	Various	0.0	C-NC/C-NC	
North	Various	9.2	100%	Various	0.0	C-NC/C-NC	

							OBC REFERENCE COMMENTS
18.0	STANDPIPE SYSTEM	Required	4 on P5 - P1	3 on Ground Floor	2 on 2nd to 27th Floors	1 on 28th Floor	3.2.9.
19.0	WATER SERVICE/SUPPLY IS ADEQUATE	Yes	Req:	1900l/m	Available:	25,000 l/m FH No. 080	3.2.5.7.
20.0	FIRE DEPARTMENT ACCESS	Yes	Location:	Gloucester St.	Distance FH to FDC	< 45m	3.2.5.16.

		FLOOR AREA	OCCUPANCY	BASED ON	LOAD (PERSONS)	OBC REFERENCE COMMENTS
21.0	OCCUPANT LOAD	P5	F3	Design of space	27	3.1.17.
		P4 - P3	F3	Design of space	54	
		P2	F3	Design of space	27	
		P1	F3	Design of space	27	
		Grd. Fl.	C, D and F2	m² per person	90	
		2nd FL.	C	No. of sleeping rooms	28	
		3rd -26th	C	No. of sleeping rooms	668	
		27th	C	m² per person	78	
		28th	C	Design of space	62	
		TOTAL			1060	
22.0	FIRE ALARM SYSTEM	Required	TYPE PROVIDED	Voice		3.2.4.

		FLOOR AREA	NO. OF EXITS 3.4.2.1. REQ. (PROV.)	TRAVEL DISTANCE m 3.4.2.5. REQ.(PROV.)	SEPARATION DISTANCE 3.4.2.3. REQ.(PROV.)	OBC REFERENCE COMMENTS
23.0	MEANS OF EGRESS	P5 - P1	3 (3)	45 (45)	39 (39 - 41)	3.7.4.
		Grd. Fl.	8 (8)	45 (27)	NA	
		2nd FL.	2 (2)	45 (5)	9 (18)	
		3rd -26th	2 (2)	45 (5)	9 (15)	
		27th	2 (2)	45 (5)	9 (15)	
		28th	2 (2)	45 (5)	9 (18)	
		29th	1 (1)	25 (18)	NA	3.3.1.3.(7)

		FLOOR AREA	AREA m²	OCCUPANT LOAD	FIXTURES REQUIRED	OBC REFERENCE COMMENTS
24.0	PLUMBING FIXTURE REQUIREMENTS	Pool/Fitness	280	60	1F & 1M	3.7.4.
		Amenity 27th & 28th	182	60	1F & 1M	Table 3.7.4.3.C

		PERSONS		2P REQ. (PROV.)	4P REQ. (PROV.)	2P C REQ. (PROV.)	OBC REFERENCE COMMENTS
25.0	ROOM SIZES	Living	m²	18.0 (28.8 Unit J.1)	16.8 (23.8 Unit B.2)	13.5 (Unit D: 38m²)	9.5.1.
		Dining	m²				9.5.7.
		Kitchen	m²		4.2 (6.6 UnitB.2)		9.5.5.
		Main Bdr	m²	9.8 (9.8 Unit J.1)	9.8 (11.6 Unit B.2)		9.5.6.
		Bedroom	m²	-	7.0m(9.1 Unit E)	-	9.5.7.2.
		Other	m²	-	-	-	9.5.7.1.

		FACILITY	REQUIRED	COMMENTS	OBC REFERENCE COMMENTS
26.0	BARRIER FREE DESIGN				3.8
		PROTECTION WITHIN FLOOR	NO	SPRINKLERS 3.3.1.7.(3)	3.3.1.7.
		P5 - P1	YES	5 SPACES PROVIDED	3.8.2.2.
		ENTRY & VESTIBULES	YES	Power door operators required. Vestibule depth: door + 1500	3.8.1.2. & 3.8.3.3.(11)
		POOL/CHANGE AREA	YES	Stalls in WRs not required to be barrier free as Univ. WR nearby.	Table 3.7.4.3.C.
		DOORS	YES	Doors in BFPOT = 860+45+15 = 920, 965 door req. Power operators req. at entries, public washrooms and amenity areas.	3.8.3.3.
		COMMON AREAS	YES		
		WASHROOMS	YES	Stalls in WRs not required to be barrier free as Univ. WR nearby.	Table 3.8.2.3.B.
		UNIVERSAL WR	YES	Pool and Amenity on 27th Fl.	3.8.3.12.
		SUITES	YES	15% of all BR types distributed arround building	3.8.2.1.(5)
		ROOF TERRACE	YES	BFPOT required throughout amenity area including roof terrace	3.8.2.3 & 3.8.3.11.
27.0	ENERGY EFFICIENCY	CLIMATIC ZONE:	Zone 1 (< 5000 Degree Days)		
		COMPLIANCE PATH:	Performance Based		
28.0	NOTES	1	ALL REFERENCES ARE TO OBC DIVISION B UNLESS PRECEDED BY [A] DIVISION A AND [C] DIVISION C		

2 Legend

Not Reviewed	NR: Not Required	FRR: Fire-resistance rating	BFPOT: Barrier Free Path of Travel
External Calculation	NC: Noncombustible	C: Combustible	

Notes & Legend

	Denotes	
—□—	"	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
CC	"	Cut Cross
CP	"	Concrete Pin
IBø	"	Round Iron Bar
S&W	"	Spike & Washer
SSIB*	"	Short Standard Iron Bar (0.3 Long)
IB*	"	Iron Bar (0.3 Long)
(WIT)	"	Witness
Meas.	"	Measured
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	"	Plan
(P2)	"	Plan
(P3)	"	Plan
○ MH-ST	"	Maintenance Hole (Storm Sewer)
○ MH-S	"	Maintenance Hole (Sanitary)
○ MH-B	"	Maintenance Hole (Bell)
○ MH-T	"	Maintenance Hole (Traffic)
○ MH-H	"	Maintenance Hole (Hydro)
○ MH-G	"	Maintenance Hole (Gas)
○ MH	"	Maintenance Hole (Unidentified)
◎ VC	"	Valve Chamber (Watermain)
———	"	Underground Storm Sewer
———	"	Underground Sanitary Sewer
———	"	Underground Water
———	"	Underground Power
———	"	Underground Gas
———	"	Underground Fibre Optic
———	"	Overhead Wires
○ UP	"	Utility Pole
○ AN	"	Anchor
○ LS	"	Light Standard
□ CB	"	Catch Basin
▦ DI	"	Ditch Inlet
CSP	"	Corrugated Steel Pipe
CPP	"	Corrugated Plastic Pipe
CCP	"	Concrete Pipe
FH	"	Fire Hydrant
◎ WV	"	Water Valve
○ SP	"	Water Stand Post
Inv.	"	Invert
T/G	"	Top of Grate
⊗ GV	"	Gas Valve
▭ GM	"	Gas Meter
▭ HM	"	Hydro Meter
▭ HH	"	Handhole
▫ TB-B	"	Bell Terminal Box
▫ TB-C	"	Cable Terminal Box
▫ TB-T	"	Traffic Terminal Box
▫ TB	"	Unidentified Terminal Box
TSP	"	Traffic Signal Post
PM	"	Parking Meter
♿	"	Disabled Parking
SCS	"	Shopping Cart Storage
○	"	Deciduous Tree
✳	"	Coniferous Tree
○ B	"	Bollard
△ S	"	Sign
CLF	"	Chain Link Fence
BF	"	Board Fence
P&W	"	Post and Wire
⋈	"	Gate
○ PO-W	"	Wood Pole
○ PO-M	"	Metal Pole
○ PO-C	"	Concrete Pole
TSL	"	Traffic Light
● FP	"	Flag Pole
MB	"	Mail Box
AC	"	Air Conditioner
TEL	"	Telephone Booth
Ⓖ	"	Refuse Container
⌖	"	Borehole
T-P	"	Test Pit
○ V-P	"	Vapour Probe
○ M-W	"	Monitoring Well
○ V-P	"	Vent Pipe
○ W	"	Well Cap
GFP	"	Gasoline Fuel Pump
Ⓕ FV	"	Fuel Tank Vent
● FTC	"	Fuel Tank Filler Cap
Ø	"	Diameter
+65.00	"	Location of Elevations
C/L	"	Centreline
———	"	Property Line

LEVEL	LANDSCAPED AREA (m²)	TOTAL AMENITIES (m²)	COMMON AMENITIES (m²)
G	527.5	452.9	452.9
2		173.6	80.4
3		18.1	
4		18.1	
5		18.1	
6		18.1	
7		18.1	
8		18.1	
9		18.1	
10		18.1	
11		18.1	
12		18.1	
13		18.1	
14		18.1	
15		18.1	
16		18.1	
17		18.1	
18		48.0	
19		48.0	
20		48.0	
21		48.0	
22		48.0	
23		18.1	
24		18.1	
25		18.1	
26		18.1	
27		271.6	259.0
ROOF		400.3	400.3
PROVIDED	**527.5**	**1809.8**	**1117.2**
REQUIRED	512.6	1386.0	693.0

70 GLOUCESTER STREET
SITE PLAN

0 5 10 20m

SITE AREA = 1708.5 m²
REGULAR RESIDENTIAL UNITS : 228 (phase 1)
CARETAKER'S UNIT: 1
GUEST SUITES 2

GROSS FLOOR AREA:
RESIDENTIAL 15,531.0m²
COMMERCIAL 127.3m²
TOTAL GROSS FLOOR AREA: 15658.3 m²
FSI: 9.17

PARKING BY CURRENT ZONING (2016-249):

	Min	Max	Provided
Residential (occupants):	116	404	
Residential (visitor):	22	inc	
TOTAL:	164	404	**328**

CLARIDGE HOMES
210 Gladstone Avenue, Suite 2001
Ottawa, Ontario K2P OY6
Tel : (613) 233 6030 Fax : (613) 233 8290

DESCRIPTION	DATE	NO.
REVISION 01	19.01.18	09
ISSUED FOR CONSTRUCTION	18.08.16	08
IN PROGRESS	18.05.14	07
ISSUED FOR TENDER	17.12. 22	06
ISSUED FOR PERMIT	17.10.30	05
FOUNDATION PERMIT (REVISED)	17.04.27	04a
FOUNDATION PERMIT	17.03.09	04
EXCAVATION PERMIT (UPDATED)	16.11.25	03
PRELIMINARY (UPDATED)	16.10.19	02
PRELIMINARY	16.09.09	01

L'ENTREPRENEUR DOIT VÉRIFIER TOUTES LES COTES ET DIMENSIONS. TOUTES LES ERREURS ET OMISSIONS DEVRONT ÊTRE SIGNALÉES AUX ARCHITECTES. LES DIMENSIONS NE DOIVENT PAS ÊTRE MESURÉES DIRECTEMENT SUR CE DESSIN. EN OUTRE, CE DESSIN NE POURRA PAS ÊTRE UTILISÉ POUR LA CONSTRUCTION QU'APRÈS AVOIR ÉTÉ SPÉCIFIQUEMENT ÉMIS POUR CONSTRUCTION.

SEAL
ALAIN FOURNIER LICENCE 5760

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Tel : (613) 727-0850
email : nepean@aovltd.com

project
70 GLOUCESTER STREET
Ottawa, Ontario

drawing title
SITE PLAN

scale 1:200		
drawn by		
verified by	date 28-04-2016	
project no 16-007	drawing no A-001	revision 01

Name of Practice:
Enter address and contact information here.

Name of Project:
Claridge District 89 Nepean

Location:
89 Nepean Street, Ottawa, Ontario, K2P 1T4

Date:

Ontario Building Code Data Matrix Part 3

No.	Item	Details	Building Code Reference[1]
3.00	Building Code Version:	O. Reg. 332/12 — Last Amendment O. Reg. 191/14	
3.01	Project Type:	☒ New ☐ Addition ☐ Renovation ☐ Change of use ☐ Addition and renovation Description: New Mixed Use Development Residential and Commercial	[A] 1.1.2.
3.02	Major Occupancy Classification:	Occupancy / Use: C- Residential / Condominiums D- Business & Personal Service / Commercial F2- Medium Hazard Industrial / Service Room F1- Low Hazard Industrial / Parking	3.1.2.1.(1)
3.03	Superimposed Major Occupancies:	☐ No ☒ Yes Description: C and F3 (parking) : 1.5HR	3.2.2.7.
3.04	Building Area (m²)	Description / Existing / New / Total: Typical Floor 0 0 0 Exit 0 0 0 0 0 0 0 0 0 Total 0 0 0 *Insert additional lines as needed*	[A] 1.4.1.2.
3.05	Gross Area (m²)	Description / Existing / New / Total: Ground Floor 0 0 0 2nd Floor 0 0 0 3-26th Floor 0 0 0 27th Floor 0 0 0 28th Floor 0 0 0 29th Floor- elevator machine rm. 0 0 0 Total 0 0 0 *Insert additional lines as needed*	[A] 1.4.1.2.
3.06	Mezzanine Area (m²)	Description / Existing / New / Total: N/A 0 0 0 0 0 0 0 0 0 0 0 0 Total 0 0 0 *Insert additional lines as needed*	3.2.1.1.
3.07	Building Height	0 Storeys above grade 0 (m) Above grade 0 Storeys below grade	[A] 1.4.1.2. & 3.2.1.1.
3.08	High Building	☐ No ☒ Yes	3.2.6.
3.09	Number of Streets/ Firefighter access	1 street(s) / Balconies	3.2.2.10. & 3.2.5.
3.10	Building Classification: (Size and Construction Relative to Occupancy)	3.2.2. Group/Div	3.2.2.20. - 83.
3.11	Sprinkler System	☐ Required ☐ Not Required Proposed: ☒ entire building ☐ selected compartments ☐ selected floor areas ☐ basement ☐ in lieu of roof rating ☐ none	3.2.1.5. & 3.2.2.17.
3.12	Standpipe System	☐ Not required ☐ Required	3.2.9.
3.13	Fire Alarm System	☐ Required ☐ Not required Proposed: ☐ Single stage ☐ Two stage ☐ None	3.2.4.
3.14	Water Service / Supply is Adequate	☐ No ☒ Yes	
3.15	Construction Type:	Restriction: ☐ Combustible permitted ☒ Non-combustible required Actual: ☐ Combustible ☒ Non-combustible ☐ Combination Heavy Timber Construction: ☒ No ☐ Yes	3.2.2.20. - 83. & 3.2.1.4.
3.16	Importance Category:	☐ Low ☐ Low human occupancy ☐ Post-disaster shelter ☒ Normal ☐ High ☐ Minor storage building ☐ Explosive or hazardous substances ☐ Post-disaster	4.1.2.1.(3) & T4.1.2.1.B
3.17	Seismic Hazard Index:	(I_E Fa Sa (0.2)) = 0 Seismic design required for Table 4.1.8.18. items 6 to 21: ((I_E Fa Sa (0.2)) ≥ 0.35 or Post-disaster) ☐ No ☐ Yes	4.1.2.1.(3) 4.1.8.18.(2)
3.18	Occupant Load	Floor Level/Area / Occupancy Type / Based On / Occupant Load (Persons): Ground / C,D,F2 / m² / 0 2nd / C / No. of Sleeping rooms / 0 3RD – 27TH / C / No. of Sleeping rooms / 0 28TH / / / 0 *Insert additional lines as needed*	3.1.17.
3.19	Barrier-free Design:	☐ Yes Explanation ☐ No	3.8.
3.20	Hazardous Substances:	☐ Yes Explanation ☐ No	3.3.1.2. & 3.3.1.19.
3.21	Required Fire Resistance Ratings	Horizontal Assembly / Rating / Supporting Assembly (H) / Noncombustible in lieu of rating? Floors over basement 0 0 ☐ No ☐ Yes ☐ N/A Floors 0 0 ☐ No ☐ Yes ☐ N/A Mezzanine 0 0 ☐ No ☐ Yes ☐ N/A Roof 0 0 ☐ No ☐ Yes ☐ N/A	3.2.2.20. - 83. & 3.2.1.4.
3.22	Spatial Separation	Wall / EBF Area (m²) / L.D. (m) / L/H or H/L / Required FRR (H) / Construction Type Required / Cladding Type Required 0 0 0 0 ☐ Noncombustible ☐ Noncombustible 0 0 0 0 ☐ Noncombustible ☐ Noncombustible 0 0 0 0 ☐ Noncombustible ☐ Noncombustible 0 0 0 0 ☐ Noncombustible ☐ Noncombustible *Insert additional lines as needed*	3.2.3.
3.23	Plumbing Fixture Requirements	Ratio: Male:Female = 50:50 Except as noted otherwise Floor Level/Area / Occupant Load / OBC Reference / Fixtures Required / Fixtures Provided Level 2/ Board Rm. 0 0 0 Level 1/ Fitness Rm. 0 0 0 0 0 0 0 0 0 *Insert additional lines as needed*	3.7.4.
3.24	Energy Efficiency:	Compliance Path: Performance Based Climatic Zone: Zone 1 (< 5000 Degree Days)	
3.25	Notes:	*Insert additional lines as needed*	

Notes & Legend

Denotes

- Survey Monument Planted
- Survey Monument Found
- SIB — Standard Iron Bar
- SSIB — Short Standard Iron Bar
- IB — Iron Bar
- CC — Cut Cross
- CP — Concrete Pin
- IBø — Round Iron Bar
- S&W — Spike & Washer
- SSIB* — Short Standard Iron Bar (0.3 Long)
- IB* — Iron Bar (0.3 Long)
- (WIT) — Witness
- Meas. — Measured
- (AOG) — Annis, O'Sullivan, Vollebekk Ltd.
- (P1) — Plan
- (P2) — Plan
- (P3) — Plan
- MH-ST — Maintenance Hole (Storm Sewer)
- MH-S — Maintenance Hole (Sanitary)
- MH-B — Maintenance Hole (Bell)
- MH-T — Maintenance Hole (Traffic)
- MH-H — Maintenance Hole (Hydro)
- MH-G — Maintenance Hole (Gas)
- MH — Maintenance Hole (Unidentified)
- VC — Valve Chamber (Watermain)
- Underground Storm Sewer
- Underground Sanitary Sewer
- Underground Water
- Underground Power
- Underground Gas
- Underground Fibre Optic
- Overhead Wires
- UP — Utility Pole
- AN — Anchor
- LS — Light Standard
- CB — Catch Basin
- DI — Ditch Inlet
- CSP — Corrugated Steel Pipe
- CPP — Corrugated Plastic Pipe
- CCP — Concrete Pipe
- FH — Fire Hydrant
- WV — Water Valve
- SP — Water Stand Post
- Inv. — Invert
- T/G — Top of Grate
- GV — Gas Valve
- GM — Gas Meter
- HM — Hydro Meter
- HH — Handhole
- TB-B — Bell Terminal Box
- TB-C — Cable Terminal Box
- TB-T — Traffic Terminal Box
- TB — Unidentified Terminal Box
- TSP — Traffic Signal Post
- PM — Parking Meter
- Disabled Parking
- SCS — Shopping Cart Storage
- Deciduous Tree
- Coniferous Tree
- B — Bollard
- S — Sign
- CLF — Chain Link Fence
- BF — Board Fence
- P&W — Post and Wire
- Gate
- PO-W — Wood Pole
- PO-M — Metal Pole
- PO-C — Concrete Pole
- TL — Traffic Light
- FP — Flag Pole
- MB — Mail Box
- AC — Air Conditioner
- TEL — Telephone Booth
- Refuse Container
- Borehole
- T-P — Test Pit
- V-P — Vapour Probe
- M-W — Monitoring Well
- V-P — Vent Pipe
- W — Well Cap
- GP — Gasoline Fuel Pump
- FV — Fuel Tank Vent
- FTC — Fuel Tank Filler Cap
- Ø — Diameter
- Location of Elevations
- C/L — Centreline
- Property Line

LEVEL	COMMON AMENITIES (m²)	TOTAL AMENITIES (m²)
G	693,3	757,1
2	101,0	179,0
3		24,9
4		24,9
5		24,9
6		24,9
7		24,9
8		24,9
9		24,9
10		24,9
11		24,9
12		24,9
13		24,9
14		24,9
15		24,9
16		24,9
17		24,9
18		56,0
19		56,0
20		56,0
21		56,0
22		56,0
23		24,9
24		24,9
25		24,9
26		24,9
27		13,4
ROOF	364,6	364,6
PROVIDED	**1158,9**	**2067,2**
REQUIRED	771,0	1542,0

SITE AREA = 1214.7 m²
LANDSCAPED AREA - 487.2 m² (364.4 m' REQUIRED)
REGULAR RESIDENTIAL UNITS : 254
GUEST SUITES : 2
CARETAKER'S UNIT: 1

GROSS FLOOR AREA:
RESIDENTIAL 16,066 m²
COMMERCIAL 174 m²
TOTAL GROSS FLOOR AREA: 16,240 m²
FSI: 13.37

PARKING BY CURRENT ZONING:

	Min	Max	Provided
Residential (occupants):	127	444	
Residential (visitor):	25	inc	
TOTAL:	152	415	**174**

CLARIDGE HOMES
210 Gladstone Avenue, Suite 2001
Ottawa, Ontario K2P OY6
Tel : (613) 233 6030 Fax : (613) 233 8290

DESCRIPTION	DATE	NO.
PROGRESS REVIEW (85%)	16-04-19	
SUPERSTRUCTURE PERMIT (RESPONSE)	11-04-19	3
SUPERSTRUCTURE PERMIT - revised	31-01-19	2a
SUPERSTRUCTURE PERMIT	19-12-18	2
70 GLOUCESTER FOUNDATION PERMIT ONLY (rev)	08-08-17	01a
70 GLOUCESTER FOUNDATION PERMIT ONLY	05-07-17	01
XXX	XXX	XX

SEAL

PROFESSIONALS

architects:
EVOQ
1435, RUE SAINT-ALEXANDRE, BUREAU 1000
MONTRÉAL (QUÉBEC) H3A 2G4
T. 514-393-9490 F. 514-393-9498
info@evoqarchitecture.com

Landscape architect:
James B. Lennox and Associates Inc.
Landscape Architects
361 Hinton Avenue South,
Ottawa, Ontario, K1Y 1A6 T : (613) 722 5168

Structural engineer
Goodeve Structural Inc.
18-77 Auriga Drive,
Nepean, Ontario, K2E 7Z7
Tel : (613) 226-4558
email : mail@goodevestructural.ca

Mécanique et électricité
Smith + Andersen
1600 Carling Ave. Suite 530
Ottawa Ontario K1Z 1G3
t 613 230 1186 f 613 230 2598
smithandandersen.com

Civil Engineer:
NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Dr.
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email novainfo@novatech-eng.com

Topographical Surveyor:
Annis O'Sullivan, Vollebekk Ltd.,
Ontario Land Surveyors
14 Concourse Gate, Suite 500
Nepean, Ontario, K2E 7S6
Tel : (613) 727-0850
email : nepean@aovltd.com

project
Claridge District
89 NEPEAN

drawing title
SITE PLAN

scale	1:200		
drawn by			
verified by		date	05-07-17
project no	9278-18-1	drawing no	A-2-001
		revision	

APPENDIX B

TIA Screening Form

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	**70 Gloucester Street and 89-91 Nepean Street**
Description of Location	**Midblock between O'Connor Street and Metcalfe Street**
Land Use Classification	**Public Parking**
Development Size (units)	**253 parking spaces**
Development Size (m^2)	
Number of Accesses and Locations	**One on Gloucester Street**
Phase of Development	**One**
Buildout Year	**2023**

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m^2
Industrial	5,000 m^2
Fast-food restaurant or coffee shop	100 m^2
Destination retail	1,000 m^2
Gas station or convenience market	75 m^2

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		X
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		X

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?		X
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		X
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?		X
Is the proposed driveway within auxiliary lanes of an intersection?		X
Does the proposed driveway make use of an existing median break that serves an existing site?		X
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		X
Does the development include a drive-thru facility?		X

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?	✓	
Does the development satisfy the Location Trigger?		X
Does the development satisfy the Safety Trigger?		X

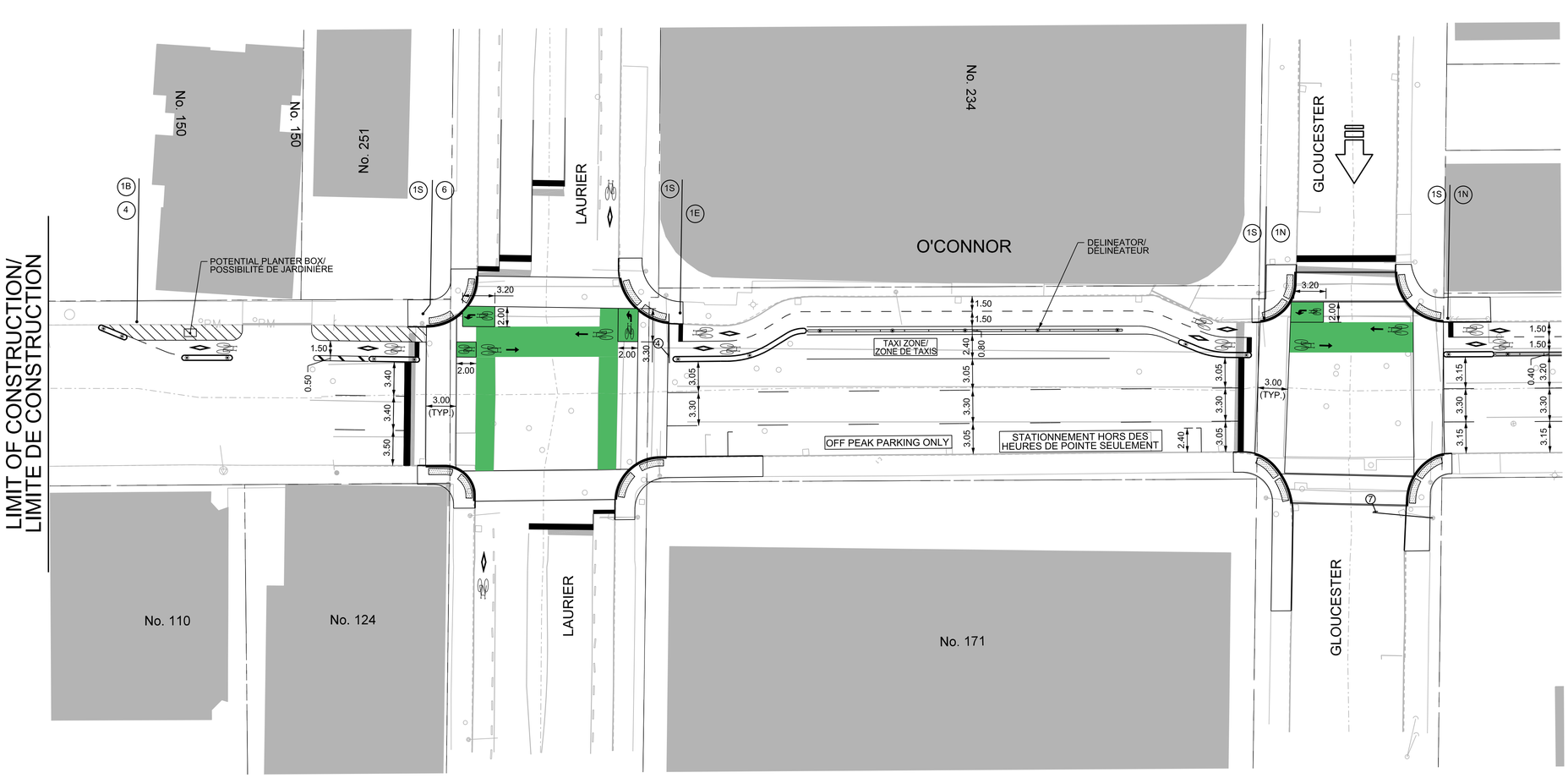
If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

