311 Somerset Street, 234-236 O'Connor Street

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report

Prepared for:

Gemstone Corporation
252 Argyle Avenue
Ottawa, ON K2P 1B9

Prepared by:

CGH TRANSPORTATION

6 Plaza Court
Ottawa, ON K2H 7W1

June 2022

PN: 2020-27

Table of Contents

List of Figures

Table of Tables

List of Appendices

1 Screening

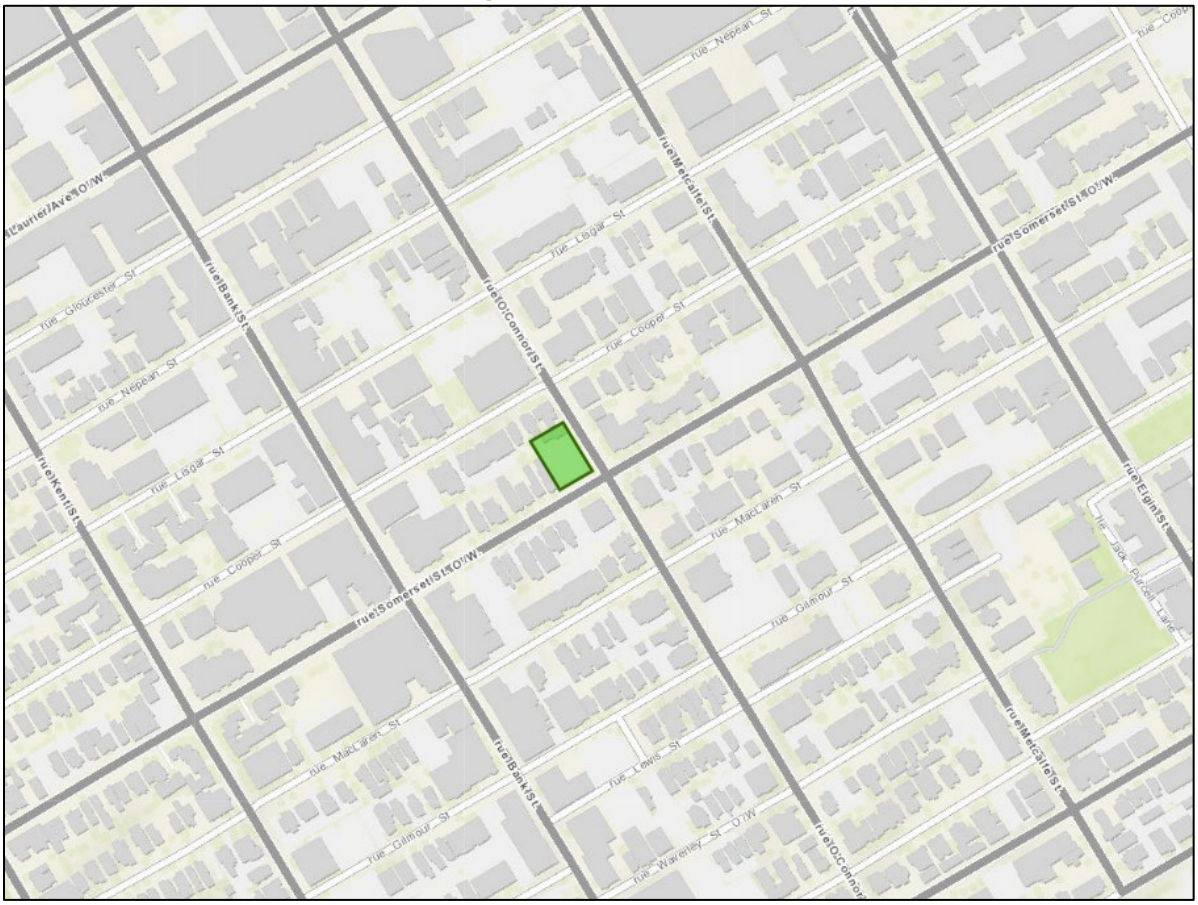
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for the TIA Study PM. As shown in the Screening Form, a TIA is required including the Design Review component and the Network Impact Component. This study is for a site plan application.

2 Existing and Planned Conditions

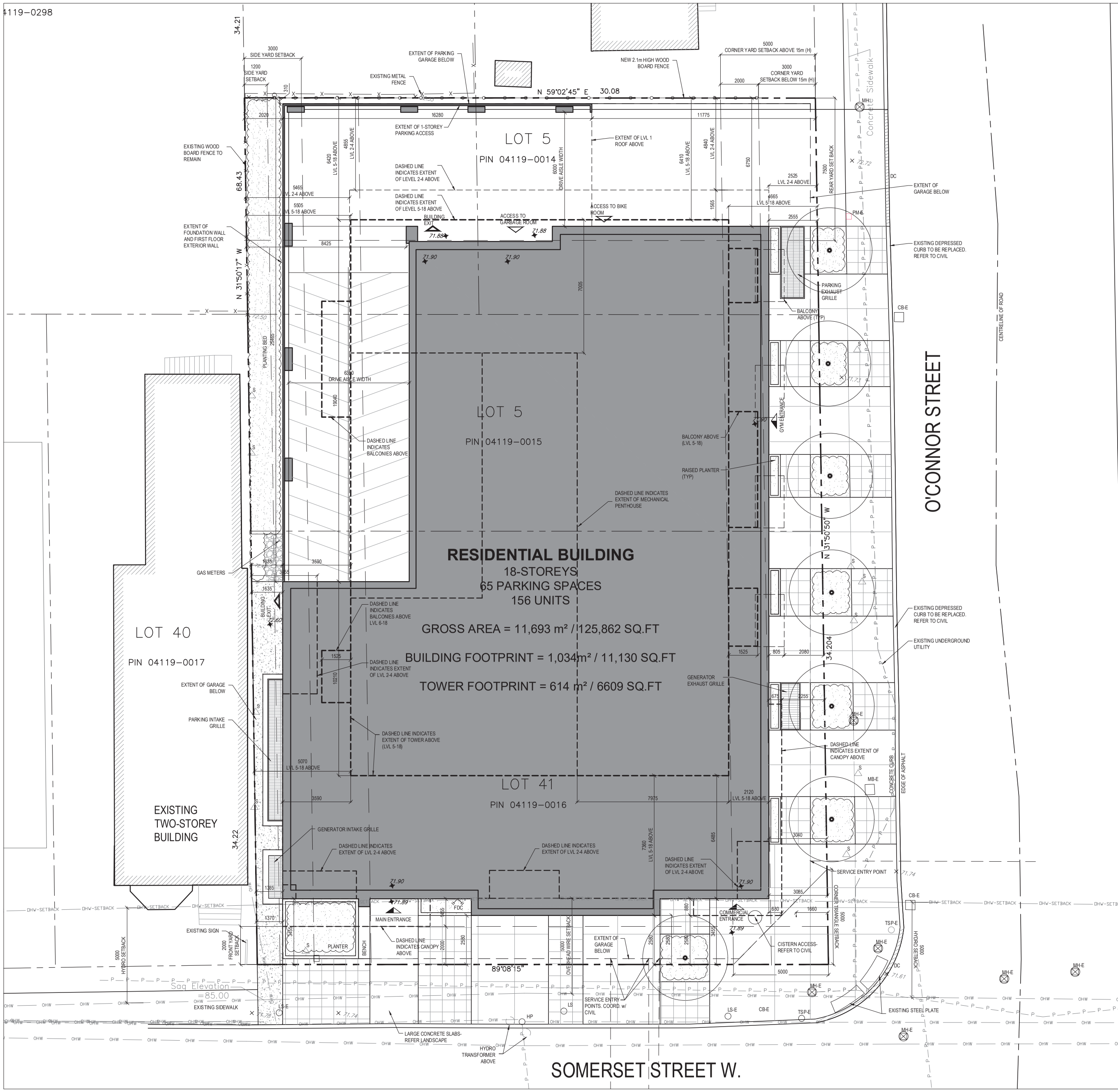
2.1 Proposed Development

The proposed development includes a 18-storey, 156-unit apartment/mixed-use building with 2,120 sq. ft. of ground floor commercial space to be constructed in a single phase and occupied by 2024 and includes 51 resident parking spaces, 14 visitor parking spaces, and 110 bicycle parking spaces. The access is proposed as a right-in/right-out access onto O'Connor Street. The subject site is zoned as Traditional Mainstreet (TM[2185]) and Residential Fifth Density (R5B[482]), and is within the area of consideration of the Centretown SDP/CDP, the Somerset Traditional Mainstreet DPA, and the Downtown Ottawa Urban Design Strategy. Figure 1 illustrates the Study Area Context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: May 17, 2022



KEY PLAN

LEGAL DESCRIPTION:
LOTS 5 AND 41, REGISTERED PLAN 12281
CITY OF OTTAWA PIN NUMBER: 04119-0013, -0014, -0015, -0016
MUNICIPAL ADDRESS: 234-236 O'Connor Street + 311 Somerset Street West, Ottawa

SITE INFORMATION
LOT AREA: 1372.3 s.m [14771.8 sq.ft]
LOT FRONTAGE: 30.09 m [98.7 ft]
LOT DEPTH: 45 m [112.2 ft]

OFFICIAL PLAN DESIGNATION: GENERAL URBAN AREA, TRADITIONAL MAINSTREET

SCHEDULE 1A: AREA Y
ZONING: TRADITIONAL MAINSTREET ZONE TM[2185]
ABUTTING ZONES:
NORTH (COOPER ST): R5B [482] F(3.0)
SOUTH (SOMERSET STREET): TM [2185] H(19)
WEST: TM[2185] H(18)
EAST: TM[2186] H(14.5)

BUILDING INFORMATION
FLOOR AREA: 1034 m² [11,130 sq.ft]
GROSS AREA: 11,693m² [125,862 sq.ft]
PROPOSED USE: MIXED-USE APARTMENT DWELLING, HIGH RISE

UNIT BREAKDOWN:
LEVEL 2 : 10 UNITS
LEVELS 3 - 4: 12 UNITS EA. (24)
LEVELS 5: 5 UNITS
LEVELS 6 -18: 9 UNITS EA. (117)
TOTAL: 156 UNITS

GROUND FLOOR COMMERCIAL:
COMMERCIAL A: 197 m² [2,120 sq.ft]

ZONING TABLE	TM[2185] REQUIRED	PROPOSED
MINIMUM LOT AREA	NO MINIMUM (ZONING)	N/A
MINIMUM LOT WIDTH	NO MINIMUM	N/A
FRONT YARD SETBACK	MINIMUM: 0m MAXIMUM: 2m MAX AT GRADE ADDITIONAL 2m ABOVE 15m/4-STOREYS	2.58 m (GROUND FLOOR) 9.94 m (LEVEL 5-18)
SETBACK FROM HYDRO UTILITIES	POLE: 6m	5.0m FROM SURVEYED HYDRO LINE RESULTING IN 3.455m SETBACK FROM PROPERTY LINE (LEVEL 2-4)
INTERIOR SIDE YARD SETBACK	3m MAX. [R5B = WITHIN 5m : 1.5m BEYOND 21m : 6m]	WEST: 1.4 m (LEVEL 1-4) 5 m (LEVEL 5-18)
REAR YARD SETBACK	7.5m MIN.	6.7 m (GROUND FLOOR) 4.8 m (LEVEL 2-4) 6.4 m [LEVEL 5-18)
BUILDING HEIGHT	MINIMUM PERMITTED HEIGHT IS 6.7M FOR 20M BACK FROM THE FRONT LOT LINE. MAXIMUM: 20m (6 STOREYS) [R5B = H (37m)] [CENTRETOWN SECONDARY PLAN = 9 to 16 STOREYS]	GF : 5.5m BUILDING HEIGHT: 58.2 m
GROUND FLOOR HEIGHT/GLAZING	MINIMUM OF 50% OF THE SURFACE AREA OF THE GROUND FLOOR FACADE, MEASURED FROM AVERAGE GRADE TO A HEIGHT OF 4.5m	ALONG SOMERSET ST. W: 53% ALONG O'CONNOR ST.: 56%
LANDSCAPED AREA	3m ABUTTING RESIDENTIAL ZONE REDUCED TO 1m WITH 1.4m HIGH FENCE	NORTH PROPERTY: 0m WITH 2.133m HIGH FENCE WEST PROPERTY: 1.6m TO 2m WITH 2.133m HIGH FENCE
MAX. FLOOR SPACE INDEX	NO MAX.	N/A
VEHICLE PARKING REQUIREMENTS (AREA Y: INNER URBAN, SCHEDULE 1A)	RESIDENTIAL: 0.5/UNIT AFTER FIRST 12 UNITS RES. VISITOR: 0.1/UNIT AFTER FIRST 12 UNITS NON-RESIDENTIAL:0 WITH GFA 200 m² OR LESS. RESIDENTIAL: [72 SPACES] RES. VISITOR: [14 SPACES] TOTAL PARKING REQUIRED: [86 SPACES]	RESIDENTIAL PROVIDED: [51 SPACES] VISITOR PROVIDED: [14 SPACES] TOTAL PARKING PROVIDED: [65 SPACES]
AMENITY AREA REQUIREMENTS	6 m² PER DWELLING UNIT. MIN. 50% OF THE REQUIRED TOTAL AMENITY AREA TO BE COMMUNAL AND AT LEAST ONE AREA OF MIN. 54 m²) TOTAL AMENITY REQUIRED: [936 m²] 50% COMMUNAL REQUIRED: [468 m²]	TOTAL AMENITY PROVIDED: [1,205 m²] TOTAL COMMUNAL PROVIDED: [723 m²] BALCONIES [Total 481.5 m²] LVL 2: 31 m² LVL 3: 45 m² LVL 4: 9 m² LVL 5: 9.5 m² LVL 6-18: 387 m² COMMUNAL [Total 723 m²] LVL 1: 213 m² LVL 2: 118 m² LVL 5: 174 m² ROOF TERRACE: 218 m²
BICYCLE PARKING SPACES	0.5 PER DWELLING UNIT [78 SPACES]	TOTAL PROVIDED: [110 SPACES]

LEGEND

SOFT LANDSCAPING
UNIT PAVERS REFER TO LANDSCAPE
ASPHALT PAVING
CONCRETE
RIVERSTONE REFER TO LANDSCAPE
EXISTING BUILDING ELEMENT TO BE REMOVED
EXISTING FENCE
NEW BOARD FENCE REFER TO LANDSCAPE
LOT LINE
SETBACK LINE
DESIGNATED BUILDING ENTRANCE / EXIT
FH FIRE HYDRANT. REFER TO CIVIL
CB CATCH BASIN
MH MANHOLE
MB MAILBOX
UTILITY POLE
OHW OVERHEAD UTILITY WIRES
L.S. LIGHT STANDARD
DC DEPRESSED CURB
0.20ø EXISTING TREE TO REMAIN (REFER TO LANDSCAPE DRAWINGS)
NEW TREE (REFER TO LANDSCAPE DRAWINGS)
NEW SHRUBS (REFER TO LANDSCAPE DRAWINGS)
NEW EVERGREEN SHRUB (REFER TO LANDSCAPE DRAWINGS)
77.70 EXISTING GROUND ELEVATION [TO DETERMINE EXISTING AVERAGE GRADE]
58.84 NEW GROUND ELEVATION REFER TO CIVIL
NOTE: 'X'-E INDICATES EXISTING TO REMAIN
TSP TRAFFIC SIGNAL POST
S SIGN
PM PARKING METER

No.	Date	Émis pour / Object
1	2020-10-02	FOR CLIENT REVIEW
2	2020-11-05	FOR COORD
3	2020-11-20	FOR COORD
4	2020-12-11	FOR COORD
5	2021-01-18	FOR COORD
6	2021-02-08	FOR COORD
7	2021-02-16	FOR COORD
8	2021-02-18	ISSUED FOR SITE PLAN CONTROL
9	2021-10-08	SITE PLAN CONTROL RESPONSE
10	2022-01-20	SITE PLAN CONTROL RESPONSE
11	2022-02-28	SITE PLAN CONTROL RESPONSE
12	2022-03-29	SITE PLAN CONTROL RESPONSE
13	2022-04-20	SITE PLAN CONTROL RESPONSE

Ingénieur / Engineer (Mécanique & Électricité / Mechanical & Electrical): Smith + Andersen

Ingénieur / Engineer (Structure / Structure): CLELAND JARDINE ENGINEERING LTD

Architecte / Architect (paysagiste / Landscape): Gino J. Aiello landscape architect www.GJALA.com

Ingénieur / Engineer (Civil / Civil): McINTOSH PERRY

Client / Client: GEMSTONE

Architecte / Architect: figurr — Collectif d'architectes / Architects Collective

L'entrepreneur doit vérifier toutes les dimensions et informations sur le site et aviser immédiatement l'architecte de toutes erreurs ou omissions.

Contractor shall verify all information and dimensions on site and immediately report any errors or omissions to the architect.

Projet / *Project*

EIGHTEEN STOREY APARTMENT BUILDING

234-236 O'CONNOR STREET
OTTAWA, ON

Titre / *Title*: SITE PLAN

Dessiné par / *Drawn by*: RD, MD
No. projet / *Project number*: *1954*
Vérifié par / *Verified by*: RC
No. dessin / *Drawing number*: A010
Révision / Revision: 0
Échelle / Scale: *AS SHOWN*
Date de création du dessin / *Drawing creation date*: 2020/09/XX

2.2 Existing Conditions

2.2.1 Area Road Network

Bank Street: Bank Street is a City of Ottawa arterial road with a two-lane urban cross-section, with sidewalks on both sides of the street and with on-street parking permitted on the west side of the road south of Lewis Street, and between Somerset Street and Lisgar Street and on the east side of the road between Gilmour Street and MacLaren Street, and between Lisgar Street and Gloucester Street (each no stopping 7:00-9:00AM and 3:30-5:30PM). The posted speed limit is 50 km/h and the Ottawa Official Plan reserves a 20.0 metre right of way within the study area.

O'Connor Street: O'Connor Street is a one-way, southbound City of Ottawa arterial road with a two-lane urban cross-section with a parking lane on the west side of the road and with a two-way curb-separated bike lane on the east side of the road and with sidewalks on both sides of the road south of Laurier Avenue W. North of Laurier Avenue W within the study area, it has a three lane urban cross-section with sidewalks are on both sides of the street and on-street parking permitted on the west side of the road (no stopping 3:30PM-5:30PM). The unposted speed limit is 50 km/h, and the Ottawa Official Plan reserves a 20.0 metre right of way within the study area.

Metcalfe Street: Metcalfe Street is a one-way, northbound City of Ottawa arterial road with a three-lane urban cross-section with sidewalks on both sides of the street and on-street parking permitted on the east side of the road (no stopping 7:00-9:00AM, 3:30PM-5:30PM). The unposted speed limit is 50 km/h and the Ottawa Official Plan reserves a 20.0 metre right of way within the study area.

Somerset Street W: Somerset Street W is a City of Ottawa arterial road west of Elgin Street and a collector road east of Elgin Street, each with a two-lane urban cross-section with sidewalks on both sides of the street. On-street parking is permitted on both sides of the road west of Bank Street (no stopping 7:00-9:00AM, 3:30PM-5:30PM), the south side of the road between Bank Street and O'Connor Street, between Metcalfe Street and Elgin Street (no stopping 7:00-9:00AM, 3:30PM-5:30PM), and on the south side of the road east of Elgin Street. The unposted speed limit is 50 km/h, the Ottawa Official Plan reserves a 20.0 metre right of way west of Elgin Street and the existing right of way varies between 18.0 and 20.5 metres to the east within the study area.

Gilmour Street: Gilmour Street is a City of Ottawa one-way, eastbound local road with a one-lane urban cross-section west of Metcalfe Street, and a two-way, two-lane urban cross-section to the east, each with sidewalks on both sides of the street. On-street parking is permitted on the south side of the road west of Bank Street, and on the north side of the road to the east. The unposted speed limit is 50 km/h, and the existing right of way is 17.0 metre within the study area.

2.2.2 Existing Intersections

Given the downtown environment, the following intersections were confirmed with City staff for inclusion and analysis:

Bank Street at Somerset Street W	The intersection of Bank Street at Somerset Street is a signalized intersection. The northbound and southbound approaches each consist of a shared through/right-turn lane. The eastbound approach consists of a shared left-turn/though lane and an auxiliary right-turn lane, and the westbound approach consists of an auxiliary left-turn lane and a shared through/right-turn lane. Northbound left turns are prohibited from 7:00-9:00AM and 3:30-5:30PM buses excepted,

	southbound left turns are prohibited bicycles excepted, and right turns on red are prohibited on all approaches from 7:00AM-7:00PM.
O'Connor Street at Somerset Street W	The intersection of O'Connor Street at Somerset Street is a signalized intersection. The southbound approach consists of a curb-separated two-way bike lane, a shared left-turn/through lane, and a shared through/right-turn lane. The eastbound approach consists of a shared though/right-turn lane, and the westbound approach consists of a shared left-turn/through lane and a left-turn bike box. No turn restrictions were noted.
Metcalfe Street at Somerset Street W	The intersection of Metcalfe Street at Somerset Street is a signalized intersection. The northbound approach consists of a shared left-turn/through lane, a through lane, and a shared left-turn/through lane. The eastbound approach consists of a shared left-turn/though lane, and the westbound approach consists of a shared through/right-turn lane. No turn restrictions were noted.
O'Connor Street at Gilmour Street	The intersection of O'Connor Street at Gilmour Street is a signalized intersection. The southbound approach consists of a curb-separated two-way bike lane, a shared left-turn/through lane, and a through lane. The eastbound approach consists of a shared though/right-turn lane. No turn restrictions were noted.

2.2.3 Existing Driveways

Six driveways on the west side and seven driveways on the east side of O'Connor Street, and nine driveways on the north side and 13 driveways on the south side of Somerset Street W are found along boundary streets within 200 metres of the proposed site access. Driveways access detached dwellings, low-rise, mid-rise, and high-rise residential land uses, and restaurants, office buildings, and embassies. Two-way accesses for the existing site are present, onto each O'Connor Street and Somerset Street W and are to be removed as part of the subject development plan.

2.2.4 Cycling and Pedestrian Facilities

Figure 3 illustrates the pedestrian facilities in the study area and Figure 4 illustrates the cycling facilities.

Sidewalks are provided along both sides of all study area streets. Cycling facilities include a two-way curb-separated bike lane along O'Connor Street, and curb-separated bike lanes on Laurier Avenue W. O'Connor Street, Metcalfe Street, Laurier Avenue W, and Somerset Street W are spine cycling routes, and Bank Street and Elgin Street are local routes.

Figure 3: Study Area Pedestrian Facilities

Source: http://maps.ottawa.ca/geoOttawa/ Accessed: May 17, 2022

Figure 4: Study Area Cycling Facilities

Source: http://maps.ottawa.ca/geoOttawa/ Accessed: May 17, 2022

Pedestrian and cyclist volumes included in study area intersection counts, presented in Section 2.2.7, have been compiled and are illustrated in Figure 5 and Figure 6, respectively.

Figure 5:Existing Pedestrian Volumes

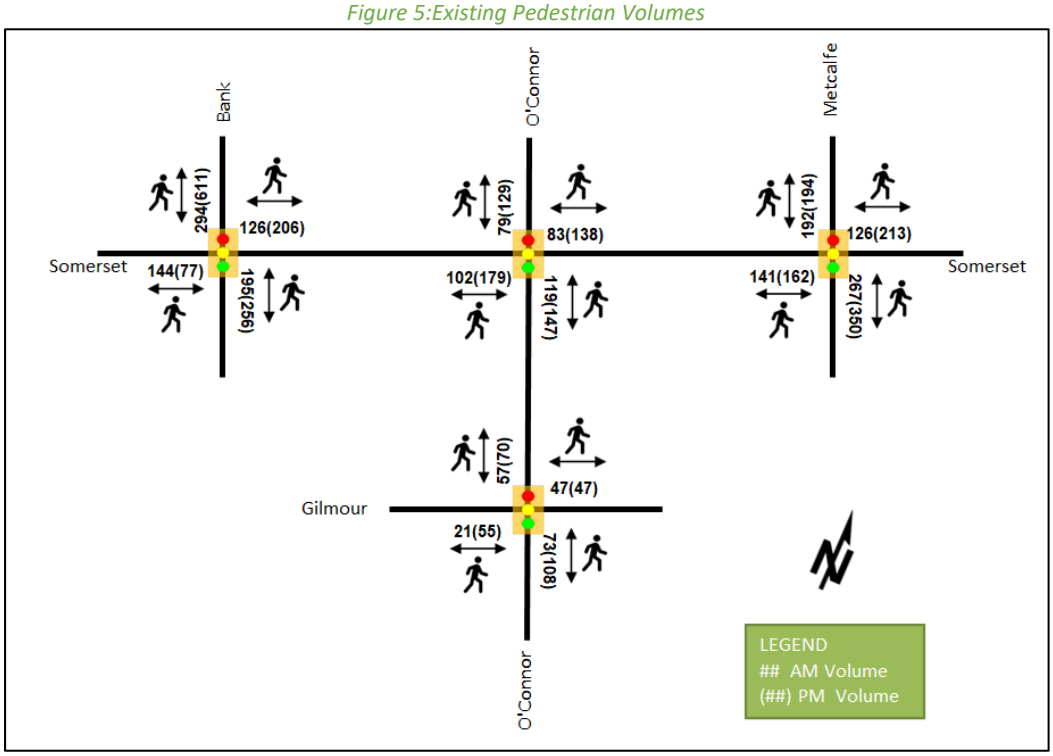
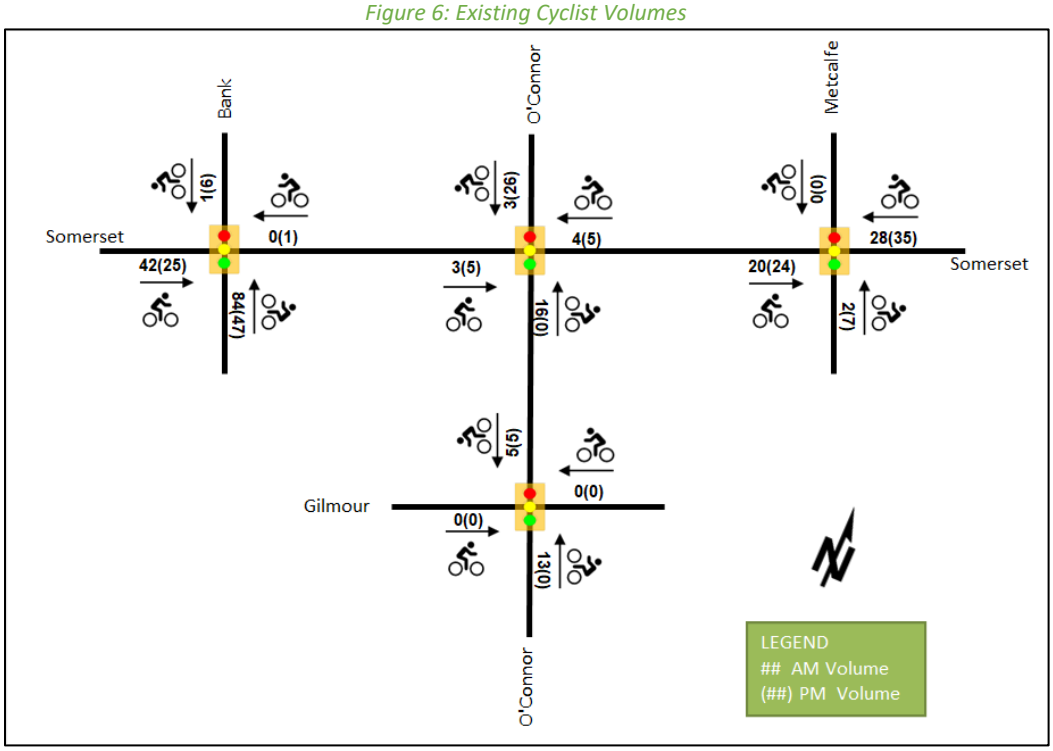


Figure 6: Existing Cyclist Volumes



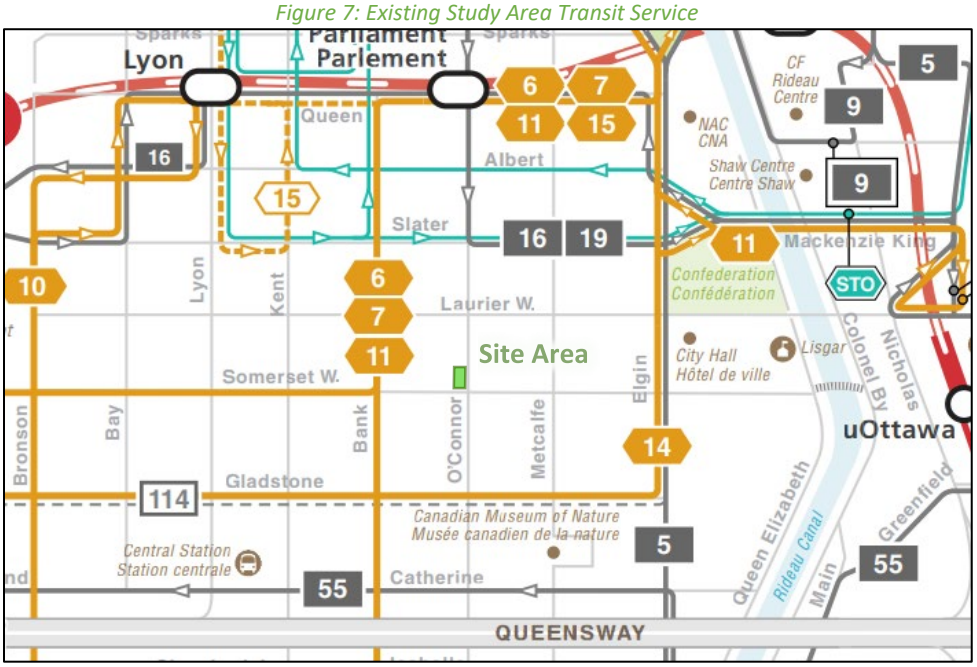
2.2.5 Existing Transit

Within the study area, the routes #6, #7, #11 travel along Bank Street with route #11 continuing along Somerset Street W, and routes #5, #14, 114 travel along Elgin Street. The frequency of these routes within proximity of the proposed site currently are:

- Route #5 – 30-minute service all day
- Route #6 – 10-15-minute service all day, 30-minute service during the evening
- Route #7 – 10-15-minute service all day, 30-minute service during the evening
- Route #11 – 15-20-minute service all day
- Route #14 –15-minute service all day, 30-minute service during the evening
- Route #114 – two buses per peak direction/period per day

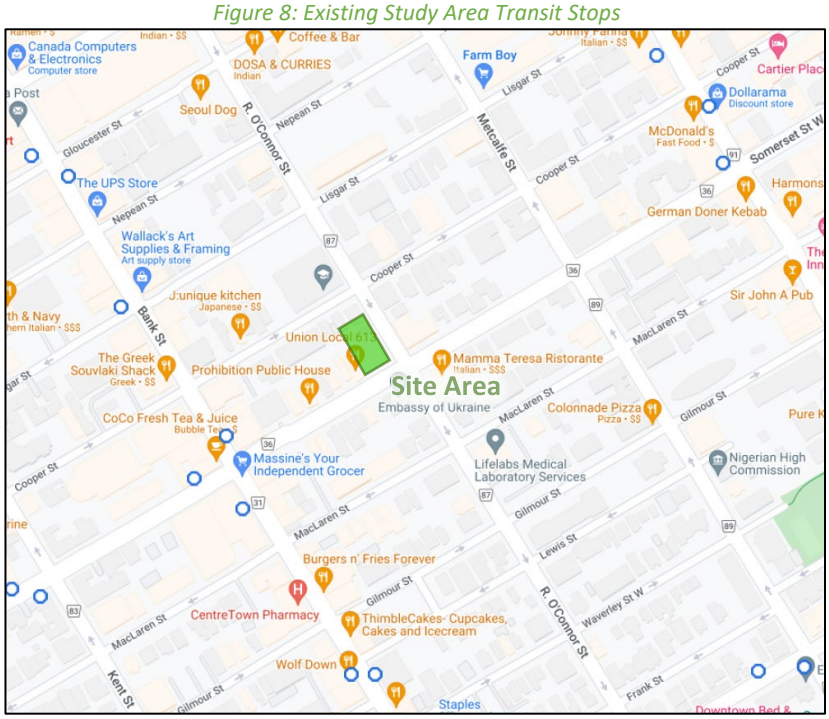
Figure 7 illustrates the transit system map in the study area and Figure 8 illustrates nearby transit stops.

Figure 7: Existing Study Area Transit Service



Source: http://www.octranspo.com/ Accessed: May 17, 2022

Figure 8: Existing Study Area Transit Stops



Source: http://www.octranspo.com/ Accessed: May 17, 2022

2.2.6 Existing Area Traffic Management Measures

Bulb-outs along the minor roads intersecting O'Connor Street, and tight corner radii at these intersections, textured crossings along arterial roads, turn restrictions at the intersection of Bank Street and Somerset Street W, and channelization on MacLaren Street at O'Connor Street constitute area traffic management measures.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from the City of Ottawa for the existing Study Area intersections. Table 1 summarizes the intersection count dates.

Table 1: Intersection Count Date

Intersection	Count Date
Bank Street at Somerset Street	Wednesday, August 5, 2015
O'Connor Street at Somerset Street	Tuesday, March 21, 2017
Metcalfe Street at Somerset Street	Thursday, May 2, 2019
O'Connor Street at Gilmour Street	Tuesday, March 21, 2017

Figure 9 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. The level of service for signalized intersections is based on volume to capacity ratio (v/c) calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. Detailed turning movement count data is included in Appendix B and the Synchro worksheets are provided in Appendix C.

Figure 9: Existing Traffic Counts

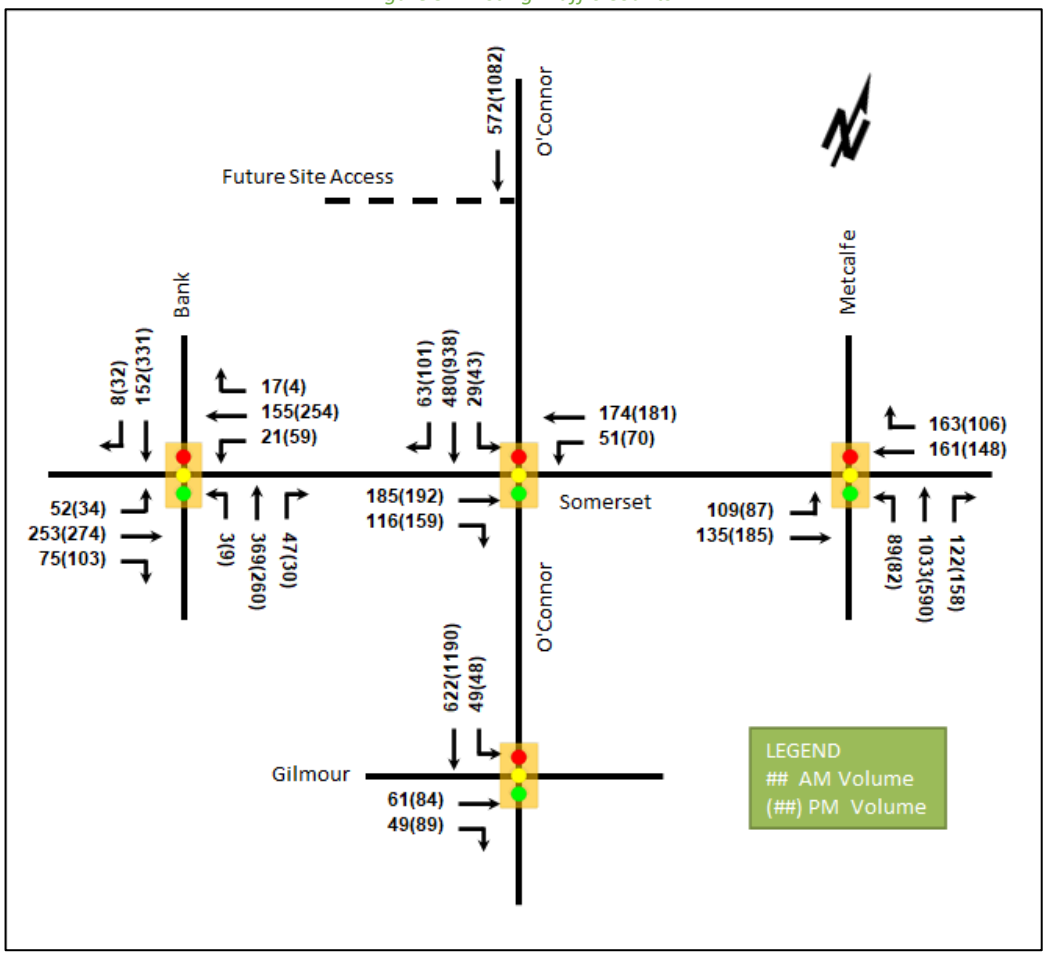


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Bank Street at Somerset Street W *Signalized*	EBL/T	B	0.67	29.7	68.3	B	0.66	28.9	68.2
	EBR	A	0.25	21.1	18.9	A	0.29	21.3	24.2
	WBL	A	0.11	9.2	m2.6	A	0.31	15.7	m6.6
	WBT/R	A	0.35	9.9	15.0	A	0.51	16.4	m34.3
	NBT/R	A	0.54	14.7	65.6	A	0.39	12.4	43.6
	SBT/R	A	0.20	10.1	22.4	A	0.47	13.5	54.7
	Overall	**A**	**0.59**	**17.6**	-	**A**	**0.54**	**17.9**	-
O'Connor Street at Somerset Street W *Signalized*	EBT/R	A	0.49	18.6	46.9	C	0.72	45.8	**#85.7**
	WBL/T	A	0.41	24.9	m49.1	B	0.68	22.8	**#34.5**
	SB	A	0.46	15.7	44.2	C	0.78	20.1	94.2
	Overall	**A**	**0.46**	**18.4**	-	**C**	**0.75**	**25.9**	-
Metcalfe Street at Somerset Street W *Signalized*	EBL/T	C	0.71	24.6	**#68.9**	A	0.60	22.4	m44.4
	WBT/R	B	0.63	23.9	66.3	A	0.49	19.5	48.1
	NB	B	0.69	17.8	67.9	A	0.50	13.5	38.6
	Overall	**B**	**0.70**	**19.8**	-	**A**	**0.54**	**16.4**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
O'Connor Street at Gilmour Street	EBT/R	A	0.33	19.0	22.3	A	0.53	25.1	36.3
	SBL/T	A	0.35	3.7	15.5	B	0.64	5.8	24.3
Signalized	**Overall**	**A**	**0.32**	**5.9**	**-**	**A**	**0.60**	**8.2**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 0.90
Delay is measured in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

During both the AM and PM peak hours, the study area intersection operates well. The intersection of O'Connor Street and Somerset Street W shows potential for queuing on the eastbound and westbound movements during the PM peak hour, as does the eastbound movement at the intersection of Metcalfe Street and Somerset Street W during the AM peak hour.

