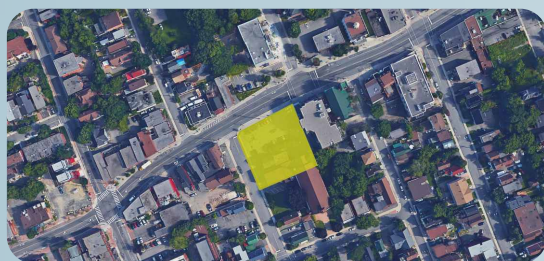
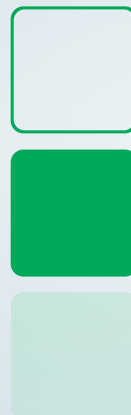
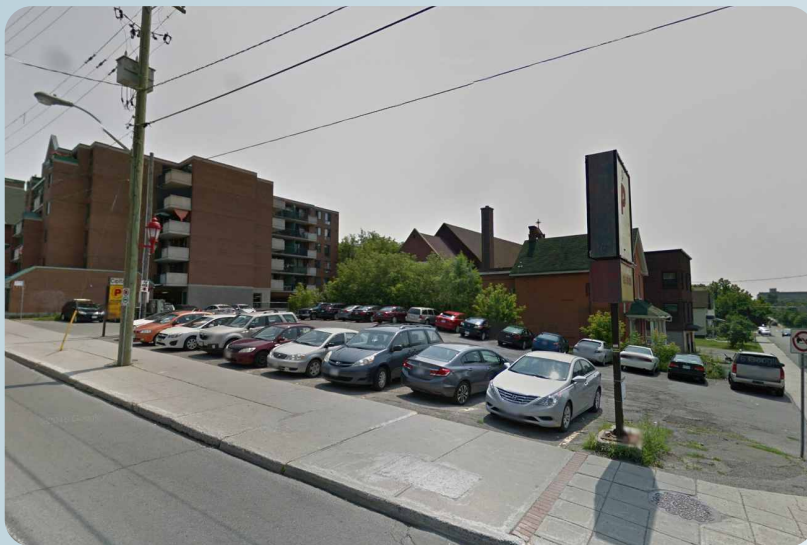
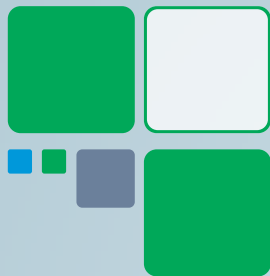


KATASA
GROUPE + DÉVELOPPEMENT



770 SOMERSET STREET RESIDENTIAL DEVELOPMENT

Transportation Impact Assessment



770 Somerset Street Residential Development

Transportation Impact Assessment

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September 19, 2017

476434-01000

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Traffic Impact Assessment

1. INTRODUCTION

Parsons has been retained to document the transportation impacts of Katasa Groupe Développement's proposed residential building located at 770 Somerset Street and 13 Lebreton Street. This TIA has been prepared in conformance with the City of Ottawa's 2017 TIA Guidelines. As such Step 1 was completed to determine the scope of the TIA. Using the TIA Screening Form, it was found that this development meets the Trip Generation Trigger, but does not meet the Location or Safety Trigger. As part of Step 1 City Staff requested that queueing between the proposed access point and the adjacent intersection be examined. The Step 1 TIA Screening Form and Certification Form for TIA PM have been included as Appendix A.

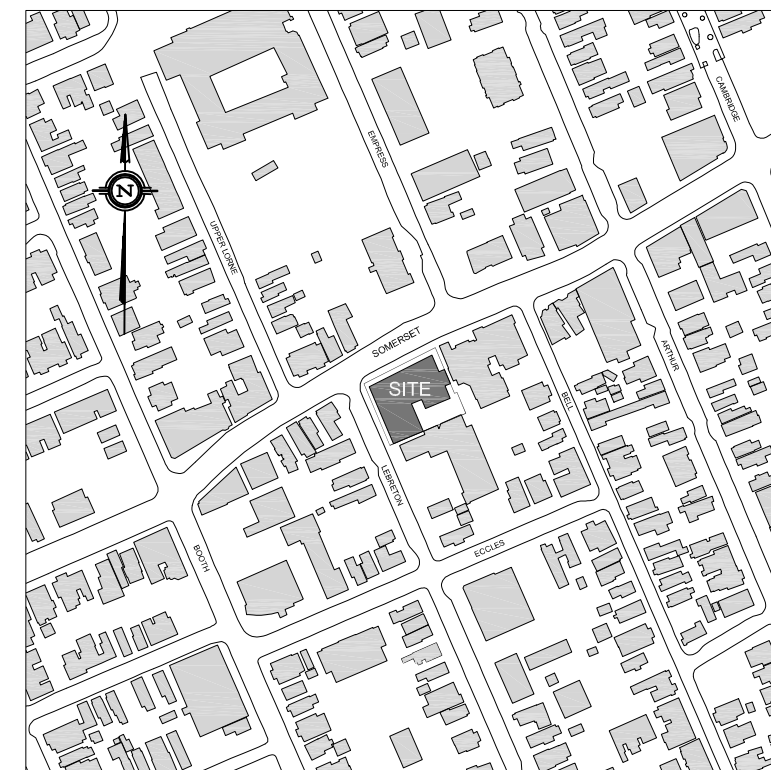
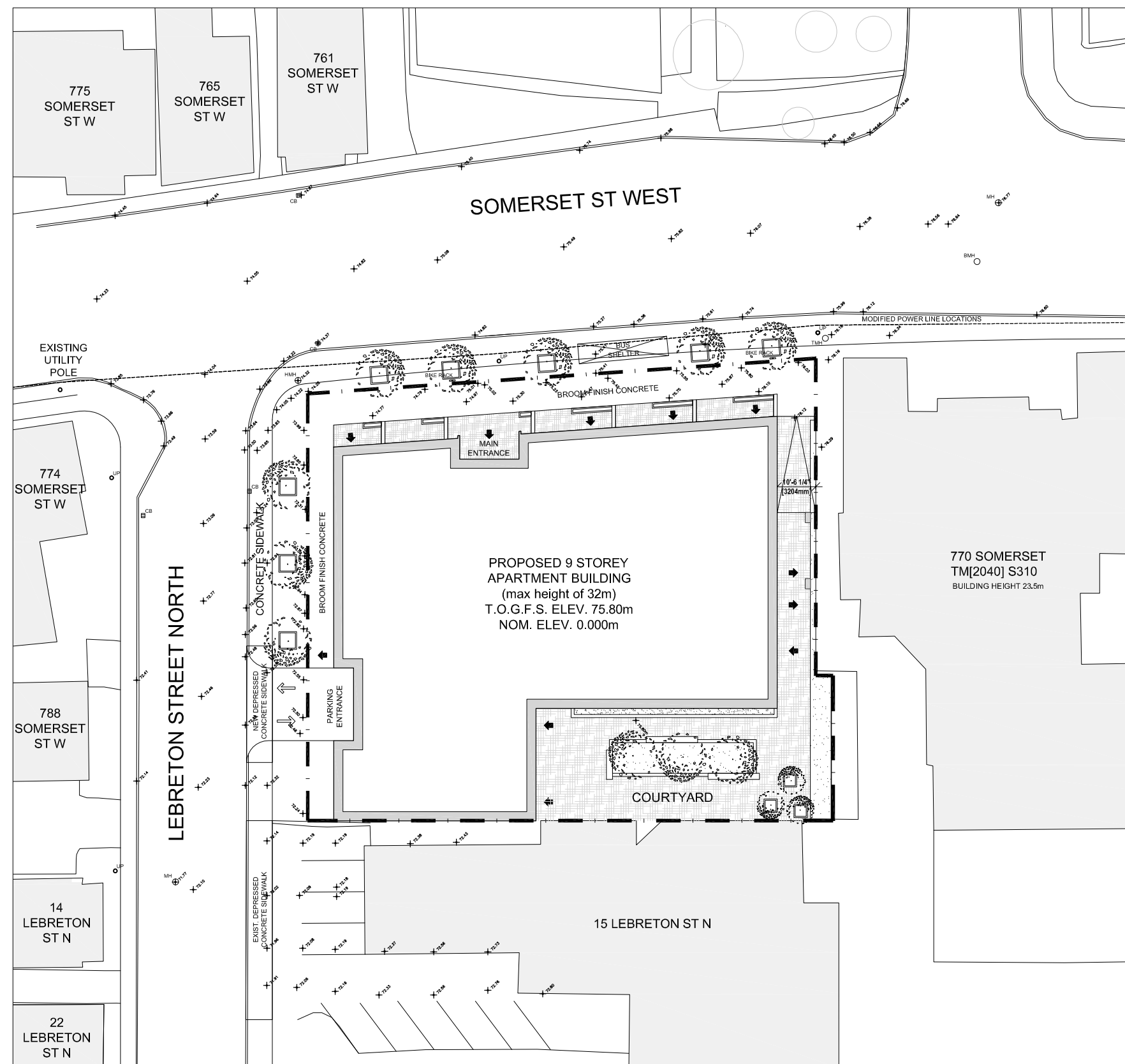
2. DESCRIPTION OF PROPOSED DEVELOPMENT

2.1. PROPOSED DEVELOPMENT

A 9-storey building with approximately 112 residential apartment units is being proposed along the south side of Somerset Street, east of Lebreton Street North. Vehicle access is proposed to Lebreton Street via a single full-movement driveway connection. A total of 89 vehicle parking spaces and 112 bicycle parking spaces are proposed to serve the subject development. Vehicle parking will be provided underground, while the bicycle parking will be provided both above ground and underground. The estimated date of occupancy is 2019, with one planned phase of development. The site is comprised of two parcels. The first, adjacent to Somerset Street, is currently a private parking lot. The second parcel, fronting onto Lebreton Street is currently occupied by a single detached home. The site's local context is depicted as **Figure 1**, the Ground Floor Site Plan is depicted as **Figure 2**.

Figure 1: Local Context





KEYPLAN (N.T.S.)

PROJECT INFORMATION

ZONING	TM [2040] S310
SITE AREA	1571.6 sq. m. (16,917 sq. ft.)
LANDSCAPED AREA (NO REQ'D MIN.)	593.8 sq. m. 6,392 sq. ft. 37.8%

UNIT STATISTICS	
STUDIO UNITS	-
1 BEDROOM UNITS	61
2 BEDROOM UNITS	51
TOTAL	112

PROJECT STATISTICS	
TOTAL BUILDING HEIGHT	(9 Storey's) = 34.8m (114'-2")

GROSS BUILDING - AREAS	
CITY OF OTTAWA DEFINITION	
P3 LEVEL	553 sq. m. 5,740 sq. ft.
P2 LEVEL	1,572 sq. m. 16,917 sq. ft.
P1 LEVEL U/G PARKING	1,517 sq. m. 16,320 sq. ft.
GROUND LEVEL (TOTAL)	982 sq. m. 10,568 sq. ft.
GROUND LEVEL (RESID. LOBBY, AMENITY, STG & BIKE)	982 sq. m. 10,568 sq. ft.
GROUND LEVEL (COMMERICAL)	440 sq. m. 4,738 sq. ft.
2ND TO 4TH LEVEL	1,047 sq. m. 11,268 sq. ft.
5TH TO 6TH LEVEL	987 sq. m. 10,627 sq. ft.
7th to 9th LEVEL	953 sq. m. 10,262 sq. ft.
TOTAL (w/o PARKING LVLS)	8,003 sq. m. 86,143.6 sq. ft.