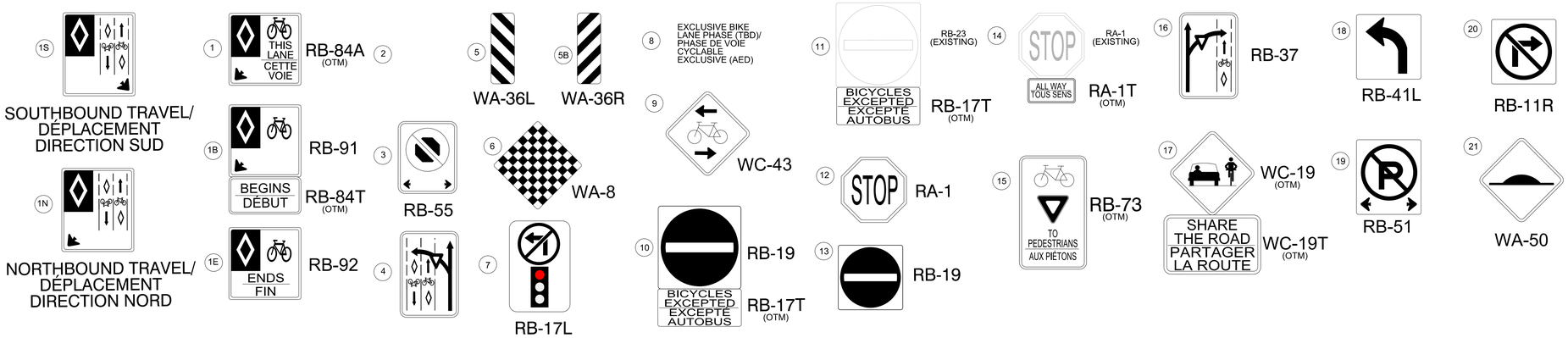
APPENDIX C

O’Connor Street Bikeway

O'Connor Street Bikeway Detailed Design Drawing • Plan Détaillé de la Voie Cyclable de la rue O'Connor

PLANNING AND GROWTH MANAGEMENT
URBANISME ET GESTION DE LA CROISSANCE





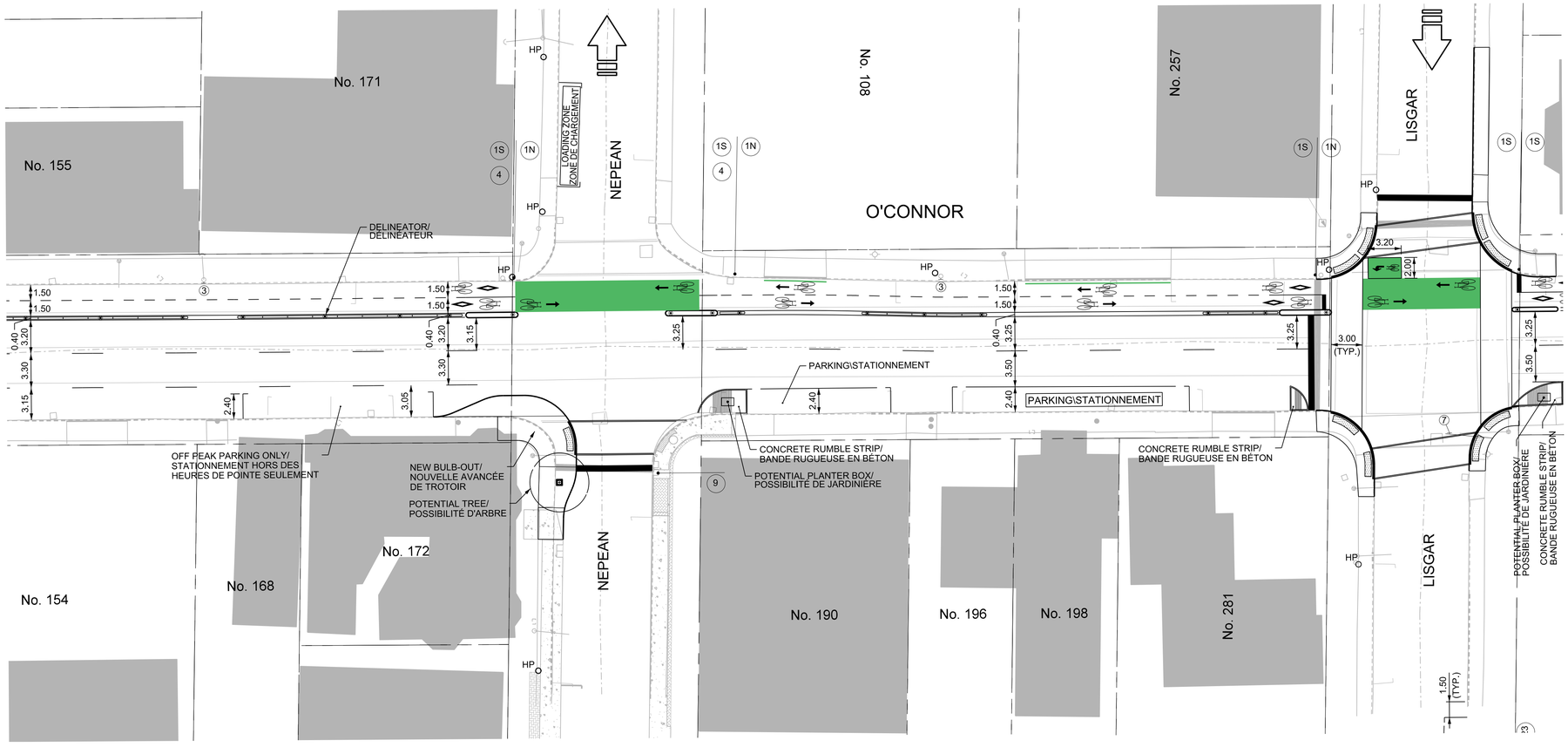
Sheet\Feuillet 1: Laurier to\à Gloucester

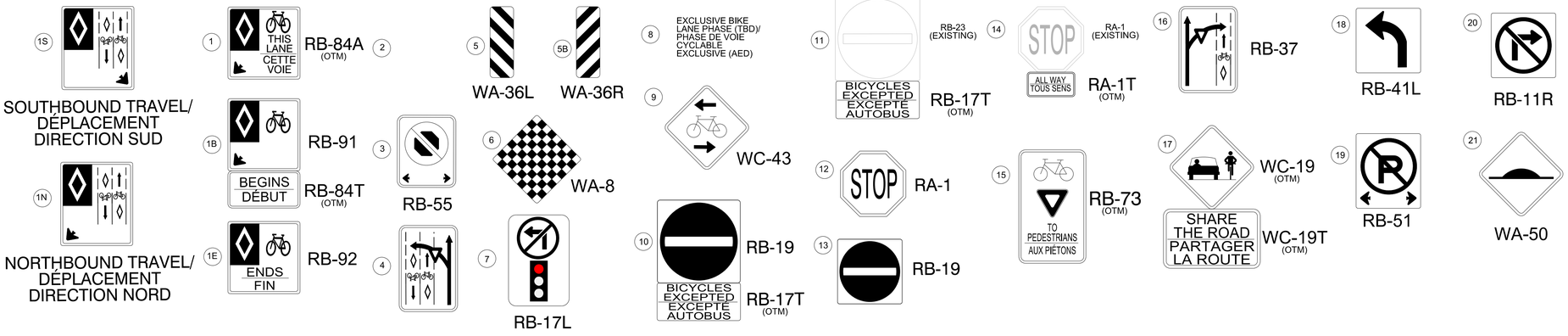
March 7, 2016

ottawa.ca
3-1-1
TTY/ATS 613-580-2401

O'Connor Street Bikeway Detailed Design Drawing • Plan Détaillé de la Voie Cyclable de la rue O'Connor

PLANNING AND GROWTH MANAGEMENT
URBANISME ET GESTION DE LA CROISSANCE





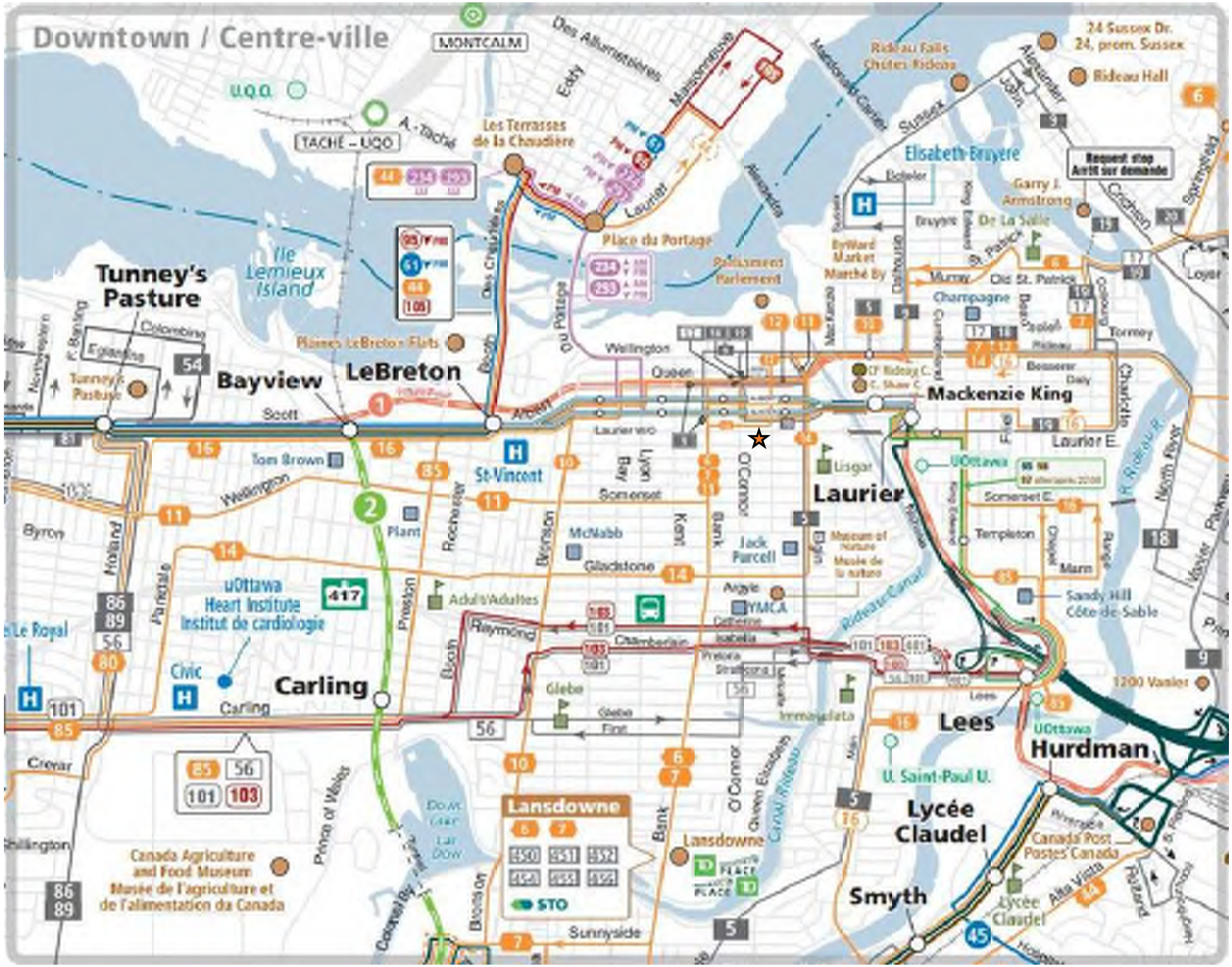
Sheet\Feuillet 2: Nepean to\à Lisgar

March 7, 2016

ottawa.ca
3-1-1
TTY/ATS 613-580-2401

APPENDIX D

OC Transpo System Information

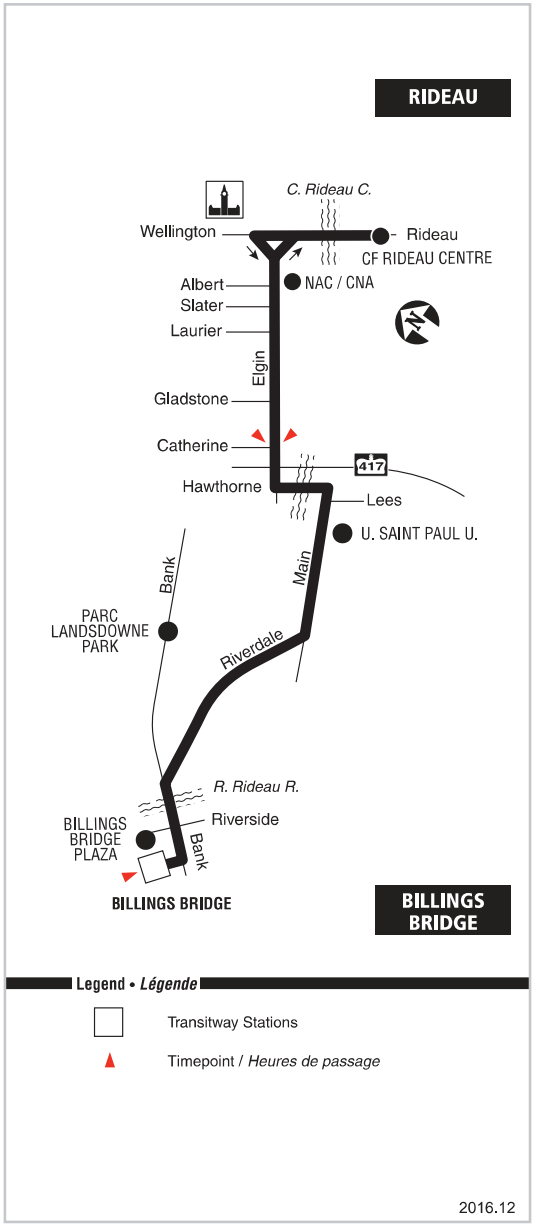


★ SUBJECT SITE

Transpo

5 RIDEAU / BILLINGS BRIDGE

7 days a week / 7 jours par semaine
All day service
Service toute la journée



Information / Renseignement.....**613-741-4390**

Customer Relations
Service à la clientèle **613-842-3600**

Lost and Found / Objets perdus **613-563-4011**

Schedule / Horaire.....**613-560-1000**

Text / Texto **560560**

plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

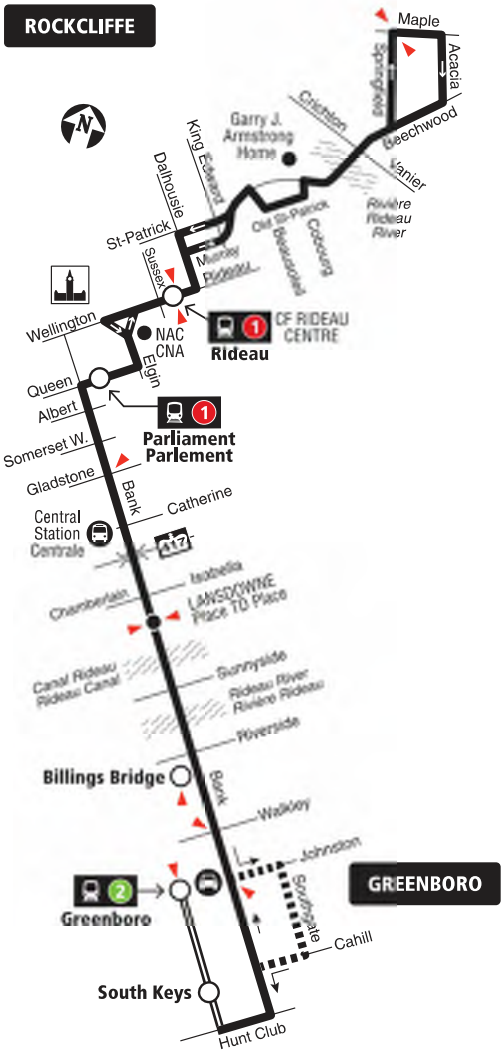
Effective / En vigueur Dec. 25 déc. 2016

6 ROCKCLIFFE / GREENBORO

Fréquent

7 days a week / 7 jours par semaine

All day service
Service toute la journée



2018.09

Schedule / Horaire.....613-560-1000
Text / Texto 560560
plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Customer Relations
Service à la clientèle 613-741-4390
Lost and Found / Objets perdus.....613-563-4011
Security / Sécurité.....613-741-2478

Effective September 2, 2018
En vigueur 2 septembre 2018

OC Transpo
INFO 613-741-4390
octranspo.com

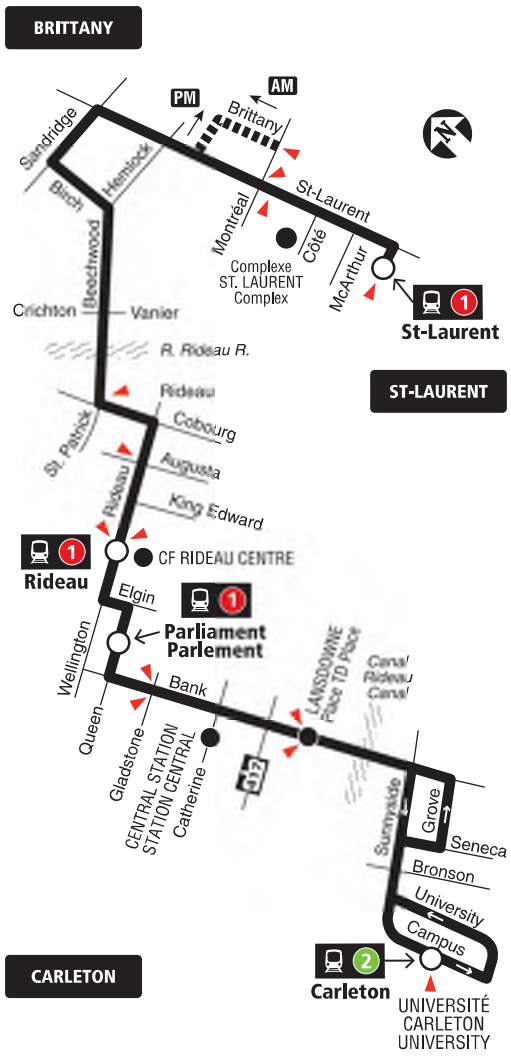
7 ST-LAURENT / CARLETON

Fréquent

7 days a week / 7 jours par semaine

All day service

Service toute la journée



Station

Peak periods only / Périodes de pointe seulement

Timepoint / Heures de passage

2018.09

Schedule / Horaire.....613-560-1000

Text / Texto 560560

plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Customer Relations
Service à la clientèle 613-741-4390

Lost and Found / Objets perdus.....613-563-4011

Security / Sécurité.....613-741-2478

Effective Septembre 2, 2018
En vigueur 2 septembre 2018

OC Transpo

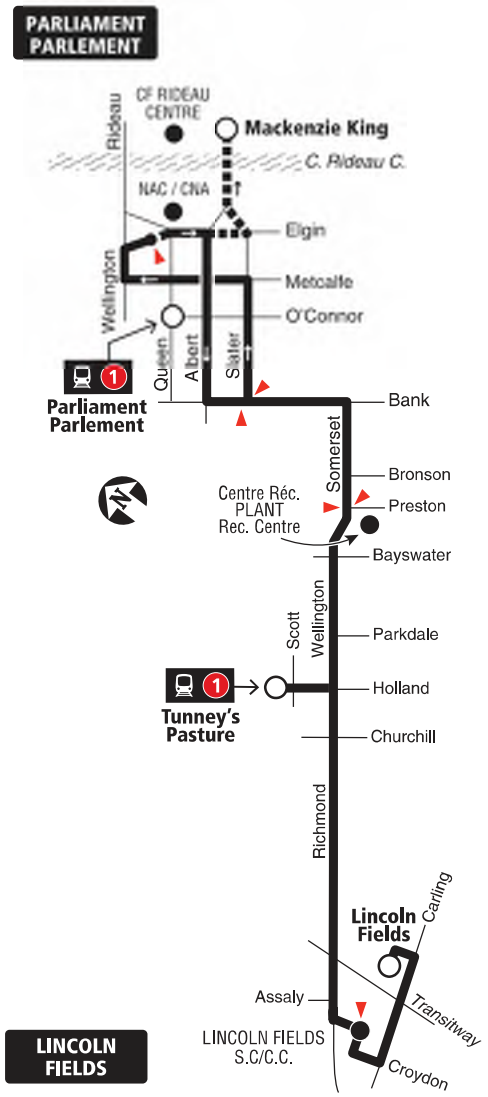
INFO 613-741-4390
octranspo.com

11 LINCOLN FIELDS / PARLIAMENT / PARLEMENT

Fréquent

7 days a week / 7 jours par semaine

All day service
Service toute la journée



Transitway & Station
Some trips / Quelques trajets
Timepoint / Heures de passage

2018.10

Schedule / Horaire.....613-560-1000
Text / Texto 560560
plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Customer Relations
Service à la clientèle **613-741-4390**
Lost and Found / Objets perdus.....**613-563-4011**
Security / Sécurité.....**613-741-2478**

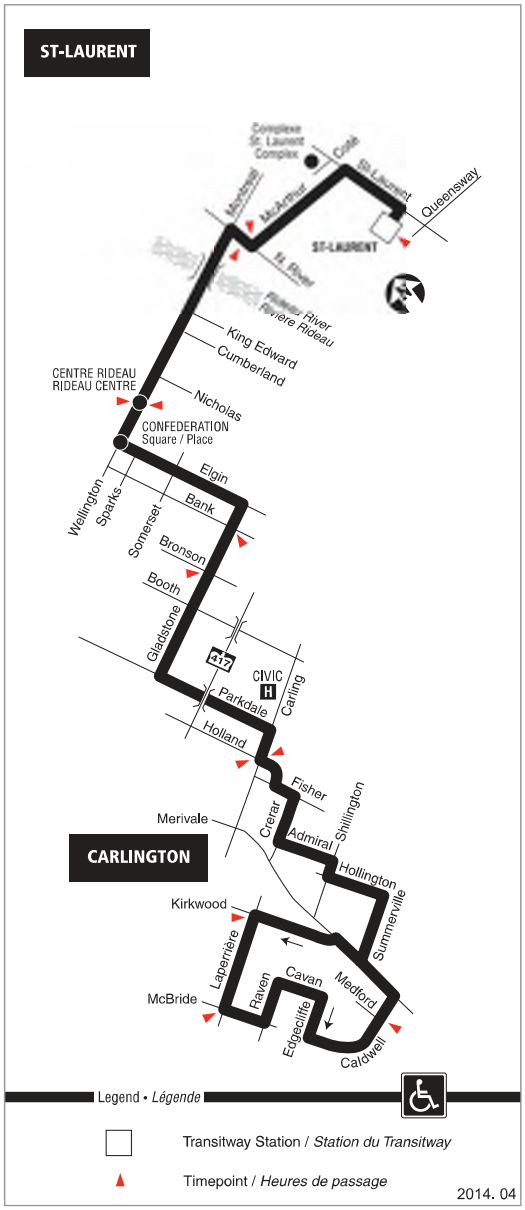
Effective October 15, 2018
En vigueur 15 octobre 2018

OC Transpo
INFO 613-741-4390
octranspo.com

OC Transpo

14 ST-LAURENT / CARLINGTON

7 days a week / 7 jours par semaine
All day service
Service toute la journée



Information / Renseignement.....**613-741-4390**

Customer Relations
Service à la clientèle **613-842-3600**

Lost and Found / Objets perdus **613-563-4011**

Schedule / Horaire.....**613-560-1000**

Text / Texto **560560**

plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Effective / En vigueur Sept 5 sept 2004

APPENDIX E

Traffic Count and Signal Timing Information

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

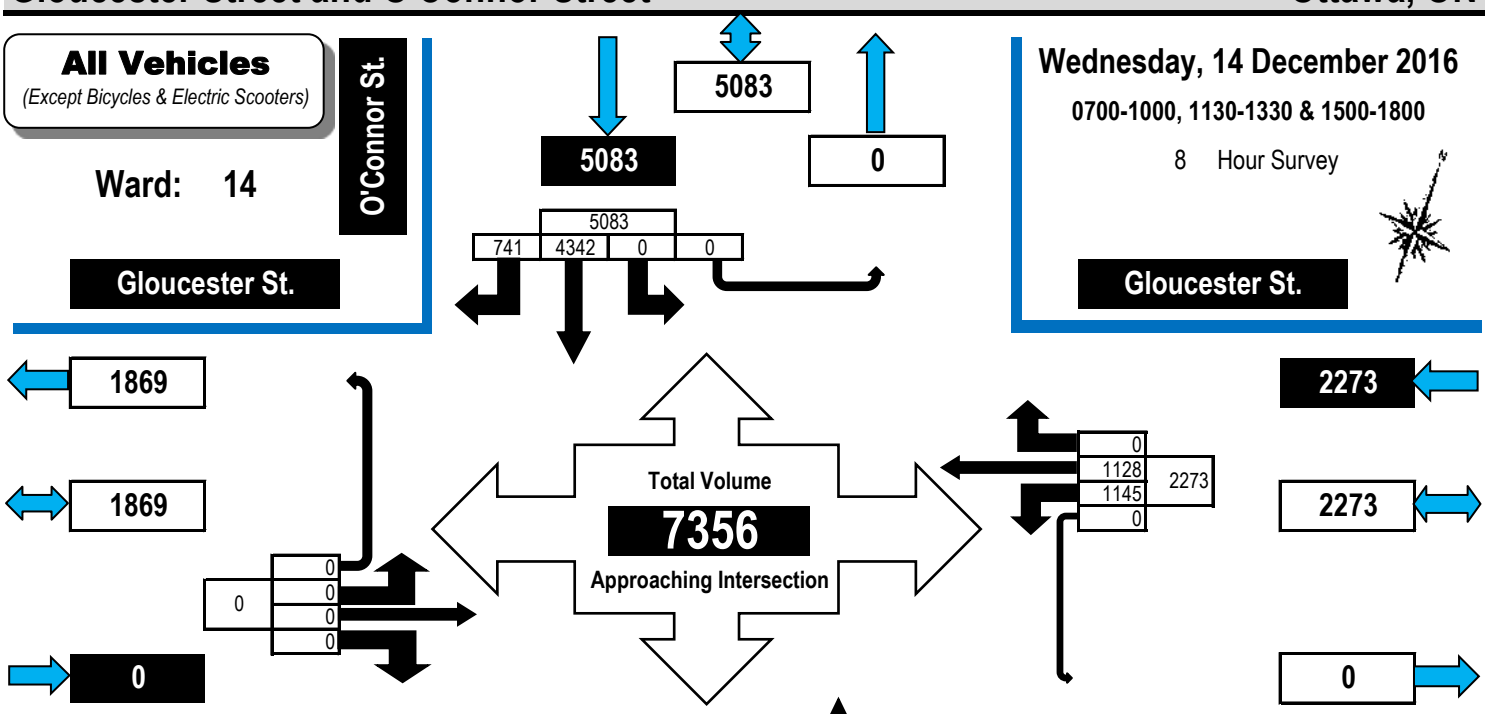
Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

