

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

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PN: 2020-27

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1 Screening

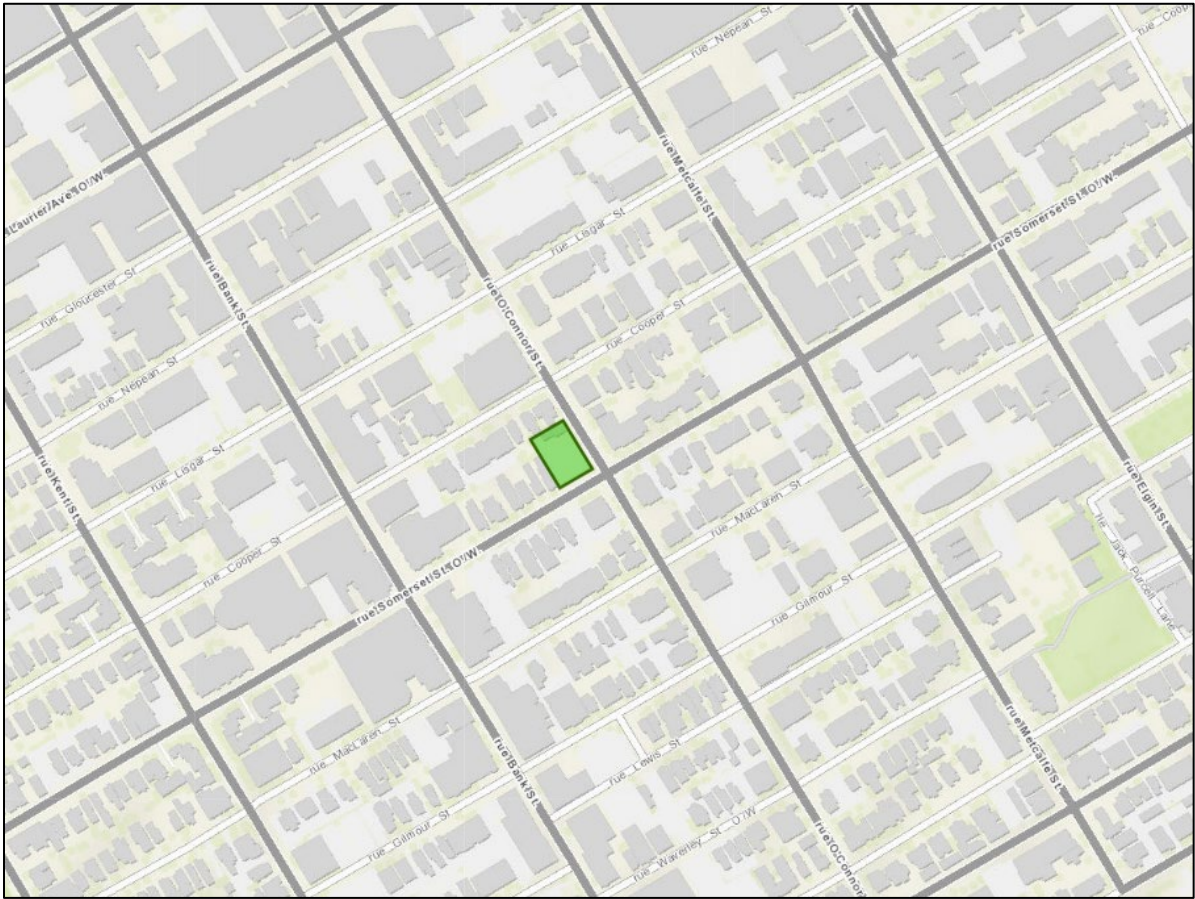
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for the TIA Study PM. As shown in the Screening Form, a TIA is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

2 Existing and Planned Conditions

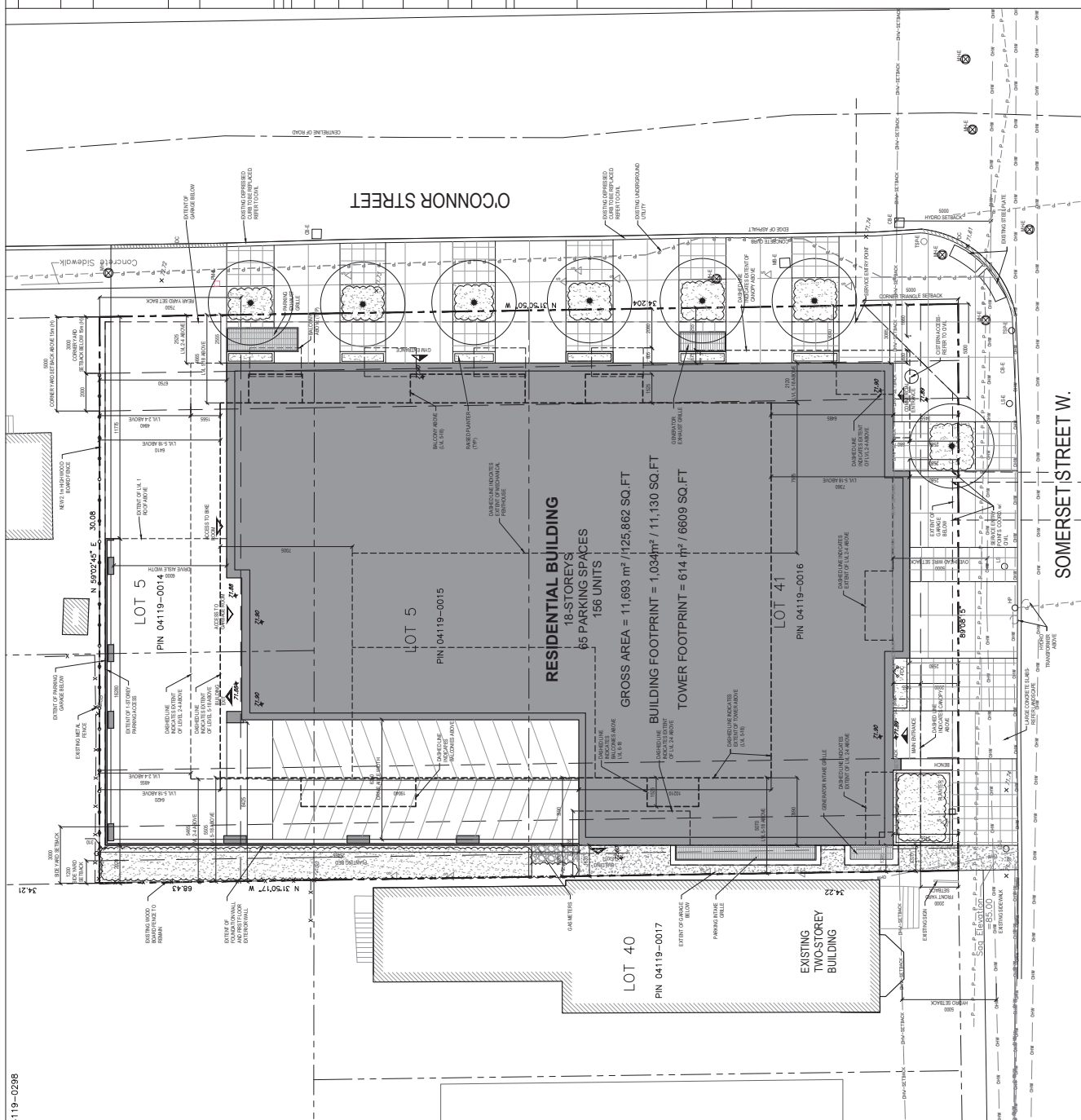
2.1 Proposed Development

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:
 2022-11-20 FOR CONDO
 2022-11-20 FOR CONDO
 2022-01-18 FOR CONDO
 2022-01-18 FOR CONDO
 2022-01-18 FOR CONDO
 2022-01-18 FOR CONDO
 2022-01-18 FOR CONDO
 2022-01-18 FOR CONDO
 2022-01-18 FOR CONDO
 2022-01-18 FOR CONDO
 2022-01-18 FOR CONDO
 2022-01-18 FOR CONDO
 2022-01-18 FOR CONDO
 2022-01-18 FOR CONDO

SITE INFORMATION
 LOT NUMBER: 2022-01-18
 LOT AREA: 10,000.00 SQ. M
 ZONING: OPA1

BUILDING INFORMATION
 BUILDING NAME: EIGHTEEN STOREY APARTMENT BUILDING
 BUILDING HEIGHT: 18 STOREYS
 BUILDING AREA: 11,130 SQ. M
 BUILDING FOOTPRINT: 1,034 SQ. M
 BUILDING SETBACK: 3.05 M

ZONING TABLE

NO.	DESCRIPTION	MINIMUM LOT AREA	MINIMUM BUILDING AREA	MINIMUM BUILDING HEIGHT	MINIMUM BUILDING FOOTPRINT	MINIMUM BUILDING SETBACK	MINIMUM BUILDING FRONT SETBACK	MINIMUM BUILDING SIDE SETBACK	MINIMUM BUILDING REAR SETBACK	MINIMUM BUILDING CORNER SETBACK	MINIMUM BUILDING FRONT SETBACK	MINIMUM BUILDING SIDE SETBACK	MINIMUM BUILDING REAR SETBACK	MINIMUM BUILDING CORNER SETBACK
1	OPA1	10,000.00	11,130.00	18 STOREYS	1,034.00	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05

LEGEND

- SOFT LANDSCAPING
- LANDSCAPE (TREES)
- LANDSCAPE (SHRUBS)
- LANDSCAPE (GRASS)
- LANDSCAPE (WATER)
- LANDSCAPE (ROCK)
- LANDSCAPE (MATERIAL)
- LANDSCAPE (ELECTRICAL)
- LANDSCAPE (MECHANICAL)
- LANDSCAPE (PLUMBING)
- LANDSCAPE (HVAC)
- LANDSCAPE (FIRE)
- LANDSCAPE (GAS)
- LANDSCAPE (WATER SUPPLY)
- LANDSCAPE (SEWER)
- LANDSCAPE (STORMWATER)
- LANDSCAPE (SLOPE)
- LANDSCAPE (ELEVATION)
- LANDSCAPE (FINISH)
- LANDSCAPE (COLOR)
- LANDSCAPE (TEXTURE)
- LANDSCAPE (SMOOTH)
- LANDSCAPE (ROUGH)
- LANDSCAPE (POLISHED)
- LANDSCAPE (UNPOLISHED)
- LANDSCAPE (PAINTED)
- LANDSCAPE (UNPAINTED)
- LANDSCAPE (GLAZED)
- LANDSCAPE (UNGLAZED)
- LANDSCAPE (TINTED)
- LANDSCAPE (UNTINTED)
- LANDSCAPE (OPAQUE)
- LANDSCAPE (TRANSPARENT)
- LANDSCAPE (REFLECTIVE)
- LANDSCAPE (NON-REFLECTIVE)
- LANDSCAPE (GLOSS)
- LANDSCAPE (MATTE)
- LANDSCAPE (SILK)
- LANDSCAPE (TEXTURED)
- LANDSCAPE (SMOOTH)
- LANDSCAPE (ROUGH)
- LANDSCAPE (POLISHED)
- LANDSCAPE (UNPOLISHED)
- LANDSCAPE (PAINTED)
- LANDSCAPE (UNPAINTED)
- LANDSCAPE (GLAZED)
- LANDSCAPE (UNGLAZED)
- LANDSCAPE (TINTED)
- LANDSCAPE (UNTINTED)
- LANDSCAPE (OPAQUE)
- LANDSCAPE (TRANSPARENT)
- LANDSCAPE (REFLECTIVE)
- LANDSCAPE (NON-REFLECTIVE)
- LANDSCAPE (GLOSS)
- LANDSCAPE (MATTE)
- LANDSCAPE (SILK)
- LANDSCAPE (TEXTURED)

18 STOREY RESIDENTIAL BUILDING
 18 STOREYS
 156 UNITS
 GROSS AREA = 11,693 m² / 125,862 SQ. FT.
 BUILDING FOOTPRINT = 1,034 m² / 11,130 SQ. FT.
 TOWER FOOTPRINT = 614 m² / 6609 SQ. FT.

EXISTING TWO-STORY BUILDING
 2 STOREYS
 10 UNITS
 GROSS AREA = 1,000 m² / 10,764 SQ. FT.
 BUILDING FOOTPRINT = 1,000 m² / 10,764 SQ. FT.

LOT 5
 PIN 04119-0015
 156 UNITS
 GROSS AREA = 11,693 m² / 125,862 SQ. FT.
 BUILDING FOOTPRINT = 1,034 m² / 11,130 SQ. FT.
 TOWER FOOTPRINT = 614 m² / 6609 SQ. FT.

LOT 40
 PIN 04119-0017
 10 UNITS
 GROSS AREA = 1,000 m² / 10,764 SQ. FT.
 BUILDING FOOTPRINT = 1,000 m² / 10,764 SQ. FT.

LOT 41
 PIN 04119-0016
 10 UNITS
 GROSS AREA = 1,000 m² / 10,764 SQ. FT.
 BUILDING FOOTPRINT = 1,000 m² / 10,764 SQ. FT.

24-BLOCKING STREET
 OTTAWA, ON

SITE PLAN

EIGHTEEN STOREY APARTMENT BUILDING

24-BLOCKING STREET
 OTTAWA, ON

SMITH + ANDERSEN
 ENGINEERS

CLELAND JARDINE
 ENGINEERS

McINTOSH PERRY
 ARCHITECTS

GEMSTONE
 ARCHITECTS

figuri
 ARCHITECTS

119-0298

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.

Metcalf 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/through 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 through/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/through 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 through/right-turn lane. No turn restrictions were noted.

2.2.3 Existing Driveways

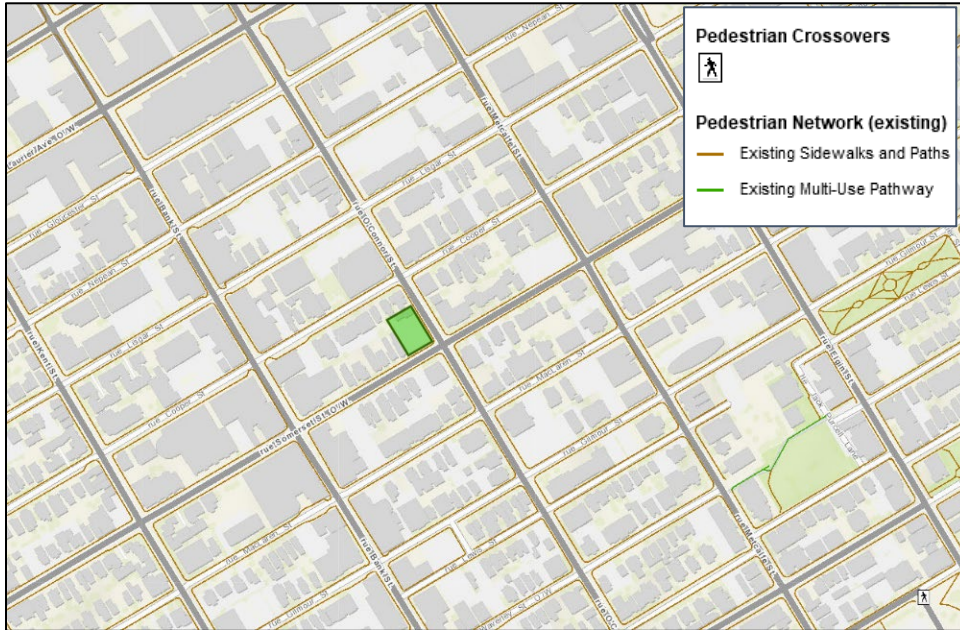
Six driveways on the west side and seven driveways on the east side of O'Connor Street, and nine driveways on the north side and 13 driveways on the south side of Somerset Street W are found along boundary streets within 200 metres of the proposed site access. Driveways access detached dwellings, low-rise, 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

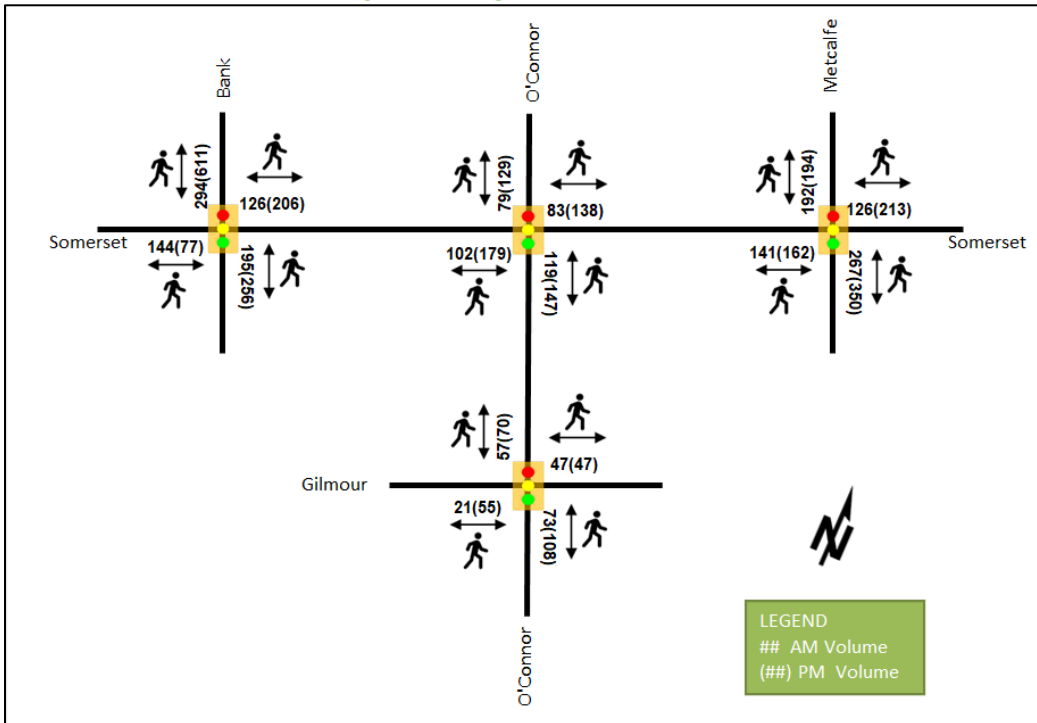
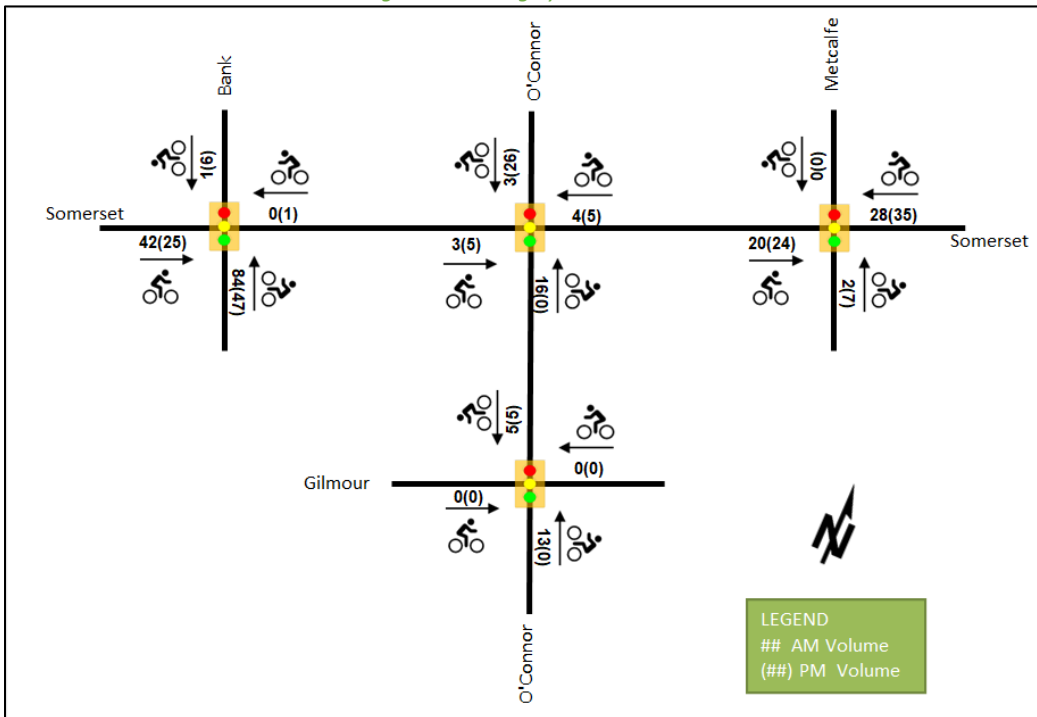


Figure 6: Existing Cyclist Volumes



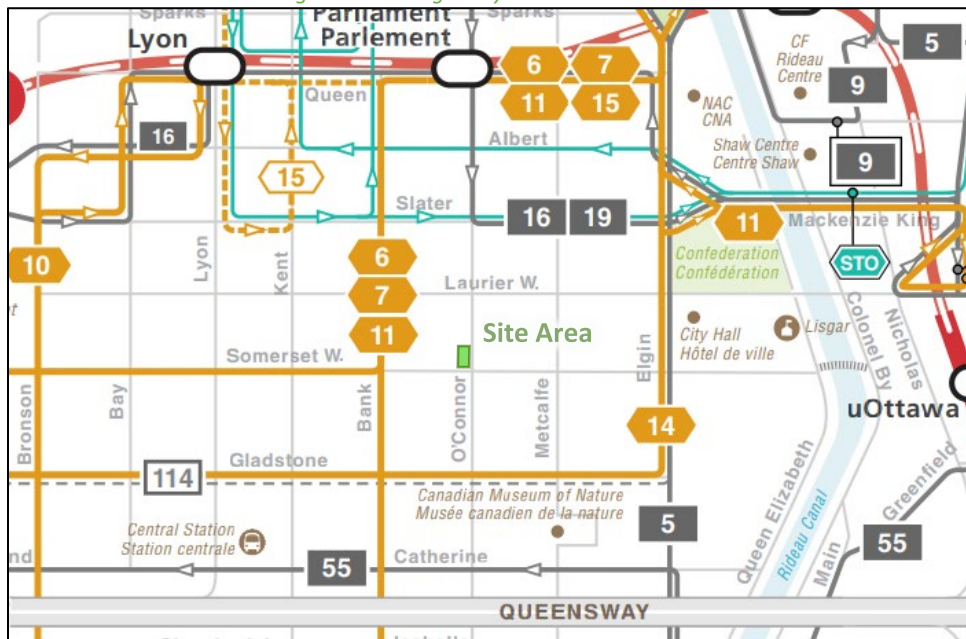
2.2.5 Existing Transit

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

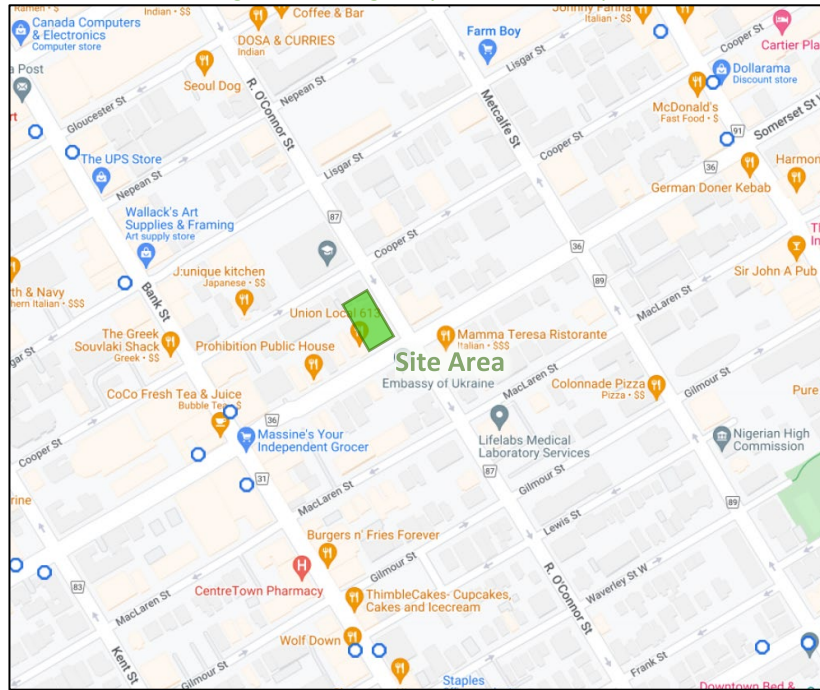
Figure 7 illustrates the transit system map in the study area and Figure 8 illustrates nearby transit stops.