2.2.8 Collision Analysis

Collision data have been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding study are road network. Table 3 summarizes the collisions types and conditions in the study area, Figure 10 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of these locations. Collision data are included in Appendix D.

Table 3: Study Area Collision Summary, 2016-2020

		Number	%
Total Collisions		**56**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	15	27%
	Property Damage Only	41	73%
Initial Impact Type	**Approaching**	1	2%
	Angled	6	11%
	Rear end	4	7%
	Sideswipe	15	27%
	Turning Movement	10	18%
	SMV Unattended	11	20%
	SMV Other	8	14%
	Other	1	2%
Road Surface Condition	**Dry**	43	77%
	Wet	6	11%
	Loose Snow	4	7%
	Slush	2	4%
	Packed Snow	1	2%
Pedestrian Involved		6	11%
Cyclists Involved		8	14%

Figure 10: Study Area Collision Records – Representation of Study Area Collisions

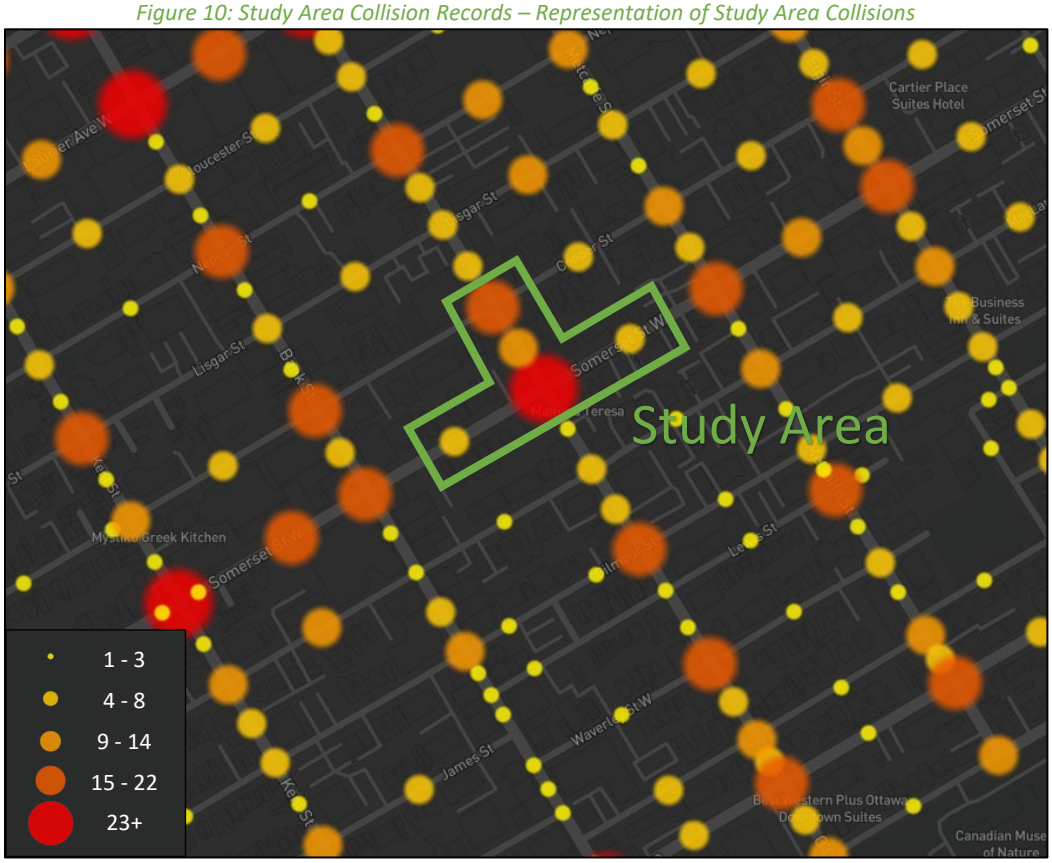


Table 4: Summary of Collision Locations, 2016-2020

	Number	%
Intersections / Segments	**56**	**100%**
Cooper St at O'Connor St	12	21%
Somerset St at O'Connor St	22	39%
Somerset St W btwn Bank St & O'Connor St	5	9%
Somerset St W btwn O'Connor St & Metcalfe St	6	11%
O'Connor St btwn Cooper St & Somerset St	11	20%

Within the study area, the intersection of Somerset Street at O'Connor Street is noted to have experienced higher collisions than other locations. Table 5 summarizes the collision types and conditions for the intersection of Somerset Street at O'Connor Street.

Table 5: Somerset Street at O'Connor Street Collision Summary

		Number	%
Total Collisions		**22**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	6	27%
	Property Damage Only	16	73%
Initial Impact Type	**Angle**	2	9%
	Rear end	4	18%
	Sideswipe	5	23%
	Turning Movement	5	23%
	SMV Other	5	23%
	Other	1	5%
Road Surface Condition	**Dry**	15	68%
	Wet	3	14%
	Loose Snow	3	14%
	Slush	1	5%
Pedestrian Involved		3	14%
Cyclists Involved		3	14%

The Somerset Street at O'Connor Street intersection had a total of 22 collisions during the 2016-2020 time period, with 16 involving property damage only and the remaining six having non-fatal injuries. The collision types are most represented by sideswipe, turning movement, and SMV (other) each with five collisions, followed by rear end with four collisions, two angle and one collision as other. Vehicle, pedestrian, and cyclist volumes are high at this intersection, and no single collision type is overly represented at this location. Weather conditions may affect collisions at this location.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

The subject development is within the Centretown CDP Area. As such, it is subject to the planning polices outlined in the CDP. The CDP makes the following general propositions: that a "Safe Crossing Project" be initiated along arterial route intersections, however makes no specific recommendations; to expand the cycle network with on-street cycling routes and/or facilities along Bank Street, Metcalfe Street, Somerset Street W and Gladstone Avenue; pursue pedestrian comfort improvements along Metcalfe, Elgin, Bay, Somerset Streets; convert Metcalfe to a two-way road as a pilot study including the conversion Metcalfe Street's museum frontage to greenspace, with no specified timeline of implementation.

The subject development is also within the area considered by the Downtown Ottawa Urban Design Strategy, which includes several recommendations for the study area including priority consideration for the conversion of O'Connor Street and Metcalfe Street to two-way roads, the conversion of the museum frontage on Metcalfe Street to greenspace, and study area streetscape improvements, each with no specified timeline of implementation.

Within the Transportation Master Plan, the Rapid Transit and Transit Priority Network's Affordable Network diagram shows isolated transit priority measures on Bank Street, Somerset Street W west of Bank Street, and Elgin Street.

From the City of Ottawa's Planned Construction Projects Portal, the intersection of Nepean Street and O'Connor Street is due for intersection improvements this year and the intersection of Waverly Street W and Metcalfe Street is due for signalization within 1-2 years.

2.3.2 Other Study Area Developments

70 Gloucester Street, 89-91 Nepean Street

The application includes a zoning by-law amendment permitting the construction of two 27-storey residential apartment buildings consisting of 488 residential dwelling units and 2350 ft^2 of ground floor retail. The development is anticipated to generate 203 AM and 228 PM peak hour new two-way auto trips. (Novatech 2019)

96 Nepean Street

The application includes a site plan for a 27-storey residential building consisting of 201 residential dwelling units. The development is anticipated to generate an additional 59 AM and 57 PM peak hour new two-way auto trips. (Novatech, 2011) The file was last updated in 2012.

180 Metcalfe Street

The application includes an official plan amendment, zoning by-law amendment and a site plan control revision application permitting the construction of a 30-storey mixed-use building with 311 dwelling units and ground floor commercial uses. The development is anticipated to create a net increase of 40 AM peak hour outbound auto trips and 36 PM peak hour inbound auto trips. (Parsons 2018)

318-320 Lisgar Street, 235-241 Bank Street

The application includes a site plan for the construction of a six-storey mixed-use building and a zoning by-law amendment to permit office uses on the second floor. The development is anticipated to produce 11 AM and 16 PM peak hour new two-way auto trips. (Delcan, 2014)

390-394 Bank Street

The application includes a site plan for the construction of a 9-storey mixed use building with 127 residential dwelling units and 6,750 m^2 of ground floor commercial space. The development is anticipated to be built by 2024 and is forecasted to generate 16 AM and 19 PM peak hour new two-way vehicle trips. (CGH, 2021)

322 Waverley Street

The application includes an official plan and zoning by-law amendment application to permit the construction of a 6-storey building with 27 residential dwelling units. No TIA is available for this development.

257 Lisgar Street, 108 Nepean Street

The application includes a zoning by-law amendment to permit the construction of a 27-storey mixed-use building with 295 residential dwelling units and 120 m^2 of ground-floor commercial space. The development is anticipated to be built by 2022 and is forecasted to generate 31 AM and 31 PM peak hour new two-way vehicle trips. (Parsons, 2021)

331 Cooper Street

The application includes a zoning by-law amendment and site plan for converting an existing 7-storey non-residential building to an 8-storey mid-rise apartment building. The development is anticipated to be built by 2021. No TIA is available for this development.

267 O'Connor Street

The application includes a zoning by-law amendment to permit the construction of two 30-storey residential buildings with a total of 547 residential dwelling units in two phases. Phase 1 is anticipated to be built by 2023 and is forecasted to generate 59 new AM and 65 new PM two-way peak-hour auto trips. Phase 2 is anticipated to be built by 2025 and is forecasted to generate 62 new AM two-way peak hour auto trips and 69 new PM two-way peak hour auto trips. (Parsons, 2020)

359 Kent Street, 436-444 MacLaren Street

The application includes official plan amendment and zoning by-law amendment to permit the construction of a 35-storey mixed-use building with a total of 405 apartment units, 21,388 ft^2 of office space, and 7,833 ft^2 of commercial space. The development is assumed to be built by 2024 and is forecasted to generate 31 AM and 32 PM peak hour new two-way vehicle trips. (Parsons, 2021)

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of Bank Street at Somerset Street W, O'Connor Street at Somerset Street W, Metcalfe Street at Somerset Street W, O'Connor Street at Gilmour Street, and the intersection of site accesses and O'Connor Street.

The boundary roads will be O'Connor Street and Somerset Street W, and screenline 36 is south of Laurier Ave within proximity to the site however will not be reviewed as part of this study.

3.2 Time Periods

As the proposed development is composed primarily of residential units the AM and PM peak hours will be examined.

3.3 Horizon Years

The anticipated build-out year is 2024. As a result, the full build-out plus five years horizon year is 2029.

4 Exemption Review

Table 6 summarizes the exemptions for this TIA.

Table 6: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Required
	4.2.3 New Street Networks	Only required for plans of subdivision	Exempt
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Required
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Required
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Required
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Exempt
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess	Exempt

Module	Element	Explanation	Exempt/Required
		of equivalent volume permitted by established zoning	

5 Development-Generated Travel Demand

5.1 Mode Shares

Examining the mode shares recommended in the TRANS Trip Generation Manual (2020) for the subject district, derived from the most recent National Capital Region Origin-Destination survey (OD Survey), the existing average district mode shares by land use for Ottawa Inner Area have been summarized in Table 7.

Table 7: TRANS Trip Generation Manual Recommended Mode Shares – Ottawa Inner Area

Travel Mode	Multi-Unit (High-Rise)		Commercial Generator	
	AM	PM	AM	PM
Auto Driver	26%	25%	39%	22%
Auto Passenger	6%	8%	2%	4%
Transit	28%	21%	16%	12%
Cycling	5%	6%	3%	4%
Walking	34%	39%	40%	58%
Total	**100%**	**100%**	**100%**	**100%**

5.2 Trip Generation

This TIA has been prepared using the vehicle and person trip rates for the residential dwellings using the TRANS Trip Generation Manual (2020) and the vehicle trip rates and derived person trip rates for commercial component from the ITE Trip Generation Manual 10th Edition (2017) using the City-prescribed conversion factor of 1.28. Table 8 summarizes the person trip rates for the proposed residential land uses for each peak period and the person trip rates for the non-residential land uses by peak hour.

Table 8: Trip Generation Person Trip Rates by Peak Period

Land Use	Land Use Code	Peak Period	Vehicle Trip Rate	Person Trip Rates
Multi-Unit (High-Rise)	221 & 222 (TRANS)	AM	-	0.80
		PM	-	0.90
Land Use	**Land Use Code**	**Peak Hour**	**Vehicle Trip Rate**	**Person Trip Rates**
Strip Retail Plaza	822 (ITE)	AM	2.36	3.02
		PM	6.59	8.44

Using the above person trip rates, the total person trip generation has been estimated. Table 9 summarizes the total person trip generation for the residential land uses and for the non-residential land uses.

Table 9: Total Residential Person Trip Generation by Peak Period

Land Use	Units	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Multi-Unit (High-Rise)	156	39	86	125	81	59	140
Land Use	**Units / GFA**	**AM Peak Hour**			**PM Peak Hour**		
		In	**Out**	**Total**	**In**	**Out**	**Total**
Retail (<40k sq. ft.)	2,120	4	2	6	9	9	18

Internal capture rates from the ITE Trip Generation Handbook 3rd Edition have been assigned to the development's retail component for mixed-use developments. The rates summarized in Table 10 represent the percentage of trips to/from the retail use based on the residential component.

Table 10: Internal Capture Rates

Land Use	AM		PM	
	In	Out	In	Out
Residential to/from Retail	17%	14%	10%	26%

Using the above mode share targets, the internal capture rates, and the person trip rates, the person trips by mode have been projected. Trip generation by peak hour has been forecasted using the prescribed peak period conversion factors presented in the TRANS Trip Generation Manual (2020) for the residential component. Table 11 summarizes the residential trip generation and the non-residential trip generation by mode and peak hour.

Table 11: Trip Generation by Mode

Travel Mode		AM Peak Hour				PM Peak Hour			
		Mode Share	In	Out	Total	Mode Share	In	Out	Total
Multi-Unit (High-Rise)	Auto Driver	**26%**	5	11	16	**25%**	9	7	15
	Auto Passenger	**6%**	1	2	4	**8%**	3	2	5
	Transit	**28%**	6	13	19	**21%**	8	6	14
	Cycling	**5%**	1	2	3	**6%**	2	2	4
	Walking	**34%**	8	17	25	**39%**	17	12	29
	Total	**100%**	**20**	**43**	**63**	**100%**	**36**	**26**	**62**
Retail (<40k sq. ft.)	Auto Driver	**39%**	1	1	2	**22%**	3	3	6
	Auto Passenger	**2%**	0	0	0	**4%**	0	0	1
	Transit	**16%**	0	0	1	**12%**	1	1	2
	Cycling	**3%**	0	0	0	**4%**	0	0	1
	Walking	**40%**	1	1	2	**58%**	5	4	9
	Internal Capture	*varies*	*-1*	*0*	*-1*	*varies*	*-1*	*-2*	*-3*
	Total	**100%**	**3**	**2**	**5**	**100%**	**8**	**7**	**15**
Total	Auto Driver	-	6	12	18	-	12	10	21
	Auto Passenger	-	1	2	4	-	3	2	6
	Transit	-	6	13	20	-	9	7	16
	Cycling	-	1	2	3	-	2	2	5
	Walking	-	9	18	27	-	22	16	38
	Total	-	**23**	**45**	**68**	-	**44**	**33**	**77**

As shown above, a total of 18 AM and 21 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

5.3 Trip Distribution

To understand the travel patterns of the subject development, the OD Survey has been reviewed to determine the travel for residential uses which were applied based on the build-out of Ottawa Inner. Table 12 below summarizes the distributions.

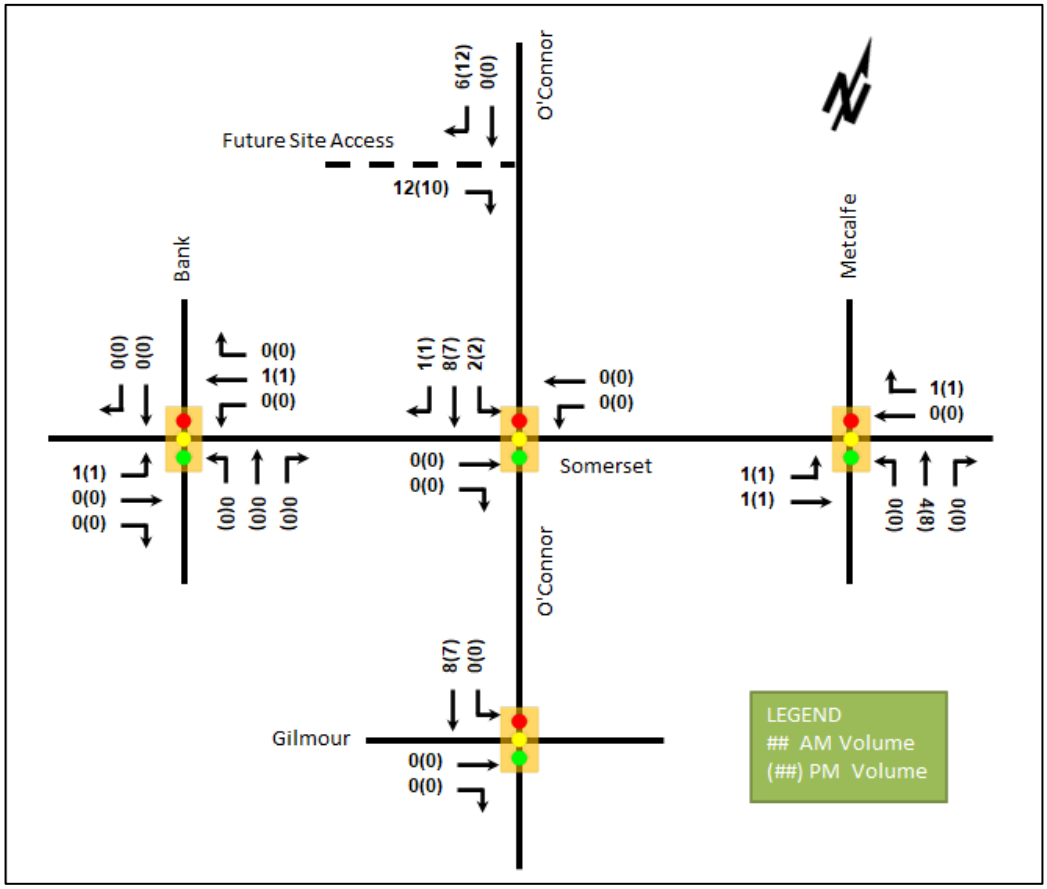
Table 12: OD Survey Distribution – Ottawa Inner

To/From	Residential % of Trips	Via
North	10%	Metcalfe/O'Connor
South	35%	Metcalfe/O'Connor
East	25%	10% Somerset, 15% Metcalfe/O'Connor
West	30%	10% Somerset, 20% Metcalfe/O'Connor
Total	100%	-

5.4 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the study area road network. Figure 11 illustrates the new site generated auto volumes.

Figure 11: New Site Generation Auto Volumes



6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3. None of the confirmed projects listed are expected to have any impact on the study area intersection operations.

6.2 Background Growth

A review of the background projections from the City's TRANS Regional Model for the 2011 and 2031 horizons was completed to determine the background growth for each of the study area roadways. Table 13 summarizes the results of the model and the projections are provided in Appendix E.

Table 13: TRANS Regional Model Projections – Study Area Growth Rates

Street	Direction Growth % from 2011 to 2031		Direction Growth % from Existing to 2031	
	Eastbound	**Westbound**	**Eastbound**	**Westbound**
Gilmour St	-1.23%	-	-0.97%	-
Somerset St W	-0.59%	-3.38%	-1.55%	-3.62%
	Northbound	**Southbound**	**Northbound**	**Southbound**
Bank St	-0.50%	1.618%	-1.82%	-2.54%
Metcalfe St	0.62%	-	-0.37%	-
O'Connor St	-	1.615%	-	-0.17%

Consistent with a downtown development context, area growth has either been achieved, or is projected to be negative. Consequently, and in keeping with adjacent development TIAs, no growth will be applied to the study area road network.

6.3 Other Developments

The background developments explicitly considered in the background conditions (Section 6.2) include:

- 70 Gloucester Street, 89-91 Nepean Street
- 180 Metcalfe Street
- 390-394 Bank Street
- 257 Lisgar Street, 108 Nepean Street
- 267 O'Connor Street
- 359 Kent Street,436, 444 MacLaren Street

The background development volumes within the study area have been provided in Appendix F.

7 Demand Rationalization

7.1 2024 Future Background Operations

Figure 13 illustrates the 2024 background volumes and Table 15 summarizes the 2024 background intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2024 future background horizon are provided in Appendix G.

Figure 12: 2024 Future Background Volumes

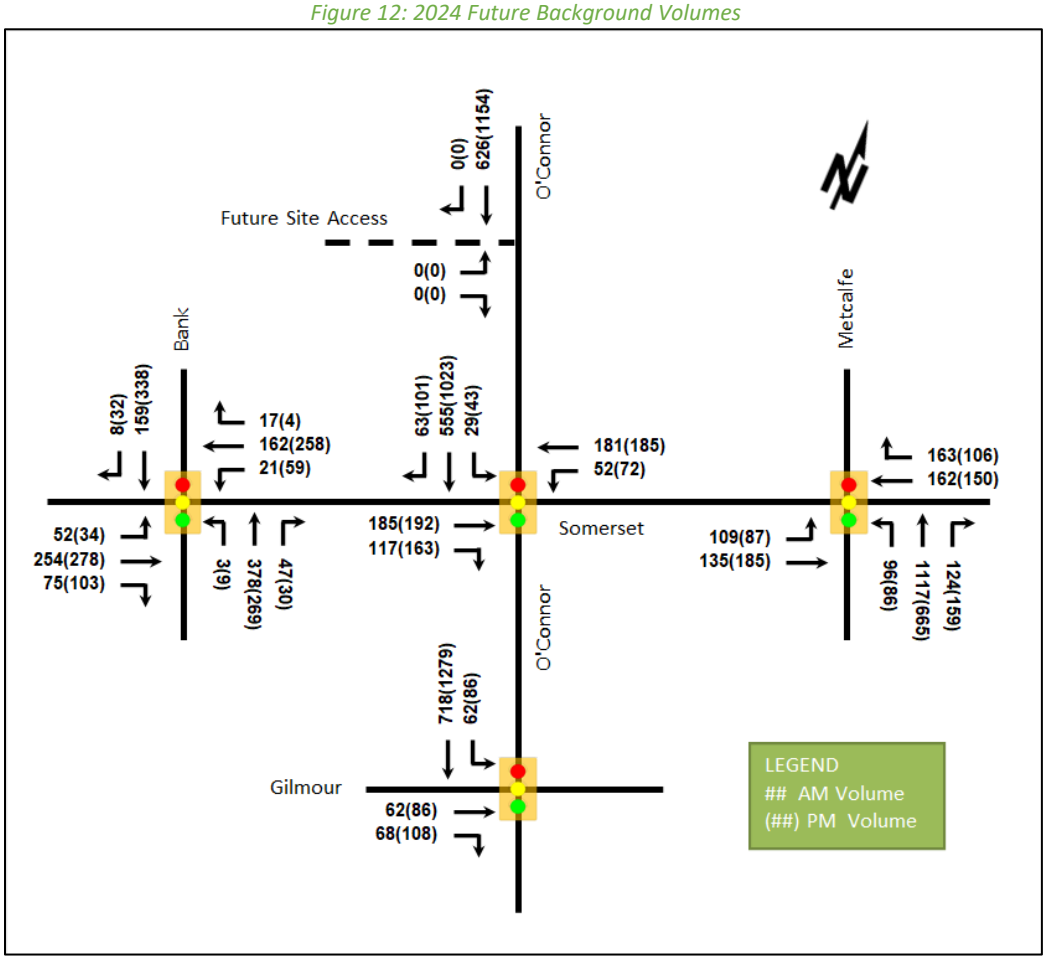


Table 14: 2024 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Bank Street at Somerset Street W *Signalized*	EBL/T	A	0.60	27.2	60.6	A	0.60	26.9	61.1
	EBR	A	0.23	20.7	17.5	A	0.26	20.9	22.1
	WBL	A	0.10	8.7	m2.4	A	0.25	14.6	m6.4
	WBT/R	A	0.33	9.5	13.7	A	0.46	16.0	m31.7
	NBT/R	A	0.50	13.9	58.8	A	0.37	12.0	39.8
	SBT/R	A	0.19	10.0	21.2	A	0.43	12.9	49.0
	Overall	**A**	**0.54**	**16.5**	-	**A**	**0.49**	**17.0**	-
O'Connor Street at Somerset Street W *Signalized*	EBT/R	A	0.44	16.3	40.0	B	0.65	43.9	76.7
	WBL/T	A	0.37	24.2	m45.8	A	0.57	18.7	30.1
	SB	A	0.47	15.9	45.3	C	0.76	19.3	89.5
	Overall	**A**	**0.44**	**17.7**	-	**C**	**0.71**	**24.1**	-
Metcalfe Street at Somerset Street W *Signalized*	EBL/T	A	0.58	17.8	41.6	A	0.52	19.8	m41.7
	WBT/R	A	0.57	22.0	58.3	A	0.45	18.4	42.7
	NB	B	0.67	17.3	64.8	A	0.49	13.6	38.3
	Overall	**B**	**0.62**	**18.2**	-	**A**	**0.50**	**15.6**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
O'Connor Street at Gilmour Street *Signalized*	EBT/R	A	0.34	16.6	21.4	A	0.54	24.6	36.0
	SBL/T	A	0.36	3.3	14.3	B	0.64	5.8	19.9
	Overall	**A**	**0.33**	**5.2**	-	**A**	**0.59**	**8.1**	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay is measured in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

During both the AM and PM peak hours, the study area intersections operate similarly to existing conditions, with operational improvement for all study area intersections due to the peak hour factor increasing from 0.90 to 1.00. No new capacity issues are noted

7.2 2029 Future Background Operations

Figure 13 illustrates the 2029 background volumes and Table 15 summarizes the 2029 background intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2029 future background horizon are provided in Appendix H.

Figure 13: 2029 Future Background Volumes

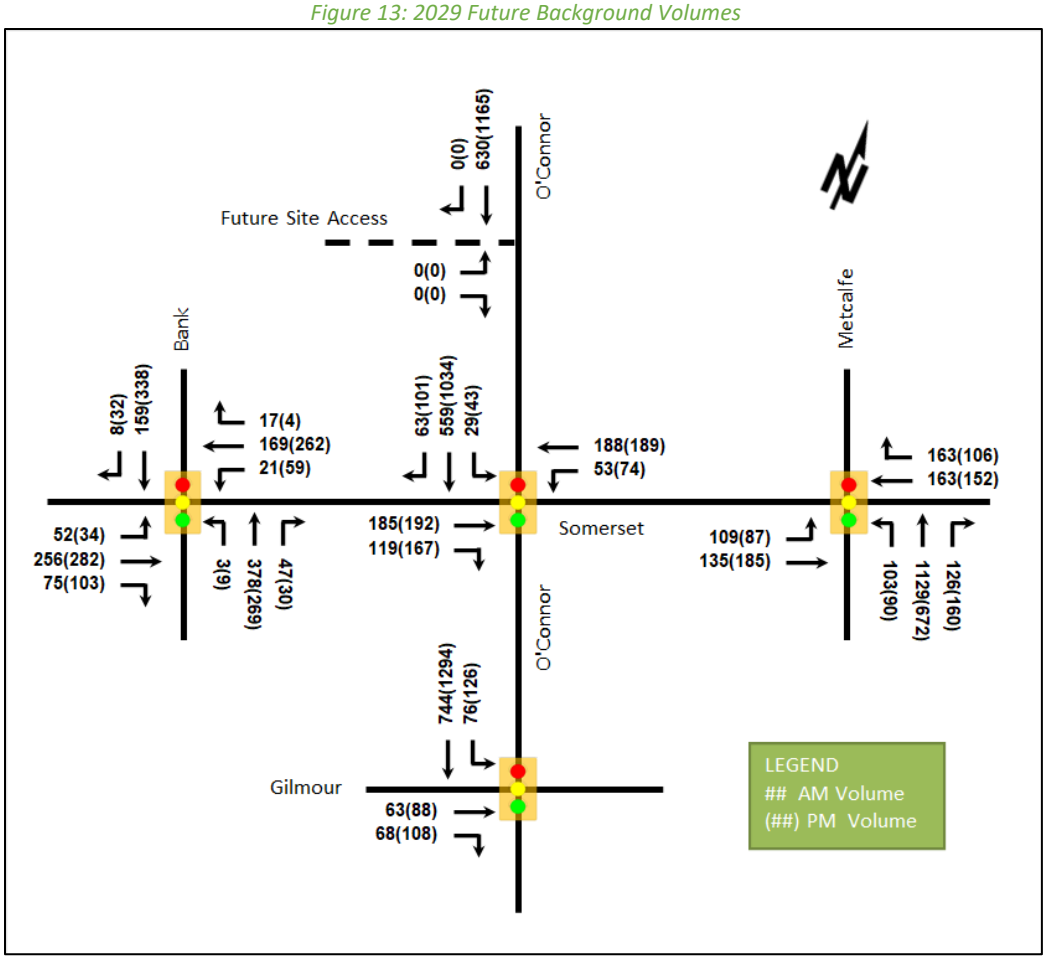


Table 15: 2029 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Bank Street at Somerset Street W *Signalized*	EBL/T	B	0.61	27.4	60.9	B	0.61	27.1	62.1
	EBR	A	0.23	20.7	17.5	A	0.26	20.9	22.1
	WBL	A	0.10	8.6	m2.3	A	0.25	14.5	m6.0
	WBT/R	A	0.34	9.6	14.0	A	0.47	15.8	m31.7
	NBT/R	A	0.50	13.9	58.8	A	0.37	12.0	39.8
	SBT/R	A	0.19	10.0	21.2	A	0.43	12.9	49.0
	Overall	**A**	**0.54**	**16.5**	**-**	**A**	**0.50**	**17.0**	**-**
O'Connor Street at Somerset Street W *Signalized*	EBT/R	A	0.45	16.5	40.3	B	0.66	44.3	77.7
	WBL/T	A	0.38	23.8	m46.2	A	0.59	19.5	30.9
	SB	A	0.47	16.0	45.5	C	0.76	19.5	91.1
	Overall	**A**	**0.44**	**17.7**	**-**	**C**	**0.71**	**24.5**	**-**
Metcalfe Street at Somerset Street W *Signalized*	EBL/T	A	0.58	17.9	41.7	A	0.52	20.0	m41.5
	WBT/R	A	0.57	22.1	58.7	A	0.45	18.6	43.3
	NB	B	0.68	17.5	66.3	A	0.50	13.7	39.1
	Overall	**B**	**0.63**	**18.3**	**-**	**A**	**0.50**	**15.8**	**-**
O'Connor Street at Gilmour Street *Signalized*	EBT/R	A	0.35	16.9	21.6	A	0.54	25.1	36.7
	SBL/T	A	0.38	3.5	15.8	B	0.67	6.6	32.3
	Overall	**A**	**0.35**	**5.4**	**-**	**B**	**0.62**	**8.8**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay is measured in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

During both the AM and PM peak hours, the study area intersections at the 2029 future background horizon operate similarly to the 2024 future background conditions. No new capacity issues are noted.

7.3 Modal Share Sensitivity

No capacity constraints have been noted at any study area intersections. Given the application of unmodified district mode shares and considering the downtown land-use context of the site, rationalization for adjusted demand is not required for this TIA.

8 Development Design

8.1 Design for Sustainable Modes

The proposed development is a mixed-use building with vehicle parking located underground and bicycle parking, located internal to the building, accessing the site's driveway. Bicycle parking is located in a secure storage room on the main floor and in the three underground parking levels. The ramps to underground parking are proposed as having 16% grades with 8% transition grades. Hard surface connections are provided from all proposed building entrances to the surrounding pedestrian facilities, additionally providing access to area transit. Stops for the routes #6, #7, #11, and the southbound routes #5, #14, and #114 are located within 400 metres of the proposed building entrances, with the northbound routes #5, #14, and #114 are just beyond this distance on the opposite side of Elgin Street.

8.2 Circulation and Access

Vehicle and bicycle access are proposed via the right-in/right-out access onto O'Connor Street. Any fence or wall separating the properties will need a setback of 3.5 metres from the near edge of the sidewalk to provide sight lines for exiting vehicles. The sight lines can be permitted through a maximum height of 0.75 metres through the setback or a transparent structure, e.g. ,chain link fence.

The internal garbage storage area accesses the site's driveway, and as such, garbage collection may either be collected in the vehicle driveway area or carted further to be collected on O'Connor Street. Emergency services are assumed to be able to access the site via its two arterial road frontages.

9 Parking

9.1 Parking Supply

The site provides 110 bicycle spaces (0.71 spaces per unit), 51 tenant vehicle parking spaces (0.35 spaces per unit after the first 12), and 14 visitor vehicle parking spaces (0.1 spaces per unit after the first 12). The site is seeking a parking exemption to permit the site to provide parking below the zoning by-law minimum parking provisions of 65 tenants spaces, given the site is in Area Y and as all parking is located underground. The visitor and bicycle parking minimum parking requirements are being met. All parking is located underground across three levels. The trip forecasts from the site, based on the surrounding area of the City, support the decreased parking rate and would serve the estimated auto travel to and from the site during peak hours.

9.2 Spillover Parking

Examining the trip generation presented in Section 5.2, based upon existing area mode shares, primary auto trips generated by the proposed development are 18 two-way AM peak hour auto trips, and 21 two-way PM peak hour auto trips. Given that the site is proposing a total of 51 tenant parking spaces and 14 visitor parking spaces, it is assumed that the parking demand will be satisfied even with the reduced parking rate for tenant parking. Notwithstanding the alignment of the modal share targets and proposed parking rates, effects from any remaining potential spillover from the tenant parking will be examined.

A review of the Centretown LAPS, over 600 spaces off-street parking spaces are provided within 400 metres of the site and were noted to have available capacity throughout the week. The on-street parking is generally limited to two-hours and are also noted to have residual capacity to support spill over parking. The weekends are noted to have reduced capacity during Saturdays and Sunday morning.

Overall, while the site is anticipated to meet the parking demands generated by the type of development in this area of the City, the surrounding area is expected to be able to support the minimal theoretical amount of residual parking demands from the site. Additionally, the marketing of the site and TDM measures should promote non-auto travel and limited parking for residents.

10 Boundary Street Design

Table 16 summarizes the MMLOS analysis for the boundary streets of O'Connor Street and Somerset Street West. The existing and future conditions for both streets will be the same and are considered in one row. The boundary street analysis is based on the designation of "General Urban Area" for O'Connor Street and Traditional Mainstreet for Somerset Street W. The MMLOS worksheets has been provided in Appendix I.

Table 16: Boundary Street MMLOS Analysis

Segment	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target
O'Connor Street	C	C	A	C	N/A	N/A	C	D
Somerset Street W	A	B	**E**	C	N/A	N/A	B	D

The boundary streets will meet MMLOS targets for all but the bicycle LOS on Somerset Street W due to mixed traffic conditions. To meet targets, Somerset Street W would require a curbside bike lane, however limited opportunity exists for improvements within the corridor given right of way constraints. Given the limits of the site

frontage, the performance of cycling facilities for the greater Somerset Street W corridor context should be investigated by the City to determine an appropriate treatment.

Crowding PLOS is not considered in the PLOS due to the excessively high-volume threshold. At the lowest threshold given, of 250 pedestrians per hour, the minimum effective sidewalk width required to achieve LOS A would be 3.0 metres, whereby nearly any sidewalk considered for installation in the City would not be able to meet this target.

11 Access Intersections Design

11.1 Location and Design of Access

The site will access the one-way southbound O'Connor Street via a right-in/right-out access at the northernmost extent of the site.

11.2 Intersection Control

Based upon the projected volumes, the site access will have stop-control on the minor approach. No further traffic control is necessary to address operational issues.

11.3 Access Intersection Design

11.3.1 2024 Future Total Access Intersection Operations

The 2024 future total intersection volumes are illustrated in Figure 14 and the access intersection operations are summarized below in Table 17. The level of service for unsignalized intersections is based on HCM 2010 delay. The synchro worksheets have been provided in Appendix J.

Figure 14: 2024 Future Total Volumes

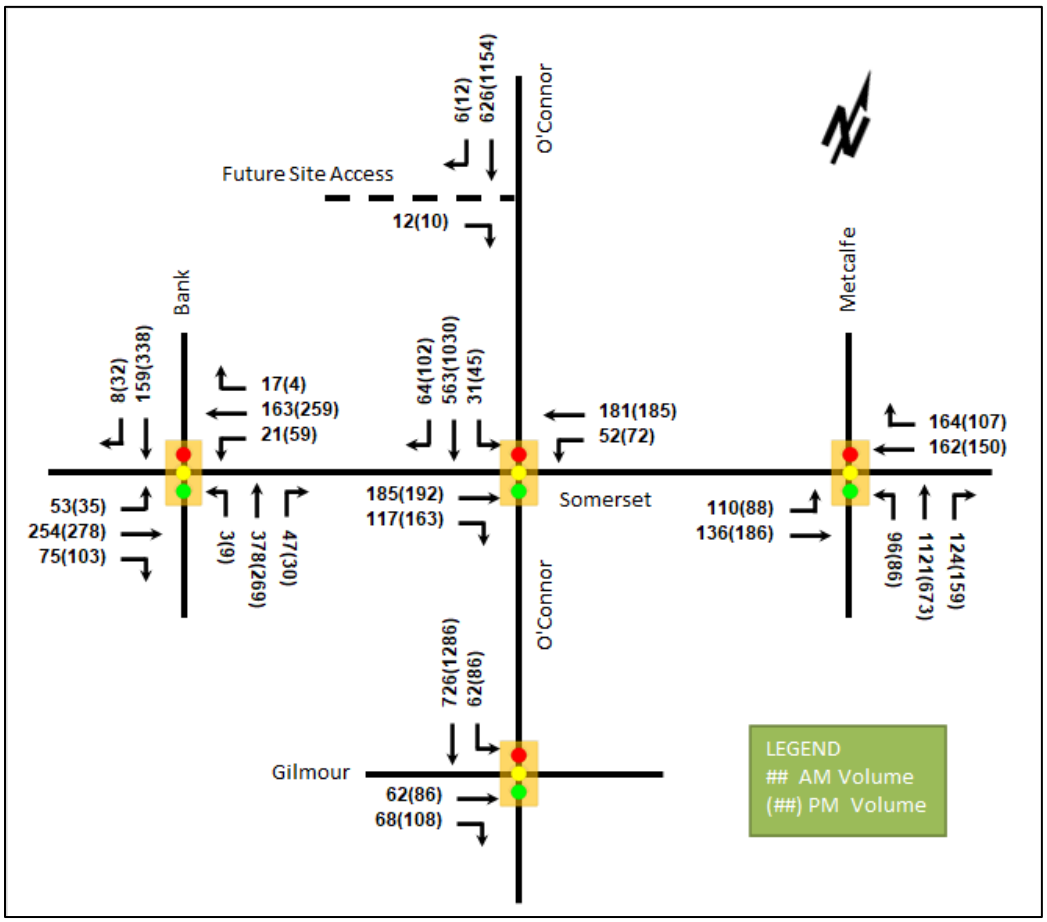


Table 17: 2024 Future Total Access Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Site Access at O'Connor Street	EBR	B	0.02	10.4	0.8	B	0.02	13.1	0.8
	SBT/R	-	-	-	-	-	-	-	-
Unsignalized	**Overall**	**A**	**-**	**0.2**	**-**	**A**	**-**	**0.1**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay is measured in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The access intersection on the 2024 future total horizons operates well. No capacity issues are noted.