Gloucester Street and O'Connor Street — Ottawa, ON

All Vehicles
(Except Bicycles & Electric Scooters)

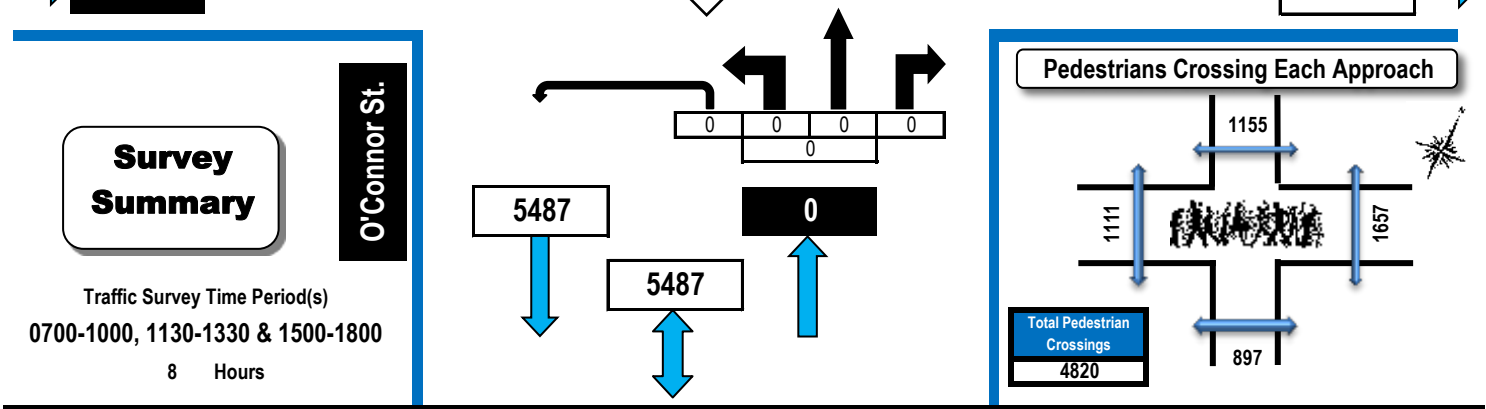
Ward: 14

Wednesday, 14 December 2016
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey



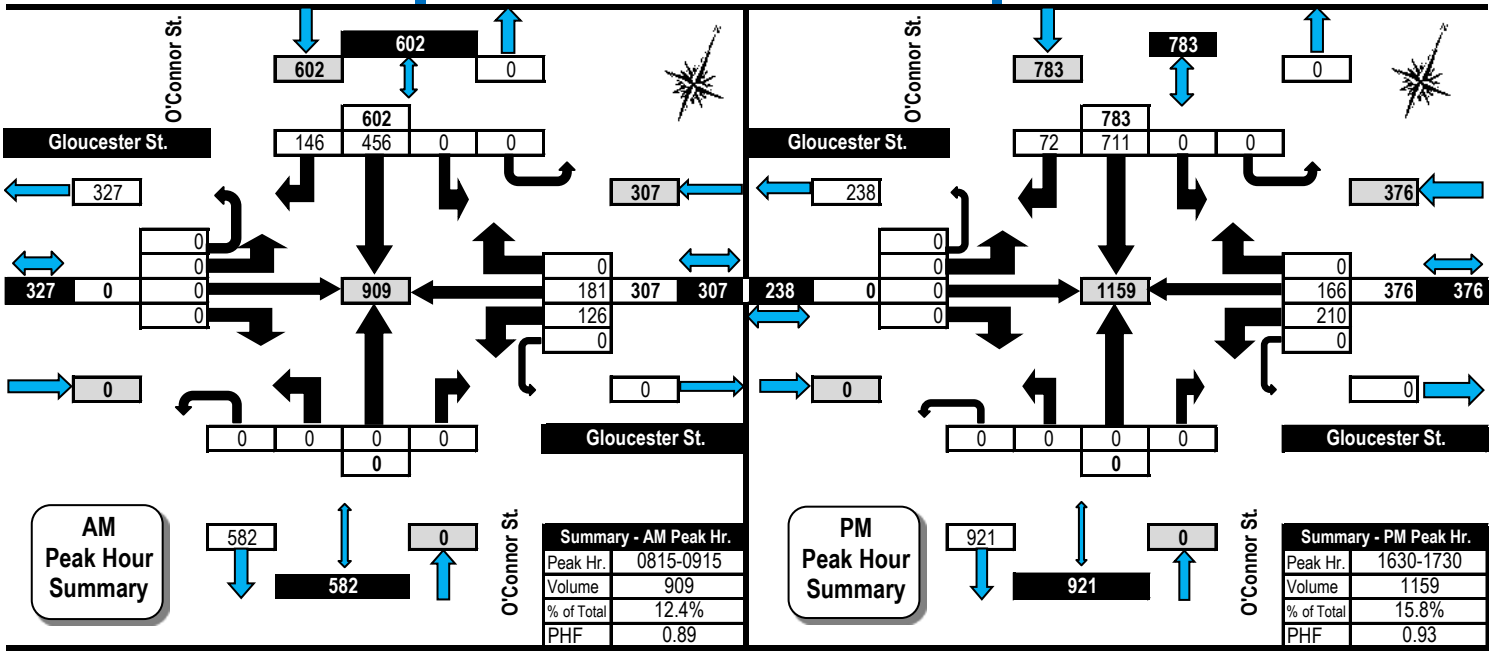
Survey Summary

Traffic Survey Time Period(s)
0700-1000, 1130-1330 & 1500-1800
8 Hours



Pedestrians Crossing Each Approach

Total Pedestrian Crossings: 4820



AM Peak Hour Summary

582 — 582 — 0

Summary - AM Peak Hr.	
Peak Hr.	0815-0915
Volume	909
% of Total	12.4%
PHF	0.89

PM Peak Hour Summary

921 — 921 — 0

Summary - PM Peak Hr.	
Peak Hr.	1630-1730
Volume	1159
% of Total	15.8%
PHF	0.93

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

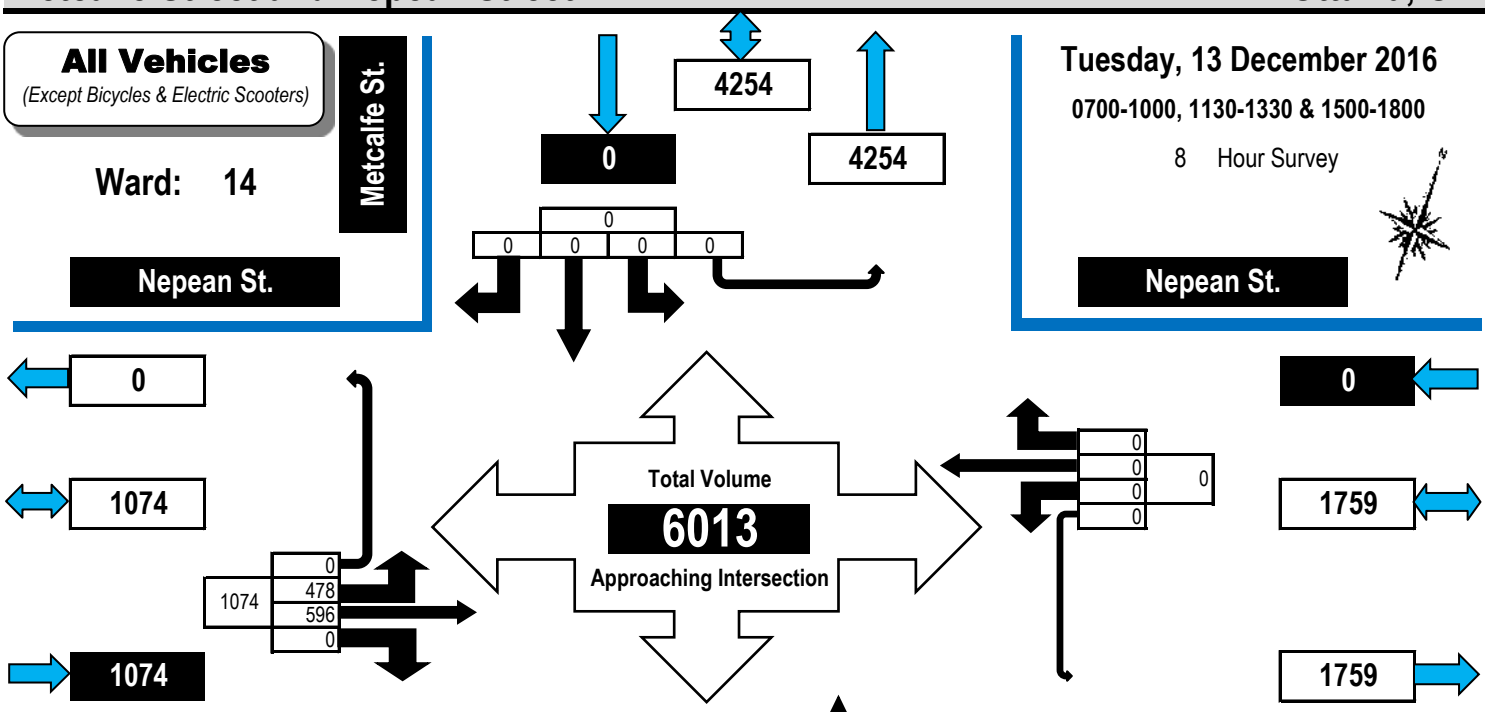
Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

Metcalfe Street and Nepean Street — Ottawa, ON

All Vehicles
(Except Bicycles & Electric Scooters)

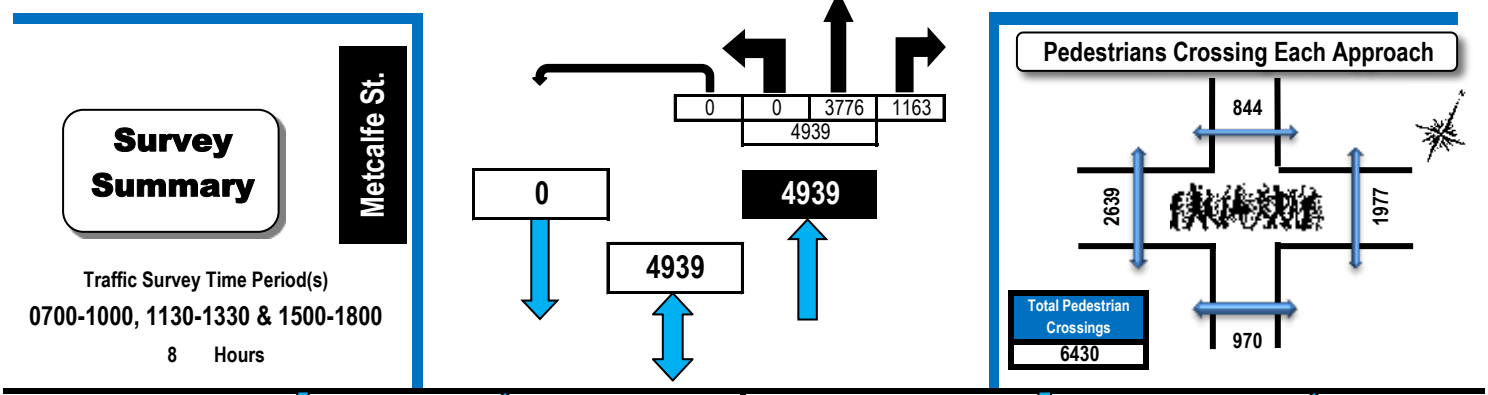
Ward: 14

Tuesday, 13 December 2016
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey



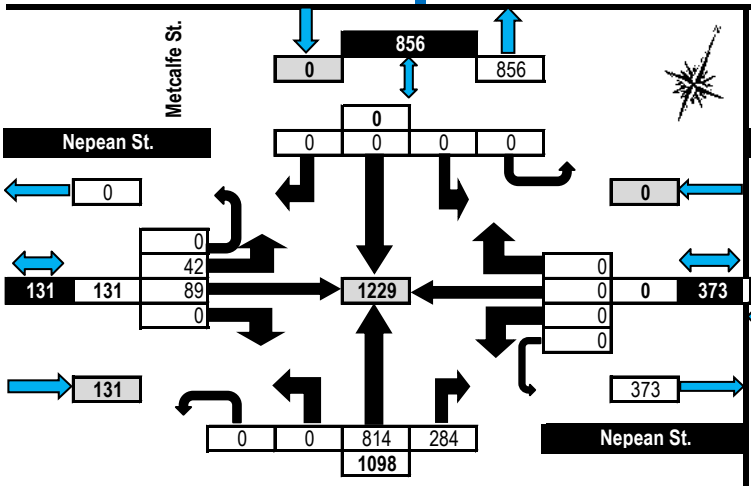
Survey Summary

Traffic Survey Time Period(s)
0700-1000, 1130-1330 & 1500-1800
8 Hours



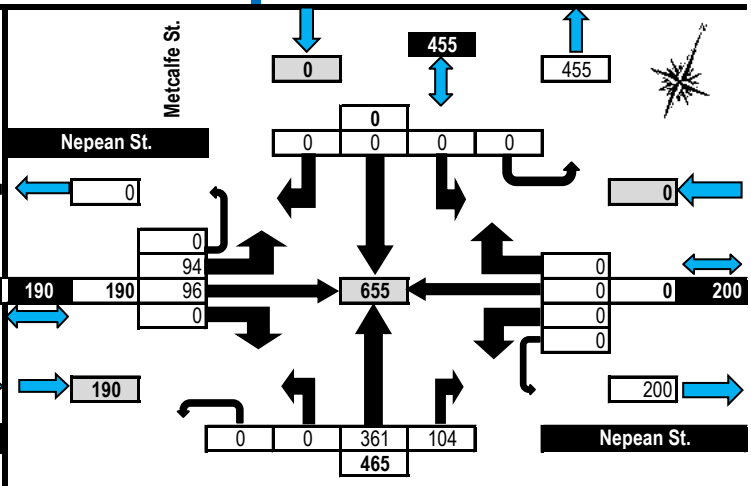
Pedestrians Crossing Each Approach

Total Pedestrian Crossings: 6430



AM Peak Hour Summary

Summary - AM Peak Hr.	
Peak Hr.	0815-0915
Volume	1229
% of Total	20.4%
PHF	0.94



PM Peak Hour Summary

Summary - PM Peak Hr.	
Peak Hr.	1630-1730
Volume	655
% of Total	10.9%
PHF	0.90

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

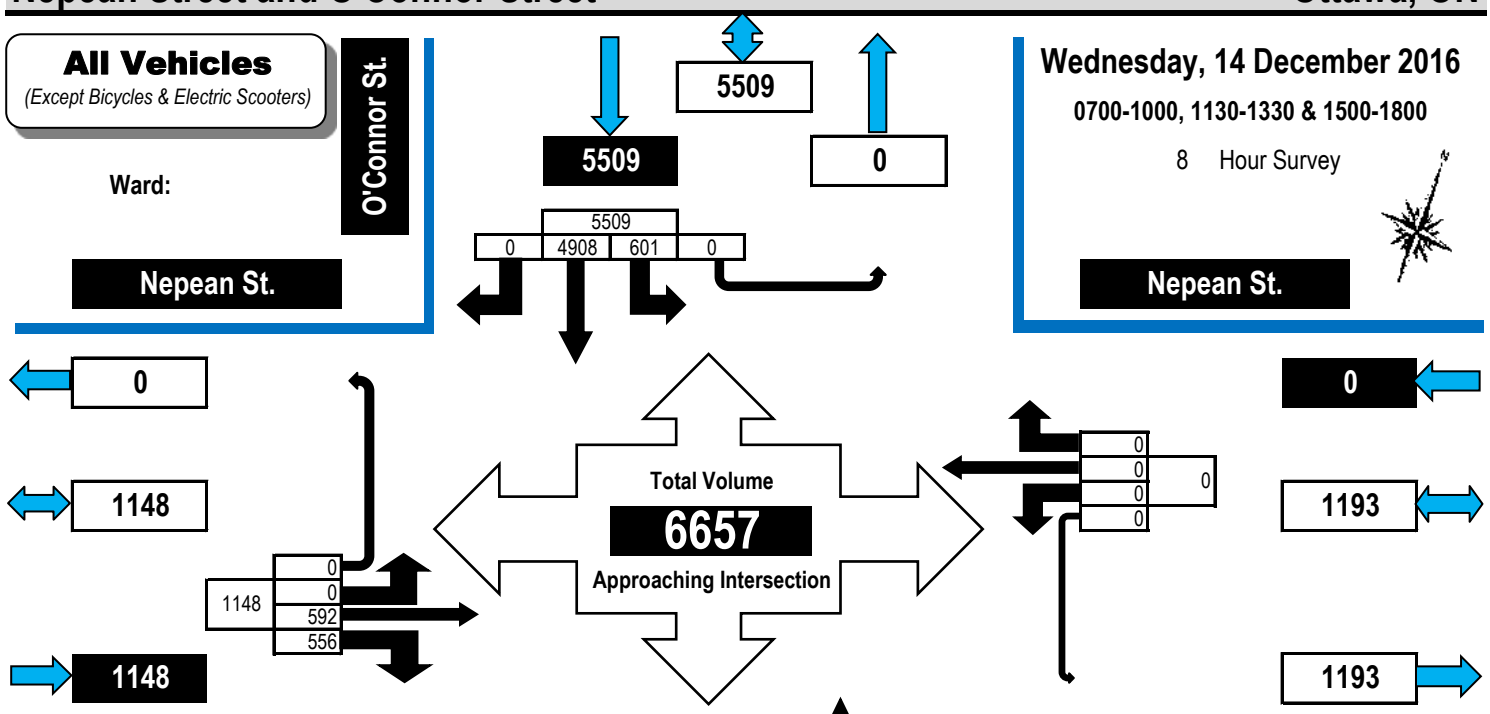
Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

Nepean Street and O'Connor Street — Ottawa, ON

All Vehicles
(Except Bicycles & Electric Scooters)

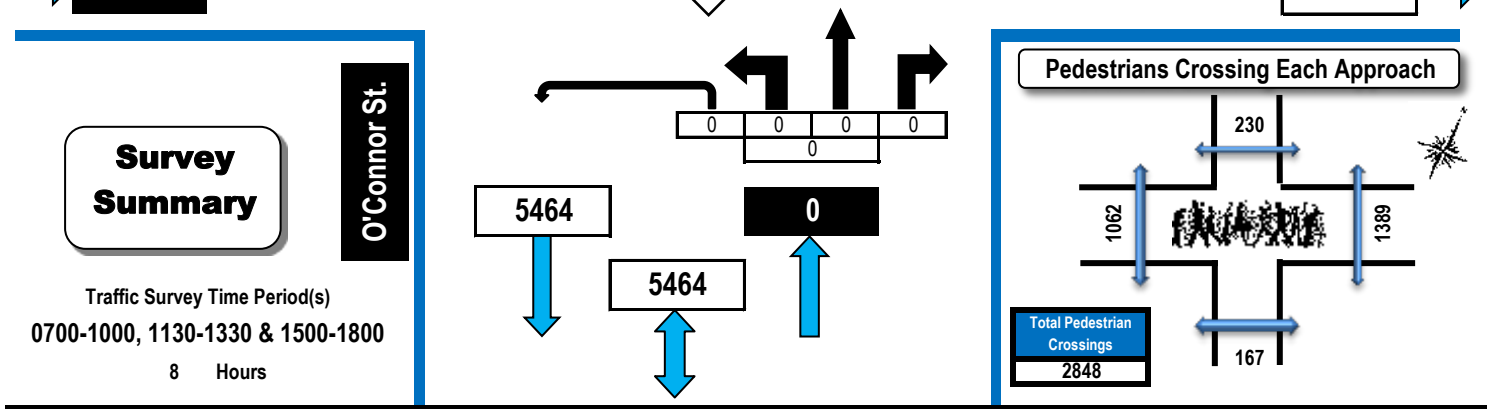
Ward:

Wednesday, 14 December 2016
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey



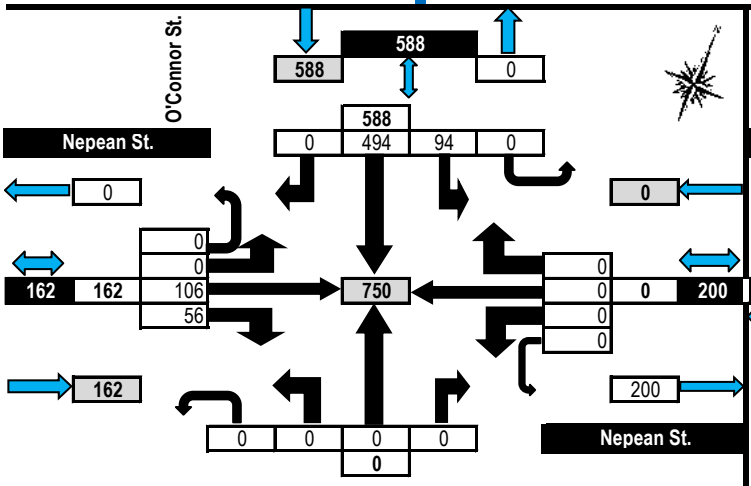
Survey Summary

Traffic Survey Time Period(s)
0700-1000, 1130-1330 & 1500-1800
8 Hours



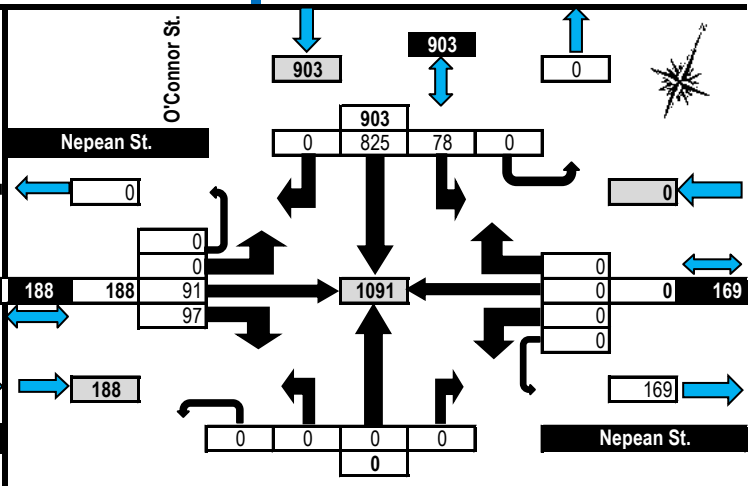
Pedestrians Crossing Each Approach

Total Pedestrian Crossings: 2848



AM Peak Hour Summary

Summary - AM Peak Hr.	
Peak Hr.	0830-0930
Volume	750
% of Total	11.3%
PHF	0.91



PM Peak Hour Summary

Summary - PM Peak Hr.	
Peak Hr.	1615-1715
Volume	1091
% of Total	16.4%
PHF	0.93

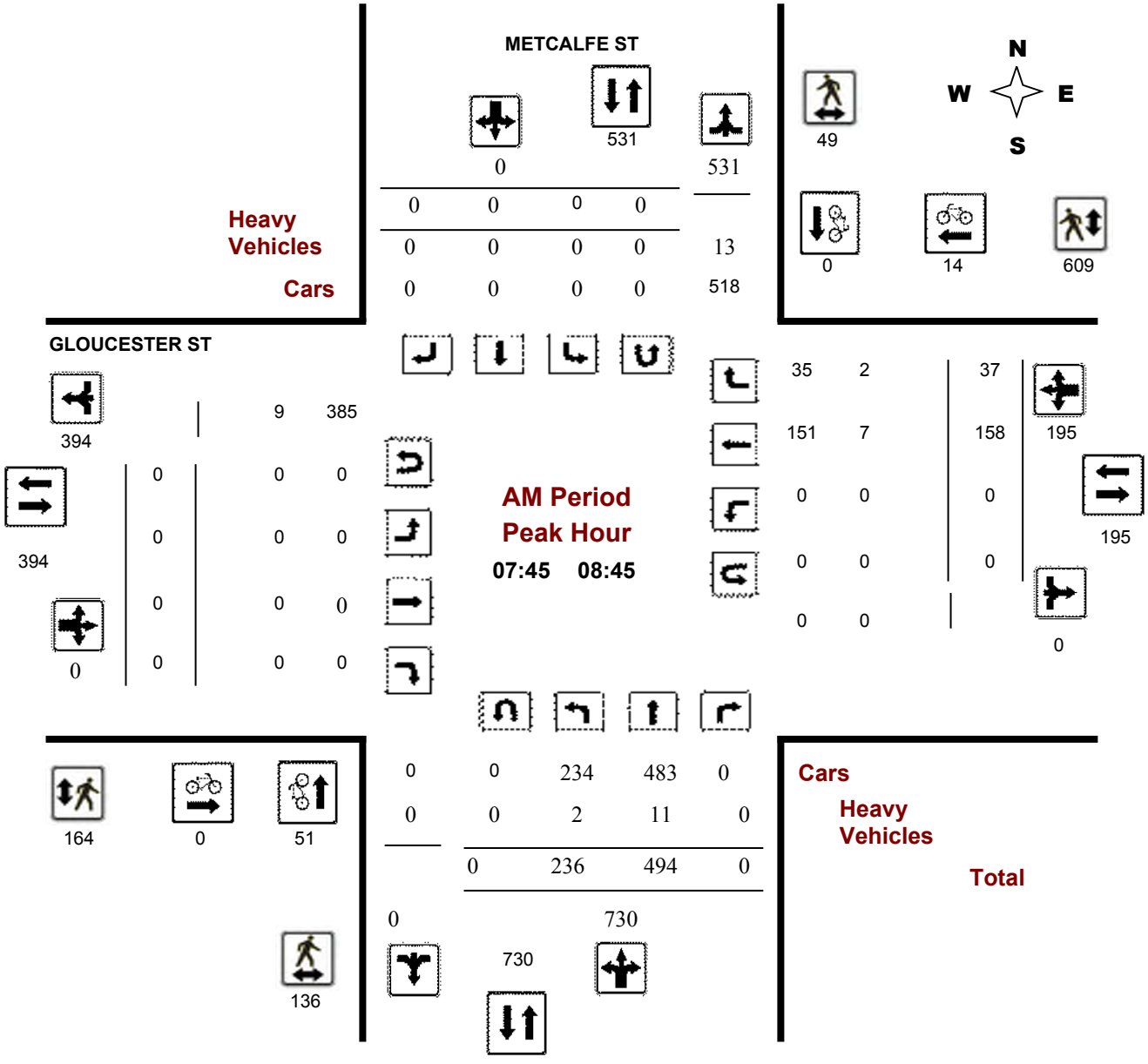
Public Works - Traffic Services

Turning Movement Count - Peak Hour Diagram

GLOUCESTER ST @ METCALFE ST

Survey Date: Wednesday, August 27, 2014
Start Time: 07:00

WO No: 29418
Device: Jamar Technologies, Inc



Comments

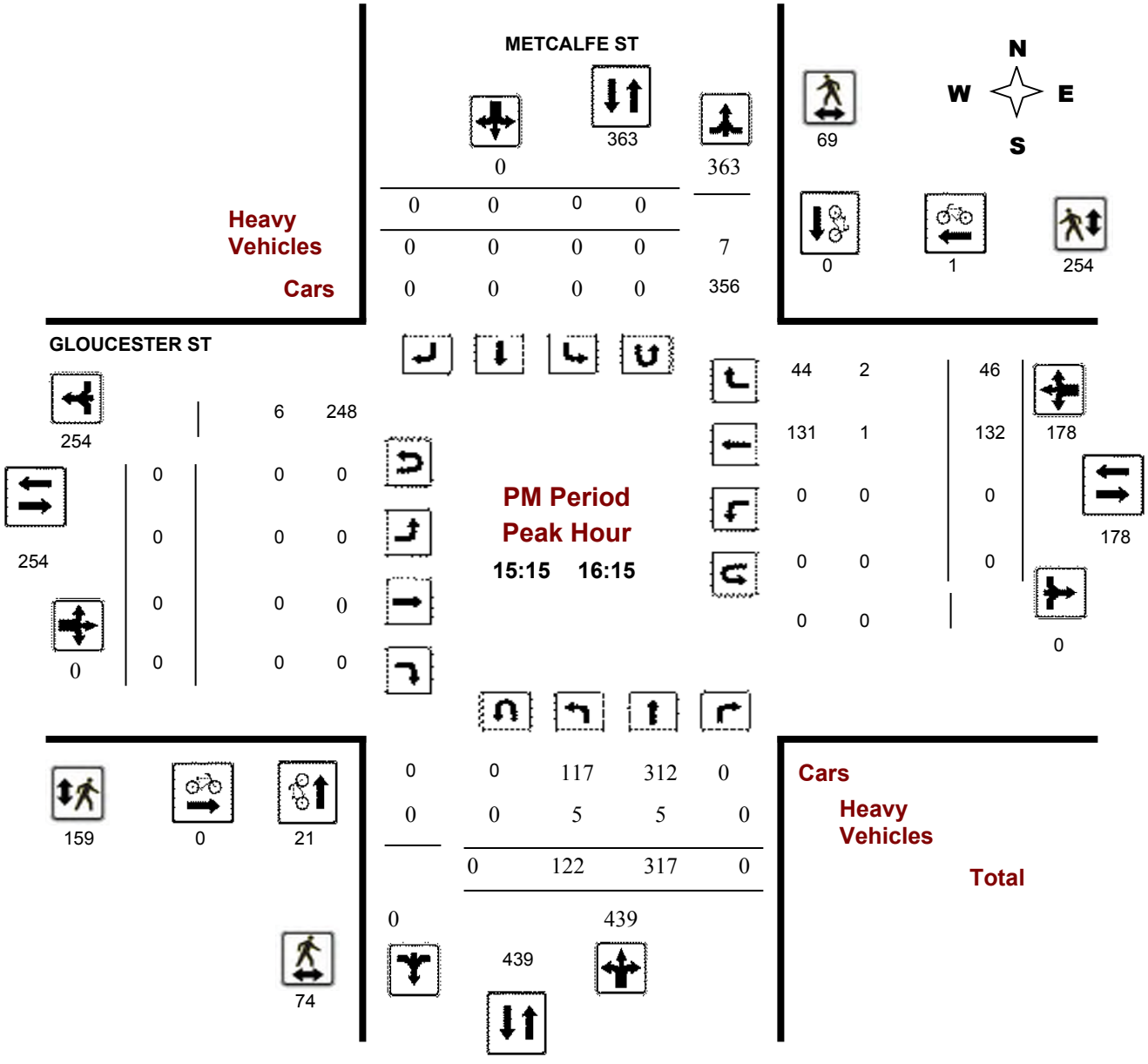
Public Works - Traffic Services

Turning Movement Count - Peak Hour Diagram

GLOUCESTER ST @ METCALFE ST

Survey Date: Wednesday, August 27, 2014
Start Time: 07:00

WO No: 29418
Device: Jamar Technologies, Inc



Comments

Traffic Signal Timing

City of Ottawa, Transportation Services Department

Traffic Operations Unit

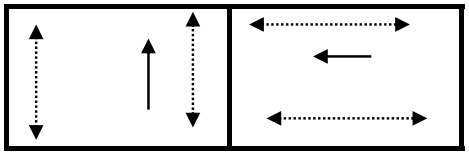
Intersection:	**Main:**	Metcalfe	**Side:**	Gloucester	
Controller:	**ATC3**			**TSD:**	**5544**
Author:	Matthew Anderson			**Date:**	05-Dec-2016

Existing Timing Plans†

	Plan					**Ped Minimum Time**		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	***Walk***	***DW***	***A+R***
Cycle	60	55	55	55	55			
Offset	55	52	14	26	52			
NB Thru	41	36	32	36	36	19	6	3.3 + 1.7
WB Thru	19	19	23	19	19	7	7	3.3 + 1.8

Phasing Sequence‡

Plan: All



Schedule

Weekday

Time	Plan
0:15	4
7:00	1
9:30	2
15:00	3
18:00	2
22:30	4

Saturday

Time	Plan
0:15	4
8:00	2
10:00	5
18:30	2
22:00	4

Sunday

Time	Plan
0:15	4
8:00	2
22:00	4

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

Cost is $56.50 ($50 + HST)

Traffic Signal Timing

City of Ottawa, Transportation Services Department

Traffic Operations Unit

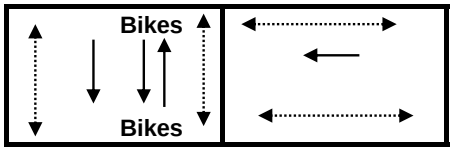
Intersection:	**Main:**	O'Connor	**Side:**	Gloucester	
Controller:	**ATC3**			**TSD:**	**5619**
Author:	Matthew Anderson			**Date:**	05-Dec-2016

Existing Timing Plans†

	Plan					**Ped Minimum Time**		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	***Walk***	***DW***	***A+R***
Cycle	60	55	55	55	55			
Offset	52	52	14	33	52			
NB Thru	35	32	31	32	32	15	9	3.3 + 2.0
SB Thru	35	32	31	32	32	15	9	3.3 + 2.0
WB Thru	25	23	24	23	23	7	8	3.3 + 2.3

Phasing Sequence‡

Plan:



Schedule

Weekday

Time	Plan
0:15	4
7:00	1
9:30	2
15:00	3
18:00	2
22:30	4

Saturday

Time	Plan
0:10	4
8:00	2
10:00	5
22:00	4

Sunday

Time	Plan
0:15	4
8:00	2
22:00	4

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

Cost is $56.50 ($50 + HST)

APPENDIX F

Collision Records

City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2013 **To:** December 31, 2017

Location: GLOUCESTER ST @ METCALFE ST

Traffic Control: Traffic signal **Total Collisions:** 7

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Sep-15, Fri,14:08	Clear	SMV unattended vehicle	P.D. only	Dry	Unknown	Unknown	Unknown	Unattended vehicle	
2017-Sep-15, Fri,10:31	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Delivery van	Other motor vehicle	
2017-May-15, Mon,18:00	Clear	Sideswipe	P.D. only	Dry	West	Unknown	Unknown	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Jul-25, Fri,14:50	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-May-30, Fri,12:45	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-May-29, Thu,08:25	Clear	SMV other	Non-fatal injury	Dry	North	Turning left	Automobile, station wagon	Pedestrian	1

2013-Jul-19, Fri,08:30	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Pick-up truck	Other motor vehicle	

Location: GLOUCESTER ST @ O'CONNOR ST

Traffic Control: Traffic signal **Total Collisions:** 8

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Nov-27, Mon,17:29	Rain	SMV other	Non-fatal injury	Wet	West	Turning left	Automobile, station wagon	Pedestrian	1
2017-Sep-20, Wed,09:03	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jun-27, Mon,02:20	Rain	Angle	P.D. only	Wet	North	Going ahead	Pick-up truck	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Mar-31, Thu,11:30	Rain	SMV other	Non-fatal injury	Wet	West	Turning left	Pick-up truck	Pedestrian	1
2015-Dec-22, Tue,12:05	Rain	SMV other	Non-fatal injury	Wet	West	Turning left	Pick-up truck	Pedestrian	1
2014-Jun-03, Tue,15:08	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Passenger van	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2014-Jan-24, Fri,07:40	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

2013-Mar-14, Thu,12:42	Clear	SMV other	Non-fatal injury	Dry	South	Turning right	Automobile, station wagon	Pedestrian	1

Location: METCALFE ST @ NEPEAN ST

Traffic Control: Traffic signal **Total Collisions:** 7

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Sep-15, Fri,09:00	Clear	SMV unattended vehicle	P.D. only	Dry	Unknown	Unknown	Unknown	Unattended vehicle	
2016-Oct-12, Wed,10:10	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Pick-up truck	Other motor vehicle	
2016-Jun-03, Fri,17:15	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Nov-16, Mon,08:30	Clear	Angle	P.D. only	Dry	North	Turning left	Bicycle	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Cyclist	
2014-Oct-27, Mon,08:05	Clear	SMV other	Non-fatal injury	Dry	East	Going ahead	Delivery van	Pedestrian	1
2013-Dec-15, Sun,15:00	Snow	Angle	P.D. only	Loose snow	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2013-Oct-02, Wed,08:35	Clear	Angle	P.D. only	Dry	West	Going ahead	Passenger van	Other motor vehicle	

					North	Going ahead	Pick-up truck	Other motor vehicle	

Location: NEPEAN ST @ O'CONNOR ST

Traffic Control: Stop sign **Total Collisions:** 20

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Dec-20, Wed,08:30	Clear	Sideswipe	P.D. only	Loose snow	South	Changing lanes	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Passenger van	Other motor vehicle	
2017-Dec-14, Thu,21:27	Clear	Angle	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Jul-18, Tue,10:20	Clear	SMV other	Non-fatal injury	Dry	South	Turning left	Automobile, station wagon	Pedestrian	1
2017-Jun-27, Tue,16:08	Clear	Turning movement	Non-fatal injury	Dry	South	Turning left	Automobile, station wagon	Cyclist	
					North	Going ahead	Bicycle	Other motor vehicle	
2017-May-20, Sat,11:01	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Bicycle	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Cyclist	
2017-Apr-15, Sat,12:55	Clear	Angle	P.D. only	Dry	East	Going ahead	Pick-up truck	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

2016-Sep-22, Thu,09:00	Clear	Rear end	Non-fatal injury	Dry	East	Slowing or stopping	Police vehicle	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2016-Jun-22, Wed,16:20	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2016-May-12, Thu,17:29	Clear	Angle	P.D. only	Dry	East	Going ahead	Passenger van	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2016-Feb-11, Thu,17:15	Snow	Angle	P.D. only	Loose snow	East	Turning right	Pick-up truck	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2016-Jan-20, Wed,13:28	Clear	Angle	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2016-Jan-11, Mon,13:32	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Sep-12, Sat,10:03	Rain	Turning movement	P.D. only	Wet	South	Turning left	Pick-up truck	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle

2015-Aug-28, Fri,10:59	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Passenger van	Other motor vehicle
2015-Jan-02, Fri,07:42	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Jun-02, Mon,17:25	Clear	Angle	P.D. only	Dry	East	Going ahead	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Mar-27, Thu,09:49	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Passenger van	Other motor vehicle
2014-Mar-12, Wed,18:05	Snow	Rear end	P.D. only	Loose snow	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2013-Apr-26, Fri,14:52	Clear	Angle	Non-fatal injury	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Passenger van	Other motor vehicle
2013-Mar-28, Thu,20:00	Clear	Angle	Non-fatal injury	Wet	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Construction equipment	Other motor vehicle

APPENDIX G

Excerpt from ITE Trip Generation Handbook, 5th Edition

ITE Traffic Eng Handbook 4th Edition

Table 14–1 Typical Peak-Hour Volumes as a Percentage of the Total Parking Stalls

Type of Activity	A.M. Peak Hour In	A.M. Peak Hour Out	P.M. Peak Hour In	P.M. Peak Hour Out
Hotel–motel	30 – 50	30 – 50	30 – 60	10 – 30
Residential	5 – 10	30 – 50	30 – 50	10 – 30
Office	40 – 70	5 – 15	5 – 20	40 – 70
Medical Office	40 – 60	10 – 20	10 – 30	60 – 80
Hospital				
Visitor	30 – 40	40 – 50	40 – 60	50 – 75
Employee	60 – 75	5 – 10	10 – 15	60 – 75
Retail–commercial	10 – 30	10 – 20	30 – 60	40 – 65
Central business district	40 – 60	10 – 20	10 – 30	40 – 60
Airport All Traffic[a]	40 – 65	30 – 50	70 – 90	70 – 90
Short-term (0–3 hr)	50 – 75	80 – 100	90 – 100	90 – 100
Mid-term (4–24 hr)	10 – 30	5 – 10	10 – 30	10 – 30
Long-term (more than 24 hr)	5 – 10	5 – 10	5 – 10	5 – 10
Special events	Before event—(In) 80 – 100			After event—(Out) 85 – 200[a,b]

[a]Parking and bypass (loading–unloading).
[b]Maximum assumes a 30-min departure.

Source: Adapted from Robert A. Weant and Herbert S. Levinson, *Parking*, Westport, Conn. Eno Foundation for Transportation, Inc., 1990. Adapted from Robert W. Crommelin, *Entrance-Exit Design and Control for Major Parking Facilities*, a seminar presentation (Encino, Calif., 1972); and Anthony P. Chest, Mary S. Smith, and Sam Bhuyan, *Parking Structures Planning, Design, Construction, Maintenance and Repair* (New York: Van Nostrand Reinhold, 1989).

on the type of generator served, user characteristics (employee, shopper, etc.), and parking capacity. Volumes are typically expressed as a ratio of the number of vehicles to the number of parking stalls in the facility. Table 14–1 gives peak-hour ratios for a number of activities.

The number of vehicles that can enter (acceptance rate) or leave a parking facility, per lane, is related to the angle of approach (sharp turns have less capacity then straight-in runs), whether any control is used, the familiarity of the driver with the facility, the freedom of internal circulation (for entry), the amount of vehicular traffic on the streets (for exit) and the degree of conflict with pedestrians crossing the driveway. In general, for a self-parking facility with no control, the capacity per lane ranges up to 800 vph. One engineer has recommended a design value of 400 vph.[5] Guidelines have been developed for considering capacities related to control methods, and also to street traffic (but not pedestrian sidewalk conflicts).[6]

Table 14–2 Vehicle Acceptance Rates of Large Parking Areas

Approach to Entrance	Number of Studies	Average Acceptance Rates Vehicles per Hour per Lane: Unfamiliar Entrance[1]	Average Acceptance Rates Vehicles per Hour per Lane: Familiar Entrance[2]
Straight approach (no turn movement)	20	850	1,100
90° right turn	15	750	1,000
90° left turn	24	830	900
Oblique angle, right	8	650	1,000
Oblique angle, left	4	720	[3]

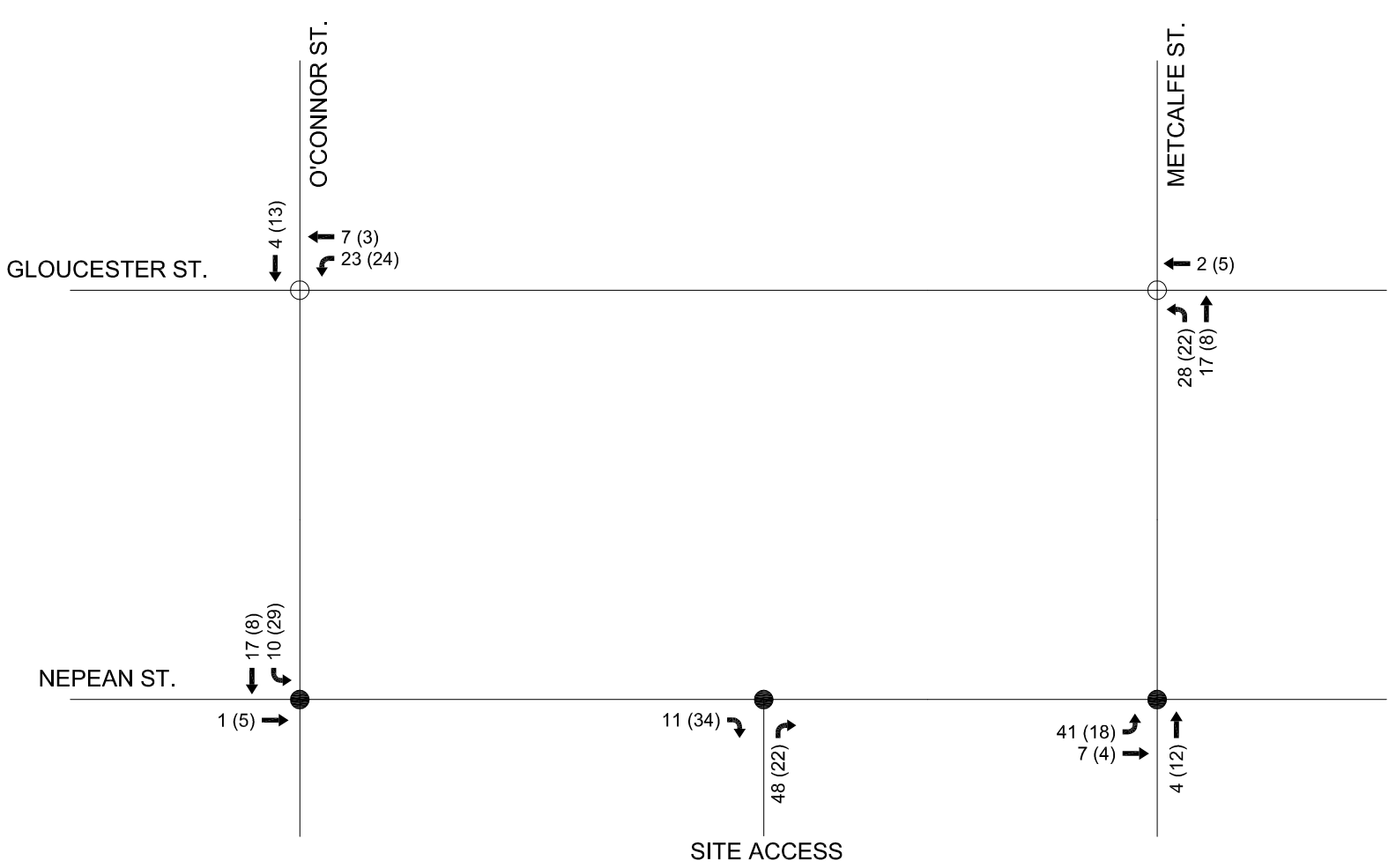
[1] Includes racetracks, stadiums, and other facilities not frequently visited by the same individuals.
[2] Includes industrial plants, military bases, and other facilities where the same drivers enter daily.
[3] No data available.

Source: A.A. Carter, Jr. "Vehicle Acceptance Rates of Parking Areas," *Public Roads* (Oct. 1959).

[5] R.F. Hintersteiner, "Parking Control Guidelines for the Design of Parking Facility Portals," *ITE Journal* (Jan. 1989), p. 28–31.
[6] J.M. Frantzeskakis, "Traffic Flow Analysis for Dimensioning Entrances-Exits and Reservoir Space for Off Street Parking," *ITE Journal* (May 1981), pp. 16–24.

APPENDIX H

Excerpts from Other Area Development Reports



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LEGEND

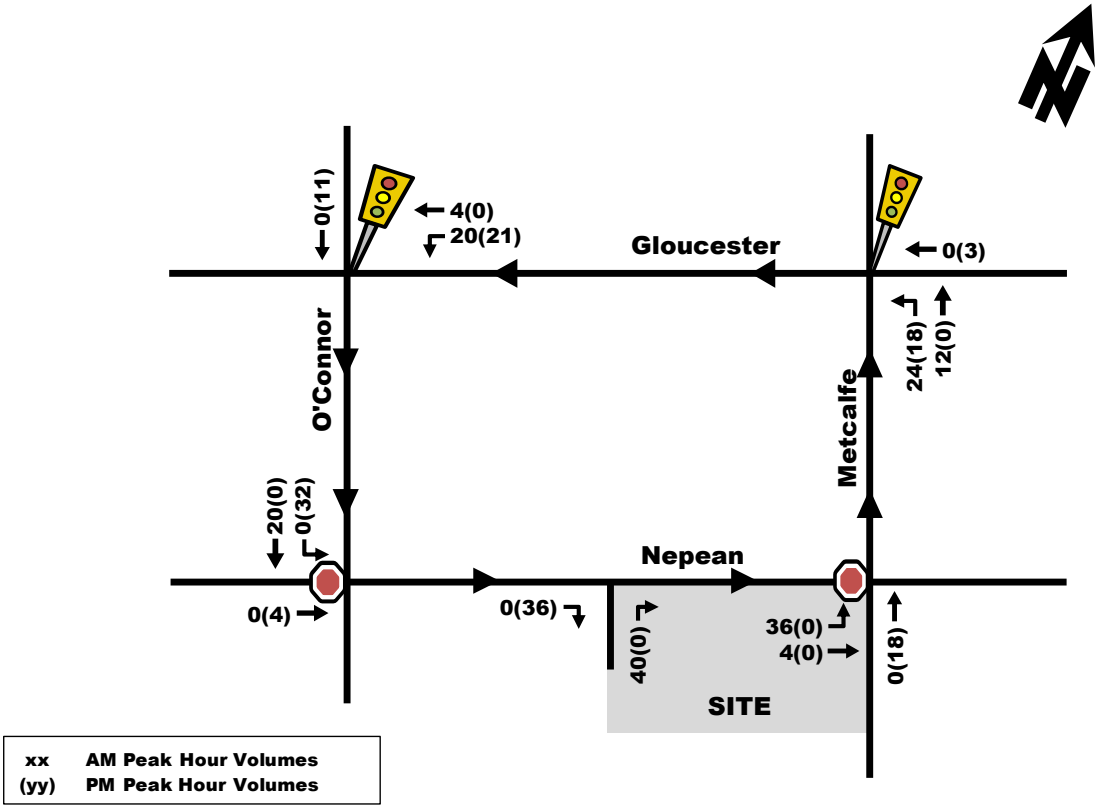
- Unsignalized Intersection
- Signalized Intersection
- xx VPH AM Peak Hour
- (xx) VPH PM Peak Hour

96 NEPEAN STREET

SITE TRAFFIC

NOV 2011 111153 FIGURE 12

Figure 6: "Net" New Site-Generated Peak Hour Traffic



7.0 BACKGROUND TRAFFIC NETWORK

7.1 Transportation Network Changes

Recent/planned transportation network changes in the broader study area include:

- Replacement of the surface transit lanes on Albert and Slater with the below-grade LRT line (November 2018);
- Road modifications on Queen Street including wider sidewalks, raised intersections, and some reduction in turn lanes;
- Road modifications on Albert and Slater Streets with wider sidewalks and replacement of the bus-only lanes with a raised cycle track; and
- Reconstructing Elgin Street as a more "complete street" with wider sidewalks, reduced speed limit, some loss of on-street parking and loss of peak hour traffic lanes due to permanent on-street parking.

7.2 Background Traffic Growth

This is not applicable to new downtown developments.

7.3 Other Area Development

See Section 3.2.