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

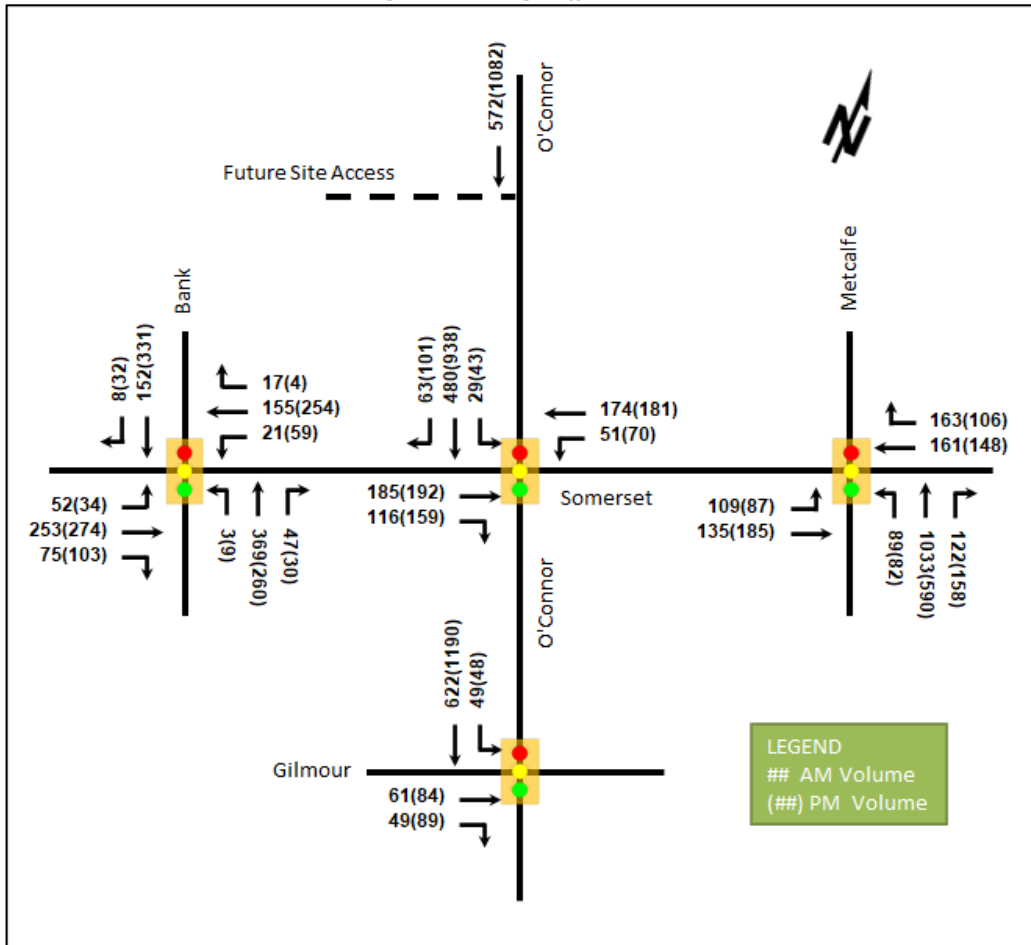


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)
Bank Street at Somerset Street W <i>Signalized</i>	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 <i>Signalized</i>	EBC/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 <i>Signalized</i>	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 (95 th)	LOS	V/C	Delay (s)	Q (95 th)
O’Connor Street at Gilmour Street <i>Signalized</i>	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
	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 area 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

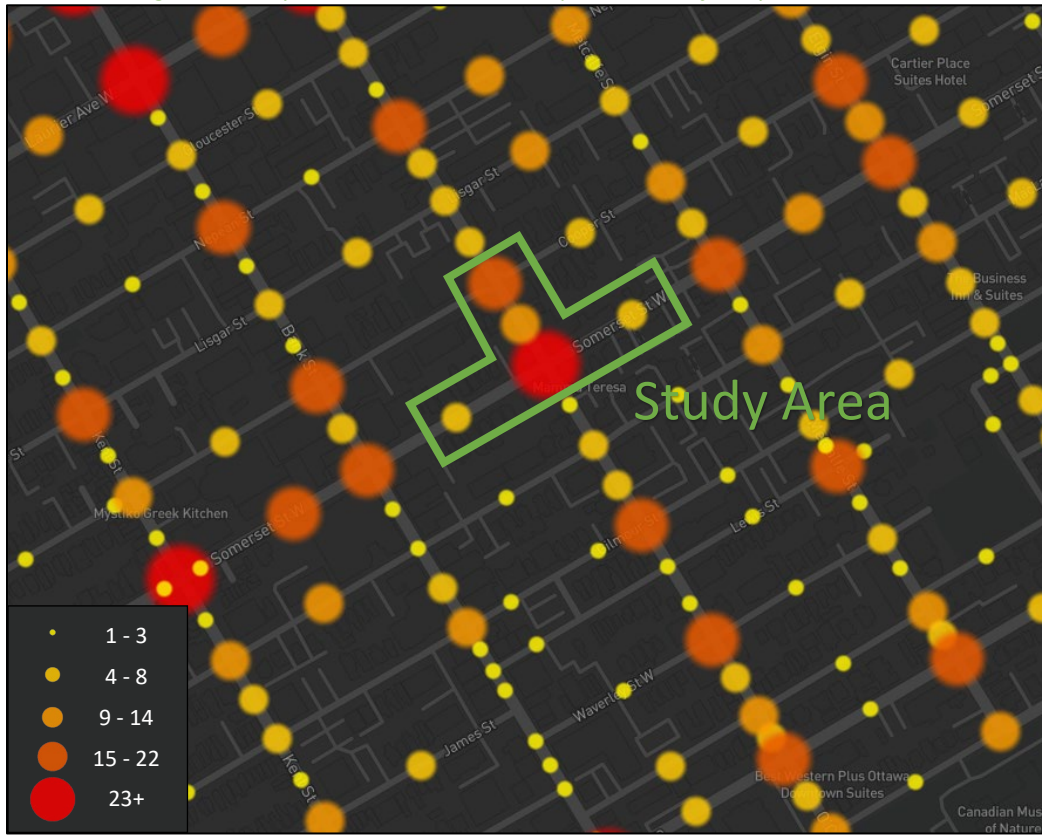


Table 4: Summary of Collision Locations, 2016-2020

Intersections / Segments	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 policies 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 ft² 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 m² 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 m² 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 ft² of office space, and 7,833 ft² 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		
Retail (<40k sq. ft.)	2,120	In	Out	Total	In	Out	Total
		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
	<i>Internal Capture</i>	<i>varies</i>	<i>-1</i>	<i>0</i>	<i>-1</i>	<i>varies</i>	<i>-1</i>	<i>-2</i>	<i>-3</i>
	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.

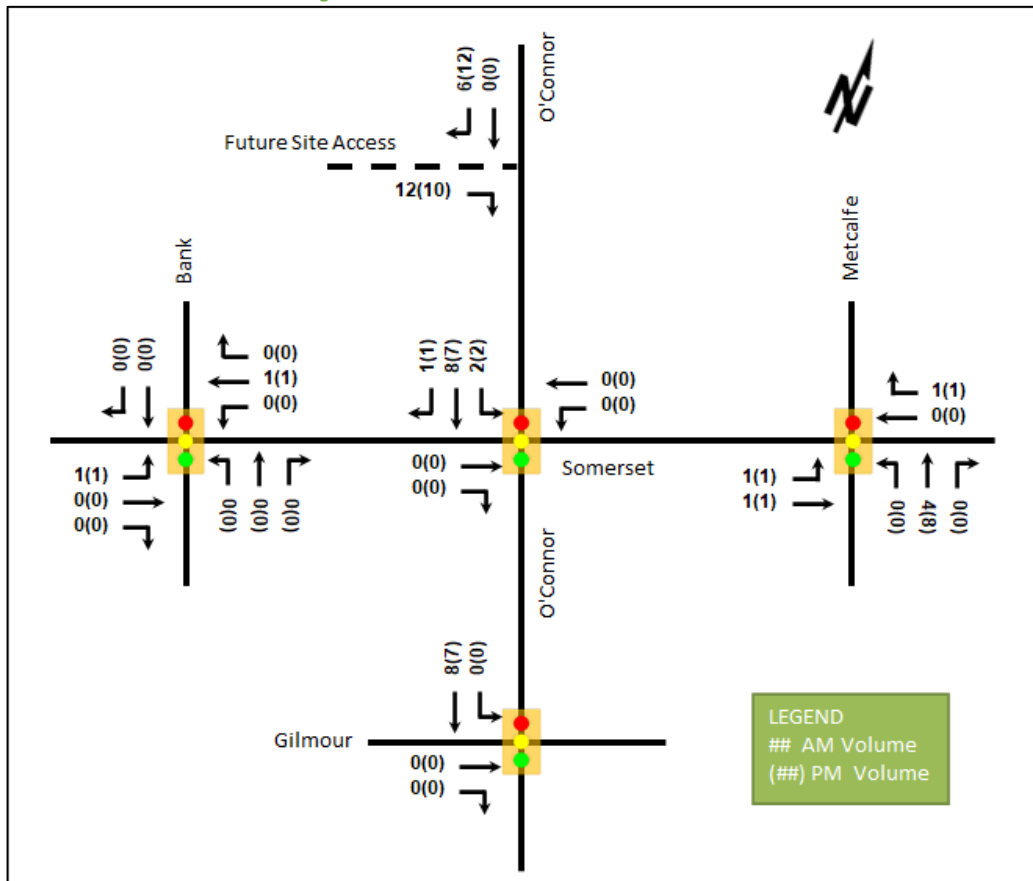
Table 12: OD Survey Distribution – Ottawa Inner

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

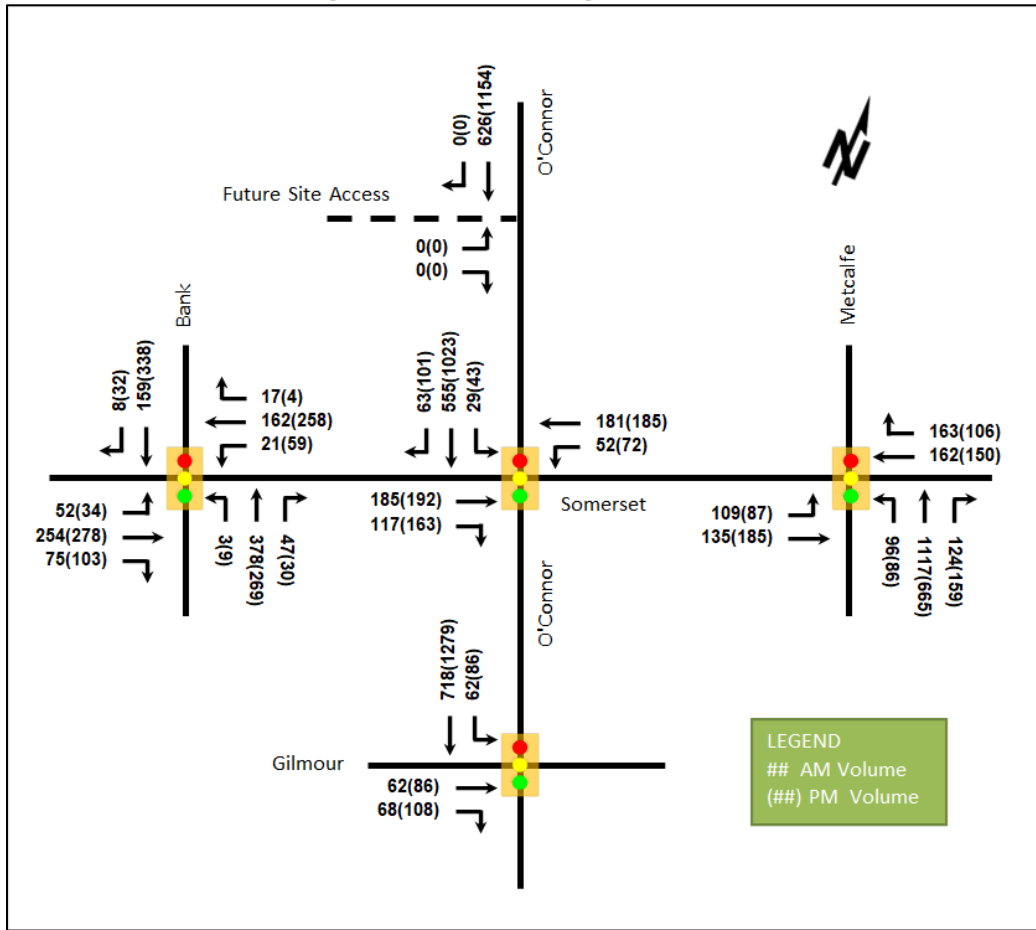


Table 14: 2024 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)
Bank Street at Somerset Street W <i>Signalized</i>	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 <i>Signalized</i>	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 <i>Signalized</i>	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 (95 th)	LOS	V/C	Delay (s)	Q (95 th)
O'Connor Street at Gilmour Street <i>Signalized</i>	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

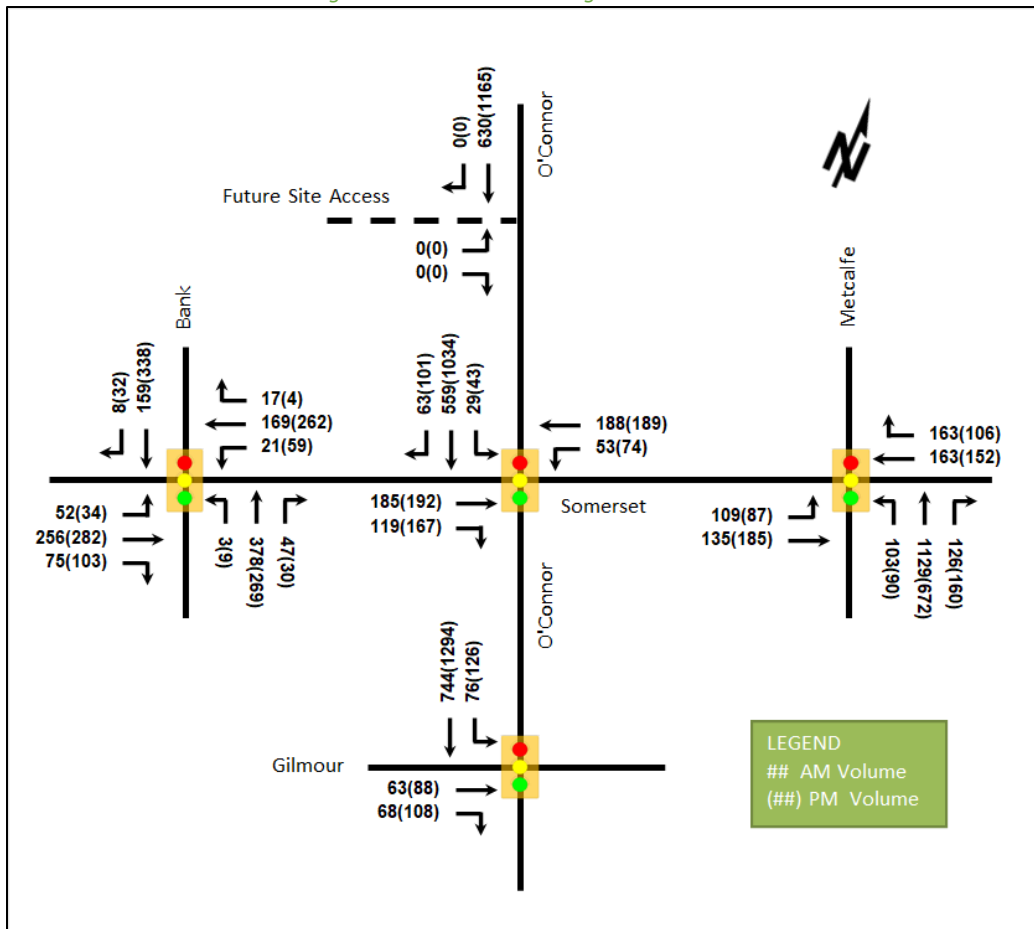


Table 15: 2029 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)
Bank Street at Somerset Street W <i>Signalized</i>	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 <i>Signalized</i>	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 <i>Signalized</i>	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 <i>Signalized</i>	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

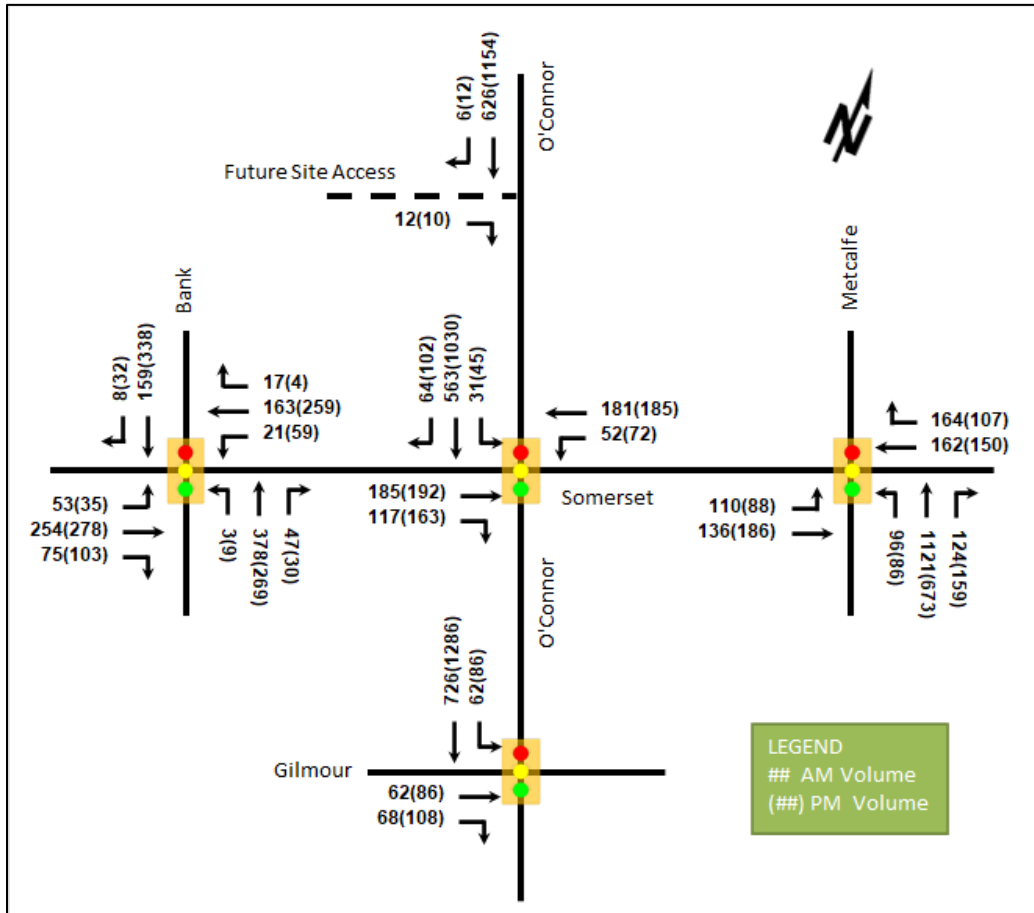


Table 17: 2024 Future Total Access Intersection Operations

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

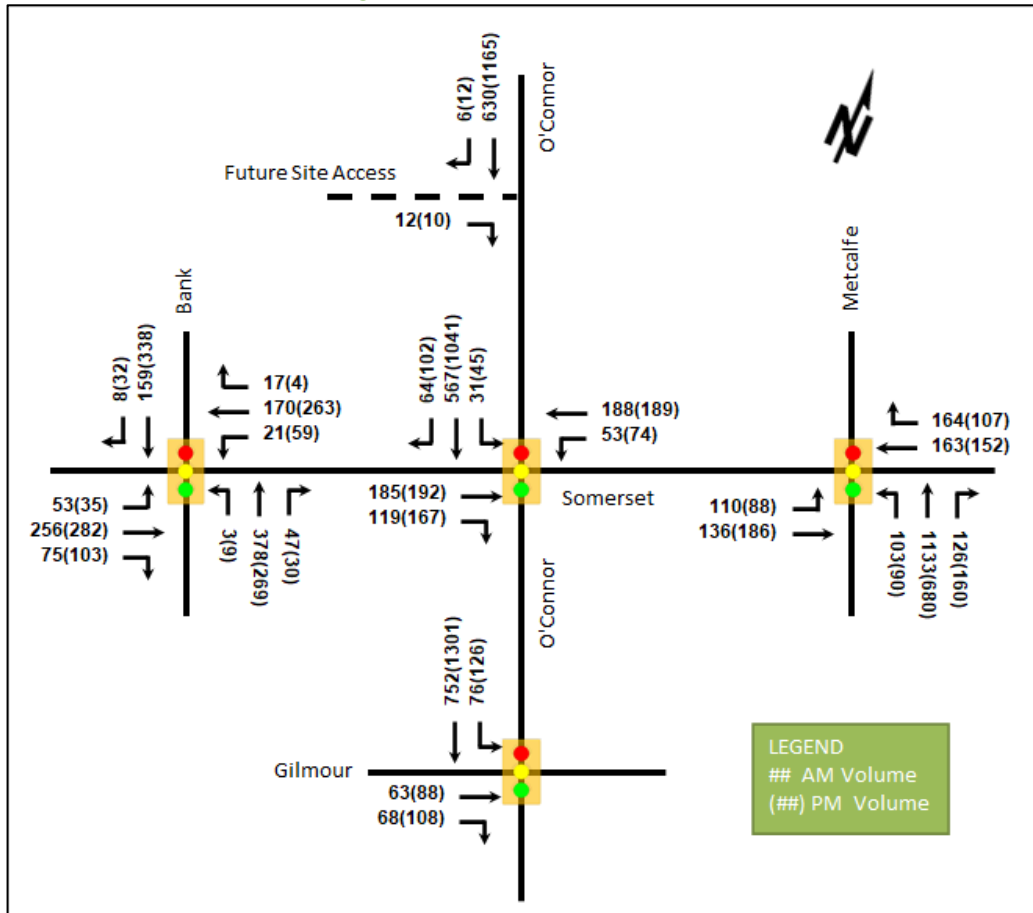


Table 18: 2029 Future Total Access Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Site Access at O’Connor Street	EBR	B	0.02	10.4	0.8	B	0.02	13.1	0.8
	SBT/R	-	-	-	-	-	-	-	-
	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 (95 th)	LOS	V/C	Delay	Q (95 th)
Bank Street at Somerset Street W <i>Signalized</i>	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 <i>Signalized</i>	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 <i>Signalized</i>	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 <i>Signalized</i>	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 (95 th)	LOS	V/C	Delay	Q (95 th)
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 ft² 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 in 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

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 Apartment 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 licensed¹ or registered² professional in good standing, whose field of expertise [check appropriate field(s)] is either transportation engineering or transportation planning .

