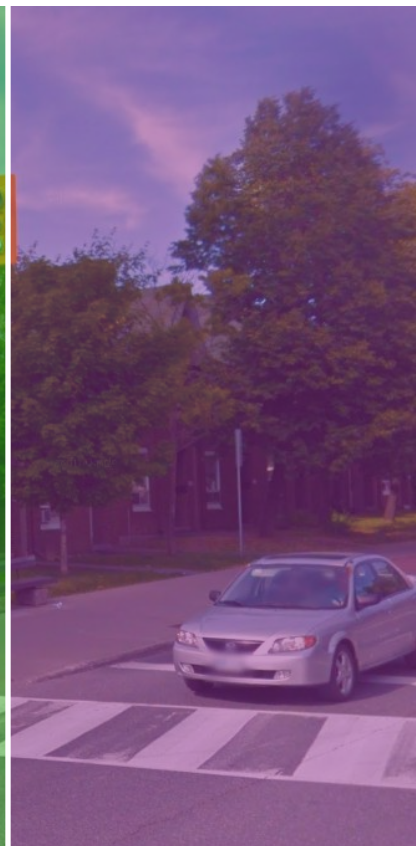
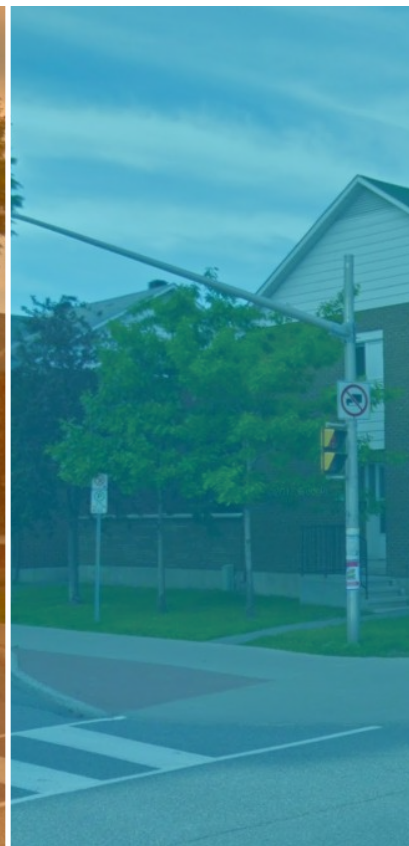




811 Gladstone Avenue

Transportation Impact Assessment Study





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 licensed¹ or registered² 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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Signature of Individual certifier that s/he meets the above four criteria

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811 Gladstone Avenue Residential Development

Transportation Impact Assessment

prepared for:
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February 20, 2019

476557-01000

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TRANSPORTATION IMPACT ASSESSMENT

1. DESCRIPTION OF PROPOSED DEVELOPMENT

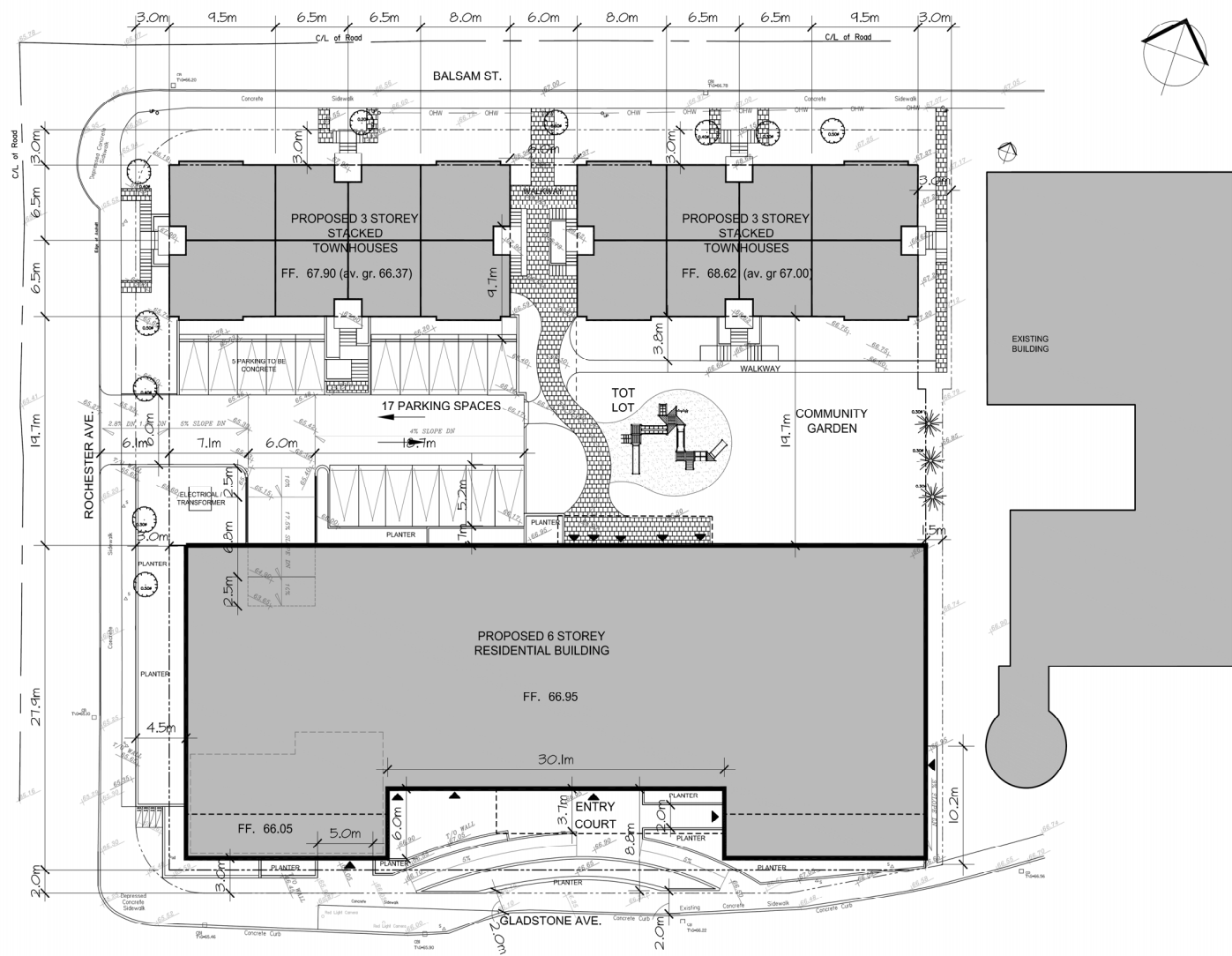
1.1. PROPOSED DEVELOPMENT

A residential development comprised of 108 apartment units and 32 townhomes is being proposed on the property bounded by Gladstone Avenue, Rochester Street, Booth Street, and Balsam Street. The lot was previously occupied by a residential development that consisted of 23 attached homes (townhouses) with a driveway off of Balsam Street which provides access to 13 vehicle parking spaces. This development has since been demolished and the site is now vacant. The proponent is proposing a new driveway access to Rochester Street that would serve the development and provide access to 39 vehicle parking spaces (17 spaces at grade). The estimated date of occupancy is 2020, with one planned phase of development. The site's local context is depicted as Figure 1, the Ground Floor Site Plan is depicted as Figure 2. The TIA Screening Form and City correspondence have been included in Appendix A.

Figure 1: Local Context



PROJECT INFORMATION		
ZONING BY-LAW 2008-250		
(City of Ottawa)	TM & R4A	
SITE AREA:	51,224 SQ.FT	
ZONING REQUIREMENTS		
BUILDING HEIGHT:	6 FLRS (20M)	
MAX FRONT YARD		
(GLADSTONE):	2.0M	
MIN INTERIOR YARD:	1.2M	
MIN CORNER SIDE YARD		
(ROCHESTER):	3.0M	
	(5.0M ABOVE 15M)	
MIN REAR YARD:	7.5M	
PARKING REQUIRED (RES):	0.5/UNIT	
	(AFTER 12 UNITS)	
	TOTAL: 64	
PARKING REQUIRED (VIS):	0.1/UNIT	
	(AFTER 12 UNITS)	
	TOTAL: 13	
BICYCLE PARKING:	0.5/UNIT	
	TOTAL: 70	
AMENITY AREA:	6 SQM/UNIT	
	834 SQM	
PROJECT STATISTICS		
BUILDING HEIGHT (FLAT ROOF):	6 FLRS (19M)	
FRONT YARD		
(GLADSTONE):	0.8 M	
INTERIOR YARD:	1.5 M	
CORNER SIDE YARD		
(ROCHESTER):	3.0 M	
REAR YARD:	3.0 M	
PARKING PROVIDED:	38 SPACES	
BICYCLE PARKING:	70	
AMENITY AREA:	1,722 SQM	
UNIT STATISTICS		
BACHELOR:	15	(11%)
1 BEDROOM:	59	(42%)
2 BEDROOM:	38	(27%)
3 BEDROOM:	20	(14%)
4 BEDROOM:	8	(6%)



811 GLADSTONE AVE.
6 Storey Mixed Use and Residential

Site Plan



2. EXISTING CONDITIONS

2.1. AREA ROAD NETWORK

Gladstone Avenue is an east-west Major Collector with a two-lane cross-section and back to back left turn lanes at its intersections with Rochester Street and Booth Street. Additionally, a channelized right-turn lane is provided at the Booth Street intersection. On-street parking is provided along the north side of Gladstone Avenue. The posted speed limit is 40 km/h.

Booth Street is a north-south Major Collector road with a two-lane cross-section. The posted speed limit is 40 km/h. On-street parking is provided on the west side of the roadway within vicinity of the site.

Rochester Street is a north-south local road with a two-lane cross-section. On-street parking is permitted along the frontage of the property. The posted speed limit is 50 km/h.

Balsam Street is an east-west local road with a two-lane cross-section. On-street parking is permitted along the frontage of the property. The unposted (default) speed limit of 50 km/h applies along this street.

2.2. PEDESTRIAN/CYCLING NETWORK

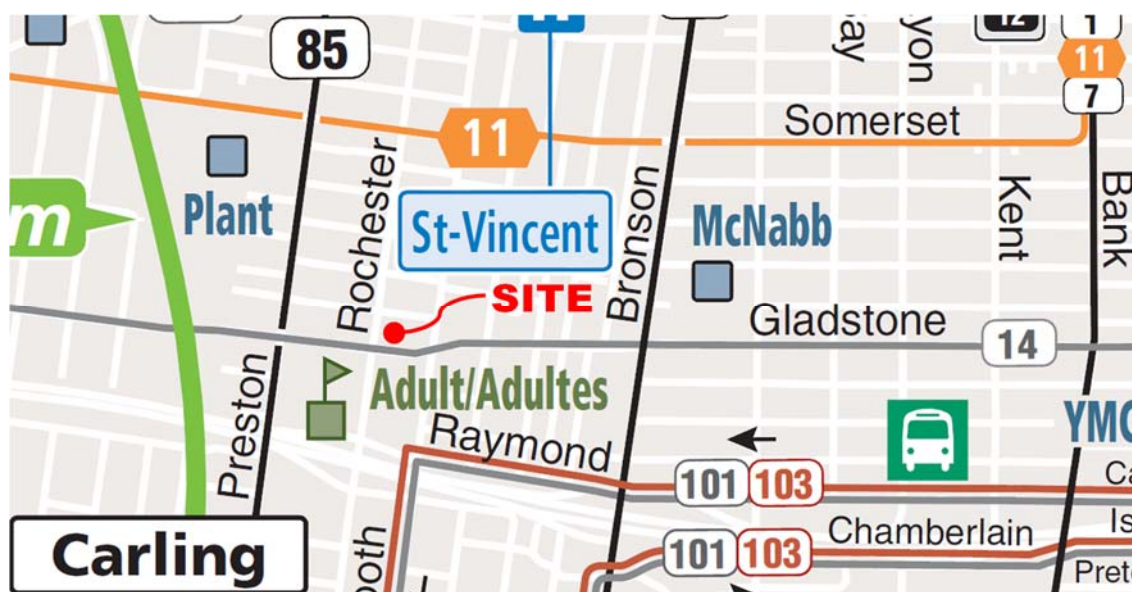
According to the City's 2013 Official Cycling Plan (OCP), Gladstone Avenue and Booth Street are designated "Spine" Routes. However, no formal cycling facilities are currently provided or planned along either street, and therefore cyclists operate in mixed traffic.

Curbside sidewalks are provided on both sides along boundary streets with crosswalks at the signalized intersections and crossing north-south at the unsignalized intersections within the Study Area.

2.3. TRANSIT NETWORK

OC Transpo service is currently located along Gladstone Avenue with bus stops provided near the site for Local Route #14.

Figure 3: Area Transit Network



2.4. EXISTING ROAD SAFETY CONDITIONS

Collision history for the study area intersections (2012 to 2016, inclusive) was obtained from the City of Ottawa and most collisions (75% or 54 vehicles) involved only property damage, indicating low impact speeds, and 25% (18 vehicles) involved personal injuries. The primary causes of collisions cited by police include; angle (36% or 26 vehicles), turning movement (18% or 13 vehicles), and rear end (17% or 12 vehicles) type collisions.

A standard unit of measure for assessing collisions at an intersection is based on the number collisions per million entering vehicles (MEV). At intersections within the study area, reported collisions have historically take place at a rate of:

- 0.54/MEV at the Booth/Gladstone intersection;
- 1.32/MEV at the Rochester/Gladstone intersection;
- 0.59/MEV at the Rochester/Balsam intersection; and
- 0.09/MEV at the Booth/Balsam intersection.

At the Rochester/Gladstone intersection there was a total of 39 collisions in the 5-year period, which equates to approximately 8 collisions per year, on average. The majority of collisions were angle and resulted in property damage only.

It is noteworthy that within the 5-years of recorded collision data there were 5 collisions involving pedestrians and 5 collisions involving cyclists, resulting in non-fatal injuries. All collisions involving pedestrians occurred at the Gladstone/Rochester intersection. Collisions involving cyclists occurred at the Rochester/Gladstone and Booth/Gladstone intersections.

The source collision data as provided by the City of Ottawa and related analysis is provided as Appendix B.