CAR PARKING	
REQUIRED	
RESIDENCE	-
- 0.5 PER UNIT (250 UNITS)	-
VISITOR	-
- 0.2 PER DWELLING UNIT (AFTER 12 UNITS)	-
TOTAL	-

PROVIDED	
UNDERGROUND	89
BICYCLE PARKING	
REQUIRED	
RESIDENCE	-
- 0.5 PER UNIT (112 UNITS)	-
PROVIDED	
UNDERGROUND	59
ABOVE GROUND	53
TOTAL	112

AMENITY SPACE	
OUTDOOR (COURTYD)	3325 sq. ft. (308 sq. m.)
GROUND FLOOR	1906 sq. ft. (177 sq. m.)
ROOF	4470 sq. ft. (415 sq. m.)
TOTAL	9701 sq. ft. (900 sq. m.)

STORAGE LOCKERS	
PROVIDED	112

Figure 2: Site Plan



3. EXISTING CONDITIONS

3.1. AREA ROAD NETWORK

Somerset Street is an east-west arterial roadway, which extends from Wellington Street West in the west to Elgin Street in the east, where Somerset Street becomes a collector road, east to Queen Elizabeth Drive. Within the study area, its cross-section consists of a single travel lane in each direction and the unposted speed limit is 50 km/h. On street parking is provided on both sides of Somerset Street within the Study Area.

Lebreton Street North is a north-south local street that extends from Somerset Street south to Highway 417. Lebreton Street continues south of Highway 417, but is discontinuous due to the highway. Within the Study Area, the cross-section consists of a single travel lane in each direction with on street parking along some sections. The unposted speed limit is understood to be 50 km/h.

3.2. PEDESTRIAN/CYCLING NETWORK

According to the City's 2013 Official Cycling Plan (OCP), Somerset Street is classified as a "Suggested Route". Within the study area, no formal cycling facilities are currently provided and cyclists would operate in mixed traffic.

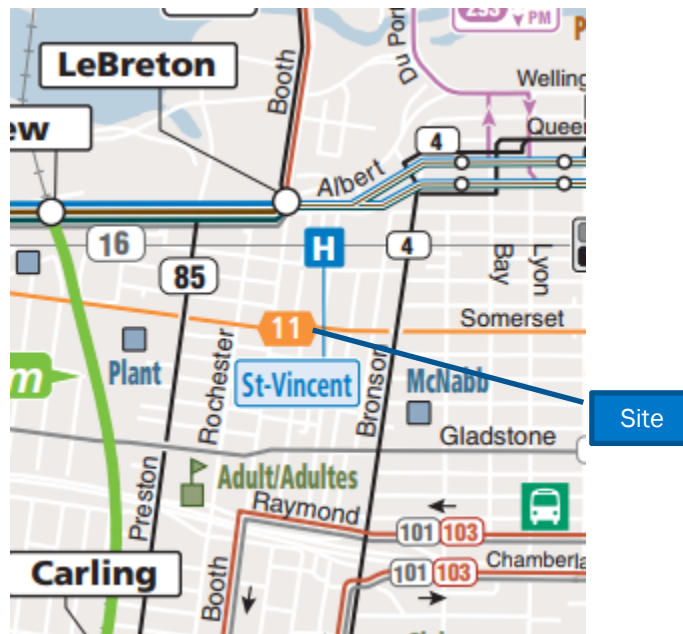
Curbside sidewalks are provided along both sides of Somerset Street with crosswalks at the signalized and unsignalized intersections within the Study Area.

3.3. TRANSIT NETWORK

OC Transpo service is currently provided along Somerset Street with bus stops provided directly adjacent to the site for Local Route #11.

Rapid transit is located approximately 500m north of the site via the Future LeBreton LRT Station.

Figure 3: Area Transit Network



3.4. EXISTING STUDY AREA INTERSECTION

Lebreton Street / Somerset Street

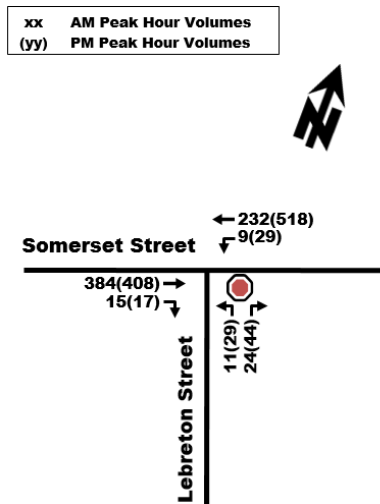
The Lebreton Street / Somerset Street intersection is an unsignalized three-legged intersection, with a stop control on the minor approach. East of the intersection parking is not provided along the south side and a second travel lane replaces the parking.



3.5. EXISTING INTERSECTION OPERATIONS

Weekday morning and afternoon peak hour traffic volumes were not available from the City of Ottawa at the Lebreton Street / Somerset Street intersection. Therefore, a new intersection turning movement count was undertaken. **Figure 4** documents the AM and PM peak hour traffic volumes at the Study Area intersection. Peak hour traffic volumes are included as Appendix B.

Figure 4: Existing Peak Hour Traffic Volumes



3.6. EXISTING CAPACITY CONDITIONS

Table 1 below, summarizes the Existing performance of the studied intersection using SYNCHRO (V9) traffic analysis. The detailed model output of the existing conditions is provided within Appendix C.

Table 1: Existing Capacity Analysis

Intersection	Approach / Movement		AM Peak Hour				PM Peak Hour			
			LOS ¹	V/C	Delay (s)	Queue (m) ²	LOS ₁	V/C	Delay (s)	Queue (m) ²
Somerset Street W / Lebreton Street N (Unsignalized)	EB	T/R	A	0.25	0	0	A	0.27	0	0
	WB	L/T	A	0.01	0.4	0.2	A	0.03	0.8	0.7
	NB	L/R	B	0.07	12.2	1.7	C	0.22	17.3	6.1
L=Left Turn Movement(s); T=Through Movement(s); R=Right Turn Movement(s) # - 95 TH Percentile volume exceeds capacity, queue may be longer 1 - Level of Service based on v/c ratio as per the City of Ottawa TIA Guidelines 2 - 95 th Percentile queue										

As shown in the table above, the unsignalized Somerset Street W / Lebreton Street N intersections' critical movement is projected to operate well at LOS 'B' for the AM peak period and operate acceptably with LOS 'C' for the PM peak period for the northbound movements.

3.7. EXISTING ROAD SAFETY CONDITIONS

Collision history for study area roads (2011 to 2016, inclusive) was obtained from the City of Ottawa, and all collisions (100%) involved only property damage, indicating low impact speeds. Over the five-year period, four collisions were observed at the intersection of Somerset Street at Lebreton Street. The collision types, cited by police in their reports, included, angle (50%), sideswipe (25%), and single vehicle (other) (25%) 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 the Somerset Street/Lebreton Street intersection, reported collisions have historically taken place at a rate of 0.23/MEV. Additionally, the most recent reported collision occurred in 2014, three years prior to the writing of this document.

Based on the available data, there does not appear to be any prevailing safety issues at the unsignalized study area intersection. The source collision data as provided by the City of Ottawa and related analysis is included as Appendix D.

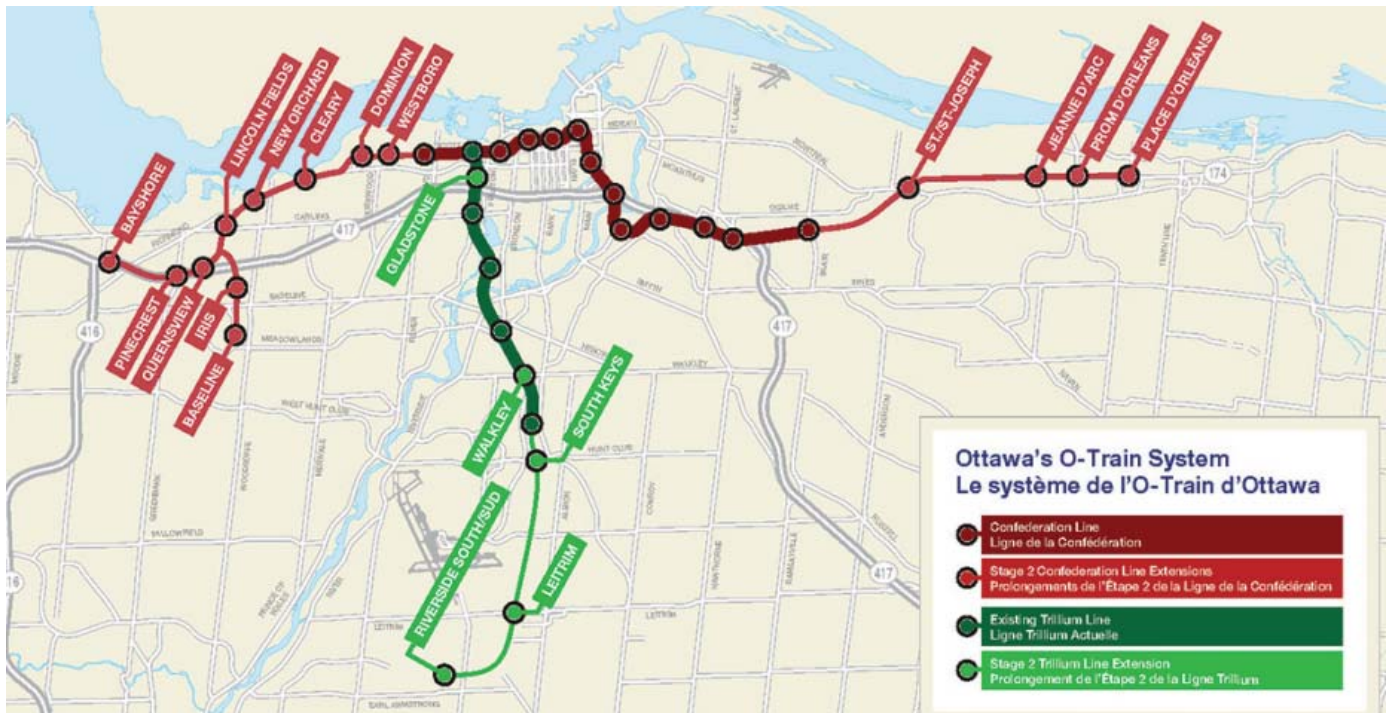
4. PLANNED CONDITIONS

4.1. PLANNED STUDY AREA TRANSPORTATION NETWORK CHANGES

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 which includes a tunnel through the City's Downtown. Currently, this phase of construction is underway and is expected to be completed by 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 2024. The following Figure 5 illustrates the planned Phases I and II of the future Confederation/Trillium Lines. As mentioned previously, the subject development is located less than 500 m from the Lebreton Station.

Figure 5: Planned LRT Phase II



5. DEVELOPMENT-GENERATED TRAFFIC

5.1. TRIP GENERATION RATES

Appropriate trip generation rates for the proposed development of approximately 112 apartment units were obtained from the 9th Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual, which are summarized in **Table 2**.

Table 2: ITE Vehicle Trip Generation Rates

Land Use	Data Source	Trip Rates	
		AM Peak	PM Peak
Apartment	ITE 220	$T = 0.49(x) + 3.73$	$T = 0.55(x) + 17.65$
Notes: T = Average Vehicle Trip Ends X = Residential units			

As ITE trip generation surveys only record vehicle trips and typically reflect highly suburban locations (with little to no access by travel modes other than private automobiles), adjustment factors appropriate to the more connected suburban study area context were applied to attain estimates of person trips for the proposed development. This approach is considered appropriate within the industry for more urban developments.

To convert ITE vehicle trip rates to person trips, an auto occupancy factor and a non-auto trip factor were applied to the ITE vehicle trip rates. Based on our review of available literature, and consistent with the TIA Guidelines, a combined factor of approximately 1.28 is considered reasonable to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%. As such, the person trip generation for the proposed site is summarized in **Table 3**.