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


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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)
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Appendix B

Turning Movement Counts



Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

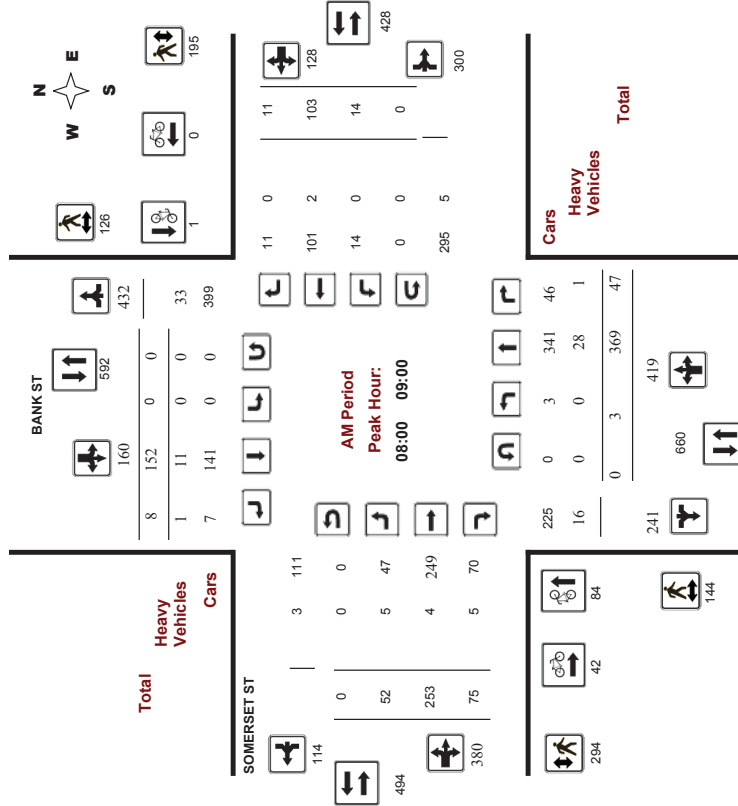
BANK ST @ SOMERSET ST

Survey Date: Wednesday, August 05, 2015

Start Time: 07:00

WO No: 34727

Device: Jamar Technologies, Inc



Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

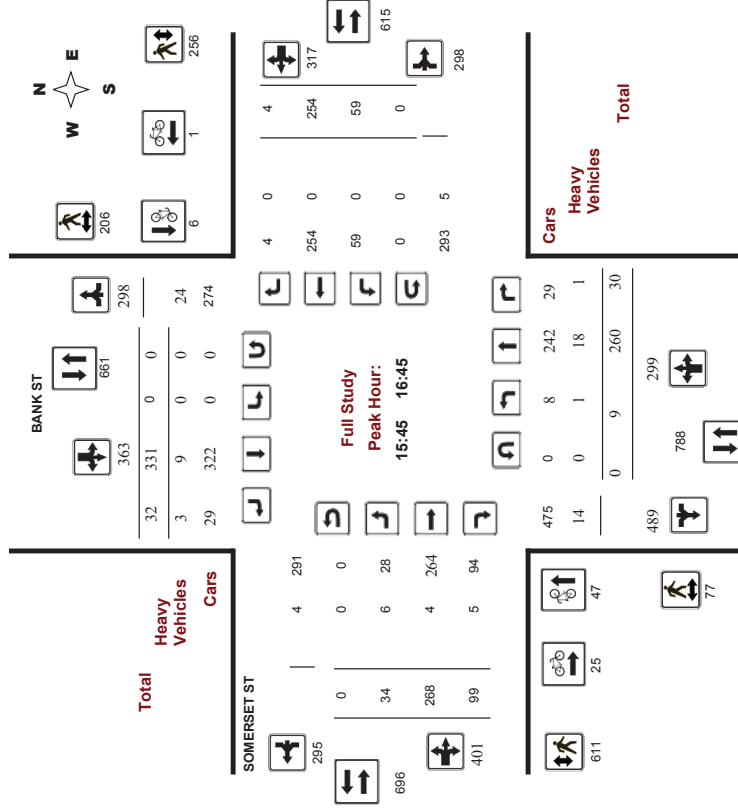
BANK ST @ SOMERSET ST

Survey Date: Wednesday, August 05, 2015

Start Time: 07:00

WO No: 34727

Device: Jamar Technologies, Inc





Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

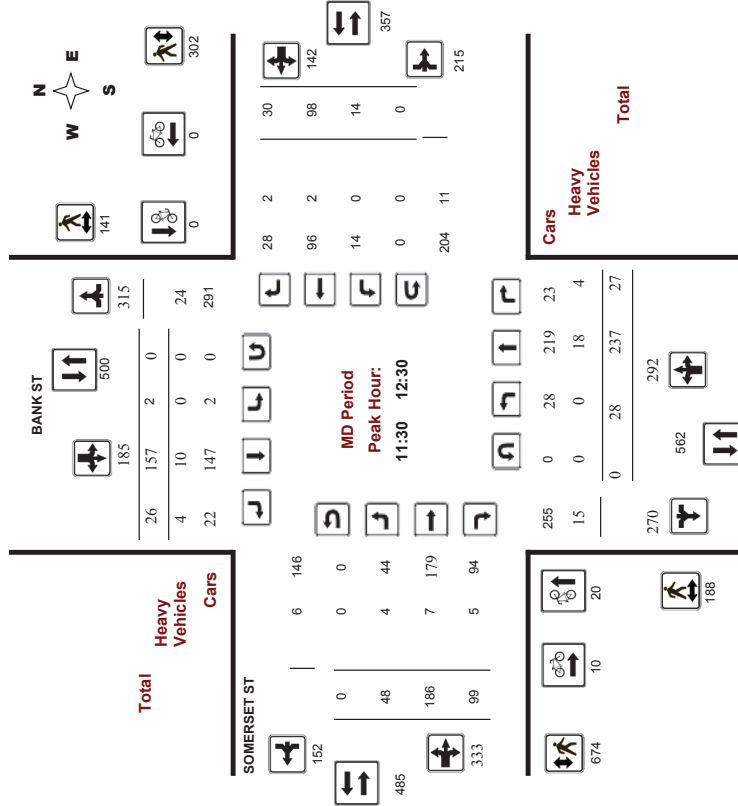
BANK ST @ SOMERSET ST

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

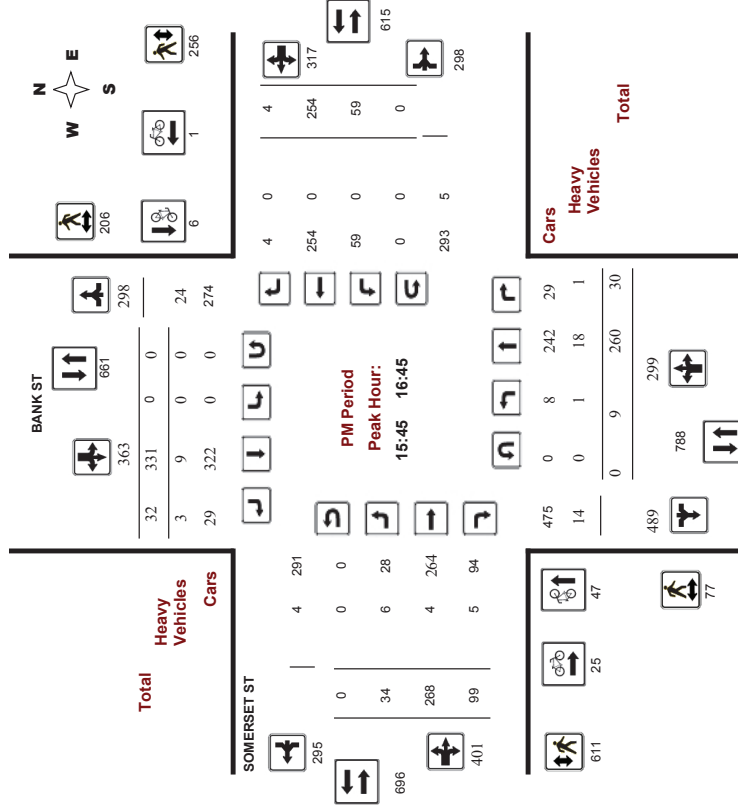
BANK ST @ SOMERSET ST

Survey Date: Wednesday, August 05, 2015

Start Time: 07:00

WO No: 34727

Device: Jamar Technologies, Inc



Comments



Transportation Services - Traffic Services **W.O.** 34727
Turning Movement Count - 15 Minute Summary Report

Survey Date: Wednesday, August 05, 2015 **BANK ST @ SOMERSET ST**
 Total Observed U-Turns
 Northbound: 0 Southbound: 0
 Eastbound: 0 Westbound: 1

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

TOTAL: 119 2141 267 2627 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 **Work Order** 34727
Turning Movement Count - Cyclist Volume Report

Count Date: Wednesday, August 05, 2015 **BANK ST @ SOMERSET ST** **Start Time:** 07:00

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

Comment:



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	Northbound						Southbound						Eastbound						Westbound						Grand Total		
	LT		ST		RT		N		LT		ST		RT		E		LT		ST		RT		W			STR	
	LT	RT	LT	RT	LT	RT	TOT	LT	RT	LT	RT	LT	RT	TOT	LT	RT	LT	RT	LT	RT	LT	RT	TOT	STR		TOT	
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	0	0	0	0	0	0	0	0	0	0	0	0								
Total	7	164	10	181	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
	E	W	E	W		E	W	E	W		
07:00 07:15	16	21	21	25	37	22	22	47	84		
07:15 07:30	15	17	17	27	32	46	73	105			
07:30 07:45	17	10	10	38	27	41	79	106			
07:45 08:00	27	21	21	48	48	50	95	143			
07:00 08:00	75	69	69	135	144	159	294	438			
08:00 08:15	22	30	30	56	52	111	163				
08:15 08:30	36	30	30	78	66	50	128	194			
08:30 08:45	29	32	32	73	61	41	114	175			
08:45 09:00	57	34	34	88	91	48	136	227			
08:00 09:00	144	126	126	284	270	195	489	759			
09:00 09:15	32	29	29	42	61	121	182				
09:15 09:30	33	22	22	61	55	84	139				
09:30 09:45	31	50	50	78	81	38	116	197			
09:45 10:00	33	43	43	66	76	35	101	177			
09:00 10:00	129	144	144	284	273	138	422	695			
11:30 11:45	24	42	42	108	66	80	188	254			
11:45 12:00	42	50	50	159	92	32	191	283			
12:00 12:15	61	19	19	194	80	108	302	382			
12:15 12:30	61	30	30	213	91	82	295	386			
11:30 12:30	188	141	141	302	329	674	976	1305			
12:30 12:45	70	37	37	209	107	58	267	374			
12:45 13:00	58	37	37	182	95	61	263	358			
13:00 13:15	58	34	34	182	92	115	297	389			
13:15 13:30	61	35	35	187	96	96	283	379			
12:30 13:30	247	143	143	390	390	330	1110	1500			
15:00 15:15	51	17	17	83	68	133	201				
15:15 15:30	12	22	22	118	34	45	163	197			
15:30 15:45	28	52	52	129	80	44	173	253			
15:45 16:00	21	48	48	133	69	54	187	256			
15:00 16:00	112	139	139	463	251	193	656	907			
16:00 16:15	12	40	40	146	52	101	247	299			
16:15 16:30	19	63	63	169	82	44	213	295			
16:30 16:45	25	55	55	163	80	57	220	300			
16:45 17:00	11	65	65	164	76	78	242	318			
16:00 17:00	67	223	223	642	290	280	922	1212			
17:00 17:15	31	83	83	179	88	88	267	381			
17:15 17:30	39	72	72	186	86	86	272	383			
17:30 17:45	34	44	44	160	78	83	253	331			
17:45 18:00	36	40	40	154	76	98	252	328			
17:00 18:00	140	239	239	365	379	365	1044	1423			
Total	1102	1224	1224	3951	2326	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	0	0	0	1	1
07:15	0	0	0	0	0
07:30	0	0	0	0	0
07:45	0	0	0	0	0
08:00	0	0	0	0	0
08:15	0	0	0	0	0
08:30	0	0	0	0	0
08:45	0	0	0	0	0
09:00	0	0	0	0	0
09:15	0	0	0	0	0
09:30	0	0	0	0	0
09:45	0	0	0	0	0
10:00	0	0	0	0	0
11:30	0	0	0	0	0
11:45	0	0	0	0	0
12:00	0	0	0	0	0
12:15	0	0	0	0	0
12:30	0	0	0	0	0
12:45	0	0	0	0	0
13:00	0	0	0	0	0
13:15	0	0	0	0	0
13:30	0	0	0	0	0
15:00	0	0	0	0	0
15:15	0	0	0	0	0
15:30	0	0	0	0	0
15:45	0	0	0	0	0
16:00	0	0	0	0	0
16:15	0	0	0	0	0
16:30	0	0	0	0	0
16:45	0	0	0	0	0
17:00	0	0	0	0	0
17:15	0	0	0	0	0
17:30	0	0	0	0	0
17:45	0	0	0	0	0
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

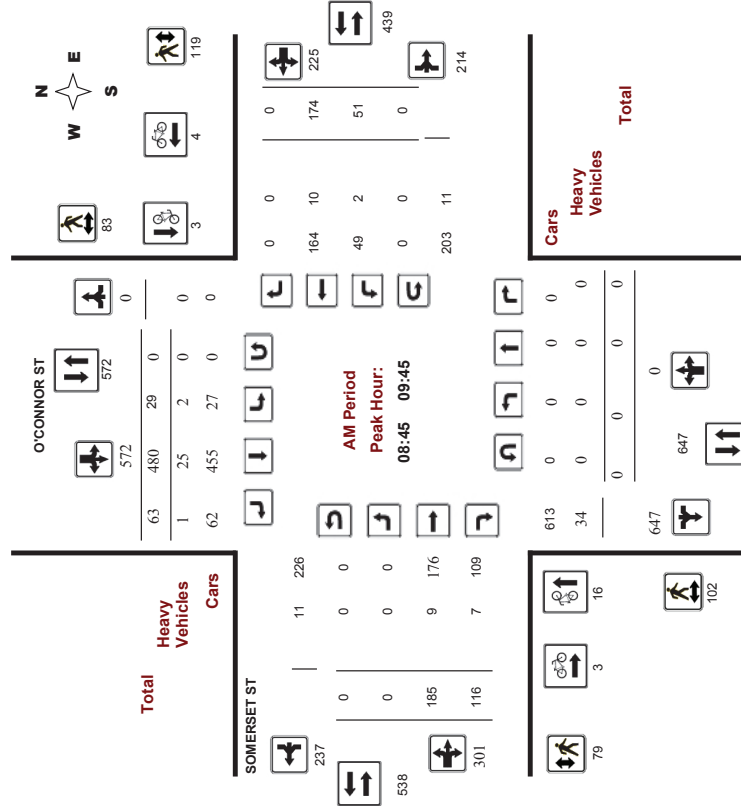
O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017

Start Time: 07:00

WO No: 36787

Device: Miovision





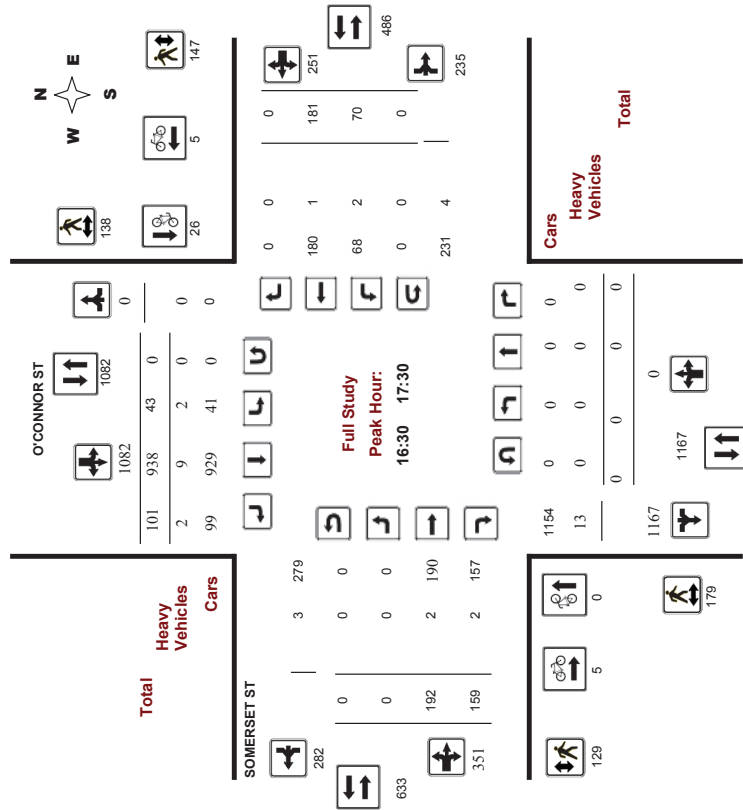
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017
Start Time: 07:00

WO No: 36787
Device: Miovision



Comments



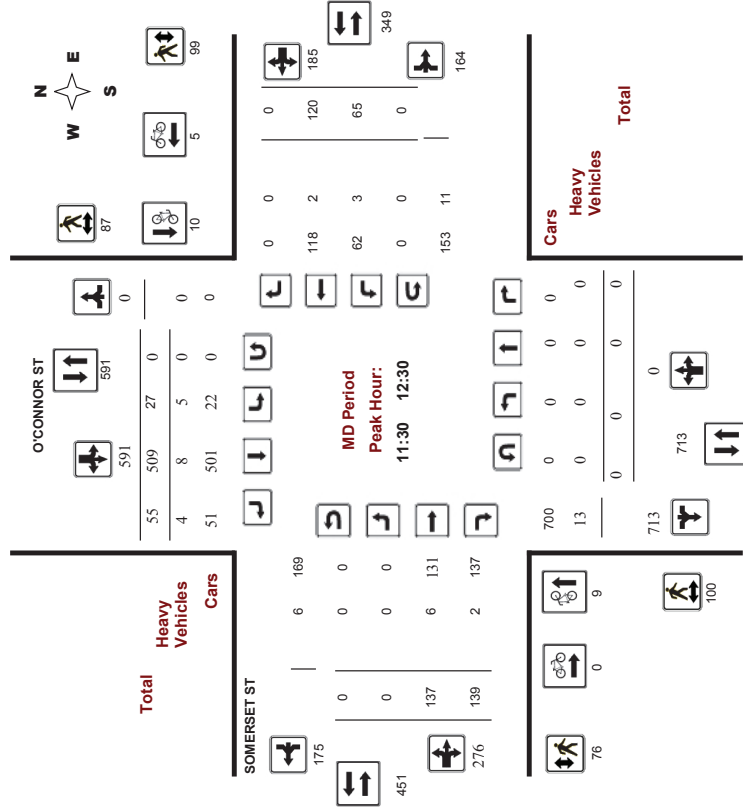
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017
Start Time: 07:00

WO No: 36787
Device: Miovision



Comments



Transportation Services - Traffic Services
Turning Movement Count - Full Study Peak Hour Diagram

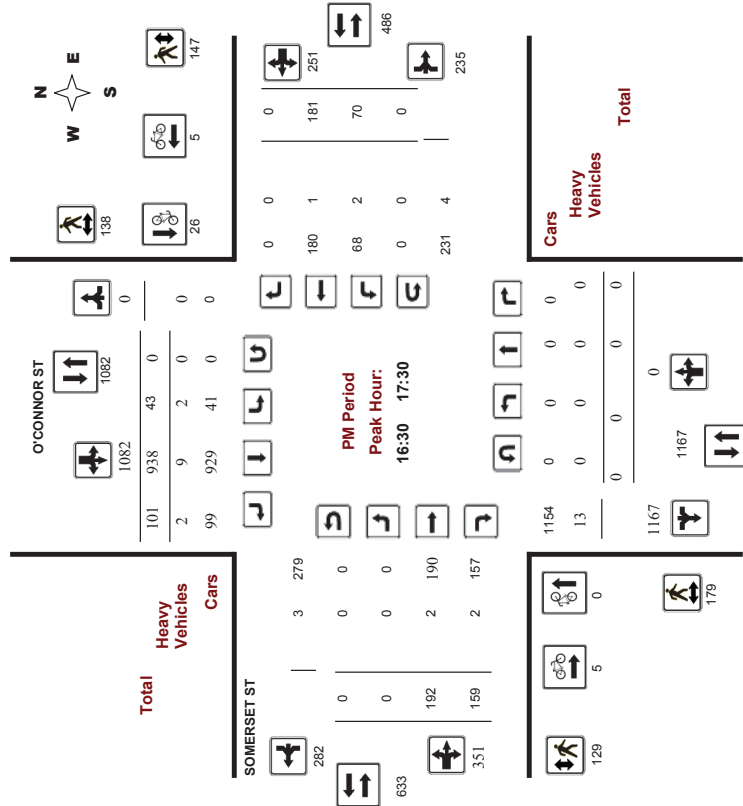
O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017

Start Time: 07:00

WO No: 36787

Device: Miovision



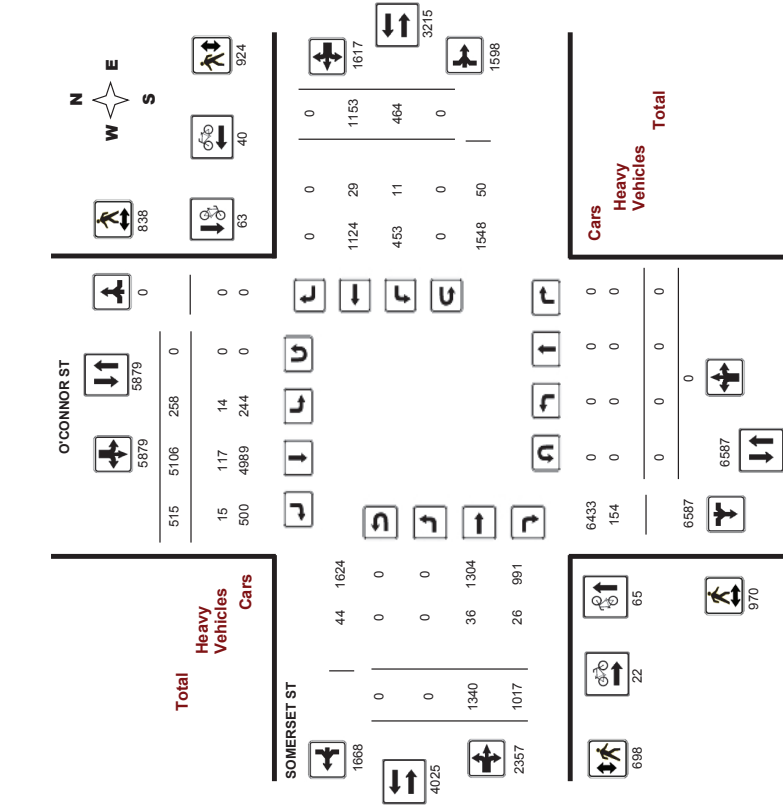
Transportation Services - Traffic Services
Turning Movement Count - Full Study Diagram

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017

WO#: 36787

Device: Miovision





Transportation Services - Traffic Services
Turning Movement Count - Full Study Summary Report

Work Order
36787



Transportation Services - Traffic Services
Turning Movement Count - 15 Minute Summary Report

W.O.
36787

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017
Total Observed U-Turns
 Northbound: 0 Southbound: 0
 Eastbound: 0 Westbound: 0
AA DT Factor
 1.00

Period	O'CONNOR ST								SOMERSET ST								Grand Total		
	Northbound				Southbound				Eastbound				Westbound						
	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT			
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	0	0	0	0	0	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.																			
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.																			
AVG 24hr	0	0	0	0	470	9288	938	10705	10705	0	2440	1852	4232	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.																			