11.3.2 2029 Future Total Access Intersection Operations

The 2029 future total intersection volumes are illustrated in Figure 14 and the access intersection operations are summarized below in Table 17. The level of service for unsignalized intersections is based on HCM 2010 delay. The synchro worksheets have been provided in Appendix K.

Figure 15: 2029 Future Total Volumes

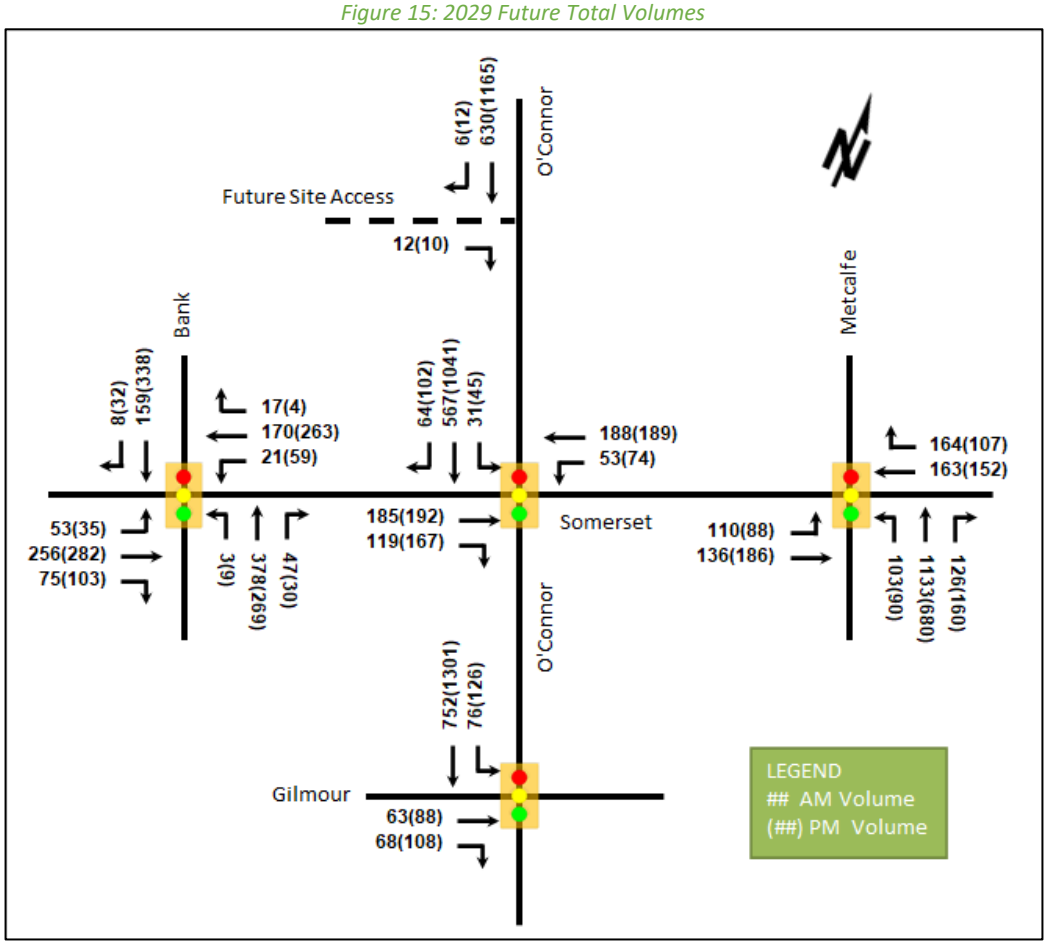


Table 18: 2029 Future Total Access Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Site Access at O'Connor Street	EBR	B	0.02	10.4	0.8	B	0.02	13.1	0.8
	SBT/R	-	-	-	-	-	-	-	-
Unsignalized	**Overall**	**A**	**-**	**0.2**	**-**	**A**	**-**	**0.1**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay is measured in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The access intersection on the 2029 future total horizons operates well. No capacity issues are noted.

11.3.3 Access Intersection MMLOS

As the access intersection will be unsignalized, no access intersection MMLOS analysis has been performed.

11.3.4 Recommended Design Elements

The exemption for the driveway from the adjacent property requires a 3.5-metre setback from the near edge of the sidewalk for any structure on the shared property line to maintain adequate sight lines between accesses and pedestrian facilities. For the length of this setback, it is recommended that any structure be either transparent or be no higher than 0.75 metres. No other access intersection design elements are proposed outside of the typical private approach considerations.

12 Transportation Demand Management

12.1 Context for TDM

The mode shares used within the TIA represent the unmodified district shares. The site further proposes a parking rate of 0.35 spaces per unit which should act as a constraint on the auto mode share beyond the level of auto use forecasted. Given the site context, supportive TDM measures should be provided and those aimed at increasing walk and bicycle modes should be of specific emphasis.

The subject site is within the Somerset Traditional Mainstreet Design Priority Area.

The total number of bedrooms is 187 across 125 studio and one-bedroom units and 31 two-bedroom. No age restrictions are noted.

12.2 Need and Opportunity

The foregoing analysis assumes a high level of walking, and similar levels of reliance on each the auto and transit modes. The proposed reduction in parking spaces reduces the risk of an increase in auto mode share above the area targets. Notwithstanding this constraint on additional vehicle trips, negligible impacts are anticipated from the potential failure to meet these targets.

12.3 TDM Program

The "suite of post occupancy TDM measures" has been summarized in the TDM checklists for the residential land uses. The checklist is provided in Appendix L. The key TDM measures recommended include:

- Display local area maps with walking/cycling access routes and key destinations at major entrances
- Display relevant transit schedules and route maps at entrances
- Provide a multimodal travel option information package to new residents
- Inclusion of a 1-month Presto card for first time new apartment rental, with a set time frame for this offer (e.g., 6-months) from the initial opening of the site
- Unbundle parking cost from purchase or rental costs

13 Transit

13.1 Route Capacity

In Section 5.1 the trip generation by mode was estimated, including an estimate of the number of transit trips that will be generated by the proposed development. Table 19 summarizes the transit trip generation.

Table 19: Trip Generation by Transit Mode

Travel Mode	Residential Mode Share AM(PM)	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Transit	28%(21%)	6	13	20	9	7	16

The proposed development is anticipated to generate an additional 20 AM peak hour transit trips and 16 PM peak hour transit trips. Of these trips, 13 outbound AM trips and 9 inbound PM trips are anticipated. From the trip distribution found in Section 5.3, the development is anticipated to generate less than five trips in each direction. As such and, given a minimum of 15-minute service in each direction, no service changes are anticipated as being required to accommodate site-generated transit trips.

13.2 Transit Priority

Examining the study area intersection delays, negligible impacts are noted on the transit movements at the study area intersections.

14 Network Intersection Design

14.1 Network Intersection Control

No change to the existing signalized control is recommended for the network intersections.

14.2 Network Intersection Design

14.2.1 2024 Future Total Network Intersection Operations

The 2024 future total network intersection operations are summarized below in Table 20. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets have been provided in Appendix J.

Table 20: 2024 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Bank Street at Somerset Street W *Signalized*	EBL/T	B	0.61	27.4	60.8	A	0.60	27.0	61.6
	EBR	A	0.23	20.9	17.6	A	0.27	21.0	22.2
	WBL	A	0.10	8.8	m2.4	A	0.25	14.7	m6.4
	WBT/R	A	0.33	9.6	13.9	A	0.47	16.1	m31.9
	NBT/R	A	0.50	13.9	58.9	A	0.37	12.0	39.8
	SBT/R	A	0.19	10.0	21.2	A	0.43	12.9	49.0
	Overall	**A**	**0.54**	**16.6**	**-**	**A**	**0.50**	**17.1**	**-**
O'Connor Street at Somerset Street W *Signalized*	EBT/R	A	0.44	16.5	40.2	B	0.66	44.1	76.9
	WBL/T	A	0.37	24.2	m45.5	A	0.57	18.7	30.0
	SB	A	0.48	16.1	46.2	C	0.77	19.6	91.2
	Overall	**A**	**0.45**	**17.8**	**-**	**C**	**0.71**	**24.3**	**-**
Metcalfe Street at Somerset Street W *Signalized*	EBL/T	A	0.59	18.3	42.2	A	0.52	19.9	m42.0
	WBT/R	A	0.57	22.2	58.8	A	0.45	18.6	43.2
	NB	B	0.67	17.3	64.9	A	0.49	13.7	38.9
	Overall	**B**	**0.63**	**18.3**	**-**	**A**	**0.50**	**15.7**	**-**
O'Connor Street at Gilmour Street *Signalized*	EBT/R	A	0.34	16.6	21.4	A	0.54	24.8	36.2
	SBL/T	A	0.37	3.3	14.4	B	0.64	5.8	19.9
	Overall	**A**	**0.33**	**5.2**	**-**	**A**	**0.60**	**8.1**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay is measured in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The network intersections for the 2024 future total horizon continue to operate well, and similarly to the 2024 future background conditions. No new capacity issues are noted.

14.2.2 2029 Future Total Network Intersection Operations

The 2029 future total network intersection operations are summarized below in Table 20. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets have been provided in Appendix K.

Table 21: 2029 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Bank Street at Somerset Street W *Signalized*	EBL/T	B	0.61	27.5	61.2	B	0.61	27.2	62.2
	EBR	A	0.23	20.9	17.6	A	0.27	21.0	22.2
	WBL	A	0.10	8.7	m2.3	A	0.26	14.6	m6.0
	WBT/R	A	0.34	9.6	14.3	A	0.47	15.9	m31.8
	NBT/R	A	0.50	13.9	58.9	A	0.37	12.0	39.8
	SBT/R	A	0.19	10.0	21.2	A	0.43	12.9	49.0
	Overall	**A**	**0.54**	**16.6**	-	**A**	**0.50**	**17.1**	-
O'Connor Street at Somerset Street W *Signalized*	EBT/R	A	0.45	16.6	40.5	B	0.67	44.5	77.7
	WBL/T	A	0.38	23.8	m46.2	A	0.59	19.5	30.9
	SB	A	0.48	16.1	46.6	C	0.77	19.8	92.6
	Overall	**A**	**0.45**	**17.8**	-	**C**	**0.72**	**24.6**	-
Metcalfe Street at Somerset Street W *Signalized*	EBL/T	A	0.59	18.4	42.1	A	0.52	20.1	m41.7
	WBT/R	A	0.57	22.2	59.0	A	0.45	18.6	43.5
	NB	B	0.68	17.6	66.6	A	0.50	13.8	39.5
	Overall	**B**	**0.64**	**18.5**	-	**A**	**0.50**	**15.8**	-
O'Connor Street at Gilmour Street *Signalized*	EBT/R	A	0.35	16.9	21.6	A	0.55	25.3	36.8
	SBL/T	A	0.39	3.5	15.8	B	0.67	6.6	32.3
	Overall	**A**	**0.35**	**5.3**	-	**B**	**0.62**	**8.9**	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay is measured in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The network intersections for the 2029 future total horizon continue to operate well, and similarly to the 2029 future background conditions. No new capacity issues are noted.

14.2.3 Network Intersection MMLOS

Table 22 summarizes the MMLOS analysis for the study area network intersections below. The existing and future conditions for both intersections will be the same and are considered in one row. The intersection analysis is based on the designation of "Traditional Mainstreet" for the Somerset Street W at Bank Street and Somerset Street W at O'Connor Street intersections, and for "General Urban Area" for the Gilmour Street at O'Connor Street intersection and for the policy area of "Within 300m of a school" for the Somerset Street W at Metcalfe Street intersection. The MMLOS worksheets has been provided in Appendix I.

Table 22: Study Area Intersection MMLOS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Somerset Street W at O'Connor Street	B	B	C	C	N/A	N/A	**E**	D	C	D
Somerset Street W at Bank Street	**C**	B	**F**	C	D	D	**F**	D	A	D
Somerset Street W at Metcalfe Street	**B**	A	**E**	C	N/A	N/A	D	D	B	E
Gilmour Street at O'Connor Street	B	C	B	C	N/A	N/A	N/A	N/A	A	D

The MMLOS targets will not be met for the pedestrian and bicycle LOS at the intersection of Somerset Street W and Bank Street and the intersection of Somerset Street W and Metcalfe Street. Pedestrian delay LOS is not considered in the PLOS calculation.

To meet pedestrian LOS targets at both intersections, the roadways would need to be narrowed to no more than two lanes on all approaches.

To meet bicycle LOS targets, the eastbound approach at the intersection of Somerset Street W and Bank Street would require a configuration where cyclists do not have to shift left of the right-turning lane, such as a protected crossing, and the northbound approach at the intersection of Somerset Street and Metcalfe Street would require a two-stage left turn.

Truck LOS targets are not being met at the intersections of Somerset Street W at O'Connor Street and Somerset Street W and Bank Street. To meet targets, the southbound approach at the intersection of Somerset Street W and O'Connor Street and the eastbound and westbound approaches at the intersection of Somerset Street W and Bank Street would require either an additional receiving lane, or a greater than 15-metre effective turning radius. Given the trade-offs with pedestrian LOS and the downtown context, it is recommended that these mitigations not be implemented.

All other MMLOS targets are being met for the study area network intersections.

Pedestrian delay LOS is not considered in the PLOS calculation as it is not a suitable metric for the assessment of pedestrian LOS as formulated. This exclusion is consistent with City direction since 2015, and no alternative methodology has been provided for its assessment.

14.2.4 Recommended Design Elements

No study area intersection design elements are proposed as part of this study.

15 Summary of Improvements Indicated and Modifications Options

The following summarizes the analysis and results presented in this TIA report:

Proposed Site and Screening

- The proposed site includes 156 apartment dwelling units and 2,120 ft^2 of ground floor commercial space
- The site access is proposed as being right-in/right-out onto O'Connor Street
- The development is proposed to be completed as a single phase by 2024
- The Trip Generation, Location and Safety triggers were met for the TIA Screening
- This report accompanies a site plan application

Existing Conditions

- O'Connor Street, Somerset Street, Bank Street, and Metcalfe Street are arterial roads in the study area
- Sidewalks are provided on both sides of the study area roadways
- Two-way curb-separated bike lanes are on O'Connor Street, curb-separated bike lanes are on Laurier Avenue W, O'Connor Street, Metcalfe Street, Laurier Avenue W, and Somerset Street W are spine routes, and Bank Street and Elgin Street are local routes
- The high volumes on roadways produced elevated number of collisions at the intersection of Somerset Street W at O'Connor Street, however no collision type is overly represented
- Study area intersections operate well, with some queuing noted at the intersection of O'Connor Street and Somerset Street during the PM peak hour

Development Generated Travel Demand

- The proposed development is forecasted produce 68 two-way people trips during the AM peak hour and 77 two-way people trips during the PM peak hour
- Of the forecasted people trips, 18 two-way trips will be vehicle trips during the AM peak hour and 21 two-way trips will be vehicle trips during the PM peak hour
- Of the forecasted trips, 10% are anticipated to travel north, 35% south, 25% east, and 30% to travel west

Background Conditions

- The background developments were explicitly included in the background conditions, where from examination of the TRANS model, no growth was anticipated between existing conditions and 2031
- The study area intersections at both future horizons will operate similarly to the existing conditions

Development Design

- Auto parking will be underground across three parking levels, bicycle parking will be located internal to the building in both a secure storage room accessing the drive aisle and in the three parking levels
- Hard surface connections will be made along both site frontages to surrounding pedestrian facilities, transit stops for area routes are typically within 400 metres walk or just beyond this distance
- A setback of 3.5 metres from the near edge of the sidewalk is proposed for the wall separating the properties, where through the setback the structure be either transparent or the maximum height of the wall be 0.75 metres
- Garbage collection will either be via the site driveway or on O'Connor Street and emergency services are assumed to be able to access the site via its two arterial road frontages

Parking

- The site proposes bicycle parking at a rate of 0.71 spaces per unit for 110 spaces, tenant parking at a rate of 0.35 spaces after the first twelve units for a total of 51 spaces, and visitor parking at a rate of 0.1 spaces after the first twelve units for a total of 14 spaces
- Minimum visitor and bicycle parking provision rates are being met, and the site is proposing tenant parking at a deficit of 14 spaces from the minimum for which the development requires an exemption
- The proposed parking rate is supported by the forecasted trips and estimated site auto travel
- Residual capacity is noted in the surrounding area for private, paid, off-street, and on-street parking supply and can accommodate any minimal potential spillover parking from the site

Boundary Street Design

- The boundary streets will not meet bicycle MMLOS targets on Somerset Street W due to the mixed traffic conditions
- Limited opportunity for BLOS improvement exists due to corridor constraints, and the City should investigate treatment options for the greater corridor context

Access Intersections Design

- The site access is proposed as being right-in/right-out onto O'Connor Street and as being stop-controlled on the minor approach with O'Connor Street operating as a free flow corridor
- The access intersection operations perform well at both horizons
- The site is seeking an exemption for its access that does not provide minimum setbacks from the property line
- A 3.5-metre setback from the near edge of the sidewalk for any visual obstructions along the shared property line is recommended as part of access intersection design

TDM

- The site proposes providing parking at a rate commensurate with primary auto trip generation, and therefore, transit and active mode shares are likely to be achieved
- Supportive TDM measures to be included within the proposed development should include:
    - Display local area maps with walking/cycling access routes and key destinations at major entrances
    - Display relevant transit schedules and route maps at entrances
    - Provide a multimodal travel option information package to new residents
    - Inclusion of a 1-month Presto card for first time new townhome purchase and apartment rental, with a set time frame for this offer (e.g., 6-months) from the initial opening of the site
    - Unbundle parking cost from purchase or rental costs

Transit

- The site is anticipated to generate 13 outbound AM transit trips and 9 inbound PM transit trips
- Average site-generated ridership increases would translate to approximately one additional rider per bus per route in the area, thus no change is transit service is anticipated as being required
- Examining the study area intersection delays, negligible impacts are noted on the transit movements at the study area intersections

Network Intersection Design

- Generally, the network intersections will operate well at the future total horizons, where no capacity issues are noted
- The MMLOS targets will not be met for the pedestrian LOS and bicycle LOS at the intersections of Somerset Street W at Bank Street and Somerset Street W at Metcalfe Street intersections and for the truck LOS at the intersections of Somerset Street W at O'Connor Street and Somerset Street W and Bank Street
- Pedestrian LOS cannot be met with the existing approach geometries of the intersections
- The Somerset Street W at Bank Street intersection would require an approach where cyclists do not need to shift left of the right-turn lane, and the Somerset Street W at Metcalfe intersection would require a two-stage left turn
- Any mitigation aimed at meeting truck LOS would negatively impact pedestrian LOS, and given the downtown context, such treatments are not recommended

16 Conclusion

It is recommended that, from a transportation perspective, the proposed development applications proceed.

Prepared By:

John Kingsley, EIT
Transportation Engineering Intern

Reviewed By:

Andrew Harte, P.Eng.
Senior Transportation Engineer

Appendix A

TIA Screening Form and PM Certification Form

13 Markham Avenue
Ottawa ON K2G 3Z1

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: 15-Sep-20
Project Number: 2020-27
Project Reference: 311 Somerset

1.1 Description of Proposed Development	
Municipal Address	311 Somerset Street W, 234-236 O'Connor Street
Description of Location	Lots 5 and 41, Registered Plan 12281
Land Use Classification	TM[2185], R5B[482] F(3.0)
Development Size	16-Storey, 139-Unit Aartment Building
Accesses	One right-in-right-out access onto O'Connor St
Phase of Development	One phase
Buildout Year	2024
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Townhomes or apartments	
Development Size	139	Units
Trip Generation Trigger	Yes	

1.3 Location Triggers		
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	Yes	O'Connor Street Spine Route
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	Yes	Somerset Traditional Mainstreet, Downtown Ottawa Urban Design Strategy
Location Trigger	Yes	

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

TIA Plan Reports

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

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

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

CERTIFICATION

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

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

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 ___Ottawa_____ this __20__ day of _____September_____, 2018.
(City)

Name: _____Andrew Harte_____
(Please Print)

Professional Title: _____Professional Engineer_____

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

Office Contact Information (Please Print)
Address: 13 Markham Avenue
City / Postal Code: Ottawa / K2G 3Z1
Telephone / Extension: (613) 697-3797
E-Mail Address: Andrew.Harte@CGHTransportation.com

Appendix B

Turning Movement Counts

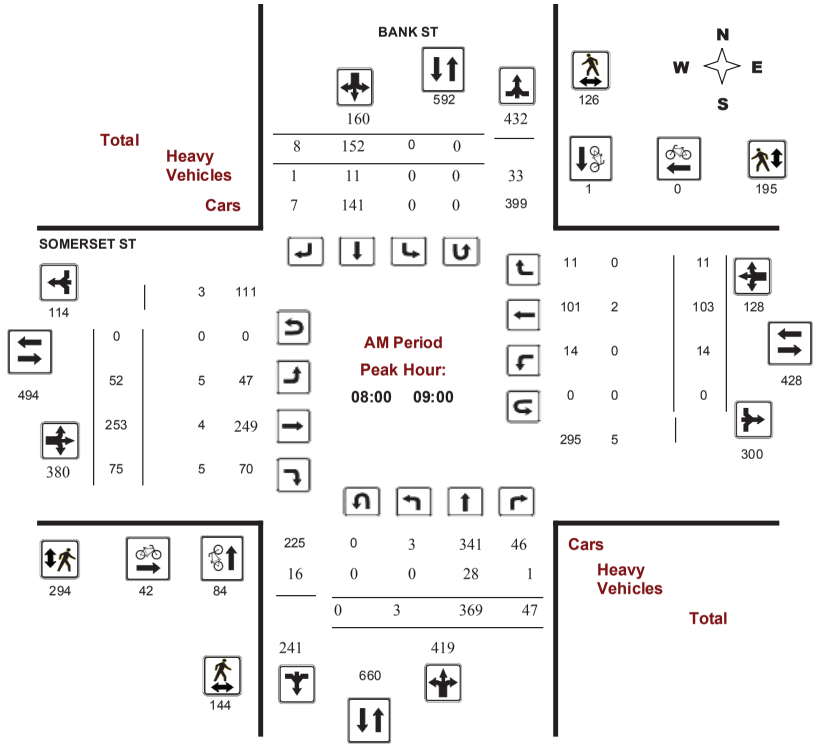
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BANK ST @ SOMERSET ST

Survey Date: Wednesday, August 05, 2015
Start Time: 07:00

WO No: 34727
Device: Jamar Technologies, Inc



Comments

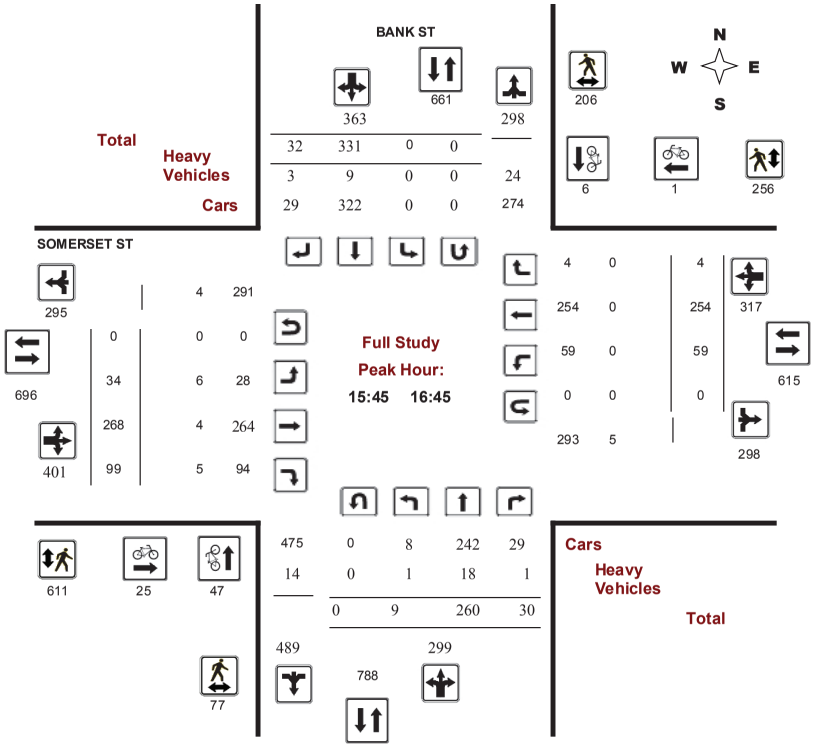
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BANK ST @ SOMERSET ST

Survey Date: Wednesday, August 05, 2015
Start Time: 07:00

WO No: 34727
Device: Jamar Technologies, Inc



Comments

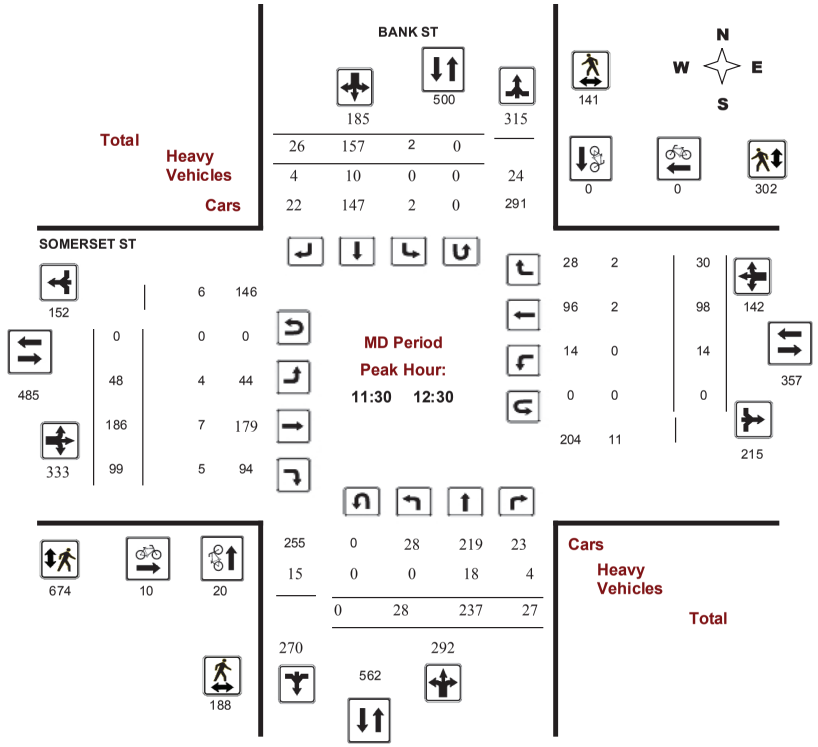
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BANK ST @ SOMERSET ST

Survey Date: Wednesday, August 05, 2015
Start Time: 07:00

WO No: 34727
Device: Jamar Technologies, Inc



Comments

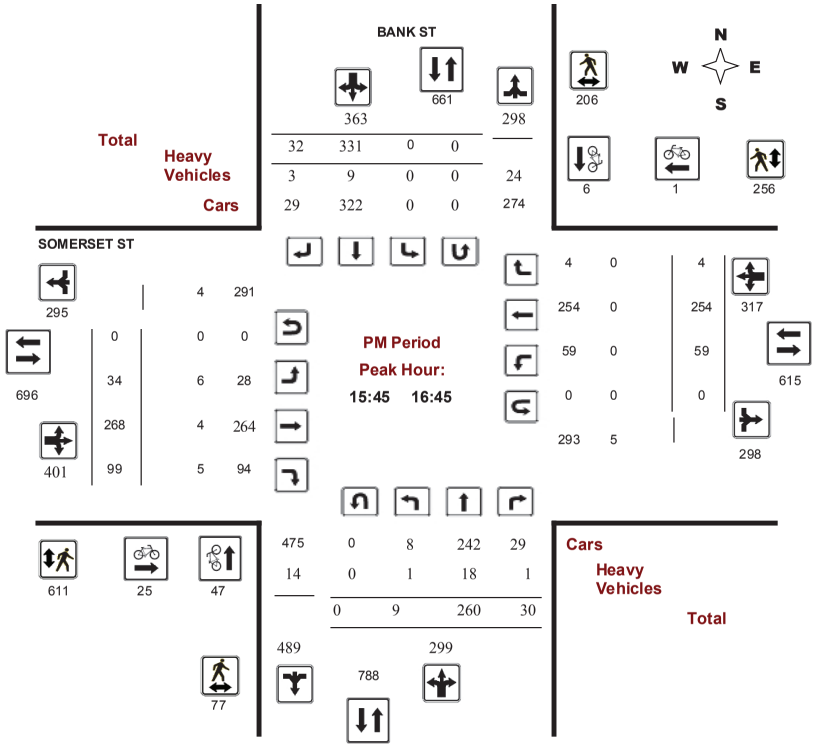
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BANK ST @ SOMERSET ST

Survey Date: Wednesday, August 05, 2015
Start Time: 07:00

WO No: 34727
Device: Jamar Technologies, Inc



Comments

Transportation Services - Traffic Services

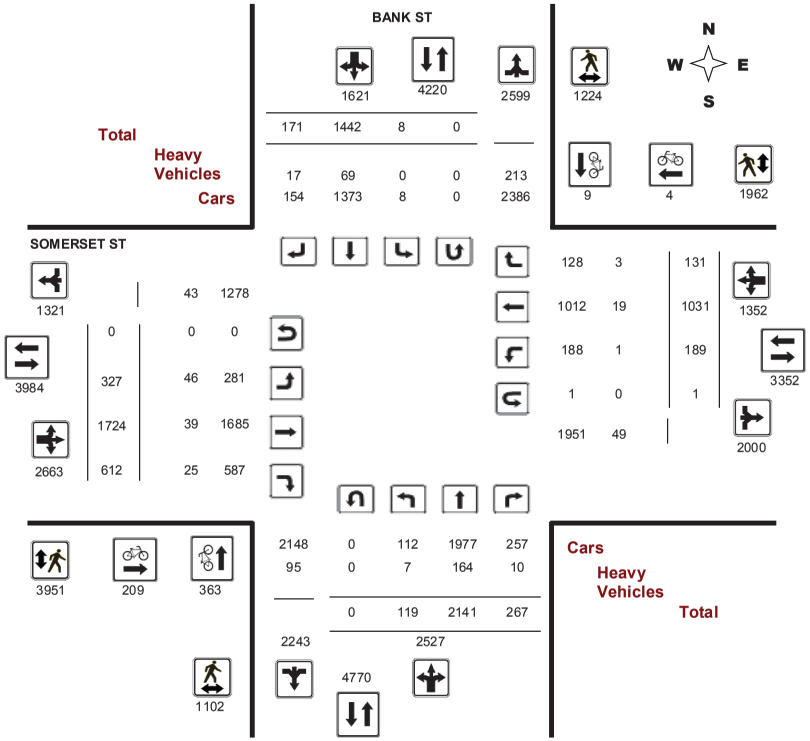
Turning Movement Count - Full Study Diagram

BANK ST @ SOMERSET ST

Survey Date: Wednesday, August 05, 2015

WO#: 34727

Device: Jamar Technologies, Inc



Comments

Transportation Services - Traffic Services

Work Order 34727

Turning Movement Count - Full Study Summary Report

BANK ST @ SOMERSET ST

Survey Date: Wednesday, August 05, 2015

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 1

AADT Factor .90

Full Study

	BANK ST									SOMERSET ST									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	3	251	36	**290**	0	103	13	**116**	**406**	46	160	39	**245**	14	58	11	**83**	**328**	**734**
08:00 09:00	3	369	47	**419**	0	152	8	**160**	**579**	52	253	75	**380**	14	103	11	**128**	**508**	**1087**
09:00 10:00	25	266	44	**335**	1	133	23	**157**	**492**	46	199	60	**305**	15	100	9	**124**	**429**	**921**
11:30 12:30	28	237	27	**292**	2	157	26	**185**	**477**	48	186	99	**333**	14	98	30	**142**	**475**	**952**
12:30 13:30	24	240	23	**287**	0	147	22	**169**	**456**	30	196	83	**309**	8	114	38	**160**	**469**	**925**
15:00 16:00	14	253	24	**291**	3	247	19	**269**	**560**	30	228	83	**341**	41	191	8	**240**	**581**	**1141**
16:00 17:00	7	260	30	**297**	0	287	29	**316**	**613**	38	253	96	**387**	39	222	10	**271**	**658**	**1271**
17:00 18:00	15	265	36	**316**	2	216	31	**249**	**565**	37	249	77	**363**	44	145	14	**203**	**566**	**1131**
Sub Total	119	2141	267	**2527**	8	1442	171	**1621**	**4148**	327	1724	612	**2663**	189	1031	131	**1351**	**4014**	**8162**
U Turns				**0**				**0**	**0**				**0**				**1**	**1**	**1**
Total	119	2141	267	**2527**	8	1442	171	**1621**	**4148**	327	1724	612	**2663**	189	1031	131	**1352**	**4015**	**8163**
EQ 12Hr	165	2976	371	**3513**	11	2004	238	**2253**	**5766**	455	2396	851	**3702**	263	1433	182	**1879**	**5581**	**11347**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor. **1.39**																			
AVG 12Hr	149	2678	334	**3161**	10	1804	214	**2028**	**5189**	409	2157	766	**3331**	236	1290	164	**1691**	**5022**	**10211**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **.90**																			
AVG 24Hr	195	3509	438	**4141**	13	2363	280	**2657**	**6798**	536	2825	1003	**4364**	310	1690	215	**2216**	**6580**	**13378**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**																			

Comments:

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

W.O. 34727

Turning Movement Count - 15 Minute Summary Report

BANK ST @ SOMERSET ST

Survey Date: Wednesday, August 05, 2015

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 1

		BANK ST								SOMERSET ST									
		Northbound				Southbound				Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	1	49	6	**56**	0	27	4	**31**	**87**	5	30	10	**45**	4	10	4	**19**	**64**	**151**
07:15	07:30	0	55	11	**66**	0	24	4	**28**	**94**	11	30	11	**52**	6	16	5	**27**	**79**	**173**
07:30	07:45	2	72	9	**83**	0	28	2	**30**	**113**	17	52	12	**81**	3	17	1	**21**	**102**	**215**
07:45	08:00	0	75	10	**85**	0	24	3	**27**	**112**	13	48	6	**67**	1	15	1	**17**	**84**	**196**
08:00	08:15	0	91	15	**106**	0	44	1	**45**	**151**	10	65	25	**100**	5	23	2	**30**	**130**	**281**
08:15	08:30	0	88	9	**97**	0	21	1	**22**	**119**	18	60	13	**91**	1	38	1	**40**	**131**	**250**
08:30	08:45	2	95	11	**108**	0	46	1	**47**	**155**	13	69	13	**95**	3	28	7	**38**	**133**	**288**
08:45	09:00	1	95	12	**108**	0	41	5	**46**	**154**	11	59	24	**94**	5	14	1	**20**	**114**	**268**
09:00	09:15	7	72	13	**92**	0	26	1	**27**	**119**	13	43	14	**70**	1	11	1	**13**	**83**	**202**
09:15	09:30	3	65	8	**76**	0	24	1	**25**	**101**	9	53	19	**81**	4	42	3	**49**	**130**	**231**
09:30	09:45	7	64	10	**81**	0	40	13	**53**	**134**	13	50	15	**78**	4	18	1	**23**	**101**	**235**
09:45	10:00	8	65	13	**86**	1	43	8	**52**	**138**	11	53	12	**76**	6	29	4	**39**	**115**	**253**
11:30	11:45	6	81	4	**91**	0	57	10	**67**	**158**	17	48	22	**87**	5	23	7	**35**	**122**	**280**
11:45	12:00	9	41	7	**57**	2	44	8	**54**	**111**	10	44	23	**77**	1	15	2	**18**	**95**	**206**
12:00	12:15	6	57	11	**74**	0	9	2	**11**	**85**	9	52	25	**86**	5	35	3	**43**	**129**	**214**
12:15	12:30	7	58	5	**70**	0	47	6	**53**	**123**	12	42	29	**83**	3	25	18	**46**	**129**	**252**
12:30	12:45	6	40	5	**51**	0	34	7	**41**	**92**	8	44	21	**73**	0	33	7	**40**	**113**	**205**
12:45	13:00	7	65	9	**81**	0	11	12	**23**	**104**	7	51	19	**77**	4	41	11	**56**	**133**	**237**
13:00	13:15	4	68	4	**76**	0	50	1	**51**	**127**	6	52	22	**80**	1	21	8	**30**	**110**	**237**
13:15	13:30	7	67	5	**79**	0	52	2	**54**	**133**	9	49	21	**79**	3	19	12	**34**	**113**	**246**
15:00	15:15	2	68	4	**74**	0	29	0	**29**	**103**	5	44	7	**56**	4	40	4	**48**	**104**	**207**
15:15	15:30	6	67	7	**80**	1	48	7	**56**	**136**	5	64	23	**92**	7	38	0	**45**	**137**	**273**
15:30	15:45	2	55	3	**60**	2	82	7	**91**	**151**	11	54	30	**95**	7	37	4	**48**	**143**	**294**
15:45	16:00	4	63	10	**77**	0	88	5	**93**	**170**	9	66	23	**98**	23	76	0	**99**	**197**	**367**
16:00	16:15	2	48	5	**55**	0	70	10	**80**	**135**	7	72	23	**102**	16	58	2	**76**	**178**	**313**
16:15	16:30	1	76	7	**84**	0	95	10	**105**	**189**	10	64	21	**95**	7	71	1	**79**	**174**	**363**
16:30	16:45	2	73	8	**83**	0	78	7	**85**	**168**	8	66	32	**106**	13	49	1	**63**	**169**	**337**
16:45	17:00	2	63	10	**75**	0	44	2	**46**	**121**	13	51	20	**84**	3	44	6	**53**	**137**	**258**
17:00	17:15	1	76	9	**86**	0	42	4	**46**	**132**	4	71	16	**91**	3	60	7	**70**	**161**	**293**
17:15	17:30	2	69	15	**86**	0	54	8	**62**	**148**	10	81	20	**111**	22	47	2	**71**	**182**	**330**
17:30	17:45	7	58	6	**71**	0	54	6	**60**	**131**	12	53	20	**85**	11	17	0	**28**	**113**	**244**
17:45	18:00	5	62	6	**73**	2	66	13	**81**	**154**	11	44	21	**76**	8	21	5	**34**	**110**	**264**
TOTAL:		119	2141	267	**2527**	8	1442	171	**1621**	**4148**	327	1724	612	**2663**	189	1031	131	**1352**	**4015**	**8163**

Note: U-Turns are included in Totals.