3. PLANNED CONDITIONS

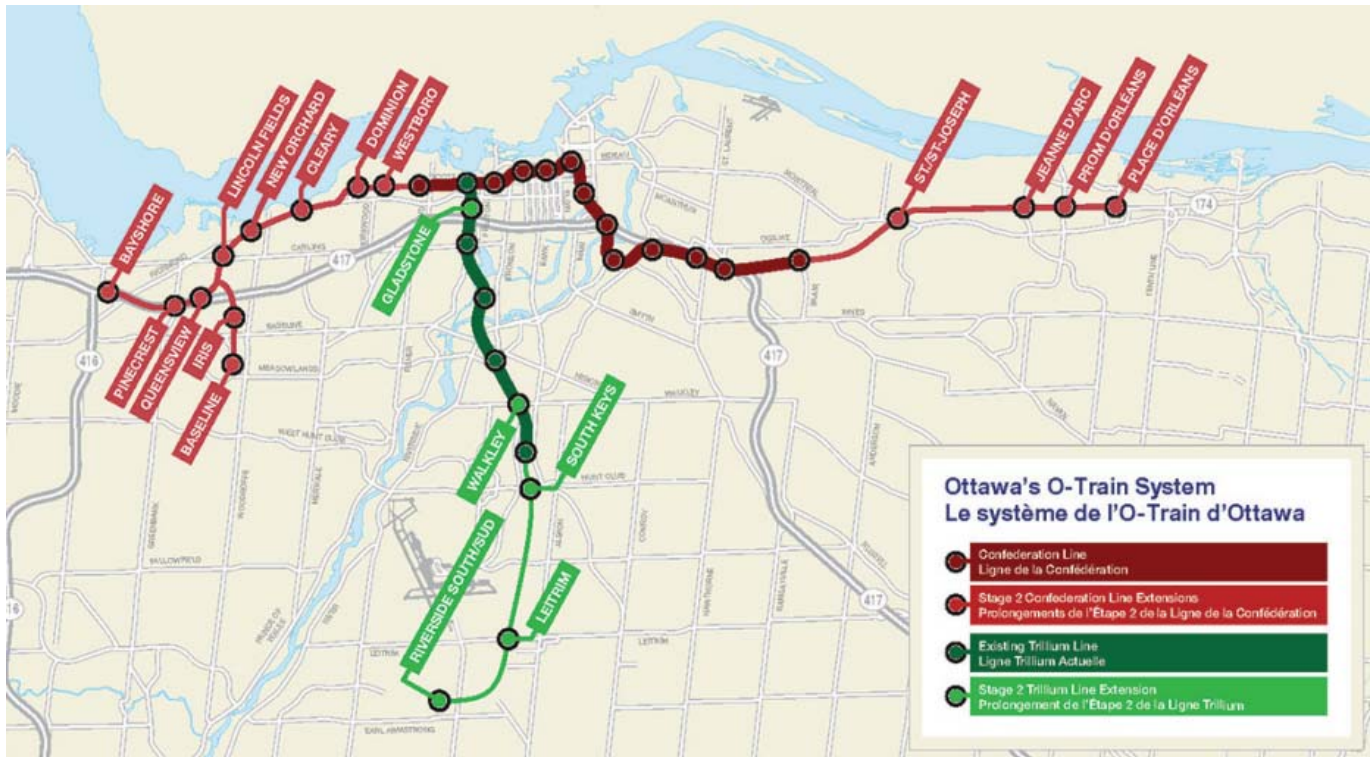
3.1. PLANNED STUDY AREA TRANSPORTATION NETWORK CHANGES

Transit Priority Projects

A notable transportation network change within the study area is the Phase I construction of the east-west LRT, which is the conversion of the City's existing BRT corridor to LRT between the current Blair transit station and the Tunney's Pasture station and includes a tunnel through the City's Downtown. Currently, this phase of construction is underway and is expected to be completed in early 2019.

Phase II of the LRT construction, which will extend the City's LRT further east, west and south (further improving transit within the vicinity of the site), is expected to begin by 2019 and be completed by 2023. The following Figure 4 illustrates the planned Phases I and II of the future Confederation/Trillium Lines. The proposed site is approximately 450m walking distance from the future LRT station at Gladstone.

Figure 4:Planned LRT Phase II



3.2. OTHER AREA DEVELOPMENTS

According to the City's development application search tool, the following developments are planned within the vicinity of the subject site.

17 Aberdeen Street

SAKTO Corporation is proposing the expansion of an existing apartment building at the above-noted address, which is located approximately 440 m southwest of the subject development. The Transportation Overview (prepared by IBI Group) projected an increase in vehicle traffic of approximately 40-50 veh/h during the morning and afternoon peak hours.

220 Lebreton Avenue

Costantino & Associates Architects is proposing a 4-storey 10-unit apartment building at the above-noted address, which is located approximately 490 m southeast of the subject development. A Transportation Impact Study has not been prepared prior to this study.

166-170 Preston Street

A developer is proposing a 15-unit condominium development with ground-floor retail at the above-noted address, which is located approximately 290m east of the subject development. A Transportation Impact Study has not been prepared prior to this study.

288 Booth Street

DCR Phoenix Homes is proposing a 9-storey mixed-use development with 75 residential units, a supermarket and ground-floor restaurant at the above-noted address, which is located approximately 390m north of the subject development. A Transportation Impact Study has not been prepared prior to this study.

4. STUDY AREA AND TIME PERIODS

4.1. STUDY AREA

The following intersections are included in the Study Area for the proposed development:

- Gladstone Avenue at Rochester Street
- Gladstone Avenue at Booth Street
- Booth Street at Balsam Street
- Rochester Street at Balsam Street

The following road segments are included in the Study Area for the proposed development:

- Gladstone Avenue
- Rochester Street
- Balsam Street
- Booth Street

Illustrated as Figure 5 are the most recent weekday morning and afternoon peak hour traffic volumes obtained from the City of Ottawa and Parsons' Subconsultant (Table 1) at the study area intersections. The peak hour turning movement counts are included as Appendix C.

Figure 5: Existing Peak Hour Traffic Volumes

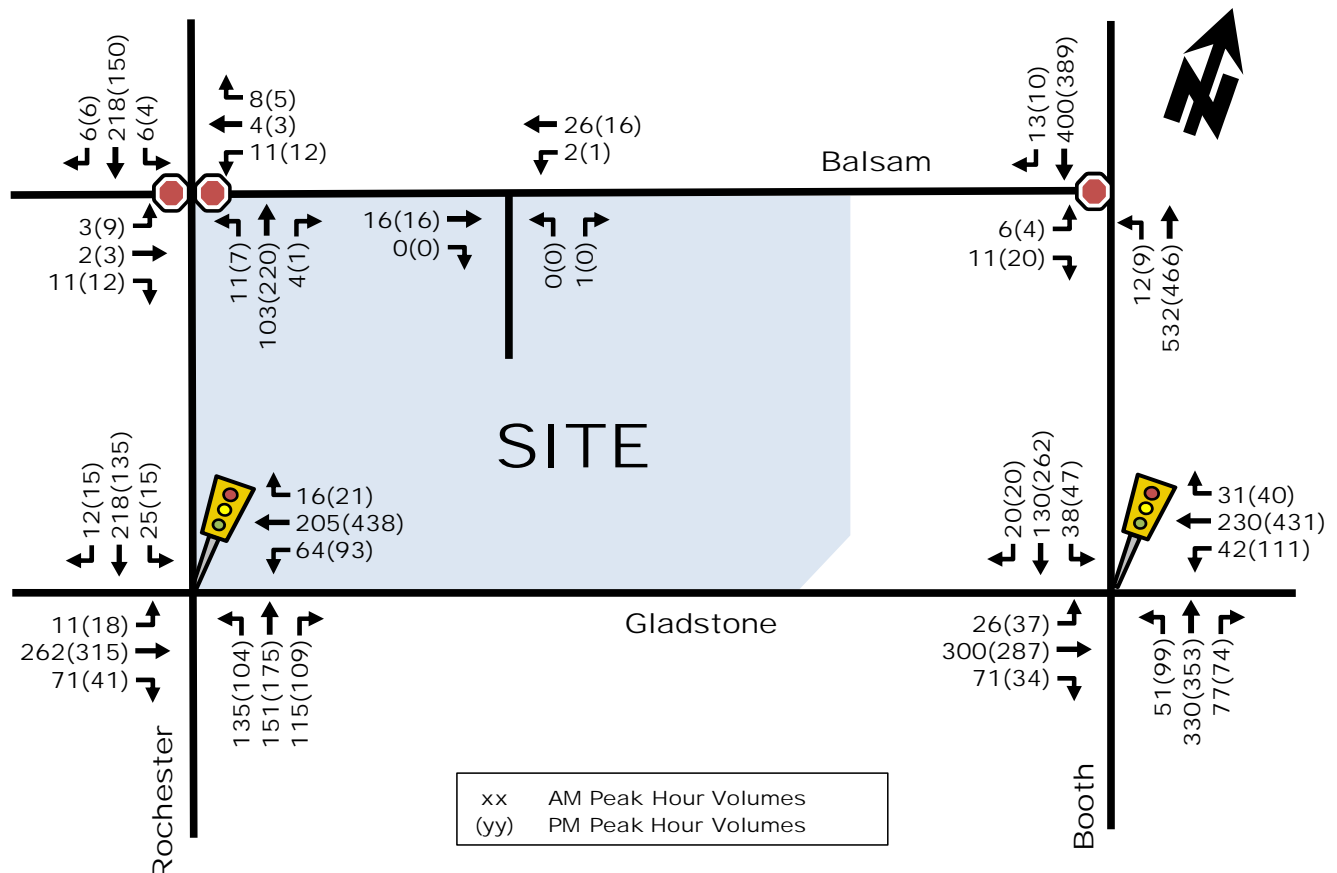


Table 1: Turning Movement Count Summary

Intersection	Count Source	Count Date
Gladstone/Rochester	City of Ottawa	Wednesday, November 23, 2016
Gladstone/Booth	City of Ottawa	Wednesday, July 27, 2016
Balsam/Rochester	Parsons' Subconsultant	Wednesday, December 13, 2017
Balsam/Booth	Parsons' Subconsultant	Thursday, December 14, 2017
Balsam/Site	Parsons' Subconsultant	Thursday, December 14, 2017

4.2. TIME PERIODS

Given the trips expected to be generated by this development will be residential trips, the time periods to be assessed are the weekday morning and afternoon commuter peak hours.

4.3. HORIZON YEARS

For the purposes of the operational analysis it is assumed that the subject development will be fully built and occupied by 2020. This will necessitate the analysis of 2020 and 2025 horizons.

5. EXEMPTION REVIEW

Based on the City's TIA guidelines and the subject site, the following modules/elements of the TIA process, summarized in Table 2, are recommended to be exempt in the subsequent steps of the TIA process:

Table 2: Exemptions Review Summary

Module	Element	Exemption Consideration
4.1 Development Design	4.1.3 New Street Networks	Not required for applications involving site plans.
4.6 Neighbourhood Traffic Management	All elements	This development is within 100m driving distance of both a major collector (Booth Street) and arterial (Gladstone Avenue) roadway
4.8 Review of Network Concept	All elements	This development is not expected to generate 200-person trips more than the permitted zoning for the site.

6. DEVELOPMENT GENERATED TRAVEL DEMAND

6.1. TRIP GENERATION

Appropriate trip generation rates for the proposed development consisting of approximately 148 residential units was obtained from the City's 2009 TRANS Trip Generation – Residential Trip Rates. These rates are summarized in Table 3.

Table 3: 2009 TRANS Trip Generation Rates

Land Use	ITE Land Use Code	Trip Rates	
		AM Peak	PM Peak
Mid-Rise Apartments	ITE 223	T = 0.17(du)	T = 0.16(du)
Townhouses	ITE 224	T = 0.34(du)	T = 0.38(du)
Notes: T = Average Vehicle Trip Ends du = Dwelling units			

Using the TRANS Trip Generation rates for apartment and townhouse uses, the total amount of vehicle trips generated by the proposed residential development was projected. The results are summarized in Table 4.

Table 4: Projected Vehicle Trip Generation – TRANS Model

Land Use	Area	AM Peak (Veh/h)			PM Peak (Veh/h)		
		In	Out	Total	In	Out	Total
Mid-Rise Apartments	108 units	5	13	18	9	8	17
Townhouses	32 units	4	7	11	6	6	12
Total 'New' Auto Trips		9	20	29	15	14	29

As shown in Table 4, a total of approximately 29 veh/h are projected to travel to/from the proposed development during both the weekday morning and afternoon commuter peak hours. Using the TRANS Auto Trips projected in Table 4 and the mode share percentages outline in Table 3.13 of the TRANS Trip Generation Study, the modal share for the apartment and townhouse land uses within the proposed development are summarized in Table 5 and Table 6, respectively. The total site trip generation is summarized in Table 7.

Table 5: TRANS Model Site Trip Generation – Apartments

Travel Mode	Mode Share	AM Peak (Person Trips/h)			Mode Share	PM Peak (Person Trips/h)		
		In	Out	Total		In	Out	Total
Auto Driver	27%	5	13	18	23%	9	8	17
Auto Passenger	3%	0	2	2	6%	2	2	4
Transit	27%	6	12	18	29%	13	8	21
Non-motorized	43%	8	21	29	42%	18	14	32
Total Person Trips	100%	19	48	67	100%	42	32	74

Table 6: TRANS Model Site Trip Generation – Townhouses

Travel Mode	Mode Share	AM Peak (Person Trips/h)			Mode Share	PM Peak (Person Trips/h)		
		In	Out	Total		In	Out	Total
Auto Driver	33%	4	7	11	39%	6	6	12
Auto Passenger	5%	1	0	1	4%	1	0	1
Transit	22%	3	4	7	15%	3	1	4
Non-motorized	40%	6	8	14	42%	8	6	14
Total Person Trips	100%	14	19	33	100%	18	13	31

Table 7: Total TRANS Model Site Trip Generation

Travel Mode	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
	In	Out	Total	In	Out	Total
Auto Driver	9	20	29	15	14	29
Auto Passenger	1	2	3	3	2	5
Transit	9	16	25	16	9	25
Non-motorized	14	29	43	26	20	46
Total Person Trips	33	67	100	60	45	105

As shown in Table 7, based on the TRANS Trip Generation method, the proposed site is projected to generate approximately 100 to 105 person-trips per hour during the weekday commuter peak hours. The increase in two-way transit trips is estimated to be 25 persons per hour, and the increase in bike/walk trips is approximately 43 to 46 persons per hour.

The total amount of 'new' vehicle traffic to the study area is projected to be 29 veh/h during the peak hours. This amount of traffic equates to approximately 1 new vehicle every 2 minutes during peak hours and is not considered a significant increase in traffic. It is noteworthy that the site was previously occupied by a residential development which generated peak hour vehicle trips that have not been accounted for. As such, the actual net increase in site vehicle trip generation will be much less than 29 veh/h and therefore no future vehicle capacity analysis related to the development's vehicle impact is expected to be required.

6.1.1. MODE SHARES

For the Horizon Year 2025, which represents five-years beyond full-build out, the following future mode share targets outlined in Table 8 have been used at the request of the City. These mode shares reflect the addition of proposed Gladstone LRT Transit Station within close proximity of the development.