Table 3: Modified Person Trip Generation Rates

Land Use	Units	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Apartment	112	15	61	76	66	37	103
Total Person Trips		15	61	76	66	37	103
Note: 1.28 factor to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%							

The mode share targets for the development have been summarized in **Table 4** below.

Table 4: Mode Share Targets for the Development

Travel Mode	Mode Share Target	Rationale
Auto Passenger	40%	See rationale below
Auto Driver	10%	See rationale below
Transit	30%	See rationale below
Walking	10%	See rationale below
Cycling	10%	See rationale below

The modes shares presented in **Table 4** have been estimated using the 2011 OD Survey Data for the Ottawa Inner Area. The existing mode shares have been carried forward as the Mode Share Targets for the purposes of this analysis. It is acknowledged that due to the proximity of the Lebreton Future LRT Station (approximately 450m north of the subject site) it is likely that this area will experience an increase in the transit mode share over time. The existing mode shares have been carried forward to ensure that the traffic projections are conservative (i.e. err on the high side).

Using the mode share and total person trips, both documented above, the person trips by mode were estimated. The person trips shown in **Table 3** for the proposed site were reduced by modal share values for the 2019 scenario, with the total site-generated vehicle traffic summarized in **Table 5**.

Table 5: Total Site Trip Generation

Travel Mode	Mode Share	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	40%	6	25	31	27	15	42
Auto Passenger	10%	2	6	8	7	4	11
Transit	30%	4	18	22	19	11	30
Non-motorized	20%	3	12	15	13	7	20
Total Person Trips	100%	15	61	76	66	37	103
Total 'New' Auto Trips		6	25	31	27	15	42

As shown in **Table 5**, the resulting number of potential 'new' two-way vehicle trips for the proposed development is approximately 31 and 42 veh/h during the weekday morning and afternoon peak hours, respectively.

5.2. TRIP DISTRIBUTION

The vehicle traffic distribution was developed using the 2011 NCR Household Origin – Destination Survey. The resultant distribution is outlined in **Table 6**.

Table 6: Traffic Distribution

To/From	AM Peak Hour
North	25%
South	5%
East	65%
West	5%
Total	100%

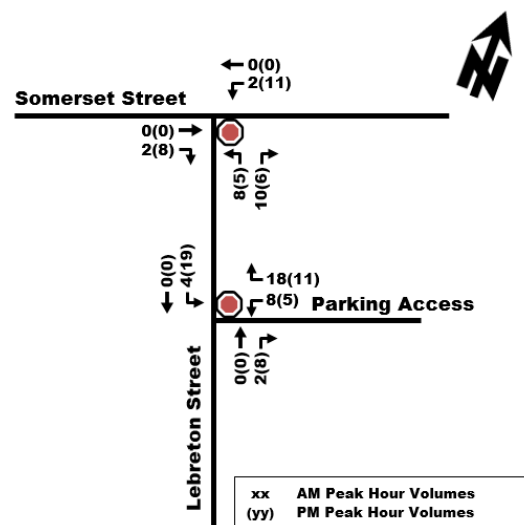
5.3. TRIP ASSIGNMENT

New site generated trips were assigned to the Study Area intersections using the above distribution, turning movement splits, proximity / connectivity to major transportation infrastructure (i.e. Highway 417), and the proposed access configuration. **Figure 6** below displays the percentage assignment and **Figure 7** shows the resulting volume assignment of the new site generated trip used in this analysis.

Figure 6: Site Generated Percentage Assignment



Figure 7: Site Generated Volumes Assignment



6. BACKGROUND NETWORK TRAFFIC

6.1. CHANGES TO THE BACKGROUND TRANSPORTATION NETWORK

The background transportation network will be impacted by completion of Lebreton LRT Station. The Lebreton LRT Station is replacing the rapid bus station that was functioning before the Light Rail project began and has since been closed. Buses formerly using the Transitway have been detoured to alternate routes to maintain transit service connectivity while the LRT is constructed. Lebreton Station is located within 600m of the site and is likely to improve the existing non-motorized mode share within the study area. However, as noted previously, the shift in mode share has not been reflected in the proposed mode share for the proposed development. This will present a conservative estimate of the impact of vehicle traffic on the Study Area intersection.

6.2. GENERAL BACKGROUND GROWTH RATES

To estimate traffic growth beyond the Study Area a background growth rate of 2% has been applied to the turning movement counts along Somerset Street. **Figure 8** and **Figure 9** show the future background traffic volumes for the 2019 and 2024 future background traffic volumes, respectively.

Figure 8: 2019 Future Background Traffic

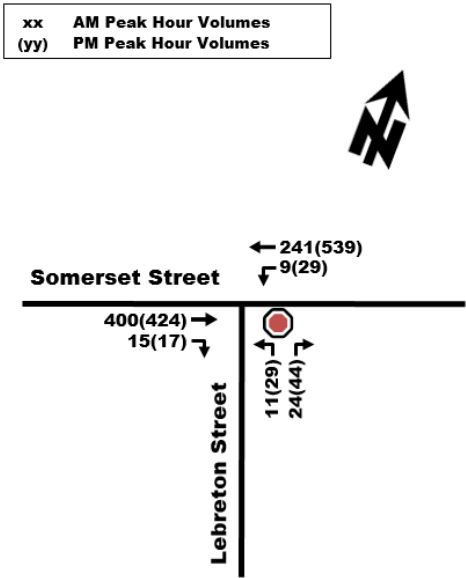
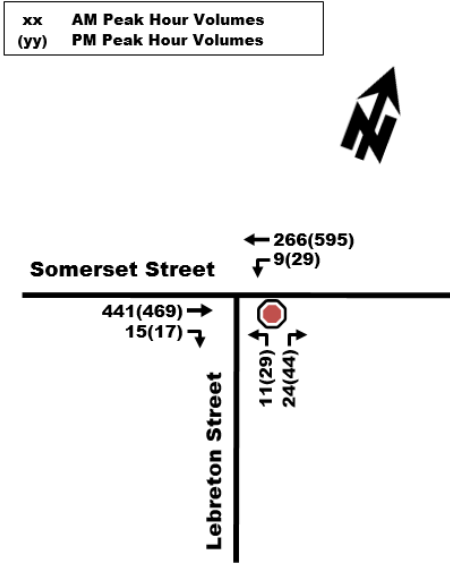


Figure 9: 2024 Future Background Traffic



6.3. OTHER AREA DEVELOPMENT

With respect to other area development, the City of Ottawa’s Development Applications website was reviewed and no active development applications within the area of influence of the subject site were found. As part of this scoping process it was requested that the City of Ottawa provide TIAs for any relevant developments that are to be considered as part of this TIA. No additional information was provided and therefore no developments, beyond the subject development, were considered in the analysis herein.

7. DEMAND RATIONALIZATION

7.1. DESCRIPTION OF CAPACITY ISSUE(S)

An operational analysis of the traffic conditions for the intersection of Somerset Street and Lebreton Street was conducted for the projected years 2019 and 2024 with the applied background growth. See following sections below for summary of analysis.

7.1.1. 2019 BACKGROUND CAPACITY

Table 7 below, summarizes the operational analysis of the Study Area intersection for the 2019 horizon including background growth using SYNCHRO (V9) traffic analysis. The detailed model output of projected background conditions is provided within Appendix F.

Table 7: 2019 Future Background Capacity Analysis

Intersection	Approach / Movement		AM Peak Hour				PM Peak Hour			
			LOS ¹	V/C	Delay (s)	Queue (m) ²	LOS ₁	V/C	Delay (s)	Queue (m) ²
Somerset Street W / Lebreton Street N (Unsignalized)	EB	T/R	A	0.25	0	0	A	0.28	0	0
	WB	L/T	A	0.01	0.4	0.2	A	0.03	0.8	0.7
	NB	L/R	B	0.07	12.2	1.7	C	0.23	18.1	6.5
L=Left Turn Movement(s); T=Through Movement(s); R=Right Turn Movement(s) # - 95 TH Percentile volume exceeds capacity, queue may be longer 1 - Level of Service based on v/c ratio as per the City of Ottawa TIA Guidelines 2 - 95 th Percentile queue										

As shown in the table above, the unsignalized Somerset Street W / Lebreton Street N intersections' critical movement is projected to operate well at LOS 'B' for the AM peak period and operate acceptably with LOS 'C' for the PM peak period for the northbound movements.

7.1.2. 2024 BACKGROUND CAPACITY

Table 8 below, summarizes the 2024 background growth projected performance of the studied intersections using SYNCHRO (V9) traffic analysis. The detailed model output of projected background conditions is provided within Appendix G.

Table 8: 2024 Future Background Capacity Analysis

Intersection	Approach / Movement		AM Peak Hour				PM Peak Hour			
			LOS ¹	V/C	Delay (s)	Queue (m) ²	LOS ₁	V/C	Delay (s)	Queue (m) ²
Somerset Street W / Lebreton Street N (Unsignalized)	EB	T/R	A	0.29	0	0	A	0.31	0	0
	WB	L/T	A	0.01	0.4	0.2	A	0.03	0.8	0.7
	NB	L/R	B	0.08	13.1	1.9	C	0.25	20.3	7.5
L=Left Turn Movement(s); T=Through Movement(s); R=Right Turn Movement(s) # - 95 TH Percentile volume exceeds capacity, queue may be longer 1 - Level of Service based on v/c ratio as per the City of Ottawa TIA Guidelines 2 - 95 th Percentile queue										

As shown in the table above, the unsignalized Somerset Street W / Lebreton Street N intersections' critical movement is projected to operate well at LOS 'B' for the AM peak period and operate acceptably with LOS 'C' for the PM peak period for the northbound movements.

7.1.3. FUTURE TOTAL DEMAND

To assess the impact that the development will have on the local network, the site generated volumes are applied to the 2019 and 2024 future background projections. **Figure 10** and **Figure 11** show the projected traffic volumes for the 2019 and 2024 future total future traffic volumes, respectively.

Figure 10: 2019 Total Future Traffic

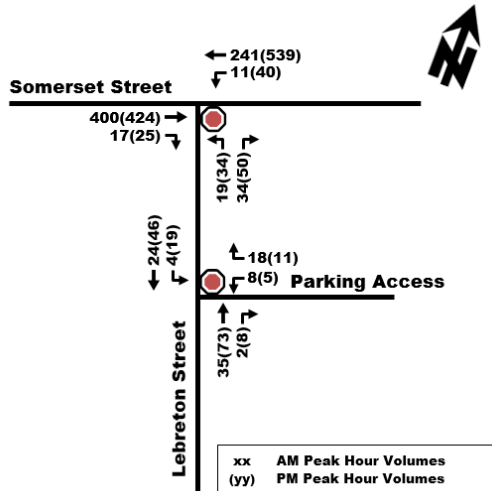
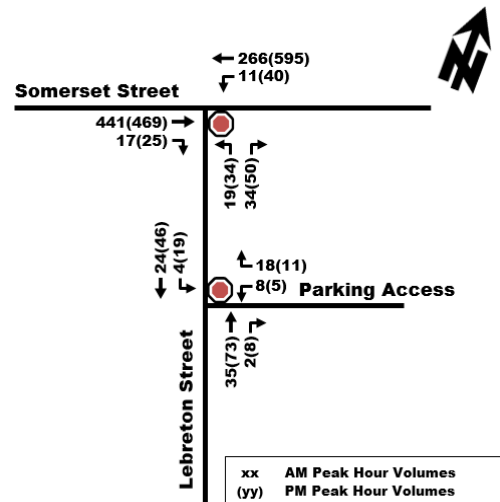


Figure 11: 2024 Total Future Traffic



7.1.4. 2019 FUTURE CAPACITY

Table 9 below, summarizes the 2019 future growth projected performance of the studied intersections using SYNCHRO (V9) traffic analysis. The detailed model output of projected background conditions is provided within Appendix F.