Comment:

Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order 34727

BANK ST @ SOMERSET ST

Count Date: Wednesday, August 05, 2015 **Start Time:** 07:00

	BANK ST			SOMERSET ST			
Time Period	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00 08:00	42	1	**43**	25	0	**25**	**68**
08:00 09:00	84	1	**85**	42	0	**42**	**127**
09:00 10:00	69	0	**69**	34	2	**36**	**105**
11:30 12:30	20	0	**20**	10	0	**10**	**30**
12:30 13:30	42	0	**42**	17	0	**17**	**59**
15:00 16:00	34	3	**37**	18	0	**18**	**55**
16:00 17:00	48	4	**52**	23	1	**24**	**76**
17:00 18:00	24	0	**24**	40	1	**41**	**65**
Total	363	9	**372**	209	4	**213**	**585**

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

W.O. 34727

Turning Movement Count - Heavy Vehicle Report

BANK ST @ SOMERSET ST

Survey Date: Wednesday, August 05, 2015

Time Period	BANK ST Northbound LT	ST	RT	N TOT	BANK ST Southbound LT	ST	RT	S TOT	STR TOT	SOMERSET ST Eastbound LT	ST	RT	E TOT	SOMERSET ST Westbound LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 08:00	3	23	0	**26**	0	13	3	**16**	**42**	7	6	1	**14**	0	2	1	**3**	**17**	**59**
08:00 09:00	0	28	1	**29**	0	11	1	**12**	**41**	5	4	5	**14**	0	2	0	**2**	**16**	**57**
09:00 10:00	1	22	3	**26**	0	3	2	**5**	**31**	7	6	5	**18**	1	2	0	**3**	**21**	**52**
11:30 12:30	0	18	4	**22**	0	10	4	**14**	**36**	4	7	5	**16**	0	2	2	**4**	**20**	**56**
12:30 13:30	2	21	1	**24**	0	6	2	**8**	**32**	5	5	3	**13**	0	7	0	**7**	**20**	**52**
15:00 16:00	0	17	1	**18**	0	11	1	**12**	**30**	6	5	2	**13**	0	2	0	**2**	**15**	**45**
16:00 17:00	1	21	0	**22**	0	9	4	**13**	**35**	6	3	4	**13**	0	1	0	**1**	**14**	**49**
17:00 18:00	0	14	0	**14**	0	6	0	**6**	**20**	6	3	0	**9**	0	1	0	**1**	**10**	**30**
Sub Total	7	164	10	**181**	0	69	17	**86**	**267**	46	39	25	**110**	1	19	3	**23**	**133**	**400**
U-Turns (Heavy Vehicles)				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	7	164	10	**0**	0	69	17	**86**	**267**	46	39	25	**110**	1	19	3	**23**	**133**	**400**

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

Work Order 34727

Turning Movement Count - Pedestrian Volume Report

BANK ST @ SOMERSET ST

Count Date: Wednesday, August 05, 2015 **Start Time:** 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	16	21	**37**	25	22	**47**	**84**
07:15 07:30	15	17	**32**	27	46	**73**	**105**
07:30 07:45	17	10	**27**	38	41	**79**	**106**
07:45 08:00	27	21	**48**	45	50	**95**	**143**
07:00 08:00	75	69	**144**	135	159	**294**	**438**
08:00 08:15	22	30	**52**	55	56	**111**	**163**
08:15 08:30	36	30	**66**	78	50	**128**	**194**
08:30 08:45	29	32	**61**	73	41	**114**	**175**
08:45 09:00	57	34	**91**	88	48	**136**	**227**
08:00 09:00	144	126	**270**	294	195	**489**	**759**
09:00 09:15	32	29	**61**	79	42	**121**	**182**
09:15 09:30	33	22	**55**	61	23	**84**	**139**
09:30 09:45	31	50	**81**	78	38	**116**	**197**
09:45 10:00	33	43	**76**	66	35	**101**	**177**
09:00 10:00	129	144	**273**	284	138	**422**	**695**
11:30 11:45	24	42	**66**	108	80	**188**	**254**
11:45 12:00	42	50	**92**	159	32	**191**	**283**
12:00 12:15	61	19	**80**	194	108	**302**	**382**
12:15 12:30	61	30	**91**	213	82	**295**	**386**
11:30 12:30	188	141	**329**	674	302	**976**	**1305**
12:30 12:45	70	37	**107**	209	58	**267**	**374**
12:45 13:00	58	37	**95**	202	61	**263**	**358**
13:00 13:15	58	34	**92**	182	115	**297**	**389**
13:15 13:30	61	35	**96**	187	96	**283**	**379**
12:30 13:30	247	143	**390**	780	330	**1110**	**1500**
15:00 15:15	51	17	**68**	83	50	**133**	**201**
15:15 15:30	12	22	**34**	118	45	**163**	**197**
15:30 15:45	28	52	**80**	129	44	**173**	**253**
15:45 16:00	21	48	**69**	133	54	**187**	**256**
15:00 16:00	112	139	**251**	463	193	**656**	**907**
16:00 16:15	12	40	**52**	146	101	**247**	**299**
16:15 16:30	19	63	**82**	169	44	**213**	**295**
16:30 16:45	25	55	**80**	163	57	**220**	**300**
16:45 17:00	11	65	**76**	164	78	**242**	**318**
16:00 17:00	67	223	**290**	642	280	**922**	**1212**
17:00 17:15	31	83	**114**	179	88	**267**	**381**
17:15 17:30	39	72	**111**	186	86	**272**	**383**
17:30 17:45	34	44	**78**	160	93	**253**	**331**
17:45 18:00	36	40	**76**	154	98	**252**	**328**
17:00 18:00	140	239	**379**	679	365	**1044**	**1423**
Total	1102	1224	**2326**	3951	1962	**5913**	**8239**

Comment:

Transportation Services - Traffic Services

Work Order 34727

Turning Movement Count - 15 Min U-Turn Total Report

BANK ST @ SOMERSET ST

Survey Date: Wednesday, August 05, 2015

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	1	1
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	1	1

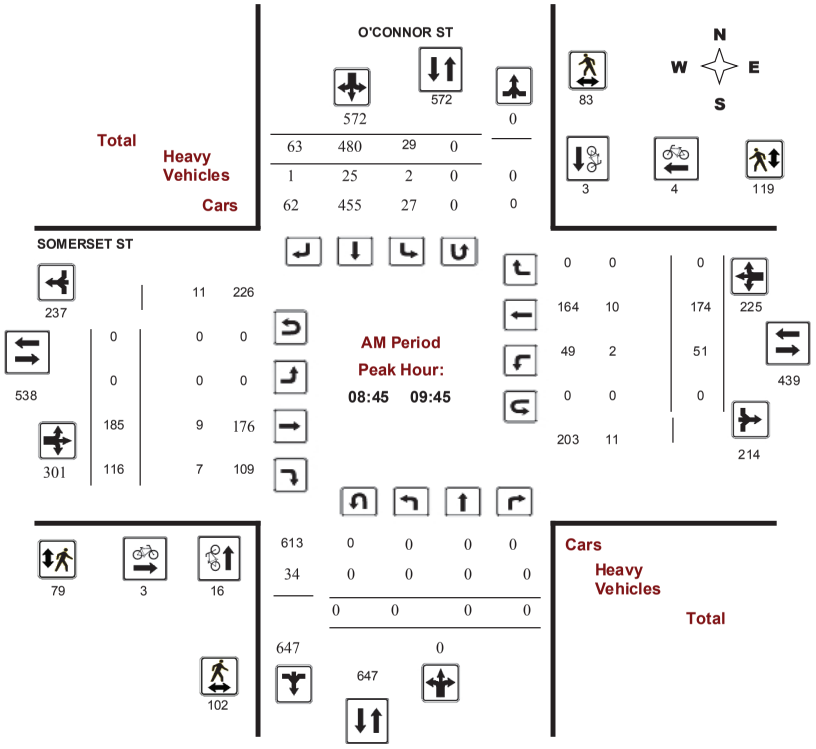
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017 **WO No:** 36787

Start Time: 07:00 **Device:** Miovision



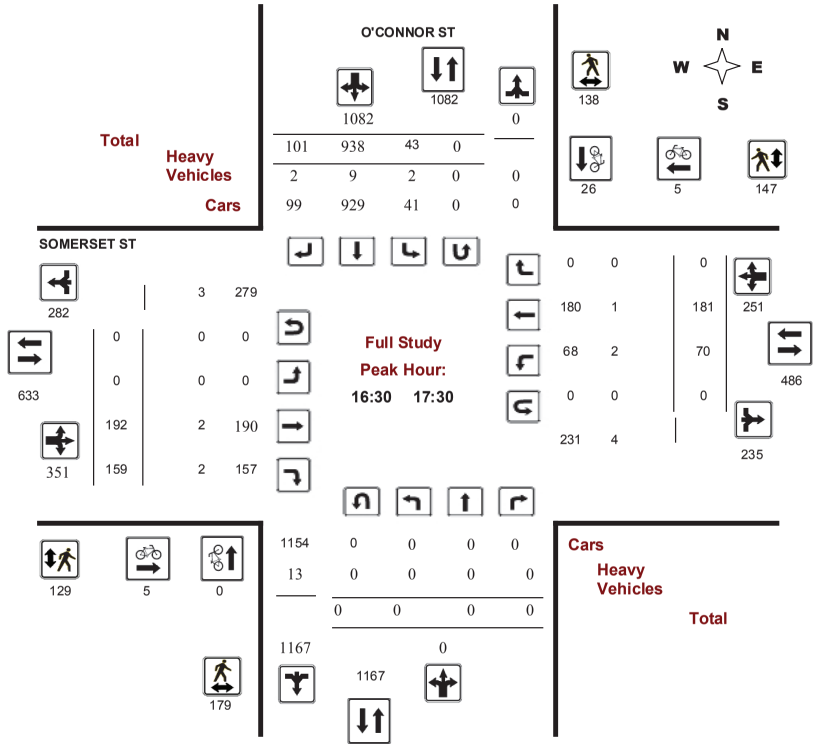
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017 **WO No:** 36787

Start Time: 07:00 **Device:** Miovision



Comments

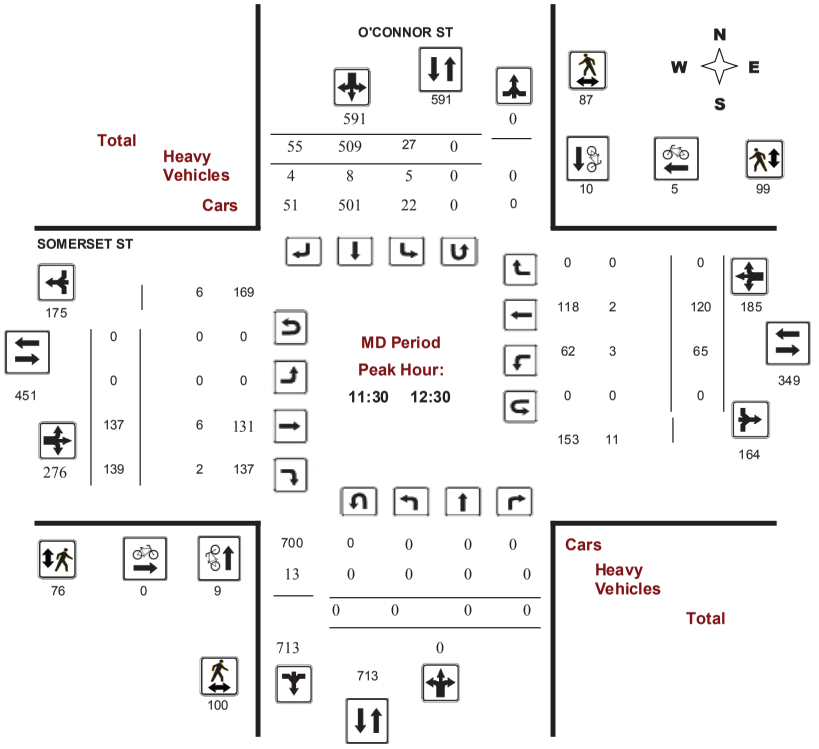
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017 **WO No:** 36787

Start Time: 07:00 **Device:** Miovision



Comments

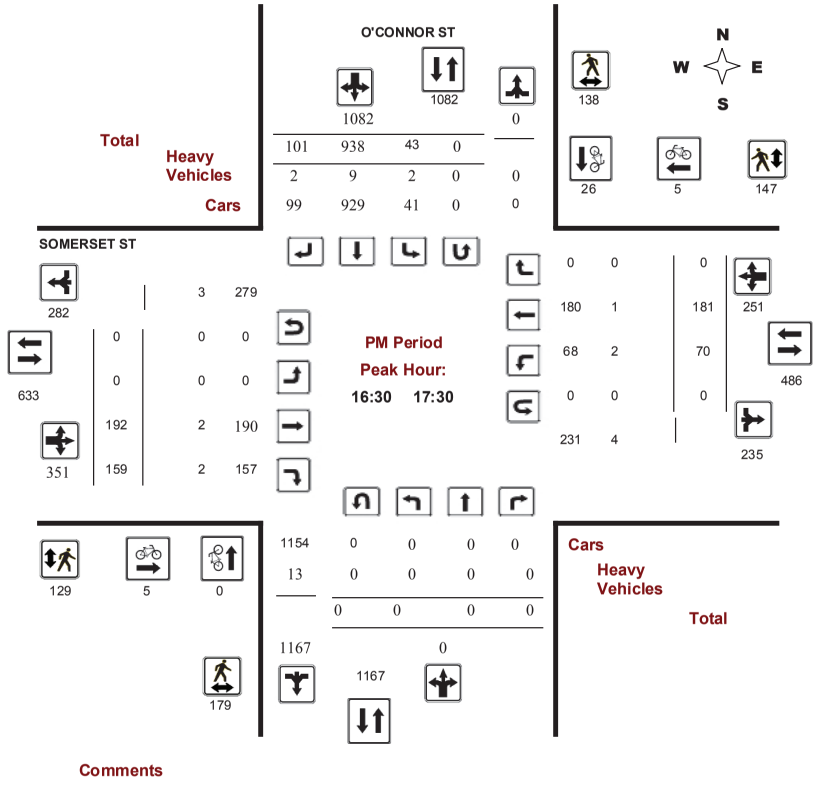
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017 **WO No:** 36787

Start Time: 07:00 **Device:** Miovision



Comments

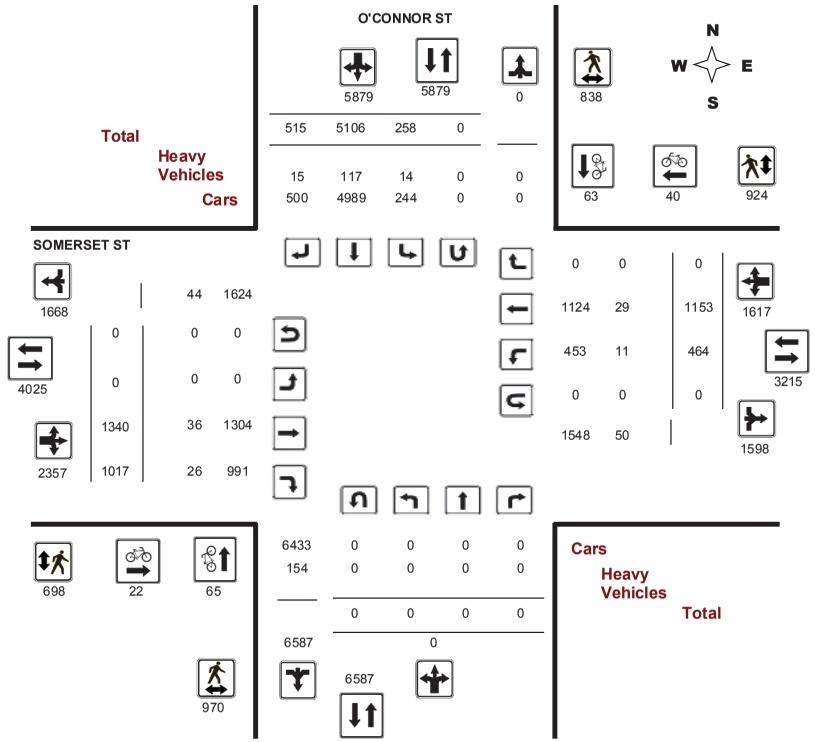
Transportation Services - Traffic Services

Turning Movement Count - Full Study Diagram

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017 **WO#:** 36787

Device: Miovision



Comments

Transportation Services - Traffic Services

Work Order 36787

Turning Movement Count - Full Study Summary Report

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor 1.00

Full Study

	O'CONNOR ST									SOMERSET ST									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	0	0	0	**0**	19	443	45	**507**	**507**	0	143	78	**221**	36	109	0	**145**	**366**	**873**
08:00 09:00	0	0	0	**0**	42	466	50	**558**	**558**	0	197	110	**307**	57	164	0	**221**	**528**	**1086**
09:00 10:00	0	0	0	**0**	20	484	68	**572**	**572**	0	170	108	**278**	56	165	0	**221**	**499**	**1071**
11:30 12:30	0	0	0	**0**	27	509	55	**591**	**591**	0	137	139	**276**	65	120	0	**185**	**461**	**1052**
12:30 13:30	0	0	0	**0**	31	497	57	**585**	**585**	0	145	105	**250**	41	116	0	**157**	**407**	**992**
15:00 16:00	0	0	0	**0**	37	872	64	**973**	**973**	0	168	181	**349**	79	142	0	**221**	**570**	**1543**
16:00 17:00	0	0	0	**0**	45	916	88	**1049**	**1049**	0	198	155	**353**	60	161	0	**221**	**574**	**1623**
17:00 18:00	0	0	0	**0**	37	919	88	**1044**	**1044**	0	182	141	**323**	70	176	0	**246**	**569**	**1613**
Sub Total	0	0	0	**0**	258	5106	515	**5879**	**5879**	0	1340	1017	**2357**	464	1153	0	**1617**	**3974**	**9853**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	0	0	0	**0**	258	5106	515	**5879**	**5879**	0	1340	1017	**2357**	464	1153	0	**1617**	**3974**	**9853**
EQ 12Hr	0	0	0	**0**	359	7097	716	**8172**	**8172**	0	1863	1414	**3276**	645	1603	0	**2248**	**5524**	**13696**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	0	0	0	**0**	359	7097	716	**8172**	**8172**	0	1863	1414	**3276**	645	1603	0	**2248**	**5524**	**13696**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**1.00**						
AVG 24Hr	0	0	0	**0**	470	9298	938	**10705**	**10705**	0	2440	1852	**4292**	845	2099	0	**2944**	**7236**	**17941**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													**1.31**						

Comments:
Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

W.O. 36787

Turning Movement Count - 15 Minute Summary Report

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

	O'CONNOR ST									SOMERSET ST									
	Northbound				Southbound					Eastbound				Westbound					
Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	0	0	0	**0**	4	90	9	**103**	**103**	0	21	12	**33**	3	13	0	**16**	**49**	**152**
07:15 07:30	0	0	0	**0**	2	102	8	**112**	**112**	0	37	16	**53**	6	21	0	**27**	**80**	**192**
07:30 07:45	0	0	0	**0**	6	127	5	**138**	**138**	0	37	27	**64**	17	45	0	**62**	**126**	**264**
07:45 08:00	0	0	0	**0**	7	124	23	**154**	**154**	0	48	23	**71**	10	30	0	**40**	**111**	**265**
08:00 08:15	0	0	0	**0**	8	134	14	**156**	**156**	0	60	25	**85**	13	40	0	**53**	**138**	**294**
08:15 08:30	0	0	0	**0**	7	99	15	**121**	**121**	0	41	23	**64**	18	41	0	**59**	**123**	**244**
08:30 08:45	0	0	0	**0**	12	113	10	**135**	**135**	0	52	29	**81**	17	38	0	**55**	**136**	**271**
08:45 09:00	0	0	0	**0**	15	120	11	**146**	**146**	0	44	33	**77**	9	45	0	**54**	**131**	**277**
09:00 09:15	0	0	0	**0**	8	127	13	**148**	**148**	0	52	31	**83**	13	41	0	**54**	**137**	**285**
09:15 09:30	0	0	0	**0**	4	104	16	**124**	**124**	0	45	26	**71**	16	44	0	**60**	**131**	**255**
09:30 09:45	0	0	0	**0**	2	129	23	**154**	**154**	0	44	26	**70**	13	44	0	**57**	**127**	**281**
09:45 10:00	0	0	0	**0**	6	124	16	**146**	**146**	0	29	25	**54**	14	36	0	**50**	**104**	**250**
11:30 11:45	0	0	0	**0**	3	130	21	**154**	**154**	0	29	31	**60**	17	31	0	**48**	**108**	**262**
11:45 12:00	0	0	0	**0**	9	123	14	**146**	**146**	0	46	50	**96**	19	31	0	**50**	**146**	**292**
12:00 12:15	0	0	0	**0**	7	125	11	**143**	**143**	0	26	34	**60**	20	29	0	**49**	**109**	**252**
12:15 12:30	0	0	0	**0**	8	131	9	**148**	**148**	0	36	24	**60**	9	29	0	**38**	**98**	**246**
12:30 12:45	0	0	0	**0**	4	115	16	**135**	**135**	0	45	29	**74**	12	23	0	**35**	**109**	**244**
12:45 13:00	0	0	0	**0**	13	134	15	**162**	**162**	0	34	25	**59**	11	37	0	**48**	**107**	**269**
13:00 13:15	0	0	0	**0**	11	129	9	**149**	**149**	0	33	28	**61**	9	26	0	**35**	**96**	**245**
13:15 13:30	0	0	0	**0**	3	119	17	**139**	**139**	0	33	23	**56**	9	30	0	**39**	**95**	**234**
15:00 15:15	0	0	0	**0**	13	227	17	**257**	**257**	0	35	48	**83**	24	32	0	**56**	**139**	**396**
15:15 15:30	0	0	0	**0**	10	224	11	**245**	**245**	0	37	47	**84**	18	35	0	**53**	**137**	**382**
15:30 15:45	0	0	0	**0**	6	210	25	**241**	**241**	0	51	39	**90**	20	32	0	**52**	**142**	**383**
15:45 16:00	0	0	0	**0**	8	211	11	**230**	**230**	0	45	47	**92**	17	43	0	**60**	**152**	**382**
16:00 16:15	0	0	0	**0**	7	230	16	**253**	**253**	0	52	34	**86**	11	44	0	**55**	**141**	**394**
16:15 16:30	0	0	0	**0**	9	236	24	**269**	**269**	0	53	41	**94**	16	38	0	**54**	**148**	**417**
16:30 16:45	0	0	0	**0**	14	240	27	**281**	**281**	0	51	38	**89**	16	43	0	**59**	**148**	**429**
16:45 17:00	0	0	0	**0**	15	210	21	**246**	**246**	0	42	42	**84**	17	36	0	**53**	**137**	**383**
17:00 17:15	0	0	0	**0**	7	242	24	**273**	**273**	0	47	40	**87**	24	56	0	**80**	**167**	**440**
17:15 17:30	0	0	0	**0**	7	246	29	**282**	**282**	0	52	39	**91**	13	46	0	**59**	**150**	**432**
17:30 17:45	0	0	0	**0**	13	238	18	**269**	**269**	0	31	30	**61**	12	45	0	**57**	**118**	**387**
17:45 18:00	0	0	0	**0**	10	193	17	**220**	**220**	0	52	32	**84**	21	29	0	**50**	**134**	**354**
TOTAL:	0	0	0	**0**	258	5106	515	**5879**	**5879**	0	1340	1017	**2357**	464	1153	0	**1617**	**3974**	**9853**

Note: U-Turns are included in Totals.

Comment:

Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order 36787

O'CONNOR ST @ SOMERSET ST

Count Date: Tuesday, March 21, 2017 **Start Time:** 07:00

Time Period	O'CONNOR ST Northbound	O'CONNOR ST Southbound	O'CONNOR ST Street Total	SOMERSET ST Eastbound	SOMERSET ST Westbound	SOMERSET ST Street Total	Grand Total
07:00 08:00	8	1	**9**	3	3	**6**	**15**
08:00 09:00	30	1	**31**	2	6	**8**	**39**
09:00 10:00	10	3	**13**	3	2	**5**	**18**
11:30 12:30	9	10	**19**	0	5	**5**	**24**
12:30 13:30	5	1	**6**	0	3	**3**	**9**
15:00 16:00	2	10	**12**	3	3	**6**	**18**
16:00 17:00	1	18	**19**	6	5	**11**	**30**
17:00 18:00	0	19	**19**	5	13	**18**	**37**
Total	65	63	**128**	22	40	**62**	**190**

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

W.O. 36787

Turning Movement Count - Heavy Vehicle Report

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017

Time Period	O'CONNOR ST Northbound LT	ST	RT	N TOT	Southbound LT	ST	RT	S TOT	STR TOT	SOMERSET ST Eastbound LT	ST	RT	E TOT	Westbound LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 08:00	0	0	0	**0**	1	20	3	**24**	**24**	0	8	3	**11**	0	4	0	**4**	**15**	**39**
08:00 09:00	0	0	0	**0**	1	15	2	**18**	**18**	0	5	2	**7**	3	3	0	**6**	**13**	**31**
09:00 10:00	0	0	0	**0**	1	26	1	**28**	**28**	0	6	6	**12**	1	9	0	**10**	**22**	**50**
11:30 12:30	0	0	0	**0**	5	8	4	**17**	**17**	0	6	2	**8**	3	2	0	**5**	**13**	**30**
12:30 13:30	0	0	0	**0**	1	16	2	**19**	**19**	0	3	4	**7**	1	4	0	**5**	**12**	**31**
15:00 16:00	0	0	0	**0**	1	8	1	**10**	**10**	0	5	3	**8**	1	3	0	**4**	**12**	**22**
16:00 17:00	0	0	0	**0**	3	15	2	**20**	**20**	0	3	5	**8**	2	3	0	**5**	**13**	**33**
17:00 18:00	0	0	0	**0**	1	9	0	**10**	**10**	0	0	1	**1**	0	1	0	**1**	**2**	**12**
Sub Total	0	0	0	**0**	14	117	15	**146**	**146**	0	36	26	**62**	11	29	0	**40**	**102**	**248**
U-Turns (Heavy Vehicles)				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	0	0	0	**0**	14	117	15	**146**	**146**	0	36	26	**62**	11	29	0	**40**	**102**	**248**

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

Work Order 36787

Turning Movement Count - Pedestrian Volume Report

O'CONNOR ST @ SOMERSET ST

Count Date: Tuesday, March 21, 2017 **Start Time:** 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	7	4	**11**	13	3	**16**	**27**
07:15 07:30	11	14	**25**	8	16	**24**	**49**
07:30 07:45	11	22	**33**	19	22	**41**	**74**
07:45 08:00	27	22	**49**	25	34	**59**	**108**
07:00 08:00	56	62	**118**	65	75	**140**	**258**
08:00 08:15	36	27	**63**	31	42	**73**	**136**
08:15 08:30	39	16	**55**	26	47	**73**	**128**
08:30 08:45	34	39	**73**	35	53	**88**	**161**
08:45 09:00	44	37	**81**	28	58	**86**	**167**
08:00 09:00	153	119	**272**	120	200	**320**	**592**
09:00 09:15	24	22	**46**	18	34	**52**	**98**
09:15 09:30	19	18	**37**	21	15	**36**	**73**
09:30 09:45	15	6	**21**	12	12	**24**	**45**
09:45 10:00	19	9	**28**	13	18	**31**	**59**
09:00 10:00	77	55	**132**	64	79	**143**	**275**
11:30 11:45	27	22	**49**	16	15	**31**	**80**
11:45 12:00	22	22	**44**	17	27	**44**	**88**
12:00 12:15	30	21	**51**	19	28	**47**	**98**
12:15 12:30	21	22	**43**	24	29	**53**	**96**
11:30 12:30	100	87	**187**	76	99	**175**	**362**
12:30 12:45	32	23	**55**	16	28	**44**	**99**
12:45 13:00	27	43	**70**	13	28	**41**	**111**
13:00 13:15	29	30	**59**	14	24	**38**	**97**
13:15 13:30	24	18	**42**	23	18	**41**	**83**
12:30 13:30	112	114	**226**	66	98	**164**	**390**
15:00 15:15	29	26	**55**	18	15	**33**	**88**
15:15 15:30	23	21	**44**	13	20	**33**	**77**
15:30 15:45	37	23	**60**	19	19	**38**	**98**
15:45 16:00	31	27	**58**	7	26	**33**	**91**
15:00 16:00	120	97	**217**	57	80	**137**	**354**
16:00 16:15	33	32	**65**	24	34	**58**	**123**
16:15 16:30	37	34	**71**	38	43	**81**	**152**
16:30 16:45	47	36	**83**	32	34	**66**	**149**
16:45 17:00	41	37	**78**	27	34	**61**	**139**
16:00 17:00	158	139	**297**	121	145	**266**	**563**
17:00 17:15	52	36	**88**	44	38	**82**	**170**
17:15 17:30	39	29	**68**	26	41	**67**	**135**
17:30 17:45	53	39	**92**	35	34	**69**	**161**
17:45 18:00	50	61	**111**	24	35	**59**	**170**
17:00 18:00	194	165	**359**	129	148	**277**	**636**
Total	970	838	**1808**	698	924	**1622**	**3430**

Comment:

Transportation Services - Traffic Services

Work Order 36787

Turning Movement Count - 15 Min U-Turn Total Report

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	0	0

Transportation Services - Traffic Services

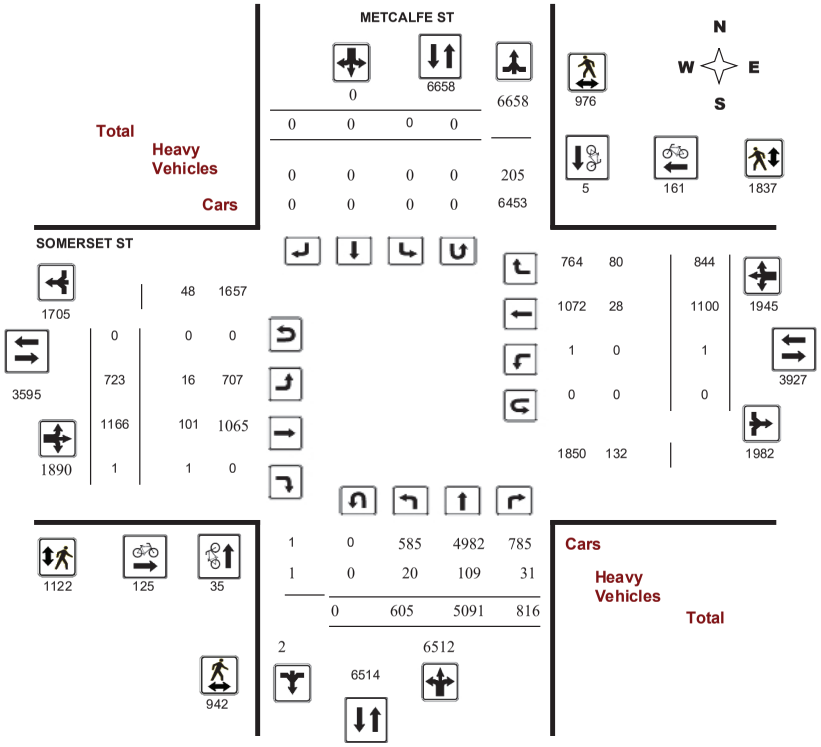
Turning Movement Count - Study Results

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019 **WO No:** 38599

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

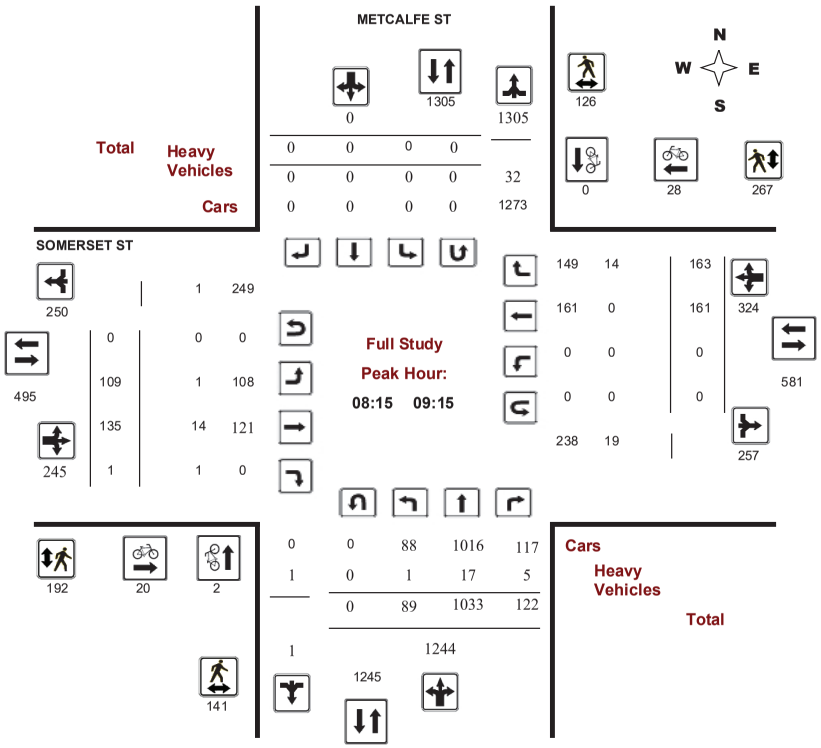
Turning Movement Count - Study Results

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019 **WO No:** 38599

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



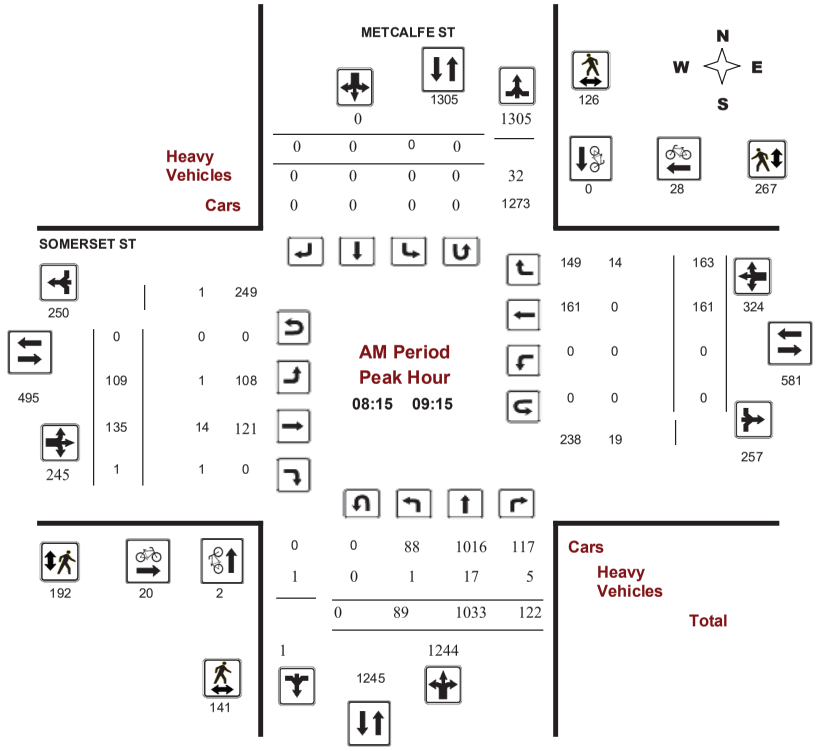
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019 **WO No:** 38599

Start Time: 07:00 **Device:** Miovision



Comments

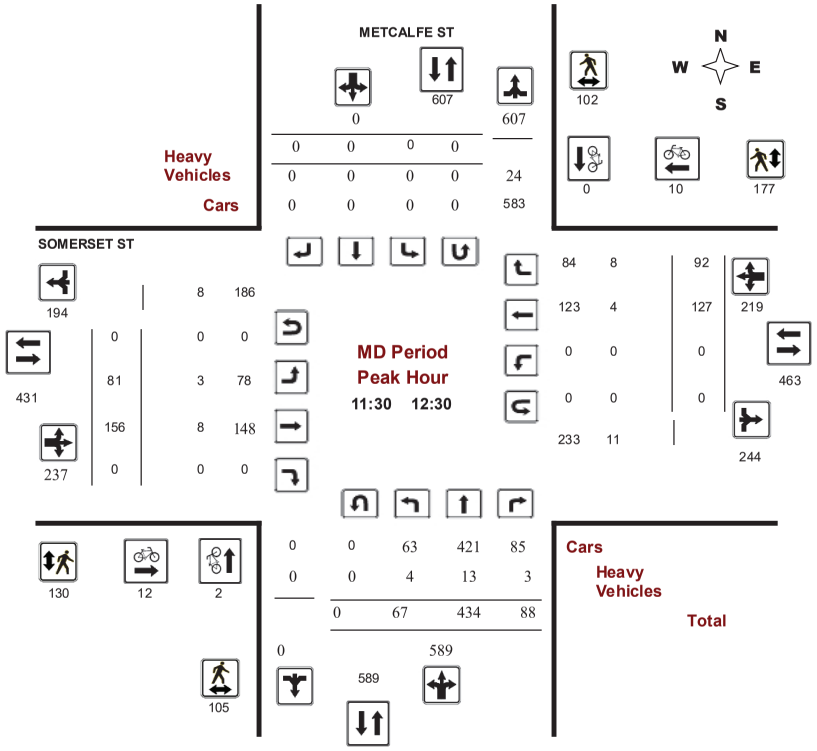
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019 **WO No:** 38599

Start Time: 07:00 **Device:** Miovision



Comments

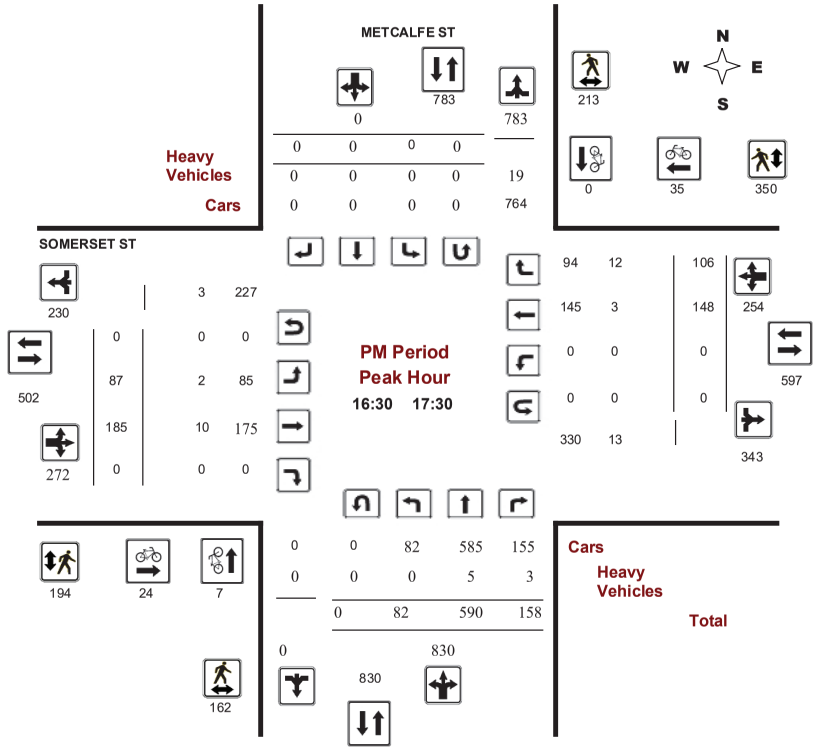
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019 **WO No:** 38599