Table 8: Future Mode Share Targets for the Development

Travel Mode	Mode Share Target	Rationale
Transit	65%	Development is located within 600 m of a future LRT station, making it a Transit-Oriented Development (TOD) which have transit targets of 65%.
Walking	10%	This is consistent with the City's TMP, TOD areas and the existing OD-survey.
Biking	5%	This is consistent with the City's TMP, TOD areas and the existing OD-survey.
Auto Driver	15%	This is consistent with TOD targets.
Auto Passenger	5%	This is consistent with TOD targets.

Based on the future mode share targets for this development, the project site-generated person trips are outlined in Table 9.

Table 9: Future Projected 2025 Total Site-Generated Person Trips

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	15%	6	9	15	10	6	16
Auto Passenger	5%	1	4	5	1	3	4
Transit	65%	22	43	65	40	29	69
Non-motorized	15%	4	11	15	9	7	16
Total Person Trips	100%	33	67	100	60	45	105
Total 'New' Auto Trips		6	9	15	10	6	16

As shown in Table 9, based on the future modal shares, the proposed site is still projected to generate approximately 100 to 105 person-trips per hour during the weekday commuter peak hours. The increase in two-way transit trips is estimated to be 65 to 69 persons per hour, and the increase in bike/walk trips is approximately 15 to 16 persons per hour.

The total amount of 'new' vehicle traffic to the study area is projected to be 15 to 16 veh/h during the peak hours. This amount of traffic equates to approximately 1 new vehicle every 4 minutes during peak hours and is not considered a significant increase in traffic. While we think that this level of site traffic generation is likely too low, it helps to rationalize why no future vehicle capacity analysis related to the development's vehicle impact is expected to be required.

6.2. TRIP DISTRIBUTION

Given the low projected number of vehicle trips projected to be generated by the proposed development, the future roadway network impact is considered negligible. As such, no further traffic assessment is included herein.

6.3. TRIP ASSIGNMENT

Given the low projected number of vehicle trips projected to be generated by the proposed development, the future roadway network impact is considered negligible. Because of this and the foregoing rationale, no further traffic assessment is included herein.

7. BACKGROUND NETWORK TRAVEL DEMANDS

The following background traffic growth through the immediate study area (summarized in Table 10) was calculated based on historical traffic count data (years 2001, 2004, and 2017) provided by the City of Ottawa at the Gladstone/Booth intersection. Detailed background traffic growth analysis is included as Appendix D.

Table 10: Gladstone/Booth Historical Background Growth (2001 – 2017)

Time Period	Percent Annual Change				
	North Leg	South Leg	East Leg	West Leg	Overall
8 hrs	-3.52%	-1.96%	-0.69%	-0.67%	-1.58%
AM Peak	-4.19%	-2.40%	0.04%	0.44%	-1.39%
PM Peak	-2.32%	-0.91%	-0.47%	-0.44%	-0.97%

As shown in Table 8, the Gladstone/Booth intersection has experienced an approximate 1% to 2% annual decrease in vehicle traffic within recent years (calculated as a weighted average). This is in accordance with the intersection traffic growth rates provided by the City of Ottawa, Transportation Planning (Appendix D). A 1% per annum growth factor was applied to existing traffic volumes along Gladstone Avenue, Rochester Street, and Booth Street to obtain background traffic volumes for the 2020 built-out horizon year and 2025 (5-years beyond site build-out). The resultant 2020 and 2025 background traffic volumes are depicted as Figure 6 and Figure 7, respectively.

Figure 6: 2020 Background Traffic Volumes

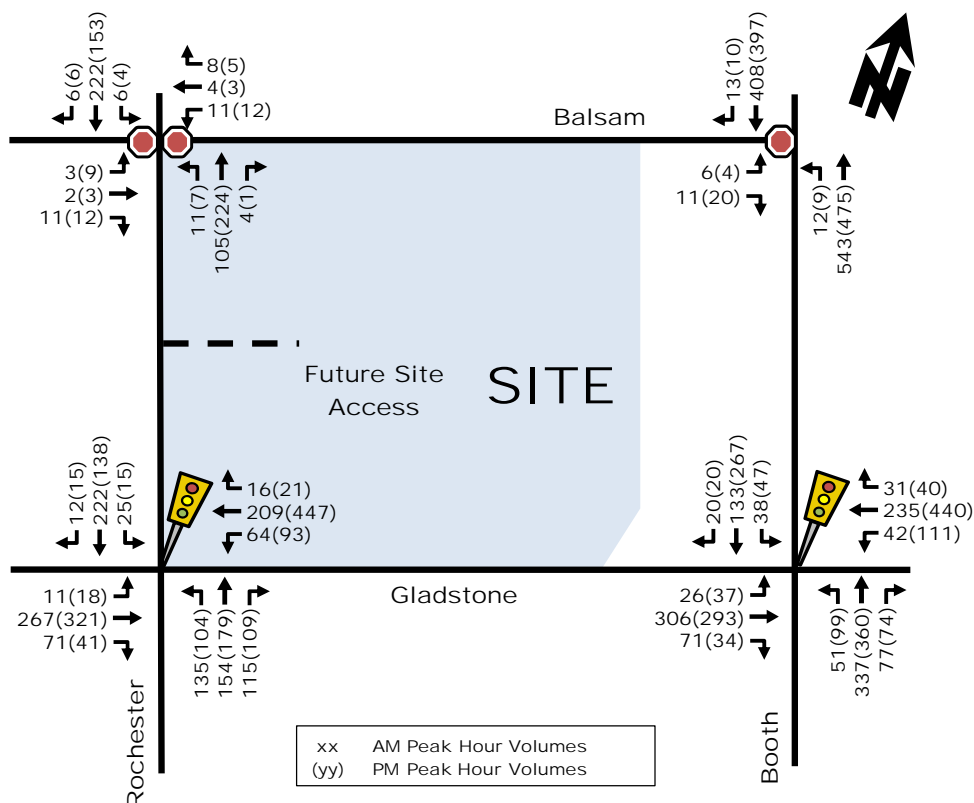
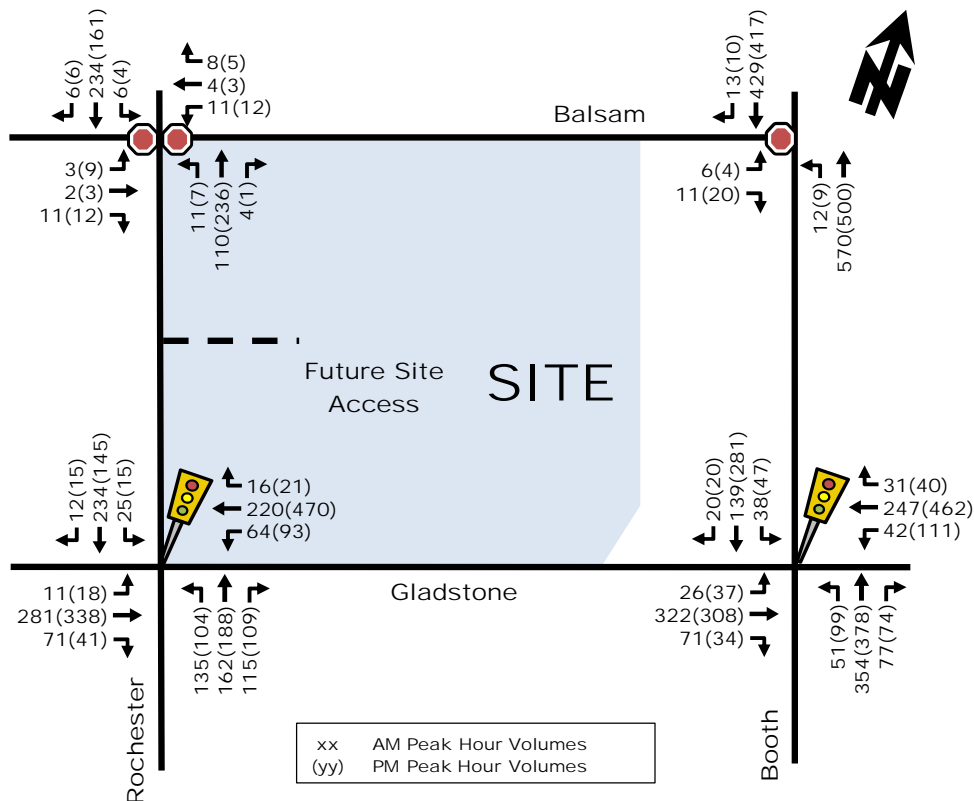


Figure 7: 2025 Background Traffic Volumes



8. DEMAND RATIONALIZATION

Based on the foregoing analysis of trip-generation and background traffic growth, the site-generated traffic volumes are considered negligible as only 1 vehicle is projected every 2 minutes. As such, no vehicle LOS is required for this analysis.

9. DEVELOPMENT DESIGN

9.1. DESIGN FOR SUSTAINABLE MODES

Location of Transit Facilities

The subject site is approximately 60 to 100m walking distance from bus stops located on Gladstone Avenue and approximately 280m walking distance from bus stops located on Preston Street. Additionally, the site is approximately 450m walking distance from the future LRT station at Gladstone.

Pedestrian Routes and Facilities

The building will have at-grade accesses directly on to Gladstone Avenue, Booth Street, Rochester Street and Balsam Street. Sidewalks located across on both sides of the street and no internal walkways or site circulation is required.

Bicycle Parking

The proponent is providing bicycle parking spaces at a rate of 0.5 per unit which equates to 70 parking spaces, meeting the City's By-Law requirements. The majority of bicycle parking spaces are provided indoors in a secure, well-lit area.

9.2. CIRCULATION AND ACCESS

The proposed development access is a new 6m wide driveway connection to Rochester Street which meets By-Law requirements.

With regard to on-site circulation, the proposed parking lot is laid out such that two-way traffic can be efficiently accommodated. A Site Plan of the underground parking has been provided and meets the City's minimum By-Law requirements. The ramp width to the underground parking lot is 6m, meeting the minimum requirement. Drive aisle widths accommodating the 2-way vehicle traffic meet the minimum width of 6m. The ramp providing access to the lower level parking has proper transition grades and a ramp grade between 10% to 15%. The ramp access does not exceed a 2% or less transition grade within 6m from the property line.

Garbage pick up will take place on-site. The garbage bins are located in the proposed underground parking garage and will be rolled out to the garbage pick-up area located at the bottom of the ramp, with access to/from Rochester Street.

10. PARKING SUPPLY AND SPILL-OVER PARKING

Vehicle Parking

A parking rate of approximately 0.23 parking spaces for the 140 residential units is proposed. This would provide 39 parking spaces for residents of and visitors to the proposed development. Table 11 below compares the minimum parking rates required for Area Y (Inner Urban Mainstreets), Area Z (Near Major LRT Stations) and parking spaces provided.

Table 11: Required Parking Spaces

Total Units	Parking Required in Area Y	Parking Required in Area Z	Visitor Parking Required	Total Minimum Parking		Parking Spaces Provided
				Area Y	Area Z	
148	64	0	13	77	13	39

With the construction of the proposed Gladstone LRT Station, the subject development will be within approximately 450m walking distance and therefore the future parking space demand will likely decrease, lower than the minimal parking anticipated to be required prior to the construction of the Gladstone LRT Station. Furthermore, OCH provides low-income, community-housing and therefore the demand for parking spaces will be lower and on-street spill-over parking is not anticipated.

Bicycle Parking

There are 70 bicycle parking spaces provided for residents which meets the City's minimum By-Law requirements. 34 spaces are horizontal, and 36 spaces are vertical which exceeds the maximum limit of 50% vertical bicycle spaces outlined in the By-Law requirements.

11. BOUNDARY STREET DESIGN

11.1. MOBILITY

The boundary streets for the development are Gladstone Avenue, Booth Street, Rochester Street, and Balsam. At this time, there has not been any complete street concepts prepared for these streets in proximity of the development. The existing roadways, geometry consists of the following features.

- Gladstone Avenue:
 - 1 vehicle travel lane in each direction;
 - 1.8 – 2m sidewalks on both sides of the roadway;
 - More than 3,000 vehicles per day along Gladstone Avenue; and

- Two mid-block collisions between Rochester and Booth in a 5-year period.
- Booth Street
 - 1 vehicle travel lane in each direction;
 - 1.5 – 1.8m sidewalks on both sides of the roadway;
 - More than 3,000 vehicles per day along Booth Street; and
 - One mid-block collision between Gladstone and Balsam in a 5-year period.
- Rochester Street:
 - 1 vehicle travel lane in each direction;
 - 1.8 – 2m sidewalks on both sides of the roadway;
 - More than 3,000 vehicles per day along Rochester Street; and
 - Three mid-block collisions between Gladstone and Balsam in a 5-year period.
- Balsam Street:
 - 1 vehicle travel lane in each direction;
 - 1.2 – 1.5m sidewalks on both sides of the roadway;
 - Less than 3,000 vehicles per day along Balsam Street; and
 - Two mid-block collisions between Rochester and Booth in a 5-year period.

The multi-modal level of service analysis for the subject road segments adjacent to the site is summarized in Table 12 with detail analysis provided in Appendix E.

Table 12: MMLoS – Boundary Street Segment

Road Segment	Level of Service							
	Pedestrian		Bicycle (BLoS)		Transit (TLoS)		Truck (TkLoS)	
	PLoS	Target	BLoS	Target	TLoS	Target	TkLoS	Target
Gladstone between Rochester and Booth	C	A	D	B	D	D	B	D
Booth between Balsam and Gladstone	D	A	D	B	-	N/A	-	N/A
Rochester between Balsam and Gladstone	C	A	D	D	-	N/A	-	N/A
Balsam between Rochester and Booth	B	A	B	D	-	N/A	-	N/A

Given the development's proximity to a future LRT Station, the target levels of service for pedestrians and cyclists are high ('A' to 'B'). The transit level of service is met with regards to the future signal priority planned for Gladstone Avenue. The truck level of service is met given the existing geometry.

With regard to pedestrians, the high traffic volumes and small boulevard width, result in low level of service for pedestrians. Providing a 2m boulevard between the sidewalk and the vehicle travel lanes would improve the level of service to PLoS 'B'. This boulevard treatment could be considered at the time of road reconstruction.

With regard to cyclists, there are currently no dedicated cycling facilities along boundary street and as such, cyclists share the roadway with vehicles. Providing dedicated bicycle lanes would improve the level of service to BLoS 'B'. However, no facilities are planned within the study area according to the OCP.

11.2. ROAD SAFETY

Collision history for the study area intersections (Gladstone/Booth, Gladstone/Rochester, Rochester/Balsam, and Booth/Balsam; 2012 to 2016, inclusive) was obtained from the City of Ottawa. Based on the most recent five-year collision data, approximately 54% of collisions (39 of 72 collisions) occurred at the Gladstone/Rochester intersection. Of these 39 collisions, 23% were angle collisions involving eastbound vehicles.