APPENDIX I

Segment MMLOS Analysis

Pedestrian Level of Service (PLOS)

Sidewalk Width	Boulevard Width	Avg. Daily Curb Lane Traffic Volume	Presence of On-Street Parking	Operating Speed	Segment PLOS
Nepean Street (North Side)					
1.8m	None	<3,000 vpd	Yes	50 km/hr	B
Nepean Street (South Side)					
1.5m	None	<3,000 vpd	Yes	50 km/hr	E
Gloucester Street (North Side)					
1.5m	None	>3,000 vpd	Yes	50 km/hr	E
Gloucester Street (South Side)					
1.5m	None	>3,000 vpd	Yes	50 km/hr	E

Bicycle Level of Service (BLOS)

Road Class	Bike Route	Type of Bikeway	Travel Lanes	Centerline Markings	Operating Speed	Segment BLOS
Nepean Street						
Local	-	Mixed Traffic	2	No	50 km/hr	B
Gloucester Street						
Local	-	Mixed Traffic	2	No	50 km/hr	B

Auto LOS

Direction	Directional Capacity[1]	Traffic Volumes		V/C Ratio and LOS				Auto LOS
		AM Peak	PM Peak	AM Peak		PM Peak		
				v/c	LOS	v/c	LOS	
Nepean Street								
EB	400vph	131	190	0.33	A	0.48	A	A
Gloucester Street								
WB	400vph	307	376	0.77	C	0.94	E	E

1. Typical lane capacity based on the City's guidelines for the TRANS long-range transportation model

Segment MMLOS Summary

	Segment	Nepean St North	Nepean St South	Gloucester St North	Gloucester St South
Pedestrian	Sidewalk Width	1.8m	1.5m	1.5m	1.5m
	Boulevard Width	None	None	None	None
	Average Daily Curb Lane Traffic Volume	<3000vpd	<3000vpd	>3000vpd	>3000vpd
	On-Street Parking	Yes	Yes	Yes	Yes
	Operating Speed	50 km/h	50 km/h	50 km/hr	50 km/hr
	Level of Service	B	E	E	E
	Target	A			
Cyclist	Road Classification	Local		Local	
	Bike Route Classification	-		-	
	Type of Bikeway	Mixed Traffic		Mixed Traffic	
	Travel Lanes	2		2	
	Centerline Markings	No		No	
	Operating Speed	50 km/h		50 km/hr	
	Level of Service	B		B	
	Target	D			
Transit	Facility Type	-		-	
	Friction/Congestion/Incident Potential	-		-	
	Level of Service	-		-	
	Target	-			
Truck	Lane Width	-		-	
	Travel Lanes (per direction)	-		-	
	Level of Service	-		-	
	Target	-			
Auto	Volume	190 vph		376 vph	
	Capacity	400 vph		400 vph	
	Volume to Capacity Ratio	0.48		0.94	
	Level of Service	A		E	
	Target	E			

APPENDIX J

Intersection MMLOS Analysis

Pedestrian Level of Service (PLOS)

Criteria	North Approach		South Approach		East Approach		West Approach	
O'Connor Street/Gloucester Street								
PETSI SCORE								
CROSSING DISTANCE CONDITIONS								
Median > 2.4m in Width	No	88	No	88	No	105	No	105
Lanes Crossed (3.5m Lane Width)	4		4		3		3	
SIGNAL PHASING AND TIMING								
Left Turn Conflict	No Left Turn/Prohibited	0	Permissive	-8	No Left Turn/Prohibited	0	No Left Turn/Prohibited	0
Right Turn Conflict	No Right Turn/Prohibited	0	No Right Turn/Prohibited	0	No Right Turn/Prohibited	0	Permissive or Yield	-5
Right Turn on Red	RTOR Allowed	-3	N/A	0	N/A	0	N/A	0
Leading Pedestrian Interval	No	-2	No	-2	No	-2	No	-2
CORNER RADIUS								
Parallel Radius	No Right Turn	0	No Right Turn	0	No Right Turn	0	> 3m to 5m	-4
Parallel Right Turn Channel	No Right Turn	0	No Right Turn	0	No Right Turn	0	No Right Turn Channel	-4
Perpendicular Radius	N/A	0	N/A	0	N/A	0	N/A	0
Perpendicular Right Turn Channel	N/A	0	N/A	0	N/A	0	N/A	0
CROSSING TREATMENT								
Treatment	Standard	-7	Standard	-7	Textured	-4	Textured	-4
PETSI SCORE		**76**		**71**		**99**		**86**
LOS		**B**		**C**		**A**		**B**
DELAY SCORE								
Cycle Length		60		60		55		55
Pedestrian Walk Time		11.4		11.4		16.7		16.7
DELAY SCORE		**19.7**		**19.7**		**13.3**		**13.3**
LOS		**B**		**B**		**B**		**B**
OVERALL		**B**		**C**		**B**		**B**

Criteria	North Approach		South Approach		East Approach		West Approach	
Metcalfe Street/Gloucester Street								
PETSI SCORE								
CROSSING DISTANCE CONDITIONS								
Median > 2.4m in Width	No	105	No	105	No	105	No	105
Lanes Crossed (3.5m Lane Width)	3		3		3		3	
SIGNAL PHASING AND TIMING								
Left Turn Conflict	No Left Turn/Prohibited	0	No Left Turn/Prohibited	0	No Left Turn/Prohibited	0	Permissive	-8
Right Turn Conflict	Permissive or Yield	-5	No Right Turn/Prohibited	0	No Right Turn/Prohibited	0	No Right Turn/Prohibited	0
Right Turn on Red	N/A	0	N/A	0	RTOR Allowed	-3	N/A	0
Leading Pedestrian Interval	No	-2	No	-2	No	-2	No	-2
CORNER RADIUS								
Parallel Radius	> 3m to 5m	-4	No Right Turn	0	No Right Turn	0	No Right Turn	0
Parallel Right Turn Channel	No Right Turn Channel	-4	No Right Turn	0	No Right Turn	0	No Right Turn	0
Perpendicular Radius	N/A	0	N/A	0	N/A	0	N/A	0
Perpendicular Right Turn Channel	N/A	0	N/A	0	N/A	0	N/A	0
CROSSING TREATMENT								
Treatment	Standard	-7	Standard	-7	Standard	-7	Standard	-7
PETSI SCORE		**83**		**96**		**93**		**88**
LOS		**B**		**A**		**A**		**B**
DELAY SCORE								
Cycle Length		60		60		55		55
Pedestrian Walk Time		6.9		6.9		21		21
DELAY SCORE		**23.5**		**23.5**		**10.5**		**10.5**
LOS		**C**		**C**		**B**		**B**
OVERALL		**C**		**C**		**B**		**B**

Criteria	North Approach		South Approach		East Approach		West Approach	
Metcalfe Street/Nepean Street								
PETSI SCORE								
CROSSING DISTANCE CONDITIONS								
Median > 2.4m in Width	No	105	No	105	No	120	No	120
Lanes Crossed (3.5m Lane Width)	3		3		2		2	
SIGNAL PHASING AND TIMING								
Left Turn Conflict	Permissive	-8	No Left Turn/Prohibited	0	No Left Turn/Prohibited	0	No Left Turn/Prohibited	0
Right Turn Conflict	No Right Turn/Prohibited	0	No Right Turn/Prohibited	0	Permissive or Yield	-5	No Right Turn/Prohibited	0
Right Turn on Red	N/A	0	RTOR Allowed	-3	N/A	0	N/A	0
Leading Pedestrian Interval	No	-2	No	-2	No	-2	No	-2
CORNER RADIUS								
Parallel Radius	No Right Turn	0	No Right Turn	0	> 3m to 5m	-4	No Right Turn	0
Parallel Right Turn Channel	No Right Turn	0	No Right Turn	0	No Right Turn Channel	-4	No Right Turn	0
Perpendicular Radius	N/A	0	N/A	0	N/A	0	N/A	0
Perpendicular Right Turn Channel	N/A	0	N/A	0	N/A	0	N/A	0
CROSSING TREATMENT								
Treatment	Standard	-7	Standard	-7	Standard	-7	Standard	-7
PETSI SCORE		**88**		**93**		**98**		**111**
LOS		**B**		**A**		**A**		**A**
DELAY SCORE								
Cycle Length		60		60		55		55
Pedestrian Walk Time		6.9		6.9		21		21
DELAY SCORE		**23.5**		**23.5**		**10.5**		**10.5**
LOS		**C**		**C**		**B**		**B**
OVERALL		**C**		**C**		**B**		**B**

Bicycle Level of Service (BLOS)

Approach	Bikeway Facility Type	Criteria	Travel Lanes and/or Speed	BLOS
O'Connor Street/Gloucester Street				
North Approach	Separated Facility	Right Turn Lane Characteristics	Two-Stage Right Turn	A
		Left Turn Accommodation	No Left Turn	-
South Approach	Separated Facility	Right Turn Lane Characteristics	No Right Turn	-
		Left Turn Accommodation	Two-Stage Left Turn Bike Box	A
East Approach	Mixed Traffic	Right Turn Lane Characteristics	No Right Turn	A
		Left Turn Accommodation	No Lanes Crossed, 50km/hr	B
Metcalfe Street/Gloucester Street				
South Approach	Mixed Traffic	Right Turn Lane Characteristics	No Right Turn	-
		Left Turn Accommodation	No Lanes Crossed, 50km/hr	B
East Approach	Mixed Traffic	Right Turn Lane Characteristics	No Impact to LTS	A
		Left Turn Accommodation	No Left Turn	-
Metcalfe Street/Nepean Street				
South Approach	Mixed Traffic	Right Turn Lane Characteristics	No impact to LTS	A
		Left Turn Accommodation	No Left Turn	-
West Approach	Mixed Traffic	Right Turn Lane Characteristics	No Right Turn	-
		Left Turn Accommodation	No Lanes Crossed, 50km/hr	B

Truck Level of Service (TkLOS)

Approach	Effective Corner Radius	Number of Receiving Lanes on Departure from Intersection	LOS
O'Connor Street/Gloucester Street			
North Approach	< 10m	Two[1]	D
Metcalfe Street/Gloucester Street			
East Approach	< 10m	Three	D
Metcalfe Street/Nepean Street			
South Approach	< 10m	Two[1]	D

1. Wide lane widths equivalent to two lanes

Auto LOS

Intersection	AM Peak			PM Peak		
	Max V/C or Delay	LOS	Movement	Max V/C or Delay	LOS	Movement
O'Connor Street/ Gloucester Street	0.43	A	SBT/R	0.45	A	WBL
Metcalfe Street/ Gloucester Street	0.53	A	WBT/R	0.35	A	WBT/R
Metcalfe Street/ Nepean Street	0.46	A	NBT/R	0.24	A	NBT/R
O'Connor Street/ Nepean Street	60 sec	F	EBT/R	108 sec	F	EBT/R

Notes:

- Intersection parameters used in the analysis are consistent with the TIA guidelines (saturation flow rate: 1800vphpl, PHF: 0.90).
- The southbound approach to the O'Connor Street/Gloucester Street intersection is assumed to consist of one through lane and one through/right turn lane during the AM peak hour due to on-street parking located on the west side of O'Connor Street.
- The westbound approach to the O'Connor Street/Gloucester Street and eastbound approach to the Metcalfe Street/ Nepean Street intersection are assumed to consist of one through lane and one left turn lane due to the wide road platform and parking prohibitions in proximity to the intersection.
- Traffic signal timings obtained from City of Ottawa, included in Appendix E.
- Detailed Synchro reports are included in Appendix L.

	Intersection	O'Connor Street/Gloucester Street				Metcalfe Street/Gloucester Street			
		North	South	East	West	North	South	East	West
Pedestrian	Median > 2.4m in Width	No	No	No	No	No	No	No	No
	Lanes (3.5m Lane Width)	4	4	3	3	3	3	3	3
	Conflicting Left Turns	No Left Turn	Permissive	No Left Turn	No Left Turn	No Left Turn	No Left Turn	No Left Turn	Permissive
	Conflicting Right Turns	No Right Turn	No Right Turn	No Right Turn	Permissive	Permissive	No Right Turn	No Right Turn	No Right Turn
	Right Turn on Red	Allowed	N/A	N/A	N/A	N/A	N/A	Allowed	N/A
	Pedestrian Leading Interval	No	No	No	No	No	No	No	No
	Parallel Radius	No Right Turn	No Right Turn	No Right Turn	3m to 5m	3m to 5m	No Right Turn	No Right Turn	No Right Turn
	Parallel Channel	No Right Turn	No Right Turn	No Right Turn	No Channel	No Channel	No Right Turn	No Right Turn	No Right Turn
	Perpendicular Radius	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Perpendicular Channel	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Crosswalk Type	Standard	Standard	Textured	Textured	Standard	Standard	Standard	Standard
	PETSI Score	76	71	99	86	83	96	93	88
	Delay Score	19.7	19.7	13.3	13.3	23.5	23.5	10.5	10.5
	Level of Service	B	C	B	B	C	C	B	B
		C				C			
	Target	A				A			
Cyclist	Type of Bikeway	Separated	Separated	Mixed Traffic	-	-	Mixed Traffic	Mixed Traffic	-
	Turning Speed	N/A	N/A	N/A	-	-	N/A	N/A	-
	Right Turn Storage	N/A	N/A	N/A	-	-	N/A	N/A	-
	Dual Right Turn Lanes	No	N/A	N/A	-	-	N/A	No	-
	Shared Through-Right Lane	No	N/A	N/A	-	-	N/A	Yes	-
	Bike Box	N/A	Yes	No	-	-	No	N/A	-
	Lanes Crossed for Left Turns	N/A	N/A	None	-	-	None	N/A	-
	Dual Left Turn Lanes	N/A	N/A	No	-	-	No	N/A	-
	Approach Speed	N/A	N/A	50km/hr	-	-	50km/hr	N/A	-
	Level of Service	A	A	B	-	-	B	A	-
		B				B			
	Target	C				C			
Transit	Facility Type	-	-	-	-	-	-	-	-
	Average Signal Delay	-	-	-	-	-	-	-	-
	Level of Service	-	-	-	-	-	-	-	-
		-				-			
	Target	-				-			
Truck	Turning Radius	< 10m	-	-	-	-	-	< 10m	-
	Receiving Lanes	Two	-	-	-	-	-	Three	-
	Level of Service	D	-	-	-	-	-	D	-
		D				D			
	Target	D				D			
Auto	Volume to Capacity Ratio	0.74				0.53			
	Level of Service	C				A			
	Target	E				E			

	Intersection	Metcalfe Street/Nepean Street			
		North	South	East	West
Pedestrian	Median > 2.4m in Width	No	No	No	No
	Lanes (3.5m Lane Width)	3	3	2	2
	Conflicting Left Turns	Permissive	No Left Turn	No Left Turn	No Left Turn
	Conflicting Right Turns	No Right Turn	No Right Turn	Permissive	No Right Turn
	Right Turn on Red	N/A	Allowed	N/A	N/A
	Pedestrian Leading Interval	No	No	No	No
	Parallel Radius	No Right Turn	No Right Turn	< 3m	No Right Turn
	Parallel Channel	No Right Turn	No Right Turn	No Channel	No Right Turn
	Perpendicular Radius	N/A	N/A	N/A	N/A
	Perpendicular Channel	N/A	N/A	N/A	N/A
	Crosswalk Type	Standard	Standard	Standard	Standard
	PETSI Score	88	93	98	111
	Delay Score	23.5	23.5	10.5	10.5
	Level of Service	C	C	B	B
		C			
	Target	A			
Cyclist	Type of Bikeway	-	Mixed Traffic	-	Mixed Traffic
	Turning Speed	-	N/A	-	N/A
	Right Turn Storage	-	N/A	-	N/A
	Dual Right Turn Lanes	-	No	-	N/A
	Shared Through-Right Lane	-	Yes	-	N/A
	Bike Box	-	N/A	-	No
	Lanes Crossed for Left Turns	-	N/A	-	None
	Dual Left Turn Lanes	-	N/A	-	No
	Approach Speed	-	N/A	-	50km/hr
	Level of Service	-	A	-	B
		B			
	Target	C			
Transit	Facility Type	-	-	-	-
	Average Signal Delay	-	-	-	-
	Level of Service	-	-	-	-
		-			
	Target	-			
Truck	Turning Radius	-	< 10m	-	-
	Receiving Lanes	-	Two	-	-
	Level of Service	-	D	-	-
		D			
	Target	D			
Auto	Volume to Capacity Ratio	0.46			
	Level of Service	A			
	Target	E			

APPENDIX K

Traffic Signal Justification Warrants

NOVATECH
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TRAFFIC SIGNAL JUSTIFICATION

LOCATION: O'CONNOR at NEPEAN

DATE: DEC 14, 2016

JUSTIFICATION 1 – Minimum Vehicular Volume

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)				PERCENTAGE / WARRANT								
APPROACH LANES	1		2 or MORE		HOUR ENDING								TOTAL ACROSS
FLOW CONDITION	FREE FLOW	RESTR FLOW	FREE FLOW	RESTR FLOW	8:00	9:00	10:00	12:30	13:30	16:00	17:00	18:00	
A. ALL APPROACHES	480 (385)	720 (575)	600 (480)	900 (720)	537	734	708	763	730	1048	1091	1046	
100% FULFILLED										✓	✓	✓	300%
80% FULFILLED						✓		✓	✓				240%
ACTUAL % IF BELOW 80% VALUE					60%		79%						139%
												TOTAL DOWN:	679%
												AVERAGE (TOTAL/8):	85%

T Intersection Add 50%

	180 143	255 203	180 143	255 203									
B. MINOR STREET BOTH APPROACHES	120 (95)	170 (135)	120 (95)	170 (135)	105	126	134	143	126	141	185	138	TOTAL ACROSS
100% FULFILLED						✓					✓		200%
80% FULFILLED								✓		✓		✓	240%
ACTUAL % IF BELOW 80% VALUE					62%		79%		74%				215%
												TOTAL DOWN:	655%
												AVERAGE (TOTAL/8):	82%

JUSTIFICATION 2 – Delay To Cross Traffic

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)				PERCENTAGE / WARRANT								
APPROACH LANES	1		2 or MORE		HOUR ENDING								TOTAL ACROSS
FLOW CONDITION	FREE FLOW	RESTR FLOW	FREE FLOW	RESTR FLOW	8:00	9:00	10:00	12:30	13:30	16:00	17:00	18:00	
A. MAJOR STREET BOTH APPROACHES	480 (385)	720 (575)	600 (480)	900 (720)	432	558	574	620	604	907	906	908	
100% FULFILLED										✓	✓	✓	300%
80% FULFILLED													—
ACTUAL % IF BELOW 80% VALUE					48%	62%	64%	69%	67%				310%
												TOTAL DOWN:	610%
												AVERAGE (TOTAL/8):	76%

B. TRAFFIC CROSSING MAJOR STREET	50 (40)	75 (60)	50 (40)	75 (60)	86	150	114	138	137	109	130	120	TOTAL ACROSS
100% FULFILLED					✓	✓	✓	✓	✓	✓	✓	✓	800%
80% FULFILLED													—
ACTUAL % IF BELOW 80% VALUE													—
												TOTAL DOWN:	800%
												AVERAGE (TOTAL/8):	100%

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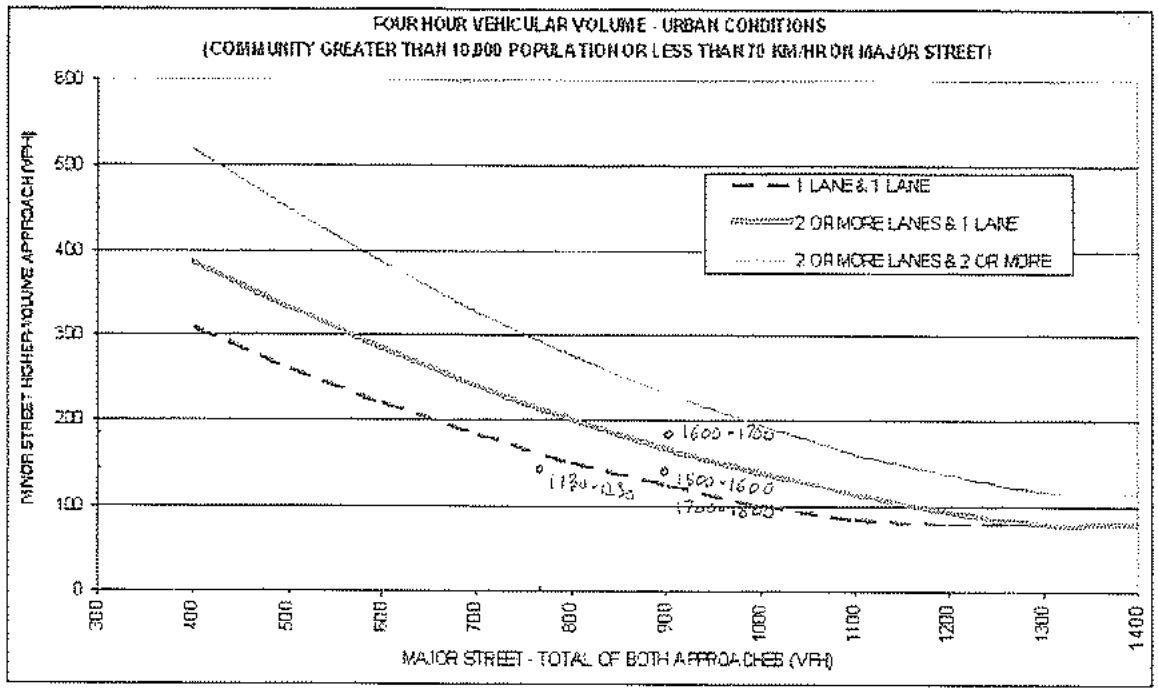
TRAFFIC SIGNAL JUSTIFICATION

LOCATION: O'CONNOR at NEPEAN

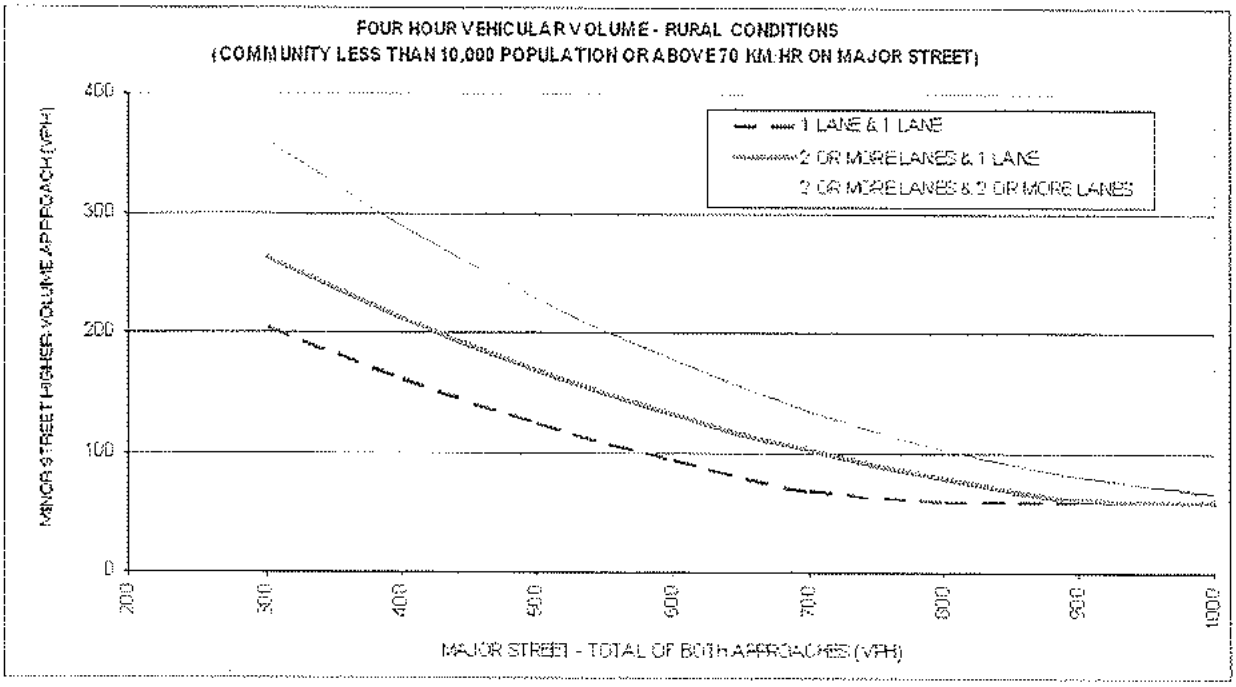
DATE: DEC 14, 2016

JUSTIFICATION 4 – Minimum Four-Hour Vehicle Volume

A. Restricted Flow



B. Free Flow



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TRAFFIC SIGNAL JUSTIFICATION SUMMARY TABLE

LOCATION: O'CONNOR at DEPEAU

DATE: DEC 14, 2016

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT		COMPLIANCE	
		FREE FLOW	RESTRICTED FLOW	SECTIONAL %	ENTIRE % [2]
		OPERATING SPEED ≥ 70KM/H	OPERATING SPEED < 70 KM/H		
1. MINIMUM VEHICULAR WARRANT	A. Vehicle volume, all approaches for each of the heaviest 8 hours of an average day, and	480 600 (2 or more lane approach	720 900 (2 or more lane approach	85%	82%
	B. Vehicle volume, along minor street, for each of the same 8 hours.	120 180 (tee intersection)	170 255 (tee intersection)	82%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume, along major street for each for the heaviest 8 hours of an average day, and	480 600 (2 or more lane approach)	720 900 (2 or more lane approach	76%	76%
	B [1]. Combined vehicle and pedestrian volume crossing the major street for each of the same 8 hours	50	75	100%	
3. VOLUME/DELAY COMBINATION	The above Justifications (1 and 2) both satisfied to the extent of 80% or more	Yes ☐		No ☑	NO
4. MINIMUM FOUR HOUR VEHICLE VOLUME	Plotted point representing hourly volume for minor approach vs. major approach for four highest hours of an average day fall above the applicable curve	Yes ☐		No ☑	NO
5. COLLISION EXPERIENCE	A. Total reported accidents of types susceptible to correction by a traffic signal, per 12 month period averaged over a 36 month period, and	5			
	B. Adequate trial of less restrictive remedies, where satisfactory observance and enforcement have failed to reduce the number of accidents	Yes ☐		No ☐	
6. PEDESTRIAN VOLUME AND DELAY	A. Plotted point representing 8 hour pedestrian volume vs. 8 hour vehicular volume fall in justified zone, and	Yes ☐		No ☑	NO
	B. Plotted point representing 8 hour volume of pedestrian experiencing delays of 10 s or more vs. 8 hour pedestrian volume fall in justified zone	Yes ☐		No ☐	

NOTES
1) For definition of crossing volume refer to the Ontario Traffic Manual Book 12, Section 4.5 (Nov. 2007).
2) The lowest sectional percentage governs the entire Justification.

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TRAFFIC SIGNAL JUSTIFICATION USING PROJECTED VOLUMES

LOCATION: O'CONNOR ST at NEPEAN ST

YEAR: 2023

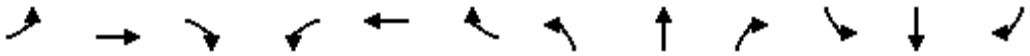
JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL		ENTIRE % [2]
		OPERATING SPEED ≥ 70KM/H	OPERATING SPEED < 70 KM/H	NUMERICAL	PERCENT	
1. MINIMUM VEHICULAR WARRANT	A. Vehicle volume, all approaches (average hour)	480 600 (2 or more lane approach	720 900 (2 or more lane approach	583	65%	59%
	B. Vehicle volume along minor street (average hour)	120 180 (tee intersection)	170 255 (tee intersection)	101	59%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volume along major street (average hour)	480 600 (2 or more lane approach)	720 900 (2 or more lane approach	482	54%	54%
	B [1]. Combined vehicle and pedestrian volume crossing the major street (average hour)	50	75	84	112%	

NOTES

1) For definition of crossing volume refer to the Ontario Traffic Manual Book 12, Section 4.5 (Nov. 2007).
2) The lowest sectional percentage governs the entire Justification.
3) Average hourly volumes estimated from peak hour volumes, AHV = PM / 2 or AHV = (AM + PM) / 4.