Table 9: 2019 Total Future Capacity Analysis

Intersection	Approach / Movement		AM Peak Hour				PM Peak Hour			
			LOS ¹	V/C	Delay (s)	Queue (m) ²	LOS ₁	V/C	Delay (s)	Queue (m) ²
Somerset Street W / Lebreton Street N (Unsignalized)	EB	T/R	A	0.27	0	0	A	0.26	0	0
	WB	L/T	A	0.01	0.5	0.2	A	0.04	1	0.8
	NB	L/R	B	0.11	13	2.9	C	0.22	17.2	5.9
Lebreton Street N / Parking Access (Unsignalized)	WB	L/R	A	0.03	8.7	0.7	A	0.02	9	0.4
	NB	T/R	A	0.02	0	0	A	0.05	0	0
	SB	L/T	A	0	1	0.1	A	0.01	2.2	0.3
L=Left Turn Movement(s); T=Through Movement(s); R=Right Turn Movement(s) # - 95 TH Percentile volume exceeds capacity, queue may be longer 1 - Level of Service based on v/c ratio as per the City of Ottawa TIA Guidelines 2 - 95 th Percentile queue										

As shown in the table above, the unsignalized Somerset Street W / Lebreton Street N intersections' critical movement is projected to operate well at LOS 'B' for the AM peak period and operate acceptably with LOS 'C' for the PM peak period for the northbound movements.

The proposed site access is shown to operate with good LOS (LOS A) on all movements in both the AM and PM peak hours.

7.1.5. 2024 FUTURE CAPACITY

Table 10 below, summarizes the 2024 future growth projected performance of the studied intersections using SYNCHRO (V9) traffic analysis. The detailed model output of projected future conditions is provided within Appendix G.

Table 10: 2024 Total Future Capacity Analysis

Intersection	Approach / Movement		AM Peak Hour				PM Peak Hour			
			LOS ¹	V/C	Delay (s)	Queue (m) ²	LOS ₁	V/C	Delay (s)	Queue (m) ²
Somerset Street W / Lebreton Street N (Unsignalized)	EB	T/R	A	0.29	0	0	A	0.29	0	0
	WB	L/T	A	0.01	0.4	0.3	A	0.04	1	0.8
	NB	L/R	B	0.12	13.8	3.2	C	0.25	19.1	6.7
Lebreton Street N / Parking Access (Unsignalized)	WB	L/R	A	0.03	8.7	0.7	A	0.02	9	0.4
	NB	T/R	A	0.02	0	0	A	0.05	0	0
	SB	L/T	A	0	1	0.1	A	0.01	2.2	0.3
L=Left Turn Movement(s); T=Through Movement(s); R=Right Turn Movement(s) # - 95 th Percentile volume exceeds capacity, queue may be longer 1 - Level of Service based on v/c ratio as per the City of Ottawa TIA Guidelines 2 - 95 th Percentile queue										

As shown in the table above, the unsignalized Somerset Street W / Lebreton Street N intersections' critical movement is projected to operate well at LOS 'B' for the AM peak period and operate acceptably with LOS 'C' for the PM peak period for the northbound movements.

The proposed site access is projected to operate with good LOS (LOS A) on all movements in both the AM and PM peak hours for the 2024 horizon.

7.2. ADJUSTMENTS TO DEMANDS

7.2.1. FUTURE BACKGROUND DEMANDS

With the intersection performing acceptably within both 2019 and 2024 projected background horizons, no adjustments to the projected traffic demands are suggested at this point.

7.2.2. FUTURE TOTAL DEMANDS

With the intersection performing acceptably within both 2019 and 2024 projected total future horizons, no adjustments to the projected traffic demands are suggested at this point.

8. OTHER CONSIDERATIONS

8.1. QUEUEING

The intersection of Somerset Street at Lebreton Street performs at an acceptable level for 2019 and 2024 horizons including the projected site generated traffic and traffic growth. Since the site access is located on Lebreton Street approximately 30m from Somerset, traffic queuing has been analyzed to ensure that queues do not back up between the intersections causing queues to interfere with operations on Somerset Street. The queuing can be summarized as follows:

- Northbound queuing along Lebreton Street is projected to be 7m, or approximately one vehicle length, from Somerset during the 2024 horizon PM peak hours. This queue length is less than 30m and will not interfere with vehicles making southbound left turns into the site.
- Southbound queuing along Lebreton Street is projected to be negligible and will not cause a backup of cars onto Somerset Street as a result of the proposed access.

9. CONCLUSIONS

Based on the foregoing analysis of the proposed site, the following transportation related conclusions are offered:

- a) The existing unsignalized intersection of Lebreton Street at Somerset Street is currently operating at an acceptable level of service during the morning and afternoon peak hours.
- b) Transit service is located directly adjacent to the site along Somerset Street and the site is within 500m walking distance to the Lebreton Transit Station (future Phase 2 LRT station).
- c) Collision data reveals that four collisions have been recorded in the five years prior to this study and all collision reports indicated that property damage only was report. This indicates that the rare collision that occurs at this location are occurring at low speeds.
- d) No mitigation measures are required to address existing operational or safety issues within the Study Area.
- e) To account for traffic growth beyond the Study Area a 2% annual growth rate was applied to traffic volumes on Somerset Street.
- f) Based on the number of apartment units proposed for this residential development, the trip generation trigger is met. A total of 31 net new AM peak hour and 42 net new PM peak hour vehicle trips.
- g) The operational analysis of the Study Area intersection and the site access showed that for both the 2019 and 2024 horizons the intersections would operate with good LOS and low delays. As there were no projected deficiencies, no mitigation measures were recommended, or required.
- h) The site has a planned full movements access onto Lebreton Street, approximately 30m south of the intersection of Lebreton Street and Somerset Street. The operational analysis of the subject intersection showed that vehicles entering the subject development would not queue back to, or interfere with operations at, the intersection of Lebreton Street and Somerset Street. Additionally, queuing from the unsignalized intersection would not back up to and block the site access.
- i) The proposed development is approximately 500m from the Lebreton Transit Station, the future LRT Station. This will encourage a high transit mode share potentially decreasing the reliance of future residents on personal automobiles.

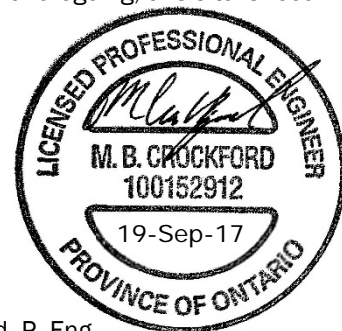
The proposed development will encourage use of the Future LRT, via the Lebreton LRT Station, and will promote a shift away from car-oriented transportation towards active and transit modes. The new auto trips resulting from the proposed development can be accommodated by the Study Area road network. Considering the foregoing, this site is recommended to be approved, from a transportation perspective.

Prepared By:



Matthew Mantle, EIT
Transportation Analyst

Reviewed By:



Mark Crockford, P. Eng.
Transportation Engineer

Appendix A

SCREENING AND CERTIFICATION FORM



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.

City Of Ottawa
Infrastructure Services and Community
Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
Ottawa, ON K1P 1J1
Tel. : 613-580-2424
Fax: 613-560-6006

Ville d'Ottawa
Services d'infrastructure et Viabilité des
collectivités
Urbanisme et Gestion de la croissance
110, avenue Laurier Ouest
Ottawa (Ontario) K1P 1J1
Tél. : 613-580-2424
Télécopieur: 613-560-6006

Dated at _____Markham_____ this __8th__ day of _____August_____, 2017.
(City)

Name: _____Mark Crockford_____
(Please Print)

Professional Title: _____Professional Engineer_____



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

Office Contact Information (Please Print)
Address: 1223 Michael Street, Suite 100
City / Postal Code: Ottawa / K1J 7T2
Telephone / Extension: (905) 943-0406
E-Mail Address: Mark.Crockford@Parsons.com

City of Ottawa 2017 TIA Guidelines
TIA Screening Form

Date 8-Aug-17
Project 770 Somerset
Project Number 476434

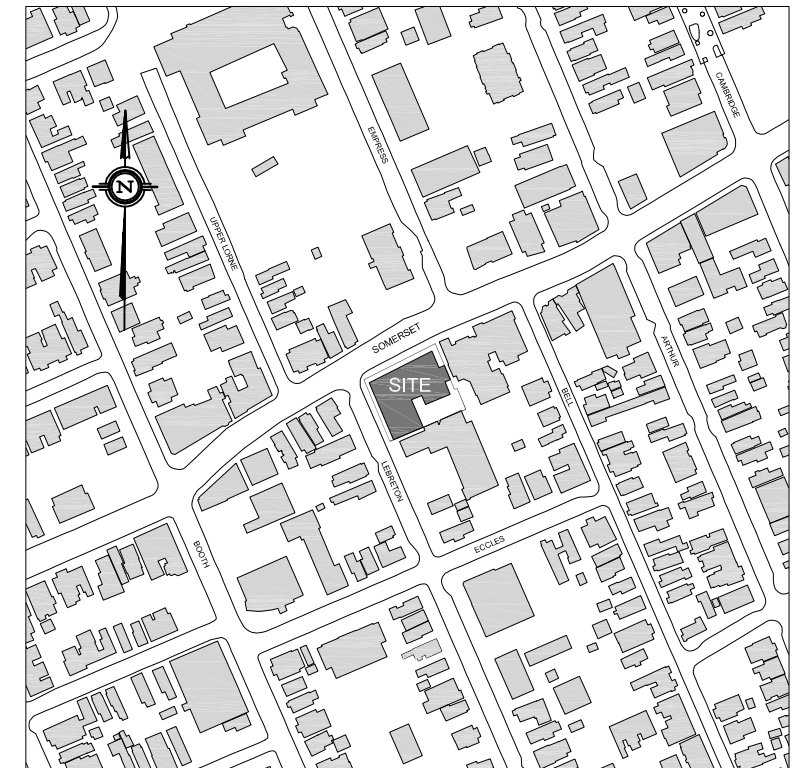
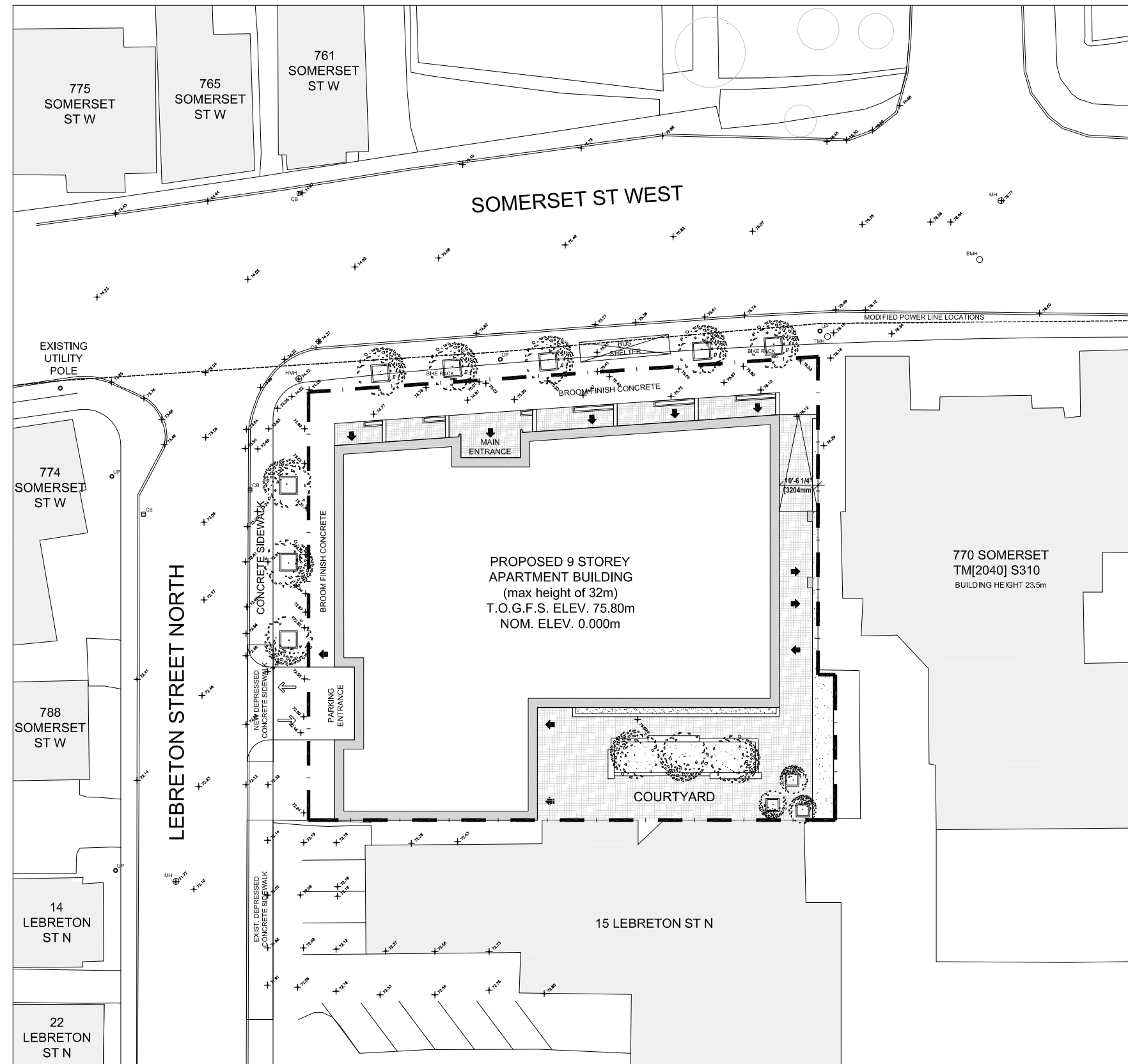
Results of Screening	Yes/No
Development Satisfies the Trip Generation Trigger	Yes
Development Satisfies the Location Trigger	No
Development Satisfies the Safety Trigger	No