The Gladstone/Rochester intersection underwent significant intersection modifications in 2018 as part of the Roads Safety's Pedestrian Safety Enhancement Program. These enhancements include the following measures:

- Pedestrian advance crossing all directions;
- Raised median on the north leg of the intersection;
- Depressed median on the west leg of the intersection; and,
- Prohibiting the eastbound left-turn movement (including removing the auxiliary turn lane).

These measures have been included in the intersection MMLoS analysis (Section 15.2).

12. ACCESS INTERSECTION DESIGN

12.1. LOCATION AND DESIGN OF ACCESS

Site access is a proposed new 6m driveway to Rochester Street, approximately 40m north of the Rochester/Gladstone signalized intersection and 30m south of the Rochester/Balsam unsignalized intersection. This location is acceptable with respect to the City's Private Approach By-Law. Regarding the design, the proposed surface and underground parking lot is laid out such that two-way traffic can be efficiently accommodated.

12.2. INTERSECTION CONTROL

As there are only approximately 29 two-way vehicle trips projected in both peak hours a signal would not be warranted at this driveway. STOP control on the minor (site access) is recommended.

13. TRANSPORTATION DEMAND MANAGEMENT

The TDM checklist is attached as Appendix F. Some of the TDM measures that the proponent is providing/considering are as follows:

- Sidewalks provided fronting the site;
- Pedestrian amenities (benches, canopies, planters) provided along building's frontage;
- The amount of bicycle parking exceeds the By-Law minimum requirement;
- Interior bike storage provided with access provided adjacent to the surface parking lot;
- Safe and direct connections for pedestrians to nearby transit stops and future Gladstone Transit Station.

Given the type of development and its location, a high amount of non-auto trips is expected to be generated by the proposed development. As OCH provides affordable housing, residents more likely to rely on active mode transportation compared to other developments.

14. TRANSIT

14.1. ROUTE CAPACITY

The existing transit loads of Route #14 was received from OC Transpo and have been summarized below in Table 13 for boarding, alighting and average load at departure. The passenger loads were calculated in January 2017 for the weekday peak periods. The typical passenger loads for OC Transpo are 50 passengers for a single bus, 75 passengers for an articulated bus, and 90 passengers for a double-decker bus. Typical buses planned for Route #14 include mostly single buses with some articulated buses in the AM peak and single buses in the PM peak.

Table 13: Transit Average and Max Passenger Loads

Route	Direction	AM Peak (6:45-9:30am)			PM Peak (3:30-6:30pm)		
		Boarding	Alighting	Average Load at Departure	Boarding	Alighting	Average Load at Departure
14	Eastbound	1	1	25	2	1	17
	Westbound	1	6	12	1	2	22

The projected transit ridership from the subject development was forecasted as 60 (22 in, 43 out) and 69 (40 in, 29 out) persons/h in the AM and PM peaks, respectively for the 2025 horizon year. Applying these trips to the existing route and passenger loads, the AM and PM routes will need higher capacity buses (preferably articulated buses) to be able to accommodate the forecasted additional trips. The future Gladstone LRT station will also provide additional capacity to help accommodate the increase in transit ridership.

It should be noted that there is an existing transit shelter in the northeast quadrant at the Rochester/Gladstone intersection that is within the 811 Gladstone property limits. Unfortunately, the shelter cannot be maintained once the site is built as the grade will need to be recaptured to support the new building. An alternative can be relocating the stop to the northwest quadrant of the intersection on the Gladstone frontage of 260 Rochester. This property is also an OCH development.

15. INTERSECTION DESIGN

15.1. STUDY AREA INTERSECTION CONTROL AND DESIGN

There are only approximately 29 two-way vehicle trips projected in both peak hours which equates to approximately one vehicle every 2 minutes. Given the low projected number of vehicle trips projected to be generated by the proposed development, the future roadway network and intersection impact is considered negligible. As such, no further traffic assessment is included herein.

15.2. EXISTING MMLoS FOR SIGNALIZED STUDY AREA INTERSECTIONS

The MMLoS analysis for the signalized Rochester/Gladstone and Booth/Gladstone study area intersections is summarized in Table 14. The existing detailed MMLoS analysis is provided as Appendix E.

Table 14: MMLoS – Signalized Study Area Intersections, Existing Conditions

Intersection	Level of Service									
	Pedestrian (PLOS)		Bicycle (BLOS)		Transit (TLOS)		Truck (TkLoS)		Vehicles (LoS)	
	PLOS	Target	BLOS	Target	TLOS	Target	TkLoS	Target	LoS	Target
Rochester/ Gladstone	C	A	D	B	C	No Target	F	D	A	E
Booth/ Gladstone	C	A	D	B	D	No Target	F	No Target	B	E

The letters identified in red text in Table 14 do not meet the MMLoS targets for their designated area (within 600m of a rapid transit station). At the study area intersection, the pedestrian and bicycle target levels of service are not met at both signalized intersections and the TkLoS is not met at the Rochester/Gladstone intersection. The following discussion regarding these modes is provided:

- Pedestrian – High pedestrian level of service is difficult to achieve at signalized intersections. At the study area intersections, the PLOS target is not met due to pedestrian delay and, at the Booth/Gladstone intersection, pedestrians crossing 4 lanes on the west and south legs. Prohibiting right-turns on red and

removing the right-turn channel at the Booth/Gladstone intersection will help to improve the pedestrian experience but will decrease the transit and vehicle levels of service. Furthermore, these methods will not increase the overall PLoS as the limiting factor is pedestrian delay.

- Bicycles – There are no cycling facilities on Rochester Street and Booth Street and as such, cyclists travel in mixed traffic. This results in a BLoS 'D' at signalized study area intersections.
- Transit - Within the study area there are no existing transit priority measures, as such, there is no target TLoS for these intersections.
- Trucks – The TkLoS at the Rochester/Gladstone intersection is not met as trucks turning from Rochester Street onto Gladstone Avenue only have one receiving lane. Booth Street does not form part of the truck route and as such, there is no TkLoS target for the Booth/Gladstone intersection.

16. CONCLUSIONS AND NEXT STEPS

Based on the results summarized herein the following conclusions are offered:

- A residential development comprised of 32 townhomes and 108 apartments is being proposed at 811 Gladstone Avenue with an estimated build-out in 2020 replacing an existing residential development;
- The proposed development is projected to generate 'new' two-way vehicle volumes of approximately 29 veh/h during the weekday morning and afternoon peak hours;
- A total of 39 parking spaces are provided with 17 spaces in a surface parking lot and 22 spaces in an underground lot. This amount of parking does not meet the City's minimum (nor exceed the maximum) parking requirements for a development located in Area Y. However, when the Gladstone LRT Station is operative, the site will be within Area Z which has a By-Law parking requirement of only 13 spaces. As such, and given that the project is low income housing, the proposed 39 parking spaces are considered sufficient;
- 70 bicycle parking spaces have been provided which meets the minimum bicycle parking spaces outlined in the City's By-Law requirements;
- Site access is proposed via a new driveway connection to Rochester Street, located 40m north of the Gladstone/Rochester intersection;
- As shown in Table 7, the increase in vehicle traffic as a result of the proposed development is anticipated to be minimal, and therefore vehicle LOS for future conditions has not been included in this study;
- The pedestrian MMLoS target is not met at signalized study area intersections due to high pedestrian delay (a function of the existing signal timing parameters which are not expected to change). The bicycle MMLoS target will not be satisfied unless cycling facilities are provided (not planned in the OCP); and,
- The subject site is within 450m of the future Gladstone LRT Station. As a result, the proposed development is considered a TOD. This development will support TOD principles and is a good fit with the transportation network adjacent to the site.

PARSONS

Based on the foregoing conclusions, this report satisfies the TIA requirements for 811 Gladstone and is recommended to proceed from a transportation perspective.

Prepared By:



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Reviewed By:



Mark Baker, P.Eng.
Senior Project Manager

Appendix A

Screening Form

City of Ottawa 2017 TIA Guidelines

Date

11/6/2017

TIA Screening Form

Project

Gladstone & Rochester

Project Number

Results of Screening	Yes/No
Development Satisfies the Trip Generation Trigger	Yes
Development Satisfies the Location Trigger	Yes
Development Satisfies the Safety Trigger	No

Module 1.1 - Description of Proposed Development

Municipal Address	811 Gladstone Avenue
Description of location	PLAN 16 LOTS 263 TO 265 271;AND 272 PT LOTS 262 266 267;270 AND 273 RP 4R23498 PARTS;1 TO 3 PLAN 16 LOTS 263 TO 265 271;AND 272 PT LOTS 262 266 267;270 AND 273 RP 4R23498 PARTS;1 TO 3 PLAN 16 LOTS 263 TO 265 271;AND 272 PT LOTS 262 266 267;270 AND 273 RP 4R23498 PARTS;1 TO 3
Land Use	Residential
Development Size	148 Residential Units
Number of Accesses and Locations	1 Access, Balsam Street (Existing)
Development Phasing	None at this time
Buildout Year	est. 2020
Sketch Plan / Site Plan	See attached

Module 1.2 - Trip Generation Trigger

Land Use Type	Townhomes or Apartments
Development Size	148 Units
Trip Generation Trigger Met?	Yes

Module 1.3 - Location Triggers

Development Proposes a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit, or Spine Bicycle Networks (See Sheet 3)	Yes
Development is in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone. (See Sheet 3)	Yes
Location Trigger Met?	Yes

Module 1.4 - Safety Triggers

Posted Speed Limit on any boundary road	<80 km/h
Horizontal / Vertical Curvature on a boundary street limits sight lines at a proposed driveway	No
A proposed driveway is 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) or within auxiliary lanes of an intersection;	No
A proposed driveway makes use of an existing median break that serves an existing site	No
There is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development	No
The development includes a drive-thru facility	No
Safety Trigger Met?	No

Appendix B

Collision Data

Total Area

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	10	9	5	21	0	1	6	2	54	75%
Non-fatal injury	2	4	1	5	1	5	0	0	18	25%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	12	13	6	26	1	6	6	2	72	100%
	#3 or 17%	#2 or 18%	#4 or 8%	#1 or 36%	#8 or 1%	#4 or 8%	#4 or 8%	#7 or 3%		

BALSAM ST/ROCHESTER ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2012-2016	6	5,541	1825	0.59

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	0	0	1	2	0	1	1	0	5	83%
Non-fatal injury	0	0	0	1	0	0	0	0	1	17%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	0	0	1	3	0	1	1	0	6	100%
	0%	0%	17%	50%	0%	17%	17%	0%		

GLADSTONE AVE/ROCHESTER ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2012-2016	39	16,196	1825	1.32

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	6	3	3	13	0	0	0	1	26	67%
Non-fatal injury	2	2	0	4	0	5	0	0	13	33%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	8	5	3	17	0	5	0	1	39	100%
	21%	13%	8%	44%	0%	13%	0%	3%		

BALSAM ST, BOOTH ST to ROCHESTER ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2012-2016	2	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	0	0	0	0	0	0	2	0	2	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	0	0	0	0	0	0	2	0	2	100%
	0%	0%	0%	0%	0%	0%	100%	0%		

ROCHESTER ST, BALSAM ST to GLADSTONE AVE

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2012-2016	3	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	0	0	1	0	0	0	2	0	3	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	0	0	1	0	0	0	2	0	3	100%
	0%	0%	33%	0%	0%	0%	67%	0%		

BALSAM ST/BOOTH ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2012-2016	2	11,785	1825	0.09

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	1	0	0	1	0	0	0	0	2	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	1	0	0	1	0	0	0	0	2	100%
	50%	0%	0%	50%	0%	0%	0%	0%		

BOOTH ST/GLADSTONE AVE

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2012-2016	17	17,213	1825	0.54

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	3	6	0	5	0	0	0	1	15	88%
Non-fatal injury	0	2	0	0	0	0	0	0	2	12%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	3	8	0	5	0	0	0	1	17	100%
	18%	47%	0%	29%	0%	0%	0%	6%		

GLADSTONE AVE, BOOTH ST to ROCHESTER ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2012-2016	2	9,502	1825	0.12

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	0	0	0	0	0	0	0	0	0	0%
Non-fatal injury	0	0	1	0	1	0	0	0	2	100%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	0	0	1	0	1	0	0	0	2	100%
	0%	0%	50%	0%	50%	0%	0%	0%		

BOOTH ST, BALSAM ST to GLADSTONE AVE

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2012-2016	1	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	0	0	0	0	0	0	1	0	1	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	0	0	0	0	0	0	1	0	1	100%
	0%	0%	0%	0%	0%	0%	100%	0%		

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2012-01-01 TO: 2014-01-01

BALSAM ST & BOOTH ST

Former Municipality: Ottawa

Traffic Control: Stop sign

Number of Collisions: 1

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
1	2013-01-07	Mo	12:40	Clear	Daylight	Rear end	P.D. only	V1 S V2 S	Wet Wet	Going ahead Turning right	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0

BALSAM ST, BOOTH ST to ROCHESTER ST

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 1

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
2	2013-07-03	We	19:30	Clear	Daylight	Single vehicle	P.D. only	V1 S	Dry	Reversing	Pick-up truck	Unattended vehicle	0

BALSAM ST & ROCHESTER ST

Former Municipality: Ottawa

Traffic Control: Stop sign

Number of Collisions: 3

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
3	2013-03-23	Sat	03:28	Clear	Dark	Single vehicle	P.D. only	V1 N	Wet	Unknown	Unknown	Unattended vehicle	0
4	2013-03-25	Mo	17:48	Clear	Daylight	Angle	Non-fatal	V1 W V2 N	Dry Dry	Going ahead Going ahead	Pick-up truck Automobile, station	Other motor vehicle Other motor vehicle	0
5	2013-05-28	Tue	13:41	Clear	Daylight	Angle	P.D. only	V1 S V2 E	Dry Dry	Going ahead Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0

BOOTH ST & GLADSTONE AVE

Former Municipality: Ottawa

Traffic Control: Traffic signal

Number of Collisions: 6

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
6	2012-05-23	We	11:30	Clear	Daylight	Turning	P.D. only	V1 N V2 N	Dry Dry	Turning right Turning right	Passenger van Automobile, station	Other motor vehicle Other motor vehicle	0
7	2013-01-18	Fri	22:50	Snow	Dark	Angle	P.D. only	V1 W V2 S	Loose snow Unknown	Slowing or Going ahead	Passenger van Automobile, station	Other motor vehicle Other motor vehicle	0

(Note: Time of Day = "00:00" represents unknown collision time)