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019 **WO No:** 38599

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, May 02, 2019

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

	METCALFE ST								SOMERSET ST									
	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	67	999	99	**1165**	0	0	0	**0**	**1165**	96	77	0	**173**	0	106	84	**190**	**363**	**1528**
08:00 09:00	84	1054	121	**1259**	0	0	0	**0**	**1259**	115	131	1	**247**	0	154	153	**307**	**554**	**1813**
09:00 10:00	78	690	70	**838**	0	0	0	**0**	**838**	109	146	0	**255**	0	143	121	**264**	**519**	**1357**
11:30 12:30	67	434	88	**589**	0	0	0	**0**	**589**	81	156	0	**237**	0	127	92	**219**	**456**	**1045**
12:30 13:30	54	408	69	**531**	0	0	0	**0**	**531**	94	126	0	**220**	1	129	85	**215**	**435**	**966**
15:00 16:00	87	428	97	**612**	0	0	0	**0**	**612**	61	162	0	**223**	0	139	92	**231**	**454**	**1066**
16:00 17:00	93	549	137	**779**	0	0	0	**0**	**779**	91	190	0	**281**	0	142	114	**256**	**537**	**1316**
17:00 18:00	75	529	135	**739**	0	0	0	**0**	**739**	76	178	0	**254**	0	160	103	**263**	**517**	**1256**
Sub Total	605	5091	816	**6512**	0	0	0	**0**	**6512**	723	1166	1	**1890**	1	1100	844	**1945**	**3835**	**10347**
U Turns	0			**0**	0			**0**	**0**	**0**			**0**	0			**0**	**0**	**0**
Total	605	5091	816	**6512**	0	0	0	**0**	**6512**	723	1166	1	**1890**	1	1100	844	**1945**	**3835**	**10347**
EQ 12Hr	841	7076	1134	**9051**	0	0	0	**0**	**9051**	1005	1621	1	**2627**	1	1529	1173	**2703**	**5330**	**14381**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	757	6368	1021	**8146**	0	0	0	**0**	**8146**	904	1459	1	**2364**	1	1376	1056	**2433**	**4797**	**12943**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**.90**					
AVG 24Hr	992	8342	1338	**10672**	0	0	0	**0**	**10672**	1184	1911	1	**3096**	1	1803	1383	**3187**	**6283**	**16955**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019 **WO No:** 38599

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		METCALFE ST									SOMERSET ST									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	15	209	16	240	0	0	0	0	**240**	20	9	0	29	0	12	12	24	**53**	**293**
07:15	07:30	16	252	29	297	0	0	0	0	**297**	26	17	0	43	0	25	18	43	**86**	**383**
07:30	07:45	20	252	28	300	0	0	0	0	**300**	29	22	0	51	0	31	28	59	**110**	**410**
07:45	08:00	16	286	26	328	0	0	0	0	**328**	21	29	0	50	0	38	26	64	**114**	**442**
08:00	08:15	16	257	24	297	0	0	0	0	**297**	33	32	0	65	0	29	26	55	**120**	**417**
08:15	08:30	30	292	31	353	0	0	0	0	**353**	24	40	0	64	0	33	37	70	**134**	**487**
08:30	08:45	19	255	33	307	0	0	0	0	**307**	32	32	0	64	0	51	32	83	**147**	**454**
08:45	09:00	19	250	33	302	0	0	0	0	**302**	26	27	1	54	0	41	58	99	**153**	**455**
09:00	09:15	21	236	25	282	0	0	0	0	**282**	27	36	0	63	0	36	36	72	**135**	**417**
09:15	09:30	14	130	15	159	0	0	0	0	**159**	21	34	0	55	0	37	34	71	**126**	**285**
09:30	09:45	20	171	20	211	0	0	0	0	**211**	34	37	0	71	0	40	25	65	**136**	**347**
09:45	10:00	23	153	10	186	0	0	0	0	**186**	27	39	0	66	0	30	26	56	**122**	**308**
11:30	11:45	21	99	22	142	0	0	0	0	**142**	19	42	0	61	0	28	31	59	**120**	**262**
11:45	12:00	24	127	28	179	0	0	0	0	**179**	18	32	0	50	0	29	13	42	**92**	**271**
12:00	12:15	11	94	22	127	0	0	0	0	**127**	26	46	0	72	0	33	27	60	**132**	**259**
12:15	12:30	11	114	16	141	0	0	0	0	**141**	18	36	0	54	0	37	21	58	**112**	**253**
12:30	12:45	18	115	19	152	0	0	0	0	**152**	20	23	0	43	0	23	19	42	**85**	**237**
12:45	13:00	14	91	16	121	0	0	0	0	**121**	30	39	0	69	0	34	19	53	**122**	**243**
13:00	13:15	12	110	16	138	0	0	0	0	**138**	25	28	0	53	1	37	30	68	**121**	**259**
13:15	13:30	10	92	18	120	0	0	0	0	**120**	19	36	0	55	0	35	17	52	**107**	**227**
15:00	15:15	18	95	22	135	0	0	0	0	**135**	14	33	0	47	0	39	17	56	**103**	**238**
15:15	15:30	21	103	29	153	0	0	0	0	**153**	15	39	0	54	0	33	31	64	**118**	**271**
15:30	15:45	27	97	25	149	0	0	0	0	**149**	18	44	0	62	0	29	24	53	**115**	**264**
15:45	16:00	21	133	21	175	0	0	0	0	**175**	14	46	0	60	0	38	20	58	**118**	**293**
16:00	16:15	26	159	33	218	0	0	0	0	**218**	10	54	0	64	0	39	32	71	**135**	**353**
16:15	16:30	22	103	29	154	0	0	0	0	**154**	27	43	0	70	0	39	26	65	**135**	**289**
17:15	17:30	13	149	38	200	0	0	0	0	**200**	18	39	0	57	0	40	25	65	**122**	**322**
16:30	16:45	23	157	38	218	0	0	0	0	**218**	22	48	0	70	0	39	22	61	**131**	**349**
16:45	17:00	22	130	37	189	0	0	0	0	**189**	32	45	0	77	0	25	34	59	**136**	**325**
17:00	17:15	24	154	45	223	0	0	0	0	**223**	15	53	0	68	0	44	25	69	**137**	**360**
17:30	17:45	24	121	26	171	0	0	0	0	**171**	23	55	0	78	0	49	22	71	**149**	**320**
17:45	18:00	14	105	26	145	0	0	0	0	**145**	20	31	0	51	0	27	31	58	**109**	**254**
Total:		605	5091	816	6512	0	0	0	0	**6512**	723	1166	1	1890	1	1100	844	1945	**6512**	**10,347**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019 **WO No:** 38599

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

		METCALFE ST			SOMERSET ST			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	**0**	1	6	**7**	**7**
07:15	07:30	0	0	**0**	0	1	**1**	**1**
07:30	07:45	0	0	**0**	7	4	**11**	**11**
07:45	08:00	1	0	**1**	3	2	**5**	**6**
08:00	08:15	0	0	**0**	1	4	**5**	**5**
08:15	08:30	0	0	**0**	4	5	**9**	**9**
08:30	08:45	0	0	**0**	6	10	**16**	**16**
08:45	09:00	2	0	**2**	5	9	**14**	**16**
09:00	09:15	0	0	**0**	5	4	**9**	**9**
09:15	09:30	1	1	**2**	4	3	**7**	**9**
09:30	09:45	0	0	**0**	1	1	**2**	**2**
09:45	10:00	1	0	**1**	1	4	**5**	**6**
11:30	11:45	1	0	**1**	4	5	**9**	**10**
11:45	12:00	0	0	**0**	1	2	**3**	**3**
12:00	12:15	1	0	**1**	4	3	**7**	**8**
12:15	12:30	0	0	**0**	3	0	**3**	**3**
12:30	12:45	1	0	**1**	3	3	**6**	**7**
12:45	13:00	1	0	**1**	5	5	**10**	**11**
13:00	13:15	0	0	**0**	2	0	**2**	**2**
13:15	13:30	3	0	**3**	3	3	**6**	**9**
15:00	15:15	3	1	**4**	3	1	**4**	**8**
15:15	15:30	3	0	**3**	5	5	**10**	**13**
15:30	15:45	3	0	**3**	9	10	**19**	**22**
15:45	16:00	1	0	**1**	4	7	**11**	**12**
16:00	16:15	2	0	**2**	5	5	**10**	**12**
16:15	16:30	2	2	**4**	3	10	**13**	**17**
17:15	17:30	1	0	**1**	5	8	**13**	**14**
16:30	16:45	2	0	**2**	8	13	**21**	**23**
16:45	17:00	2	0	**2**	5	8	**13**	**15**
17:00	17:15	2	0	**2**	6	6	**12**	**14**
17:30	17:45	1	0	**1**	4	8	**12**	**13**
17:45	18:00	1	1	**2**	5	6	**11**	**13**
Total		35	5	**40**	125	161	**286**	**326**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019 **WO No:** 38599

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

		METCALFE ST			SOMERSET ST			
Time Period		NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00	07:15	11	9	**20**	15	21	**36**	**56**
07:15	07:30	14	10	**24**	15	34	**49**	**73**
07:30	07:45	27	12	**39**	26	45	**71**	**110**
07:45	08:00	23	20	**43**	25	67	**92**	**135**
08:00	08:15	30	25	**55**	34	71	**105**	**160**
08:15	08:30	37	33	**70**	56	71	**127**	**197**
08:30	08:45	35	28	**63**	45	67	**112**	**175**
08:45	09:00	28	34	**62**	54	66	**120**	**182**
09:00	09:15	41	31	**72**	37	63	**100**	**172**
09:15	09:30	27	19	**46**	23	37	**60**	**106**
09:30	09:45	15	13	**28**	19	36	**55**	**83**
09:45	10:00	16	16	**32**	25	31	**56**	**88**
11:30	11:45	34	20	**54**	21	41	**62**	**116**
11:45	12:00	18	29	**47**	43	40	**83**	**130**
12:00	12:15	22	27	**49**	37	49	**86**	**135**
12:15	12:30	31	26	**57**	29	47	**76**	**133**
12:30	12:45	27	27	**54**	39	55	**94**	**148**
12:45	13:00	23	29	**52**	35	71	**106**	**158**
13:00	13:15	34	26	**60**	44	51	**95**	**155**
13:15	13:30	20	30	**50**	35	42	**77**	**127**
15:00	15:15	30	32	**62**	36	54	**90**	**152**
15:15	15:30	16	33	**49**	21	34	**55**	**104**
15:30	15:45	40	32	**72**	28	52	**80**	**152**
15:45	16:00	21	36	**57**	29	51	**80**	**137**
16:00	16:15	27	55	**82**	42	63	**105**	**187**
16:15	16:30	37	34	**71**	38	88	**126**	**197**
17:15	17:30	36	56	**92**	50	97	**147**	**239**
16:30	16:45	30	46	**76**	54	82	**136**	**212**
16:45	17:00	42	48	**90**	37	88	**125**	**215**
17:00	17:15	54	63	**117**	53	83	**136**	**253**
17:30	17:45	55	27	**82**	42	82	**124**	**206**
17:45	18:00	41	50	**91**	35	58	**93**	**184**
Total	.....	942	976	**1918**	1122	1837	**2959**	**4877**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019 **WO No:** 38599

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		METCALFE ST									SOMERSET ST									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	3	1	**4**	0	0	0	**0**	**4**	0	1	0	**1**	0	0	1	**1**	**2**	**6**
07:15	07:30	0	3	3	**6**	0	0	0	**0**	**6**	0	2	0	**2**	0	0	3	**3**	**5**	**11**
07:30	07:45	1	3	3	**7**	0	0	0	**0**	**7**	1	1	0	**2**	0	0	2	**2**	**4**	**11**
07:45	08:00	0	3	2	**5**	0	0	0	**0**	**5**	0	5	0	**5**	0	1	4	**5**	**10**	**15**
08:00	08:15	2	6	1	**9**	0	0	0	**0**	**9**	1	2	0	**3**	0	0	2	**2**	**5**	**14**
08:15	08:30	1	3	0	**4**	0	0	0	**0**	**4**	0	4	0	**4**	0	0	3	**3**	**7**	**11**
08:30	08:45	0	7	1	**8**	0	0	0	**0**	**8**	1	2	0	**3**	0	0	6	**6**	**9**	**17**
08:45	09:00	0	4	1	**5**	0	0	0	**0**	**5**	0	6	1	**7**	0	0	3	**3**	**10**	**15**
09:00	09:15	0	3	3	**6**	0	0	0	**0**	**6**	0	2	0	**2**	0	0	2	**2**	**4**	**10**
09:15	09:30	1	6	0	**7**	0	0	0	**0**	**7**	0	4	0	**4**	0	4	4	**8**	**12**	**19**
09:30	09:45	2	8	0	**10**	0	0	0	**0**	**10**	3	4	0	**7**	0	2	2	**4**	**11**	**21**
09:45	10:00	2	9	0	**11**	0	0	0	**0**	**11**	0	9	0	**9**	0	0	2	**2**	**11**	**22**
11:30	11:45	1	2	0	**3**	0	0	0	**0**	**3**	0	2	0	**2**	0	1	2	**3**	**5**	**8**
11:45	12:00	0	5	0	**5**	0	0	0	**0**	**5**	1	2	0	**3**	0	2	3	**5**	**8**	**13**
12:00	12:15	1	1	1	**3**	0	0	0	**0**	**3**	0	2	0	**2**	0	0	2	**2**	**4**	**7**
12:15	12:30	2	5	2	**9**	0	0	0	**0**	**9**	2	2	0	**4**	0	1	1	**2**	**6**	**15**
12:30	12:45	1	8	0	**9**	0	0	0	**0**	**9**	0	2	0	**2**	0	0	2	**2**	**4**	**13**
12:45	13:00	0	2	0	**2**	0	0	0	**0**	**2**	2	6	0	**8**	0	1	0	**1**	**9**	**11**
13:00	13:15	2	6	3	**11**	0	0	0	**0**	**11**	1	2	0	**3**	0	1	3	**4**	**7**	**18**
13:15	13:30	1	5	0	**6**	0	0	0	**0**	**6**	0	4	0	**4**	0	6	0	**6**	**10**	**16**
15:00	15:15	1	1	0	**2**	0	0	0	**0**	**2**	1	5	0	**6**	0	2	2	**4**	**10**	**12**
15:15	15:30	0	3	0	**3**	0	0	0	**0**	**3**	0	3	0	**3**	0	0	3	**3**	**6**	**9**
15:30	15:45	1	3	1	**5**	0	0	0	**0**	**5**	0	2	0	**2**	0	0	3	**3**	**5**	**10**
15:45	16:00	0	0	1	**1**	0	0	0	**0**	**1**	1	2	0	**3**	0	2	3	**5**	**8**	**9**
16:00	16:15	0	1	3	**4**	0	0	0	**0**	**4**	0	4	0	**4**	0	2	5	**7**	**11**	**15**
16:15	16:30	0	2	1	**3**	0	0	0	**0**	**3**	0	2	0	**2**	0	0	1	**1**	**3**	**6**
17:15	17:30	0	1	1	**2**	0	0	0	**0**	**2**	0	2	0	**2**	0	0	3	**3**	**5**	**7**
16:30	16:45	0	1	1	**2**	0	0	0	**0**	**2**	1	2	0	**3**	0	1	1	**2**	**5**	**7**
16:45	17:00	0	1	0	**1**	0	0	0	**0**	**1**	1	4	0	**5**	0	0	5	**5**	**10**	**11**
17:00	17:15	0	2	1	**3**	0	0	0	**0**	**3**	0	2	0	**2**	0	2	3	**5**	**7**	**10**
17:30	17:45	1	1	1	**3**	0	0	0	**0**	**3**	0	4	0	**4**	0	0	3	**3**	**7**	**10**
17:45	18:00	0	1	0	**1**	0	0	0	**0**	**1**	0	5	0	**5**	0	0	1	**1**	**6**	**7**
Total:	None	20	109	31	**160**	0	0	0	**0**	**160**	16	101	1	**118**	0	28	80	**108**	**226**	**386**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019 **WO No:** 38599

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

		METCALFE ST		SOMERSET ST		
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	**0**
07:15	07:30	0	0	0	0	**0**
07:30	07:45	0	0	0	0	**0**
07:45	08:00	0	0	0	0	**0**
08:00	08:15	0	0	0	0	**0**
08:15	08:30	0	0	0	0	**0**
08:30	08:45	0	0	0	0	**0**
08:45	09:00	0	0	0	0	**0**
09:00	09:15	0	0	0	0	**0**
09:15	09:30	0	0	0	0	**0**
09:30	09:45	0	0	0	0	**0**
09:45	10:00	0	0	0	0	**0**
11:30	11:45	0	0	0	0	**0**
11:45	12:00	0	0	0	0	**0**
12:00	12:15	0	0	0	0	**0**
12:15	12:30	0	0	0	0	**0**
12:30	12:45	0	0	0	0	**0**
12:45	13:00	0	0	0	0	**0**
13:00	13:15	0	0	0	0	**0**
13:15	13:30	0	0	0	0	**0**
15:00	15:15	0	0	0	0	**0**
15:15	15:30	0	0	0	0	**0**
15:30	15:45	0	0	0	0	**0**
15:45	16:00	0	0	0	0	**0**
16:00	16:15	0	0	0	0	**0**
16:15	16:30	0	0	0	0	**0**
17:15	17:30	0	0	0	0	**0**
16:30	16:45	0	0	0	0	**0**
16:45	17:00	0	0	0	0	**0**
17:00	17:15	0	0	0	0	**0**
17:30	17:45	0	0	0	0	**0**
17:45	18:00	0	0	0	0	**0**
Total		0	0	0	0	**0**

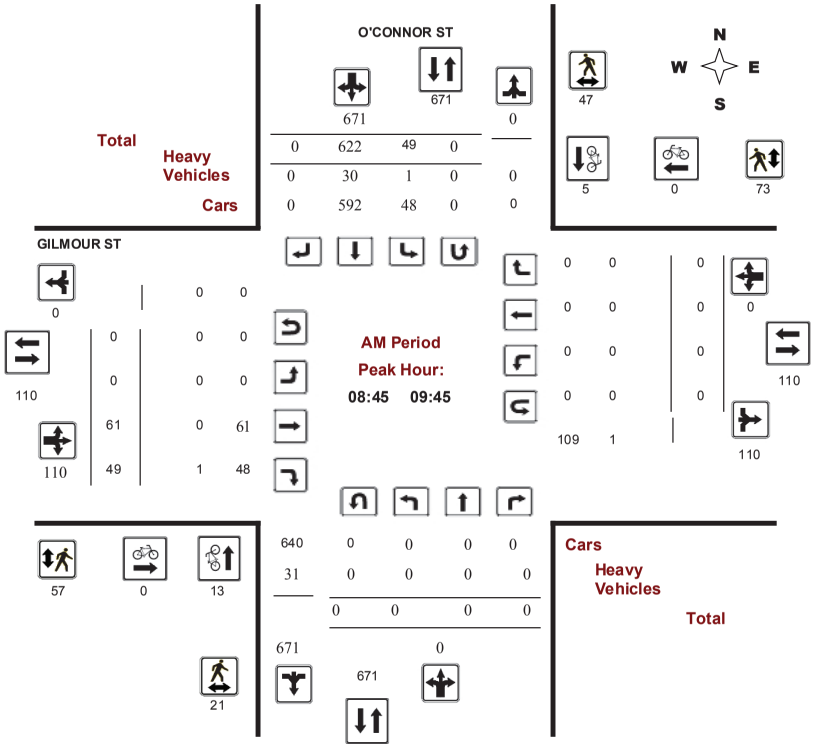
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017 **WO No:** 36785

Start Time: 07:00 **Device:** Miovision



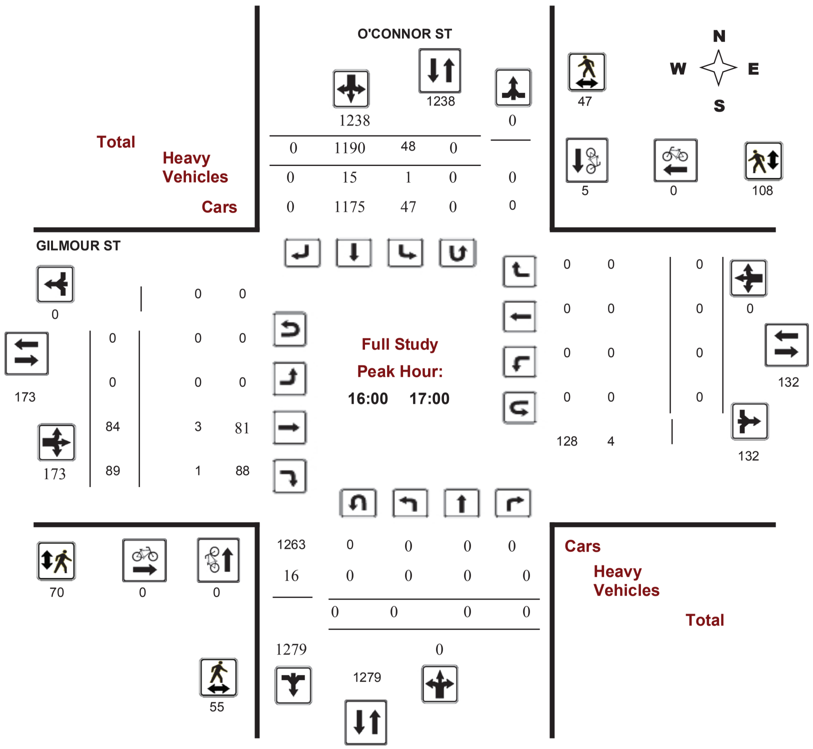
Comments

Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017 **WO No:** 36785
Start Time: 07:00 **Device:** Miovision



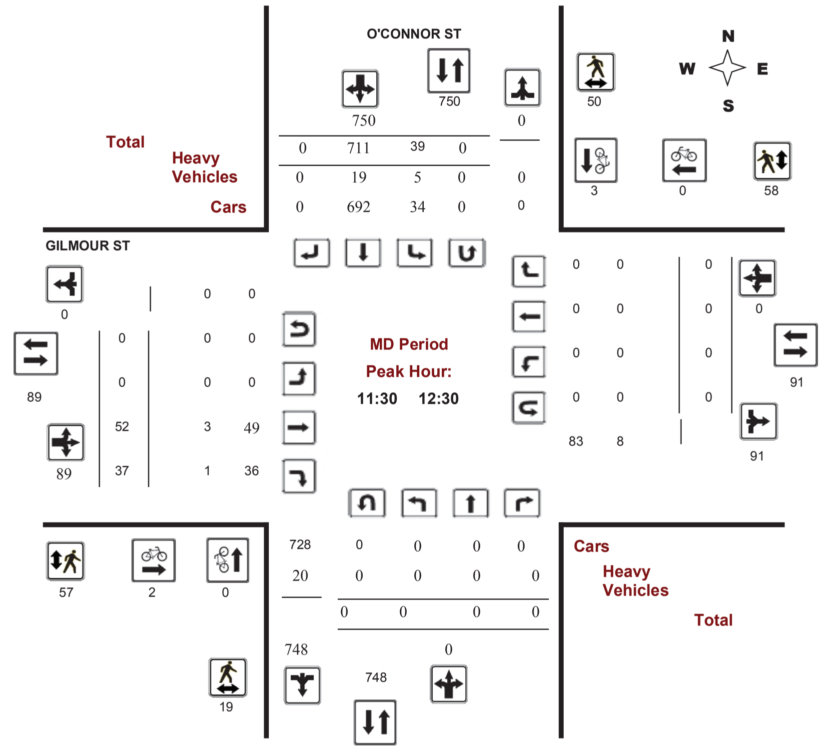
Comments

Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017 **WO No:** 36785
Start Time: 07:00 **Device:** Miovision



Comments

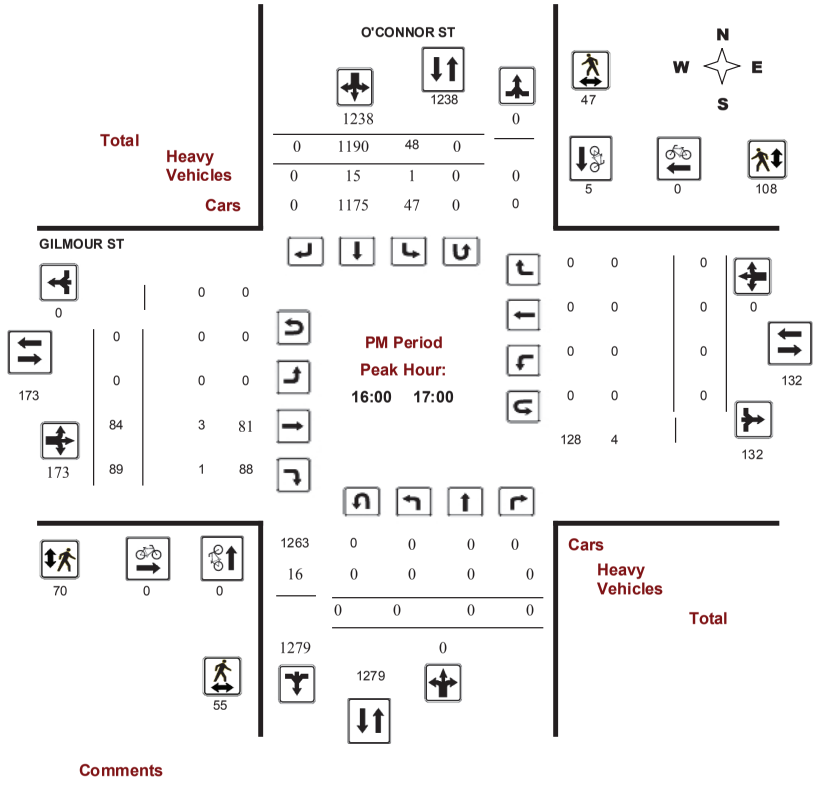
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017 **WO No:** 36785

Start Time: 07:00 **Device:** Miovision



Comments

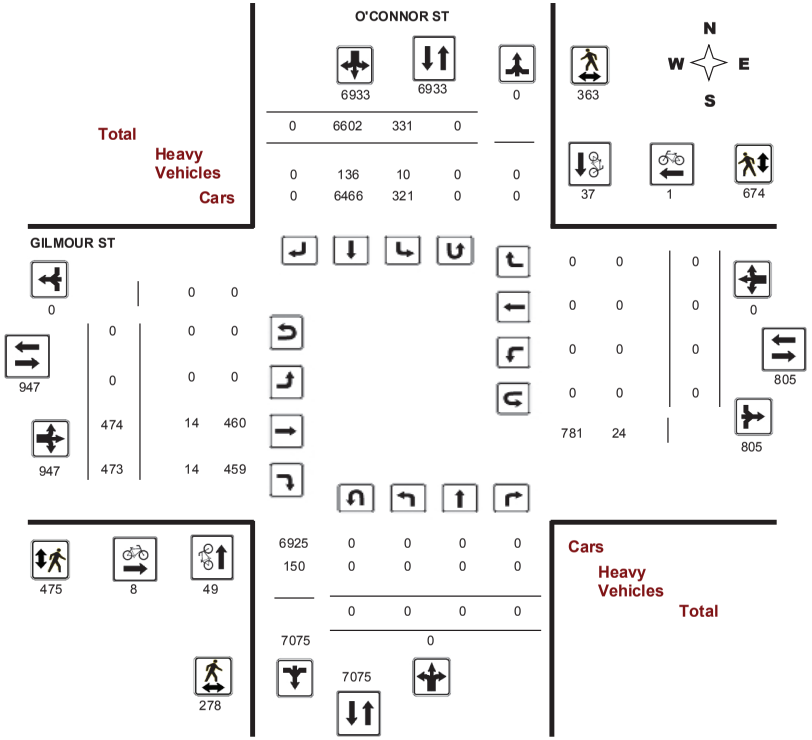
Transportation Services - Traffic Services

Turning Movement Count - Full Study Diagram

GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017 **WO#:** 36785

Device: Miovision



Comments

Transportation Services - Traffic Services

Work Order 36785

Turning Movement Count - Full Study Summary Report

GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor 1.00

Full Study

	O'CONNOR ST									GILMOUR ST									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	0	0	0	**0**	39	555	0	**594**	**594**	0	39	26	**65**	0	0	0	**0**	**65**	**659**
08:00 09:00	0	0	0	**0**	45	601	0	**646**	**646**	0	79	43	**122**	0	0	0	**0**	**122**	**768**
09:00 10:00	0	0	0	**0**	51	619	0	**670**	**670**	0	52	41	**93**	0	0	0	**0**	**93**	**763**
11:30 12:30	0	0	0	**0**	39	711	0	**750**	**750**	0	52	37	**89**	0	0	0	**0**	**89**	**839**
12:30 13:30	0	0	0	**0**	25	615	0	**640**	**640**	0	41	50	**91**	0	0	0	**0**	**91**	**731**
15:00 16:00	0	0	0	**0**	38	1192	0	**1230**	**1230**	0	54	96	**150**	0	0	0	**0**	**150**	**1380**
16:00 17:00	0	0	0	**0**	48	1190	0	**1238**	**1238**	0	84	89	**173**	0	0	0	**0**	**173**	**1411**
17:00 18:00	0	0	0	**0**	46	1119	0	**1165**	**1165**	0	73	91	**164**	0	0	0	**0**	**164**	**1329**
Sub Total	0	0	0	**0**	331	6602	0	**6933**	**6933**	0	474	473	**947**	0	0	0	**0**	**947**	**7880**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	0	0	0	**0**	331	6602	0	**6933**	**6933**	0	474	473	**947**	0	0	0	**0**	**947**	**7880**
EQ 12Hr	0	0	0	**0**	460	9177	0	**9637**	**9637**	0	659	657	**1316**	0	0	0	**0**	**1316**	**10953**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	0	0	0	**0**	460	9177	0	**9637**	**9637**	0	659	657	**1316**	0	0	0	**0**	**1316**	**10953**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**1.00**						
AVG 24Hr	0	0	0	**0**	603	12022	0	**12624**	**12624**	0	863	861	**1724**	0	0	0	**0**	**1724**	**14348**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													**1.31**						

Comments:
Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

W.O. 36785

Turning Movement Count - 15 Minute Summary Report

GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

	O'CONNOR ST									GILMOUR ST									
	Northbound				Southbound					Eastbound				Westbound					
Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	0	0	0	**0**	8	103	0	**111**	**111**	0	1	2	**3**	0	0	0	**0**	**3**	**114**
07:15 07:30	0	0	0	**0**	12	129	0	**141**	**141**	0	9	3	**12**	0	0	0	**0**	**12**	**153**
07:30 07:45	0	0	0	**0**	10	162	0	**172**	**172**	0	15	12	**27**	0	0	0	**0**	**27**	**199**
07:45 08:00	0	0	0	**0**	9	161	0	**170**	**170**	0	14	9	**23**	0	0	0	**0**	**23**	**193**
08:00 08:15	0	0	0	**0**	14	156	0	**170**	**170**	0	24	9	**33**	0	0	0	**0**	**33**	**203**
08:15 08:30	0	0	0	**0**	13	127	0	**140**	**140**	0	19	10	**29**	0	0	0	**0**	**29**	**169**
08:30 08:45	0	0	0	**0**	7	159	0	**166**	**166**	0	14	7	**21**	0	0	0	**0**	**21**	**187**
08:45 09:00	0	0	0	**0**	11	159	0	**170**	**170**	0	22	17	**39**	0	0	0	**0**	**39**	**209**
09:00 09:15	0	0	0	**0**	13	158	0	**171**	**171**	0	15	9	**24**	0	0	0	**0**	**24**	**195**
09:15 09:30	0	0	0	**0**	11	137	0	**148**	**148**	0	20	11	**31**	0	0	0	**0**	**31**	**179**
09:30 09:45	0	0	0	**0**	14	168	0	**182**	**182**	0	4	12	**16**	0	0	0	**0**	**16**	**198**
09:45 10:00	0	0	0	**0**	13	156	0	**169**	**169**	0	13	9	**22**	0	0	0	**0**	**22**	**191**
11:30 11:45	0	0	0	**0**	6	184	0	**190**	**190**	0	13	5	**18**	0	0	0	**0**	**18**	**208**
11:45 12:00	0	0	0	**0**	17	178	0	**195**	**195**	0	9	11	**20**	0	0	0	**0**	**20**	**215**
12:00 12:15	0	0	0	**0**	8	179	0	**187**	**187**	0	19	9	**28**	0	0	0	**0**	**28**	**215**
12:15 12:30	0	0	0	**0**	8	170	0	**178**	**178**	0	11	12	**23**	0	0	0	**0**	**23**	**201**
12:30 12:45	0	0	0	**0**	7	152	0	**159**	**159**	0	11	15	**26**	0	0	0	**0**	**26**	**185**
12:45 13:00	0	0	0	**0**	10	160	0	**170**	**170**	0	11	15	**26**	0	0	0	**0**	**26**	**196**
13:00 13:15	0	0	0	**0**	3	154	0	**157**	**157**	0	7	9	**16**	0	0	0	**0**	**16**	**173**
13:15 13:30	0	0	0	**0**	5	149	0	**154**	**154**	0	12	11	**23**	0	0	0	**0**	**23**	**177**
15:00 15:15	0	0	0	**0**	5	335	0	**340**	**340**	0	19	30	**49**	0	0	0	**0**	**49**	**389**
15:15 15:30	0	0	0	**0**	14	288	0	**302**	**302**	0	14	20	**34**	0	0	0	**0**	**34**	**336**
15:30 15:45	0	0	0	**0**	7	277	0	**284**	**284**	0	10	23	**33**	0	0	0	**0**	**33**	**317**
15:45 16:00	0	0	0	**0**	12	292	0	**304**	**304**	0	11	23	**34**	0	0	0	**0**	**34**	**338**
16:00 16:15	0	0	0	**0**	16	298	0	**314**	**314**	0	22	29	**51**	0	0	0	**0**	**51**	**365**
16:15 16:30	0	0	0	**0**	13	305	0	**318**	**318**	0	18	22	**40**	0	0	0	**0**	**40**	**358**
16:30 16:45	0	0	0	**0**	7	291	0	**298**	**298**	0	19	14	**33**	0	0	0	**0**	**33**	**331**
16:45 17:00	0	0	0	**0**	12	296	0	**308**	**308**	0	25	24	**49**	0	0	0	**0**	**49**	**357**
17:00 17:15	0	0	0	**0**	16	303	0	**319**	**319**	0	21	24	**45**	0	0	0	**0**	**45**	**364**
17:15 17:30	0	0	0	**0**	11	288	0	**299**	**299**	0	28	23	**51**	0	0	0	**0**	**51**	**350**
17:30 17:45	0	0	0	**0**	13	285	0	**298**	**298**	0	13	23	**36**	0	0	0	**0**	**36**	**334**
17:45 18:00	0	0	0	**0**	6	243	0	**249**	**249**	0	11	21	**32**	0	0	0	**0**	**32**	**281**
TOTAL:	0	0	0	**0**	331	6602	0	**6933**	**6933**	0	474	473	**947**	0	0	0	**0**	**947**	**7880**

Note: U-Turns are included in Totals.