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

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017
Total Observed U-Turns
 Northbound: 0 Southbound: 0
 Eastbound: 0 Westbound: 0
SOMERSET ST

Time Period	O'CONNOR ST								SOMERSET ST								Grand Total		
	Northbound				Southbound				Eastbound				Westbound						
	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT			
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



Transportation Services - Traffic Services
Turning Movement Count - Heavy Vehicle Report

W.O.
36787

O'CONNOR ST @ SOMERSET ST

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

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

Comment:

O'CONNOR ST @ SOMERSET ST

Survey Date: Tuesday, March 21, 2017

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



Turning Movement Count - 15 Min U-Turn Total Report

Survey Date: Tuesday, March 21, 2017

O'CONNOR ST @ SOMERSET ST

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	7	4	13	3	16	27
07:15 07:30	11	14	8	16	24	49
07:30 07:45	11	22	19	22	41	74
07:45 08:00	27	22	25	34	59	108
08:00 08:15	56	62	65	75	140	258
08:15 08:30	36	27	31	42	73	136
08:30 08:45	39	16	26	47	73	128
08:45 09:00	34	39	35	53	86	161
09:00 09:15	44	37	28	58	86	167
09:15 09:30	153	119	120	200	320	592
09:30 09:45	24	22	34	42	52	96
09:45 10:00	19	18	21	15	36	73
10:00 10:15	15	6	12	12	24	46
10:15 10:30	19	9	13	18	31	59
10:30 10:45	77	55	64	79	143	275
10:45 11:00	27	22	16	15	33	60
11:00 11:15	22	22	17	27	44	88
11:15 11:30	22	21	19	26	47	96
11:30 11:45	21	22	24	29	53	96
11:45 12:00	100	87	76	99	175	362
12:00 12:15	32	23	16	28	44	99
12:15 12:30	27	43	13	28	41	111
12:30 12:45	29	30	14	24	36	97
12:45 13:00	24	18	23	18	41	83
13:00 13:15	112	114	66	98	164	390
13:15 13:30	29	26	18	15	33	88
13:30 13:45	23	21	13	20	33	77
13:45 14:00	37	23	19	19	38	98
14:00 14:15	31	27	58	26	33	91
14:15 14:30	120	97	57	80	137	354
14:30 14:45	33	32	24	34	58	123
14:45 15:00	37	34	38	43	81	152
15:00 15:15	47	36	32	34	66	149
15:15 15:30	41	37	27	34	61	139
15:30 15:45	158	139	121	145	266	563
15:45 16:00	52	36	44	38	82	170
16:00 16:15	39	29	26	41	67	135
16:15 16:30	53	39	35	34	69	161
16:30 16:45	50	61	24	35	59	170
16:45 17:00	194	165	129	148	277	636
17:00 17:15	970	838	688	924	1622	3430

Comment:

Transportation Services - Traffic Services



Turning Movement Count - Pedestrian Volume Report

Count Date: Tuesday, March 21, 2017

O'CONNOR ST @ SOMERSET ST

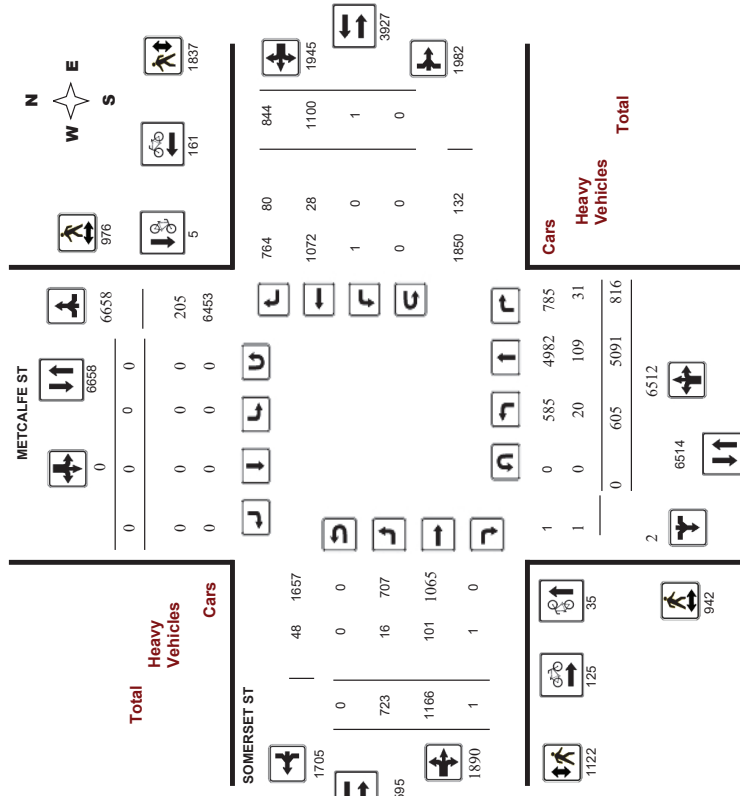
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	7	4	13	3	16	27
07:15 07:30	11	14	8	16	24	49
07:30 07:45	11	22	19	22	41	74
07:45 08:00	27	22	25	34	59	108
08:00 08:15	56	62	65	75	140	258
08:15 08:30	36	27	31	42	73	136
08:30 08:45	39	16	26	47	73	128
08:45 09:00	34	39	35	53	86	161
09:00 09:15	44	37	28	58	86	167
09:15 09:30	153	119	120	200	320	592
09:30 09:45	24	22	34	42	52	96
09:45 10:00	19	18	21	15	36	73
10:00 10:15	15	6	12	12	24	46
10:15 10:30	19	9	13	18	31	59
10:30 10:45	77	55	64	79	143	275
10:45 11:00	27	22	16	15	33	60
11:00 11:15	22	22	17	27	44	88
11:15 11:30	22	21	19	26	47	96
11:30 11:45	21	22	24	29	53	96
11:45 12:00	100	87	76	99	175	362
12:00 12:15	32	23	16	28	44	99
12:15 12:30	27	43	13	28	41	111
12:30 12:45	29	30	14	24	36	97
12:45 13:00	24	18	23	18	41	83
13:00 13:15	112	114	66	98	164	390
13:15 13:30	29	26	18	15	33	88
13:30 13:45	23	21	13	20	33	77
13:45 14:00	37	23	19	19	38	98
14:00 14:15	31	27	58	26	33	91
14:15 14:30	120	97	57	80	137	354
14:30 14:45	33	32	24	34	58	123
14:45 15:00	37	34	38	43	81	152
15:00 15:15	47	36	32	34	66	149
15:15 15:30	41	37	27	34	61	139
15:30 15:45	158	139	121	145	266	563
15:45 16:00	52	36	44	38	82	170
16:00 16:15	39	29	26	41	67	135
16:15 16:30	53	39	35	34	69	161
16:30 16:45	50	61	24	35	59	170
16:45 17:00	194	165	129	148	277	636
17:00 17:15	970	838	688	924	1622	3430

Comment:

Survey Date: Thursday, May 02, 2019
Start Time: 07:00

WO No: 38599
Device: Miovision

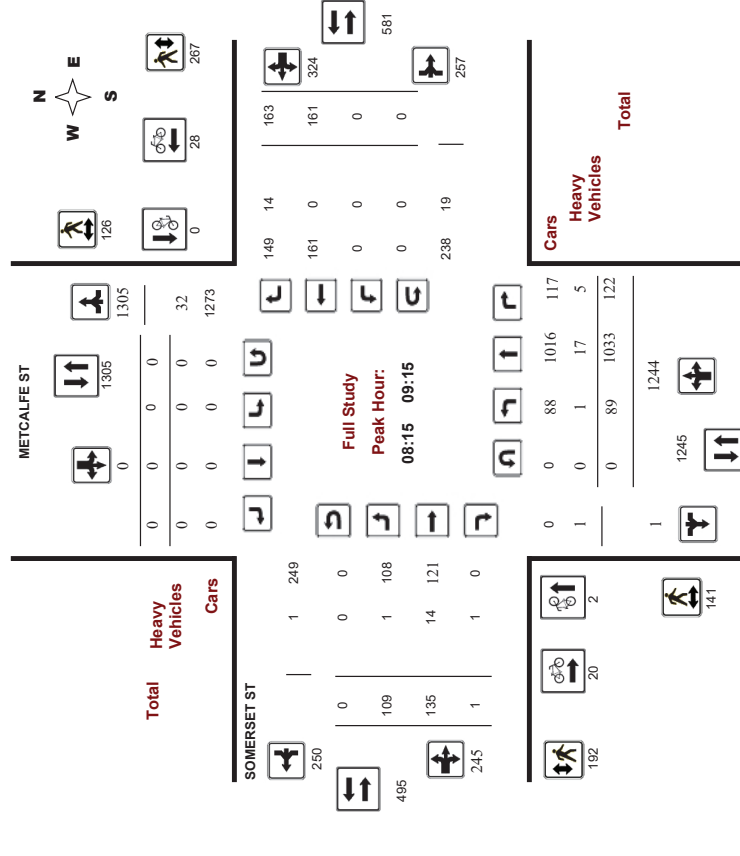
Full Study Diagram



Survey Date: Thursday, May 02, 2019
Start Time: 07:00

WO No: 38599
Device: Miovision

Full Study Peak Hour Diagram





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

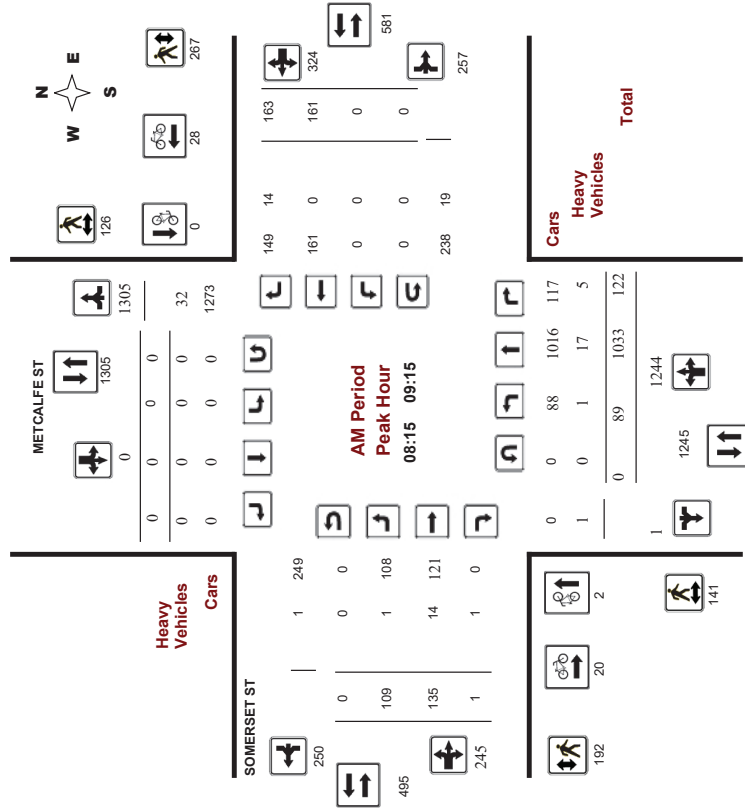
METCALFE ST @ SOMERSET ST

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

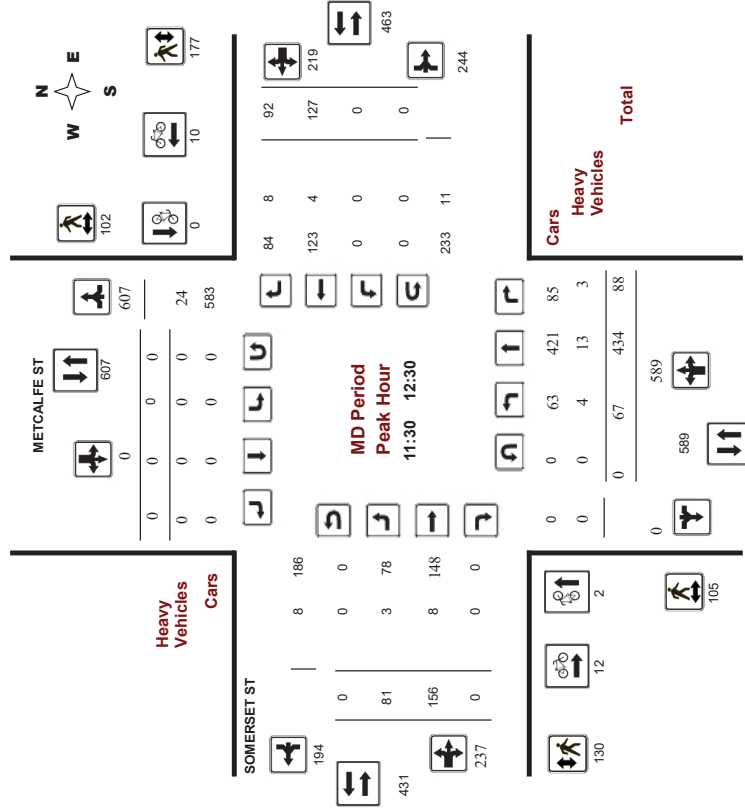
METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019

WO No: 38599

Start Time: 07:00

Device: Miovision



Comments



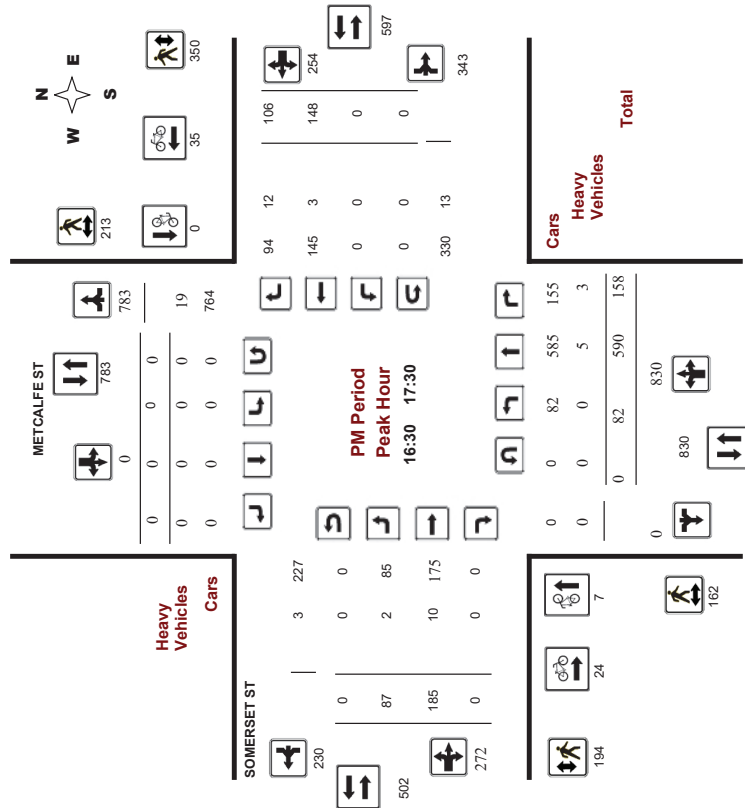
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019
Start Time: 07:00

WO No: 38599
Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Study Results

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019
Start Time: 07:00

WO No: 38599
Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, May 02, 2019
Total Observed U-Turns: 90
Southbound: 0
Eastbound: 0
Westbound: 0

Period	Northbound			Southbound			Eastbound			Westbound			WB TOT	STR TOT	Grand Total				
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	LT	ST	RT	EB TOT				LT	ST	RT	
07:00-08:00	67	989	99	1165	0	0	0	0	1165	96	77	0	173	0	106	84	180	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	680	70	838	0	0	0	0	838	109	146	0	255	0	143	121	284	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	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
AVG 12hr	757	6388	1021	8146	0	0	0	0	8146	904	1459	1	2384	1	1376	1056	2483	4797	12943
AVG 24hr	982	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
Start Time: 07:00

WO No: 38599
Device: Miovision

Full Study Pedestrian Volume

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	27	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
Start Time: 07:00

WO No: 38599
Device: Miovision

Full Study Heavy Vehicles

SOMERSET ST

Time Period	Northbound			Southbound			Eastbound			Westbound			W	STR	Grand							
	LT	ST	RT	LT	ST	RT	LT	ST	RT	LT	ST	RT				RT	TOT	TOT				
07:00 07:15	0	3	1	4	0	0	0	0	0	0	0	0	0	1	0	1	1	2	6			
07:15 07:30	0	3	3	6	0	0	0	0	0	0	0	0	0	2	0	2	0	3	5	11		
07:30 07:45	1	3	3	7	0	0	0	0	7	1	1	0	0	2	0	2	2	4	11			
07:45 08:00	0	3	2	5	0	0	0	0	5	0	0	0	0	5	0	5	0	5	10	15		
08:00 08:15	2	6	1	9	0	0	0	0	9	1	2	0	0	3	0	3	0	2	5	14		
08:15 08:30	1	3	0	4	0	0	0	0	4	0	4	0	0	4	0	4	0	3	7	11		
08:30 08:45	0	7	1	8	0	0	0	0	8	1	2	0	0	3	0	3	0	6	9	17		
08:45 09:00	0	4	1	5	0	0	0	0	5	0	6	1	7	0	0	7	0	3	10	15		
09:00 09:15	0	3	3	6	0	0	0	0	6	0	2	0	2	0	0	2	0	4	4	10		
09:15 09:30	1	6	0	7	0	0	0	0	7	0	4	0	4	0	0	4	0	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	21		
09:45 10:00	2	9	0	11	0	0	0	0	11	0	9	0	9	0	0	9	0	2	11	22		
11:30 11:45	1	2	0	3	0	0	0	0	3	0	2	0	2	0	0	2	0	2	3	5	8	
11:45 12:00	0	5	0	5	0	0	0	0	5	1	2	0	3	0	0	3	0	3	5	8	13	
12:00 12:15	1	1	1	3	0	0	0	0	3	0	2	0	2	0	0	2	0	2	4	7	7	
12:15 12:30	2	5	2	9	0	0	0	0	9	2	2	0	4	0	1	2	6	15	15	15		
12:30 12:45	1	8	0	9	0	0	0	0	9	0	2	0	2	0	0	2	0	2	4	13	13	
12:45 13:00	0	2	0	2	0	0	0	0	2	0	6	0	8	0	1	0	1	9	11	11		
13:00 13:15	2	6	3	11	0	0	0	0	11	1	2	0	3	0	1	3	4	7	18	18		
13:15 13:30	1	5	0	6	0	0	0	0	6	0	4	0	4	0	0	6	0	6	10	16	16	
15:00 15:15	1	1	0	2	0	0	0	0	2	0	1	5	0	6	0	2	4	10	12	12		
15:15 15:30	0	3	0	3	0	0	0	0	3	0	3	0	3	0	0	3	0	3	6	9	9	
15:30 15:45	1	3	1	5	0	0	0	0	5	0	2	0	2	0	0	2	0	3	5	10	10	
15:45 16:00	0	0	1	1	0	0	0	0	1	1	1	2	0	3	0	3	0	3	5	8	9	
16:00 16:15	0	1	3	4	0	0	0	0	4	0	4	0	4	0	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	2	0	1	1	3	6	6	6
17:15 17:30	0	1	1	2	0	0	0	0	2	0	2	0	2	0	0	2	0	3	5	7	7	7
16:30 16:45	0	1	1	2	0	0	0	0	2	1	2	0	3	0	1	1	2	5	7	7	7	7
16:45 17:00	0	1	0	1	0	0	0	0	1	1	4	0	5	0	0	5	0	5	10	11	11	11
17:00 17:15	0	2	1	3	0	0	0	0	3	0	2	0	2	0	0	2	0	3	5	7	10	10
17:30 17:45	1	1	1	3	0	0	0	0	3	0	4	0	4	0	0	4	0	3	7	10	10	10
17:45 18:00	0	1	0	1	0	0	0	0	1	0	5	0	5	0	0	5	0	1	6	7	7	7
Total	20	109	31	160	0	0	0	0	160	16	101	1	118	0	28	80	108	108	226	396	396	396



Transportation Services - Traffic Services

Turning Movement Count - Study Results

METCALFE ST @ SOMERSET ST

Survey Date: Thursday, May 02, 2019
Start Time: 07:00

WO No: 38599
Device: Miovision

Full Study 15 Minute U-Turn Total

METCALFE ST

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



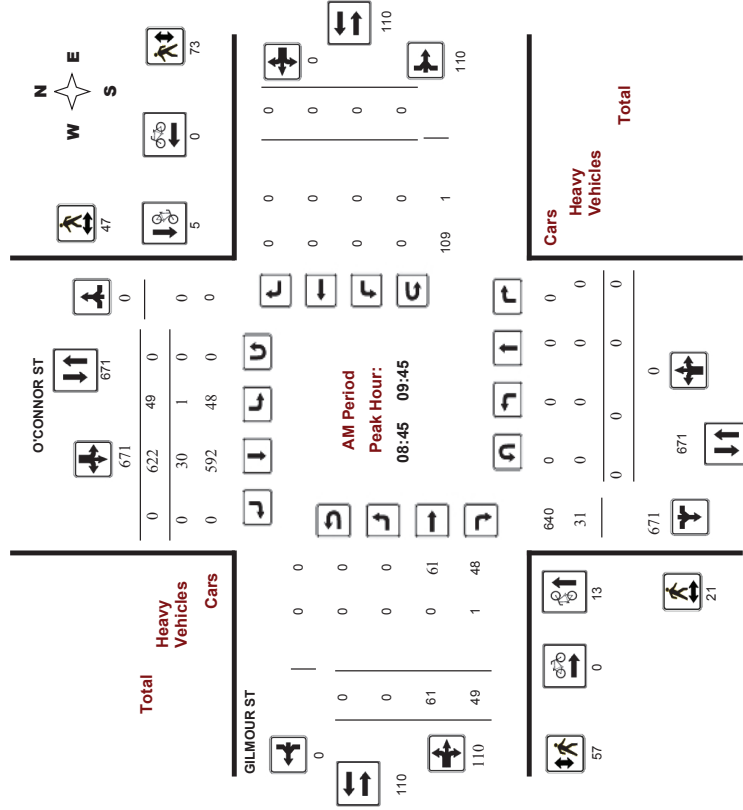
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017
Start Time: 07:00

WO No: 36785
Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

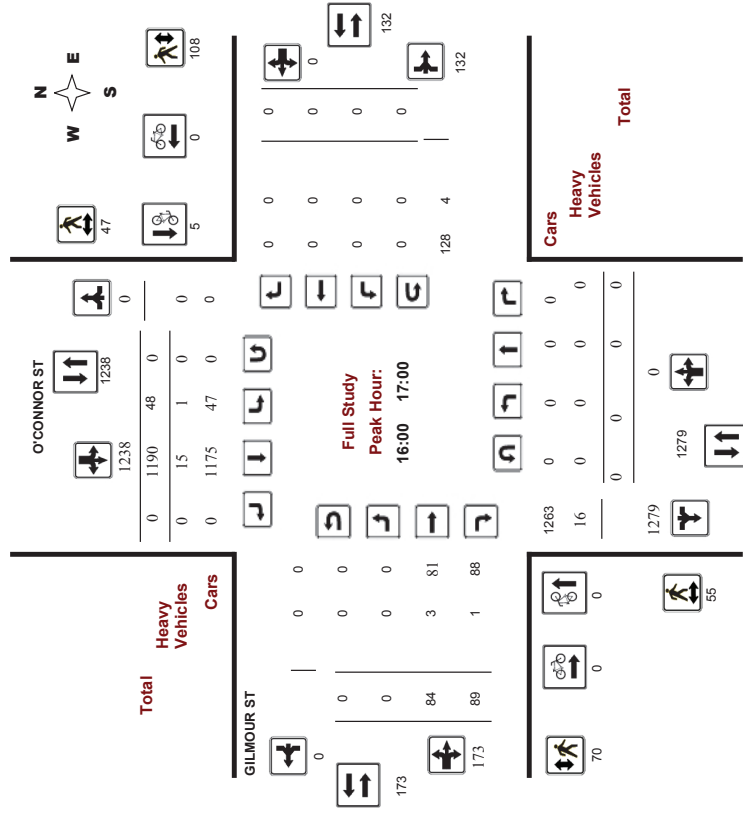
GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017

Start Time: 07:00

WO No: 36785

Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

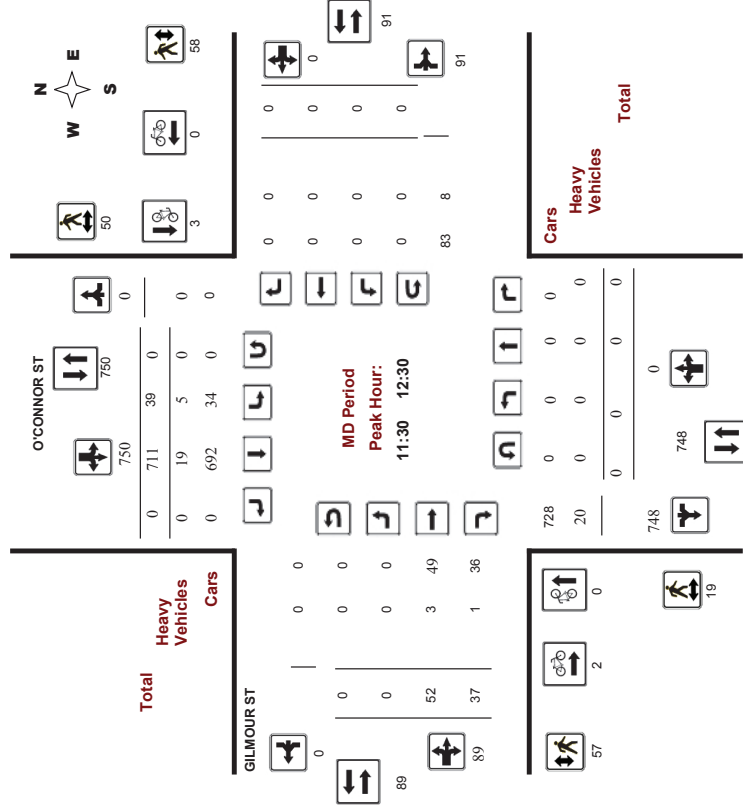
GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017

Start Time: 07:00

WO No: 36785

Device: Miovision



Comments

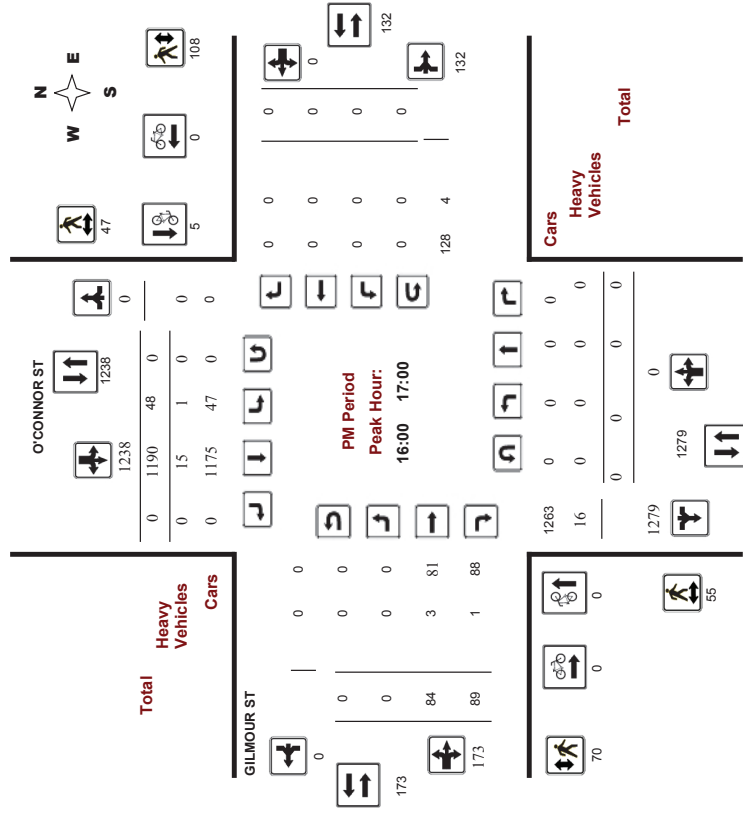


Transportation Services - Traffic Services
Turning Movement Count - Full Study Peak Hour Diagram

GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017
 Start Time: 07:00

WO No: 36785
 Device: Miovision



Comments

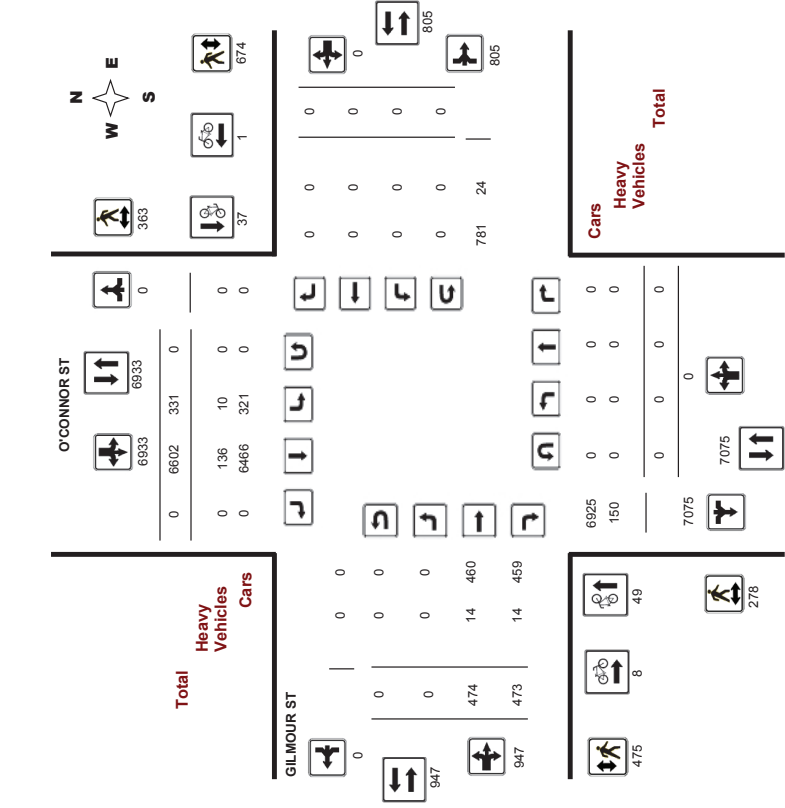


Transportation Services - Traffic Services
Turning Movement Count - Full Study Diagram

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

Period	O'CONNOR ST Northbound				Southbound				Eastbound				Westbound				Grand Total	
	N		S		SB		ST		EB		WB		RT					
	LT	RT	LT	RT	LT	RT	LT	RT	LT	RT	LT	RT	LT	RT				
07:00-08:00	0	0	0	0	39	555	0	594	0	39	26	65	0	0	0	0	65	659
08:00-09:00	0	0	0	0	45	601	0	646	0	79	43	122	0	0	0	0	122	768
09:00-10:00	0	0	0	0	51	619	0	670	0	52	41	93	0	0	0	0	93	763
11:30-12:30	0	0	0	0	39	711	0	750	0	52	37	89	0	0	0	0	89	839
12:30-13:30	0	0	0	0	25	615	0	640	0	41	50	91	0	0	0	0	91	731
15:00-16:00	0	0	0	0	38	1192	0	1230	0	54	96	150	0	0	0	0	150	1380
16:00-17:00	0	0	0	0	48	1190	0	1238	0	84	89	173	0	0	0	0	173	1411
17:00-18:00	0	0	0	0	46	1119	0	1165	0	73	91	164	0	0	0	0	164	1329
Sub Total	0	0	0	0	331	6602	0	6933	6933	474	473	947	0	0	0	0	947	7880
U Turns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	331	6602	0	6933	6933	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.