Tuesday, December 12, 2017

Page 1 of 4

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2012-01-01 TO: 2014-01-01

8	2013-02-07	Thu	01:23	Clear	Dark	Angle	P.D. only	V1 E V2 N	Dry Dry	Going ahead Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
COMMENTS: EXACT LOCATION UNKNOWN													
9	2013-04-26	Fri	11:00	Rain	Daylight	Rear end	P.D. only	V1 W V2 W	Wet Wet	Slowing or Stopped	Pick-up truck Automobile, station	Other motor vehicle Other motor vehicle	0
10	2013-06-21	Fri	09:37	Clear	Daylight	Angle	P.D. only	V1 W V2 N	Dry Dry	Going ahead Going ahead	Automobile, station Bus (other)	Other motor vehicle Other motor vehicle	0
11	2013-09-20	Fri	17:00	Clear	Daylight	Turning	P.D. only	V1 N V2 N	Dry Dry	Turning right Going ahead	Pick-up truck Automobile, station	Other motor vehicle Other motor vehicle	0

GLADSTONE AVE, BOOTH ST to ROCHESTER ST

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 1

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
12	2012-01-01	Sun	16:52	Rain	Dusk	Approaching	Non-fatal	V1 W V2 E	Wet Wet	Going ahead Slowing or	Passenger van Automobile, station	Other motor vehicle Other motor vehicle	0

GLADSTONE AVE & ROCHESTER ST

Former Municipality: Ottawa

Traffic Control: Traffic signal

Number of Collisions: 23

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
13	2012-01-28	Sat	14:20	Clear	Daylight	Turning	P.D. only	V1 N V2 N	Wet Wet	Turning left Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
14	2012-02-15	We	20:31	Clear	Dark	Angle	P.D. only	V1 W V2 S	Wet Wet	Going ahead Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
15	2012-02-29	We	23:15	Snow	Dark	Angle	P.D. only	V1 E V2 N	Loose snow Loose snow	Going ahead Going ahead	Automobile, station Pick-up truck	Other motor vehicle Other motor vehicle	0
16	2012-03-08	Thu	06:20	Clear	Daylight	Rear end	Non-fatal	V1 S V2 S	Dry Dry	Going ahead Stopped	Automobile, station Pick-up truck	Other motor vehicle Other motor vehicle	0
17	2012-05-04	Fri	12:45	Clear	Daylight	Other	P.D. only	V1 N V2 S	Dry Dry	Reversing Stopped	Passenger van Automobile, station	Other motor vehicle Other motor vehicle	0

(Note: Time of Day = "00:00" represents unknown collision time)

Tuesday, December 12, 2017

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2012-01-01 TO: 2014-01-01

18	2012-07-25	We	19:38	Clear	Daylight	Turning	P.D. only	V1 W	Dry	Turning left	Police vehicle	Other motor vehicle	0
								V2 E	Dry	Going ahead	Pick-up truck	Other motor vehicle	
19	2012-10-24	We	17:27	Clear	Daylight	Rear end	P.D. only	V1 N	Dry	Slowing or	Pick-up truck	Other motor vehicle	0
								V2 N	Dry	Slowing or	Pick-up truck	Other motor vehicle	
20	2012-12-11	Tue	15:02	Clear	Daylight	Angle	P.D. only	V1 W	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 N	Dry	Going ahead	Automobile, station	Other motor vehicle	
21	2012-12-30	Sun	20:50	Clear	Dark	Sideswipe	P.D. only	V1 E	Loose snow	Going ahead	Municipal transit bus	Other motor vehicle	0
								V2 E	Loose snow	Merging	Truck - dump	Other motor vehicle	
22	2013-01-06	Sun	09:11	Snow	Daylight	Angle	P.D. only	V1 E	Loose snow	Slowing or	Automobile, station	Other motor vehicle	0
								V2 S	Loose snow	Going ahead	Automobile, station	Other motor vehicle	
23	2013-01-29	Tue	10:00	Clear	Daylight	Angle	P.D. only	V1 E	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2 N	Wet	Going ahead	Automobile, station	Other motor vehicle	
24	2013-04-20	Sat	11:49	Clear	Daylight	Angle	Non-fatal	V1 S	Dry	Turning left	Automobile, station	Other motor vehicle	0
								V2 W	Dry	Going ahead	Pick-up truck	Other motor vehicle	
25	2013-04-30	Tue	09:25	Rain	Daylight	Turning	Non-fatal	V1 N	Wet	Turning left	Passenger van	Other motor vehicle	0
								V2 S	Wet	Going ahead	Truck - closed	Other motor vehicle	
26	2013-05-13	Mo	09:00	Clear	Daylight	Angle	P.D. only	V1 S	Dry	Turning right	Passenger van	Other motor vehicle	0
								V2 W	Dry	Turning left	Automobile, station	Other motor vehicle	
27	2013-05-21	Tue	07:52	Clear	Daylight	Rear end	P.D. only	V1 W	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2 W	Dry	Going ahead	Pick-up truck	Other motor vehicle	
								V3 W	Dry	Stopped	Municipal transit bus	Other motor vehicle	
28	2013-08-04	Sun	09:56	Clear	Daylight	Angle	P.D. only	V1 E	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2 N	Dry	Going ahead	Pick-up truck	Other motor vehicle	
29	2013-09-14	Sat	20:06	Clear	Dusk	Angle	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Going ahead	Municipal transit bus	Other motor vehicle	
30	2013-10-08	Tue	08:25	Clear	Daylight	Rear end	P.D. only	V1 N	Wet	Turning right	Pick-up truck	Other motor vehicle	0
								V2 N	Wet	Turning right	Automobile, station	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time)

Tuesday, December 12, 2017

Page 3 of 4

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2012-01-01 TO: 2014-01-01

31	2013-10-26	Sat	10:17	Clear	Daylight	Rear end	Non-fatal	V1 E	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Wet	Stopped	Municipal transit bus	Other motor vehicle	
32	2013-10-28	Mo	09:17	Clear	Daylight	Single vehicle	Non-fatal	V1 N	Dry	Turning left	Automobile, station	Pedestrian	1
33	2013-12-13	Fri	11:05	Clear	Daylight	Angle	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 N	Dry	Going ahead	Passenger van	Other motor vehicle	
34	2013-12-18	We	17:20	Clear	Dark	Angle	P.D. only	V1 E	Loose snow	Going ahead	Automobile, station	Other motor vehicle	0
								V2 N	Loose snow	Going ahead	Automobile, station	Other motor vehicle	
35	2013-12-19	Thu	18:45	Clear	Dark	Single vehicle	Non-fatal	V1 N	Wet	Turning right	Automobile, station	Pedestrian	1

ROCHESTER ST, BALSAM ST to GLADSTONE AVE

Former Municipality: Ottawa

Traffic Control: No control

Number of Collisions: 2

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
36	2012-09-12	We	08:40	Clear	Daylight	Sideswipe	P.D. only	V1 S	Dry	Merging	Automobile, station	Other motor vehicle	0
								V2 S	Dry	Going ahead	Automobile, station	Other motor vehicle	
37	2012-11-19	Mo	08:30	Clear	Daylight	Single vehicle	P.D. only	V1 U	Dry	Unknown	Unknown	Unattended vehicle	0

(Note: Time of Day = "00:00" represents unknown collision time)

Tuesday, December 12, 2017

Page 4 of 4



City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** January 1, 2017

Location: BALSAM ST @ BOOTH ST

Traffic Control: Stop sign

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-Mar-15, Sun,14:44	Clear	Angle	P.D. only	Wet	East	Slowing or stopping	Pick-up truck	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

Location: BALSAM ST @ ROCHESTER ST

Traffic Control: Stop sign

Total Collisions: 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-Jul-03, Fri,15:54	Clear	SMV other	P.D. only	Dry	North	Going ahead	Pick-up truck	Other	
2016-Jul-14, Thu,16:03	Clear	Sideswipe	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Turning left	Truck - dump	Other motor vehicle	
2016-Sep-27, Tue,09:30	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	

Location: BALSAM ST btwn ROCHESTER ST & BOOTH ST

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Jan-09, Thu,16:00	Clear	SMV unattended vehicle	P.D. only	Ice	West	Going ahead	Automobile, station wagon	Unattended vehicle	

Location: BOOTH ST @ GLADSTONE AVE

Traffic Control: Traffic signal

Total Collisions: 11

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-May-01, Thu,18:17	Clear	Angle	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Apr-02, Thu,14:58	Clear	Turning movement	Non-fatal injury	Dry	South	Going ahead	Bicycle	Other motor vehicle	
					North	Turning left	Automobile, station wagon	Cyclist	
2015-Jun-19, Fri,18:45	Clear	Turning movement	Non-fatal injury	Dry	West	Turning right	Unknown	Cyclist	
					West	Going ahead	Bicycle	Other motor vehicle	
2015-Jan-08, Thu,16:23	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jan-12, Mon,07:03	Snow	Turning movement	P.D. only	Loose snow	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Turning left	Automobile, station wagon	Other motor vehicle	
2016-Feb-17, Wed,21:33	Snow	Rear end	P.D. only	Packed snow	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Pick-up truck	Other motor vehicle	
2015-Oct-30, Fri,09:01	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	

					West	Stopped	Automobile, station wagon	Other motor vehicle
2015-Nov-25, Wed,09:54	Clear	Angle	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2016-Jun-11, Sat,10:49	Rain	Other	P.D. only	Wet	West	Reversing	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2016-Nov-09, Wed,17:48	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Cyclist
					South	Going ahead	Bicycle	Other motor vehicle
2016-Oct-12, Wed,16:58	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle

Location: BOOTH ST btwn BALSAM ST & GLADSTONE AVE

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Dec-28, Sun,10:00	Clear	SMV unattended vehicle	P.D. only	Dry	Unknown	Unknown	Unknown	Unattended vehicle	

Location: GLADSTONE AVE @ ROCHESTER ST

Traffic Control: Traffic signal

Total Collisions: 16

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Feb-06, Thu,12:00	Clear	Rear end	P.D. only	Wet	East	Going ahead	Police vehicle	Other motor vehicle	

					East	Stopped	Municipal transit bus	Other motor vehicle	
2014-Mar-08, Sat,16:39	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Dec-05, Fri,14:41	Clear	SMV other	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Pedestrian	1
2014-Oct-05, Sun,13:00	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Feb-05, Thu,19:37	Clear	Angle	P.D. only	Wet	East	Going ahead	Pick-up truck	Other motor vehicle	
					North	Going ahead	Pick-up truck	Other motor vehicle	
2014-Dec-28, Sun,13:14	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-May-27, Wed,15:13	Clear	SMV other	Non-fatal injury	Dry	West	Turning left	Pick-up truck	Pedestrian	1
2015-Aug-05, Wed,07:58	Clear	Sideswipe	P.D. only	Dry	North	Turning right	Unknown	Other motor vehicle	
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2015-May-14, Thu,09:25	Clear	Sideswipe	P.D. only	Dry	West	Turning right	Truck and trailer	Other motor vehicle	

					West	Turning left	Automobile, station wagon	Other motor vehicle	
2016-Apr-28, Thu,10:10	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Aug-30, Tue,22:34	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2016-Feb-03, Wed,09:46	Freezing Rain	Turning movement	P.D. only	Wet	South	Making "U" turn	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Feb-08, Mon,19:14	Clear	Turning movement	Non-fatal injury	Dry	West	Turning right	Automobile, station wagon	Cyclist	
					West	Going ahead	Bicycle	Other motor vehicle	
2016-Sep-07, Wed,14:22	Clear	Angle	Non-fatal injury	Dry	East	Going ahead	Pick-up truck	Other motor vehicle	
					North	Going ahead	Passenger van	Other motor vehicle	
2016-Nov-08, Tue,11:32	Clear	SMV other	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Pedestrian	1
2016-Jul-15, Fri,16:47	Rain	Angle	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	

Location: GLADSTONE AVE btwn ROCHESTER ST & BOOTH ST

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jul-09, Thu,08:30	Clear	Sideswipe	Non-fatal injury	Dry	West	Pulling away from shoulder or curb	Automobile, station wagon	Cyclist	
					West	Going ahead	Bicycle	Other motor vehicle	

Location: ROCHESTER ST btwn BALSAM ST & GLADSTONE AVE

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jan-22, Thu,13:00	Clear	SMV unattended vehicle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Unattended vehicle	