APPENDIX L

Synchro Analysis Reports

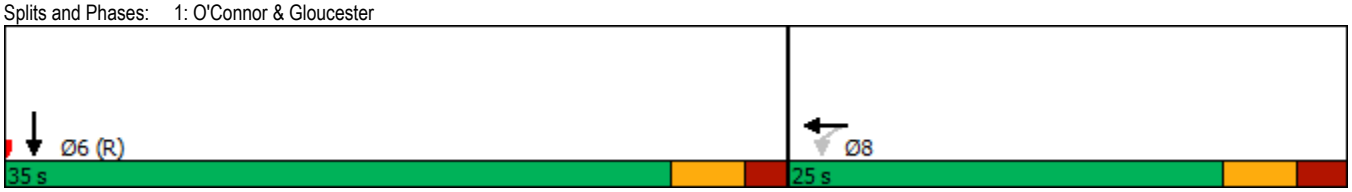


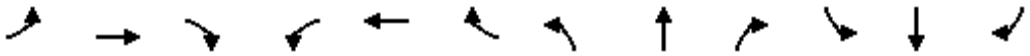
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	126	181	0	0	0	0	0	456	146
Future Volume (vph)	0	0	0	126	181	0	0	0	0	0	456	146
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	10.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	0.0			20.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor				0.83							0.94	
Frt											0.964	
Flt Protected				0.950								
Satd. Flow (prot)	0	0	0	1676	1765	0	0	0	0	0	3034	0
Flt Permitted				0.950								
Satd. Flow (perm)	0	0	0	1391	1765	0	0	0	0	0	3034	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)				58							101	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		161.2			121.8			52.2			67.5	
Travel Time (s)		11.6			8.8			3.8			4.9	
Confl. Peds. (#/hr)	159		142	142		159	190		290	290		190
Confl. Bikes (#/hr)						1			21			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	140	201	0	0	0	0	0	507	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	140	201	0	0	0	0	0	669	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type				Perm	NA						NA	
Protected Phases					8						6	
Permitted Phases				8								
Minimum Split (s)				22.0	22.0						30.0	
Total Split (s)				25.0	25.0						35.0	
Total Split (%)				41.7%	41.7%						58.3%	
Maximum Green (s)				19.4	19.4						29.7	
Yellow Time (s)				3.3	3.3						3.3	
All-Red Time (s)				2.3	2.3						2.0	
Lost Time Adjust (s)				0.0	0.0						0.0	
Total Lost Time (s)				5.6	5.6						5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				7.0	7.0						15.0	
Flash Dont Walk (s)				8.0	8.0						9.0	
Pedestrian Calls (#/hr)				60	60						60	
Act Effct Green (s)				19.4	19.4						29.7	
Actuated g/C Ratio				0.32	0.32						0.50	
v/c Ratio				0.29	0.35						0.43	
Control Delay				15.3	21.6						9.1	
Queue Delay				0.0	0.0						0.0	
Total Delay				15.3	21.6						9.1	
LOS				B	C						A	
Approach Delay					19.0						9.1	
Approach LOS					B						A	
Queue Length 50th (m)				5.8	21.8						19.8	
Queue Length 95th (m)				23.6	39.9						31.2	
Internal Link Dist (m)		137.2			97.8			28.2			43.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)				10.0								
Base Capacity (vph)				489	570						1552	
Starvation Cap Reductn				0	0						0	
Spillback Cap Reductn				0	0						0	
Storage Cap Reductn				0	0						0	
Reduced v/c Ratio				0.29	0.35						0.43	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 52 (87%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.43			
Intersection Signal Delay: 12.5		Intersection LOS: B	
Intersection Capacity Utilization 41.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: O'Connor & Gloucester



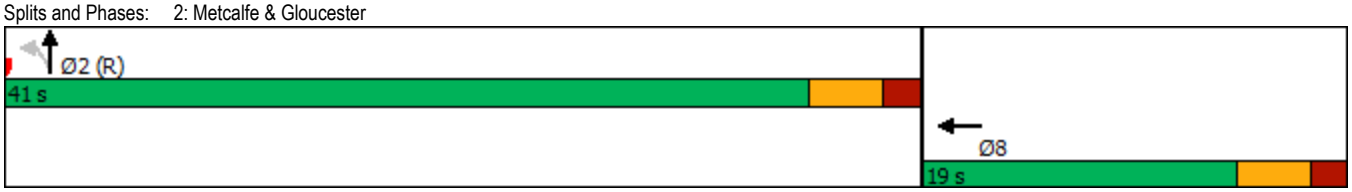


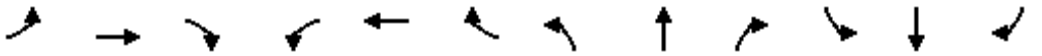
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	158	37	236	494	0	0	0	0
Future Volume (vph)	0	0	0	0	158	37	236	494	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor					0.98			0.94				
Frt					0.974							
Flt Protected								0.984				
Satd. Flow (prot)	0	0	0	0	1691	0	0	4741	0	0	0	0
Flt Permitted								0.984				
Satd. Flow (perm)	0	0	0	0	1691	0	0	4439	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)					18			85				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		60.4			146.3			76.9			65.9	
Travel Time (s)		4.3			10.5			5.5			4.7	
Confl. Peds. (#/hr)	49		136	136		49	164		609	609		164
Confl. Bikes (#/hr)						14			51			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	0	176	41	262	549	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	217	0	0	811	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type					NA		Perm	NA				
Protected Phases					8			2				
Permitted Phases							2					
Minimum Split (s)					19.0		30.1	30.1				
Total Split (s)					19.0		41.0	41.0				
Total Split (%)					31.7%		68.3%	68.3%				
Maximum Green (s)					14.0		35.9	35.9				
Yellow Time (s)					3.3		3.3	3.3				
All-Red Time (s)					1.7		1.8	1.8				
Lost Time Adjust (s)					0.0			0.0				
Total Lost Time (s)					5.0			5.1				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					7.0		19.0	19.0				
Flash Dont Walk (s)					7.0		6.0	6.0				
Pedestrian Calls (#/hr)					60		60	60				
Act Effct Green (s)					14.0			35.9				
Actuated g/C Ratio					0.23			0.60				
v/c Ratio					0.53			0.30				
Control Delay					24.0			3.7				
Queue Delay					0.0			0.1				
Total Delay					24.0			3.8				
LOS					C			A				
Approach Delay					24.0			3.8				
Approach LOS					C			A				
Queue Length 50th (m)					20.1			7.4				
Queue Length 95th (m)					39.1			10.4				
Internal Link Dist (m)		36.4			122.3			52.9			41.9	
Turn Bay Length (m)												
Base Capacity (vph)					408			2690				
Starvation Cap Reductn					0			681				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn					0			0				
Storage Cap Reductn					0			0				
Reduced v/c Ratio					0.53			0.40				

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 55 (92%), Referenced to phase 2:NBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 8.1		Intersection LOS: A	
Intersection Capacity Utilization 41.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Metcalfe & Gloucester





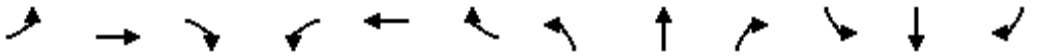
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	89	0	0	0	0	0	814	284	0	0	0
Future Volume (vph)	42	89	0	0	0	0	0	814	284	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	10.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	20.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor	0.86							0.91				
Frt								0.961				
Flt Protected	0.950											
Satd. Flow (prot)	1676	1765	0	0	0	0	0	4231	0	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	1435	1765	0	0	0	0	0	4231	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	36							259				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.5			148.8			74.2			76.9	
Travel Time (s)		13.1			10.7			5.3			5.5	
Confl. Peds. (#/hr)	112		79	79		112	366		264	264		366
Confl. Bikes (#/hr)			2			1			4			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	47	99	0	0	0	0	0	904	316	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	99	0	0	0	0	0	1220	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA						NA				
Protected Phases		4						2				
Permitted Phases	4											
Minimum Split (s)	19.0	19.0						30.0				
Total Split (s)	19.0	19.0						41.0				
Total Split (%)	31.7%	31.7%						68.3%				
Maximum Green (s)	14.0	14.0						36.0				
Yellow Time (s)	3.3	3.3						3.3				
All-Red Time (s)	1.7	1.7						1.7				
Lost Time Adjust (s)	0.0	0.0						0.0				
Total Lost Time (s)	5.0	5.0						5.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0						19.0				
Flash Dont Walk (s)	7.0	7.0						6.0				
Pedestrian Calls (#/hr)	30	30						60				
Act Effct Green (s)	14.0	14.0						36.0				
Actuated g/C Ratio	0.23	0.23						0.60				
v/c Ratio	0.13	0.24						0.46				
Control Delay	10.2	20.5						5.7				
Queue Delay	0.0	0.0						0.0				
Total Delay	10.2	20.5						5.7				
LOS	B	C						A				
Approach Delay		17.2						5.7				
Approach LOS		B						A				
Queue Length 50th (m)	1.4	9.7						18.2				
Queue Length 95th (m)	m8.2	21.2						26.2				
Internal Link Dist (m)		157.5			124.8			50.2			52.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	10.0											
Base Capacity (vph)	362	411						2642				
Starvation Cap Reductn	0	0						0				
Spillback Cap Reductn	0	0						0				
Storage Cap Reductn	0	0						0				
Reduced v/c Ratio	0.13	0.24						0.46				

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.46			
Intersection Signal Delay: 6.9		Intersection LOS: A	
Intersection Capacity Utilization 72.6%		ICU Level of Service C	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Metcalfe & Nepean



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	106	56	0	0	0	0	0	0	94	494	0
Future Volume (Veh/h)	0	106	56	0	0	0	0	0	0	94	494	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	118	62	0	0	0	0	0	0	104	549	0
Pedestrians		172			234			33			13	
Lane Width (m)		3.6			0.0			0.0			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		14			0			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											78	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	942	1163	480	870	1163	247	721			234		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	757	998	253	679	998	247	516			234		
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	33	89	100	100	100	100			92		
cM capacity (veh/h)	193	176	587	109	176	745	822			1331		

Direction, Lane #	EB 1	SB 1	SB 2
Volume Total	180	287	366
Volume Left	0	104	0
Volume Right	62	0	0
cSH	232	1331	1700
Volume to Capacity	0.78	0.08	0.22
Queue Length 95th (m)	44.8	2.0	0.0
Control Delay (s)	59.6	3.3	0.0
Lane LOS	F	A	
Approach Delay (s)	59.6	1.5	
Approach LOS	F		

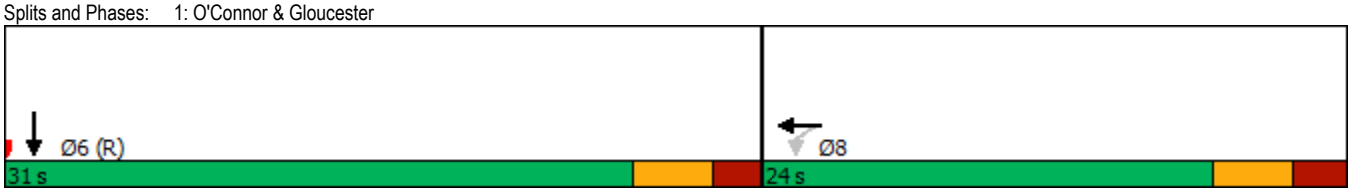
Intersection Summary				
Average Delay	14.0			
Intersection Capacity Utilization	45.4%	ICU Level of Service	A	
Analysis Period (min)	15			

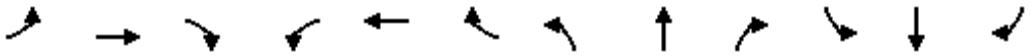
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	210	166	0	0	0	0	0	711	72
Future Volume (vph)	0	0	0	210	166	0	0	0	0	0	711	72
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	10.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	0.0			20.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor				0.86							0.98	
Frt											0.986	
Flt Protected				0.950								
Satd. Flow (prot)	0	0	0	1676	1765	0	0	0	0	0	4671	0
Flt Permitted				0.950								
Satd. Flow (perm)	0	0	0	1450	1765	0	0	0	0	0	4671	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)				46							41	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		161.2			121.8			52.2			67.5	
Travel Time (s)		11.6			8.8			3.8			4.9	
Confl. Peds. (#/hr)	132		123	123		132	143		222	222		143
Confl. Bikes (#/hr)						8			20			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	233	184	0	0	0	0	0	790	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	233	184	0	0	0	0	0	870	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type				Perm	NA						NA	
Protected Phases					8						6	
Permitted Phases				8								
Minimum Split (s)				22.0	22.0						30.0	
Total Split (s)				24.0	24.0						31.0	
Total Split (%)				43.6%	43.6%						56.4%	
Maximum Green (s)				18.4	18.4						25.7	
Yellow Time (s)				3.3	3.3						3.3	
All-Red Time (s)				2.3	2.3						2.0	
Lost Time Adjust (s)				0.0	0.0						0.0	
Total Lost Time (s)				5.6	5.6						5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				7.0	7.0						15.0	
Flash Dont Walk (s)				8.0	8.0						9.0	
Pedestrian Calls (#/hr)				60	60						60	
Act Effct Green (s)				18.4	18.4						25.7	
Actuated g/C Ratio				0.33	0.33						0.47	
v/c Ratio				0.45	0.31						0.39	
Control Delay				15.0	15.9						9.7	
Queue Delay				0.0	0.0						0.0	
Total Delay				15.0	15.9						9.7	
LOS				B	B						A	
Approach Delay					15.4						9.7	
Approach LOS					B						A	
Queue Length 50th (m)				12.8	12.7						19.1	
Queue Length 95th (m)				31.4	28.7						27.2	
Internal Link Dist (m)		137.2			97.8			28.2			43.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)				10.0								
Base Capacity (vph)				515	590						2204	
Starvation Cap Reductn				0	0						0	
Spillback Cap Reductn				0	0						0	
Storage Cap Reductn				0	0						0	
Reduced v/c Ratio				0.45	0.31						0.39	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 14 (25%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 11.6		Intersection LOS: B	
Intersection Capacity Utilization 41.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: O'Connor & Gloucester



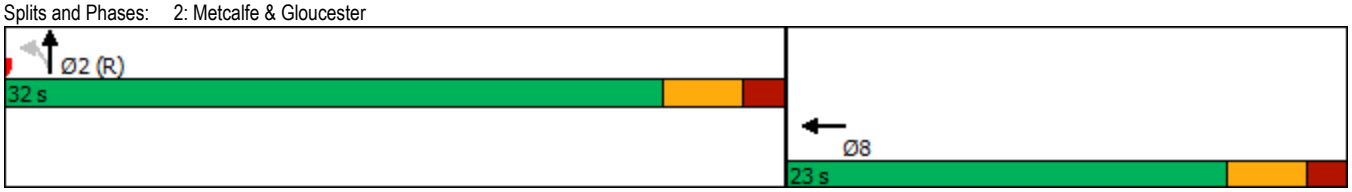


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	132	46	122	317	0	0	0	0
Future Volume (vph)	0	0	0	0	132	46	122	317	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor					0.98			0.95				
Frt					0.965							
Flt Protected								0.986				
Satd. Flow (prot)	0	0	0	0	1662	0	0	4750	0	0	0	0
Flt Permitted								0.986				
Satd. Flow (perm)	0	0	0	0	1662	0	0	4519	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)					34			136				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		60.4			146.3			76.9			65.9	
Travel Time (s)		4.3			10.5			5.5			4.7	
Confl. Peds. (#/hr)	69		74	74		69	159		254	254		159
Confl. Bikes (#/hr)						1			21			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	0	147	51	136	352	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	198	0	0	488	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type					NA		Perm	NA				
Protected Phases					8			2				
Permitted Phases							2					
Minimum Split (s)					19.0		30.1	30.1				
Total Split (s)					23.0		32.0	32.0				
Total Split (%)					41.8%		58.2%	58.2%				
Maximum Green (s)					18.0		26.9	26.9				
Yellow Time (s)					3.3		3.3	3.3				
All-Red Time (s)					1.7		1.8	1.8				
Lost Time Adjust (s)					0.0			0.0				
Total Lost Time (s)					5.0			5.1				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					7.0		19.0	19.0				
Flash Dont Walk (s)					7.0		6.0	6.0				
Pedestrian Calls (#/hr)					60		60	60				
Act Effct Green (s)					18.0			26.9				
Actuated g/C Ratio					0.33			0.49				
v/c Ratio					0.35			0.21				
Control Delay					13.7			4.6				
Queue Delay					0.0			0.0				
Total Delay					13.7			4.6				
LOS					B			A				
Approach Delay					13.7			4.6				
Approach LOS					B			A				
Queue Length 50th (m)					12.6			8.9				
Queue Length 95th (m)					26.7			15.3				
Internal Link Dist (m)		36.4			122.3			52.9			41.9	
Turn Bay Length (m)												
Base Capacity (vph)					566			2279				
Starvation Cap Reductn					0			0				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn					0			0				
Storage Cap Reductn					0			0				
Reduced v/c Ratio					0.35			0.21				

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 14 (25%), Referenced to phase 2:NBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.35			
Intersection Signal Delay: 7.2		Intersection LOS: A	
Intersection Capacity Utilization 41.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Metcalfe & Gloucester

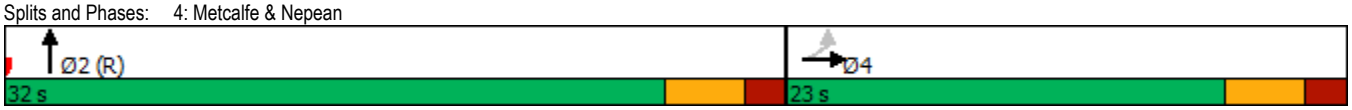


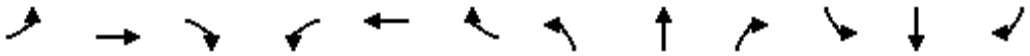
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	96	0	0	0	0	0	361	104	0	0	0
Future Volume (vph)	94	96	0	0	0	0	0	361	104	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	10.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	20.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor	0.85							0.90				
Frt								0.966				
Flt Protected	0.950											
Satd. Flow (prot)	1676	1765	0	0	0	0	0	4209	0	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	1426	1765	0	0	0	0	0	4209	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	47							116				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.5			148.8			74.2			76.9	
Travel Time (s)		13.1			10.7			5.3			5.5	
Confl. Peds. (#/hr)	127		143	143		127	373		375	375		373
Confl. Bikes (#/hr)			1						5			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	104	107	0	0	0	0	0	401	116	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	107	0	0	0	0	0	517	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA						NA				
Protected Phases		4						2				
Permitted Phases	4											
Minimum Split (s)	19.1	19.1						30.0				
Total Split (s)	23.0	23.0						32.0				
Total Split (%)	41.8%	41.8%						58.2%				
Maximum Green (s)	17.9	17.9						27.0				
Yellow Time (s)	3.3	3.3						3.3				
All-Red Time (s)	1.8	1.8						1.7				
Lost Time Adjust (s)	0.0	0.0						0.0				
Total Lost Time (s)	5.1	5.1						5.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0						19.0				
Flash Dont Walk (s)	7.0	7.0						6.0				
Pedestrian Calls (#/hr)	60	60						60				
Act Effct Green (s)	17.9	17.9						27.0				
Actuated g/C Ratio	0.33	0.33						0.49				
v/c Ratio	0.21	0.19						0.24				
Control Delay	7.4	12.1						6.5				
Queue Delay	0.0	0.0						0.0				
Total Delay	7.4	12.1						6.5				
LOS	A	B						A				
Approach Delay		9.8						6.5				
Approach LOS		A						A				
Queue Length 50th (m)	2.8	6.5						7.9				
Queue Length 95th (m)	9.9	13.9						13.0				
Internal Link Dist (m)		157.5			124.8			50.2			52.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	10.0											
Base Capacity (vph)	495	574						2125				
Starvation Cap Reductn	0	0						0				
Spillback Cap Reductn	0	0						0				
Storage Cap Reductn	0	0						0				
Reduced v/c Ratio	0.21	0.19						0.24				

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.24			
Intersection Signal Delay: 7.5		Intersection LOS: A	
Intersection Capacity Utilization 77.3%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Metcalfe & Nepean

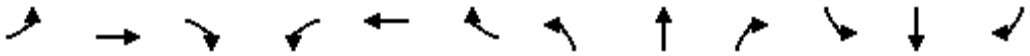




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	91	97	0	0	0	0	0	0	78	825	0
Future Volume (Veh/h)	0	91	97	0	0	0	0	0	0	78	825	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	101	108	0	0	0	0	0	0	87	917	0
Pedestrians		154			212			13			28	
Lane Width (m)		3.6			0.0			0.0			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		13			0			0			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											78	
pX, platoon unblocked	0.87	0.87	0.87	0.87	0.87		0.87					
vC, conflicting volume	1273	1457	626	1016	1457	240	1071			212		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1007	1220	260	711	1220	240	774			212		
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	20	81	100	100	100	100			94		
cM capacity (veh/h)	123	126	558	67	126	743	632			1356		

Direction, Lane #	EB 1	SB 1	SB 2
Volume Total	209	393	611
Volume Left	0	87	0
Volume Right	108	0	0
cSH	211	1356	1700
Volume to Capacity	0.99	0.06	0.36
Queue Length 95th (m)	70.0	1.6	0.0
Control Delay (s)	107.8	2.2	0.0
Lane LOS	F	A	
Approach Delay (s)	107.8	0.9	
Approach LOS	F		

Intersection Summary				
Average Delay	19.3			
Intersection Capacity Utilization	45.6%	ICU Level of Service	A	
Analysis Period (min)	15			

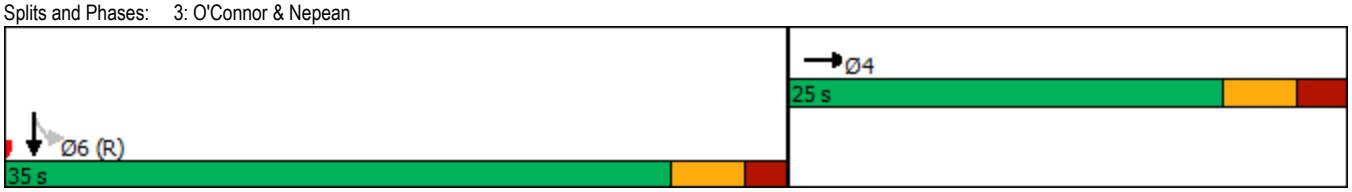


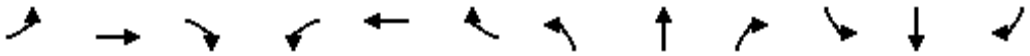
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	106	56	0	0	0	0	0	0	94	494	0
Future Volume (vph)	0	106	56	0	0	0	0	0	0	94	494	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		0.98									0.95	
Frt		0.953										
Flt Protected											0.992	
Satd. Flow (prot)	0	1652	0	0	0	0	0	0	0	0	3326	0
Flt Permitted											0.992	
Satd. Flow (perm)	0	1652	0	0	0	0	0	0	0	0	3171	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)		47									51	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		163.9			181.5			64.2			25.8	
Travel Time (s)		11.8			13.1			4.6			1.9	
Confl. Peds. (#/hr)	13		33	33		13	172		234	234		172
Confl. Bikes (#/hr)									20			20
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	118	62	0	0	0	0	0	0	104	549	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	180	0	0	0	0	0	0	0	0	653	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA								Perm	NA	
Protected Phases		4									6	
Permitted Phases										6		
Minimum Split (s)		23.6								31.3	31.3	
Total Split (s)		25.0								35.0	35.0	
Total Split (%)		41.7%								58.3%	58.3%	
Maximum Green (s)		19.4								29.7	29.7	
Yellow Time (s)		3.3								3.3	3.3	
All-Red Time (s)		2.3								2.0	2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.6									5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0								15.0	15.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		20								60	60	
Act Effct Green (s)		19.4									29.7	
Actuated g/C Ratio		0.32									0.50	
v/c Ratio		0.32									0.41	
Control Delay		13.0									5.7	
Queue Delay		0.0									0.2	
Total Delay		13.0									5.9	
LOS		B									A	
Approach Delay		13.0									5.9	
Approach LOS		B									A	
Queue Length 50th (m)		11.1									11.2	
Queue Length 95th (m)		24.8									16.5	
Internal Link Dist (m)		139.9			157.5			40.2			1.8	
Turn Bay Length (m)												
Base Capacity (vph)		565									1595	
Starvation Cap Reductn		0									308	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0									0	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.32									0.51	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 52 (87%), Referenced to phase 2: and 6:SBTL, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 7.5		Intersection LOS: A	
Intersection Capacity Utilization 45.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: O'Connor & Nepean



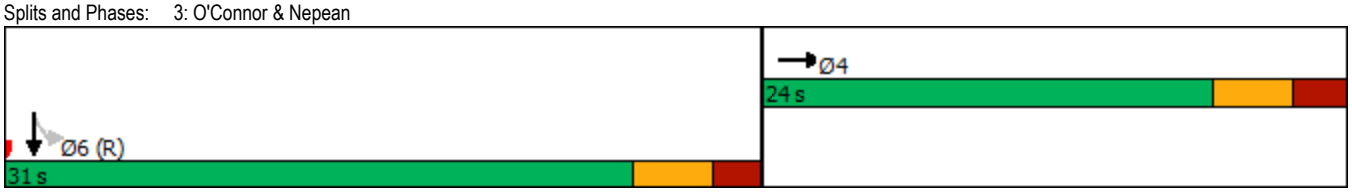


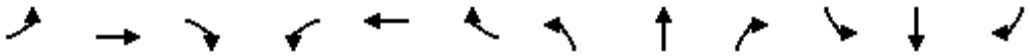
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	91	97	0	0	0	0	0	0	78	825	0
Future Volume (vph)	0	91	97	0	0	0	0	0	0	78	825	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		0.99									0.98	
Frt		0.930										
Flt Protected											0.996	
Satd. Flow (prot)	0	1619	0	0	0	0	0	0	0	0	3340	0
Flt Permitted											0.996	
Satd. Flow (perm)	0	1619	0	0	0	0	0	0	0	0	3269	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)		31									52	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		163.9			181.5			64.2			25.8	
Travel Time (s)		11.8			13.1			4.6			1.9	
Confl. Peds. (#/hr)	28		13	13		28	154		212	212		154
Confl. Bikes (#/hr)			1						18			18
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	101	108	0	0	0	0	0	0	87	917	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	209	0	0	0	0	0	0	0	0	1004	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA								Perm	NA	
Protected Phases		4									6	
Permitted Phases										6		
Minimum Split (s)		20.6								29.3	29.3	
Total Split (s)		24.0								31.0	31.0	
Total Split (%)		43.6%								56.4%	56.4%	
Maximum Green (s)		18.4								25.7	25.7	
Yellow Time (s)		3.3								3.3	3.3	
All-Red Time (s)		2.3								2.0	2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.6									5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0								15.0	15.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		20								60	60	
Act Effct Green (s)		18.4									25.7	
Actuated g/C Ratio		0.33									0.47	
v/c Ratio		0.37									0.65	
Control Delay		14.1									7.6	
Queue Delay		0.0									0.0	
Total Delay		14.1									7.6	
LOS		B									A	
Approach Delay		14.1									7.6	
Approach LOS		B									A	
Queue Length 50th (m)		13.6									16.3	
Queue Length 95th (m)		28.4									23.6	
Internal Link Dist (m)		139.9			157.5			40.2			1.8	
Turn Bay Length (m)												
Base Capacity (vph)		562									1555	
Starvation Cap Reductn		0									0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0									0	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.37									0.65	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 14 (25%), Referenced to phase 2: and 6:SBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 8.7		Intersection LOS: A	
Intersection Capacity Utilization 48.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: O'Connor & Nepean



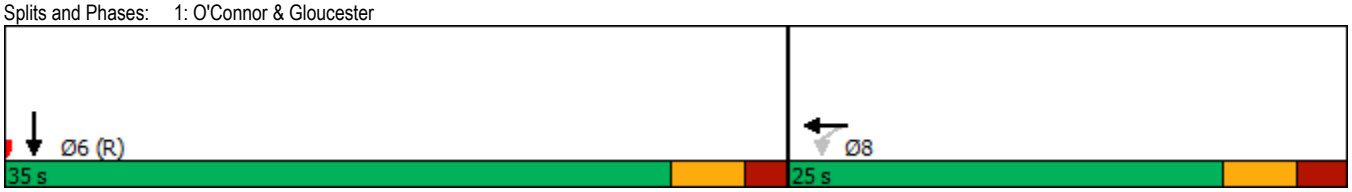


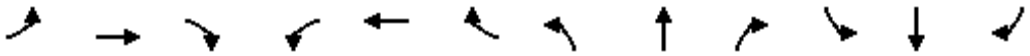
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	169	192	0	0	0	0	0	460	146
Future Volume (vph)	0	0	0	169	192	0	0	0	0	0	460	146
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	10.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	0.0			20.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor				0.83							0.94	
Frt											0.964	
Flt Protected				0.950								
Satd. Flow (prot)	0	0	0	1676	1765	0	0	0	0	0	3035	0
Flt Permitted				0.950								
Satd. Flow (perm)	0	0	0	1391	1765	0	0	0	0	0	3035	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)				66							100	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		161.2			121.8			52.2			67.5	
Travel Time (s)		11.6			8.8			3.8			4.9	
Confl. Peds. (#/hr)	159		142	142		159	190		290	290		190
Confl. Bikes (#/hr)						1			21			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	169	192	0	0	0	0	0	460	146
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	169	192	0	0	0	0	0	606	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type				Perm	NA						NA	
Protected Phases					8						6	
Permitted Phases				8								
Minimum Split (s)				22.0	22.0						30.0	
Total Split (s)				25.0	25.0						35.0	
Total Split (%)				41.7%	41.7%						58.3%	
Maximum Green (s)				19.4	19.4						29.7	
Yellow Time (s)				3.3	3.3						3.3	
All-Red Time (s)				2.3	2.3						2.0	
Lost Time Adjust (s)				0.0	0.0						0.0	
Total Lost Time (s)				5.6	5.6						5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				7.0	7.0						15.0	
Flash Dont Walk (s)				8.0	8.0						9.0	
Pedestrian Calls (#/hr)				60	60						60	
Act Effct Green (s)				19.4	19.4						29.7	
Actuated g/C Ratio				0.32	0.32						0.50	
v/c Ratio				0.34	0.34						0.39	
Control Delay				15.7	20.9						8.7	
Queue Delay				0.0	0.0						0.0	
Total Delay				15.7	20.9						8.7	
LOS				B	C						A	
Approach Delay					18.5						8.7	
Approach LOS					B						A	
Queue Length 50th (m)				12.7	20.8						17.3	
Queue Length 95th (m)				29.1	38.3						27.5	
Internal Link Dist (m)		137.2			97.8			28.2			43.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)				10.0								
Base Capacity (vph)				494	570						1552	
Starvation Cap Reductn				0	0						0	
Spillback Cap Reductn				0	0						0	
Storage Cap Reductn				0	0						0	
Reduced v/c Ratio				0.34	0.34						0.39	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 52 (87%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.39			
Intersection Signal Delay: 12.3		Intersection LOS: B	
Intersection Capacity Utilization 65.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: O'Connor & Gloucester