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.

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.

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

Time Period	O'CONNOR ST Northbound				Southbound				Eastbound				Westbound				Grand Total		
	N		S		SB		ST		EB		WB		RT						
	LT	RT	LT	RT	LT	RT	LT	RT	LT	RT	LT	RT	LT	RT					
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	163
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	166	0	169	169	0	13	9	22	0	0	0	0	22	191
11:00-11:15	0	0	0	0	6	184	0	190	190	0	13	5	18	0	0	0	0	18	208
11:15-12:00	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	474	473	947	0	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



Transportation Services - Traffic Services

W.O.
36785

Turning Movement Count - Heavy Vehicle Report

GILMOUR ST @ O'CONNOR ST

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

Time Period	O'CONNOR ST			GILMOUR ST			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street 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:

GILMOUR ST @ O'CONNOR ST

Survey Date: Tuesday, March 21, 2017

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

Survey Date: Tuesday, March 21, 2017

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	3	2	9	7	16	21
07:15 07:30	3	2	9	12	21	26
07:30 07:45	6	8	31	22	31	45
07:45 08:00	4	10	14	16	31	45
08:00 08:15	16	22	38	57	99	137
08:15 08:30	18	12	30	17	33	63
08:30 08:45	4	18	22	29	33	62
08:45 09:00	6	16	22	31	37	66
09:00 09:15	8	18	26	19	30	75
09:15 09:30	36	64	100	95	117	212
09:30 09:45	5	8	13	18	34	47
09:45 10:00	2	8	10	13	28	38
10:00 10:15	6	13	19	9	19	38
10:15 10:30	2	6	8	12	17	25
10:30 10:45	15	35	50	55	98	148
10:45 11:00	6	12	15	12	27	39
11:00 11:15	3	8	11	11	19	30
11:15 11:30	5	18	23	20	35	56
11:30 11:45	5	18	23	34	34	57
11:45 12:00	19	50	69	57	115	184
12:00 12:15	13	16	18	31	49	76
12:15 12:30	4	11	15	17	27	42
12:30 12:45	5	10	15	9	19	34
12:45 13:00	5	14	19	16	20	39
13:00 13:15	27	51	78	73	115	193
13:15 13:30	13	12	13	14	27	52
13:30 13:45	8	12	20	12	27	47
13:45 14:00	9	13	22	18	39	61
14:00 14:15	15	10	25	19	24	49
14:15 14:30	45	47	92	54	117	209
14:30 14:45	17	15	32	29	43	75
14:45 15:00	10	8	18	20	38	56
15:00 15:15	13	10	23	23	42	65
15:15 15:30	15	14	29	36	55	84
15:30 15:45	55	47	102	70	178	280
15:45 16:00	14	18	32	19	34	63
16:00 16:15	25	9	34	33	49	83
16:15 16:30	13	11	24	22	30	52
16:30 16:45	13	9	22	15	26	47
16:45 17:00	65	47	112	72	143	237
17:00 17:15	278	363	641	475	1149	1790
Total	278	363	641	475	1149	1790

Comment:



Transportation Services - Traffic Services
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)	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	3	2	9	7	16	21
07:15 07:30	3	2	9	12	21	26
07:30 07:45	6	8	31	22	31	45
07:45 08:00	4	10	14	16	31	45
08:00 08:15	16	22	38	57	99	137
08:15 08:30	18	12	30	17	33	63
08:30 08:45	4	18	22	29	33	62
08:45 09:00	6	16	22	31	37	66
09:00 09:15	8	18	26	19	30	75
09:15 09:30	36	64	100	95	117	212
09:30 09:45	5	8	13	18	34	47
09:45 10:00	2	8	10	13	28	38
10:00 10:15	6	13	19	9	19	38
10:15 10:30	2	6	8	12	17	25
10:30 10:45	15	35	50	55	98	148
10:45 11:00	6	12	15	12	27	39
11:00 11:15	3	8	11	11	19	30
11:15 11:30	5	18	23	20	35	56
11:30 11:45	5	18	23	34	34	57
11:45 12:00	19	50	69	57	115	184
12:00 12:15	13	16	18	31	49	76
12:15 12:30	4	11	15	17	27	42
12:30 12:45	5	10	15	9	19	34
12:45 13:00	5	14	19	16	20	39
13:00 13:15	27	51	78	73	115	193
13:15 13:30	13	12	13	14	27	52
13:30 13:45	8	12	20	12	27	47
13:45 14:00	9	13	22	18	39	61
14:00 14:15	15	10	25	19	24	49
14:15 14:30	45	47	92	54	117	209
14:30 14:45	17	15	32	29	43	75
14:45 15:00	10	8	18	20	38	56
15:00 15:15	13	10	23	23	42	65
15:15 15:30	15	14	29	36	55	84
15:30 15:45	55	47	102	70	178	280
15:45 16:00	14	18	32	19	34	63
16:00 16:15	25	9	34	33	49	83
16:15 16:30	13	11	24	22	30	52
16:30 16:45	13	9	22	15	26	47
16:45 17:00	65	47	112	72	143	237
17:00 17:15	278	363	641	475	1149	1790
Total	278	363	641	475	1149	1790

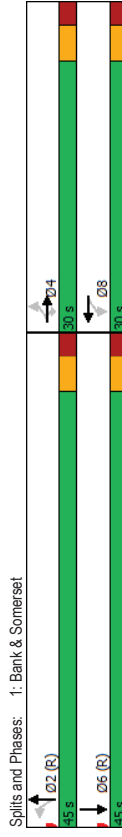
Appendix C

Synchro Intersection Worksheets – Existing Conditions

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Group	4	4	4	8	8	2	2	6
Protected Phases	4	4	4	8	8	2	2	6
Permitted Phases	4	4	4	8	8	2	2	6
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase	4	4	4	8	8	2	2	6
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	0.0	0.0
Total Lost Time (s)	5.5	5.5	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 Effr Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.53	0.53	0.53
v/c Ratio	0.67	0.25	0.11	0.35	0.54	0.20	0.20	0.20
Control Delay	29.7	21.1	9.2	9.9	14.7	10.1	10.1	10.1
Queue Delay	0.0	0.0	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	10.1	10.1
LOS	C	C	A	A	A	B	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:NBLT 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.	

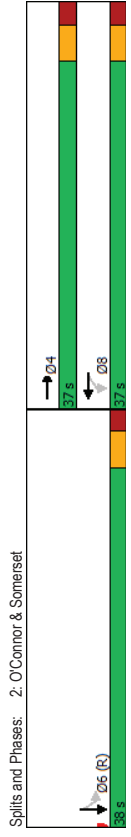


Splits and Phases: 1: Bank & Somersset

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	8	6
Permitted Phases	4	8	8	6
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	0.0
Total Lost Time (s)	5.5	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 Effr Green (s)	31.5	31.5	31.5	32.6
Actuated g/C Ratio	0.42	0.42	0.42	0.43
v/c Ratio	0.49	0.41	0.46	0.46
Control Delay	18.6	24.9	15.7	15.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.6	24.9	15.7	15.7
LOS	B	C	B	B
Approach Delay	18.6	24.9	15.7	15.7
Approach LOS	B	C	B	B
Queue Length 50th (m)	21.5	30.7	30.8	30.8
Queue Length 95th (m)	46.9	m49.1	44.2	44.2
Internal Link Dist (m)	160.8	155.7	145.7	145.7
Turn Bay Length (m)				
Base Capacity (vph)	681	617	1376	1376
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.49	0.41	0.46	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

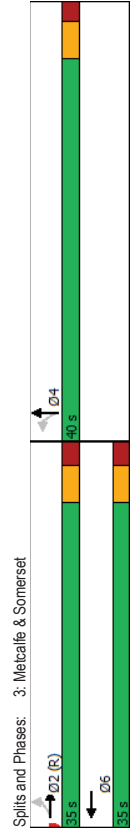
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.49
Intersection Signal Delay: 18.4
Intersection LOS: B
Intersection Capacity Utilization 67.3%
Analysis Period (min) 15
Volume for 95th percentile queue is metered by upstream signal.



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	2	6	4
Permitted Phase	2	2	6	4
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	0.0
Total Lost Time (s)	5.5	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 Effr Green (s)	29.5	29.5	29.5	34.8
Actuated g/C Ratio	0.39	0.39	0.46	0.46
v/c Ratio	0.71	0.63	0.69	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	38.0	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: 23 (39%), Referenced to phase 2EBTL, Start of Green	
Natural Cycle: 45	

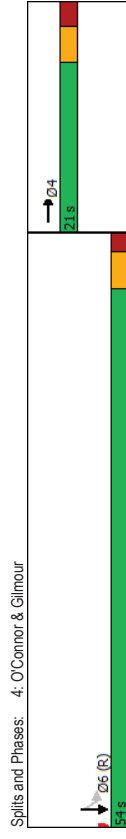
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 19.8	Intersection LOS: B
Intersection Capacity Utilization 79.0%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



	EBT	SBT
Lane Group	EBT	SBT
Lane Configurations	↔	↔
Traffic Volume (vph)	61	622
Future Volume (vph)	61	622
Lane Volume Flow (vph)	122	745
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases	4	6
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 Effr 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%
Analysis Period (min): 15



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations	34	274	103	59	254	9	260	331
Traffic Volume (vph)	34	274	103	59	254	9	260	331
Future Volume (vph)	0	342	114	66	286	0	332	404
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	NA	NA
Turn Type	4	4	4	8	8	2	2	6
Protected Phases	4	4	4	8	8	2	2	6
Permitted Phases	4	4	4	8	8	2	2	6
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase	4	4	4	8	8	2	2	6
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	0.0	0.0
Total Lost Time (s)	5.5	5.5	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 Effr Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.53	0.53	0.53
v/c Ratio	0.66	0.29	0.31	0.51	0.39	0.47	0.47	0.47
Control Delay	28.9	21.3	15.7	16.4	12.4	13.5	13.5	13.5
Queue Delay	0.0	0.0	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	13.5	13.5
LOS	C	C	B	B	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		

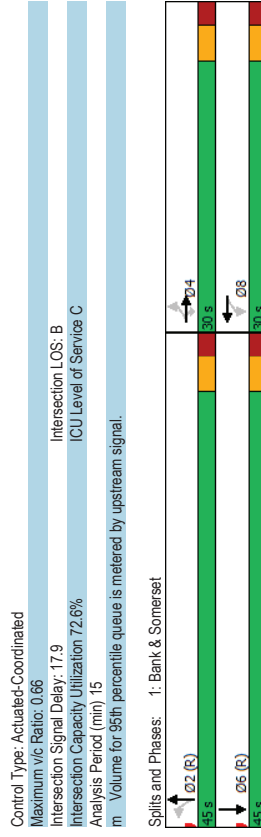
Intersection Summary

Cycle Length: 75

Actuated Cycle Length: 75

Offset: 71 (95%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 55



Lane Group	EBT	WBL	WBT	SBT	Diagram
Lane Configurations	192	70	181	938	← 4 →
Traffic Volume (vph)	192	70	181	938	
Future Volume (vph)	390	0	279	1202	
Lane Group Flow (vph)	NA	Perm	NA	NA	
Turn Type	4	8	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	0.0	
Total Lost Time (s)	5.5	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 Effr Green (s)	27.5	27.5	27.5	36.6	
Actuated g/C Ratio	0.37	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

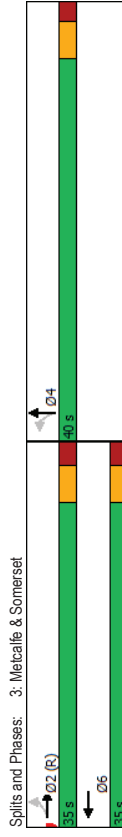
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 25.9
Intersection LOS: C
Intersection Capacity Utilization 88.2%
ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	NBT
Lane Configurations	87	185	148	590
Traffic Volume (vph)	87	185	148	590
Future Volume (vph)	0	303	282	923
Lane Group Flow (vph)	Perm	NA	NA	NA
Turn Type	2	2	6	4
Protected Phases	2	2	6	4
Permitted Phases	2	2	6	4
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	0.0
Total Lost Time (s)	5.5	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 Effr Green (s)	29.5	29.5	29.5	34.8
Actuators g/C Ratio	0.39	0.39	0.46	0.46
v/c Ratio	0.60	0.49	0.50	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	
Spillover Cap Reductn	0	0	0	
Storage Cap Reductn	0	0	0	
Reduced v/c Ratio	0.60	0.49	0.50	

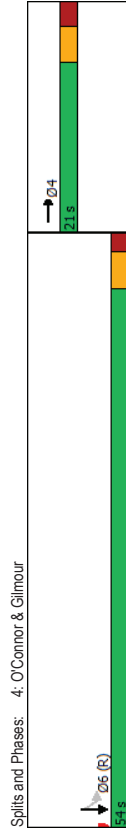
Intersection Summary
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 20 (27%), Referenced to phase 2EBTL, Start of Green
 Natural Cycle: 40

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



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	4	6
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 Effr 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%
Analysis Period (min) 15
IOU Level of Service B



Appendix D

Collision Data

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	15:41	COOPER ST @ O'CONNOR ST (00089-54)	02 - Rain	07 - Dark	02 - Stop sign	01 - Functioning	03 - P.D. only	04 - Sideswipe	02 - Wet	2	0	0	0
2017-01-21	2017	16:13	COOPER ST @ O'CONNOR ST (00089-54)	01 - Clear	07 - 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 (00089-54)	01 - Clear	07 - Daylight	02 - Stop sign	01 - Functioning	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2018-05-17	2018	17:46	COOPER ST @ O'CONNOR ST (00089-54)	01 - Clear	07 - Daylight	02 - Stop sign	00 - Unknown	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2019-12-16	2019	14:00	COOPER ST @ O'CONNOR ST (00089-54)	01 - Clear	01 - Daylight	02 - Stop sign	01 - Functioning	03 - P.D. only	05 - Turning movement	04 - Slush	2	0	1	0
2019-04-03	2019	15:10	COOPER ST @ O'CONNOR ST (00089-54)	01 - Clear	01 - Daylight	02 - Stop sign	00 - Unknown	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	1	0
2019-05-25	2019	10:59	COOPER ST @ O'CONNOR ST (00089-54)	01 - Clear	01 - Daylight	02 - Stop sign	00 - Unknown	02 - Non-fatal injury	07 - SUV other	01 - Dry	1	0	0	1
2020-11-04	2020	8:35	COOPER ST @ O'CONNOR ST (00089-54)	01 - Clear	01 - Daylight	02 - Stop sign	00 - Unknown	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
2016-04-24	2016	2:39	O'CONNORS ST @ SOMERSET ST (0002690)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
2016-01-11	2016	14:26	O'CONNORS 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'CONNORS ST @ SOMERSET ST (0002690)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Angle	02 - Wet	02 - Wet	2	0	0	0
2016-05-16	2016	17:38	O'CONNORS ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	02 - Wet	2	0	0	0
2016-01-14	2016	10:10	O'CONNORS 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'CONNORS 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
2016-06-25	2016	17:15	O'CONNORS 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
2016-07-27	2016	17:55	O'CONNORS 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
2017-09-14	2017	0:12	O'CONNORS ST @ SOMERSET ST (0002690)	01 - Clear	07 - Dark	01 - Traffic signal	00 - Unknown	03 - P.D. only	07 - SUV other	01 - Dry	1	0	0	0
2018-09-26	2018	17:25	O'CONNORS 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
2018-08-31	2018	16:36	O'CONNORS ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	03 - Loose snow	2	0	0	0
2019-11-23	2019	19:00	O'CONNORS ST @ SOMERSET ST (0002690)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	1	0	0	1
2019-03-03	2019	13:30	O'CONNORS 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
2019-05-06	2019	15:06	O'CONNORS ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	07 - SUV other	01 - Dry	2	0	0	0
2019-11-15	2019	21:00	O'CONNORS ST @ SOMERSET ST (0002690)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	03 - Loose snow	2	0	0	0
2019-06-20	2019	18:07	O'CONNORS ST @ SOMERSET ST (0002690)	03 - Snow	07 - Dark	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	04 - Slush	2	0	1	0
2020-01-25	2020	18:07	O'CONNORS ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	07 - SUV other	01 - Dry	1	0	0	1
2020-01-09	2020	10:54	O'CONNORS ST @ SOMERSET ST (0002690)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	07 - SUV other	01 - Dry	1	0	0	0
2016-02-25	2016	15:34	SOMERSET ST @ W'BN O'CONNOR ST & METCALFE ST (32034W)	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'BN O'CONNOR ST & METCALFE ST (32034W)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	07 - SUV other	01 - Dry	1	0	0	1
2019-10-29	2019	16:15	SOMERSET ST @ W'BN O'CONNOR ST & METCALFE ST (32034W)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	04 - Sideswipe	01 - Dry	2	0	1	0
2019-05-06	2019	11:13	SOMERSET ST @ W'BN O'CONNOR ST & METCALFE ST (32034W)	01 - Clear	05 - Dusk	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2020-02-29	2020	Unknown	SOMERSET ST @ W'BN O'CONNOR ST & METCALFE ST (32034W)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	06 - SUV unattended vehicle	01 - Dry	2	0	0	0
2016-10-07	2016	17:06	SOMERSET ST @ W'BN BANK ST & O'CONNOR ST (32034W)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	07 - SUV other	01 - Dry	1	0	0	1
2016-12-07	2016	20:26	SOMERSET ST @ W'BN BANK ST & O'CONNOR ST (32034W)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2019-02-25	2019	Unknown	SOMERSET ST @ W'BN BANK ST & O'CONNOR ST (32034W)	01 - Clear	00 - Unknown	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2019-03-26	2019	20:00	SOMERSET ST @ W'BN BANK ST & O'CONNOR ST (32034W)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	06 - SUV unattended vehicle	03 - Loose snow	1	0	0	0
2016-10-21	2016	12:04	O'CONNORS ST @ W'BN COOPER ST & SOMERSET ST (W 32034H)	02 - Rain	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	02 - Wet	2	0	0	0
2016-05-03	2016	11:38	O'CONNORS ST @ W'BN COOPER ST & SOMERSET ST (W 32034H)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	07 - Angle	02 - Wet	2	0	0	0
2017-11-09	2017	12:10	O'CONNORS ST @ W'BN COOPER ST & SOMERSET ST (W 32034H)	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'CONNORS ST @ W'BN COOPER ST & SOMERSET ST (W 32034H)	01 - Clear	10 - No control	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
2018-12-13	2018	16:30	O'CONNORS ST @ W'BN COOPER ST & SOMERSET ST (W 32034H)	01 - Clear	05 - Dusk	10 - No control	0	03 - P.D. only	06 - SUV unattended vehicle	01 - Dry	1	0	0	0
2019-05-15	2019	Unknown	O'CONNORS ST @ W'BN COOPER ST & SOMERSET ST (W 32034H)	01 - Clear	00 - Unknown	10 - No control	0	03 - P.D. only	06 - SUV unattended vehicle	01 - Dry	1	0	0	0
2019-05-18	2019	Unknown	O'CONNORS ST @ W'BN COOPER ST & SOMERSET ST (W 32034H)	01 - Clear	00 - Unknown	10 - No control	0	03 - P.D. only	06 - SUV unattended vehicle	01 - Dry	1	0	0	0
2020-03-02	2020	Unknown	O'CONNORS ST @ W'BN COOPER ST & SOMERSET ST (W 32034H)	01 - Clear	00 - Unknown	10 - No control	0	03 - P.D. only	06 - SUV unattended vehicle	01 - Dry	1	0	0	0
2020-12-23	2020	Unknown	O'CONNORS ST @ W'BN COOPER ST & SOMERSET ST (W 32034H)	01 - Clear	00 - Unknown	10 - No control	0	03 - P.D. only	06 - SUV 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

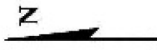


Legend

AM Peak Hour Total Traffic Volume



Distance (m)



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 a 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

M/A

User Initials: TIMW

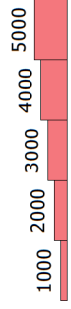
Plot Prepared: September 17, 2020

EMME Scenario: 21711

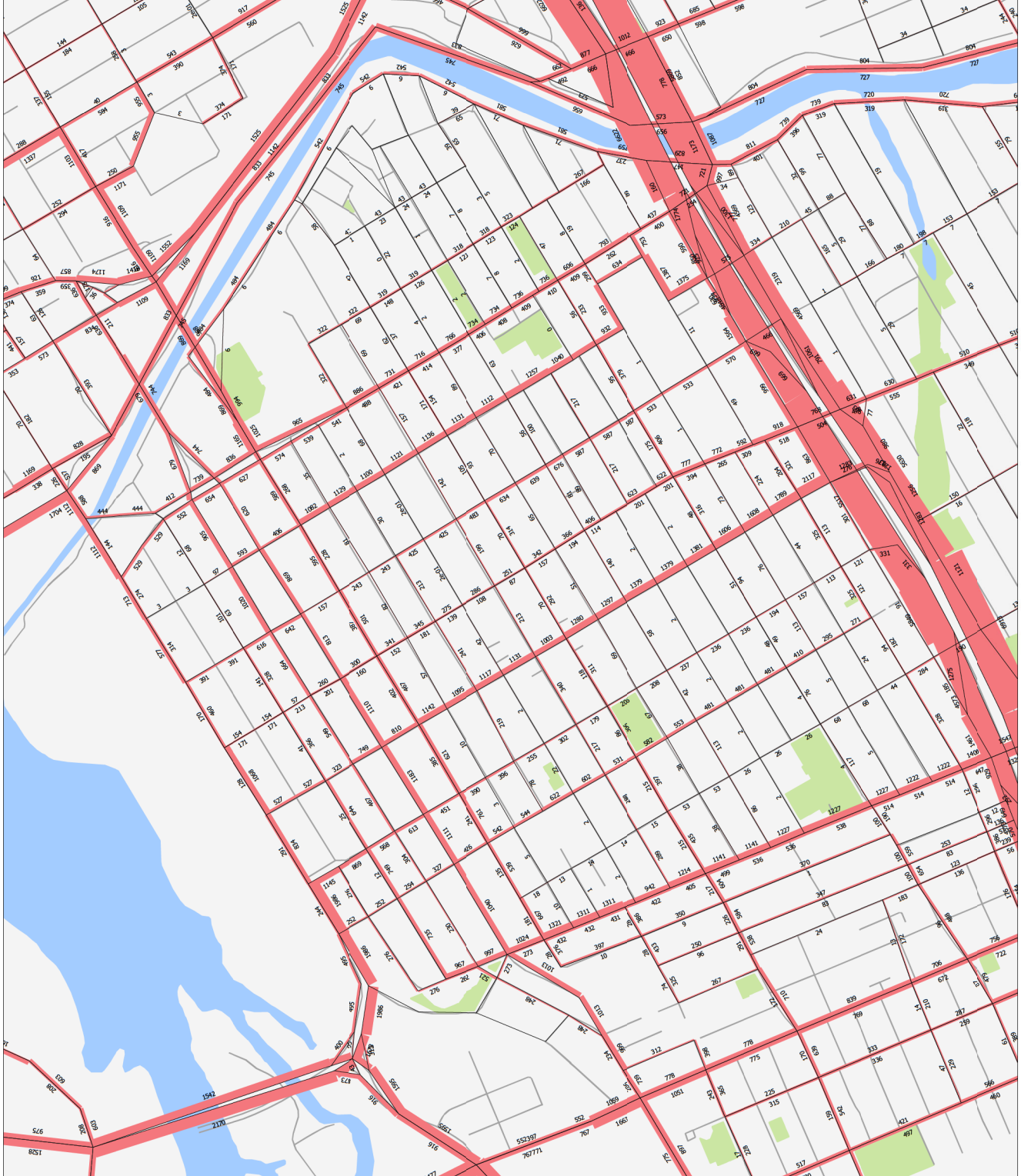


Legend

AM Peak Hour Total Traffic Volume



Distance (m)



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.