Appendix C

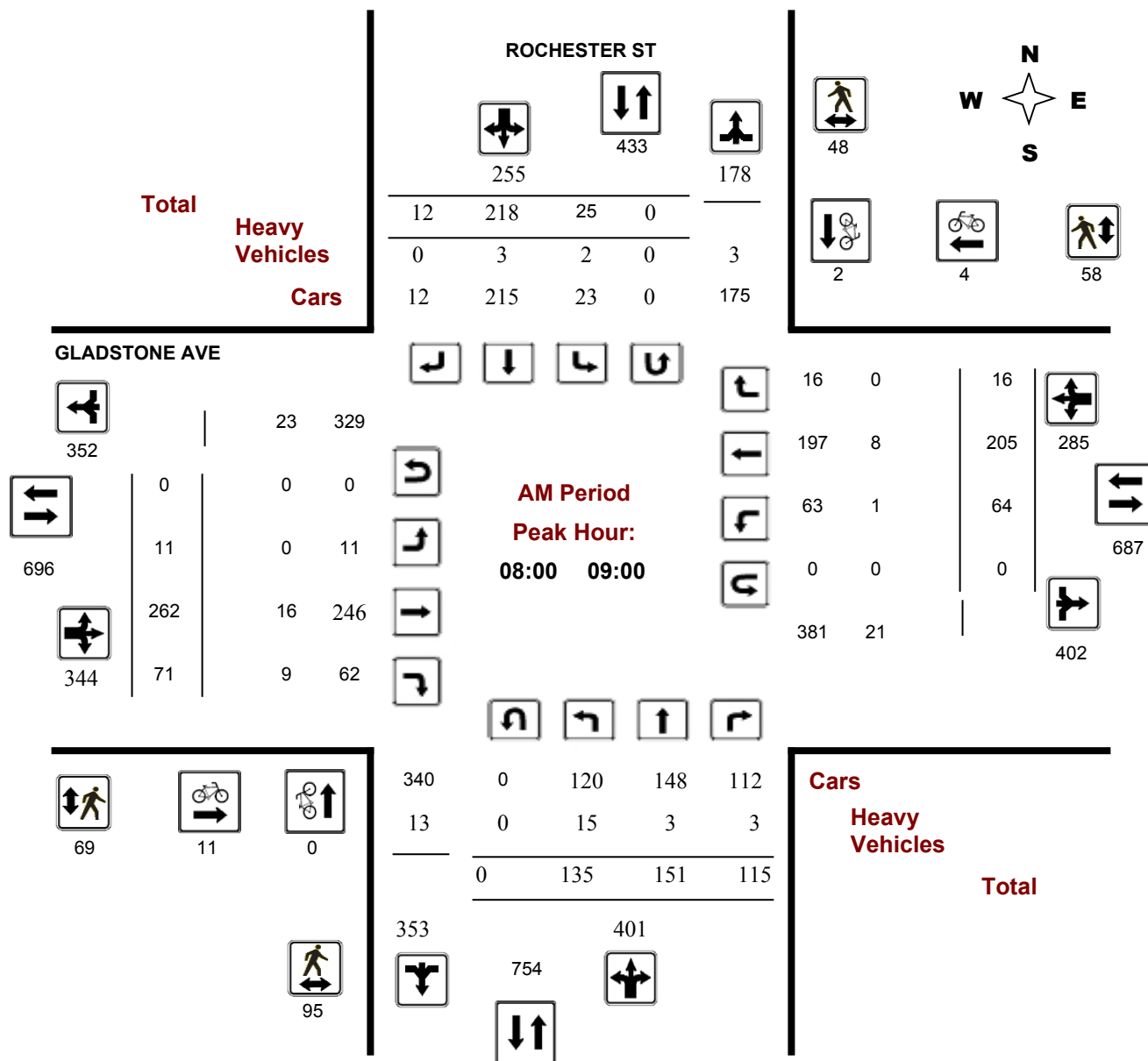
Turning Movement Counts

Survey Date: Wednesday, November 23, 2016

Start Time: 07:00

WO No: 36537

Device: Miovision

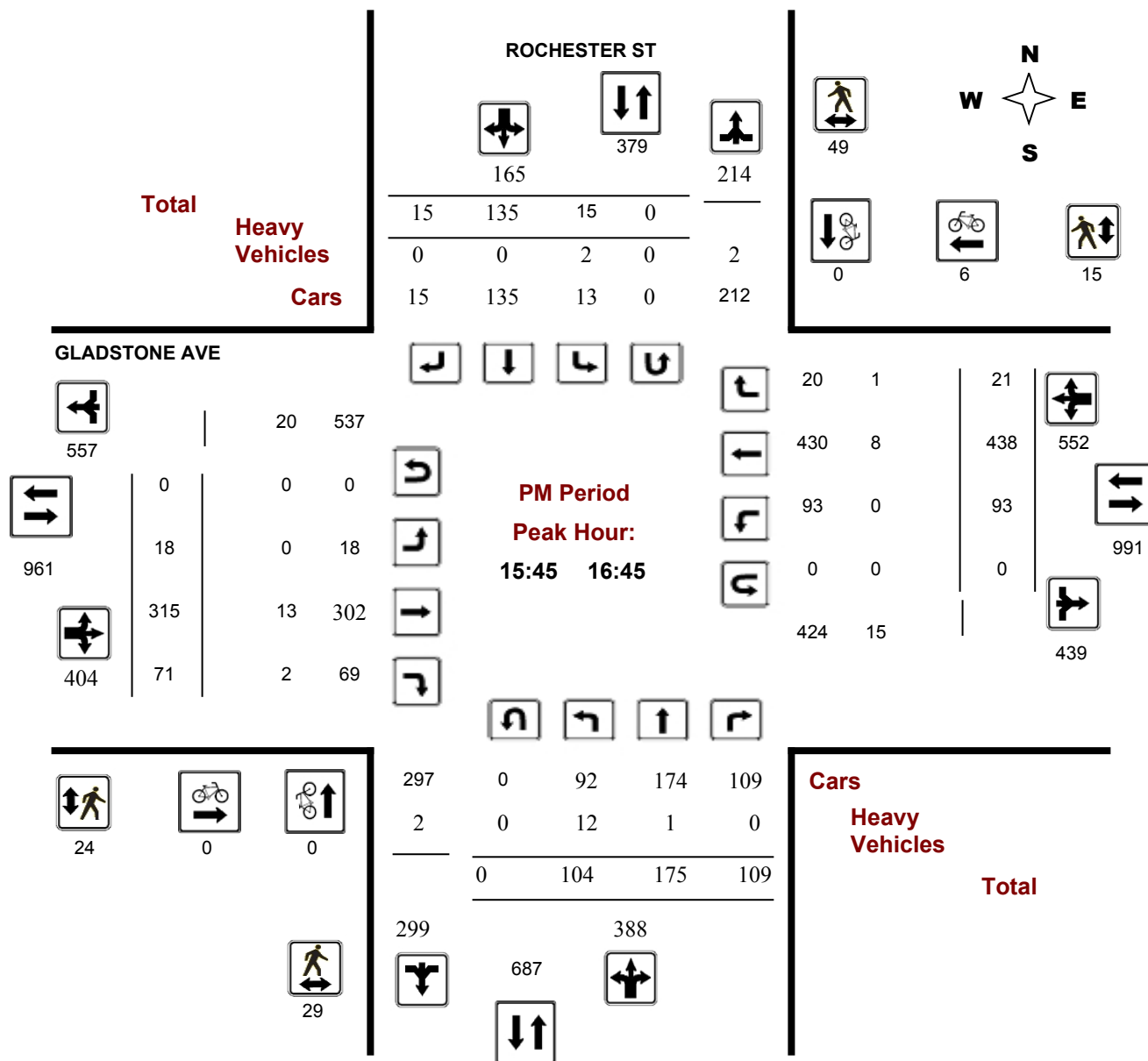


Survey Date: Wednesday, November 23, 2016

Start Time: 07:00

WO No: 36537

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

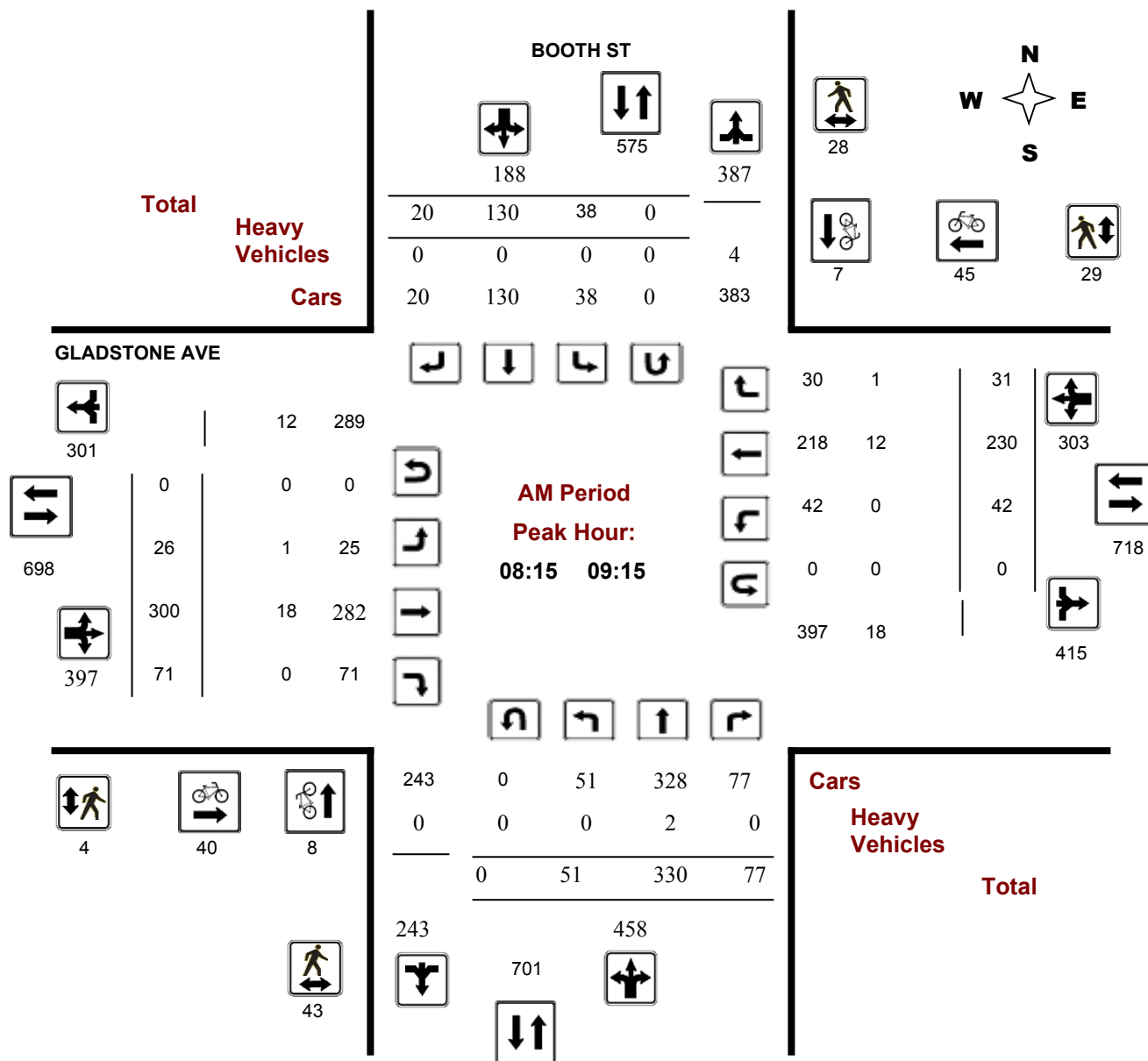
BOOTH ST @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016