Module 1.1 - Description of Proposed Development	
Municipal Address	770 Somerset Street West / 13 Lebreton Street North
Description of location	PLAN 4908 W PT LOT 31 / PLAN 4908 N PT LOT 26;LEBRETON E
Land Use	Residential
Development Size	112 Units
Number of Accesses and Locations	One access on Lebreton Street North ~35m south of Somerset St
Development Phasing	N/A
Buildout Year	est. 2020
Sketch Plan / Site Plan	See attached

Module 1.2 - Trip Generation Trigger		
Land Use Type	Townhomes or Apartments	
Development Size	112	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)	No
Development is in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone. (See Sheet 3)	No
Location Trigger Met?	No

Module 1.4 - Safety Triggers		
Posted Speed Limit on any boundary road	<60	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	



KEYPLAN (N.T.S.)

PROJECT INFORMATION

ZONING	TM [2040] S310
SITE AREA	1571.6 sq. m. (16,917 sq. ft.)
LANDSCAPED AREA (NO REQ'D MIN.)	593.8 sq. m. 6,392 sq. ft. 37.8%

PROJECT STATISTICS	(9 Storey's)
TOTAL BUILDING HEIGHT	= 34.8m (114'-2")

GROSS BUILDING - AREAS

CITY OF OTTAWA DEFINITION	
P3 LEVEL	553 sq. m. 5,740 sq. ft.
P2 LEVEL	1,572 sq. m. 16,917 sq. ft.
P1 LEVEL U/G PARKING	1,517 sq. m. 16,320 sq. ft.
GROUND LEVEL (TOTAL)	982 sq. m. 10,568 sq. ft.
GROUND LEVEL (RESID. LOBBY, AMENITY, STG & BIKE)	982 sq. m. 10,568 sq. ft.
GROUND LEVEL (COMMERICAL)	440 sq. m. 4,738 sq. ft.
2ND TO 4TH LEVEL	1,047 sq. m. 11,268 sq. ft.
5TH TO 6TH LEVEL	987 sq. m. 10,627 sq. ft.
7th to 9th LEVEL	953 sq. m. 10,262 sq. ft.
TOTAL (w/o PARKING LVLS)	8,003 sq. m. 86,143.6 sq. ft.

AMENITY SPACE

OUTDOOR (COURTYD)	3325 sq. ft. (308 sq. m.)
GROUND FLOOR	1906 sq. ft. (177 sq. m.)
ROOF	4470 sq. ft. (415 sq. m.)
TOTAL	9701 sq. ft. (900 sq. m.)

UNIT STATISTICS	
STUDIO UNITS	-
1 BEDROOM UNITS	61
2 BEDROOM UNITS	51
TOTAL	112

CAR PARKING

REQUIRED	
RESIDENCE	-
- 0.5 PER UNIT (250 UNITS)	
VISITOR	-
- 0.2 PER DWELLING UNIT (AFTER 12 UNITS)	
TOTAL	-

PROVIDED	
UNDERGROUND	89

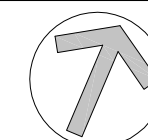
BICYCLE PARKING

REQUIRED	
RESIDENCE	-
- 0.5 PER UNIT (112 UNITS)	

PROVIDED	
UNDERGROUND	59
ABOVE GROUND	53
TOTAL	112

STORAGE LOCKERS

PROVIDED	112
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City of Ottawa 2017 TIA Guidelines
TIA Screening Form

Date 8-Aug-17
Project 770 Somerset
Project Number 476434

Results of Screening	Yes/No
Development Satisfies the Trip Generation Trigger	Yes
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Buildout Year	est. 2020
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Land Use Type	Townhomes or Apartments
Development Size	112 Units
Trip Generation Trigger Met?	Yes

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Development is in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone. (See Sheet 3)	No
Location Trigger Met?	No

Module 1.4 - Safety Triggers	
Posted Speed Limit on any boundary road	<60 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

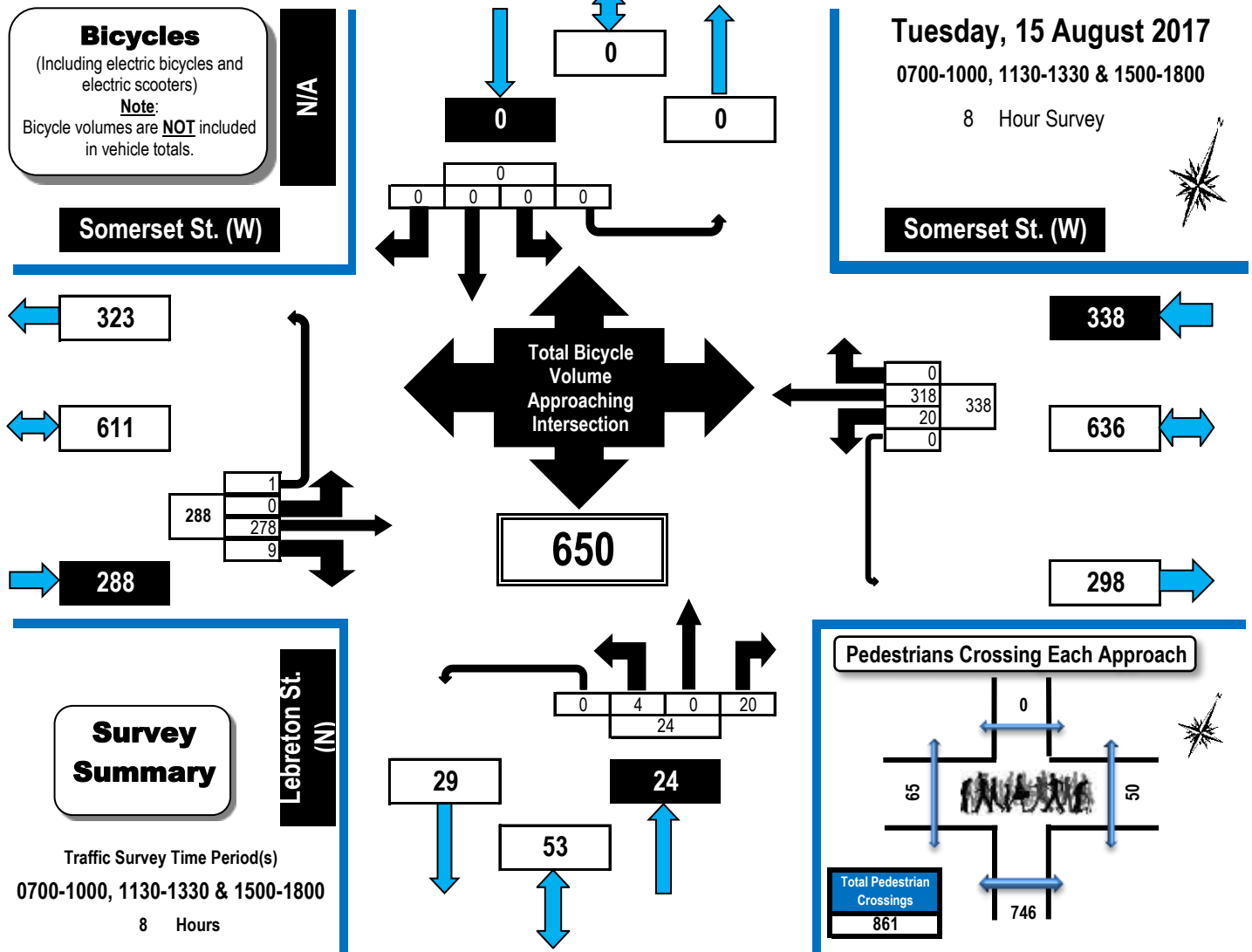
TRAFFIC DATA



Turning Movement Count Bicycle Summary Flow Diagram

Bicycles, Electric Bicycles,
and Electric Scooters

Lebreton Street (N) & Somerset Street (W) Ottawa, ON



Lebreton Street (N) & Somerset Street (W) Ottawa, ON

Survey Date: Tuesday, 15 August 2017 Start Time: 0700
Weather: Overcast-AM/Cloudy-PM Survey Duration: 8 Hrs. Survey Hours: 0700-1000, 1130-1330 & 1500-1800