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As a 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

Figure 2: Existing Traffic Volumes

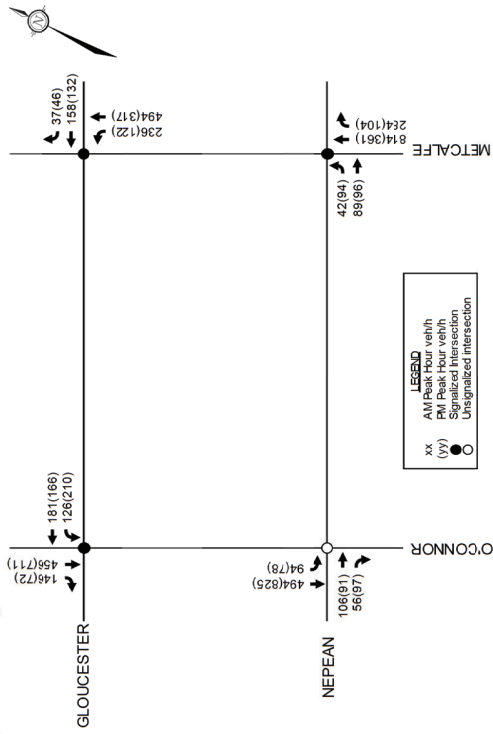
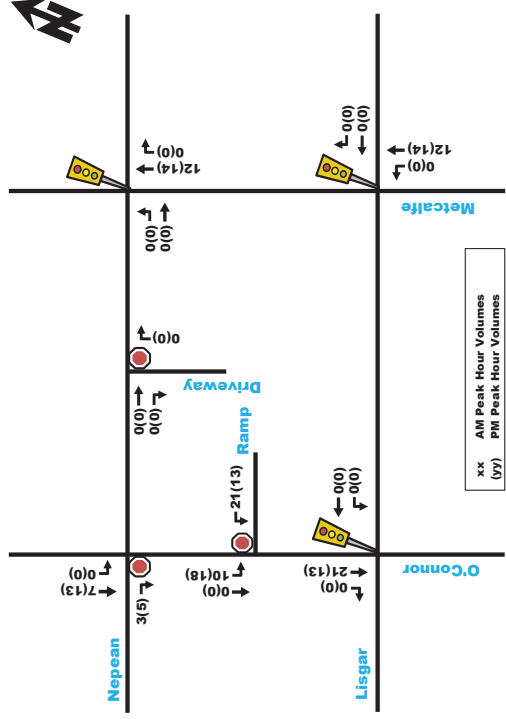


Figure 11: 2022 Site-Generated Traffic



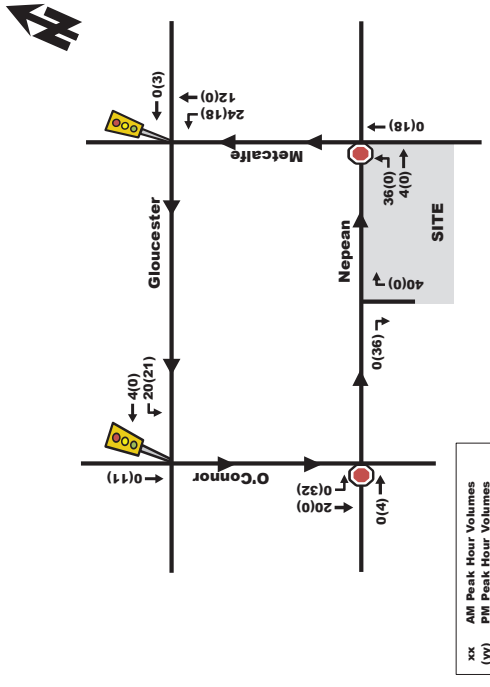
3.2. Background Network Traffic

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.



xx AM Peak Hour Volumes
yy PM Peak Hour Volumes

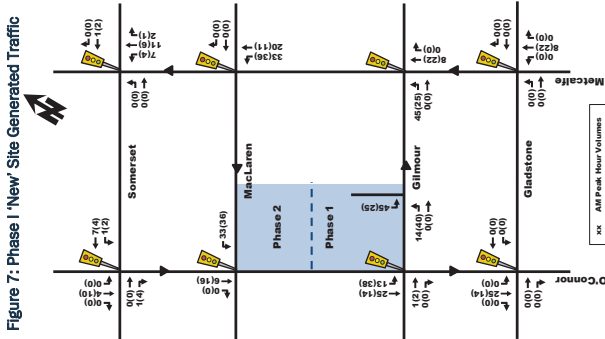


Figure 7: Phase I 'New' Site Generated Traffic

xx AM Peak Hour Volumes
yy PM Peak Hour Volumes

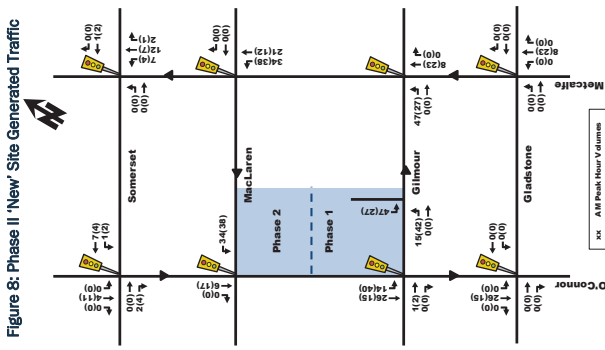
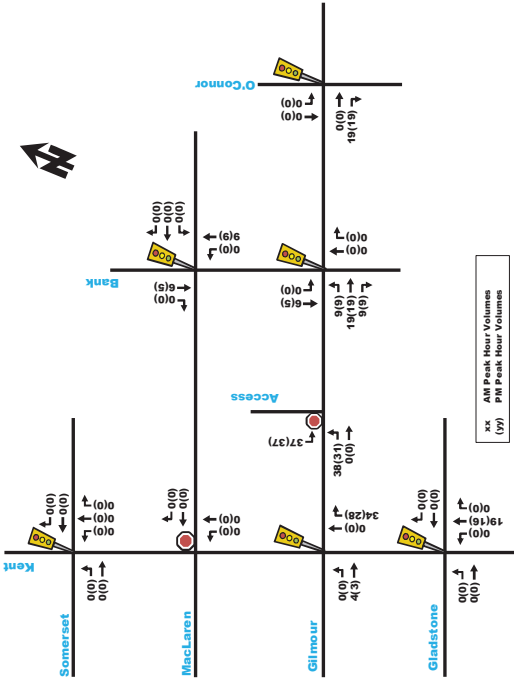


Figure 8: Phase II 'New' Site Generated Traffic

xx AM Peak Hour Volumes
yy PM Peak Hour Volumes

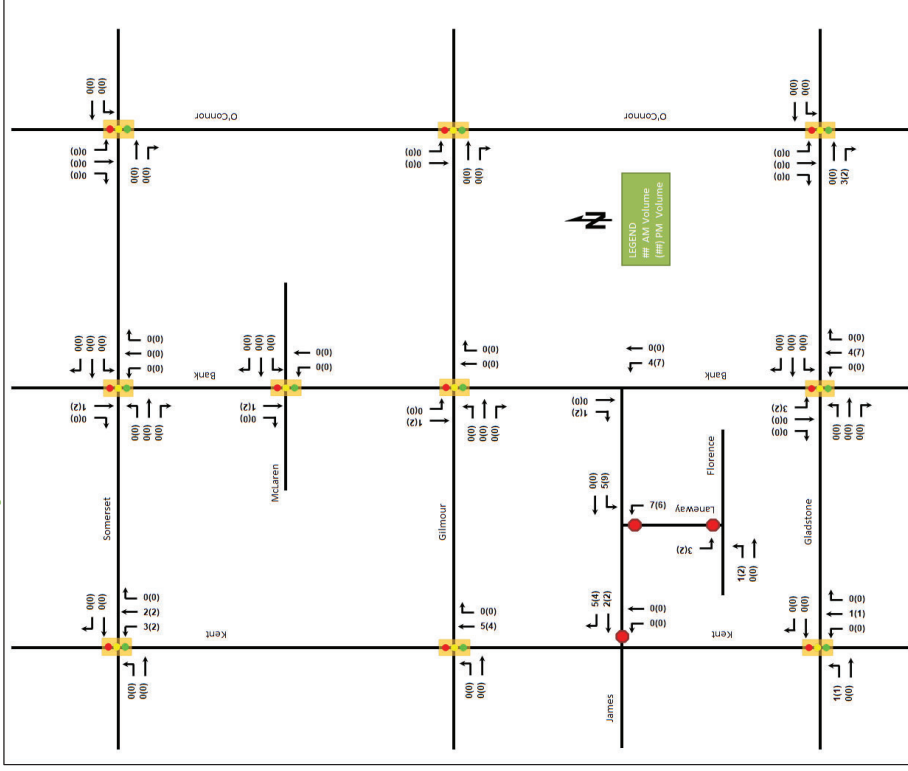
- o Departing traffic is assumed to use Hwy 417 WB primarily by travelling east on Gilmour St away from the site driveway and turning right on O'Connor St to travel southbound to Catherine St, then turning right onto the highway ramp.

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

Lanes, Volumes, Timings
1: Bank & Somersset

2024 Future Background AM Peak Hour
311 Somersset STW

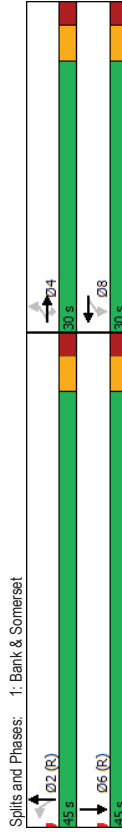
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations	52	254	75	21	162	3	378	159
Traffic Volume (vph)	52	254	75	21	162	3	378	159
Future Volume (vph)	0	306	75	21	179	0	428	167
Lane Group Flow (vph)	Perm	NA	Perm	Perm	NA	Perm	NA	NA
Turn Type	4	4	4	8	8	2	2	6
Protected Phases	4	4	4	8	8	2	2	6
Permitted Phases	4	4	4	8	8	2	2	6
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase	4	4	4	8	8	2	2	6
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	0.0	0.0
Total Lost Time (s)	5.5	5.5	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	204
Act Effr Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.53	0.53	0.53
v/c Ratio	0.60	0.23	0.10	0.33	0.50	0.50	0.19	0.19
Control Delay	27.2	20.7	8.7	9.5	13.9	10.0	10.0	10.0
Queue Delay	0.0	0.0	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	10.0	10.0
LOS	C	C	A	A	B	B	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:NBLT and 6:SBT, Start of Green	
Natural Cycle: 55	

Lanes, Volumes, Timings
1: Bank & Somersset

2024 Future Background AM Peak Hour
311 Somersset STW

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.	

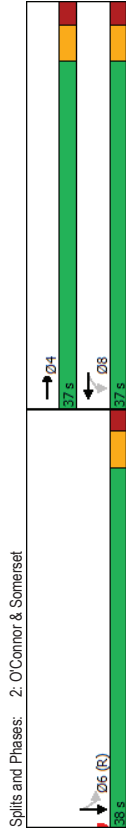


Lanes, Volumes, Timings
2: O'Connor & Somerset

Lanes, Volumes, Timings
2: O'Connor & Somerset

Lane Group	EBT	WBL	WBT	SBT
Lane Configurations	185	52	181	555
Traffic Volume (vph)	185	52	181	555
Future Volume (vph)	302	0	233	647
Lane Group Flow (vph)	NA	Perm	NA	NA
Turn Type	4	8	8	6
Protected Phases	4	8	8	6
Detector Phase	4	8	8	6
Switch Phase	10.0	10.0	10.0	10.0
Minimum Initial (s)	20.5	20.5	20.5	22.4
Minimum 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	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.4
Lead/Lag				
Lead-Lag Optimize?	3.0	3.0	3.0	3.0
Vehicle Extension (s)	Max	Max	Max	C-Max
Recall Mode	7.0	7.0	7.0	10.0
Walk Time (s)	8.0	8.0	8.0	7.0
Flash Dont Walk (s)	102	83	83	119
Pedestrian Calls (#/hr)	31.5	31.5	31.5	32.6
Act Effr Green (s)	0.42	0.42	0.42	0.43
Actuated g/C Ratio	0.44	0.37	0.47	0.47
v/c Ratio	16.3	24.2	15.9	0.0
Control Delay	0.0	0.0	0.0	0.0
Queue Delay	16.3	24.2	15.9	0.0
Total Delay	16.3	24.2	15.9	0.0
LOS	B	C	B	B
Approach Delay	16.3	24.2	15.9	0.0
Approach LOS	B	C	B	B
Queue Length 50th (m)	14.3	27.7	31.7	0.0
Queue Length 95th (m)	40.0	m45.8	45.3	0.0
Internal Link Dist (m)	160.8	155.7	145.7	0.0
Turn Bay Length (m)	681	627	1384	0.0
Base Capacity (vph)	0	0	0	0
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.44	0.37	0.47	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	Intersection LOS: B
Maximum v/c Ratio: 0.47	IOU Level of Service C
Intersection Signal Delay: 17.7	
Intersection Capacity Utilization 70.0%	
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	



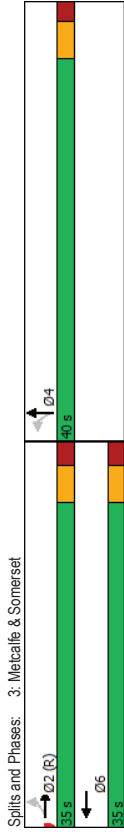
Lanes, Volumes, Timings
3: Metcalfe & Somerset

Lanes, Volumes, Timings
3: Metcalfe & 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	2	6	4
Permitted Phases	2	2	6	4
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	0.0
Total Lost Time (s)	5.5	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 Effr Green (s)	29.5	29.5	29.5	34.8
Actuated G/C Ratio	0.39	0.39	0.46	0.46
v/c Ratio	17.8	22.0	17.3	0.67
Control Delay	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.8	22.0	17.3	0.0
LOS	B	C	B	B
Approach Delay	17.8	22.0	17.3	0.0
Approach LOS	B	C	B	B
Queue Length 50th (m)	20.3	34.0	50.1	0.0
Queue Length 95th (m)	41.6	58.3	64.8	0.0
Internal Link Dist (m)	155.7	145.3	134.2	0.0
Turn Bay Length (m)				
Base Capacity (vph)	423	573	1997	0.0
Starvation Cap Reductn	0	0	0	0.0
Spillback Cap Reductn	0	0	0	0.0
Storage Cap Reductn	0	0	0	0.0
Reduced v/c Ratio	0.58	0.57	0.67	0.0

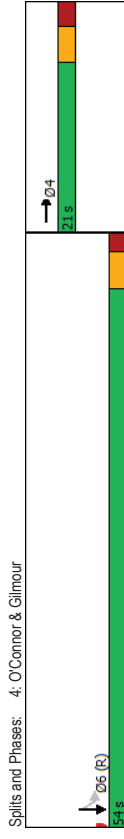
Intersection Summary	
Cycle Length:	75
Actuated Cycle Length:	75
Offset:	23 (39%), Referenced to phase 2EBTL, Start of Green
Natural Cycle:	40

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



	EBT	SBT
Lane Group	EBT	SBT
Lane Configurations	1	4
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	4	6
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 Effr 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%
Analysis Period (min): 15
IOU Level of Service A



Lanes, Volumes, Timings
1: Bank & Somerset

2024 Future Background PM Peak Hour
311 Somerset STW

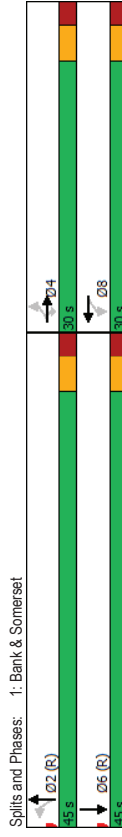
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations	34	278	103	59	258	9	269	338
Traffic Volume (vph)	34	278	103	59	258	9	269	338
Future Volume (vph)	0	312	103	59	262	0	308	370
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	NA	NA
Turn Type	4	4	4	8	8	2	2	6
Protected Phases	4	4	4	8	8	2	2	6
Permitted Phases	4	4	4	8	8	2	2	6
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase	4	4	4	8	8	2	2	6
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	0.0	0.0
Total Lost Time (s)	5.5	5.5	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 Effr Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Actuated G/C Ratio	0.33	0.33	0.33	0.33	0.33	0.53	0.53	0.53
v/c Ratio	0.60	0.26	0.25	0.46	0.37	0.43	0.43	0.43
Control Delay	26.9	20.9	14.6	16.0	12.0	12.9	12.9	12.9
Queue Delay	0.0	0.0	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	12.9	12.9
LOS	C	C	B	B	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	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	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:NBT and 6:SBT, Start of Green	
Natural Cycle: 55	

Lanes, Volumes, Timings
1: Bank & Somerset

2024 Future Background PM Peak Hour
311 Somerset STW

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.	



Lanes, Volumes, Timings
2: O'Connor & Somerset

Lanes, Volumes, Timings
2: O'Connor & Somerset

→	↖	←	↓
EBT	WBL	WBT	SBT
192	72	185	1023
192	72	185	1023
355	0	257	1167
NA	Perm	NA	NA
4	8	8	6
4	8	8	6
10.0	10.0	10.0	10.0
20.5	20.5	20.5	22.4
33.0	33.0	33.0	42.0
44.0%	44.0%	44.0%	56.0%
27.5	27.5	27.5	36.6
3.3	3.3	3.3	3.3
2.2	2.2	2.2	2.1
0.0	0.0	0.0	0.0
5.5	5.5	5.5	5.4
3.0	3.0	3.0	3.0
7.0	7.0	7.0	10.0
8.0	8.0	8.0	7.0
179	138	138	147
27.5	27.5	27.5	36.6
0.37	0.37	0.37	0.49
0.65	0.65	0.57	0.76
43.9	43.9	18.7	19.3
0.0	0.0	0.0	0.0
43.9	43.9	18.7	19.3
43.9	43.9	18.7	19.3
50.7	19.3	65.6	
76.7	30.1	89.5	
160.8	155.7	145.7	
543	454	1541	
0	0	0	
0	0	0	
0	0	0	
0.65	0.57	0.76	

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



Splits and Phases: 2: O'Connor & Somerset

D6 (R)	5.2 s
D4	3.3 s
D6 (L)	5.3 s
D8	3.3 s

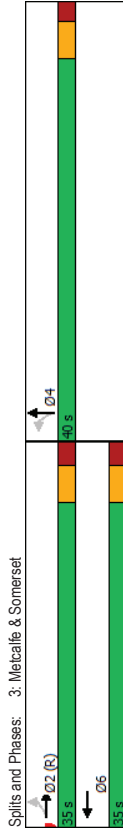
Intersection Summary	
Cycle Length:	75
Actuated Cycle Length:	75
Offset:	58 (77%), Referenced to phase 2; and 6:SBTL, Start of Green
Natural Cycle:	55

Lanes, Volumes, Timings
3: Metcalfe & Somersset

Lanes, Volumes, Timings
3: Metcalfe & Somersset

Lane Group	EBL	EBT	WBT	WBT	NBT
Lane Configurations					
Traffic Volume (vph)	87	185	150	665	411
Future Volume (vph)	87	185	150	665	910
Lane Group Flow (vph)	0	272	256	910	NA
Turn Type	Perm	NA	NA	NA	NA
Protected Phases	2	2	6	4	4
Permitted Phases	2	2	6	4	4
Detector Phase	2	2	6	4	4
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	19.5	19.5	19.5	18.2	40.0
Total Split (s)	35.0	35.0	35.0	40.0	53.3%
Total Split (%)	46.7%	46.7%	46.7%	53.3%	34.8
Maximum Green (s)	29.5	29.5	29.5	34.8	3.3
Yellow Time (s)	3.3	3.3	3.3	3.3	2.2
All-Red Time (s)	2.2	2.2	2.2	1.9	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	5.5
Total Lost Time (s)	5.5	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 Effr Green (s)	29.5	29.5	29.5	34.8	
Actuated G/C Ratio	0.39	0.39	0.46	0.46	
v/c Ratio	0.52	0.45	0.49	13.6	
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	B	
Approach Delay	19.8	18.4	13.6		
Approach LOS	B	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 2EBTL, 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%
Analysis Period (min) 15
ICU Level of Service C
m Volume for 95th percentile queue is metered by upstream signal.