Start Time: 07:00

WO No: 36092

Device: Miovision

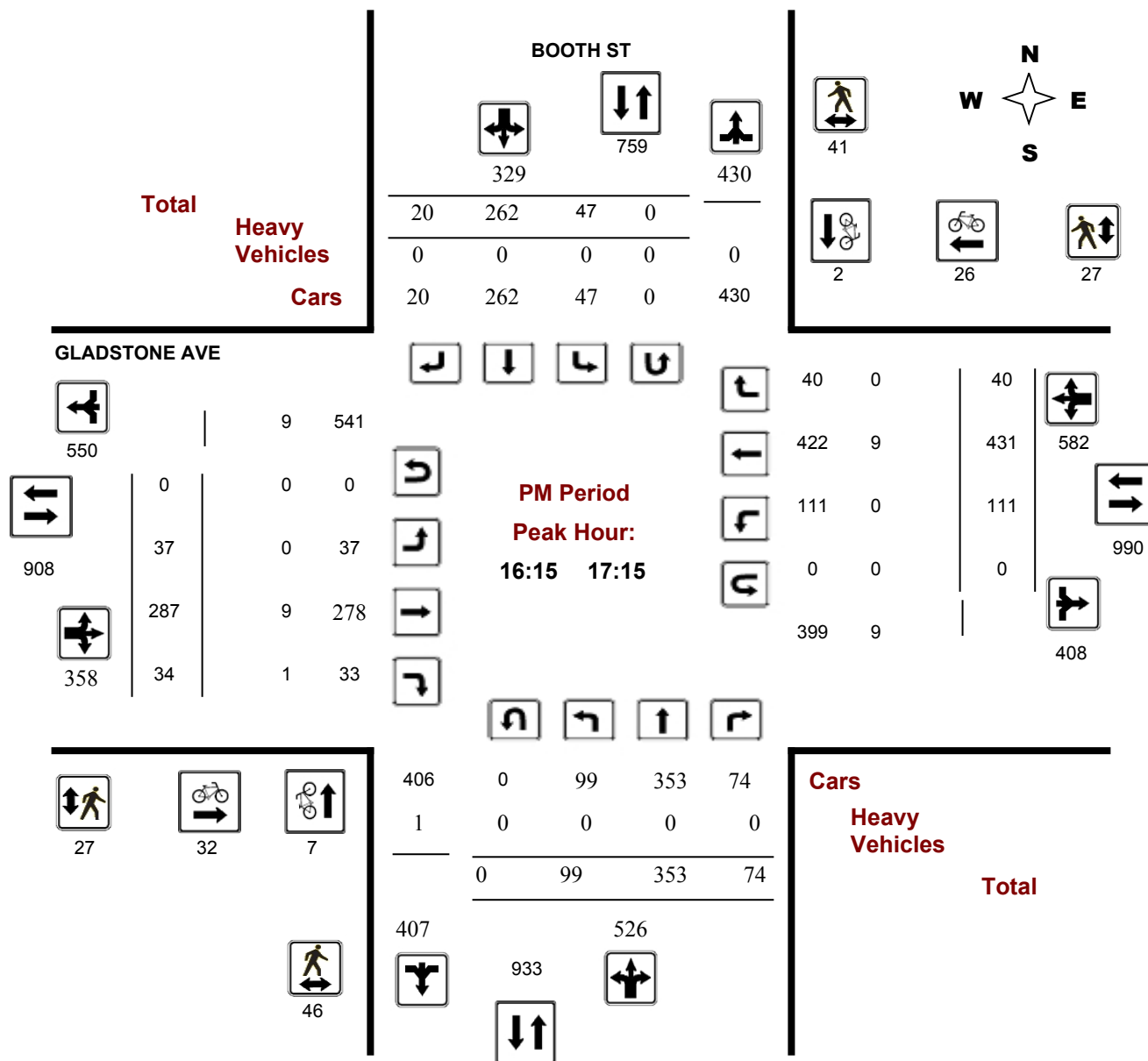


Survey Date: Wednesday, July 27, 2016

Start Time: 07:00

WO No: 36092

Device: Miovision





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

Balsam Street & Rochester Street

Ottawa, ON

All Vehicles

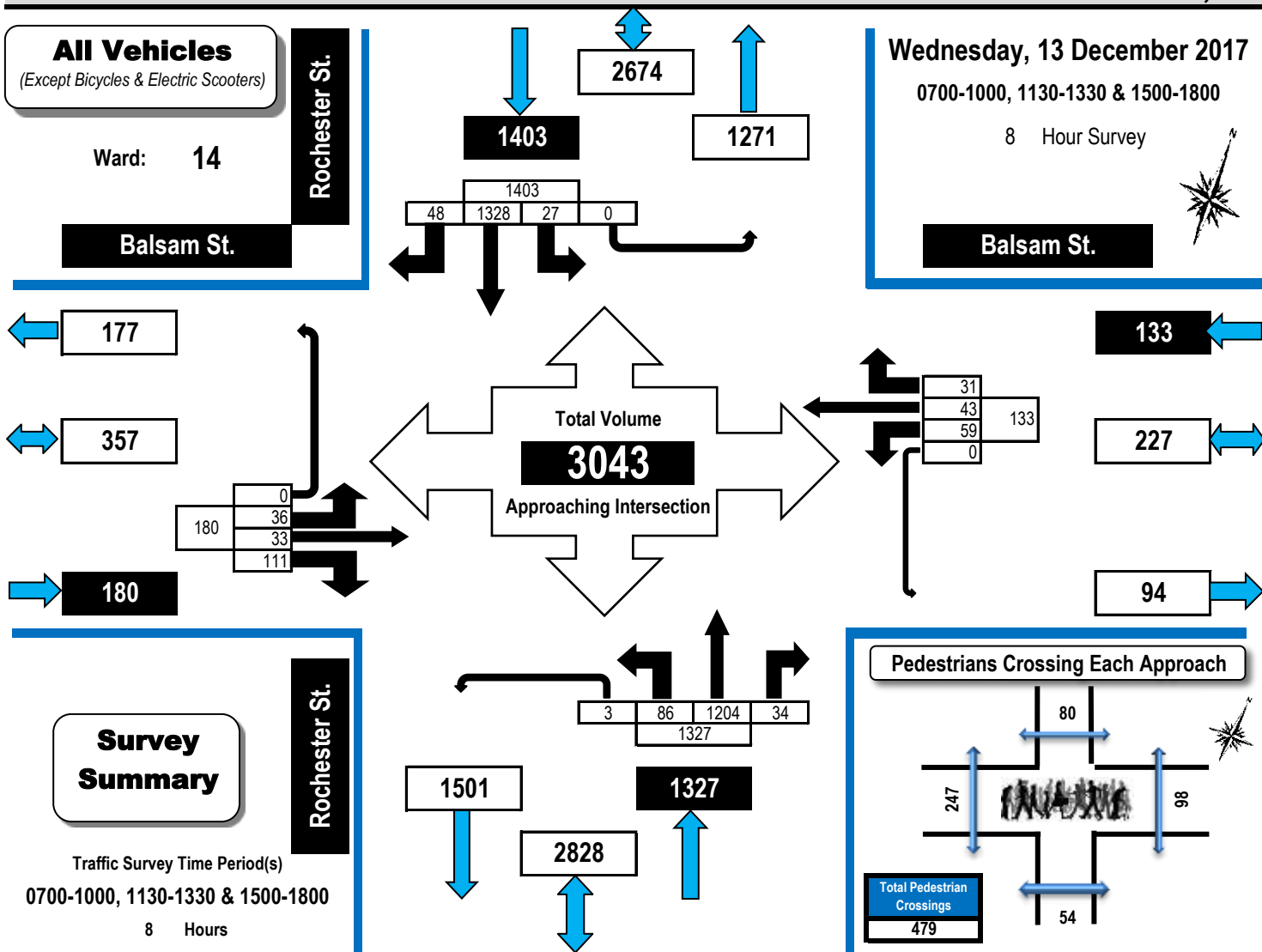
(Except Bicycles & Electric Scooters)

Ward: 14

Wednesday, 13 December 2017

0700-1000, 1130-1330 & 1500-1800

8 Hour Survey

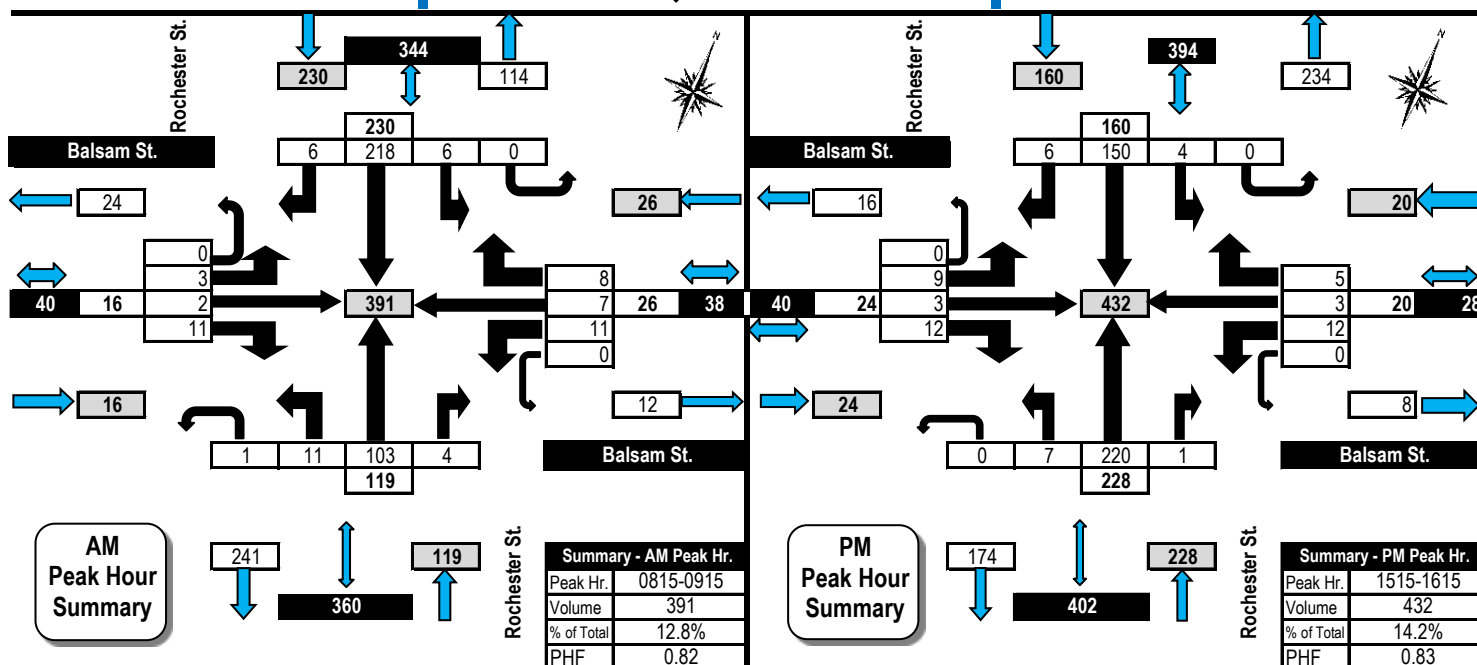


Survey Summary

Traffic Survey Time Period(s)

0700-1000, 1130-1330 & 1500-1800

8 Hours





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

Balsam Street & Booth Street

Ottawa, ON

All Vehicles

(Except Bicycles & Electric Scooters)

Ward: 14

Balsam St.

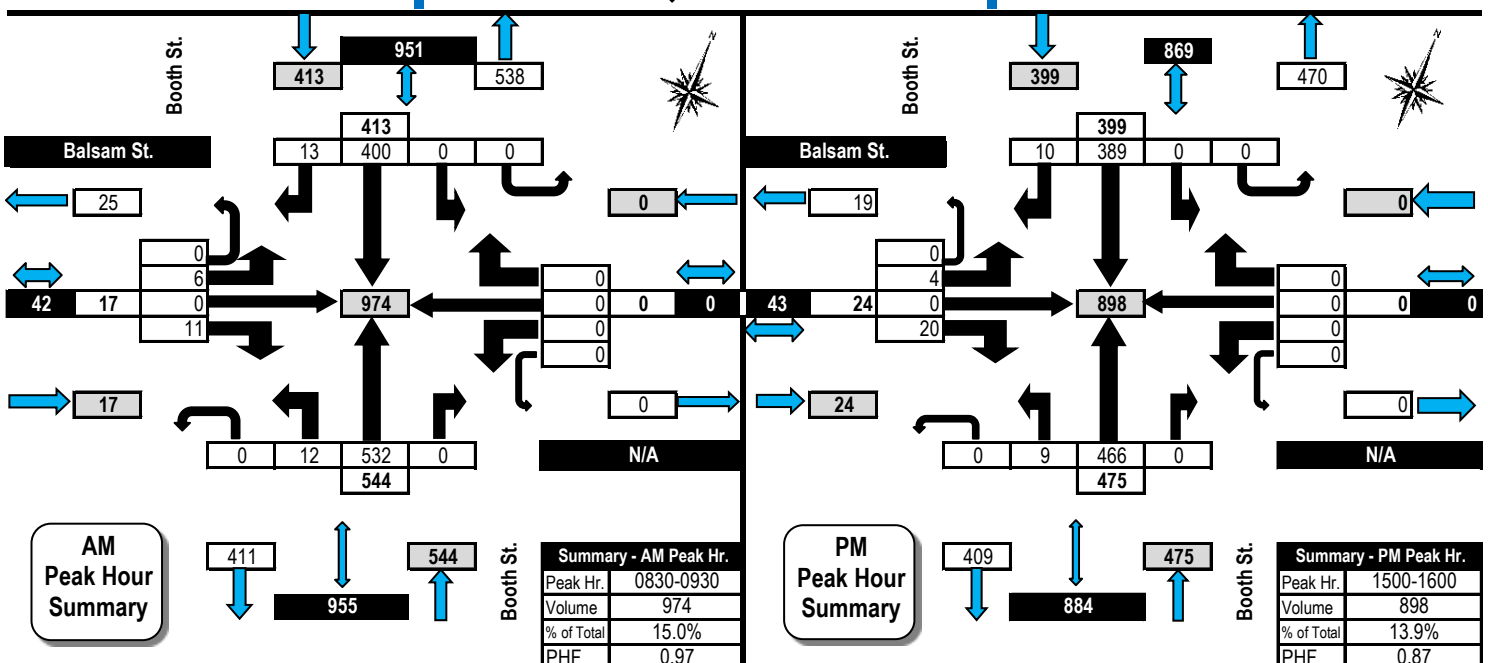
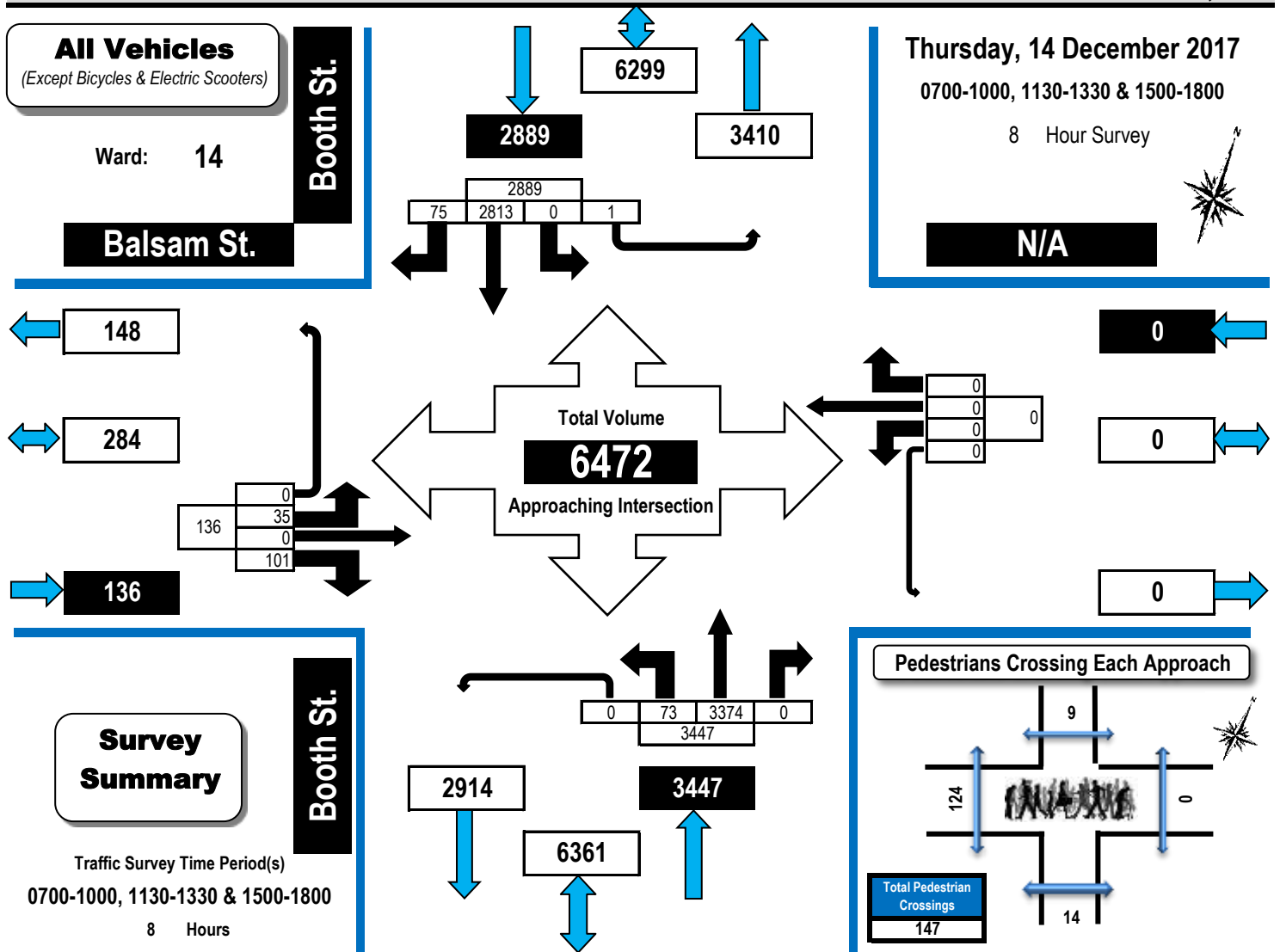
Booth St.