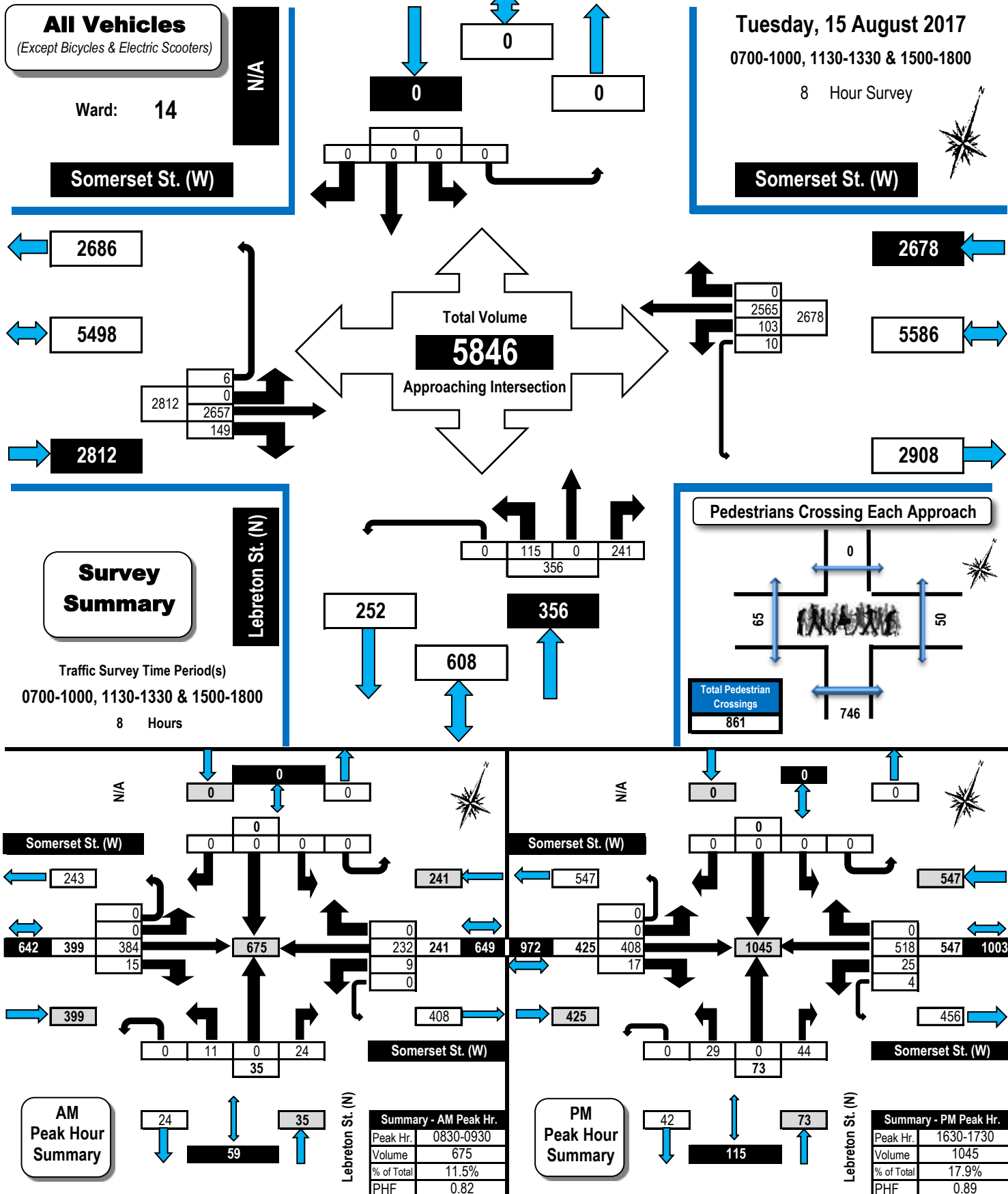
Time Period	Somerset St. (W)					Somerset St. (W)					Lebreton St. (N)					N/A					G.Tot.
	Eastbound					Westbound					Northbound					Southbound					
	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	
0700-0800	0	44	0	0	44	1	15	0	0	16	0	0	4	0	4	0	0	0	0	0	64
0800-0900	0	77	3	0	80	2	42	0	0	44	3	0	6	0	9	0	0	0	0	0	133
0900-1000	0	36	1	0	37	4	33	0	0	37	0	0	3	0	3	0	0	0	0	0	77
1130-1230	0	15	1	0	16	0	23	0	0	23	0	0	2	0	2	0	0	0	0	0	41
1230-1330	0	11	1	0	12	0	21	0	0	21	0	0	0	0	0	0	0	0	0	0	33
1500-1600	0	18	2	0	20	1	32	0	0	33	1	0	1	0	2	0	0	0	0	0	55
1600-1700	0	37	1	1	39	6	69	0	0	75	0	0	2	0	2	0	0	0	0	0	116
1700-1800	0	40	0	0	40	6	83	0	0	89	0	0	2	0	2	0	0	0	0	0	131
Totals	0	278	9	1	288	20	318	0	0	338	4	0	20	0	24	0	0	0	0	0	650



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

Lebreton Street (N) & Somerset Street (W) Ottawa, ON

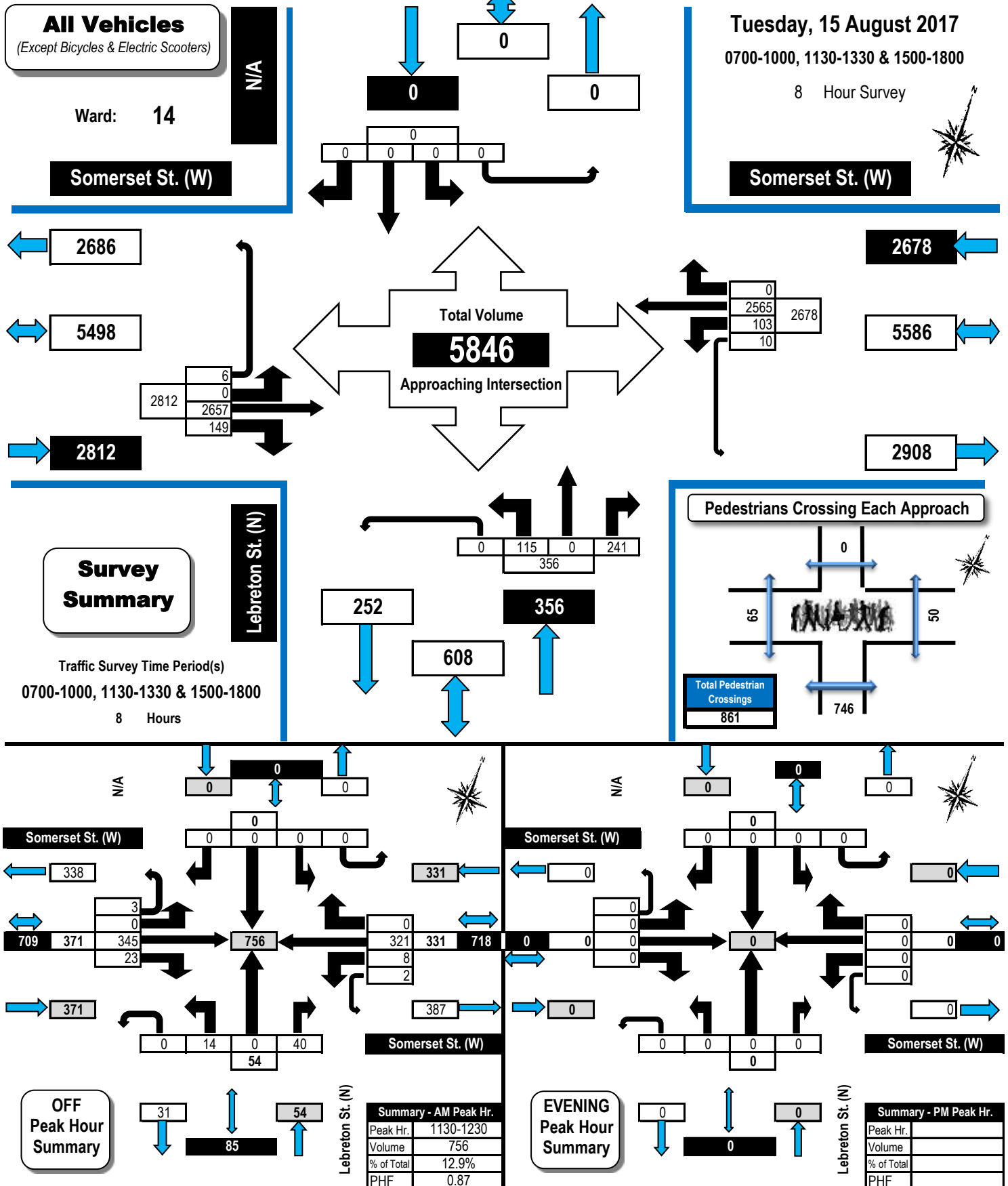




Turning Movement Count Summary, OFF and EVENING PEAK Hour Flow Diagrams

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

Lebreton Street (N) & Somerset Street (W) Ottawa, ON





Turning Movement Count Heavy Vehicle Summary Flow Diagram

Heavy Trucks, Buses,
and School Buses

Lebreton Street (N) & Somerset Street (W) Ottawa, ON

Heavy Vehicles

(Construction Vehicles, Heavy Trucks, Buses & School Buses).
Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.

N/A

Somerset St. (W)

Tuesday, 15 August 2017

0700-1000, 1130-1330 & 1500-1800

8 Hour Survey

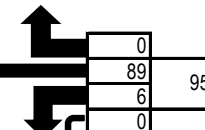
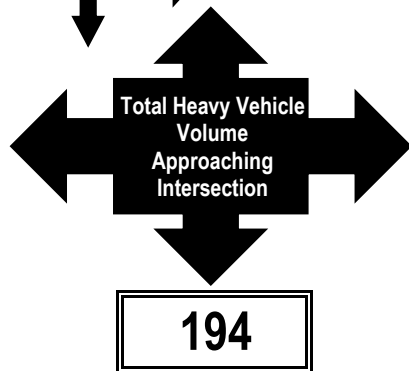
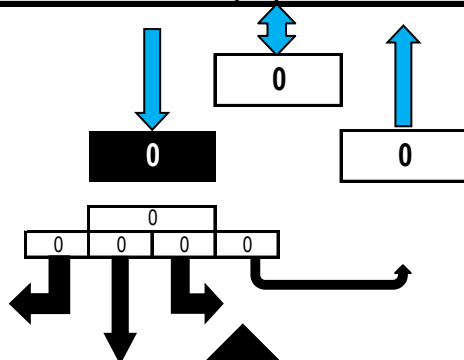
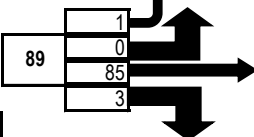
Somerset St. (W)



93

182

89



95

187

92

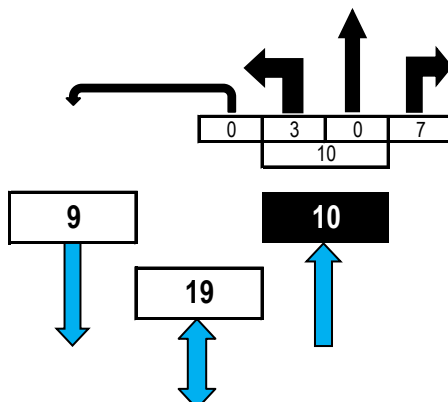
Survey Summary

Traffic Survey Time Period(s)

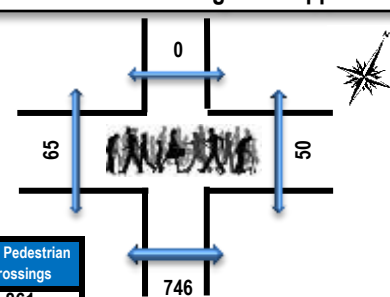
0700-1000, 1130-1330 & 1500-1800

8 Hours

Lebreton St. (N)



Pedestrians Crossing Each Approach



Total Pedestrian Crossings
861

Lebreton Street (N) & Somerset Street (W) Ottawa, ON

Survey Date: Tuesday, 15 August 2017

Weather: Overcast-AM/Cloudy-PM

Survey Duration: 8 Hrs.