Comment:

Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order 36785

GILMOUR ST @ O'CONNOR ST

Count Date: Tuesday, March 21, 2017 **Start Time:** 07:00

	O'CONNOR ST			GILMOUR ST			
Time Period	Northbound	Southbound	**Street Total**	Eastbound	Westbound	**Street Total**	**Grand Total**
07:00 08:00	5	0	**5**	1	0	**1**	**6**
08:00 09:00	26	1	**27**	2	0	**2**	**29**
09:00 10:00	8	5	**13**	0	0	**0**	**13**
11:30 12:30	0	3	**3**	2	0	**2**	**5**
12:30 13:30	3	0	**3**	1	1	**2**	**5**
15:00 16:00	5	2	**7**	0	0	**0**	**7**
16:00 17:00	0	5	**5**	0	0	**0**	**5**
17:00 18:00	2	21	**23**	2	0	**2**	**25**
Total	49	37	**86**	8	1	**9**	**95**

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

W.O. 36785

Turning Movement Count - Heavy Vehicle Report

GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017

	O'CONNOR ST									GILMOUR ST									
	Northbound				Southbound					Eastbound				Westbound					
Time Period	LT	ST	RT	**N TOT**	LT	ST	RT	**S TOT**	**STR TOT**	LT	ST	RT	**E TOT**	LT	ST	RT	**W TOT**	**STR TOT**	**Grand Total**
07:00 08:00	0	0	0	**0**	0	18	0	**18**	**18**	0	0	0	**0**	0	0	0	**0**	**0**	**18**
08:00 09:00	0	0	0	**0**	1	22	0	**23**	**23**	0	2	1	**3**	0	0	0	**0**	**3**	**26**
09:00 10:00	0	0	0	**0**	0	29	0	**29**	**29**	0	0	1	**1**	0	0	0	**0**	**1**	**30**
11:30 12:30	0	0	0	**0**	5	19	0	**24**	**24**	0	3	1	**4**	0	0	0	**0**	**4**	**28**
12:30 13:30	0	0	0	**0**	2	16	0	**18**	**18**	0	4	3	**7**	0	0	0	**0**	**7**	**25**
15:00 16:00	0	0	0	**0**	0	8	0	**8**	**8**	0	1	3	**4**	0	0	0	**0**	**4**	**12**
16:00 17:00	0	0	0	**0**	1	15	0	**16**	**16**	0	3	1	**4**	0	0	0	**0**	**4**	**20**
17:00 18:00	0	0	0	**0**	1	9	0	**10**	**10**	0	1	4	**5**	0	0	0	**0**	**5**	**15**
Sub Total	0	0	0	**0**	10	136	0	**146**	**146**	0	14	14	**28**	0	0	0	**0**	**28**	**174**
U-Turns (Heavy Vehicles)				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	0	0	0	**0**	10	136	0	**146**	**146**	0	14	14	**28**	0	0	0	**0**	**28**	**174**

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

Work Order: 36785

Turning Movement Count - Pedestrian Volume Report

GILMOUR ST @ O'CONNOR ST

Count Date: Tuesday, March 21, 2017 **Start Time:** 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	3	2	**5**	9	7	**16**	**21**
07:15 07:30	3	2	**5**	9	12	**21**	**26**
07:30 07:45	6	8	**14**	9	22	**31**	**45**
07:45 08:00	4	10	**14**	15	16	**31**	**45**
07:00 08:00	16	22	**38**	42	57	**99**	**137**
08:00 08:15	18	12	**30**	16	17	**33**	**63**
08:15 08:30	4	18	**22**	29	33	**62**	**84**
08:30 08:45	6	16	**22**	31	37	**68**	**90**
08:45 09:00	8	18	**26**	19	30	**49**	**75**
08:00 09:00	36	64	**100**	95	117	**212**	**312**
09:00 09:15	5	8	**13**	16	18	**34**	**47**
09:15 09:30	2	8	**10**	13	15	**28**	**38**
09:30 09:45	6	13	**19**	9	10	**19**	**38**
09:45 10:00	2	6	**8**	5	12	**17**	**25**
09:00 10:00	15	35	**50**	43	55	**98**	**148**
11:30 11:45	6	6	**12**	15	12	**27**	**39**
11:45 12:00	3	8	**11**	8	11	**19**	**30**
12:00 12:15	5	18	**23**	15	20	**35**	**58**
12:15 12:30	5	18	**23**	19	15	**34**	**57**
11:30 12:30	19	50	**69**	57	58	**115**	**184**
12:30 12:45	13	16	**29**	18	31	**49**	**78**
12:45 13:00	4	11	**15**	10	17	**27**	**42**
13:00 13:15	5	10	**15**	10	9	**19**	**34**
13:15 13:30	5	14	**19**	4	16	**20**	**39**
12:30 13:30	27	51	**78**	42	73	**115**	**193**
15:00 15:15	13	12	**25**	13	14	**27**	**52**
15:15 15:30	8	12	**20**	15	12	**27**	**47**
15:30 15:45	9	13	**22**	21	18	**39**	**61**
15:45 16:00	15	10	**25**	5	19	**24**	**49**
15:00 16:00	45	47	**92**	54	63	**117**	**209**
16:00 16:15	17	15	**32**	14	29	**43**	**75**
16:15 16:30	10	8	**18**	18	20	**38**	**56**
16:30 16:45	13	10	**23**	19	23	**42**	**65**
16:45 17:00	15	14	**29**	19	36	**55**	**84**
16:00 17:00	55	47	**102**	70	108	**178**	**280**
17:00 17:15	14	18	**32**	19	34	**53**	**85**
17:15 17:30	25	9	**34**	16	33	**49**	**83**
17:30 17:45	13	11	**24**	22	30	**52**	**76**
17:45 18:00	13	9	**22**	15	46	**61**	**83**
17:00 18:00	65	47	**112**	72	143	**215**	**327**
Total	278	363	**641**	475	674	**1149**	**1790**

Comment:

Transportation Services - Traffic Services

Work Order: 36785

Turning Movement Count - 15 Min U-Turn Total Report

GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	0	0

Appendix C

Synchro Intersection Worksheets – Existing Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations								
Traffic Volume (vph)	52	253	75	21	155	3	369	152
Future Volume (vph)	52	253	75	21	155	3	369	152
Lane Group Flow (vph)	0	339	83	23	191	0	465	178
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	NA
Protected Phases		4			8		2	6
Permitted Phases	4		4	8		2		
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0	45.0	45.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%
Maximum Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	144	144	144	126	126	195	195	294
Act Effct Green (s)		24.5	24.5	24.5	24.5		39.5	39.5
Actuated g/C Ratio		0.33	0.33	0.33	0.33		0.53	0.53
v/c Ratio		0.67	0.25	0.11	0.35		0.54	0.20
Control Delay		29.7	21.1	9.2	9.9		14.7	10.1
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		29.7	21.1	9.2	9.9		14.7	10.1
LOS		C	C	A	A		B	B
Approach Delay		28.0			9.8		14.7	10.1
Approach LOS		C			A		B	B
Queue Length 50th (m)		40.8	8.5	1.0	8.7		40.5	12.4
Queue Length 95th (m)		68.3	18.9	m2.6	15.0		65.6	22.4
Internal Link Dist (m)		161.3			160.8		255.6	215.8
Turn Bay Length (m)			25.0	10.0				
Base Capacity (vph)		504	329	202	547		860	888
Starvation Cap Reductn		0	0	0	0		0	0
Spillback Cap Reductn		0	0	0	0		0	0
Storage Cap Reductn		0	0	0	0		0	0
Reduced v/c Ratio		0.67	0.25	0.11	0.35		0.54	0.20

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 46 (61%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 17.6 — Intersection LOS: B
Intersection Capacity Utilization 74.4% — ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

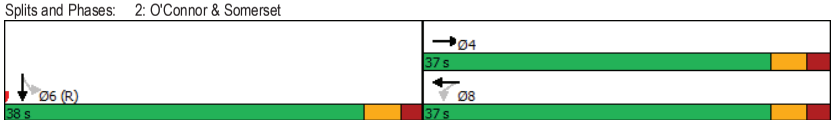
Splits and Phases: 1: Bank & Somerset

Lane Group	EBT	WBL	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	185	51	174	480
Future Volume (vph)	185	51	174	480
Lane Group Flow (vph)	335	0	250	635
Turn Type	NA	Perm	NA	NA
Protected Phases	4		8	6
Permitted Phases		8		
Detector Phase	4	8	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	22.4
Total Split (s)	37.0	37.0	37.0	38.0
Total Split (%)	49.3%	49.3%	49.3%	50.7%
Maximum Green (s)	31.5	31.5	31.5	32.6
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.1
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	5.5		5.5	5.4
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	C-Max
Walk Time (s)	7.0	7.0	7.0	10.0
Flash Dont Walk (s)	8.0	8.0	8.0	7.0
Pedestrian Calls (#/hr)	102	83	83	119
Act Effct Green (s)	31.5		31.5	32.6
Actuated g/C Ratio	0.42		0.42	0.43
v/c Ratio	0.49		0.41	0.46
Control Delay	18.6		24.9	15.7
Queue Delay	0.0		0.0	0.0
Total Delay	18.6		24.9	15.7
LOS	B		C	B
Approach Delay	18.6		24.9	15.7
Approach LOS	B		C	B
Queue Length 50th (m)	21.5		30.7	30.8
Queue Length 95th (m)	46.9		m49.1	44.2
Internal Link Dist (m)	160.8		155.7	145.7
Turn Bay Length (m)				
Base Capacity (vph)	681		617	1376
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.49		0.41	0.46

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 44 (59%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 45

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.49
Intersection Signal Delay: 18.4 — Intersection LOS: B
Intersection Capacity Utilization 67.3% — ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: O'Connor & Somerset

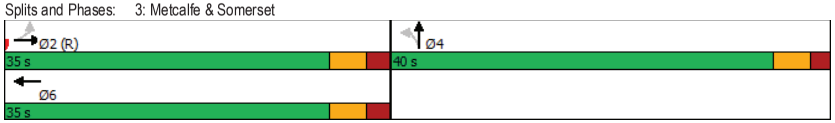


Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Traffic Volume (vph)	109	135	161	1033
Future Volume (vph)	109	135	161	1033
Lane Group Flow (vph)	0	271	360	1383
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	4
Permitted Phases	2			
Detector Phase	2	2	6	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	19.5	19.5	19.5	18.2
Total Split (s)	35.0	35.0	35.0	40.0
Total Split (%)	46.7%	46.7%	46.7%	53.3%
Maximum Green (s)	29.5	29.5	29.5	34.8
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	1.9
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	7.0	7.0	6.0
Pedestrian Calls (#/hr)	141	141	126	267
Act Effct Green (s)		29.5	29.5	34.8
Actuated g/C Ratio		0.39	0.39	0.46
v/c Ratio		0.71	0.63	0.69
Control Delay		24.6	23.9	17.8
Queue Delay		0.0	0.0	0.0
Total Delay		24.6	23.9	17.8
LOS		C	C	B
Approach Delay		24.6	23.9	17.8
Approach LOS		C	C	B
Queue Length 50th (m)		24.7	39.0	52.7
Queue Length 95th (m)		#68.9	66.3	67.9
Internal Link Dist (m)		155.7	145.3	134.2
Turn Bay Length (m)				
Base Capacity (vph)		382	573	1991
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.71	0.63	0.69

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 29 (39%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 45

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 19.8 — Intersection LOS: B
Intersection Capacity Utilization 79.0% — ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Metcalfe & Somerset

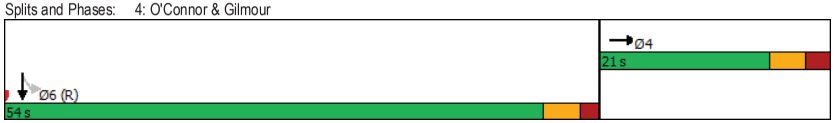


Lane Group	EBT	SBT
Lane Configurations		
Traffic Volume (vph)	61	622
Future Volume (vph)	61	622
Lane Group Flow (vph)	122	745
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases		
Detector Phase	4	6
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	20.6	26.1
Total Split (s)	21.0	54.0
Total Split (%)	28.0%	72.0%
Maximum Green (s)	15.4	48.9
Yellow Time (s)	3.3	3.3
All-Red Time (s)	2.3	1.8
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.6	5.1
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	Max	C-Max
Walk Time (s)	7.0	16.0
Flash Dont Walk (s)	8.0	5.0
Pedestrian Calls (#/hr)	47	73
Act Effct Green (s)	15.4	48.9
Actuated g/C Ratio	0.21	0.65
v/c Ratio	0.33	0.35
Control Delay	19.0	3.7
Queue Delay	0.0	0.0
Total Delay	19.0	3.7
LOS	B	A
Approach Delay	19.0	3.7
Approach LOS	B	A
Queue Length 50th (m)	8.8	9.3
Queue Length 95th (m)	22.3	15.5
Internal Link Dist (m)	127.1	143.6
Turn Bay Length (m)		
Base Capacity (vph)	368	2145
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.33	0.35

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 46 (61%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 50

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.35
Intersection Signal Delay: 5.9 — Intersection LOS: A
Intersection Capacity Utilization 44.4% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: O'Connor & Gilmour

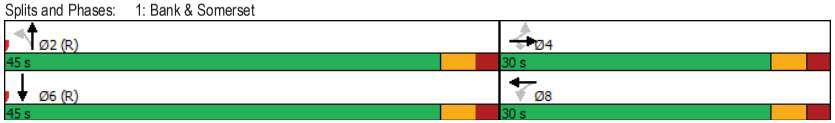


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations								
Traffic Volume (vph)	34	274	103	59	254	9	260	331
Future Volume (vph)	34	274	103	59	254	9	260	331
Lane Group Flow (vph)	0	342	114	66	286	0	332	404
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	NA
Protected Phases		4			8		2	6
Permitted Phases	4		4	8		2		
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0	45.0	45.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%
Maximum Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	77	77	77	206	206	256	256	500
Act Effct Green (s)		24.5	24.5	24.5	24.5		39.5	39.5
Actuated g/C Ratio		0.33	0.33	0.33	0.33		0.53	0.53
v/c Ratio		0.66	0.29	0.31	0.51		0.39	0.47
Control Delay		28.9	21.3	15.7	16.4		12.4	13.5
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		28.9	21.3	15.7	16.4		12.4	13.5
LOS		C	C	B	B		B	B
Approach Delay		27.0			16.2		12.4	13.5
Approach LOS		C			B		B	B
Queue Length 50th (m)		41.0	11.8	4.0	21.5		26.1	33.5
Queue Length 95th (m)		68.2	24.2	m6.6	m34.3		43.6	54.7
Internal Link Dist (m)		161.3			160.8		255.6	215.8
Turn Bay Length (m)			25.0	10.0				
Base Capacity (vph)		519	394	216	565		842	856
Starvation Cap Reductn		0	0	0	0		0	0
Spillback Cap Reductn		0	0	0	0		0	0
Storage Cap Reductn		0	0	0	0		0	0
Reduced v/c Ratio		0.66	0.29	0.31	0.51		0.39	0.47

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 71 (95%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 17.9 Intersection LOS: B
Intersection Capacity Utilization 72.6% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bank & Somerset

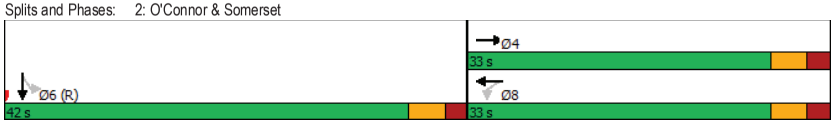


Lane Group	EBT	WBL	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	192	70	181	938
Future Volume (vph)	192	70	181	938
Lane Group Flow (vph)	390	0	279	1202
Turn Type	NA	Perm	NA	NA
Protected Phases	4		8	6
Permitted Phases		8		
Detector Phase	4	8	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	22.4
Total Split (s)	33.0	33.0	33.0	42.0
Total Split (%)	44.0%	44.0%	44.0%	56.0%
Maximum Green (s)	27.5	27.5	27.5	36.6
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.1
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	5.5		5.5	5.4
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	C-Max
Walk Time (s)	7.0	7.0	7.0	10.0
Flash Dont Walk (s)	8.0	8.0	8.0	7.0
Pedestrian Calls (#/hr)	179	138	138	147
Act Effct Green (s)	27.5		27.5	36.6
Actuated g/C Ratio	0.37		0.37	0.49
v/c Ratio	0.72		0.68	0.78
Control Delay	45.8		22.8	20.1
Queue Delay	0.0		0.0	0.0
Total Delay	45.8		22.8	20.1
LOS	D		C	C
Approach Delay	45.8		22.8	20.1
Approach LOS	D		C	C
Queue Length 50th (m)	56.3		21.0	68.9
Queue Length 95th (m)	#85.7		#34.5	94.2
Internal Link Dist (m)	160.8		155.7	145.7
Turn Bay Length (m)				
Base Capacity (vph)	544		413	1536
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.72		0.68	0.78

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 58 (77%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 25.9 Intersection LOS: C
Intersection Capacity Utilization 88.2% ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: O'Connor & Somerset

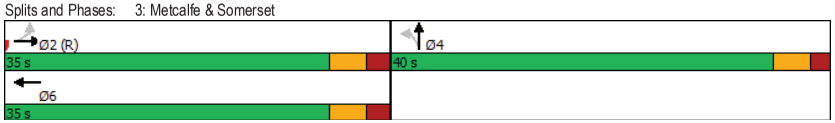


Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Traffic Volume (vph)	87	185	148	590
Future Volume (vph)	87	185	148	590
Lane Group Flow (vph)	0	303	282	923
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	4
Permitted Phases	2			
Detector Phase	2	2	6	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	19.5	19.5	19.5	18.2
Total Split (s)	35.0	35.0	35.0	40.0
Total Split (%)	46.7%	46.7%	46.7%	53.3%
Maximum Green (s)	29.5	29.5	29.5	34.8
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	1.9
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	7.0	7.0	6.0
Pedestrian Calls (#/hr)	162	162	213	350
Act Effct Green (s)		29.5	29.5	34.8
Actuated g/C Ratio		0.39	0.39	0.46
v/c Ratio		0.60	0.49	0.50
Control Delay		22.4	19.5	13.5
Queue Delay		0.0	0.0	0.0
Total Delay		22.4	19.5	13.5
LOS		C	B	B
Approach Delay		22.4	19.5	13.5
Approach LOS		C	B	B
Queue Length 50th (m)		25.0	26.9	28.1
Queue Length 95th (m)		m44.4	48.1	38.6
Internal Link Dist (m)		155.7	145.3	134.2
Turn Bay Length (m)				
Base Capacity (vph)		505	572	1843
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.60	0.49	0.50

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 20 (27%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 40

Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 16.4	Intersection LOS: B
Intersection Capacity Utilization 68.7%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 3: Metcalfe & Somerset

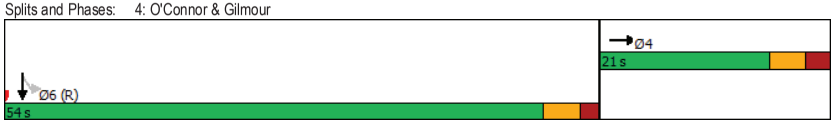


Lane Group	EBT	SBT
Lane Configurations		
Traffic Volume (vph)	84	1190
Future Volume (vph)	84	1190
Lane Group Flow (vph)	192	1375
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases		
Detector Phase	4	6
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	20.6	26.1
Total Split (s)	21.0	54.0
Total Split (%)	28.0%	72.0%
Maximum Green (s)	15.4	48.9
Yellow Time (s)	3.3	3.3
All-Red Time (s)	2.3	1.8
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.6	5.1
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	Max	C-Max
Walk Time (s)	7.0	16.0
Flash Dont Walk (s)	8.0	5.0
Pedestrian Calls (#/hr)	55	108
Act Effct Green (s)	15.4	48.9
Actuated g/C Ratio	0.21	0.65
v/c Ratio	0.53	0.64
Control Delay	25.1	5.4
Queue Delay	0.0	0.4
Total Delay	25.1	5.8
LOS	C	A
Approach Delay	25.1	5.8
Approach LOS	C	A
Queue Length 50th (m)	17.2	13.7
Queue Length 95th (m)	36.3	24.3
Internal Link Dist (m)	127.1	143.6
Turn Bay Length (m)		
Base Capacity (vph)	360	2154
Starvation Cap Reductn	0	303
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.53	0.74

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 71 (95%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 8.2 — Intersection LOS: A
Intersection Capacity Utilization 61.0% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 4: O'Connor & Gilmour



Appendix D

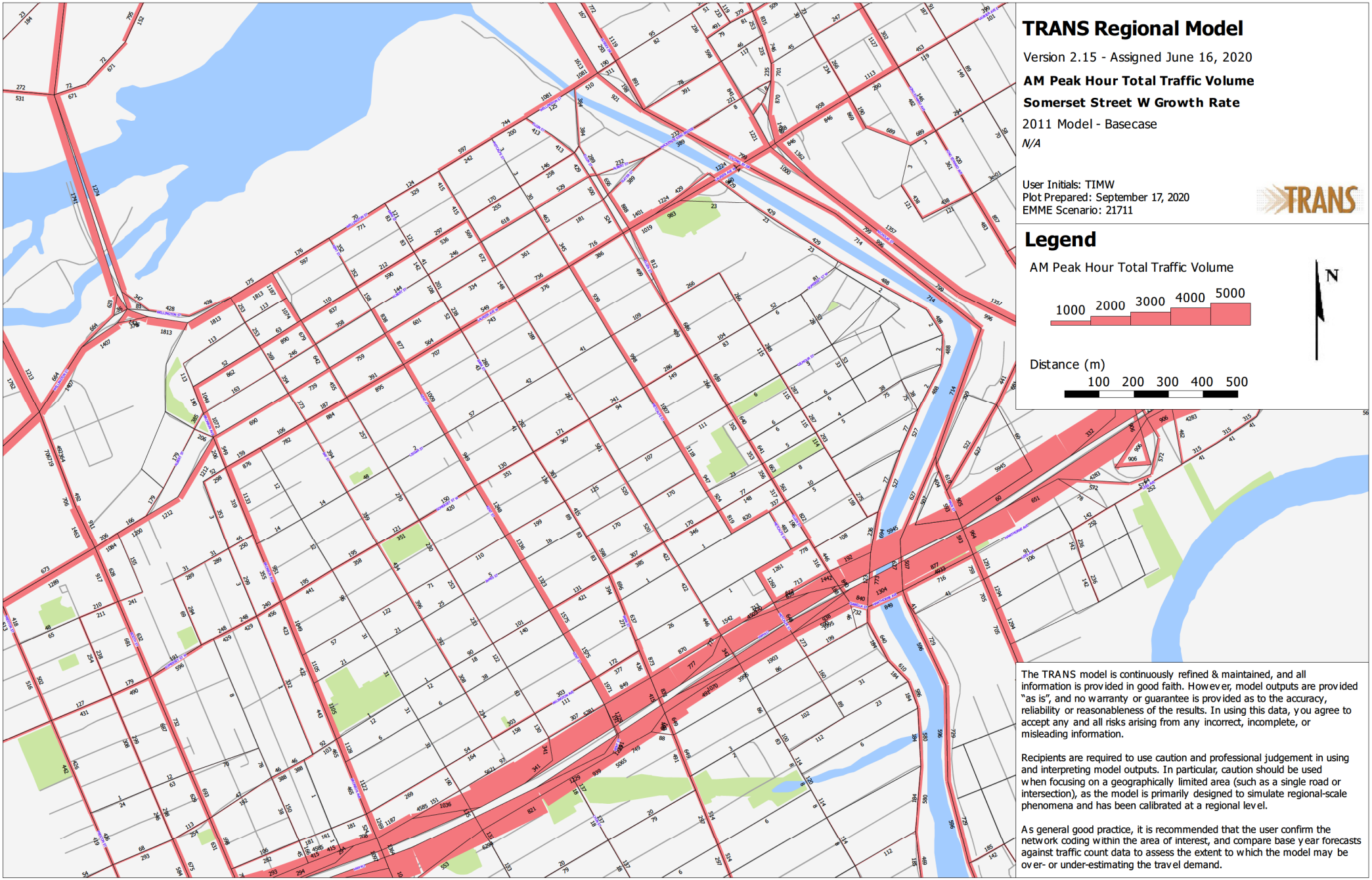
Collision Data

CGH TRANSPORTATION

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Traffic Control Condition	Classification Of Accident	Initial Impact Type	Road Surface Condition	# Vehicles	# Motorcycles	# Bicycles	# Pedestrians
2016-01-22	2016	19:41	COOPER ST @ O'CONNOR ST (0006954)	02 - Rain	07 - Dark	02 - Stop sign	01 - Functioning	03 - P.D. only	04 - Sideswipe	02 - Wet	2	0	0	0
2017-11-23	2017	21:47	COOPER ST @ O'CONNOR ST (0006954)	01 - Clear	07 - Dark	02 - Stop sign	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2017-06-21	2017	16:13	COOPER ST @ O'CONNOR ST (0006954)	01 - Clear	01 - Daylight	02 - Stop sign	00 - Unknown	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	1	0
2017-06-22	2017	10:58	COOPER ST @ O'CONNOR ST (0006954)	01 - Clear	01 - Daylight	02 - Stop sign	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2017-07-23	2017	2:54	COOPER ST @ O'CONNOR ST (0006954)	01 - Clear	07 - Dark	02 - Stop sign	00 - Unknown	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2018-05-17	2018	17:46	COOPER ST @ O'CONNOR ST (0006954)	01 - Clear	01 - Daylight	02 - Stop sign	00 - Unknown	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	1	0
2018-09-18	2018	11:40	COOPER ST @ O'CONNOR ST (0006954)	01 - Clear	01 - Daylight	02 - Stop sign	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	1	0
2019-12-16	2019	14:00	COOPER ST @ O'CONNOR ST (0006954)	01 - Clear	01 - Daylight	02 - Stop sign	01 - Functioning	03 - P.D. only	05 - Turning movement	04 - Slush	2	0	0	0
2019-04-03	2019	15:10	COOPER ST @ O'CONNOR ST (0006954)	01 - Clear	01 - Daylight	02 - Stop sign	00 - Unknown	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	1	0
2019-06-25	2019	10:59	COOPER ST @ O'CONNOR ST (0006954)	01 - Clear	01 - Daylight	02 - Stop sign	00 - Unknown	02 - Non-fatal injury	07 - SMV other	01 - Dry	1	0	0	1
2020-03-13	2020	11:32	COOPER ST @ O'CONNOR ST (0006954)	01 - Clear	01 - Daylight	02 - Stop sign	00 - Unknown	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2020-11-10	2020	8:35	COOPER ST @ O'CONNOR ST (0006954)	01 - Clear	01 - Daylight	02 - Stop sign	00 - Unknown	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
2016-12-04	2016	2:59	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2016-02-11	2016	14:26	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	99 - Other	02 - Wet	2	0	0	0
2016-03-14	2016	17:28	O'CONNOR ST @ SOMERSET ST (0002690)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	02 - Wet	2	0	0	0
2016-05-02	2016	12:36	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	1	0
2016-01-14	2016	10:10	O'CONNOR ST @ SOMERSET ST (0002690)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	03 - Loose snow	2	0	0	0
2016-08-17	2016	11:32	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2016-08-25	2016	17:15	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2017-03-09	2017	15:18	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	1	0
2017-05-05	2017	18:31	O'CONNOR ST @ SOMERSET ST (0002690)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	02 - Wet	2	0	0	0
2017-06-17	2017	0:12	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
2017-09-14	2017	23:00	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	07 - Dark	01 - Traffic signal	00 - Unknown	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
2018-09-26	2018	17:25	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2018-12-19	2018	11:41	O'CONNOR ST @ SOMERSET ST (0002690)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	03 - Loose snow	2	0	0	0
2018-08-31	2018	16:36	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2019-11-23	2019	19:00	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	07 - SMV other	01 - Dry	1	0	0	1
2019-03-03	2019	13:30	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
2019-04-06	2019	12:46	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
2019-01-15	2019	13:00	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	03 - Loose snow	2	0	0	0
2019-06-20	2019	21:00	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	1	0
2020-01-25	2020	18:07	O'CONNOR ST @ SOMERSET ST (0002690)	03 - Snow	07 - Dark	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	07 - SMV other	04 - Slush	1	0	0	1
2020-01-09	2020	10:54	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	07 - SMV other	01 - Dry	1	0	0	1
2020-09-12	2020	21:00	O'CONNOR ST @ SOMERSET ST (0002690)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2016-02-25	2016	15:34	SOMERSET ST W btwn O'CONNOR ST & METCALFE ST (__3ZBOEW)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	02 - Wet	2	0	0	0
2016-04-12	2016	16:38	SOMERSET ST W btwn O'CONNOR ST & METCALFE ST (__3ZBOEW)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	07 - SMV other	01 - Dry	1	0	0	1
2019-10-29	2019	16:15	SOMERSET ST W btwn O'CONNOR ST & METCALFE ST (__3ZBOEW)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	04 - Sideswipe	01 - Dry	2	0	1	0
2019-06-06	2019	21:13	SOMERSET ST W btwn O'CONNOR ST & METCALFE ST (__3ZBOEW)	01 - Clear	05 - Dusk	10 - No control	0	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
2020-02-25	2020	Unknown	SOMERSET ST W btwn O'CONNOR ST & METCALFE ST (__3ZBOEW)	01 - Clear	00 - Unknown	10 - No control	0	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry	1	0	0	0
2020-05-29	2020	11:05	SOMERSET ST W btwn O'CONNOR ST & METCALFE ST (__3ZBOEW)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry	1	0	0	0
2016-10-07	2016	17:06	SOMERSET ST W btwn BANK ST & O'CONNOR ST (__3ZA3AV)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	07 - SMV other	01 - Dry	1	0	0	1
2016-12-07	2016	20:26	SOMERSET ST W btwn BANK ST & O'CONNOR ST (__3ZA3AV)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2016-03-05	2016	1:57	SOMERSET ST W btwn BANK ST & O'CONNOR ST (__3ZA3AV)	01 - Clear	07 - Dark	10 - No control	0	02 - Non-fatal injury	01 - Approaching	01 - Dry	2	0	0	0
2019-02-01	2019	Unknown	SOMERSET ST W btwn BANK ST & O'CONNOR ST (__3ZA3AV)	01 - Clear	00 - Unknown	10 - No control	0	03 - P.D. only	06 - SMV unattended vehicle	03 - Loose snow	1	0	0	0
2019-03-26	2019	20:00	SOMERSET ST W btwn BANK ST & O'CONNOR ST (__3ZA3AV)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry	1	0	0	0
2016-10-21	2016	12:04	O'CONNOR ST btwn COOPER ST & SOMERSET ST W (__3ZA34V)	02 - Rain	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	02 - Wet	2	0	0	0
2016-01-03	2016	21:29	O'CONNOR ST btwn COOPER ST & SOMERSET ST W (__3ZA34V)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	06 - SMV unattended vehicle	05 - Packed snow	1	0	0	0
2016-09-09	2016	13:18	O'CONNOR ST btwn COOPER ST & SOMERSET ST W (__3ZA34V)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2017-11-09	2017	12:10	O'CONNOR ST btwn COOPER ST & SOMERSET ST W (__3ZA34V)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2018-12-10	2018	11:45	O'CONNOR ST btwn COOPER ST & SOMERSET ST W (__3ZA34V)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2018-12-13	2018	16:30	O'CONNOR ST btwn COOPER ST & SOMERSET ST W (__3ZA34V)	01 - Clear	05 - Dusk	10 - No control	0	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry	1	0	0	0
2019-04-15	2019	Unknown	O'CONNOR ST btwn COOPER ST & SOMERSET ST W (__3ZA34V)	01 - Clear	00 - Unknown	10 - No control	0	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry	1	0	0	0
2019-05-18	2019	Unknown	O'CONNOR ST btwn COOPER ST & SOMERSET ST W (__3ZA34V)	01 - Clear	00 - Unknown	10 - No control	0	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry	1	0	0	0
2019-05-18	2019	Unknown	O'CONNOR ST btwn COOPER ST & SOMERSET ST W (__3ZA34V)	01 - Clear	00 - Unknown	10 - No control	0	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry	1	0	0	0
2020-03-02	2020	Unknown	O'CONNOR ST btwn COOPER ST & SOMERSET ST W (__3ZA34V)	01 - Clear	00 - Unknown	10 - No control	0	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry	1	0	0	0
2020-12-23	2020	Unknown	O'CONNOR ST btwn COOPER ST & SOMERSET ST W (__3ZA34V)	01 - Clear	00 - Unknown	10 - No control	0	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry	1	0	0	0

Appendix E

TRANS Model Plots



TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

Somerset Street W Growth Rate

2011 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: September 17, 2020
EMME Scenario: 21711

TRANS

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

N

Distance (m)

100 200 300 400 500

The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

Somerset Street W Growth Rate

2031 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: September 17, 2020
EMME Scenario: 21711

TRANS

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

N

Distance (m)

100 200 300 400 500

The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

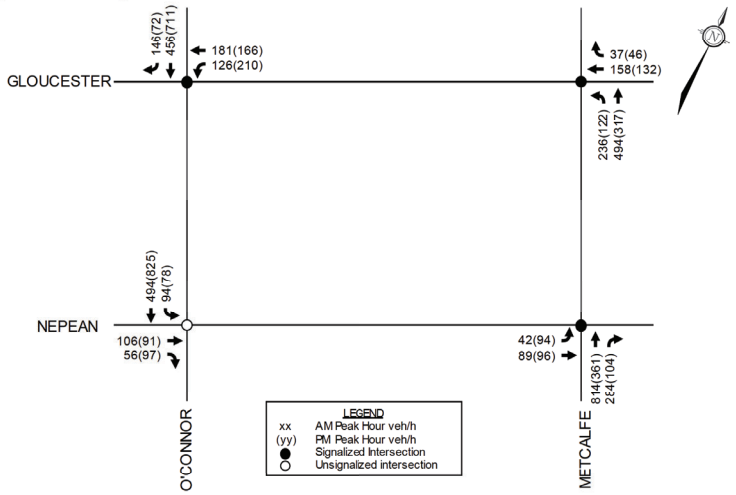
As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

Appendix F

Background Development Volumes

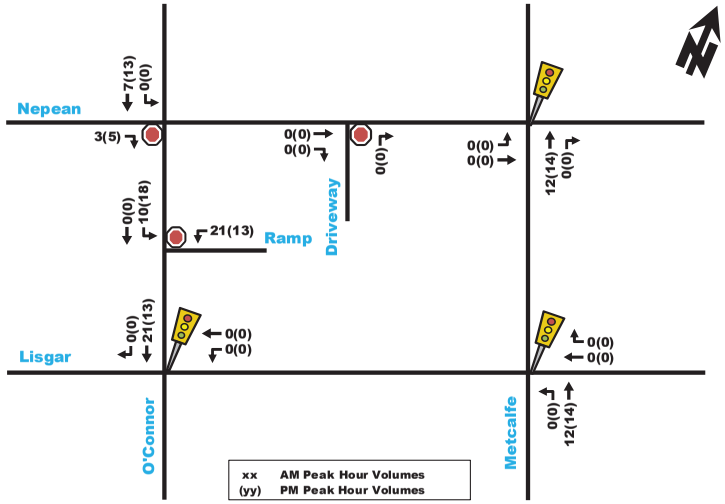
CGH TRANSPORTATION

Figure 2: Existing Traffic Volumes



PARSONS

Figure 11: 2022 Site-Generated Traffic



3.2. Background Network Traffic

3.2.1. Transportation network plans

Refer to Section 2.1.3: Planned Study Area Transportation Network Changes.

3.2.2. Background Growth

Given that the proposed development will be located in the well-developed core downtown area of the city of Ottawa, traffic along study area roadways is not anticipated to increase drastically within the future horizon years. Also, since the development is located in a TOD area, within 600m of LRT's Parliament Station, transit usage is expected to continuously increase, and auto usage is expected to decrease. Major other area developments within the study area are accounted for in Section 3.2.3. Nonetheless, a background growth rate of 1% has been applied to the study area roadways to account for trips that may be generated by future other area developments that are minor or located outside the scope of the study area. Figure 12 provides the future background traffic at 2022 and Figure 13 provides the future background traffic at 2027. Note that a traffic signal is anticipated to be constructed at the intersection of O'Connor/Nepean prior to the construction of the proposed development and the EBT movement is assumed to be reinstated as a result.

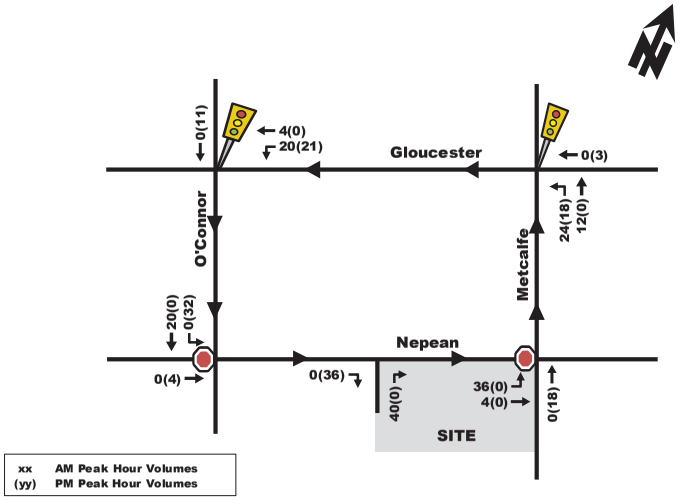


Figure 7: Phase I 'New' Site Generated Traffic

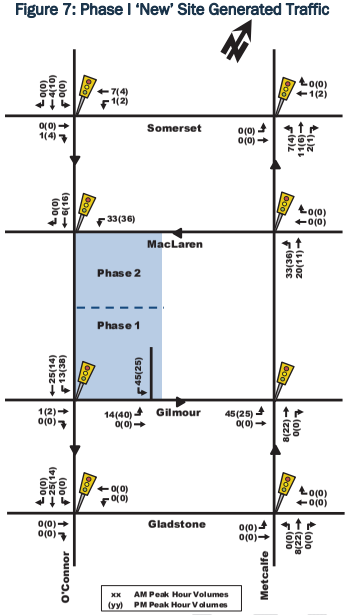
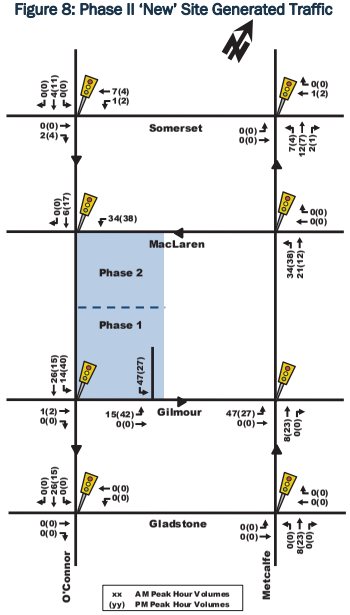
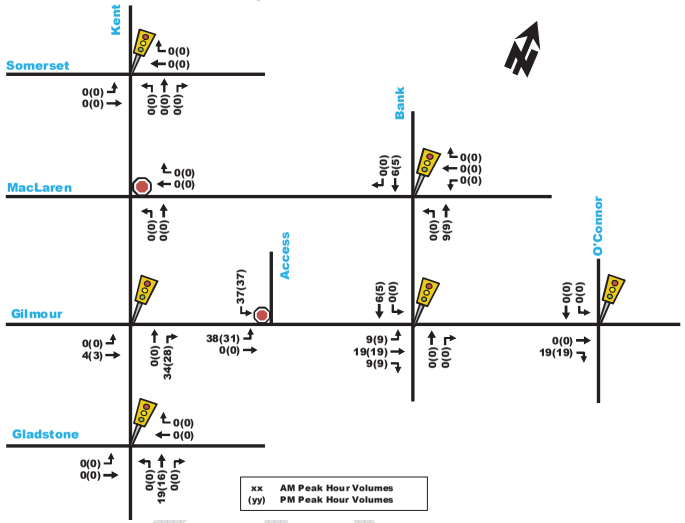


Figure 8: Phase II 'New' Site Generated Traffic



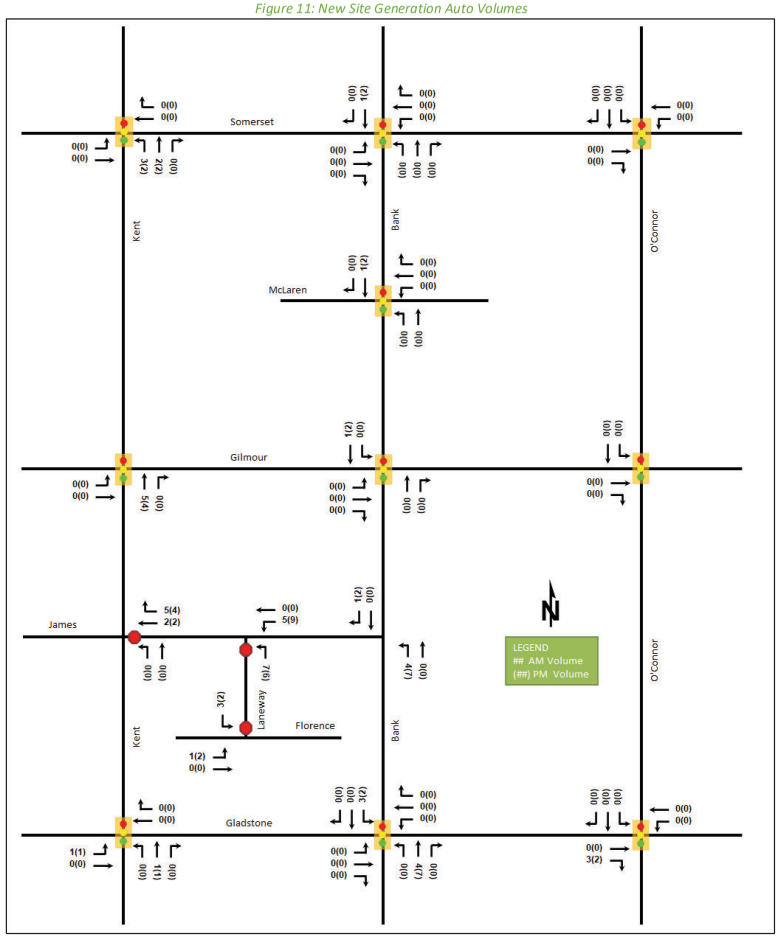
- Departing traffic is assumed to use Hwy 417 WB primarily by travelling east on Gilmour St away from the site driveway and turning right on O'Connor St to travel southbound to Catherine St, then turning right onto the highway ramp.