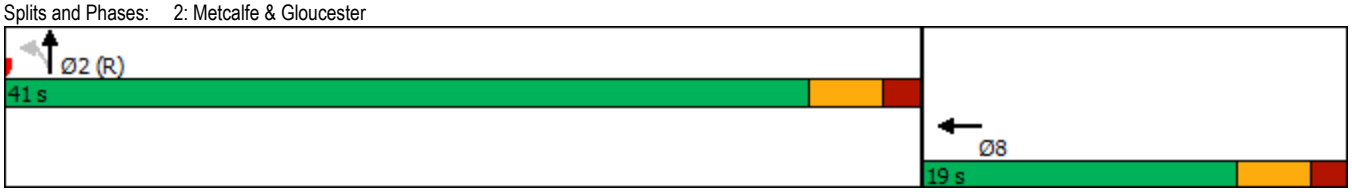


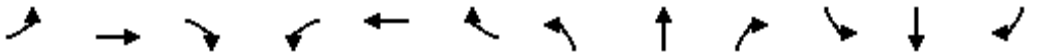
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	160	37	288	523	0	0	0	0
Future Volume (vph)	0	0	0	0	160	37	288	523	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor					0.98			0.93				
Frt					0.975							
Flt Protected								0.983				
Satd. Flow (prot)	0	0	0	0	1693	0	0	4736	0	0	0	0
Flt Permitted								0.983				
Satd. Flow (perm)	0	0	0	0	1693	0	0	4405	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)					18			93				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		60.4			146.3			76.9			65.9	
Travel Time (s)		4.3			10.5			5.5			4.7	
Confl. Peds. (#/hr)	49		136	136		49	164		609	609		164
Confl. Bikes (#/hr)						14			51			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	160	37	288	523	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	197	0	0	811	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type					NA		Perm	NA				
Protected Phases					8			2				
Permitted Phases							2					
Minimum Split (s)					19.0		30.1	30.1				
Total Split (s)					19.0		41.0	41.0				
Total Split (%)					31.7%		68.3%	68.3%				
Maximum Green (s)					14.0		35.9	35.9				
Yellow Time (s)					3.3		3.3	3.3				
All-Red Time (s)					1.7		1.8	1.8				
Lost Time Adjust (s)					0.0			0.0				
Total Lost Time (s)					5.0			5.1				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					7.0		19.0	19.0				
Flash Dont Walk (s)					7.0		6.0	6.0				
Pedestrian Calls (#/hr)					60		60	60				
Act Effct Green (s)					14.0			35.9				
Actuated g/C Ratio					0.23			0.60				
v/c Ratio					0.48			0.30				
Control Delay					22.7			4.0				
Queue Delay					0.0			0.1				
Total Delay					22.7			4.1				
LOS					C			A				
Approach Delay					22.7			4.1				
Approach LOS					C			A				
Queue Length 50th (m)					17.8			9.3				
Queue Length 95th (m)					35.2			12.2				
Internal Link Dist (m)		36.4			122.3			52.9			41.9	
Turn Bay Length (m)												
Base Capacity (vph)					408			2673				
Starvation Cap Reductn					0			737				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn					0			0				
Storage Cap Reductn					0			0				
Reduced v/c Ratio					0.48			0.42				

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 55 (92%), Referenced to phase 2:NBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 7.7		Intersection LOS: A	
Intersection Capacity Utilization 44.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Metcalfe & Gloucester



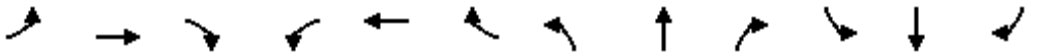


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	100	0	0	0	0	0	818	284	0	0	0
Future Volume (vph)	119	100	0	0	0	0	0	818	284	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	10.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	20.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor	0.86							0.91				
Frt								0.961				
Flt Protected	0.950											
Satd. Flow (prot)	1676	1765	0	0	0	0	0	4233	0	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	1435	1765	0	0	0	0	0	4233	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	36							258				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.5			148.8			74.2			76.9	
Travel Time (s)		13.1			10.7			5.3			5.5	
Confl. Peds. (#/hr)	112		79	79		112	366		264	264		366
Confl. Bikes (#/hr)			2			1			4			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	119	100	0	0	0	0	0	818	284	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	100	0	0	0	0	0	1102	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA						NA				
Protected Phases		4						2				
Permitted Phases	4											
Minimum Split (s)	19.0	19.0						30.0				
Total Split (s)	19.0	19.0						41.0				
Total Split (%)	31.7%	31.7%						68.3%				
Maximum Green (s)	14.0	14.0						36.0				
Yellow Time (s)	3.3	3.3						3.3				
All-Red Time (s)	1.7	1.7						1.7				
Lost Time Adjust (s)	0.0	0.0						0.0				
Total Lost Time (s)	5.0	5.0						5.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0						19.0				
Flash Dont Walk (s)	7.0	7.0						6.0				
Pedestrian Calls (#/hr)	30	30						60				
Act Effct Green (s)	14.0	14.0						36.0				
Actuated g/C Ratio	0.23	0.23						0.60				
v/c Ratio	0.33	0.24						0.42				
Control Delay	16.5	20.3						5.3				
Queue Delay	0.0	0.0						0.0				
Total Delay	16.5	20.3						5.3				
LOS	B	C						A				
Approach Delay		18.2						5.3				
Approach LOS		B						A				
Queue Length 50th (m)	8.1	9.7						15.4				
Queue Length 95th (m)	20.4	20.9						22.4				
Internal Link Dist (m)		157.5			124.8			50.2			52.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	10.0											
Base Capacity (vph)	362	411						2643				
Starvation Cap Reductn	0	0						0				
Spillback Cap Reductn	0	0						0				
Storage Cap Reductn	0	0						0				
Reduced v/c Ratio	0.33	0.24						0.42				

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 7.4		Intersection LOS: A	
Intersection Capacity Utilization 74.1%		ICU Level of Service D	
Analysis Period (min) 15			

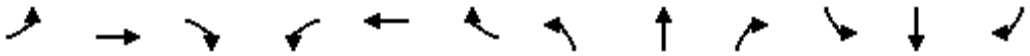
Splits and Phases: 4: Metcalfe & Nepean



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	107	56	0	0	0	0	0	0	104	531	0
Future Volume (Veh/h)	0	107	56	0	0	0	0	0	0	104	531	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	107	56	0	0	0	0	0	0	104	531	0
Pedestrians		172			234			33			13	
Lane Width (m)		3.6			0.0			0.0			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		14			0			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											78	
pX, platoon unblocked	0.93	0.93	0.93	0.93	0.93		0.93					
vC, conflicting volume	924	1145	470	850	1145	247	703			234		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	778	1015	293	699	1015	247	542			234		
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	39	90	100	100	100	100			92		
cM capacity (veh/h)	190	175	563	121	175	745	819			1331		

Direction, Lane #	EB 1	SB 1	SB 2
Volume Total	163	281	354
Volume Left	0	104	0
Volume Right	56	0	0
cSH	229	1331	1700
Volume to Capacity	0.71	0.08	0.21
Queue Length 95th (m)	37.7	2.0	0.0
Control Delay (s)	52.0	3.4	0.0
Lane LOS	F	A	
Approach Delay (s)	52.0	1.5	
Approach LOS	F		

Intersection Summary				
Average Delay	11.8			
Intersection Capacity Utilization	45.5%	ICU Level of Service	A	
Analysis Period (min)	15			

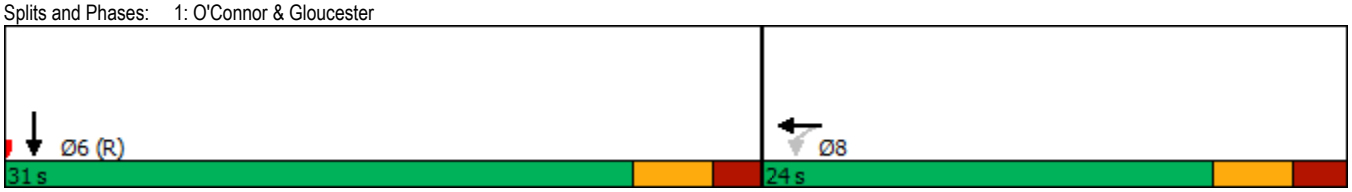


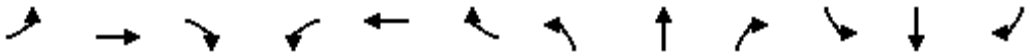
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	255	169	0	0	0	0	0	735	72
Future Volume (vph)	0	0	0	255	169	0	0	0	0	0	735	72
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	10.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	0.0			20.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor				0.86							0.98	
Frt											0.987	
Flt Protected				0.950								
Satd. Flow (prot)	0	0	0	1676	1765	0	0	0	0	0	4678	0
Flt Permitted				0.950								
Satd. Flow (perm)	0	0	0	1450	1765	0	0	0	0	0	4678	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)				46							39	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		161.2			121.8			52.2			67.5	
Travel Time (s)		11.6			8.8			3.8			4.9	
Confl. Peds. (#/hr)	132		123	123		132	143		222	222		143
Confl. Bikes (#/hr)						8			20			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	255	169	0	0	0	0	0	735	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	255	169	0	0	0	0	0	807	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type				Perm	NA						NA	
Protected Phases					8						6	
Permitted Phases				8								
Minimum Split (s)				22.0	22.0						30.0	
Total Split (s)				24.0	24.0						31.0	
Total Split (%)				43.6%	43.6%						56.4%	
Maximum Green (s)				18.4	18.4						25.7	
Yellow Time (s)				3.3	3.3						3.3	
All-Red Time (s)				2.3	2.3						2.0	
Lost Time Adjust (s)				0.0	0.0						0.0	
Total Lost Time (s)				5.6	5.6						5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				7.0	7.0						15.0	
Flash Dont Walk (s)				8.0	8.0						9.0	
Pedestrian Calls (#/hr)				60	60						60	
Act Effct Green (s)				18.4	18.4						25.7	
Actuated g/C Ratio				0.33	0.33						0.47	
v/c Ratio				0.50	0.29						0.37	
Control Delay				15.8	15.4						9.5	
Queue Delay				0.0	0.0						0.0	
Total Delay				15.8	15.4						9.5	
LOS				B	B						A	
Approach Delay					15.6						9.5	
Approach LOS					B						A	
Queue Length 50th (m)				15.0	12.0						17.4	
Queue Length 95th (m)				34.3	26.9						25.0	
Internal Link Dist (m)		137.2			97.8			28.2			43.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)				10.0								
Base Capacity (vph)				515	590						2206	
Starvation Cap Reductn				0	0						0	
Spillback Cap Reductn				0	0						0	
Storage Cap Reductn				0	0						0	
Reduced v/c Ratio				0.50	0.29						0.37	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 14 (25%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 11.6		Intersection LOS: B	
Intersection Capacity Utilization 44.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: O'Connor & Gloucester



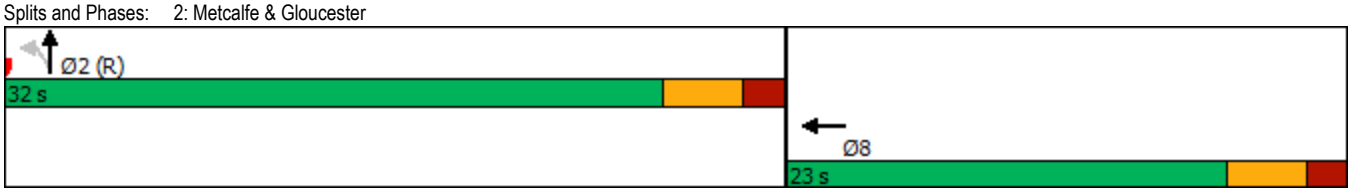


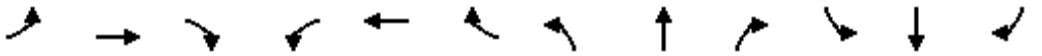
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	140	46	162	325	0	0	0	0
Future Volume (vph)	0	0	0	0	140	46	162	325	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor					0.98			0.94				
Frt					0.967							
Flt Protected								0.984				
Satd. Flow (prot)	0	0	0	0	1668	0	0	4741	0	0	0	0
Flt Permitted								0.984				
Satd. Flow (perm)	0	0	0	0	1668	0	0	4465	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)					32			162				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		60.4			146.3			76.9			65.9	
Travel Time (s)		4.3			10.5			5.5			4.7	
Confl. Peds. (#/hr)	69		74	74		69	159		254	254		159
Confl. Bikes (#/hr)						1			21			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	140	46	162	325	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	186	0	0	487	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type					NA		Perm	NA				
Protected Phases					8			2				
Permitted Phases							2					
Minimum Split (s)					19.0		30.1	30.1				
Total Split (s)					23.0		32.0	32.0				
Total Split (%)					41.8%		58.2%	58.2%				
Maximum Green (s)					18.0		26.9	26.9				
Yellow Time (s)					3.3		3.3	3.3				
All-Red Time (s)					1.7		1.8	1.8				
Lost Time Adjust (s)					0.0			0.0				
Total Lost Time (s)					5.0			5.1				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					7.0		19.0	19.0				
Flash Dont Walk (s)					7.0		6.0	6.0				
Pedestrian Calls (#/hr)					60		60	60				
Act Effct Green (s)					18.0			26.9				
Actuated g/C Ratio					0.33			0.49				
v/c Ratio					0.33			0.21				
Control Delay					13.4			4.4				
Queue Delay					0.0			0.0				
Total Delay					13.4			4.4				
LOS					B			A				
Approach Delay					13.4			4.4				
Approach LOS					B			A				
Queue Length 50th (m)					11.7			8.4				
Queue Length 95th (m)					25.1			14.9				
Internal Link Dist (m)		36.4			122.3			52.9			41.9	
Turn Bay Length (m)												
Base Capacity (vph)					567			2266				
Starvation Cap Reductn					0			0				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn					0			0				
Storage Cap Reductn					0			0				
Reduced v/c Ratio					0.33			0.21				

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 14 (25%), Referenced to phase 2:NBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.33			
Intersection Signal Delay: 6.9		Intersection LOS: A	
Intersection Capacity Utilization 43.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Metcalfe & Gloucester





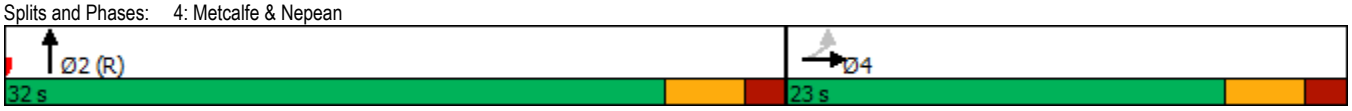
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	100	0	0	0	0	0	391	104	0	0	0
Future Volume (vph)	112	100	0	0	0	0	0	391	104	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	10.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	20.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor	0.85							0.91				
Frt								0.968				
Flt Protected	0.950											
Satd. Flow (prot)	1676	1765	0	0	0	0	0	4246	0	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	1426	1765	0	0	0	0	0	4246	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	49							104				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.5			148.8			74.2			76.9	
Travel Time (s)		13.1			10.7			5.3			5.5	
Confl. Peds. (#/hr)	127		143	143		127	373		375	375		373
Confl. Bikes (#/hr)			1						5			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	112	100	0	0	0	0	0	391	104	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	100	0	0	0	0	0	495	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA						NA				
Protected Phases		4						2				
Permitted Phases	4											
Minimum Split (s)	19.1	19.1						30.0				
Total Split (s)	23.0	23.0						32.0				
Total Split (%)	41.8%	41.8%						58.2%				
Maximum Green (s)	17.9	17.9						27.0				
Yellow Time (s)	3.3	3.3						3.3				
All-Red Time (s)	1.8	1.8						1.7				
Lost Time Adjust (s)	0.0	0.0						0.0				
Total Lost Time (s)	5.1	5.1						5.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0						19.0				
Flash Dont Walk (s)	7.0	7.0						6.0				
Pedestrian Calls (#/hr)	60	60						60				
Act Effct Green (s)	17.9	17.9						27.0				
Actuated g/C Ratio	0.33	0.33						0.49				
v/c Ratio	0.23	0.17						0.23				
Control Delay	6.9	11.3						6.6				
Queue Delay	0.0	0.0						0.0				
Total Delay	6.9	11.3						6.6				
LOS	A	B						A				
Approach Delay		9.0						6.6				
Approach LOS		A						A				
Queue Length 50th (m)	2.8	5.7						7.7				
Queue Length 95th (m)	m9.5	m12.2						12.7				
Internal Link Dist (m)		157.5			124.8			50.2			52.9	

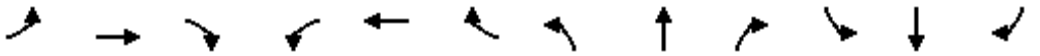
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	10.0											
Base Capacity (vph)	497	574						2137				
Starvation Cap Reductn	0	0						0				
Spillback Cap Reductn	0	0						0				
Storage Cap Reductn	0	0						0				
Reduced v/c Ratio	0.23	0.17						0.23				

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.23			
Intersection Signal Delay: 7.3		Intersection LOS: A	
Intersection Capacity Utilization 79.8%		ICU Level of Service D	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Metcalfe & Nepean

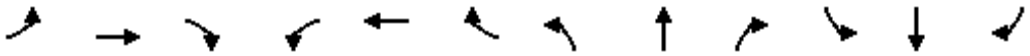




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	100	97	0	0	0	0	0	0	139	833	0
Future Volume (Veh/h)	0	100	97	0	0	0	0	0	0	139	833	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	100	97	0	0	0	0	0	0	139	833	0
Pedestrians		154			212			13			28	
Lane Width (m)		3.6			0.0			0.0			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		13			0			0			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											78	
pX, platoon unblocked	0.88	0.88	0.88	0.88	0.88		0.88					
vC, conflicting volume	1293	1477	584	1066	1477	240	987			212		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1057	1267	250	799	1267	240	709			212		
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	13	83	100	100	100	100			90		
cM capacity (veh/h)	112	115	575	46	115	743	678			1356		

Direction, Lane #	EB 1	SB 1	SB 2
Volume Total	197	417	555
Volume Left	0	139	0
Volume Right	97	0	0
cSH	190	1356	1700
Volume to Capacity	1.04	0.10	0.33
Queue Length 95th (m)	72.4	2.7	0.0
Control Delay (s)	126.7	3.3	0.0
Lane LOS	F	A	
Approach Delay (s)	126.7	1.4	
Approach LOS	F		

Intersection Summary				
Average Delay	22.5			
Intersection Capacity Utilization	48.0%	ICU Level of Service	A	
Analysis Period (min)	15			

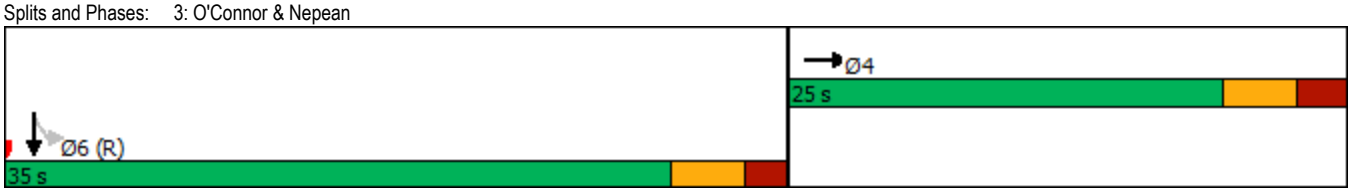


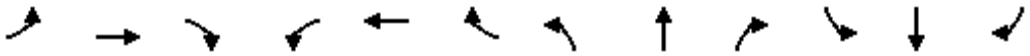
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	107	56	0	0	0	0	0	0	104	531	0
Future Volume (vph)	0	107	56	0	0	0	0	0	0	104	531	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		0.98									0.95	
Frt		0.954										
Flt Protected											0.992	
Satd. Flow (prot)	0	1654	0	0	0	0	0	0	0	0	3326	0
Flt Permitted											0.992	
Satd. Flow (perm)	0	1654	0	0	0	0	0	0	0	0	3167	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)		46									54	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		163.9			181.5			64.2			25.8	
Travel Time (s)		11.8			13.1			4.6			1.9	
Confl. Peds. (#/hr)	13		33	33		13	172		234	234		172
Confl. Bikes (#/hr)									20			20
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	107	56	0	0	0	0	0	0	104	531	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	163	0	0	0	0	0	0	0	0	635	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA								Perm	NA	
Protected Phases		4									6	
Permitted Phases										6		
Minimum Split (s)		23.6								31.3	31.3	
Total Split (s)		25.0								35.0	35.0	
Total Split (%)		41.7%								58.3%	58.3%	
Maximum Green (s)		19.4								29.7	29.7	
Yellow Time (s)		3.3								3.3	3.3	
All-Red Time (s)		2.3								2.0	2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.6									5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0								15.0	15.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		20								60	60	
Act Effct Green (s)		19.4									29.7	
Actuated g/C Ratio		0.32									0.50	
v/c Ratio		0.29									0.40	
Control Delay		12.6									6.3	
Queue Delay		0.0									0.2	
Total Delay		12.6									6.5	
LOS		B									A	
Approach Delay		12.6									6.5	
Approach LOS		B									A	
Queue Length 50th (m)		9.7									12.5	
Queue Length 95th (m)		22.3									18.6	
Internal Link Dist (m)		139.9			157.5			40.2			1.8	
Turn Bay Length (m)												
Base Capacity (vph)		565									1594	
Starvation Cap Reductn		0									355	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0									0	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.29									0.51	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 52 (87%), Referenced to phase 2: and 6:SBTL, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.40			
Intersection Signal Delay: 7.7		Intersection LOS: A	
Intersection Capacity Utilization 45.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: O'Connor & Nepean



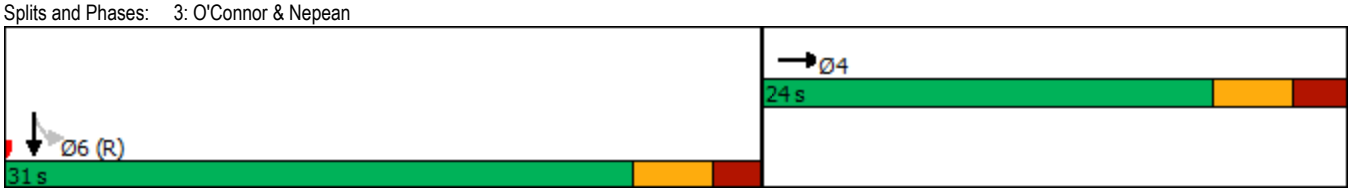


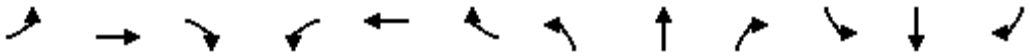
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	100	97	0	0	0	0	0	0	139	833	0
Future Volume (vph)	0	100	97	0	0	0	0	0	0	139	833	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		0.99									0.97	
Frt		0.934										
Flt Protected											0.993	
Satd. Flow (prot)	0	1627	0	0	0	0	0	0	0	0	3329	0
Flt Permitted											0.993	
Satd. Flow (perm)	0	1627	0	0	0	0	0	0	0	0	3214	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)		41									52	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		163.9			181.5			64.2			25.8	
Travel Time (s)		11.8			13.1			4.6			1.9	
Confl. Peds. (#/hr)	28		13	13		28	154		212	212		154
Confl. Bikes (#/hr)			1						18			18
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	100	97	0	0	0	0	0	0	139	833	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	197	0	0	0	0	0	0	0	0	972	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA								Perm	NA	
Protected Phases		4									6	
Permitted Phases										6		
Minimum Split (s)		20.6								29.3	29.3	
Total Split (s)		24.0								31.0	31.0	
Total Split (%)		43.6%								56.4%	56.4%	
Maximum Green (s)		18.4								25.7	25.7	
Yellow Time (s)		3.3								3.3	3.3	
All-Red Time (s)		2.3								2.0	2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.6									5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0								15.0	15.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		20								60	60	
Act Effct Green (s)		18.4									25.7	
Actuated g/C Ratio		0.33									0.47	
v/c Ratio		0.35									0.64	
Control Delay		12.9									8.0	
Queue Delay		0.0									0.0	
Total Delay		12.9									8.1	
LOS		B									A	
Approach Delay		12.9									8.1	
Approach LOS		B									A	
Queue Length 50th (m)		11.7									18.1	
Queue Length 95th (m)		25.7									25.0	
Internal Link Dist (m)		139.9			157.5			40.2			1.8	
Turn Bay Length (m)												
Base Capacity (vph)		571									1529	
Starvation Cap Reductn		0									30	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0									0	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.35									0.65	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 14 (25%), Referenced to phase 2: and 6:SBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 8.9		Intersection LOS: A	
Intersection Capacity Utilization 50.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: O'Connor & Nepean