Start Time: 0700

Survey Hours: 0700-1000, 1130-1330 & 1500-1800

Time Period	Somerset St. (W) Eastbound					Somerset St. (W) Westbound					Lebreton St. (N) Northbound					N/A Southbound					S. Tot	G.Tot.
	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot		
0700-0800	0	7	1	0	8	1	14	0	0	15	1	0	1	0	2	0	0	0	0	0	0	25
0800-0900	0	8	0	0	8	1	15	0	0	16	0	0	1	0	1	0	0	0	0	0	0	25
0900-1000	0	9	1	0	10	0	8	0	0	8	1	0	2	0	3	0	0	0	0	0	0	21
1130-1230	0	18	0	0	18	0	23	0	0	23	0	0	2	0	2	0	0	0	0	0	0	43
1230-1330	0	16	0	1	17	2	12	0	0	14	0	0	1	0	1	0	0	0	0	0	0	32
1500-1600	0	11	0	0	11	1	6	0	0	7	0	0	0	0	0	0	0	0	0	0	0	18
1600-1700	0	7	1	0	8	0	5	0	0	5	1	0	0	0	1	0	0	0	0	0	0	14
1700-1800	0	9	0	0	9	1	6	0	0	7	0	0	0	0	0	0	0	0	0	0	0	16
Totals	0	85	3	1	89	6	89	0	0	95	3	0	7	0	10	0	0	0	0	0	0	194

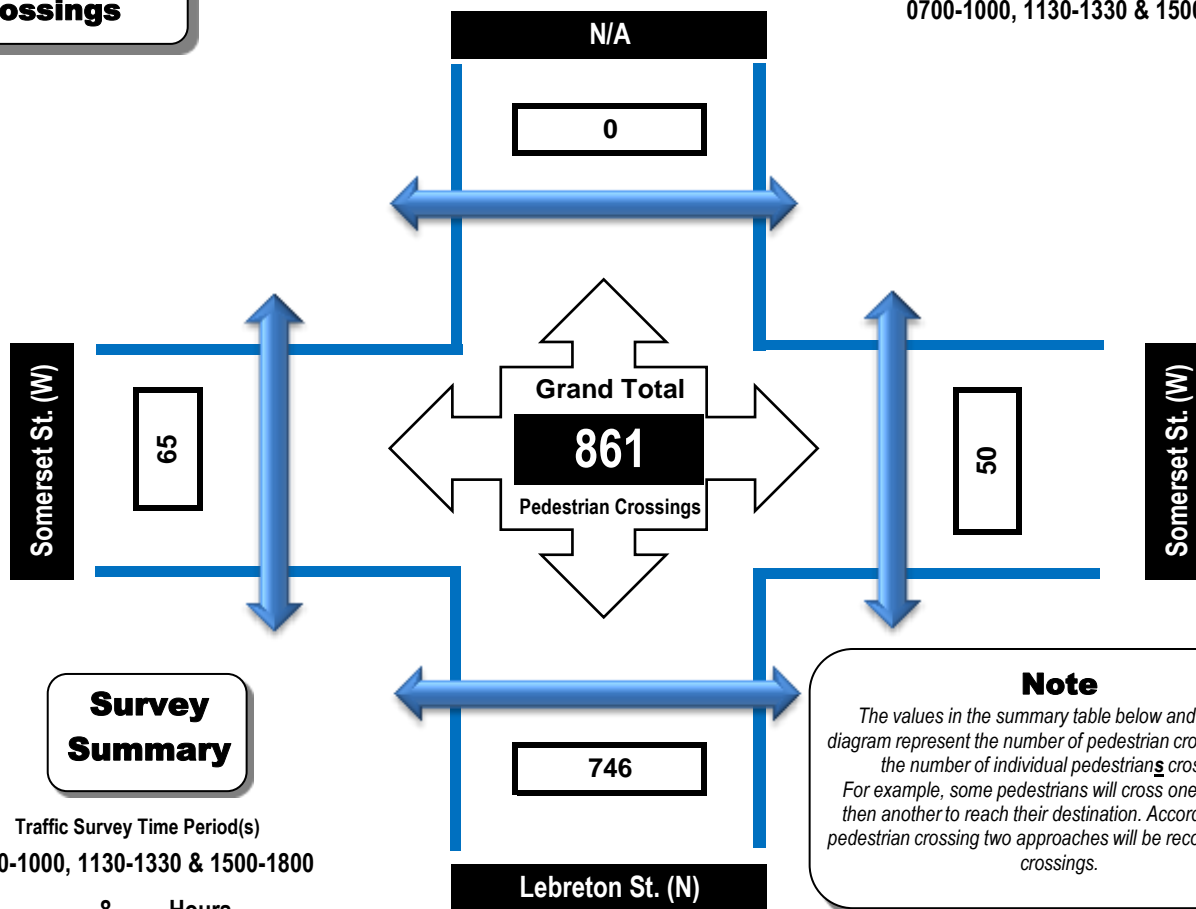


Turning Movement Count

Pedestrian Crossings Summary and Flow Diagram

**Lebreton Street (N) & Somerset Street (W)****Ottawa, ON****Pedestrian
Crossings****Tuesday, 15 August 2017**

0700-1000, 1130-1330 & 1500-1800

**Lebreton Street (N) & Somerset Street (W)****Ottawa, ON****Survey Date:** Tuesday, 15 August 2017**Start Time:** 0700**Weather:** Overcast-AM/Cloudy-PM**Survey Duration:** 8 Hrs.**Survey Hours:** 0700-1000, 1130-1330 & 1500-1800

Time Period	West Side Crossing Somerset St. (W)	East Side Crossing Somerset St. (W)	Street Total	South Side Crossing Lebreton St. (N)	North Side Crossing N/A	Street Total	Grand Total
0700-0800	3	1	4	31	0	31	35
0800-0900	1	0	1	67	0	67	68
0900-1000	6	1	7	56	0	56	63
1130-1230	20	16	36	96	0	96	132
1230-1330	5	9	14	156	0	156	170
1500-1600	11	10	21	110	0	110	131
1600-1700	5	5	10	114	0	114	124
1700-1800	14	8	22	116	0	116	138
Totals	65	50	115	746	0	746	861



Turning Movement Count

Summary Report Including AM/PM Peak Hours, PHF, AADT and Expansion Factors

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

Lebreton Street (N) & Somerset Street (W)

Ottawa, ON

Survey Date: Tuesday, 15 August 2017

Start Time: 0700

AADT Factor: 0.9

Weather: Overcast-AM/Cloudy-PM

Survey Duration: 8 Hrs.

Survey Hours: 0700-1000, 1130-1330 & 1500-1800

Somerset St. (W)

Eastbound

Somerset St. (W)

Westbound

Lebreton St. (N)

Northbound

N/A

Southbound

Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0700-0800	0	272	13	0	285	6	141	0	0	147	432	3	0	22	0	25	0	0	0	0	0	25	457
0800-0900	0	346	14	0	360	13	195	0	0	208	568	8	0	24	0	32	0	0	0	0	0	32	600
0900-1000	0	310	17	2	329	10	200	0	1	211	540	11	0	19	0	30	0	0	0	0	0	30	570
1130-1230	0	345	23	3	371	8	321	0	2	331	702	14	0	40	0	54	0	0	0	0	0	54	756
1230-1330	0	324	27	1	352	9	296	0	2	307	659	11	0	25	0	36	0	0	0	0	0	36	695
1500-1600	0	287	15	0	302	10	411	0	1	422	724	14	0	35	0	49	0	0	0	0	0	49	773
1600-1700	0	382	20	0	402	22	527	0	3	552	954	24	0	38	0	62	0	0	0	0	0	62	1016
1700-1800	0	391	20	0	411	25	474	0	1	500	911	30	0	38	0	68	0	0	0	0	0	68	979
Totals	0	2657	149	6	2812	103	2565	0	10	2678	5490	115	0	241	0	356	0	0	0	0	0	356	5846

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor

Applicable to the Day and Month of the Turning Movement Count

➔ Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts ◀

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 ➔ 12 expansion factor of 1.39

Equ. 12 Hr	0	3693	207	8	3909	143	3565	0	14	3722	7631	160	0	335	0	495	0	0	0	0	0	495	8126
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Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.9

AADT 12-hr	0	3324	186	8	3518	129	3209	0	13	3350	6868	144	0	301	0	445	0	0	0	0	0	445	7313
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24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 ➔ 24 expansion factor of 1.31

AADT 24 Hr	0	4354	244	10	4608	169	4204	0	16	4389	8997	188	0	395	0	583	0	0	0	0	0	583	9580
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AM Peak Hour Factor ➔ 0.82

Highest Hourly Vehicle Volume between 0700h & 1000h

AM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
0830-0930	0	384	15	0	399	9	232	0	0	241	640	11	0	24	0	35	0	0	0	0	0	35	675

OFF Peak Hour Factor ➔ 0.87

Highest Hourly Vehicle Volume between 1130h & 1330h

Off Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
1130-1230	0	345	23	3	371	8	321	0	2	331	702	14	0	40	0	54	0	0	0	0	0	54	756

PM Peak Hour Factor ➔ 0.89

Highest Hourly Vehicle Volume between 1500h & 1800h

PM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
1630-1730	0	408	17	0	425	25	518	0	4	547	972	29	0	44	0	73	0	0	0	0	0	73	1045

Comments

Bicycle volumes include those cyclists using the sidewalks and are recording in the direction they would be travelling if on the roadway. A majority of cyclists ignored the red signal indication at Empress Street.

Notes:

1. Includes all vehicle types except bicycles and electric scooters.
2. Expansion factors are not applied to turning movement counts if they are less than 8-hours in duration.
3. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

Disclaimer:

The information contained in this data summary is for information purposes only, and may not apply to your situation. Every effort is made to ensure the traffic count information is accurate for the survey date provided on the summary and flow diagram forms. The author, publisher, and distributor provide no warranty about the content or accuracy of either the data summary or flow diagrams. Information provided is subjective. The author, publisher, and distributor shall not be liable for any loss of profit or any other commercial damages resulting from use of this data.










Appendix C

SYNCHRO CAPACITY ANALYSIS: EXISTING CONDITIONS

HCM Unsignalized Intersection Capacity Analysis

1: Lebreton Street North & Somerset Street W











09/19/2017

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	384	15	9	232	11	24
Future Volume (Veh/h)	384	15	9	232	11	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	417	16	10	252	12	26
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			433		697	425
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			433		697	425
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	96
cM capacity (veh/h)			1127		404	629
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	433	262	38			
Volume Left	0	10	12			
Volume Right	16	0	26			
cSH	1700	1127	535			
Volume to Capacity	0.25	0.01	0.07			
Queue Length 95th (m)	0.0	0.2	1.7			
Control Delay (s)	0.0	0.4	12.2			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.4	12.2			
Approach LOS			B			
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			32.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Lebreton Street North & Somerset Street W

09/19/2017

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	408	17	29	518	29	44
Future Volume (Veh/h)	408	17	29	518	29	44
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	443	18	32	563	32	48
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			461		1079	452
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			461		1079	452
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		86	92
cM capacity (veh/h)			1100		235	608
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	461	595	80			
Volume Left	0	32	32			
Volume Right	18	0	48			
cSH	1700	1100	372			
Volume to Capacity	0.27	0.03	0.22			
Queue Length 95th (m)	0.0	0.7	6.1			
Control Delay (s)	0.0	0.8	17.3			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.8	17.3			
Approach LOS			C			
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			65.0%		ICU Level of Service	
Analysis Period (min)			15		C	

Appendix D

COLLISION DATA AND ANALYSIS

Total Area

<i>Classification of Accident</i>	<i>Rear End</i>	<i>Turning Movement</i>	<i>Sideswipe</i>	<i>Angle</i>	<i>Approaching</i>	<i>Single Vehicle (other)</i>	<i>Single vehicle (Unattended vehicle)</i>	<i>Other</i>	<i>Total</i>
P.D. only	0	0	1	2	0	1	0	0	4
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	0	0	1	2	0	1	0	0	4
	# 4 or 0%	# 4 or 0%	# 2 or 25%	# 1 or 50%	# 4 or 0%	# 2 or 25%	# 4 or 0%	# 4 or 0%	