Figure 14: 2024 Site-Generated Traffic



Based on the site-generated vehicle trips of the existing office building (provided in Table 4), study area traffic volumes are expected to decrease as shown in Figure 15. A similar trip distribution and assignment has been assumed for the existing office building's vehicle trips as the proposed residential development. This reduction in traffic volumes will be applied to the total projected traffic volumes for horizon years 2024 and 2029.

Figure 11: New Site Generation Auto Volumes



Appendix G

Synchro Intersection Worksheets – 2024 Future Background Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations								
Traffic Volume (vph)	52	254	75	21	162	3	378	159
Future Volume (vph)	52	254	75	21	162	3	378	159
Lane Group Flow (vph)	0	306	75	21	179	0	428	167
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	NA
Protected Phases		4			8		2	6
Permitted Phases	4		4	8		2		
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0	45.0	45.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%
Maximum Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	144	144	144	126	126	195	195	294
Act Effct Green (s)		24.5	24.5	24.5	24.5		39.5	39.5
Actuated g/C Ratio		0.33	0.33	0.33	0.33		0.53	0.53
v/c Ratio		0.60	0.23	0.10	0.33		0.50	0.19
Control Delay		27.2	20.7	8.7	9.5		13.9	10.0
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		27.2	20.7	8.7	9.5		13.9	10.0
LOS		C	C	A	A		B	B
Approach Delay		26.0			9.4		13.9	10.0
Approach LOS		C			A		B	B
Queue Length 50th (m)		35.9	7.6	0.9	8.1		36.1	11.6
Queue Length 95th (m)		60.6	17.5	m2.4	13.7		58.8	21.2
Internal Link Dist (m)		161.3			160.8		255.6	215.8
Turn Bay Length (m)			25.0	10.0				
Base Capacity (vph)		506	329	221	548		860	890
Starvation Cap Reductn		0	0	0	0		0	0
Spillback Cap Reductn		0	0	0	0		0	0
Storage Cap Reductn		0	0	0	0		0	0
Reduced v/c Ratio		0.60	0.23	0.10	0.33		0.50	0.19

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 46 (61%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 16.5 — Intersection LOS: B
Intersection Capacity Utilization 75.0% — ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

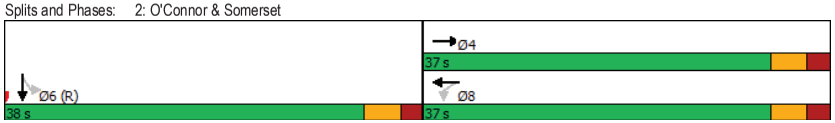
Splits and Phases: 1: Bank & Somerset

Lane Group	EBT	WBL	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	185	52	181	555
Future Volume (vph)	185	52	181	555
Lane Group Flow (vph)	302	0	233	647
Turn Type	NA	Perm	NA	NA
Protected Phases	4		8	6
Permitted Phases		8		
Detector Phase	4	8	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	22.4
Total Split (s)	37.0	37.0	37.0	38.0
Total Split (%)	49.3%	49.3%	49.3%	50.7%
Maximum Green (s)	31.5	31.5	31.5	32.6
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.1
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	5.5		5.5	5.4
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	C-Max
Walk Time (s)	7.0	7.0	7.0	10.0
Flash Dont Walk (s)	8.0	8.0	8.0	7.0
Pedestrian Calls (#/hr)	102	83	83	119
Act Effct Green (s)	31.5		31.5	32.6
Actuated g/C Ratio	0.42		0.42	0.43
v/c Ratio	0.44		0.37	0.47
Control Delay	16.3		24.2	15.9
Queue Delay	0.0		0.0	0.0
Total Delay	16.3		24.2	15.9
LOS	B		C	B
Approach Delay	16.3		24.2	15.9
Approach LOS	B		C	B
Queue Length 50th (m)	14.3		27.7	31.7
Queue Length 95th (m)	40.0		m45.8	45.3
Internal Link Dist (m)	160.8		155.7	145.7
Turn Bay Length (m)				
Base Capacity (vph)	681		627	1384
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.44		0.37	0.47

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 44 (59%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 45

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.47
Intersection Signal Delay: 17.7 Intersection LOS: B
Intersection Capacity Utilization 70.0% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: O'Connor & Somerset

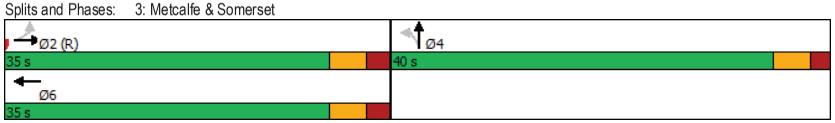


Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Traffic Volume (vph)	109	135	162	1117
Future Volume (vph)	109	135	162	1117
Lane Group Flow (vph)	0	244	325	1337
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	4
Permitted Phases	2			
Detector Phase	2	2	6	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	19.5	19.5	19.5	18.2
Total Split (s)	35.0	35.0	35.0	40.0
Total Split (%)	46.7%	46.7%	46.7%	53.3%
Maximum Green (s)	29.5	29.5	29.5	34.8
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	1.9
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	7.0	7.0	6.0
Pedestrian Calls (#/hr)	141	141	126	267
Act Effct Green (s)		29.5	29.5	34.8
Actuated g/C Ratio		0.39	0.39	0.46
v/c Ratio		0.58	0.57	0.67
Control Delay		17.8	22.0	17.3
Queue Delay		0.0	0.0	0.0
Total Delay		17.8	22.0	17.3
LOS		B	C	B
Approach Delay		17.8	22.0	17.3
Approach LOS		B	C	B
Queue Length 50th (m)		20.3	34.0	50.1
Queue Length 95th (m)		41.6	58.3	64.8
Internal Link Dist (m)		155.7	145.3	134.2
Turn Bay Length (m)				
Base Capacity (vph)		423	573	1997
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.58	0.57	0.67

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 29 (39%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 40

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 18.2 — Intersection LOS: B
Intersection Capacity Utilization 81.0% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Metcalfe & Somerset

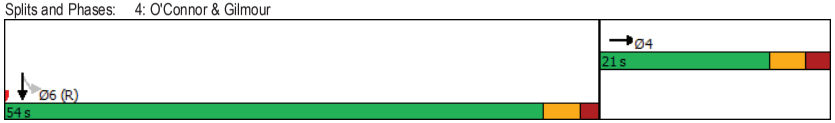


Lane Group	EBT	SBT
Lane Configurations		
Traffic Volume (vph)	62	718
Future Volume (vph)	62	718
Lane Group Flow (vph)	130	780
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases		
Detector Phase	4	6
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	20.6	26.1
Total Split (s)	21.0	54.0
Total Split (%)	28.0%	72.0%
Maximum Green (s)	15.4	48.9
Yellow Time (s)	3.3	3.3
All-Red Time (s)	2.3	1.8
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.6	5.1
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	Max	C-Max
Walk Time (s)	7.0	16.0
Flash Dont Walk (s)	8.0	5.0
Pedestrian Calls (#/hr)	47	73
Act Effct Green (s)	15.4	48.9
Actuated g/C Ratio	0.21	0.65
v/c Ratio	0.34	0.36
Control Delay	16.6	3.3
Queue Delay	0.0	0.0
Total Delay	16.6	3.3
LOS	B	A
Approach Delay	16.6	3.3
Approach LOS	B	A
Queue Length 50th (m)	7.6	8.4
Queue Length 95th (m)	21.4	14.3
Internal Link Dist (m)	127.1	143.6
Turn Bay Length (m)		
Base Capacity (vph)	377	2143
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.34	0.36

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 46 (61%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 50

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.36
Intersection Signal Delay: 5.2 — Intersection LOS: A
Intersection Capacity Utilization 47.6% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: O'Connor & Gilmour



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations								
Traffic Volume (vph)	34	278	103	59	258	9	269	338
Future Volume (vph)	34	278	103	59	258	9	269	338
Lane Group Flow (vph)	0	312	103	59	262	0	308	370
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	NA
Protected Phases		4			8		2	6
Permitted Phases	4		4	8		2		
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0	45.0	45.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%
Maximum Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	77	77	77	206	206	256	256	500
Act Effct Green (s)		24.5	24.5	24.5	24.5		39.5	39.5
Actuated g/C Ratio		0.33	0.33	0.33	0.33		0.53	0.53
v/c Ratio		0.60	0.26	0.25	0.46		0.37	0.43
Control Delay		26.9	20.9	14.6	16.0		12.0	12.9
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		26.9	20.9	14.6	16.0		12.0	12.9
LOS		C	C	B	B		B	B
Approach Delay		25.4			15.7		12.0	12.9
Approach LOS		C			B		B	B
Queue Length 50th (m)		36.5	10.6	3.5	19.1		23.8	29.9
Queue Length 95th (m)		61.1	22.1	m6.4	m31.7		39.8	49.0
Internal Link Dist (m)		161.3			160.8		255.6	215.8
Turn Bay Length (m)			25.0	10.0				
Base Capacity (vph)		521	394	236	565		843	857
Starvation Cap Reductn		0	0	0	0		0	0
Spillback Cap Reductn		0	0	0	0		0	0
Storage Cap Reductn		0	0	0	0		0	0
Reduced v/c Ratio		0.60	0.26	0.25	0.46		0.37	0.43

Intersection Summary

Cycle Length: 75
Actuated Cycle Length: 75
Offset: 71 (95%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 17.0 — Intersection LOS: B
Intersection Capacity Utilization 73.3% — ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

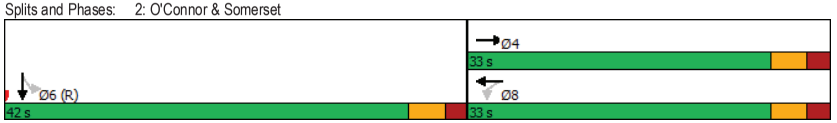
Splits and Phases: 1: Bank & Somerset

Lane Group	EBT	WBL	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	192	72	185	1023
Future Volume (vph)	192	72	185	1023
Lane Group Flow (vph)	355	0	257	1167
Turn Type	NA	Perm	NA	NA
Protected Phases	4		8	6
Permitted Phases		8		
Detector Phase	4	8	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	22.4
Total Split (s)	33.0	33.0	33.0	42.0
Total Split (%)	44.0%	44.0%	44.0%	56.0%
Maximum Green (s)	27.5	27.5	27.5	36.6
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.1
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	5.5		5.5	5.4
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	C-Max
Walk Time (s)	7.0	7.0	7.0	10.0
Flash Dont Walk (s)	8.0	8.0	8.0	7.0
Pedestrian Calls (#/hr)	179	138	138	147
Act Effct Green (s)	27.5		27.5	36.6
Actuated g/C Ratio	0.37		0.37	0.49
v/c Ratio	0.65		0.57	0.76
Control Delay	43.9		18.7	19.3
Queue Delay	0.0		0.0	0.0
Total Delay	43.9		18.7	19.3
LOS	D		B	B
Approach Delay	43.9		18.7	19.3
Approach LOS	D		B	B
Queue Length 50th (m)	50.7		19.3	65.6
Queue Length 95th (m)	76.7		30.1	89.5
Internal Link Dist (m)	160.8		155.7	145.7
Turn Bay Length (m)				
Base Capacity (vph)	543		454	1541
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.65		0.57	0.76

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 58 (77%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 24.1 — Intersection LOS: C
Intersection Capacity Utilization 91.3% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 2: O'Connor & Somerset

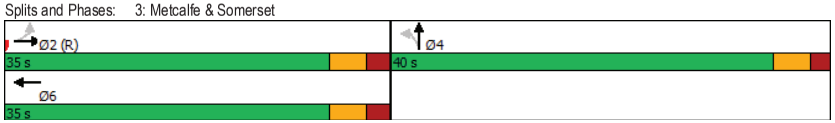


Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Traffic Volume (vph)	87	185	150	665
Future Volume (vph)	87	185	150	665
Lane Group Flow (vph)	0	272	256	910
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	4
Permitted Phases	2			
Detector Phase	2	2	6	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	19.5	19.5	19.5	18.2
Total Split (s)	35.0	35.0	35.0	40.0
Total Split (%)	46.7%	46.7%	46.7%	53.3%
Maximum Green (s)	29.5	29.5	29.5	34.8
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	1.9
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	7.0	7.0	6.0
Pedestrian Calls (#/hr)	162	162	213	350
Act Effct Green (s)		29.5	29.5	34.8
Actuated g/C Ratio		0.39	0.39	0.46
v/c Ratio		0.52	0.45	0.49
Control Delay		19.8	18.4	13.6
Queue Delay		0.0	0.0	0.0
Total Delay		19.8	18.4	13.6
LOS		B	B	B
Approach Delay		19.8	18.4	13.6
Approach LOS		B	B	B
Queue Length 50th (m)		20.3	23.7	28.0
Queue Length 95th (m)		m41.7	42.7	38.3
Internal Link Dist (m)		155.7	145.3	134.2
Turn Bay Length (m)				
Base Capacity (vph)		524	573	1864
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.52	0.45	0.49

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 20 (27%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 40

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 15.6 — Intersection LOS: B
Intersection Capacity Utilization 70.2% — ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Metcalfe & Somerset



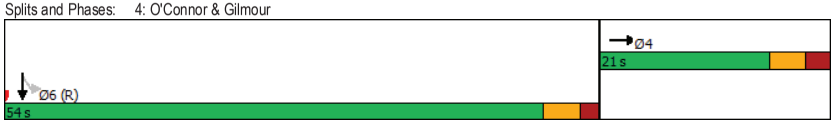
Lane Group	EBT	SBT
Lane Configurations		
Traffic Volume (vph)	86	1279
Future Volume (vph)	86	1279
Lane Group Flow (vph)	194	1365
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases		
Detector Phase	4	6
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	20.6	26.1
Total Split (s)	21.0	54.0
Total Split (%)	28.0%	72.0%
Maximum Green (s)	15.4	48.9
Yellow Time (s)	3.3	3.3
All-Red Time (s)	2.3	1.8
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.6	5.1
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	Max	C-Max
Walk Time (s)	7.0	16.0
Flash Dont Walk (s)	8.0	5.0
Pedestrian Calls (#/hr)	55	108
Act Effct Green (s)	15.4	48.9
Actuated g/C Ratio	0.21	0.65
v/c Ratio	0.54	0.64
Control Delay	24.6	5.4
Queue Delay	0.0	0.4
Total Delay	24.6	5.8
LOS	C	A
Approach Delay	24.6	5.8
Approach LOS	C	A
Queue Length 50th (m)	16.8	12.5
Queue Length 95th (m)	36.0	19.9
Internal Link Dist (m)	127.1	143.6
Turn Bay Length (m)		
Base Capacity (vph)	361	2142
Starvation Cap Reductn	0	285
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.54	0.74

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 71 (95%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 8.1	Intersection LOS: A
Intersection Capacity Utilization 66.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: O'Connor & Gilmour



Appendix H

Synchro Intersection Worksheets – 2029 Future Background Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations								
Traffic Volume (vph)	52	256	75	21	169	3	378	159
Future Volume (vph)	52	256	75	21	169	3	378	159
Lane Group Flow (vph)	0	308	75	21	186	0	428	167
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	NA
Protected Phases		4			8		2	6
Permitted Phases	4		4	8		2		
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0	45.0	45.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%
Maximum Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	144	144	144	126	126	195	195	294
Act Effct Green (s)		24.5	24.5	24.5	24.5		39.5	39.5
Actuated g/C Ratio		0.33	0.33	0.33	0.33		0.53	0.53
v/c Ratio		0.61	0.23	0.10	0.34		0.50	0.19
Control Delay		27.4	20.7	8.6	9.6		13.9	10.0
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		27.4	20.7	8.6	9.6		13.9	10.0
LOS		C	C	A	A		B	B
Approach Delay		26.1			9.5		13.9	10.0
Approach LOS		C			A		B	B
Queue Length 50th (m)		36.1	7.6	0.9	8.2		36.1	11.6
Queue Length 95th (m)		60.9	17.5	m2.3	14.0		58.8	21.2
Internal Link Dist (m)		161.3			160.8		255.6	215.8
Turn Bay Length (m)			25.0	10.0				
Base Capacity (vph)		506	329	220	549		860	890
Starvation Cap Reductn		0	0	0	0		0	0
Spillback Cap Reductn		0	0	0	0		0	0
Storage Cap Reductn		0	0	0	0		0	0
Reduced v/c Ratio		0.61	0.23	0.10	0.34		0.50	0.19

Intersection Summary

Cycle Length: 75
Actuated Cycle Length: 75
Offset: 46 (61%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 16.5 — Intersection LOS: B
Intersection Capacity Utilization 75.1% — ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bank & Somerset

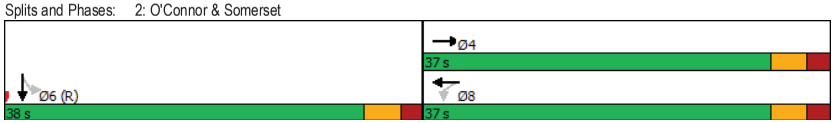
Lane Group	EBT	WBL	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	185	53	188	559
Future Volume (vph)	185	53	188	559
Lane Group Flow (vph)	304	0	241	651
Turn Type	NA	Perm	NA	NA
Protected Phases	4		8	6
Permitted Phases		8		
Detector Phase	4	8	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	22.4
Total Split (s)	37.0	37.0	37.0	38.0
Total Split (%)	49.3%	49.3%	49.3%	50.7%
Maximum Green (s)	31.5	31.5	31.5	32.6
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.1
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	5.5		5.5	5.4
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	C-Max
Walk Time (s)	7.0	7.0	7.0	10.0
Flash Dont Walk (s)	8.0	8.0	8.0	7.0
Pedestrian Calls (#/hr)	102	83	83	119
Act Effct Green (s)	31.5		31.5	32.6
Actuated g/C Ratio	0.42		0.42	0.43
v/c Ratio	0.45		0.38	0.47
Control Delay	16.5		23.8	16.0
Queue Delay	0.0		0.0	0.0
Total Delay	16.5		23.8	16.0
LOS	B		C	B
Approach Delay	16.5		23.8	16.0
Approach LOS	B		C	B
Queue Length 50th (m)	14.6		28.5	32.0
Queue Length 95th (m)	40.3		m46.2	45.5
Internal Link Dist (m)	160.8		155.7	145.7
Turn Bay Length (m)				
Base Capacity (vph)	680		627	1384
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.45		0.38	0.47

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 44 (59%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 45

Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.47	
Intersection Signal Delay: 17.7	Intersection LOS: B
Intersection Capacity Utilization 70.7%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 2: O'Connor & Somerset

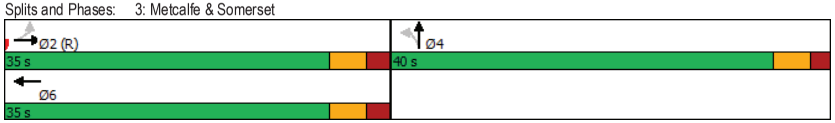


Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Traffic Volume (vph)	109	135	163	1129
Future Volume (vph)	109	135	163	1129
Lane Group Flow (vph)	0	244	326	1358
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	4
Permitted Phases	2			
Detector Phase	2	2	6	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	19.5	19.5	19.5	18.2
Total Split (s)	35.0	35.0	35.0	40.0
Total Split (%)	46.7%	46.7%	46.7%	53.3%
Maximum Green (s)	29.5	29.5	29.5	34.8
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	1.9
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	7.0	7.0	6.0
Pedestrian Calls (#/hr)	141	141	126	267
Act Effct Green (s)		29.5	29.5	34.8
Actuated g/C Ratio		0.39	0.39	0.46
v/c Ratio		0.58	0.57	0.68
Control Delay		17.9	22.1	17.5
Queue Delay		0.0	0.0	0.0
Total Delay		17.9	22.1	17.5
LOS		B	C	B
Approach Delay		17.9	22.1	17.5
Approach LOS		B	C	B
Queue Length 50th (m)		20.3	34.2	51.3
Queue Length 95th (m)		41.7	58.7	66.3
Internal Link Dist (m)		155.7	145.3	134.2
Turn Bay Length (m)				
Base Capacity (vph)		422	574	1993
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.58	0.57	0.68

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 29 (39%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 40

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 18.3 — Intersection LOS: B
Intersection Capacity Utilization 81.4% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Metcalfe & Somerset

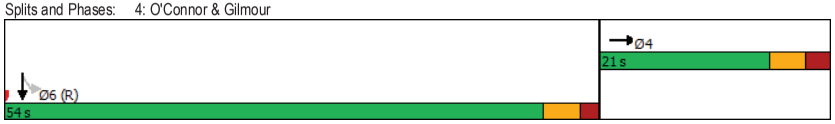


Lane Group	EBT	SBT
Lane Configurations		
Traffic Volume (vph)	63	744
Future Volume (vph)	63	744
Lane Group Flow (vph)	131	820
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases		
Detector Phase	4	6
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	20.6	26.1
Total Split (s)	21.0	54.0
Total Split (%)	28.0%	72.0%
Maximum Green (s)	15.4	48.9
Yellow Time (s)	3.3	3.3
All-Red Time (s)	2.3	1.8
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.6	5.1
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	Max	C-Max
Walk Time (s)	7.0	16.0
Flash Dont Walk (s)	8.0	5.0
Pedestrian Calls (#/hr)	47	73
Act Effct Green (s)	15.4	48.9
Actuated g/C Ratio	0.21	0.65
v/c Ratio	0.35	0.38
Control Delay	16.9	3.5
Queue Delay	0.0	0.0
Total Delay	16.9	3.5
LOS	B	A
Approach Delay	16.9	3.5
Approach LOS	B	A
Queue Length 50th (m)	7.8	9.5
Queue Length 95th (m)	21.6	15.8
Internal Link Dist (m)	127.1	143.6
Turn Bay Length (m)		
Base Capacity (vph)	377	2138
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.35	0.38

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 46 (61%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 50

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.38
Intersection Signal Delay: 5.4 — Intersection LOS: A
Intersection Capacity Utilization 48.8% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: O'Connor & Gilmour



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations								
Traffic Volume (vph)	34	282	103	59	262	9	269	338
Future Volume (vph)	34	282	103	59	262	9	269	338
Lane Group Flow (vph)	0	316	103	59	266	0	308	370
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	NA
Protected Phases		4			8		2	6
Permitted Phases	4		4	8		2		
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0	45.0	45.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%
Maximum Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	77	77	77	206	206	256	256	500
Act Effct Green (s)		24.5	24.5	24.5	24.5		39.5	39.5
Actuated g/C Ratio		0.33	0.33	0.33	0.33		0.53	0.53
v/c Ratio		0.61	0.26	0.25	0.47		0.37	0.43
Control Delay		27.1	20.9	14.5	15.8		12.0	12.9
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		27.1	20.9	14.5	15.8		12.0	12.9
LOS		C	C	B	B		B	B
Approach Delay		25.6			15.6		12.0	12.9
Approach LOS		C			B		B	B
Queue Length 50th (m)		37.0	10.6	3.5	19.1		23.8	29.9
Queue Length 95th (m)		62.1	22.1	m6.0	m31.7		39.8	49.0
Internal Link Dist (m)		161.3			160.8		255.6	215.8
Turn Bay Length (m)			25.0	10.0				
Base Capacity (vph)		522	394	234	565		843	857
Starvation Cap Reductn		0	0	0	0		0	0
Spillback Cap Reductn		0	0	0	0		0	0
Storage Cap Reductn		0	0	0	0		0	0
Reduced v/c Ratio		0.61	0.26	0.25	0.47		0.37	0.43

Intersection Summary

Cycle Length: 75
Actuated Cycle Length: 75
Offset: 71 (95%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 17.0 — Intersection LOS: B
Intersection Capacity Utilization 73.5% — ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

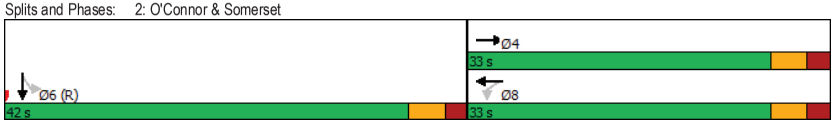
Splits and Phases: 1: Bank & Somerset

Lane Group	EBT	WBL	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	192	74	189	1034
Future Volume (vph)	192	74	189	1034
Lane Group Flow (vph)	359	0	263	1178
Turn Type	NA	Perm	NA	NA
Protected Phases	4		8	6
Permitted Phases		8		
Detector Phase	4	8	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	22.4
Total Split (s)	33.0	33.0	33.0	42.0
Total Split (%)	44.0%	44.0%	44.0%	56.0%
Maximum Green (s)	27.5	27.5	27.5	36.6
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.1
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	5.5		5.5	5.4
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	C-Max
Walk Time (s)	7.0	7.0	7.0	10.0
Flash Dont Walk (s)	8.0	8.0	8.0	7.0
Pedestrian Calls (#/hr)	179	138	138	147
Act Effct Green (s)	27.5		27.5	36.6
Actuated g/C Ratio	0.37		0.37	0.49
v/c Ratio	0.66		0.59	0.76
Control Delay	44.3		19.5	19.5
Queue Delay	0.0		0.0	0.0
Total Delay	44.3		19.5	19.5
LOS	D		B	B
Approach Delay	44.3		19.5	19.5
Approach LOS	D		B	B
Queue Length 50th (m)	51.4		20.0	66.5
Queue Length 95th (m)	77.7		30.9	91.1
Internal Link Dist (m)	160.8		155.7	145.7
Turn Bay Length (m)				
Base Capacity (vph)	541		446	1542
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.66		0.59	0.76

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 58 (77%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 24.5 — Intersection LOS: C
Intersection Capacity Utilization 92.2% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 2: O'Connor & Somerset

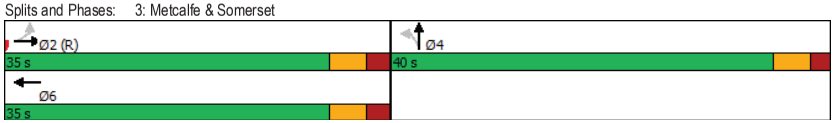


Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Traffic Volume (vph)	87	185	152	672
Future Volume (vph)	87	185	152	672
Lane Group Flow (vph)	0	272	258	922
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	4
Permitted Phases	2			
Detector Phase	2	2	6	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	19.5	19.5	19.5	18.2
Total Split (s)	35.0	35.0	35.0	40.0
Total Split (%)	46.7%	46.7%	46.7%	53.3%
Maximum Green (s)	29.5	29.5	29.5	34.8
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	1.9
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	7.0	7.0	6.0
Pedestrian Calls (#/hr)	162	162	213	350
Act Effct Green (s)		29.5	29.5	34.8
Actuated g/C Ratio		0.39	0.39	0.46
v/c Ratio		0.52	0.45	0.50
Control Delay		20.0	18.6	13.7
Queue Delay		0.0	0.0	0.0
Total Delay		20.0	18.6	13.7
LOS		B	B	B
Approach Delay		20.0	18.6	13.7
Approach LOS		B	B	B
Queue Length 50th (m)		20.6	24.0	28.6
Queue Length 95th (m)		m41.5	43.3	39.1
Internal Link Dist (m)		155.7	145.3	134.2
Turn Bay Length (m)				
Base Capacity (vph)		524	573	1861
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.52	0.45	0.50

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 20 (27%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 40

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 15.8 — Intersection LOS: B
Intersection Capacity Utilization 70.6% — ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Metcalfe & Somerset

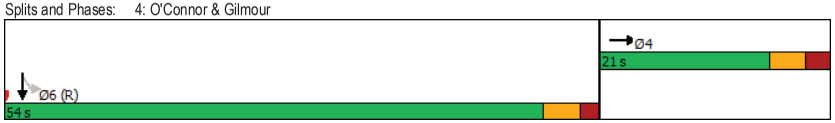


Lane Group	EBT	SBT
Lane Configurations		
Traffic Volume (vph)	88	1294
Future Volume (vph)	88	1294
Lane Group Flow (vph)	196	1420
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases		
Detector Phase	4	6
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	20.6	26.1
Total Split (s)	21.0	54.0
Total Split (%)	28.0%	72.0%
Maximum Green (s)	15.4	48.9
Yellow Time (s)	3.3	3.3
All-Red Time (s)	2.3	1.8
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.6	5.1
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	Max	C-Max
Walk Time (s)	7.0	16.0
Flash Dont Walk (s)	8.0	5.0
Pedestrian Calls (#/hr)	55	108
Act Effct Green (s)	15.4	48.9
Actuated g/C Ratio	0.21	0.65
v/c Ratio	0.54	0.67
Control Delay	25.1	6.2
Queue Delay	0.0	0.4
Total Delay	25.1	6.6
LOS	C	A
Approach Delay	25.1	6.6
Approach LOS	C	A
Queue Length 50th (m)	17.3	14.0
Queue Length 95th (m)	36.7	32.3
Internal Link Dist (m)	127.1	143.6
Turn Bay Length (m)		
Base Capacity (vph)	360	2129
Starvation Cap Reductn	0	269
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.54	0.76

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 71 (95%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 8.8 — Intersection LOS: A
Intersection Capacity Utilization 68.1% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 4: O'Connor & Gilmour



Appendix I

MMLOS Analysis

Multi-Modal Level of Service - Segments Form

Consultant	**CGH Transportation**	**Project**	**2020-27 311 Somerset**
Scenario	**Existing and Future Conditions**	**Date**	**2020-12-10**
Comments			

SEGMENTS		**Street A**	O'Connor	Somerset	Section
			1	2	3
Pedestrian	Sidewalk Width Boulevard Width	**C**	≥ 2 m 0.5 - 2 m	≥ 2 m 0.5 - 2 m	
	Avg Daily Curb Lane Traffic Volume		> 3000	≤ 3000	
	Operating Speed On-Street Parking		> 50 to 60 km/h yes	> 50 to 60 km/h no	
	Exposure to Traffic PLoS		**C**	**A**	**-**
	Effective Sidewalk Width				
	Pedestrian Volume				
	Crowding PLoS		**A**	**A**	**-**
	Level of Service		**C**	**A**	**-**
Bicycle	Type of Cycling Facility	**E**	Physically Separated	Mixed Traffic	
	Number of Travel Lanes			2-3 lanes total	
	Operating Speed			≥ 50 to 60 km/h	
	# of Lanes & Operating Speed LoS		**-**	**E**	**-**
	Bike Lane (+ Parking Lane) Width				
	Bike Lane Width LoS		**-**	**-**	**-**
	Bike Lane Blockages				
	Blockage LoS		**-**	**-**	**-**
	Median Refuge Width (no median = < 1.8 m)			< 1.8 m refuge	
	No. of Lanes at Unsignalized Crossing			≤ 3 lanes	
	Sidestreet Operating Speed			≤ 40 km/h	
	Unsignalized Crossing - Lowest LoS		**A**	**A**	**-**
	Level of Service		**A**	**E**	**-**
Transit	Facility Type	**-**			
	Friction or Ratio Transit:Posted Speed				
	Level of Service		**-**	**-**	**-**
Truck	Truck Lane Width	**C**	≤ 3.3 m	> 3.7 m	
	Travel Lanes per Direction		> 1	1	
	Level of Service		**C**	**B**	**-**

Multi-Modal Level of Service - Intersections Form

Consultant	**CGH Transportation**	**Project**	**2020-27 311 Somerset**
Scenario	**Existing and Future Conditions**	**Date**	**2022-05-24**
Comments			

INTERSECTIONS		Somerset St W at O'Connor St				Somerset St W at Bank St				Somerset St W at Metcalfe St				Gilmour St at O'Connor St			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	0 - 2	3	4	3	3	4	3	3	3	3	3	3	0 - 2	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	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	No left turn / Prohib.	Permissive	Permissive	No left turn / Prohib.	Permissive	Permissive	No left turn / Prohib.	No left turn / Prohib.	Permissive	No left turn / Prohib.	No left turn / Prohib.	Permissive	No left turn / Prohib.	No left turn / Prohib.	Permissive	No left turn / Prohib.
	Conflicting Right Turns	No right turn	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	No right turn	No right turn	Permissive or yield control	No right turn	No right turn
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR prohibited	RTOR prohibited	RTOR allowed	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR allowed	RTOR allowed	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR allowed
	Ped Signal Leading Interval?	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes
	Right Turn Channel	No Right Turn	No Channel	No Right Turn	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Right Turn	No Right Turn	No Channel	No Right Turn	No Channel	No Right Turn	No Right Turn
	Corner Radius	No Right Turn	3-5m	No Right Turn	3-5m	3-5m	5-10m	5-10m	5-10m	0-3m	No Right Turn	No Right Turn	3-5m	No Right Turn	3-5m	No Right Turn	No Right Turn
	Crosswalk Type	Std transverse markings	Std transverse markings	Textured/coloured pavement	Textured/coloured pavement	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Textured/coloured pavement	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Std transverse markings
	PETSI Score	**93**	**75**	**108**	**85**	**60**	**76**	**84**	**67**	**76**	**93**	**88**	**83**	**99**	**86**	**108**	**110**
	Ped. Exposure to Traffic LoS	**A**	**B**	**A**	**B**	**C**	**B**	**B**	**C**	**B**	**A**	**B**	**B**	**A**	**B**	**A**	**A**
	Cycle Length	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
	Effective Walk Time	26	26	24	24	27	27	12	12	29	29	23	23	44	44	7	7
	Average Pedestrian Delay	**16**	**16**	**17**	**17**	**15**	**15**	**26**	**26**	**14**	**14**	**18**	**18**	**6**	**6**	**31**	**31**
	Pedestrian Delay LoS	**B**	**B**	**B**	**B**	**B**	**B**	**C**	**C**	**B**	**B**	**B**	**B**	**A**	**A**	**D**	**D**
	Level of Service	**B**	**B**	**B**	**B**	**C**	**B**	**C**	**C**	**B**	**B**	**B**	**B**	**A**	**B**	**D**	**D**
		B				**C**				**B**				**D**			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP						Mixed Traffic					Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP		
	Right Turn Lane Configuration	Not Applicable	Not Applicable						> 50 m					Not Applicable	Not Applicable		
	Right Turning Speed	Not Applicable	Not Applicable						≤ 25 km/h					Not Applicable	Not Applicable		
	Cyclist relative to RT motorists	**Not Applicable**	**Not Applicable**	**-**	**Not Applicable**	**A**	**A**	**A**	**F**	**-**	**A**	**-**	**A**	**Not Applicable**	**Not Applicable**	**-**	**-**
	Separated or Mixed Traffic	**Separated**	**Separated**	**-**	**Separated**	**-**	**-**	**-**	**Mixed Traffic**	**-**	**-**	**-**	**-**	**Separated**	**Separated**	**-**	**-**
	Left Turn Approach	2-stage, LT box	2-stage, LT box	No lane crossed	2-stage, LT box	No lane crossed	No lane crossed	No lane crossed	No lane crossed		One lane crossed		No lane crossed	No lane crossed			
	Operating Speed	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h		> 50 to < 60 km/h		> 50 to < 60 km/h	≤ 40 km/h			
	Left Turning Cyclist	**A**	**A**	**C**	**A**	**B**	**B**	**B**	**B**	**-**	**E**	**-**	**C**	**B**	**-**	**-**	**-**
	Level of Service	**A**	**A**	**C**	**A**	**B**	**B**	**B**	**F**	**-**	**E**	**-**	**C**	**B**	**-**	**-**	**-**
		C				**F**				**E**				**B**			
Transit	Average Signal Delay					≤ 20 sec	≤ 20 sec	≤ 30 sec									
	Level of Service	**-**	**-**	**-**	**-**	**C**	**C**	**D**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		-				**D**				**-**				**-**			
Truck	Effective Corner Radius	10 - 15 m			< 10 m			< 10 m	< 10 m			< 10 m					
	Number of Receiving Lanes on Departure from Intersection	1			≥ 2			1	1			≥ 2					
	Level of Service	**E**	**-**	**-**	**D**	**-**	**-**	**F**	**F**	**-**	**-**	**D**	**-**	**-**	**-**	**-**	**-**
		E				**F**				**D**				**-**			
Auto	Volume to Capacity Ratio	0.71 - 0.80				0.0 - 0.60				0.61 - 0.70				0.0 - 0.60			
	Level of Service	**C**				**A**				**B**				**A**			

Appendix J

Synchro Intersection Worksheets – 2024 Future Total Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations								
Traffic Volume (vph)	53	254	75	21	163	3	378	159
Future Volume (vph)	53	254	75	21	163	3	378	159
Lane Group Flow (vph)	0	307	75	21	180	0	428	167
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	NA
Protected Phases		4			8		2	6
Permitted Phases	4		4	8		2		
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0	45.0	45.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%
Maximum Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	151	151	151	130	130	200	200	296
Act Effct Green (s)		24.5	24.5	24.5	24.5		39.5	39.5
Actuated g/C Ratio		0.33	0.33	0.33	0.33		0.53	0.53
v/c Ratio		0.61	0.23	0.10	0.33		0.50	0.19
Control Delay		27.4	20.9	8.8	9.6		13.9	10.0
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		27.4	20.9	8.8	9.6		13.9	10.0
LOS		C	C	A	A		B	B
Approach Delay		26.1			9.5		13.9	10.0
Approach LOS		C			A		B	B
Queue Length 50th (m)		36.0	7.6	0.9	8.2		36.2	11.6
Queue Length 95th (m)		60.8	17.6	m2.4	13.9		58.9	21.2
Internal Link Dist (m)		161.3			160.8		255.6	215.8
Turn Bay Length (m)			25.0	10.0				
Base Capacity (vph)		504	323	219	548		860	890
Starvation Cap Reductn		0	0	0	0		0	0
Spillback Cap Reductn		0	0	0	0		0	0
Storage Cap Reductn		0	0	0	0		0	0
Reduced v/c Ratio		0.61	0.23	0.10	0.33		0.50	0.19

Intersection Summary

Cycle Length: 75
Actuated Cycle Length: 75
Offset: 46 (61%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 16.6 — Intersection LOS: B
Intersection Capacity Utilization 75.0% — ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