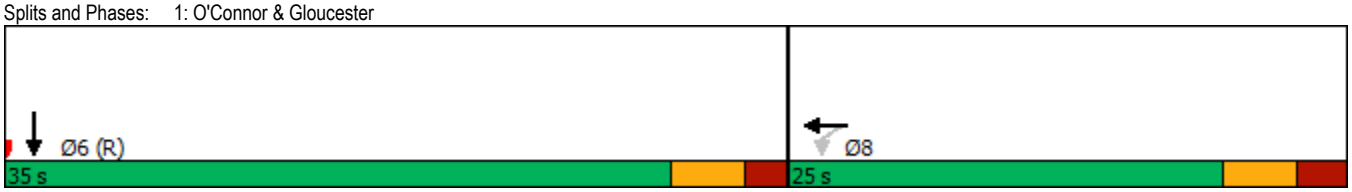


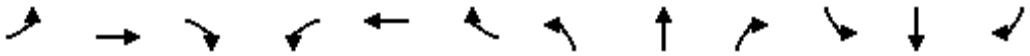
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	243	205	0	0	0	0	0	521	146
Future Volume (vph)	0	0	0	243	205	0	0	0	0	0	521	146
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	10.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	0.0			20.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor				0.83							0.94	
Frt											0.967	
Flt Protected				0.950								
Satd. Flow (prot)	0	0	0	1676	1765	0	0	0	0	0	3063	0
Flt Permitted				0.950								
Satd. Flow (perm)	0	0	0	1391	1765	0	0	0	0	0	3063	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)				55							85	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		161.2			121.8			52.2			67.5	
Travel Time (s)		11.6			8.8			3.8			4.9	
Confl. Peds. (#/hr)	159		142	142		159	190		290	290		190
Confl. Bikes (#/hr)						1			21			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	243	205	0	0	0	0	0	521	146
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	243	205	0	0	0	0	0	667	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type				Perm	NA						NA	
Protected Phases					8						6	
Permitted Phases				8								
Minimum Split (s)				22.0	22.0						30.0	
Total Split (s)				25.0	25.0						35.0	
Total Split (%)				41.7%	41.7%						58.3%	
Maximum Green (s)				19.4	19.4						29.7	
Yellow Time (s)				3.3	3.3						3.3	
All-Red Time (s)				2.3	2.3						2.0	
Lost Time Adjust (s)				0.0	0.0						0.0	
Total Lost Time (s)				5.6	5.6						5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				7.0	7.0						15.0	
Flash Dont Walk (s)				8.0	8.0						9.0	
Pedestrian Calls (#/hr)				60	60						60	
Act Effct Green (s)				19.4	19.4						29.7	
Actuated g/C Ratio				0.32	0.32						0.50	
v/c Ratio				0.50	0.36						0.43	
Control Delay				18.8	19.7						9.4	
Queue Delay				0.0	0.0						0.0	
Total Delay				18.8	19.7						9.4	
LOS				B	B						A	
Approach Delay					19.2						9.4	
Approach LOS					B						A	
Queue Length 50th (m)				21.2	21.7						20.4	
Queue Length 95th (m)				42.1	39.4						31.8	
Internal Link Dist (m)		137.2			97.8			28.2			43.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)				10.0								
Base Capacity (vph)				486	570						1559	
Starvation Cap Reductn				0	0						0	
Spillback Cap Reductn				0	0						0	
Storage Cap Reductn				0	0						0	
Reduced v/c Ratio				0.50	0.36						0.43	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 52 (87%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 13.3		Intersection LOS: B	
Intersection Capacity Utilization 45.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: O'Connor & Gloucester



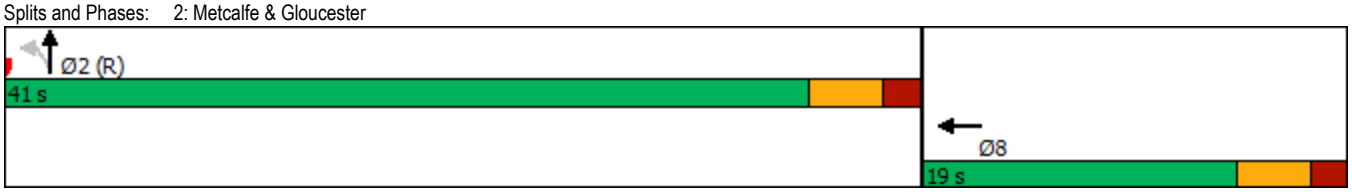


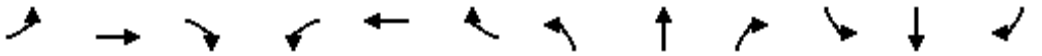
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	186	37	435	553	0	0	0	0
Future Volume (vph)	0	0	0	0	186	37	435	553	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor					0.99			0.91				
Frt					0.978							
Flt Protected								0.978				
Satd. Flow (prot)	0	0	0	0	1701	0	0	4712	0	0	0	0
Flt Permitted								0.978				
Satd. Flow (perm)	0	0	0	0	1701	0	0	4303	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)					16			80				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		60.4			146.3			76.9			65.9	
Travel Time (s)		4.3			10.5			5.5			4.7	
Confl. Peds. (#/hr)	49		136	136		49	164		609	609		164
Confl. Bikes (#/hr)						14			51			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	186	37	435	553	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	223	0	0	988	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type					NA		Perm	NA				
Protected Phases					8			2				
Permitted Phases							2					
Minimum Split (s)					19.0		30.1	30.1				
Total Split (s)					19.0		41.0	41.0				
Total Split (%)					31.7%		68.3%	68.3%				
Maximum Green (s)					14.0		35.9	35.9				
Yellow Time (s)					3.3		3.3	3.3				
All-Red Time (s)					1.7		1.8	1.8				
Lost Time Adjust (s)					0.0			0.0				
Total Lost Time (s)					5.0			5.1				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					7.0		19.0	19.0				
Flash Dont Walk (s)					7.0		6.0	6.0				
Pedestrian Calls (#/hr)					60		60	60				
Act Effct Green (s)					14.0			35.9				
Actuated g/C Ratio					0.23			0.60				
v/c Ratio					0.55			0.38				
Control Delay					24.5			4.5				
Queue Delay					0.0			0.1				
Total Delay					24.5			4.6				
LOS					C			A				
Approach Delay					24.5			4.6				
Approach LOS					C			A				
Queue Length 50th (m)					21.0			14.0				
Queue Length 95th (m)					40.3			14.6				
Internal Link Dist (m)		36.4			122.3			52.9			41.9	
Turn Bay Length (m)												
Base Capacity (vph)					409			2606				
Starvation Cap Reductn					0			608				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn					0			0				
Storage Cap Reductn					0			0				
Reduced v/c Ratio					0.55			0.49				

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 55 (92%), Referenced to phase 2:NBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 8.3		Intersection LOS: A	
Intersection Capacity Utilization 53.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Metcalfe & Gloucester



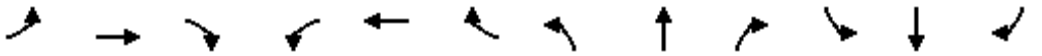


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	236	113	0	0	0	0	0	879	284	0	0	0
Future Volume (vph)	236	113	0	0	0	0	0	879	284	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	10.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	20.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor	0.86							0.92				
Frt								0.963				
Flt Protected	0.950											
Satd. Flow (prot)	1676	1765	0	0	0	0	0	4263	0	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	1435	1765	0	0	0	0	0	4263	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	36							239				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.5			148.8			74.2			76.9	
Travel Time (s)		13.1			10.7			5.3			5.5	
Confl. Peds. (#/hr)	112		79	79		112	366		264	264		366
Confl. Bikes (#/hr)			2			1			4			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	236	113	0	0	0	0	0	879	284	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	236	113	0	0	0	0	0	1163	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA						NA				
Protected Phases		4						2				
Permitted Phases	4											
Minimum Split (s)	19.0	19.0						30.0				
Total Split (s)	19.0	19.0						41.0				
Total Split (%)	31.7%	31.7%						68.3%				
Maximum Green (s)	14.0	14.0						36.0				
Yellow Time (s)	3.3	3.3						3.3				
All-Red Time (s)	1.7	1.7						1.7				
Lost Time Adjust (s)	0.0	0.0						0.0				
Total Lost Time (s)	5.0	5.0						5.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0						19.0				
Flash Dont Walk (s)	7.0	7.0						6.0				
Pedestrian Calls (#/hr)	30	30						60				
Act Effct Green (s)	14.0	14.0						36.0				
Actuated g/C Ratio	0.23	0.23						0.60				
v/c Ratio	0.65	0.27						0.44				
Control Delay	27.3	20.9						5.6				
Queue Delay	0.0	0.0						0.0				
Total Delay	27.3	20.9						5.6				
LOS	C	C						A				
Approach Delay		25.3						5.6				
Approach LOS		C						A				
Queue Length 50th (m)	19.9	10.7						17.3				
Queue Length 95th (m)	#47.8	23.6						24.7				
Internal Link Dist (m)		157.5			124.8			50.2			52.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	10.0											
Base Capacity (vph)	362	411						2653				
Starvation Cap Reductn	0	0						0				
Spillback Cap Reductn	0	0						0				
Storage Cap Reductn	0	0						0				
Reduced v/c Ratio	0.65	0.27						0.44				

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 10.1		Intersection LOS: B	
Intersection Capacity Utilization 81.8%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Metcalfe & Nepean



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	133	56	0	0	0	0	0	0	206	561	0
Future Volume (Veh/h)	0	133	56	0	0	0	0	0	0	206	561	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	133	56	0	0	0	0	0	0	206	561	0
Pedestrians		172			234			33			13	
Lane Width (m)		3.6			0.0			0.0			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		14			0			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											78	
pX, platoon unblocked	0.91	0.91	0.91	0.91	0.91		0.91					
vC, conflicting volume	1158	1379	486	1082	1379	247	733			234		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	977	1220	239	894	1220	247	511			234		
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	0	91	0	100	100	100			85		
cM capacity (veh/h)	125	118	595	0	118	745	820			1331		

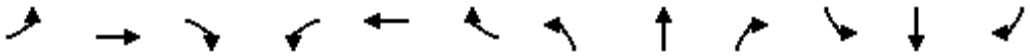
Direction, Lane #	EB 1	SB 1	SB 2
Volume Total	189	393	374
Volume Left	0	206	0
Volume Right	56	0	0
cSH	155	1331	1700
Volume to Capacity	1.22	0.15	0.22
Queue Length 95th (m)	86.7	4.4	0.0
Control Delay (s)	202.1	5.0	0.0
Lane LOS	F	A	
Approach Delay (s)	202.1	2.6	
Approach LOS	F		

Intersection Summary					
Average Delay	42.0				
Intersection Capacity Utilization	48.8%	ICU Level of Service		A	
Analysis Period (min)	15				

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	173	361	87	0
Future Volume (Veh/h)	0	0	173	361	87	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	173	361	87	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	122			60		
pX, platoon unblocked					0.93	
vC, conflicting volume			0		707	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		644	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			89		76	100
cM capacity (veh/h)			1623		362	1085

Direction, Lane #	WB 1	NB 1
Volume Total	534	87
Volume Left	173	87
Volume Right	0	0
cSH	1623	362
Volume to Capacity	0.11	0.24
Queue Length 95th (m)	2.9	7.4
Control Delay (s)	3.1	18.1
Lane LOS	A	C
Approach Delay (s)	3.1	18.1
Approach LOS		C

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	41.9%	ICU Level of Service		A
Analysis Period (min)	15			



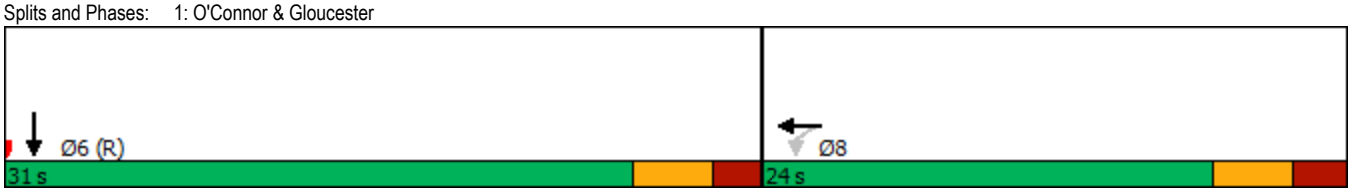
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	405	195	0	0	0	0	0	772	72
Future Volume (vph)	0	0	0	405	195	0	0	0	0	0	772	72
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	10.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	0.0			20.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor				0.86							0.98	
Frt											0.987	
Flt Protected				0.950								
Satd. Flow (prot)	0	0	0	1676	1765	0	0	0	0	0	4682	0
Flt Permitted				0.950								
Satd. Flow (perm)	0	0	0	1450	1765	0	0	0	0	0	4682	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)				46							37	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		161.2			121.8			52.2			67.5	
Travel Time (s)		11.6			8.8			3.8			4.9	
Confl. Peds. (#/hr)	132		123	123		132	143		222	222		143
Confl. Bikes (#/hr)						8			20			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	405	195	0	0	0	0	0	772	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	405	195	0	0	0	0	0	844	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type				Perm	NA						NA	
Protected Phases					8						6	
Permitted Phases				8								
Minimum Split (s)				22.0	22.0						30.0	
Total Split (s)				24.0	24.0						31.0	
Total Split (%)				43.6%	43.6%						56.4%	
Maximum Green (s)				18.4	18.4						25.7	
Yellow Time (s)				3.3	3.3						3.3	
All-Red Time (s)				2.3	2.3						2.0	
Lost Time Adjust (s)				0.0	0.0						0.0	
Total Lost Time (s)				5.6	5.6						5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				7.0	7.0						15.0	
Flash Dont Walk (s)				8.0	8.0						9.0	
Pedestrian Calls (#/hr)				60	60						60	
Act Effct Green (s)				18.4	18.4						25.7	
Actuated g/C Ratio				0.33	0.33						0.47	
v/c Ratio				0.79	0.33						0.38	
Control Delay				28.1	15.9						9.7	
Queue Delay				0.0	0.0						0.0	
Total Delay				28.1	15.9						9.7	
LOS				C	B						A	
Approach Delay					24.2						9.7	
Approach LOS					C						A	
Queue Length 50th (m)				28.8	14.2						18.4	
Queue Length 95th (m)				#73.0	30.7						26.4	
Internal Link Dist (m)		137.2			97.8			28.2			43.5	

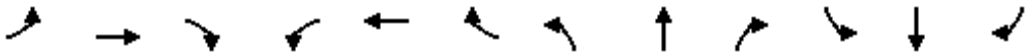
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)				10.0								
Base Capacity (vph)				515	590						2207	
Starvation Cap Reductn				0	0						0	
Spillback Cap Reductn				0	0						0	
Storage Cap Reductn				0	0						0	
Reduced v/c Ratio				0.79	0.33						0.38	

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 55
Offset: 14 (25%), Referenced to phase 6:SBT, Start of Green
Natural Cycle: 55
Control Type: Pretimed
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 15.7 Intersection LOS: B
Intersection Capacity Utilization 52.8% ICU Level of Service A
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: O'Connor & Gloucester



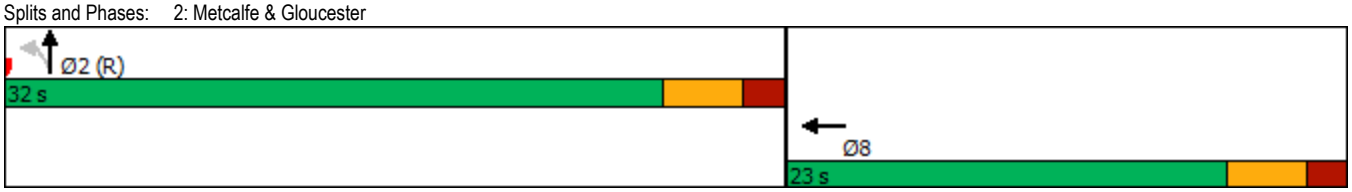


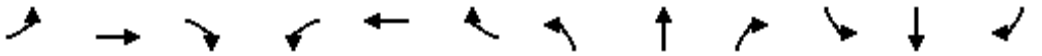
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	156	46	253	387	0	0	0	0
Future Volume (vph)	0	0	0	0	156	46	253	387	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor					0.98			0.93				
Frt					0.969							
Flt Protected								0.981				
Satd. Flow (prot)	0	0	0	0	1674	0	0	4726	0	0	0	0
Flt Permitted								0.981				
Satd. Flow (perm)	0	0	0	0	1674	0	0	4399	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)					29			253				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		60.4			146.3			76.9			65.9	
Travel Time (s)		4.3			10.5			5.5			4.7	
Confl. Peds. (#/hr)	69		74	74		69	159		254	254		159
Confl. Bikes (#/hr)						1			21			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	156	46	253	387	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	202	0	0	640	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type					NA		Perm	NA				
Protected Phases					8			2				
Permitted Phases							2					
Minimum Split (s)					19.0		30.1	30.1				
Total Split (s)					23.0		32.0	32.0				
Total Split (%)					41.8%		58.2%	58.2%				
Maximum Green (s)					18.0		26.9	26.9				
Yellow Time (s)					3.3		3.3	3.3				
All-Red Time (s)					1.7		1.8	1.8				
Lost Time Adjust (s)					0.0			0.0				
Total Lost Time (s)					5.0			5.1				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					7.0		19.0	19.0				
Flash Dont Walk (s)					7.0		6.0	6.0				
Pedestrian Calls (#/hr)					60		60	60				
Act Effct Green (s)					18.0			26.9				
Actuated g/C Ratio					0.33			0.49				
v/c Ratio					0.36			0.28				
Control Delay					14.2			5.9				
Queue Delay					0.0			0.0				
Total Delay					14.2			5.9				
LOS					B			A				
Approach Delay					14.2			5.9				
Approach LOS					B			A				
Queue Length 50th (m)					13.3			10.8				
Queue Length 95th (m)					27.7			20.5				
Internal Link Dist (m)		36.4			122.3			52.9			41.9	
Turn Bay Length (m)												
Base Capacity (vph)					567			2280				
Starvation Cap Reductn					0			0				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn					0			0				
Storage Cap Reductn					0			0				
Reduced v/c Ratio					0.36			0.28				

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 14 (25%), Referenced to phase 2:NBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.36			
Intersection Signal Delay: 7.9		Intersection LOS: A	
Intersection Capacity Utilization 42.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Metcalfe & Gloucester





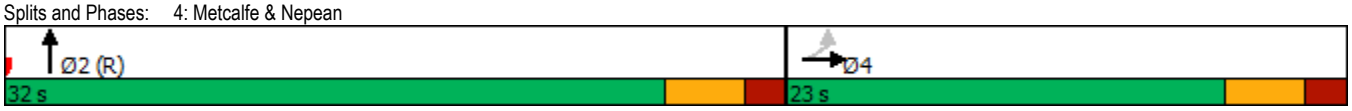
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	125	0	0	0	0	0	428	104	0	0	0
Future Volume (vph)	228	125	0	0	0	0	0	428	104	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	10.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	20.0			0.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor	0.85							0.92				
Frt								0.971				
Flt Protected	0.950											
Satd. Flow (prot)	1676	1765	0	0	0	0	0	4288	0	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	1426	1765	0	0	0	0	0	4288	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	44							104				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		181.5			148.8			74.2			76.9	
Travel Time (s)		13.1			10.7			5.3			5.5	
Confl. Peds. (#/hr)	127		143	143		127	373		375	375		373
Confl. Bikes (#/hr)			1						5			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	228	125	0	0	0	0	0	428	104	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	125	0	0	0	0	0	532	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA						NA				
Protected Phases		4						2				
Permitted Phases	4											
Minimum Split (s)	19.1	19.1						30.0				
Total Split (s)	23.0	23.0						32.0				
Total Split (%)	41.8%	41.8%						58.2%				
Maximum Green (s)	17.9	17.9						27.0				
Yellow Time (s)	3.3	3.3						3.3				
All-Red Time (s)	1.8	1.8						1.7				
Lost Time Adjust (s)	0.0	0.0						0.0				
Total Lost Time (s)	5.1	5.1						5.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0						19.0				
Flash Dont Walk (s)	7.0	7.0						6.0				
Pedestrian Calls (#/hr)	60	60						60				
Act Effct Green (s)	17.9	17.9						27.0				
Actuated g/C Ratio	0.33	0.33						0.49				
v/c Ratio	0.46	0.22						0.25				
Control Delay	12.1	11.5						6.8				
Queue Delay	0.0	0.0						0.0				
Total Delay	12.1	11.5						6.8				
LOS	B	B						A				
Approach Delay		11.9						6.8				
Approach LOS		B						A				
Queue Length 50th (m)	10.7	7.5						8.5				
Queue Length 95th (m)	m19.4	m13.9						13.7				
Internal Link Dist (m)		157.5			124.8			50.2			52.9	

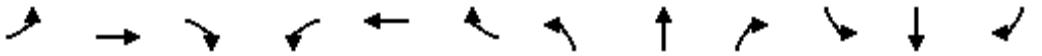
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)	10.0											
Base Capacity (vph)	493	574						2157				
Starvation Cap Reductn	0	0						0				
Spillback Cap Reductn	0	0						0				
Storage Cap Reductn	0	0						0				
Reduced v/c Ratio	0.46	0.22						0.25				

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.46			
Intersection Signal Delay: 8.8		Intersection LOS: A	
Intersection Capacity Utilization 87.6%		ICU Level of Service E	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Metcalfe & Nepean





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	116	97	0	0	0	0	0	0	264	895	0
Future Volume (Veh/h)	0	116	97	0	0	0	0	0	0	264	895	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	116	97	0	0	0	0	0	0	264	895	0
Pedestrians		154			212			13			28	
Lane Width (m)		3.6			0.0			0.0			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		13			0			0			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											78	
pX, platoon unblocked	0.87	0.87	0.87	0.87	0.87		0.87					
vC, conflicting volume	1605	1789	614	1356	1789	240	1049			212		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1398	1610	261	1112	1610	240	760			212		
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	0	83	0	100	100	100			81		
cM capacity (veh/h)	57	63	560	0	63	743	643			1356		

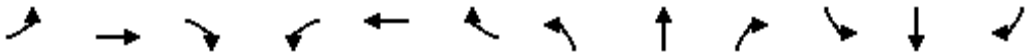
Direction, Lane #	EB 1	SB 1	SB 2
Volume Total	213	562	597
Volume Left	0	264	0
Volume Right	97	0	0
cSH	106	1356	1700
Volume to Capacity	2.00	0.19	0.35
Queue Length 95th (m)	142.6	5.8	0.0
Control Delay (s)	550.5	4.9	0.0
Lane LOS	F	A	
Approach Delay (s)	550.5	2.4	
Approach LOS	F		

Intersection Summary				
Average Delay	87.5			
Intersection Capacity Utilization	54.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	107	424	176	0
Future Volume (Veh/h)	0	0	107	424	176	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	107	424	176	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	122			60		
pX, platoon unblocked					0.95	
vC, conflicting volume			0		638	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		588	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		58	100
cM capacity (veh/h)			1623		416	1085

Direction, Lane #	WB 1	NB 1
Volume Total	531	176
Volume Left	107	176
Volume Right	0	0
cSH	1623	416
Volume to Capacity	0.07	0.42
Queue Length 95th (m)	1.7	16.5
Control Delay (s)	2.0	19.8
Lane LOS	A	C
Approach Delay (s)	2.0	19.8
Approach LOS		C

Intersection Summary				
Average Delay	6.4			
Intersection Capacity Utilization	46.8%	ICU Level of Service		A
Analysis Period (min)	15			

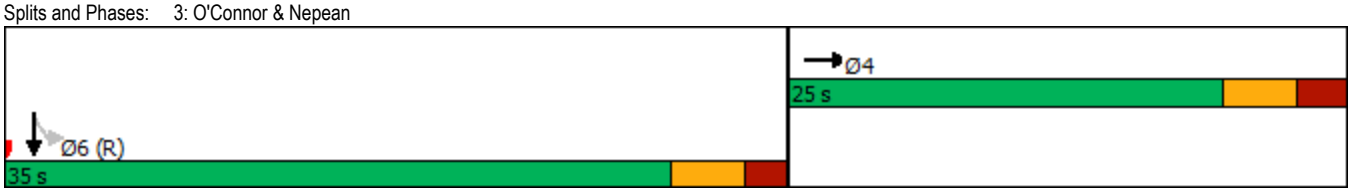


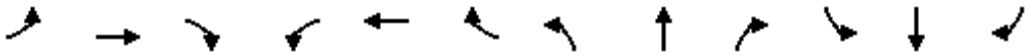
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	133	56	0	0	0	0	0	0	209	561	0
Future Volume (vph)	0	133	56	0	0	0	0	0	0	209	561	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		0.98									0.92	
Frt		0.960										
Flt Protected											0.987	
Satd. Flow (prot)	0	1669	0	0	0	0	0	0	0	0	3309	0
Flt Permitted											0.987	
Satd. Flow (perm)	0	1669	0	0	0	0	0	0	0	0	3047	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)		37									127	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		163.9			181.5			64.2			25.8	
Travel Time (s)		11.8			13.1			4.6			1.9	
Confl. Peds. (#/hr)	13		33	33		13	172		234	234		172
Confl. Bikes (#/hr)									20			20
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	133	56	0	0	0	0	0	0	209	561	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	189	0	0	0	0	0	0	0	0	770	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA								Perm	NA	
Protected Phases		4									6	
Permitted Phases										6		
Minimum Split (s)		23.6								31.3	31.3	
Total Split (s)		25.0								35.0	35.0	
Total Split (%)		41.7%								58.3%	58.3%	
Maximum Green (s)		19.4								29.7	29.7	
Yellow Time (s)		3.3								3.3	3.3	
All-Red Time (s)		2.3								2.0	2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.6									5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0								15.0	15.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		20								60	60	
Act Effct Green (s)		19.4									29.7	
Actuated g/C Ratio		0.32									0.50	
v/c Ratio		0.34									0.49	
Control Delay		14.3									6.5	
Queue Delay		0.0									0.2	
Total Delay		14.3									6.8	
LOS		B									A	
Approach Delay		14.3									6.8	
Approach LOS		B									A	
Queue Length 50th (m)		12.9									15.8	
Queue Length 95th (m)		27.3									23.1	
Internal Link Dist (m)		139.9			157.5			40.2			1.8	
Turn Bay Length (m)												
Base Capacity (vph)		564									1572	
Starvation Cap Reductn		0									247	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0									0	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.34									0.58	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 52 (87%), Referenced to phase 2: and 6:SBTL, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 8.2		Intersection LOS: A	
Intersection Capacity Utilization 48.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: O'Connor & Nepean





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	116	97	0	0	0	0	0	0	264	895	0
Future Volume (vph)	0	116	97	0	0	0	0	0	0	264	895	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		0.99									0.94	
Frt		0.939										
Flt Protected											0.989	
Satd. Flow (prot)	0	1637	0	0	0	0	0	0	0	0	3316	0
Flt Permitted											0.989	
Satd. Flow (perm)	0	1637	0	0	0	0	0	0	0	0	3133	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)		34									94	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		163.9			181.5			64.2			25.8	
Travel Time (s)		11.8			13.1			4.6			1.9	
Confl. Peds. (#/hr)	28		13	13		28	154		212	212		154
Confl. Bikes (#/hr)			1						18			18
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	116	97	0	0	0	0	0	0	264	895	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	213	0	0	0	0	0	0	0	0	1159	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)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA								Perm	NA	
Protected Phases		4									6	
Permitted Phases										6		
Minimum Split (s)		20.6								29.3	29.3	
Total Split (s)		24.0								31.0	31.0	
Total Split (%)		43.6%								56.4%	56.4%	
Maximum Green (s)		18.4								25.7	25.7	
Yellow Time (s)		3.3								3.3	3.3	
All-Red Time (s)		2.3								2.0	2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.6									5.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0								15.0	15.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		20								60	60	
Act Effct Green (s)		18.4									25.7	
Actuated g/C Ratio		0.33									0.47	
v/c Ratio		0.37									0.77	
Control Delay		13.9									11.2	
Queue Delay		0.0									0.0	
Total Delay		13.9									11.2	
LOS		B									B	
Approach Delay		13.9									11.2	
Approach LOS		B									B	
Queue Length 50th (m)		13.7									27.2	
Queue Length 95th (m)		28.5									78.1	
Internal Link Dist (m)		139.9			157.5			40.2			1.8	
Turn Bay Length (m)												
Base Capacity (vph)		570									1514	
Starvation Cap Reductn		0									2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0									0	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.37									0.77	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 14 (25%), Referenced to phase 2: and 6:SBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 11.6		Intersection LOS: B	
Intersection Capacity Utilization 56.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: O'Connor & Nepean