SOMERSET ST W/LEBRETON ST N

<i>Years</i>	<i>Total # Collisions</i>	<i>24 Hr AADT Veh Volume</i>	<i>Days</i>	<i>Collisions/MEV</i>
2013-2015	4	9,580	1826	0.23

<i>Classification of Accident</i>	<i>Rear End</i>	<i>Turning Movement</i>	<i>Sideswipe</i>	<i>Angle</i>	<i>Approaching</i>	<i>Single Vehicle (other)</i>	<i>Single vehicle (Unattended vehicle)</i>	<i>Other</i>	<i>Total</i>
P.D. only	0	0	1	2	0	1	0	0	4
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	0	0	1	2	0	1	0	0	4
	0%	0%	25%	50%	0%	25%	0%	0%	



City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** January 1, 2016

Location: LEBRETON ST @ SOMERSET 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
2014-Apr-12, Sat,10:57	Clear	Angle	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2011-01-01 TO: 2014-01-01

LEBRETON ST & SOMERSET 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
1	2012-11-26	Mo	02:30	Snow	Dark	Single vehicle	P.D. only	V1 W	Loose snow	Turning left	Automobile, station	Skidding/Sliding	0
2	2013-02-27	We	13:17	Snow	Daylight	Angle	P.D. only	V1 N V2 E	Loose snow Slush	Turning right Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
3	2013-08-15	Thu	13:37	Clear	Daylight	Sideswipe	P.D. only	V1 W V2 W	Dry Dry	Going ahead Going ahead	Automobile, station Truck and trailer	Other motor vehicle Other motor vehicle	0

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

Friday, August 25, 2017

Page 1 of 1

Appendix E

TRIP GENERATION

Trip Generation 770 Somerset

9/12/2017 11:10 AM

ITE Vehicle Trip Generation Rates

Land Use	Data Source	Trip Rate	
		AM Peak	PM Peak
Apartment	ITE 220	0.51	0.62

Modified Person Trip Generation Rates

Land Use	Data Source	Person Trip Rate	
		AM Peak	PM Peak
Apartment	ITE 220	0.65	0.79
<i>Note: 1.28 factor to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%</i>			

ITE Fitted Curve Equations

Land Use	Data Source	Fitted Curve Equation			
		AM Peak		PM Peak	
Apartment	ITE 220	T=	0.49(x) + 3.73	T=	0.55(x) + 17.65

Modified Person Trip Generation

Land Use	Data Source	Area	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
			In	Out	Total	In	Out	Total
Units			20%	80%		65%	35%	
Apartment	ITE 220	112 du	15	61	76	66	37	103
Total			15	61	76	66	37	103

Total Site Trip Generation

Travel Mode	Mode Share	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	40%	6	25	31	27	15	42
Auto Passenger	10%	2	6	8	7	4	11
Transit	30%	4	18	22	19	11	30
Non-motorized	20%	3	12	15	13	7	20
Total Person Trips	100%	15	61	76	66	37	103
Total 'New' Auto Trips		6	25	31	27	15	42

Total Site Vehicle Trip Generation

Travel Mode	AM Peak (veh/hr)			PM Peak (veh/hr)		
	In	Out	Total	In	Out	Total
Total Site Trip Generation	6	25	31	27	15	42
Total 'New' Auto Trips	6	25	31	27	15	42










Appendix F

SYNCHRO CAPACITY ANALYSIS: PROJECTED 2019 CONDITIONS

HCM Unsignalized Intersection Capacity Analysis

1: Lebreton Street North & Somerset Street W










09/01/2017

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	400	17	11	241	19	34
Future Volume (Veh/h)	400	17	11	241	19	34
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	435	18	12	262	21	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	453			730	444	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	453			730	444	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	99			95	94	
cM capacity (veh/h)	1108			385	614	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	453	274	58			
Volume Left	0	12	21			
Volume Right	18	0	37			
cSH	1700	1108	505			
Volume to Capacity	0.27	0.01	0.11			
Queue Length 95th (m)	0.0	0.2	2.9			
Control Delay (s)	0.0	0.5	13.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.5	13.0			
Approach LOS			B			
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			33.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Lebreton Street North










09/01/2017

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	18	35	2	4	24
Future Volume (Veh/h)	8	18	35	2	4	24
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	9	20	39	2	4	27
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	75	40			41	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	75	40			41	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			100	
cM capacity (veh/h)	926	1031			1568	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	29	41	31			
Volume Left	9	0	4			
Volume Right	20	2	0			
cSH	996	1700	1568			
Volume to Capacity	0.03	0.02	0.00			
Queue Length 95th (m)	0.7	0.0	0.1			
Control Delay (s)	8.7	0.0	1.0			
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	1.0			
Approach LOS	A					
Intersection Summary						
Average Delay		2.8				
Intersection Capacity Utilization		14.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

1: Lebreton Street North & Somerset Street W










09/05/2017

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	384	15	9	232	11	24
Future Volume (Veh/h)	384	15	9	232	11	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	417	16	10	252	12	26
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			433		697	425
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			433		697	425
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	96
cM capacity (veh/h)			1127		404	629
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	433	262	38			
Volume Left	0	10	12			
Volume Right	16	0	26			
cSH	1700	1127	535			
Volume to Capacity	0.25	0.01	0.07			
Queue Length 95th (m)	0.0	0.2	1.7			
Control Delay (s)	0.0	0.4	12.2			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.4	12.2			
Approach LOS			B			
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			32.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Somerset Street W










09/01/2017

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	424	25	40	539	34	50
Future Volume (Veh/h)	424	25	40	539	34	50
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)	424	25	40	539	34	50
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			449		1056	436
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			449		1056	436
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		86	92
cM capacity (veh/h)			1111		241	620
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	449	579	84			
Volume Left	0	40	34			
Volume Right	25	0	50			
cSH	1700	1111	379			
Volume to Capacity	0.26	0.04	0.22			
Queue Length 95th (m)	0.0	0.8	5.9			
Control Delay (s)	0.0	1.0	17.2			
Lane LOS		A	C			
Approach Delay (s)	0.0	1.0	17.2			
Approach LOS			C			
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			72.7%	ICU Level of Service		C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Lebreton Street North & Parking Access










09/01/2017

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	11	73	8	19	46
Future Volume (Veh/h)	5	11	73	8	19	46
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	11	73	8	19	46
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	161	77			81	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	161	77			81	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			99	
cM capacity (veh/h)	820	984			1517	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	16	81	65			
Volume Left	5	0	19			
Volume Right	11	8	0			
cSH	926	1700	1517			
Volume to Capacity	0.02	0.05	0.01			
Queue Length 95th (m)	0.4	0.0	0.3			
Control Delay (s)	9.0	0.0	2.2			
Lane LOS	A		A			
Approach Delay (s)	9.0	0.0	2.2			
Approach LOS	A					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			20.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Somerset Street W

09/05/2017

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	424	17	29	539	29	44
Future Volume (Veh/h)	424	17	29	539	29	44
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	461	18	32	586	32	48
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			479		1120	470
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			479		1120	470
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		86	92
cM capacity (veh/h)			1083		222	594
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	479	618	80			
Volume Left	0	32	32			
Volume Right	18	0	48			
cSH	1700	1083	355			
Volume to Capacity	0.28	0.03	0.23			
Queue Length 95th (m)	0.0	0.7	6.5			
Control Delay (s)	0.0	0.8	18.1			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.8	18.1			
Approach LOS			C			
Intersection Summary						
Average Delay		1.6				
Intersection Capacity Utilization		66.1%	ICU Level of Service	C		
Analysis Period (min)		15				











Appendix G

SYNCHRO CAPACITY ANALYSIS: PROJECTED 2024 CONDITIONS

HCM Unsignalized Intersection Capacity Analysis

1: Lebreton Street North & Somerset Street W










09/12/2017

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	441	15	9	266	11	24
Future Volume (Veh/h)	441	15	9	266	11	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	479	16	10	289	12	26
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			495		796	487
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			495		796	487
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	96
cM capacity (veh/h)			1069		353	581
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	495	299	38			
Volume Left	0	10	12			
Volume Right	16	0	26			
cSH	1700	1069	482			
Volume to Capacity	0.29	0.01	0.08			
Queue Length 95th (m)	0.0	0.2	1.9			
Control Delay (s)	0.0	0.4	13.1			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.4	13.1			
Approach LOS			B			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			35.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Lebreton Street North & Somerset Street W










09/12/2017

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	469	17	29	595	29	44
Future Volume (Veh/h)	469	17	29	595	29	44
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	510	18	32	647	32	48
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			528		1230	519
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			528		1230	519
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		83	91
cM capacity (veh/h)			1039		190	557
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	528	679	80			
Volume Left	0	32	32			
Volume Right	18	0	48			
cSH	1700	1039	314			
Volume to Capacity	0.31	0.03	0.25			
Queue Length 95th (m)	0.0	0.7	7.5			
Control Delay (s)	0.0	0.8	20.3			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.8	20.3			
Approach LOS			C			
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			69.2%	ICU Level of Service		C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Lebreton Street North & Somerset Street W










09/12/2017

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	441	17	11	266	19	34
Future Volume (Veh/h)	441	17	11	266	19	34
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	479	18	12	289	21	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	497			801	488	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	497			801	488	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	99			94	94	
cM capacity (veh/h)	1067			350	580	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	497	301	58			
Volume Left	0	12	21			
Volume Right	18	0	37			
cSH	1700	1067	468			
Volume to Capacity	0.29	0.01	0.12			
Queue Length 95th (m)	0.0	0.3	3.2			
Control Delay (s)	0.0	0.4	13.8			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.4	13.8			
Approach LOS			B			
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			35.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Lebreton Street North










09/12/2017

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	18	35	2	4	24
Future Volume (Veh/h)	8	18	35	2	4	24
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	9	20	39	2	4	27
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	75	40			41	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	75	40			41	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			100	
cM capacity (veh/h)	926	1031			1568	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	29	41	31			
Volume Left	9	0	4			
Volume Right	20	2	0			
cSH	996	1700	1568			
Volume to Capacity	0.03	0.02	0.00			
Queue Length 95th (m)	0.7	0.0	0.1			
Control Delay (s)	8.7	0.0	1.0			
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	1.0			
Approach LOS	A					
Intersection Summary						
Average Delay		2.8				
Intersection Capacity Utilization		14.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

1: Somerset Street W










09/12/2017

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	469	25	40	595	34	50
Future Volume (Veh/h)	469	25	40	595	34	50
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)	469	25	40	595	34	50
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			494		1156	482
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			494		1156	482
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		84	91
cM capacity (veh/h)			1070		209	585
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	494	635	84			
Volume Left	0	40	34			
Volume Right	25	0	50			
cSH	1700	1070	339			
Volume to Capacity	0.29	0.04	0.25			
Queue Length 95th (m)	0.0	0.8	6.7			
Control Delay (s)	0.0	1.0	19.1			
Lane LOS		A	C			
Approach Delay (s)	0.0	1.0	19.1			
Approach LOS			C			
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			78.3%	ICU Level of Service		D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Lebreton Street North & Parking Access

09/12/2017

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	11	73	8	19	46
Future Volume (Veh/h)	5	11	73	8	19	46
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	11	73	8	19	46
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	161	77			81	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	161	77			81	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			99	
cM capacity (veh/h)	820	984			1517	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	16	81	65			
Volume Left	5	0	19			
Volume Right	11	8	0			
cSH	926	1700	1517			
Volume to Capacity	0.02	0.05	0.01			
Queue Length 95th (m)	0.4	0.0	0.3			
Control Delay (s)	9.0	0.0	2.2			
Lane LOS	A		A			
Approach Delay (s)	9.0	0.0	2.2			
Approach LOS	A					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			20.3%	ICU Level of Service		A
Analysis Period (min)			15			