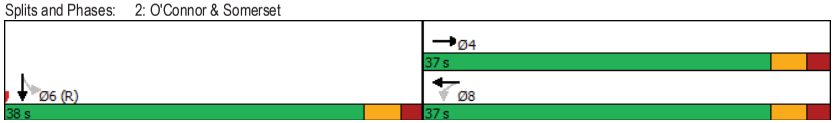
Splits and Phases: 1: Bank & Somerset

Lane Group	EBT	WBL	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	185	52	181	563
Future Volume (vph)	185	52	181	563
Lane Group Flow (vph)	302	0	233	658
Turn Type	NA	Perm	NA	NA
Protected Phases	4		8	6
Permitted Phases		8		
Detector Phase	4	8	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	22.4
Total Split (s)	37.0	37.0	37.0	38.0
Total Split (%)	49.3%	49.3%	49.3%	50.7%
Maximum Green (s)	31.5	31.5	31.5	32.6
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.1
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	5.5		5.5	5.4
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	C-Max
Walk Time (s)	7.0	7.0	7.0	10.0
Flash Dont Walk (s)	8.0	8.0	8.0	7.0
Pedestrian Calls (#/hr)	106	89	89	120
Act Effct Green (s)	31.5		31.5	32.6
Actuated g/C Ratio	0.42		0.42	0.43
v/c Ratio	0.44		0.37	0.48
Control Delay	16.5		24.2	16.1
Queue Delay	0.0		0.0	0.0
Total Delay	16.5		24.2	16.1
LOS	B		C	B
Approach Delay	16.5		24.2	16.1
Approach LOS	B		C	B
Queue Length 50th (m)	14.6		27.8	32.4
Queue Length 95th (m)	40.2		m45.5	46.2
Internal Link Dist (m)	160.8		155.7	33.6
Turn Bay Length (m)				
Base Capacity (vph)	679		626	1381
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.44		0.37	0.48

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 44 (59%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 45

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 17.8 — Intersection LOS: B
Intersection Capacity Utilization 70.3% — ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: O'Connor & Somerset

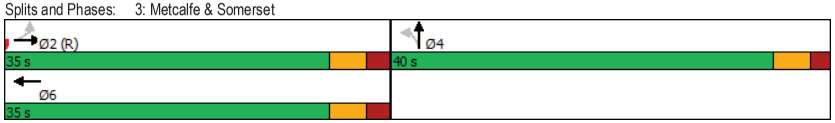


Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Traffic Volume (vph)	110	136	162	1121
Future Volume (vph)	110	136	162	1121
Lane Group Flow (vph)	0	246	326	1341
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	4
Permitted Phases	2			
Detector Phase	2	2	6	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	19.5	19.5	19.5	18.2
Total Split (s)	35.0	35.0	35.0	40.0
Total Split (%)	46.7%	46.7%	46.7%	53.3%
Maximum Green (s)	29.5	29.5	29.5	34.8
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	1.9
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	7.0	7.0	6.0
Pedestrian Calls (#/hr)	145	145	130	268
Act Effct Green (s)		29.5	29.5	34.8
Actuated g/C Ratio		0.39	0.39	0.46
v/c Ratio		0.59	0.57	0.67
Control Delay		18.3	22.2	17.3
Queue Delay		0.0	0.0	0.0
Total Delay		18.3	22.2	17.3
LOS		B	C	B
Approach Delay		18.3	22.2	17.3
Approach LOS		B	C	B
Queue Length 50th (m)		20.7	34.2	50.3
Queue Length 95th (m)		42.2	58.8	64.9
Internal Link Dist (m)		155.7	145.3	134.2
Turn Bay Length (m)				
Base Capacity (vph)		420	571	1998
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.59	0.57	0.67

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 29 (39%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 40

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 18.3 — Intersection LOS: B
Intersection Capacity Utilization 81.3% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Metcalfe & Somerset

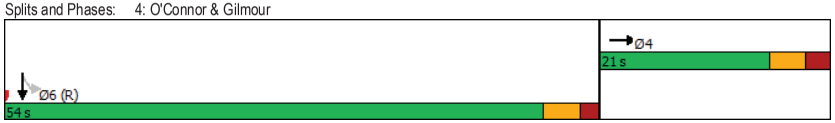


Lane Group	EBT	SBT
Lane Configurations		
Traffic Volume (vph)	62	726
Future Volume (vph)	62	726
Lane Group Flow (vph)	130	788
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases		
Detector Phase	4	6
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	20.6	26.1
Total Split (s)	21.0	54.0
Total Split (%)	28.0%	72.0%
Maximum Green (s)	15.4	48.9
Yellow Time (s)	3.3	3.3
All-Red Time (s)	2.3	1.8
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.6	5.1
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	Max	C-Max
Walk Time (s)	7.0	16.0
Flash Dont Walk (s)	8.0	5.0
Pedestrian Calls (#/hr)	48	74
Act Effct Green (s)	15.4	48.9
Actuated g/C Ratio	0.21	0.65
v/c Ratio	0.34	0.37
Control Delay	16.6	3.3
Queue Delay	0.0	0.0
Total Delay	16.6	3.3
LOS	B	A
Approach Delay	16.6	3.3
Approach LOS	B	A
Queue Length 50th (m)	7.6	8.4
Queue Length 95th (m)	21.4	14.4
Internal Link Dist (m)	127.1	143.6
Turn Bay Length (m)		
Base Capacity (vph)	377	2143
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.34	0.37

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 46 (61%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 50

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.37
Intersection Signal Delay: 5.2 — Intersection LOS: A
Intersection Capacity Utilization 47.8% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: O'Connor & Gilmour



Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	12	0	0	626	6
Future Vol, veh/h	0	12	0	0	626	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	12	0	0	626	6

Major/Minor	Minor2			Major2		
Conflicting Flow All	-	316			-	0
Stage 1	-	-			-	-
Stage 2	-	-			-	-
Critical Hdwy	-	6.94			-	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			-	-
Follow-up Hdwy	-	3.32			-	-
Pot Cap-1 Maneuver	0	680			-	-
Stage 1	0	-			-	-
Stage 2	0	-			-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	680			-	-
Mov Cap-2 Maneuver	-	-			-	-
Stage 1	-	-			-	-
Stage 2	-	-			-	-

Approach	EB	SB
HCM Control Delay, s	10.4	0
HCM LOS	B	

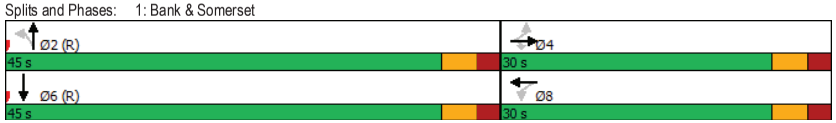
Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	680	-	-
HCM Lane V/C Ratio	0.018	-	-
HCM Control Delay (s)	10.4	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations								
Traffic Volume (vph)	35	278	103	59	259	9	269	338
Future Volume (vph)	35	278	103	59	259	9	269	338
Lane Group Flow (vph)	0	313	103	59	263	0	308	370
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	NA
Protected Phases		4			8		2	6
Permitted Phases	4		4	8		2		
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0	45.0	45.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%
Maximum Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	84	84	84	210	210	261	261	500
Act Effct Green (s)		24.5	24.5	24.5	24.5		39.5	39.5
Actuated g/C Ratio		0.33	0.33	0.33	0.33		0.53	0.53
v/c Ratio		0.60	0.27	0.25	0.47		0.37	0.43
Control Delay		27.0	21.0	14.7	16.1		12.0	12.9
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		27.0	21.0	14.7	16.1		12.0	12.9
LOS		C	C	B	B		B	B
Approach Delay		25.5			15.8		12.0	12.9
Approach LOS		C			B		B	B
Queue Length 50th (m)		36.6	10.6	3.6	19.4		23.8	29.9
Queue Length 95th (m)		61.6	22.2	m6.4	m31.9		39.8	49.0
Internal Link Dist (m)		161.3			160.8		255.6	215.8
Turn Bay Length (m)			25.0	10.0				
Base Capacity (vph)		520	388	234	565		842	857
Starvation Cap Reductn		0	0	0	0		0	0
Spillback Cap Reductn		0	0	0	0		0	0
Storage Cap Reductn		0	0	0	0		0	0
Reduced v/c Ratio		0.60	0.27	0.25	0.47		0.37	0.43

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 71 (95%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 17.1 Intersection LOS: B
Intersection Capacity Utilization 73.3% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bank & Somerset

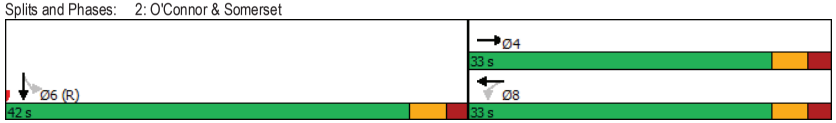


Lane Group	EBT	WBL	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	192	72	185	1030
Future Volume (vph)	192	72	185	1030
Lane Group Flow (vph)	355	0	257	1177
Turn Type	NA	Perm	NA	NA
Protected Phases	4		8	6
Permitted Phases		8		
Detector Phase	4	8	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	22.4
Total Split (s)	33.0	33.0	33.0	42.0
Total Split (%)	44.0%	44.0%	44.0%	56.0%
Maximum Green (s)	27.5	27.5	27.5	36.6
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.1
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	5.5		5.5	5.4
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	C-Max
Walk Time (s)	7.0	7.0	7.0	10.0
Flash Dont Walk (s)	8.0	8.0	8.0	7.0
Pedestrian Calls (#/hr)	183	144	144	148
Act Effct Green (s)	27.5		27.5	36.6
Actuated g/C Ratio	0.37		0.37	0.49
v/c Ratio	0.66		0.57	0.77
Control Delay	44.1		18.7	19.6
Queue Delay	0.0		0.0	0.0
Total Delay	44.1		18.7	19.6
LOS	D		B	B
Approach Delay	44.1		18.7	19.6
Approach LOS	D		B	B
Queue Length 50th (m)	50.9		19.2	66.6
Queue Length 95th (m)	76.9		30.0	91.2
Internal Link Dist (m)	160.8		155.7	31.6
Turn Bay Length (m)				
Base Capacity (vph)	540		453	1538
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.66		0.57	0.77

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 58 (77%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 24.3 Intersection LOS: C
Intersection Capacity Utilization 91.6% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 2: O'Connor & Somerset

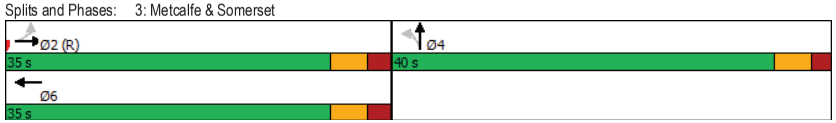


Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Traffic Volume (vph)	88	186	150	673
Future Volume (vph)	88	186	150	673
Lane Group Flow (vph)	0	274	257	918
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	4
Permitted Phases	2			
Detector Phase	2	2	6	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	19.5	19.5	19.5	18.2
Total Split (s)	35.0	35.0	35.0	40.0
Total Split (%)	46.7%	46.7%	46.7%	53.3%
Maximum Green (s)	29.5	29.5	29.5	34.8
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	1.9
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	7.0	7.0	6.0
Pedestrian Calls (#/hr)	166	166	218	351
Act Effct Green (s)		29.5	29.5	34.8
Actuated g/C Ratio		0.39	0.39	0.46
v/c Ratio		0.52	0.45	0.49
Control Delay		19.9	18.6	13.7
Queue Delay		0.0	0.0	0.0
Total Delay		19.9	18.6	13.7
LOS		B	B	B
Approach Delay		19.9	18.6	13.7
Approach LOS		B	B	B
Queue Length 50th (m)		20.7	23.9	28.4
Queue Length 95th (m)		m42.0	43.2	38.9
Internal Link Dist (m)		155.7	145.3	134.2
Turn Bay Length (m)				
Base Capacity (vph)		523	571	1865
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.52	0.45	0.49

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 20 (27%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 40

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 15.7 Intersection LOS: B
Intersection Capacity Utilization 70.6% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Metcalfe & Somerset

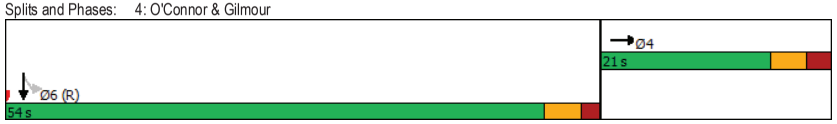


Lane Group	EBT	SBT
Lane Configurations		
Traffic Volume (vph)	86	1286
Future Volume (vph)	86	1286
Lane Group Flow (vph)	194	1372
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases		
Detector Phase	4	6
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	20.6	26.1
Total Split (s)	21.0	54.0
Total Split (%)	28.0%	72.0%
Maximum Green (s)	15.4	48.9
Yellow Time (s)	3.3	3.3
All-Red Time (s)	2.3	1.8
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.6	5.1
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	Max	C-Max
Walk Time (s)	7.0	16.0
Flash Dont Walk (s)	8.0	5.0
Pedestrian Calls (#/hr)	56	109
Act Effct Green (s)	15.4	48.9
Actuated g/C Ratio	0.21	0.65
v/c Ratio	0.54	0.64
Control Delay	24.8	5.4
Queue Delay	0.0	0.4
Total Delay	24.8	5.8
LOS	C	A
Approach Delay	24.8	5.8
Approach LOS	C	A
Queue Length 50th (m)	16.9	12.5
Queue Length 95th (m)	36.2	19.9
Internal Link Dist (m)	127.1	143.6
Turn Bay Length (m)		
Base Capacity (vph)	360	2142
Starvation Cap Reductn	0	286
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.54	0.74

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 71 (95%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 8.1 Intersection LOS: A
Intersection Capacity Utilization 66.5% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 4: O'Connor & Gilmour



Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	10	0	0	1154	12
Future Vol, veh/h	0	10	0	0	1154	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	10	0	0	1154	12

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	583		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.94		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.32		-	-
Pot Cap-1 Maneuver	0	456		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	456		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	13.1	0
HCM LOS	B	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	456	-	-
HCM Lane V/C Ratio	0.022	-	-
HCM Control Delay (s)	13.1	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Appendix K

Synchro Intersection Worksheets – 2029 Future Total Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations								
Traffic Volume (vph)	53	256	75	21	170	3	378	159
Future Volume (vph)	53	256	75	21	170	3	378	159
Lane Group Flow (vph)	0	309	75	21	187	0	428	167
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	NA
Protected Phases		4			8		2	6
Permitted Phases	4		4	8		2		
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0	45.0	45.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%
Maximum Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	151	151	151	130	130	200	200	296
Act Effct Green (s)		24.5	24.5	24.5	24.5		39.5	39.5
Actuated g/C Ratio		0.33	0.33	0.33	0.33		0.53	0.53
v/c Ratio		0.61	0.23	0.10	0.34		0.50	0.19
Control Delay		27.5	20.9	8.7	9.6		13.9	10.0
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		27.5	20.9	8.7	9.6		13.9	10.0
LOS		C	C	A	A		B	B
Approach Delay		26.2			9.5		13.9	10.0
Approach LOS		C			A		B	B
Queue Length 50th (m)		36.3	7.6	0.9	8.4		36.2	11.6
Queue Length 95th (m)		61.2	17.6	m2.3	14.3		58.9	21.2
Internal Link Dist (m)		161.3			160.8		255.6	215.8
Turn Bay Length (m)			25.0	10.0				
Base Capacity (vph)		504	323	217	548		860	890
Starvation Cap Reductn		0	0	0	0		0	0
Spillback Cap Reductn		0	0	0	0		0	0
Storage Cap Reductn		0	0	0	0		0	0
Reduced v/c Ratio		0.61	0.23	0.10	0.34		0.50	0.19

Intersection Summary

Cycle Length: 75
Actuated Cycle Length: 75
Offset: 46 (61%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 16.6 — Intersection LOS: B
Intersection Capacity Utilization 75.2% — ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

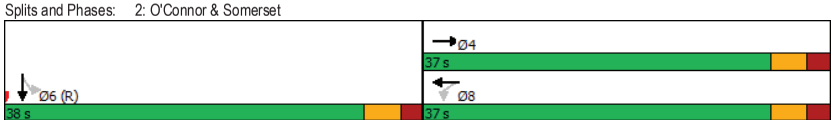
Splits and Phases: 1: Bank & Somerset

Lane Group	EBT	WBL	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	185	53	188	567
Future Volume (vph)	185	53	188	567
Lane Group Flow (vph)	304	0	241	662
Turn Type	NA	Perm	NA	NA
Protected Phases	4		8	6
Permitted Phases		8		
Detector Phase	4	8	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	22.4
Total Split (s)	37.0	37.0	37.0	38.0
Total Split (%)	49.3%	49.3%	49.3%	50.7%
Maximum Green (s)	31.5	31.5	31.5	32.6
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.1
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	5.5		5.5	5.4
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	C-Max
Walk Time (s)	7.0	7.0	7.0	10.0
Flash Dont Walk (s)	8.0	8.0	8.0	7.0
Pedestrian Calls (#/hr)	106	89	89	120
Act Effct Green (s)	31.5		31.5	32.6
Actuated g/C Ratio	0.42		0.42	0.43
v/c Ratio	0.45		0.38	0.48
Control Delay	16.6		23.8	16.1
Queue Delay	0.0		0.0	0.0
Total Delay	16.6		23.8	16.1
LOS	B		C	B
Approach Delay	16.6		23.8	16.1
Approach LOS	B		C	B
Queue Length 50th (m)	15.0		28.4	32.7
Queue Length 95th (m)	40.5		m46.2	46.6
Internal Link Dist (m)	160.8		155.7	33.6
Turn Bay Length (m)				
Base Capacity (vph)	678		626	1382
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.45		0.38	0.48

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 44 (59%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 45

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 17.8 — Intersection LOS: B
Intersection Capacity Utilization 71.1% — ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: O'Connor & Somerset

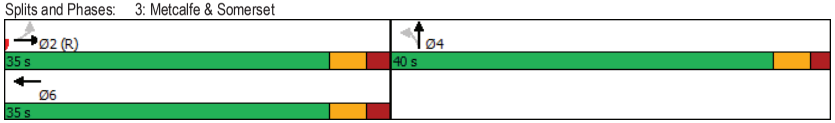


Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Traffic Volume (vph)	110	136	163	1133
Future Volume (vph)	110	136	163	1133
Lane Group Flow (vph)	0	246	327	1362
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	4
Permitted Phases	2			
Detector Phase	2	2	6	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	19.5	19.5	19.5	18.2
Total Split (s)	35.0	35.0	35.0	40.0
Total Split (%)	46.7%	46.7%	46.7%	53.3%
Maximum Green (s)	29.5	29.5	29.5	34.8
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	1.9
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	7.0	7.0	6.0
Pedestrian Calls (#/hr)	145	145	130	268
Act Effct Green (s)		29.5	29.5	34.8
Actuated g/C Ratio		0.39	0.39	0.46
v/c Ratio		0.59	0.57	0.68
Control Delay		18.4	22.2	17.6
Queue Delay		0.0	0.0	0.0
Total Delay		18.4	22.2	17.6
LOS		B	C	B
Approach Delay		18.4	22.2	17.6
Approach LOS		B	C	B
Queue Length 50th (m)		20.7	34.3	51.5
Queue Length 95th (m)		42.1	59.0	66.6
Internal Link Dist (m)		155.7	145.3	134.2
Turn Bay Length (m)				
Base Capacity (vph)		420	571	1994
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.59	0.57	0.68

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 29 (39%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 40

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 18.5 — Intersection LOS: B
Intersection Capacity Utilization 81.8% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Metcalfe & Somerset

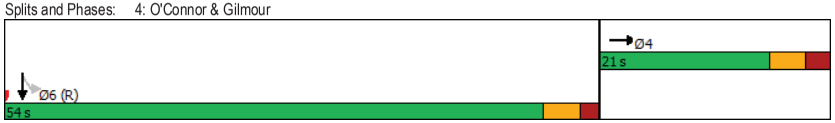


Lane Group	EBT	SBT
Lane Configurations		
Traffic Volume (vph)	63	752
Future Volume (vph)	63	752
Lane Group Flow (vph)	131	828
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases		
Detector Phase	4	6
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	20.6	26.1
Total Split (s)	21.0	54.0
Total Split (%)	28.0%	72.0%
Maximum Green (s)	15.4	48.9
Yellow Time (s)	3.3	3.3
All-Red Time (s)	2.3	1.8
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.6	5.1
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	Max	C-Max
Walk Time (s)	7.0	16.0
Flash Dont Walk (s)	8.0	5.0
Pedestrian Calls (#/hr)	48	74
Act Effct Green (s)	15.4	48.9
Actuated g/C Ratio	0.21	0.65
v/c Ratio	0.35	0.39
Control Delay	16.9	3.5
Queue Delay	0.0	0.0
Total Delay	16.9	3.5
LOS	B	A
Approach Delay	16.9	3.5
Approach LOS	B	A
Queue Length 50th (m)	7.8	9.6
Queue Length 95th (m)	21.6	15.8
Internal Link Dist (m)	127.1	143.6
Turn Bay Length (m)		
Base Capacity (vph)	377	2138
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.35	0.39

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 46 (61%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 50

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.39
Intersection Signal Delay: 5.3 — Intersection LOS: A
Intersection Capacity Utilization 49.0% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: O'Connor & Gilmour



Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	12	0	0	630	6
Future Vol, veh/h	0	12	0	0	630	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	12	0	0	630	6

Major/Minor	Minor2			Major2		
Conflicting Flow All	-	318			-	0
Stage 1	-	-			-	-
Stage 2	-	-			-	-
Critical Hdwy	-	6.94			-	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			-	-
Follow-up Hdwy	-	3.32			-	-
Pot Cap-1 Maneuver	0	678			-	-
Stage 1	0	-			-	-
Stage 2	0	-			-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	678			-	-
Mov Cap-2 Maneuver	-	-			-	-
Stage 1	-	-			-	-
Stage 2	-	-			-	-

Approach	EB	SB
HCM Control Delay, s	10.4	0
HCM LOS	B	

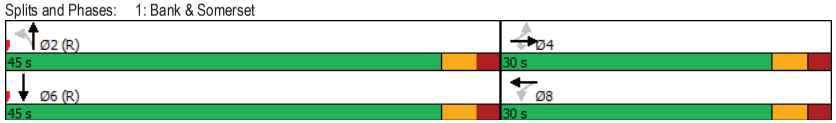
Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	678	-	-
HCM Lane V/C Ratio	0.018	-	-
HCM Control Delay (s)	10.4	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations								
Traffic Volume (vph)	35	282	103	59	263	9	269	338
Future Volume (vph)	35	282	103	59	263	9	269	338
Lane Group Flow (vph)	0	317	103	59	267	0	308	370
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	NA
Protected Phases		4			8		2	6
Permitted Phases	4		4	8		2		
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0	45.0	45.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%
Maximum Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Pedestrian Calls (#/hr)	84	84	84	210	210	261	261	500
Act Effct Green (s)		24.5	24.5	24.5	24.5		39.5	39.5
Actuated g/C Ratio		0.33	0.33	0.33	0.33		0.53	0.53
v/c Ratio		0.61	0.27	0.26	0.47		0.37	0.43
Control Delay		27.2	21.0	14.6	15.9		12.0	12.9
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		27.2	21.0	14.6	15.9		12.0	12.9
LOS		C	C	B	B		B	B
Approach Delay		25.7			15.6		12.0	12.9
Approach LOS		C			B		B	B
Queue Length 50th (m)		37.2	10.6	3.5	19.4		23.8	29.9
Queue Length 95th (m)		62.2	22.2	m6.0	m31.8		39.8	49.0
Internal Link Dist (m)		161.3			160.8		255.6	215.8
Turn Bay Length (m)			25.0	10.0				
Base Capacity (vph)		520	388	231	565		842	857
Starvation Cap Reductn		0	0	0	0		0	0
Spillback Cap Reductn		0	0	0	0		0	0
Storage Cap Reductn		0	0	0	0		0	0
Reduced v/c Ratio		0.61	0.27	0.26	0.47		0.37	0.43

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 71 (95%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 17.1 Intersection LOS: B
Intersection Capacity Utilization 73.6% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bank & Somerset

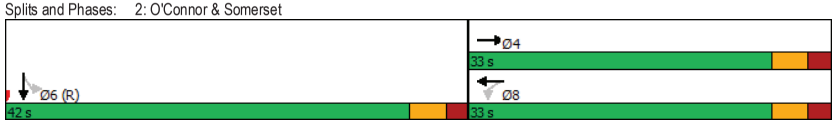


Lane Group	EBT	WBL	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	192	74	189	1041
Future Volume (vph)	192	74	189	1041
Lane Group Flow (vph)	359	0	263	1188
Turn Type	NA	Perm	NA	NA
Protected Phases	4		8	6
Permitted Phases		8		
Detector Phase	4	8	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	22.4
Total Split (s)	33.0	33.0	33.0	42.0
Total Split (%)	44.0%	44.0%	44.0%	56.0%
Maximum Green (s)	27.5	27.5	27.5	36.6
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.1
Lost Time Adjust (s)	0.0		0.0	0.0
Total Lost Time (s)	5.5		5.5	5.4
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	C-Max
Walk Time (s)	7.0	7.0	7.0	10.0
Flash Dont Walk (s)	8.0	8.0	8.0	7.0
Pedestrian Calls (#/hr)	183	144	144	148
Act Effct Green (s)	27.5		27.5	36.6
Actuated g/C Ratio	0.37		0.37	0.49
v/c Ratio	0.67		0.59	0.77
Control Delay	44.5		19.5	19.8
Queue Delay	0.0		0.0	0.0
Total Delay	44.5		19.5	19.8
LOS	D		B	B
Approach Delay	44.5		19.5	19.8
Approach LOS	D		B	B
Queue Length 50th (m)	51.6		20.0	67.6
Queue Length 95th (m)	77.7		30.9	92.6
Internal Link Dist (m)	160.8		155.7	31.6
Turn Bay Length (m)				
Base Capacity (vph)	539		446	1539
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.67		0.59	0.77

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 58 (77%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 24.6 Intersection LOS: C
Intersection Capacity Utilization 92.5% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 2: O'Connor & Somerset

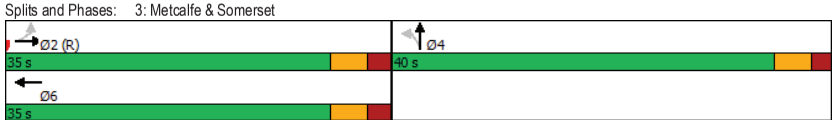


Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Traffic Volume (vph)	88	186	152	680
Future Volume (vph)	88	186	152	680
Lane Group Flow (vph)	0	274	259	930
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	4
Permitted Phases	2			
Detector Phase	2	2	6	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	19.5	19.5	19.5	18.2
Total Split (s)	35.0	35.0	35.0	40.0
Total Split (%)	46.7%	46.7%	46.7%	53.3%
Maximum Green (s)	29.5	29.5	29.5	34.8
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	1.9
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	7.0	7.0	6.0
Pedestrian Calls (#/hr)	166	166	218	351
Act Effct Green (s)		29.5	29.5	34.8
Actuated g/C Ratio		0.39	0.39	0.46
v/c Ratio		0.52	0.45	0.50
Control Delay		20.1	18.6	13.8
Queue Delay		0.0	0.0	0.0
Total Delay		20.1	18.6	13.8
LOS		C	B	B
Approach Delay		20.1	18.6	13.8
Approach LOS		C	B	B
Queue Length 50th (m)		21.0	24.2	29.0
Queue Length 95th (m)		m41.7	43.5	39.5
Internal Link Dist (m)		155.7	145.3	134.2
Turn Bay Length (m)				
Base Capacity (vph)		523	572	1864
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.52	0.45	0.50

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 20 (27%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 40

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 15.8 Intersection LOS: B
Intersection Capacity Utilization 70.9% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Metcalfe & Somerset

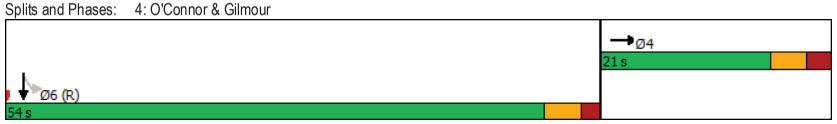


Lane Group	EBT	SBT
Lane Configurations		
Traffic Volume (vph)	88	1301
Future Volume (vph)	88	1301
Lane Group Flow (vph)	196	1427
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases		
Detector Phase	4	6
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	20.6	26.1
Total Split (s)	21.0	54.0
Total Split (%)	28.0%	72.0%
Maximum Green (s)	15.4	48.9
Yellow Time (s)	3.3	3.3
All-Red Time (s)	2.3	1.8
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.6	5.1
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	Max	C-Max
Walk Time (s)	7.0	16.0
Flash Dont Walk (s)	8.0	5.0
Pedestrian Calls (#/hr)	56	109
Act Effct Green (s)	15.4	48.9
Actuated g/C Ratio	0.21	0.65
v/c Ratio	0.55	0.67
Control Delay	25.3	6.2
Queue Delay	0.0	0.4
Total Delay	25.3	6.6
LOS	C	A
Approach Delay	25.3	6.6
Approach LOS	C	A
Queue Length 50th (m)	17.5	14.0
Queue Length 95th (m)	36.8	32.3
Internal Link Dist (m)	127.1	143.6
Turn Bay Length (m)		
Base Capacity (vph)	359	2129
Starvation Cap Reductn	0	269
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.55	0.77

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 71 (95%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 8.9 Intersection LOS: A
Intersection Capacity Utilization 68.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 4: O'Connor & Gilmour



Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	10	0	0	1165	12
Future Vol, veh/h	0	10	0	0	1165	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	10	0	0	1165	12

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	589		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.94		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.32		-	-
Pot Cap-1 Maneuver	0	452		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	452		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	13.1	0
HCM LOS	B	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	452	-	-
HCM Lane V/C Ratio	0.022	-	-
HCM Control Delay (s)	13.1	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Appendix L

TDM Checklist

CGH TRANSPORTATION

TDM Measures Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend

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

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		1. TDM PROGRAM MANAGEMENT	
		1.1 Program coordinator	
BASIC	★	1.1.1 Designate an internal coordinator, or contract with an external coordinator	☐
		1.2 Travel surveys	
BETTER		1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
		2. WALKING AND CYCLING	
		2.1 Information on walking/cycling routes & destinations	
BASIC		2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances	☑
		2.2 Bicycle skills training	
		Commuter travel	
BETTER	★	2.2.1 Offer on-site cycling courses for commuters, or subsidize off-site courses	☐
		2.3 Valet bike parking	
		Visitor travel	
BETTER		2.3.1 Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games)	☐

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		3. TRANSIT	
		3.1 Transit information	
BASIC		3.1.1 Display relevant transit schedules and route maps at entrances	☐
BASIC		3.1.2 Provide online links to OC Transpo and STO information	☑
BETTER		3.1.3 Provide real-time arrival information display at entrances	☐
		3.2 Transit fare incentives	
		Commuter travel	
BETTER		3.2.1 Offer preloaded PRESTO cards to encourage commuters to use transit	☐
BETTER	★	3.2.2 Subsidize or reimburse monthly transit pass purchases by employees	☐
		Visitor travel	
BETTER		3.2.3 Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	☐
		3.3 Enhanced public transit service	
		Commuter travel	
BETTER		3.3.1 Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends)	☐
		Visitor travel	
BETTER		3.3.2 Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	☐
		3.4 Private transit service	
		Commuter travel	
BETTER		3.4.1 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for shift changes, weekends)	☐
		Visitor travel	
BETTER		3.4.2 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for festivals, concerts, games)	☐

			TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		4.	**RIDESHARING**	
		4.1	**Ridematching service**	
			Commuter travel	
BASIC	★	4.1.1	Provide a dedicated ridematching portal at OttawaRideMatch.com	☐
		4.2	**Carpool parking price incentives**	
			Commuter travel	
BETTER		4.2.1	Provide discounts on parking costs for registered carpools	☐
		4.3	**Vanpool service**	
			Commuter travel	
BETTER		4.3.1	Provide a vanpooling service for long-distance commuters	☐
		5.	**CARSHARING & BIKESHARING**	
		5.1	**Bikeshare stations & memberships**	
BETTER		5.1.1	Contract with provider to install on-site bikeshare station for use by commuters and visitors	☐
			Commuter travel	
BETTER		5.1.2	Provide employees with bikeshare memberships for local business travel	☐
		5.2	**Carshare vehicles & memberships**	
			Commuter travel	
BETTER		5.2.1	Contract with provider to install on-site carshare vehicles and promote their use by tenants	☐
BETTER		5.2.2	Provide employees with carshare memberships for local business travel	☐
		6.	**PARKING**	
		6.1	**Priced parking**	
			Commuter travel	
BASIC	★	6.1.1	Charge for long-term parking (daily, weekly, monthly)	☑
BASIC		6.1.2	Unbundle parking cost from lease rates at multi-tenant sites	☑
			Visitor travel	
BETTER		6.1.3	Charge for short-term parking (hourly)	☐

TDM Measures Checklist
Version 1.0 (30 June 2017)
City of Ottawa

			TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		7.	**TDM MARKETING & COMMUNICATIONS**	
		7.1	**Multimodal travel information**	
			Commuter travel	
BASIC	★	7.1.1	Provide a multimodal travel option information package to new/relocating employees and students	☑
			Visitor travel	
BETTER	★	7.1.2	Include multimodal travel option information in invitations or advertising that attract visitors or customers (e.g. for festivals, concerts, games)	☐
		7.2	**Personalized trip planning**	
			Commuter travel	
BETTER	★	7.2.1	Offer personalized trip planning to new/relocating employees	☐
		7.3	**Promotions**	
			Commuter travel	
BETTER		7.3.1	Deliver promotions and incentives to maintain awareness, build understanding, and encourage trial of sustainable modes	☐
		8.	**OTHER INCENTIVES & AMENITIES**	
		8.1	**Emergency ride home**	
			Commuter travel	
BETTER	★	8.1.1	Provide emergency ride home service to non-driving commuters	☐
		8.2	**Alternative work arrangements**	
			Commuter travel	
BASIC	★	8.2.1	Encourage flexible work hours	☐
BETTER		8.2.2	Encourage compressed workweeks	☐
BETTER	★	8.2.3	Encourage telework	☐
		8.3	**Local business travel options**	
			Commuter travel	
BASIC	★	8.3.1	Provide local business travel options that minimize the need for employees to bring a personal car to work	☐
		8.4	**Commuter incentives**	
			Commuter travel	
BETTER		8.4.1	Offer employees a taxable, mode-neutral commuting allowance	☐
		8.5	**On-site amenities**	
			Commuter travel	
BETTER		8.5.1	Provide on-site amenities/services to minimize mid-day or mid-commute errands	☐

TDM Measures Checklist:
Residential Developments (multi-family, condominium or subdivision)

Legend

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

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	1.	**TDM PROGRAM MANAGEMENT**	
	1.1	**Program coordinator**	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☑
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
	2.	**WALKING AND CYCLING**	
	2.1	**Information on walking/cycling routes & destinations**	
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances *(multi-family, condominium)*	☑
	2.2	**Bicycle skills training**	
BETTER	2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses	☐

TDM Measures Checklist **City of Ottawa**
Version 1.0 (30 June 2017)

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	3.	**TRANSIT**	
	3.1	**Transit information**	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☑
BETTER	3.1.2	Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
	3.2	**Transit fare incentives**	
BASIC ★	3.2.1	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☑
BETTER	3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	☐
	3.3	**Enhanced public transit service**	
BETTER ★	3.3.1	Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☐
	3.4	**Private transit service**	
BETTER	3.4.1	Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐
	4.	**CARSHARING & BIKESHARING**	
	4.1	**Bikeshare stations & memberships**	
BETTER	4.1.1	Contract with provider to install on-site bikeshare station (*multi-family)*	☐
BETTER	4.1.2	Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
	4.2	**Carshare vehicles & memberships**	
BETTER	4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	☐
BETTER	4.2.2	Provide residents with carshare memberships, either free or subsidized	☐
	5.	**PARKING**	
	5.1	**Priced parking**	
BASIC ★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☑
BASIC ★	5.1.2	Unbundle parking cost from monthly rent *(multi-family)*	☑

			TDM measures: *Residential developments*	Check if proposed & add descriptions
		6.	**TDM MARKETING & COMMUNICATIONS**	
		6.1	**Multimodal travel information**	
BASIC	★	6.1.1	Provide a multimodal travel option information package to new residents	☑
		6.2	**Personalized trip planning**	
BETTER	★	6.2.1	Offer personalized trip planning to new residents	☐

TDM-Supportive Development Design and Infrastructure Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

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: *Non-residential developments*	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	☑
BASIC		1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑
BASIC		1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
		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 *(see Official Plan policy 4.3.3)*	☐
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 *(see Official Plan policy 4.3.12)*	☑

		TDM-supportive design & infrastructure measures: *Non-residential developments*	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 *(see Official Plan policy 4.3.10)*	☑
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 *(see Official Plan policy 4.3.10)*	☑
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 *(see Official Plan policy 4.3.11)*	☐
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☐
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	☐
	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	☐
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)	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	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 Official Plan policy 4.3.6)*	☑
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 Zoning By-law Section 111)*	☑
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 Zoning By-law Section 111)*	☑
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☐
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office 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 Zoning By-law Section 111)*	☐
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☐
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☐
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☐
	2.4	**Bicycle repair station**	
BETTER	2.4.1	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)	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐
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	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐
	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	☐
	4.2	**Carpool parking**	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces *(see Zoning By-law Section 94)*	☐
	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	☐

TDM-Supportive Development Design and Infrastructure Checklist **City of Ottawa**
Version 1.0 (30 June 2017)

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	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	☑
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	☐
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 Zoning By-law Section 104)*	☐
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 Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	☐
	7.	**OTHER**	
	7.1	**On-site amenities to minimize off-site trips**	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	☐

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: *Residential developments*	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	☑
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
	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 *(see Official Plan policy 4.3.3)*	☑
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 *(see Official Plan policy 4.3.12)*	☑

		TDM-supportive design & infrastructure measures: *Residential developments*	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 *(see Official Plan policy 4.3.10)*	☑
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 *(see Official Plan policy 4.3.10)*	☑
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 *(see Official Plan policy 4.3.11)*	☐
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☐
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	☐
	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	☐
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)	☐

		TDM-supportive design & infrastructure measures: *Residential developments*	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 Official Plan policy 4.3.6)*	☑
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 Zoning By-law Section 111)*	☑
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 Zoning By-law Section 111)*	☑
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	☐
	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 Zoning By-law Section 111)*	☑
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☐
	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)	☐
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐
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	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐

TDM-Supportive Development Design and Infrastructure Checklist **City of Ottawa**
Version 1.0 (30 June 2017)

		TDM-supportive design & infrastructure measures: *Residential developments*	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	☐
	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 Zoning By-law Section 94)*	☐
	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	☐
	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	☐
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	☐
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 Zoning By-law Section 104)*	☐
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 Zoning By-law Section 111)*	☐
	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)	☐