Thursday, 14 December 2017

0700-1000, 1130-1330 & 1500-1800

8 Hour Survey

N/A



Appendix D

Background Traffic Growth

Gladstone/Booth
8 hrs

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2001	Thursday 28 June	3714	3994	3941	3315	2924	3848	3461	2883	28080
2004	Tuesday 3 August	2987	3973	3760	2682	3079	3076	2871	2966	25394
2017	Wednesday 27 July	1687	2637	3181	2001	2863	3057	2772	2808	21006

North Leg	Year	Counts				% Change			
		NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
	2001	3994	3714	7708	28080				
	2004	3973	2987	6960	25394	-0.5%	-19.6%	-9.7%	-9.6%
	2017	2637	1687	4324	21006	-33.6%	-43.5%	-37.9%	-17.3%

Regression Estimate 2001 4106 3548 7654
Regression Estimate 2017 2663 1649 4311
Average Annual Change -2.67% -4.68% -3.52%

West Leg	Year	Counts				% Change			
		EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
	2001	3461	2883	6344	28080				
	2004	2871	2966	5837	25394	-17.0%	2.9%	-8.0%	-9.6%
	2017	2772	2808	5580	21006	-3.4%	-5.3%	-4.4%	-17.3%

Regression Estimate 2001 3240 2930 6170
Regression Estimate 2017 2721 2819 5540
Average Annual Change -1.09% -0.24% -0.67%

East Leg	Year	Counts				% Change			
		EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
	2001	3848	2924	6772	28080				
	2004	3076	3079	6155	25394	-20.1%	5.3%	-9.1%	-9.6%
	2017	3057	2863	5920	21006	-0.6%	-7.0%	-3.8%	-17.3%

Regression Estimate 2001 3549 3004 6553
Regression Estimate 2017 2988 2881 5869
Average Annual Change -1.07% -0.26% -0.69%

South Leg	Year	Counts				% Change			
		NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
	2001	3941	3315	7256	28080				
	2004	3760	2682	6442	25394	-4.6%	-19.1%	-11.2%	-9.6%
	2017	3181	2001	5182	21006	-15.4%	-25.4%	-19.6%	-17.3%

Regression Estimate 2001 3923 3130 7052
Regression Estimate 2017 3177 1958 5135
Average Annual Change -1.31% -2.89% -1.96%

Gladstone/Booth
AM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2001	Thursday 28 June	602	564	534	529	308	428	369	292	3626
2004	Tuesday 3 August	374	583	549	356	332	340	332	308	3174
2017	Wednesday 27 July	188	387	458	243	303	415	397	301	2692

North Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2001	564	602	1166	3626				
2004	583	374	957	3174	3.4%	-37.9%	-17.9%	-12.5%
2017	387	188	575	2692	-33.6%	-49.7%	-39.9%	-15.2%

Regression Estimate 2001 589 530 1119
Regression Estimate 2017 393 171 564
Average Annual Change -2.50% -6.81% -4.19%

West Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2001	369	292	661	3626				
2004	332	308	640	3174	-10.0%	5.5%	-3.2%	-12.5%
2017	397	301	698	2692	19.6%	-2.3%	9.1%	-15.2%

Regression Estimate 2001 349 299 648
Regression Estimate 2017 392 303 695
Average Annual Change 0.74% 0.08% 0.44%

East Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2001	428	308	736	3626				
2004	340	332	672	3174	-20.6%	7.8%	-8.7%	-12.5%
2017	415	303	718	2692	22.1%	-8.7%	6.8%	-15.2%

Regression Estimate 2001 387 320 707
Regression Estimate 2017 406 306 711
Average Annual Change 0.29% -0.28% 0.04%

South Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2001	534	529	1063	3626				
2004	549	356	905	3174	2.8%	-32.7%	-14.9%	-12.5%
2017	458	243	701	2692	-16.6%	-31.7%	-22.5%	-15.2%

Regression Estimate 2001 548 472 1020
Regression Estimate 2017 461 230 691
Average Annual Change -1.07% -4.40% -2.40%

Gladstone/Booth
PM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2001	Thursday 28 June	532	576	587	514	527	586	515	485	4322
2004	Tuesday 3 August	500	532	560	450	480	484	419	493	3918
2017	Wednesday 27 July	329	430	526	407	582	408	358	550	3590

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2001	576	532	1108	4322				
2004	532	500	1032	3918	-7.6%	-6.0%	-6.9%	-9.3%
2017	430	329	759	3590	-19.2%	-34.2%	-26.5%	-8.4%

Regression Estimate 2001 568 535 1103
Regression Estimate 2017 428 330 758
Average Annual Change -1.75% -2.98% -2.32%

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2001	515	485	1000	4322				
2004	419	493	912	3918	-18.6%	1.6%	-8.8%	-9.3%
2017	358	550	908	3590	-14.6%	11.6%	-0.4%	-8.4%

Regression Estimate 2001 483 483 966
Regression Estimate 2017 351 550 900
Average Annual Change -1.98% 0.81% -0.44%

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2001	586	527	1113	4322				
2004	484	480	964	3918	-17.4%	-8.9%	-13.4%	-9.3%
2017	408	582	990	3590	-15.7%	21.3%	2.7%	-8.4%

Regression Estimate 2001 553 500 1053
Regression Estimate 2017 400 576 976
Average Annual Change -2.00% 0.89% -0.47%

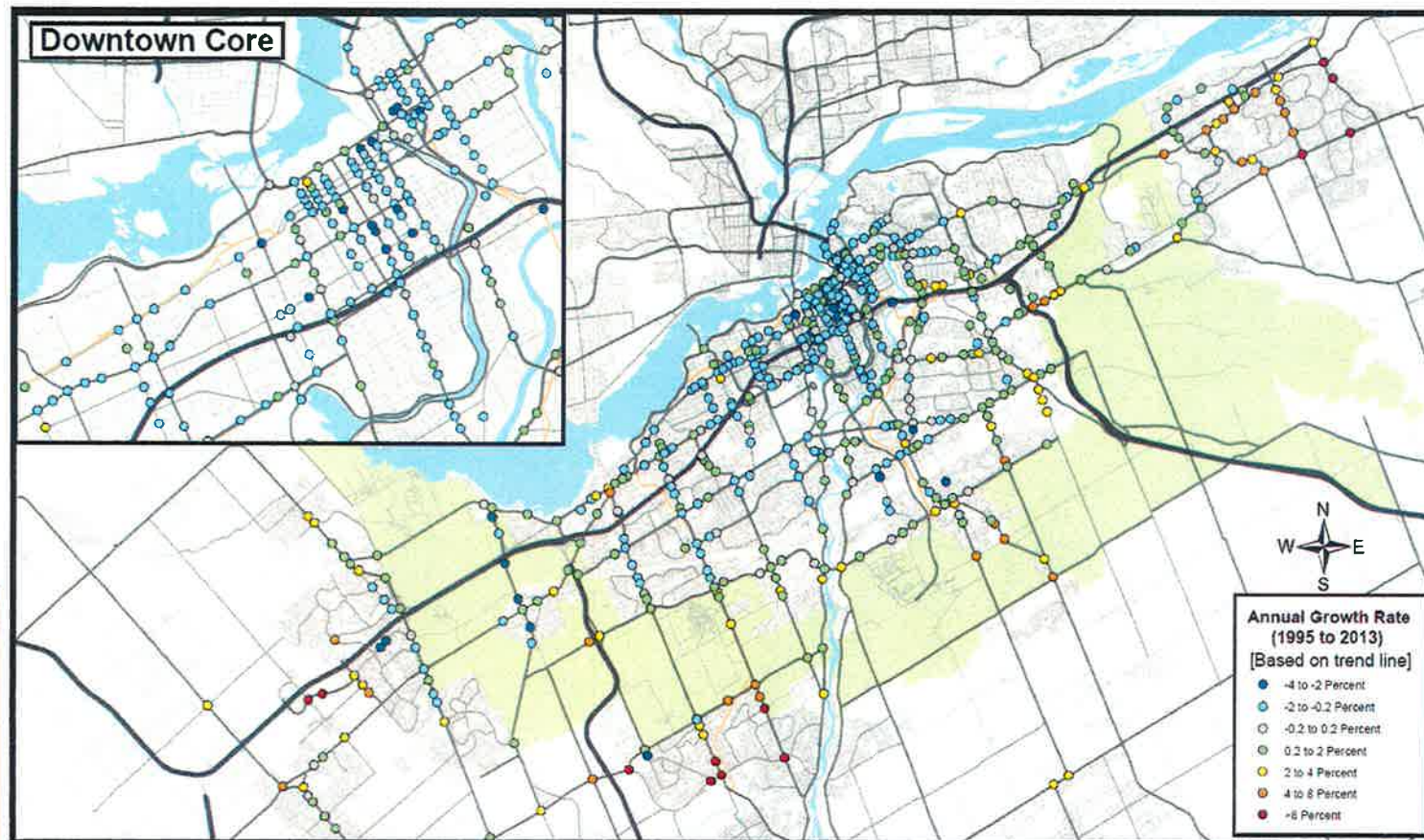
Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2001	587	514	1101	4322				
2004	560	450	1010	3918	-4.6%	-12.5%	-8.3%	-9.3%
2017	526	407	933	3590	-6.1%	-9.6%	-7.6%	-8.4%

Regression Estimate 2001 580 493 1072
Regression Estimate 2017 524 402 926
Average Annual Change -0.62% -1.26% -0.91%

3.2 Background Traffic: Background Growth

INTERSECTION TRAFFIC GROWTH RATES, AM PEAK PERIOD (0700 to 0900)

Total Vehicular Volume Entering the Intersection, 1995 to 2013, Scenario F AM 2



- Growth rates vary by location
- In some areas, traffic has been declining
- Growth rate must be justified

Appendix E

MMLOS Analysis

Multi-Modal Level of Service - Segments Form

Consultant
Scenario
Comments

PARSONS
811 Gladstone TIA

Project
Date

811 Gladstone
24-Jan-18

SEGMENTS		Street A	Gladstone	Booth	Rochester	Balsam
			1	2	3	4
Pedestrian	Sidewalk Width	-	≥ 2 m	1.8 m	≥ 2 m	1.8 m
	Boulevard Width		< 0.5	< 0.5 m	< 0.5	< 0.5 m
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	> 3000	≤ 3000
	Operating Speed		> 30 to 50 km/h	> 30 to 50 km/h	> 30 to 50 km/h	> 30 to 50 km/h
	On-Street Parking		no	no	no	no
	Exposure to Traffic PLoS		C	D	C	B
	Effective Sidewalk Width					
	Pedestrian Volume					
	Crowding PLoS		-	-	-	-
Level of Service	-	-	-	-		
Bicycle	Type of Cycling Facility	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Number of Travel Lanes		2-3 lanes total	2-3 lanes total	2-3 lanes total	≤ 2 (no centreline)
	Operating Speed		>40 to <50 km/h	>40 to <50 km/h	>40 to <50 km/h	>40 to <50 km/h
	# of Lanes & Operating Speed LoS		D	D	D	B
	Bike Lane (+ Parking Lane) Width					
	Bike Lane Width LoS		-	-	-	-
	Bike Lane Blockages					
	Blockage LoS		-	-	-	-
	Median Refuge Width (no median = < 1.8 m)					
	No. of Lanes at Unsignalized Crossing					
	Sidestreet Operating Speed					
	Unsignalized Crossing - Lowest LoS		-	-	-	-
Level of Service	-	-	-	-		
Transit	Facility Type	D	Mixed Traffic			
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8			
	Level of Service		D	-	-	-
Truck	Truck Lane Width	B	> 3.7 m			
	Travel Lanes per Direction		1			
	Level of Service		B	-	-	-

Multi-Modal Level of Service - Intersections Form

Consultant
Scenario
Comments

PARSONS
Existing Intersection Analysis

Project
Date

811 Gladstone
Feb-19

INTERSECTIONS		Booth/Gladstone				Rochester/Gladstone			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	0 - 2	3	3	4	0 - 2	3	3	0 - 2
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	No left turn / Prohib.	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTor) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Right Turn Channel	No Channel	Smart Channel	No Channel	Smart Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	3-5m	3-5m	3-5m	3-5m	10-15m	5-10m	5-10m	10-15m
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	PETSI Score	92	83	77	66	98	76	76	90
	Ped. Exposure to Traffic LoS	A	B	B	C	A	B	B	A
	Cycle Length	90	90	90	90	90	90	90	90
	Effective Walk Time	33	33	25	25	32	32	24	24
	Average Pedestrian Delay	18	18	23	23	19	19	24	24
	Pedestrian Delay LoS	B	B	C	C	B	B	C	C
	Level of Service	B	B	C	C	B	B	C	C
Direction of Travel		NORTHBOUND	SOUTHBOUND	EASTBOUND	WESTBOUND	NORTHBOUND	SOUTHBOUND	EASTBOUND	WESTBOUND
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	≤ 50 m	≤ 50 m	≤ 50 m	≤ 50 m	≤ 50 m	≤ 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	D	D	D	D	D	D
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	One lane crossed	One lane crossed	No lane crossed	No lane crossed	One lane crossed	One lane crossed
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	B	B	D	D	B	B	D	D
	Level of Service	D	D	D	D	D	D	D	D
Transit	Average Signal Delay	≤ 20 sec		≤ 30 sec		≤ 20 sec		≤ 20 sec	
	Level of Service	-	-	C	D	-	-	C	C
Truck	Effective Corner Radius	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1	1	1	1	1	1
	Level of Service	F	F	F	F	F	F	F	F
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.0 - 0.60			
	Level of Service	B				A			

Appendix F

TDM Checklist

TDM-Supportive Development Design and Infrastructure Checklist: Residential Developments (multi-family or condominium)

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

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
1. WALKING & CYCLING: ROUTES		
1.1 Building location & access points		
BASIC	1.1.1 Locate building close to the street, and do not locate parking areas between the street and building entrances	<input checked="" type="checkbox"/>
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	<input checked="" type="checkbox"/>
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	<input checked="" type="checkbox"/>
1.2 Facilities for walking & cycling		
REQUIRED	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (<i>see Official Plan policy 4.3.3</i>)	<input checked="" type="checkbox"/> <i>Within 600m walking distance of the future Gladstone LRT Station</i>
REQUIRED	1.2.2 Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible (<i>see Official Plan policy 4.3.12</i>)	<input checked="" type="checkbox"/>

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3 Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (<i>see Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.4 Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (<i>see Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.5 Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (<i>see Official Plan policy 4.3.11</i>)	<input type="checkbox"/>
BASIC	1.2.6 Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	<input checked="" type="checkbox"/>
BASIC	1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	<input type="checkbox"/>
BASIC	1.2.8 Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	<input type="checkbox"/>
1.3 Amenities for walking & cycling		
BASIC	1.3.1 Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	<input type="checkbox"/>
BASIC	1.3.2 Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	<input type="checkbox"/>

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
2. WALKING & CYCLING: END-OF-TRIP FACILITIES		
2.1 Bicycle parking		
REQUIRED	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see <i>Official Plan policy 4.3.6</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored (see <i>Zoning By-law Section 111</i>)	<input type="checkbox"/> 76% of bicycle spaces provided are vertical
BASIC	2.1.4 Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	<input type="checkbox"/>
2.2 Secure bicycle parking		
REQUIRED	2.2.1 Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
BETTER	2.2.2 Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	<input type="checkbox"/>
2.3 Bicycle repair station		
BETTER	2.3.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	<input type="checkbox"/>
3. TRANSIT		
3.1 Customer amenities		
BASIC	3.1.1 Provide shelters, lighting and benches at any on-site transit stops	<input type="checkbox"/>
BASIC	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	<input type="checkbox"/>
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	<input type="checkbox"/>

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
4. RIDESHARING		
4.1 Pick-up & drop-off facilities		
BASIC	4.1.1 Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	<input type="checkbox"/>
5. CARSHARING & BIKESHARING		
5.1 Carshare parking spaces		
BETTER	5.1.1 Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses (see <i>Zoning By-law Section 94</i>)	<input type="checkbox"/>
5.2 Bikeshare station location		
BETTER	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	<input type="checkbox"/>
6. PARKING		
6.1 Number of parking spaces		
REQUIRED	6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	<input type="checkbox"/>
BASIC	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	<input checked="" type="checkbox"/>
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (see <i>Zoning By-law Section 104</i>)	<input type="checkbox"/>
BETTER	6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking (see <i>Zoning By-law Section 111</i>)	<input type="checkbox"/>
6.2 Separate long-term & short-term parking areas		
BETTER	6.2.1 Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	<input type="checkbox"/>