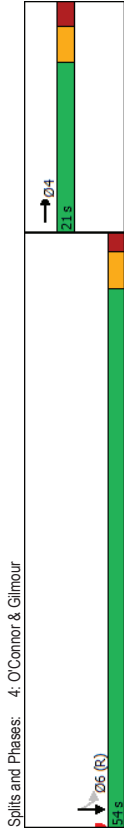


Lanes, Volumes, Timings
4: O'Connor & Gilmour

Lanes, Volumes, Timings
4: O'Connor & Gilmour

	EBT	SBT
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	4	6
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 Effr 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%
Analysis Period (min): 15
IOU Level of Service C



Appendix H

Synchro Intersection Worksheets – 2029 Future Background Conditions

Lanes, Volumes, Timings
1: Bank & Somersset

2029 Future Background AM Peak Hour
311 Somersset STW

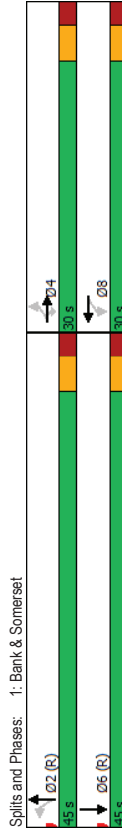
EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
→	↔	↔	↔	↔	↔	↔	↔
4	4	4	8	8	2	2	6
4	4	4	8	8	2	2	6
10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
30.0	30.0	30.0	30.0	30.0	45.0	45.0	45.0
40.0%	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%
24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
144	144	144	126	126	195	195	204
24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
0.33	0.33	0.33	0.33	0.33	0.53	0.53	0.53
0.61	0.23	0.10	0.34	0.50	0.19	0.19	0.19
27.4	20.7	8.6	9.6	13.9	10.0	10.0	10.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27.4	20.7	8.6	9.6	13.9	10.0	10.0	10.0
C	C	A	A	B	B	B	B
26.1	9.5	9.5	13.9	10.0	10.0	10.0	10.0
C	A	A	B	B	B	B	B
36.1	7.6	0.9	8.2	36.1	11.6	11.6	11.6
60.9	17.5	m2.3	14.0	58.8	21.2	21.2	21.2
161.3	160.8	160.8	255.6	215.8	215.8	215.8	215.8
506	329	220	549	860	890	890	890
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0.61	0.23	0.10	0.34	0.50	0.19	0.19	0.19

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

Lanes, Volumes, Timings
1: Bank & Somersset

2029 Future Background AM Peak Hour
311 Somersset STW

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

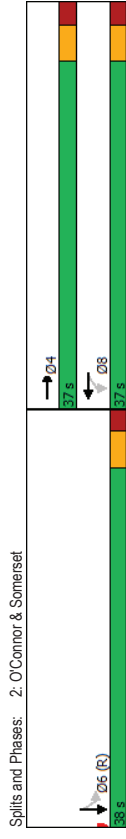


Lanes, Volumes, Timings
2: O'Connor & Somerset

Lanes, Volumes, Timings
2: O'Connor & Somerset

Lane Group	EBT	WBL	WBT	SBT
Lane Configurations	185	53	188	559
Traffic Volume (vph)	185	53	188	559
Future Volume (vph)	304	0	241	651
Lane Group Flow (vph)	NA	Perm	NA	NA
Turn Type	4	8	8	6
Protected Phases	4	8	8	6
Detector Phase	4	8	8	6
Switch Phase	10.0	10.0	10.0	10.0
Minimum Initial (s)	20.5	20.5	20.5	22.4
Minimum 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	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.4
Lead/Lag				
Lead-Lag Optimize?	3.0	3.0	3.0	3.0
Vehicle Extension (s)	Max	Max	Max	C-Max
Recall Mode	7.0	7.0	7.0	10.0
Walk Time (s)	8.0	8.0	8.0	7.0
Flash Dont Walk (s)	102	83	83	119
Pedestrian Calls (#/hr)	31.5	31.5	31.5	32.6
Act Effr Green (s)	0.42	0.42	0.42	0.43
Actuated g/C Ratio	0.45	0.38	0.47	0.43
v/c Ratio	16.5	23.8	16.0	16.0
Control Delay	0.0	0.0	0.0	0.0
Queue Delay	16.5	23.8	16.0	16.0
Total Delay	16.5	23.8	16.0	16.0
LOS	B	C	B	B
Approach Delay	16.5	23.8	16.0	16.0
Approach LOS	B	C	B	B
Queue Length 50th (m)	14.6	28.5	32.0	32.0
Queue Length 95th (m)	40.3	m46.2	45.5	45.5
Internal Link Dist (m)	160.8	155.7	145.7	145.7
Turn Bay Length (m)				
Base Capacity (vph)	680	627	1384	1384
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.45	0.38	0.47	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	Intersection LOS: B
Maximum v/c Ratio: 0.47	IOU Level of Service C
Intersection Signal Delay: 17.7	
Intersection Capacity Utilization 70.7%	
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	



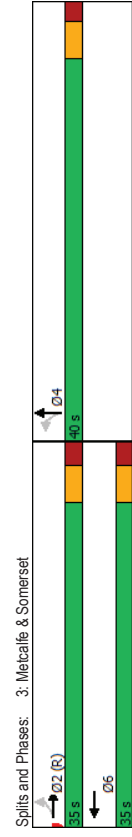
Lanes, Volumes, Timings
3: Metcalfe & Somerset

Lanes, Volumes, Timings
3: Metcalfe & Somerset

EBL	EBT	WBT	NBT
109	135	163	1129
109	135	163	1129
0	244	326	1358
Perm	NA	NA	NA
2	2	6	4
2	2	6	4
10.0	10.0	10.0	10.0
19.5	19.5	19.5	18.2
35.0	35.0	35.0	40.0
46.7%	46.7%	46.7%	53.3%
29.5	29.5	29.5	34.8
3.3	3.3	3.3	3.3
2.2	2.2	2.2	1.9
0.0	0.0	0.0	0.0
5.5	5.5	5.5	5.2
3.0	3.0	3.0	3.0
7.0	7.0	7.0	7.0
7.0	7.0	7.0	6.0
141	141	126	267
29.5	29.5	29.5	34.8
0.39	0.39	0.46	0.46
17.9	22.1	17.5	17.5
0.0	0.0	0.0	0.0
17.9	22.1	17.5	17.5
B	C	B	B
17.9	22.1	17.5	17.5
B	C	B	B
20.3	34.2	51.3	51.3
41.7	58.7	66.3	66.3
155.7	145.3	134.2	134.2
422	574	1993	1993
0	0	0	0
0	0	0	0
0	0	0	0
0.58	0.57	0.68	0.68

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

EBL	EBT	WBT	NBT
109	135	163	1129
109	135	163	1129
0	244	326	1358
Perm	NA	NA	NA
2	2	6	4
2	2	6	4
10.0	10.0	10.0	10.0
19.5	19.5	19.5	18.2
35.0	35.0	35.0	40.0
46.7%	46.7%	46.7%	53.3%
29.5	29.5	29.5	34.8
3.3	3.3	3.3	3.3
2.2	2.2	2.2	1.9
0.0	0.0	0.0	0.0
5.5	5.5	5.5	5.2



Lanes, Volumes, Timings
4: O'Connor & Gilmour

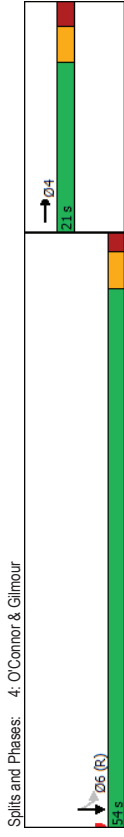
Lanes, Volumes, Timings
4: O'Connor & Gilmour

2029 Future Background AM Peak Hour
311 Somerset STW

2029 Future Background AM Peak Hour
311 Somerset STW

Lane Group	EBT	SBT	
Lane Configurations	↔	↔	↔
Traffic Volume (vph)	63	744	744
Future Volume (vph)	63	744	744
Lane Group Flow (vph)	131	820	
Turn Type	NA	NA	NA
Protected Phases	4	6	
Permitted Phases	4	6	
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 Effr 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%
Analysis Period (min): 15
IOU Level of Service A



Lanes, Volumes, Timings
1: Bank & Somerset

2029 Future Background PM Peak Hour
311 Somerset STW

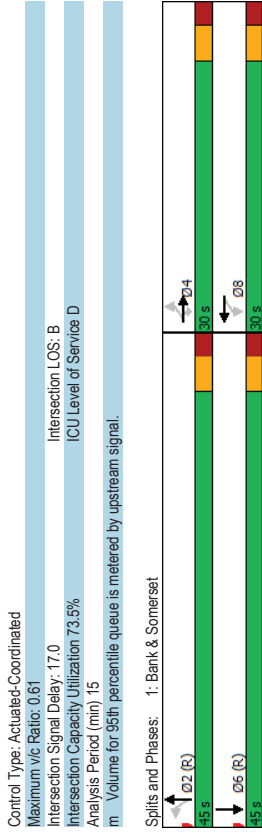
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations	34	282	103	59	262	9	269	338
Traffic Volume (vph)	34	282	103	59	262	9	269	338
Future Volume (vph)	0	316	103	59	266	0	308	370
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	NA	NA
Turn Type	4	4	4	8	8	2	2	6
Protected Phases	4	4	4	8	8	2	2	6
Permitted Phases	4	4	4	8	8	2	2	6
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	0.0	0.0
Total Lost Time (s)	5.5	5.5	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 Effr Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Actuated G/C Ratio	0.33	0.33	0.33	0.33	0.33	0.53	0.53	0.53
v/c Ratio	0.61	0.26	0.25	0.47	0.37	0.43	0.43	0.43
Control Delay	27.1	20.9	14.5	15.8	12.0	12.9	12.9	12.9
Queue Delay	0.0	0.0	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	12.9	12.9
LOS	C	C	B	B	B	B	B	B
Approach Delay	25.6	15.6	15.6	12.0	12.9	12.0	12.9	12.9
Approach LOS	C	C	B	B	B	B	B	B
Queue Length 50th (m)	37.0	10.6	3.5	19.1	23.8	29.9	29.9	29.9
Queue Length 95th (m)	62.1	22.1	m6.0	m31.7	39.8	49.0	49.0	49.0
Internal Link Dist (m)	161.3			160.8	255.6	215.8	215.8	215.8
Turn Bay Length (m)	25.0	10.0						
Base Capacity (vph)	522	394	234	565	843	857	857	857
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.26	0.25	0.47	0.37	0.43	0.43	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

Lanes, Volumes, Timings
1: Bank & Somerset

2029 Future Background PM Peak Hour
311 Somerset STW



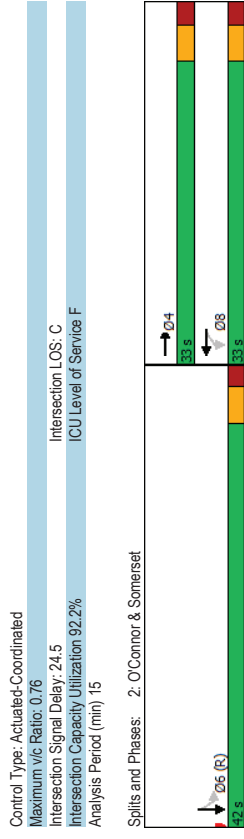
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 17.0
Intersection LOS: B
Intersection Capacity Utilization: 73.5%
IOU Level of Service: D
Analysis Period (min): 15
m: Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bank & Somerset

Lanes, Volumes, Timings
2: O'Connor & Somerset

Lanes, Volumes, Timings
2: O'Connor & Somerset

EBT	WBL	WBT	SBT
192	74	189	1034
192	74	189	1034
359	0	263	1178
NA	Perm	NA	NA
4	8	8	6
4	8	8	6
10.0	10.0	10.0	10.0
20.5	20.5	20.5	22.4
33.0	33.0	33.0	42.0
44.0%	44.0%	44.0%	56.0%
27.5	27.5	27.5	36.6
3.3	3.3	3.3	3.3
2.2	2.2	2.2	2.1
0.0	0.0	0.0	0.0
5.5	5.5	5.5	5.4
3.0	3.0	3.0	3.0
7.0	7.0	7.0	10.0
8.0	8.0	8.0	7.0
179	138	138	147
27.5	27.5	27.5	36.6
0.37	0.37	0.37	0.49
0.66	0.69	0.76	
44.3	19.5	19.5	
0.0	0.0	0.0	
44.3	19.5	19.5	
D	B	B	
44.3	19.5	19.5	
D	B	B	
51.4	20.0	66.5	
77.7	30.9	91.1	
160.8	155.7	145.7	
541	446	1542	
0	0	0	
0	0	0	
0	0	0	
0.66	0.69	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			

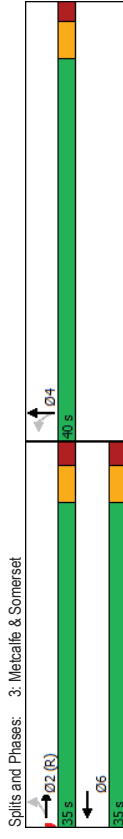


Lanes, Volumes, Timings
3: Metcalfe & Somerset

Lanes, Volumes, Timings
3: Metcalfe & Somerset

Lane Group	EBL	EBT	WBT	NBT
Lane Configurations	87	185	152	672
Traffic Volume (vph)	87	185	152	672
Future Volume (vph)	0	272	258	922
Lane Group Flow (vph)	Perm	NA	NA	NA
Turn Type	2	2	6	4
Protected Phases	2	2	6	4
Permitted Phases	2	2	6	4
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	0.0
Total Lost Time (s)	5.5	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 Effr Green (s)	29.5	29.5	29.5	34.8
Actuated G/C Ratio	0.39	0.39	0.46	0.46
v/c Ratio	0.52	0.45	0.50	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	B
Approach Delay	20.0	18.6	13.7	
Approach LOS	B	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	
Spillover 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 2EBTL, 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%
IOU Level of Service C
Analysis Period (min): 15
m. Volume for 95th percentile queue is metered by upstream signal.



Lanes, Volumes, Timings
4: O'Connor & Gilmour

2029 Future Background PM Peak Hour
4: O'Connor & Gilmour

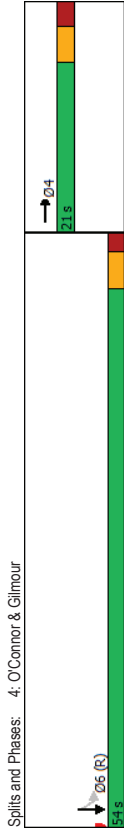
311 Somerset STW

311 Somerset STW

Lane Group	EBT	SBT	
Lane Configurations	↔	↔	↔
Traffic Volume (vph)	88	1294	414
Future Volume (vph)	88	1294	
Lane Group Flow (vph)	196	1420	
Turn Type	NA	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 Effr 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%
Analysis Period (min):	15



Appendix I

MMLOS Analysis

Multi-Modal Level of Service - Segments Form

CGH Transportation Existing and Future Conditions	2020-27	311 Somerset
Comments	2020-12-10	

Project Date	O'Connor	Somerset	Section
	1	2	3

SEGMENTS	Street A	O'Connor	Somerset	Section	
Pedestrian	C	Sidewalk Width	≥ 2 m	≥ 2 m	
		Boulevard Width	0.5 - 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	E	Type of Cycling Facility	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	C	Truck Lane Width	≤ 3.3 m	> 3.7 m	
		Travel Lanes per Direction	> 1	1	
		Level of Service	C	B	-

Multi-Modal Level of Service - Intersections Form

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

		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							
		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST				
Pedestrian	Lanes Median	3 No Median - 2.4 m	3 No Median - 2.4 m	3 No Median - 2.4 m	4 No Median - 2.4 m	3 No Median - 2.4 m	3 No Median - 2.4 m	3 No Median - 2.4 m	3 No Median - 2.4 m	3 No Median - 2.4 m	3 No Median - 2.4 m	3 No Median - 2.4 m	3 No Median - 2.4 m	3 No Median - 2.4 m	3 No Median - 2.4 m	0 - 2 No Median - 2.4 m	0 - 2 No Median - 2.4 m				
	Conflicting Left Turns	No left turn / Prohib.	Permissive	No left turn / Prohib.	No left turn / Prohib.	Permissive	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.	Permissive	No left turn / Prohib.	No left turn / Prohib.	Permissive	No left turn / Prohib.	Permissive	Permissive	No left turn / Prohib.				
	Conflicting Right Turns	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	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	No right turn				
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR allowed			
	Ped Signal Leading Interval?	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
	Right Turn Channel	No Right Turn	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Right Turn	No Right Turn			
	Corner Radius	No Right Turn	3-5m	5-10m	5-10m	5-10m	5-10m	5-10m	5-10m	5-10m	5-10m	5-10m	5-10m	5-10m	5-10m	No Right Turn	No Right Turn				
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Std transverse markings			
	PEITS Score	93	75	84	67	76	75	84	67	76	75	84	67	76	75	88	83	108	110		
	Ped. Exposure to Traffic LOS	A	B	B	C	C	B	B	C	C	B	B	C	C	B	B	B	A	A		
Cycle Length	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75			
Effective Walk Time	26	26	12	12	27	27	12	12	27	27	12	12	23	23	23	23	44	44			
Average Pedestrian Delay	16	16	15	26	15	15	26	26	15	15	14	18	18	14	18	18	6	6			
Pedestrian Delay LOS	B	B	B	C	C	B	C	C	C	B	B	B	B	B	B	B	A	A			
Level of Service	B				C				C				B				D				
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							
		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	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic				
	Right Turn Lane Configuration	Not Applicable	Not Applicable	> 50 m	> 50 m	Not Applicable	Not Applicable	> 50 m	> 50 m	Not Applicable	Not Applicable	> 50 m	> 50 m	Not Applicable	Not Applicable	> 50 m	> 50 m				
	Right Turning Speed	Not Applicable	Not Applicable	≤ 25 km/h	≤ 25 km/h	Not Applicable	Not Applicable	≤ 25 km/h	≤ 25 km/h	Not Applicable	Not Applicable	≤ 25 km/h	≤ 25 km/h	Not Applicable	Not Applicable	≤ 25 km/h	≤ 25 km/h				
	Cyclist relative to RT motorists Separated or Mixed Traffic	Not Applicable Separated	Not Applicable Separated	F	F	Not Applicable Separated	Not Applicable Separated	F	F	Not Applicable Separated	Not Applicable Separated	F	F	Not Applicable Separated	Not Applicable Separated	F	F				
	Left Turn Approach	2-stage, LT box > 50 to < 60 km/h	2-stage, LT box > 50 to < 60 km/h	No lane crossed > 40 to ≤ 50 km/h	No lane crossed > 40 to ≤ 50 km/h	2-stage, LT box > 50 to < 60 km/h	2-stage, LT box > 50 to < 60 km/h	No lane crossed > 40 to ≤ 50 km/h	No lane crossed > 40 to ≤ 50 km/h	2-stage, LT box > 50 to < 60 km/h	2-stage, LT box > 50 to < 60 km/h	No lane crossed > 40 to ≤ 50 km/h	No lane crossed > 40 to ≤ 50 km/h	2-stage, LT box > 50 to < 60 km/h	2-stage, LT box > 50 to < 60 km/h	No lane crossed > 40 to ≤ 50 km/h	No lane crossed > 40 to ≤ 60 km/h				
	Operating Speed	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			
	Left Turning Cyclist	A	A	C	C	A	A	C	C	A	A	C	C	A	A	C	C	A			
	Level of Service	C				F				F				E				B			
	Average Signal Delay	≤ 20 sec	≤ 20 sec	≤ 30 sec	≤ 30 sec	≤ 20 sec	≤ 20 sec	≤ 30 sec	≤ 30 sec	≤ 20 sec	≤ 20 sec	≤ 30 sec	≤ 30 sec	≤ 20 sec	≤ 20 sec	≤ 30 sec	≤ 30 sec	≤ 20 sec			
	Level of Service	C				D				D				D				-			
Truck	Effective Corner Radius	10 - 15 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m	< 10 m				
	Number of Receiving Lanes on Departure from Intersection	1	≥ 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Level of Service	E				F				F				D				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

Lanes, Volumes, Timings
1: Bank & Somerset

2024 Future Total AM Peak Hour
311 Somerset ST W

	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	4	4	8	8	2	2	6
Permitted Phases	4	4	4	8	8	2	2	6
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	0.0	0.0
Total Lost Time (s)	5.5	5.5	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	206
Act Effr Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Actuated G/C Ratio	0.33	0.33	0.33	0.33	0.33	0.53	0.53	0.53
v/c Ratio	0.61	0.23	0.10	0.33	0.50	0.50	0.19	0.19
Control Delay	27.4	20.9	8.8	9.6	13.9	10.0	10.0	10.0
Queue Delay	0.0	0.0	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	10.0	10.0
LOS	C	C	A	A	B	B	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		

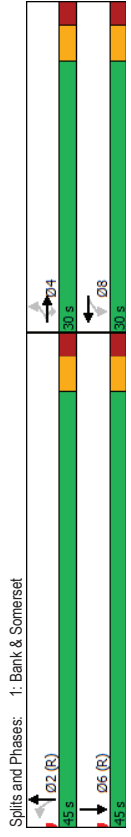
Intersection Summary

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

Lanes, Volumes, Timings
1: Bank & Somerset

2024 Future Total AM Peak Hour
311 Somerset ST W

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



Lanes, Volumes, Timings
2: O'Connor & Somerset

2024 Future Total AM Peak Hour
311 Somerset SW

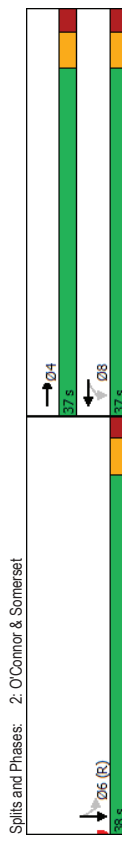
Lane Group	EBT	WBL	WBT	SBT
Lane Configurations	185	52	181	563
Traffic Volume (vph)	185	52	181	563
Future Volume (vph)	302	0	233	658
Lane Group Flow (vph)	NA	Perm	NA	NA
Turn Type	4	8	8	6
Protected Phases	4	8	8	6
Detector Phase	4	8	8	6
Switch Phase	10.0	10.0	10.0	10.0
Minimum Initial (s)	20.5	20.5	20.5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

Lanes, Volumes, Timings
2: O'Connor & Somerset

2024 Future Total AM Peak Hour
311 Somerset SW

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



Lanes, Volumes, Timings
3: Metcalfe & Somerset

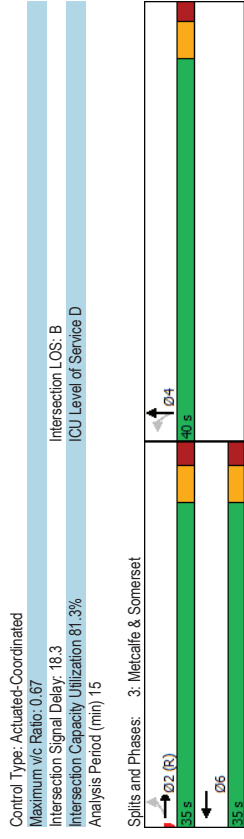
2024 Future Total AM Peak Hour
311 Somerset SW

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	2	6	4
Permitted Phases	2	2	6	4
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	0.0
Total Lost Time (s)	5.5	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 Effr Green (s)	29.5	29.5	29.5	34.8
Actuated g/C Ratio	0.39	0.39	0.46	0.46
v/c Ratio	0.59	0.57	0.67	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	

Lanes, Volumes, Timings
3: Metcalfe & Somerset

2024 Future Total AM Peak Hour
311 Somerset SW



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

Splits and Phases: 3: Metcalfe & Somerset	
55 s	10 s
10 s	10 s

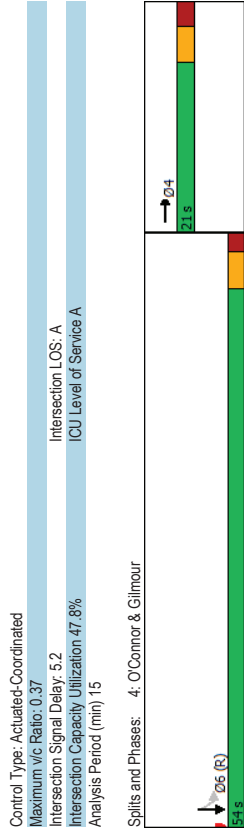
Lanes, Volumes, Timings
4: O'Connor & Gilmour

2024 Future Total AM Peak Hour
311 Somerset St W

	EBT	SBT
Lane Group	EBT	SBT
Lane Configurations	↔	↔
Traffic Volume (vph)	62	726
Future Volume (vph)	62	726
Lane Volume Flow (vph)	130	788
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases	4	6
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 Effr 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		

Lanes, Volumes, Timings
4: O'Connor & Gilmour

2024 Future Total AM Peak Hour
311 Somerset St W



HCM 2010 TWSC
5: O'Connor & Site Access

2024 Future Total AM Peak Hour
311 Somerset St W

Intersection	EBL	EBR	NBL	NBT	SBT	SBR
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	f					
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	-	-	-	-
Grade, %	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	Minor2	Major2	Major2	-	0
Conflicting Flow All	-	316	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hwy	-	6.94	-	-	-	-
Critical Hwy Stg 1	-	-	-	-	-	-
Critical Hwy Stg 2	-	-	-	-	-	-
Follow-up Hwy	-	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	EB	SB	SB	-	-
HCM Control Delay, s	10.4	-	-	-	0	-
HCM LOS	B	-	-	-	-	-
Minor Lane/Major Mvmt	EBLn1	EBLn1	SBT	SBR	-	-
Capacity (veh/h)	680	680	-	-	-	-
HCM Lane V/C Ratio	0.018	0.018	-	-	-	-
HCM Control Delay (s)	10.4	10.4	-	-	-	-
HCM Lane LOS	B	B	-	-	-	-
HCM 95th %ile Q(veh)	0.1	0.1	-	-	-	-

Lanes, Volumes, Timings
1: Bank & Somerset

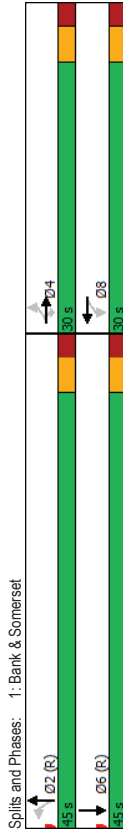
2024 Future Total PM Peak Hour
311 Somerset St W

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations	f							
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							
Permitted Phases	4							
Detector Phase	4							
Switch Phase	4							
Minimum Initial (s)	10.0							
Minimum Split (s)	25.5							
Total Split (s)	30.0							
Total Split (%)	40.0%							
Maximum Green (s)	24.5							
Yellow Time (s)	3.3							
All-Red Time (s)	2.2							
Lost Time Adjust (s)	0.0							
Total Lost Time (s)	5.5							
Lead/Lag	5.5							
Lead-Lag Optimize?	3.0							
Vehicle Extension (s)	3.0							
Recall Mode	Max							
Walk Time (s)	7.0							
Flash Dont Walk (s)	13.0							
Pedestrian Calls (#/hr)	84							
Act Effrt Green (s)	24.5							
Actuated g/C Ratio	0.33							
v/c Ratio	0.60							
Control Delay	27.0							
Queue Delay	0.0							
Total Delay	27.0							
LOS	C							
Approach Delay	25.5							
Approach LOS	C							
Queue Length 50th (m)	36.6							
Queue Length 95th (m)	61.6							
Internal Link Dist (m)	161.3							
Turn Bay Length (m)	25.0							
Base Capacity (vph)	520							
Starvation Cap Reductn	0							
Spillback Cap Reductn	0							
Storage Cap Reductn	0							
Reduced v/c Ratio	0.60							
Intersection Summary	0.60							
Cycle Length: 75	0.27							
Actuated Cycle Length: 75	0.25							
Offset: 71 (95%), Referenced to phase 2:NBLT and 6:SBT, Start of Green	0.47							
Natural Cycle: 55	0.37							

Lanes, Volumes, Timings
1: Bank & Somerset

2024 Future Total PM Peak Hour
311 Somerset STW

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



Lanes, Volumes, Timings
2: O'Connor & Somerset

2024 Future Total PM Peak Hour
311 Somerset STW

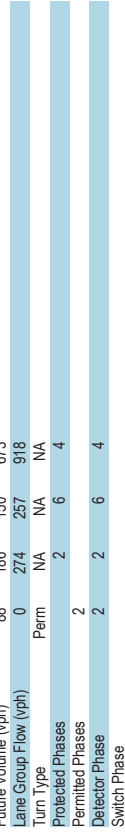
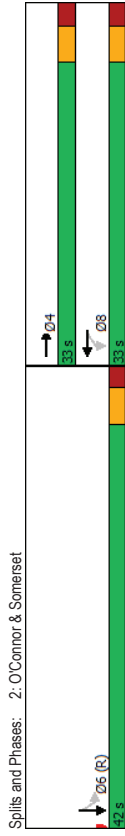
	EBT	WBL	WBT	SBT
Lane Group	EBT	WBL	WBT	SBT
Lane Configurations	T	T	T	T
Traffic Volume (vph)	192	72	185	1030
Future Volume (vph)	192	72	185	1030
Lane Group Flow (vph)	355	0	257	1177
Turn Type	NA	Perm	NA	NA
Protected Phases	4	8	8	6
Permitted Phases	8	8	8	6
Detector Phase	4	8	8	6
Switch Phase				
Minimum 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	0.0
Total Lost Time (s)	5.5	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	27.5	36.6
Actuated g/C Ratio	0.37	0.37	0.49	0.49
v/c Ratio	0.66	0.57	0.77	0.77
Control Delay	44.1	18.7	19.6	19.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	44.1	18.7	19.6	19.6
LOS	D	B	B	B
Approach Delay	44.1	18.7	19.6	19.6
Approach LOS	D	B	B	B
Queue Length 50th (m)	50.9	19.2	66.6	66.6
Queue Length 95th (m)	76.9	30.0	91.2	91.2
Internal Link Dist (m)	160.8	155.7	31.6	31.6
Turn Bay Length (m)				
Base Capacity (vph)	540	453	1538	1538
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.66	0.57	0.77	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				

Lanes, Volumes, Timings
2: O'Connor & Somerset

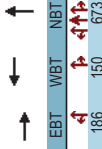
Lanes, Volumes, Timings
3: Metcalfe & Somerset

Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 24.3
 Intersection Capacity Utilization 91.6%
 Analysis Period (min) 15

Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 24.3
 Intersection Capacity Utilization 91.6%
 Analysis Period (min) 15



Splits and Phases: 2: O'Connor & Somerset



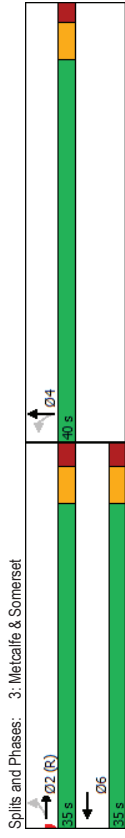
Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Traffic Volume (vph)	88	186	150	673
Future Volume (vph)	88	186	150	673
Lane Group Flow (vph)	0	274	257	918
Turn Type	Perm	NA	NA	NA
Protected Phases	2	2	6	4
Permitted Phases	2	2	6	4
Detector Phase	2	2	6	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	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	0.0
Total Lost Time (s)	5.5	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 Effr Green (s)	29.5	29.5	29.5	34.8
Actuated g/C Ratio	0.39	0.39	0.46	0.46
v/c Ratio	0.52	0.45	0.49	0.49
Control Delay	19.9	18.6	13.7	13.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.9	18.6	13.7	13.7
LOS	B	B	B	B
Approach Delay	19.9	18.6	13.7	13.7
Approach LOS	B	B	B	B
Queue Length 50th (m)	20.7	23.9	28.4	28.4
Queue Length 95th (m)	m42.0	43.2	38.9	38.9
Internal Link Dist (m)	155.7	145.3	134.2	134.2
Turn Bay Length (m)				
Base Capacity (vph)	523	571	1865	1865
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.52	0.45	0.49	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	

2024 Future Total PM Peak Hour
311 Somerset STW

Lanes, Volumes, Timings
4: O'Connor & Gilmour

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



2024 Future Total PM Peak Hour
311 Somerset STW

Lane Group	EBT	SBT
Lane Configurations	T	T
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	4	6
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 Effort 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		

Lanes, Volumes, Timings
4: O'Connor & Gilmour

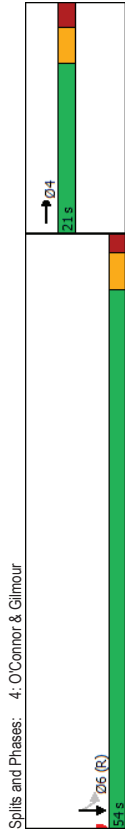
HCM 2010 TWSC
5: O'Connor & Site Access

2024 Future Total PM Peak Hour

311 Somerset ST W

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

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	-
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	Minor2	Major2
Conflicting Flow All	-	583	-
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	-	-

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

Lanes, Volumes, Timings
1: Bank & Somerset

2029 Future Total AM Peak Hour
311 Somerset SW

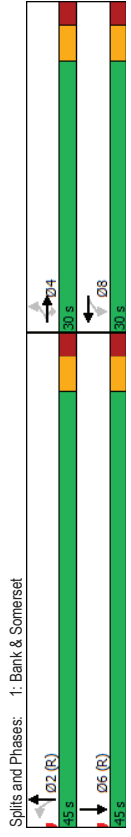
EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
→	↔	↔	↔	↔	↔	↔	↔
4	4	4	8	8	2	2	6
4	4	4	8	8	2	2	6
10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
30.0	30.0	30.0	30.0	30.0	45.0	45.0	45.0
40.0%	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%
24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Max	Max	Max	Max	Max	C-Max	C-Max	C-Max
7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
151	151	151	130	130	200	200	206
24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
0.33	0.33	0.33	0.33	0.33	0.53	0.53	0.53
0.61	0.23	0.10	0.34	0.50	0.19	0.19	0.19
27.5	20.9	8.7	9.6	13.9	10.0	10.0	10.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27.5	20.9	8.7	9.6	13.9	10.0	10.0	10.0
C	C	A	A	B	B	B	B
26.2	9.5	9.5	13.9	10.0			
C	A	A	B	B	B	B	B
36.3	7.6	0.9	8.4	36.2	11.6	11.6	11.6
61.2	17.6	m2.3	14.3	58.9	21.2	21.2	21.2
161.3			160.8	255.6	215.8	215.8	215.8
504	323	217	548	860	890	890	890
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0.61	0.23	0.10	0.34	0.50	0.19	0.19	0.19

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

Lanes, Volumes, Timings
1: Bank & Somerset

2029 Future Total AM Peak Hour
311 Somerset SW

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



Lanes, Volumes, Timings
2: O'Connor & Somerset

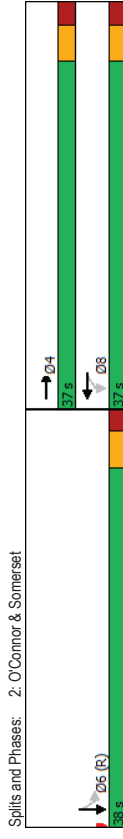
2029 Future Total AM Peak Hour
311 Somerset STW

	EBT	WBL	WBT	SBT
Lane Configurations	1	4	4	4
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	8	6
Permitted Phases	4	8	8	6
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	0.0
Total Lost Time (s)	5.5	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 Effr Green (s)	31.5	31.5	31.5	32.6
Actuated g/C Ratio	0.42	0.42	0.42	0.43
v/c Ratio	0.45	0.38	0.48	0.48
Control Delay	16.6	23.8	16.1	16.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.6	23.8	16.1	16.1
LOS	B	C	B	B
Approach Delay	16.6	23.8	16.1	16.1
Approach LOS	B	C	B	B
Queue Length 50th (m)	15.0	28.4	32.7	32.7
Queue Length 95th (m)	40.5	m46.2	46.6	46.6
Internal Link Dist (m)	160.8	155.7	33.6	33.6
Turn Bay Length (m)				
Base Capacity (vph)	678	626	1382	1382
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.45	0.38	0.48	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				

Lanes, Volumes, Timings
2: O'Connor & Somerset

2029 Future Total AM Peak Hour
311 Somerset STW

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



Lanes, Volumes, Timings
3: Metcalfe & Somerset

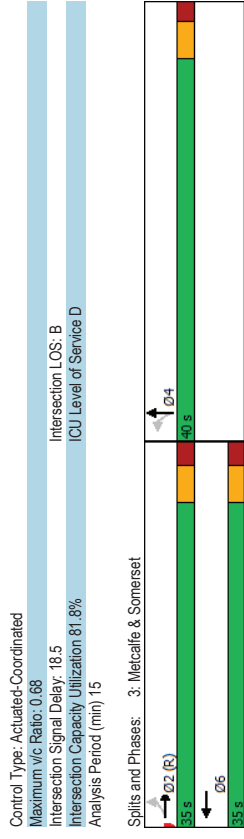
2029 Future Total AM Peak Hour
311 Somerset SW

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	2	6	4
Permitted Phases	2	2	6	4
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	0.0
Total Lost Time (s)	5.5	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 Effr Green (s)	29.5	29.5	29.5	34.8
Actuated G/C Ratio	0.39	0.39	0.46	0.46
v/c Ratio	0.59	0.57	0.68	0.68
Control Delay	18.4	22.2	17.6	17.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.4	22.2	17.6	17.6
LOS	B	C	B	B
Approach Delay	18.4	22.2	17.6	17.6
Approach LOS	B	C	B	B
Queue Length 50th (m)	20.7	34.3	51.5	51.5
Queue Length 95th (m)	42.1	59.0	66.6	66.6
Internal Link Dist (m)	155.7	145.3	134.2	134.2
Turn Bay Length (m)				
Base Capacity (vph)	420	571	1994	1994
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.59	0.57	0.68	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	

Lanes, Volumes, Timings
3: Metcalfe & Somerset

2029 Future Total AM Peak Hour
311 Somerset SW



Lanes, Volumes, Timings
4: O'Connor & Gilmour

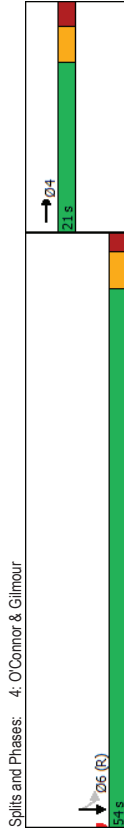
2029 Future Total AM Peak Hour
4: O'Connor & Gilmour

311 Somerset St W

311 Somerset St W

	EBT	SBT
Lane Group	EBT	SBT
Lane Configurations	↔	↔
Traffic Volume (vph)	63	752
Future Volume (vph)	63	752
Lane Volume Flow (vph)	131	828
Turn Type	NA	NA
Protected Phases	4	6
Permitted Phases	4	6
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 Effr 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 SBT _L , 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%
Analysis Period (min): 15



2029 Future Total AM Peak Hour
 311 Somerset St W
 HCM 6th TWSC
 5: O'Connor & Site Access

Intersection	EBL	EBR	NBL	NBT	SBR	SBR
Int Delay, s/veh	0.2					
Movement	0	12	0	0	630	6
Lane Configurations	f					
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	Minor2	Major2	Major2	-	0
Conflicting Flow All	-	318	-	-	-	-
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	EB	SB	SB	-	-
HCM Control Delay, s	10.4	-	-	-	0	-
HCM LOS	B	B	-	-	-	-
Minor Lane/Major Mvmt	EBLn1	SBR	SBR	SBR	-	-
Capacity (veh/h)	678	-	-	-	-	-
HCM Lane V/C Ratio	0.018	-	-	-	-	-
HCM Control Delay (s)	10.4	-	-	-	-	-
HCM Lane LOS	B	-	-	-	-	-
HCM 95th %ile Q(veh)	0.1	-	-	-	-	-

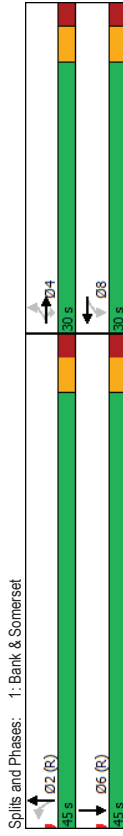
2029 Future Total PM Peak Hour
 311 Somerset St W
 Lanes, Volumes, Timings
 1: Bank & Somerset

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations	f							
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							
Permitted Phases	4							
Detector Phase	4							
Switch Phase	4							
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	0.0	0.0
Total Lost Time (s)	5.5	5.5	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 Effrt Green (s)	24.5	24.5	24.5	24.5	24.5	39.5	39.5	39.5
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.53	0.53	0.53
v/c Ratio	0.61	0.27	0.26	0.47	0.37	0.43	0.43	0.43
Control Delay	27.2	21.0	14.6	15.9	12.0	12.9	12.0	12.9
Queue Delay	0.0	0.0	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	12.0	12.9
LOS	C	C	B	B	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	23.8	29.9
Queue Length 95th (m)	62.2	22.2	m6.0	m31.8	39.8	49.0	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	842	857
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.27	0.26	0.47	0.37	0.43	0.37	0.43
Intersection Summary								
Cycle Length: 75								
Actuated Cycle Length: 75								
Offset: 71 (95%), Referenced to phase 2:NBLT and 6:SBT, Start of Green								
Natural Cycle: 55								

Lanes, Volumes, Timings
1: Bank & Somerset

2029 Future Total PM Peak Hour
311 Somerset STW

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

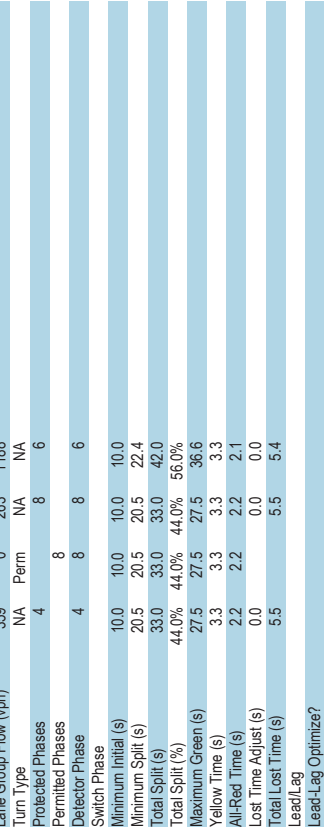


Splits and Phases: 1: Bank & Somerset

Lanes, Volumes, Timings
2: O'Connor & Somerset

2029 Future Total PM Peak Hour
311 Somerset STW

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



Lane Group	EBT	WBL	WBT	SBT
Lane Configurations	T	T	T	T
Traffic Volume (vph)	192	74	189	1041
Future Volume (vph)	192	74	189	1041
Lane Group Flow (vph)	359	0	283	1188
Turn Type	NA	Perm	NA	NA
Protected Phases	4	8	8	6
Permitted Phases	8	8	8	6
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	0.0
Total Lost Time (s)	5.5	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	27.5	36.6
Actuated g/C Ratio	0.37	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	

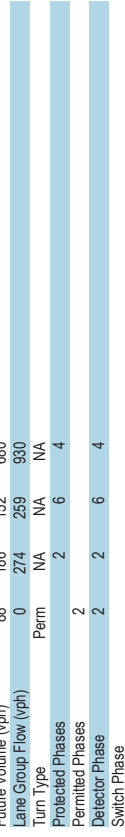
Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 58 (77%), Referenced to phase 2; and 6:SBTL, Start of Green	
Natural Cycle: 55	

Lanes, Volumes, Timings
2: O'Connor & Somerset

Lanes, Volumes, Timings
3: Metcalfe & Somerset

Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 24.6
 Intersection Capacity Utilization 92.5%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service F



Splits and Phases: 2: O'Connor & Somerset

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	2	6	4
Permitted Phases	2	2	6	4
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	0.0
Total Lost Time (s)	5.5	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 Effr Green (s)	29.5	29.5	29.5	34.8
v/c Ratio	0.39	0.39	0.46	0.46
Control Delay	20.1	18.6	13.8	13.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.1	18.6	13.8	13.8
LOS	C	B	B	B
Approach Delay	20.1	18.6	13.8	13.8
Approach LOS	C	B	B	B
Queue Length 50th (m)	21.0	24.2	29.0	29.0
Queue Length 95th (m)	m41.7	43.5	39.5	39.5
Internal Link Dist (m)	155.7	145.3	134.2	134.2
Turn Bay Length (m)				
Base Capacity (vph)	523	572	1864	1864
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.52	0.45	0.50	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	

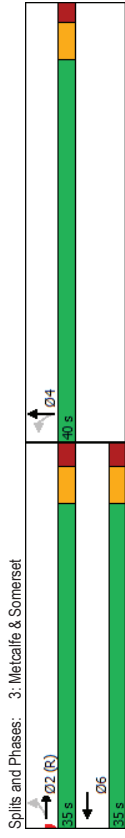
05-31-2022 JK

05-31-2022 JK

3: Metcalfe & Somerset

2029 Future Total PM Peak Hour
311 Somerset STW

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



Splits and Phases: 3: Metcalfe & Somerset

4: O'Connor & Gilmour

2029 Future Total PM Peak Hour
311 Somerset STW

	EBT	SBT
Lane Group	EBT	SBT
Lane Configurations	TB	RT
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	4	6
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 Effort 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		

Lanes, Volumes, Timings
4: O'Connor & Gilmour

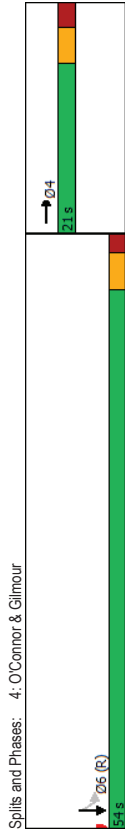
HCM 2010 TWSC
5: O'Connor & Site Access

2029 Future Total PM Peak Hour

311 Somerset St W

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 8.9
Intersection Capacity Utilization 68.3%
Analysis Period (min) 15

Intersection 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	-
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	Minor2	Major2
Conflicting Flow All	-	589	-
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

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: <i>Non-residential developments</i>		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	<input type="checkbox"/>
1.2 Travel surveys		
BETTER	1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>
2.2 Bicycle skills training		
<i>Commuter travel</i>		
BETTER ★	2.2.1 Offer on-site cycling courses for commuters, or subsidize off-site courses	<input type="checkbox"/>
2.3 Valet bike parking		
<i>Visitor travel</i>		
BETTER	2.3.1 Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games)	<input type="checkbox"/>

TDM measures: <i>Non-residential developments</i>		Check if proposed & add descriptions
3. TRANSIT		
3.1 Transit information		
BASIC	3.1.1 Display relevant transit schedules and route maps at entrances	<input type="checkbox"/>
BASIC	3.1.2 Provide online links to OC Transpo and STO information	<input checked="" type="checkbox"/>
BETTER	3.1.3 Provide real-time arrival information display at entrances	<input type="checkbox"/>
3.2 Transit fare incentives		
<i>Commuter travel</i>		
BETTER	3.2.1 Offer preloaded PRESTO cards to encourage commuters to use transit	<input type="checkbox"/>
BETTER ★	3.2.2 Subsidize or reimburse monthly transit pass purchases by employees	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	3.2.3 Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	<input type="checkbox"/>
3.3 Enhanced public transit service		
<i>Commuter travel</i>		
BETTER	3.3.1 Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends)	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	3.3.2 Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	<input type="checkbox"/>
3.4 Private transit service		
<i>Commuter travel</i>		
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)	<input type="checkbox"/>
<i>Visitor travel</i>		
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)	<input type="checkbox"/>

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

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

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	<input checked="" type="checkbox"/>
1.2 Travel surveys		
BETTER	1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	<input type="checkbox"/>
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)	<input checked="" type="checkbox"/>
2.2 Bicycle skills training		
BETTER	2.2.1 Offer on-site cycling courses for residents, or subsidize off-site courses	<input type="checkbox"/>

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)	<input checked="" type="checkbox"/>
BETTER	3.1.2 Provide real-time arrival information display at entrances (multi-family, condominium)	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>
BETTER	3.2.2 Offer at least one year of free monthly transit passes on residence purchase/move-in	<input type="checkbox"/>
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)	<input type="checkbox"/>
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)	<input type="checkbox"/>
4. CARSHARING & BIKESHARING		
4.1 Bikeshare stations & memberships		
BETTER	4.1.1 Contract with provider to install on-site bikeshare station (multi-family)	<input type="checkbox"/>
BETTER	4.1.2 Provide residents with bikeshare memberships, either free or subsidized (multi-family)	<input type="checkbox"/>
4.2 Carshare vehicles & memberships		
BETTER	4.2.1 Contract with provider to install on-site carshare vehicles and promote their use by residents	<input type="checkbox"/>
BETTER	4.2.2 Provide residents with carshare memberships, either free or subsidized	<input type="checkbox"/>
5. PARKING		
5.1 Priced parking		
BASIC	5.1.1 Unbundle parking cost from purchase price (condominium)	<input checked="" type="checkbox"/>
BASIC	5.1.2 Unbundle parking cost from monthly rent (multi-family)	<input checked="" type="checkbox"/>

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 package to new residents	<input checked="" type="checkbox"/>
6.2 Personalized trip planning		
BETTER ★	6.2.1 Offer personalized trip planning to new residents	<input type="checkbox"/>

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	<input checked="" type="checkbox"/>
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	<input checked="" type="checkbox"/>
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	<input checked="" type="checkbox"/>
1.2 Facilities for walking & cycling		
REQUIRED	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see <i>Official Plan policy 4.3.3</i>)	<input type="checkbox"/>
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 <i>Official Plan policy 4.3.12</i>)	<input checked="" type="checkbox"/>

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

TDM-supportive design & infrastructure measures: 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 <i>Official Plan policy 4.3.6</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions, that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
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	<input type="checkbox"/>
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	<input type="checkbox"/>
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 <i>Zoning By-law Section 111</i>)	<input type="checkbox"/>
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)	<input type="checkbox"/>
2.3 Shower & change facilities		
BASIC	2.3.1 Provide shower and change facilities for the use of active commuters	<input type="checkbox"/>
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	<input type="checkbox"/>
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)	<input type="checkbox"/>

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	<input type="checkbox"/>
BASIC	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	<input type="checkbox"/>
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	<input type="checkbox"/>
4. RIDESHARING		
4.1 Pick-up & drop-off facilities		
BASIC	4.1.1 Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	<input type="checkbox"/>
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	<input type="checkbox"/>
BETTER	4.2.2 At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	<input type="checkbox"/>
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)	<input type="checkbox"/>
5.2 Bikeshare station location		
BETTER	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	<input type="checkbox"/>

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	<input checked="" type="checkbox"/>
BASIC	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	<input type="checkbox"/>
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (see Zoning By-law Section 104)	<input type="checkbox"/>
BETTER	6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking (see Zoning By-law Section 111)	<input type="checkbox"/>
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)	<input type="checkbox"/>
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	<input type="checkbox"/>

**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	<input checked="" type="checkbox"/>
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	<input checked="" type="checkbox"/>
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	<input checked="" type="checkbox"/>
1.2 Facilities for walking & cycling		
REQUIRED	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see <i>Official Plan policy 4.3.3</i>)	<input checked="" type="checkbox"/>
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 <i>Official Plan policy 4.3.12</i>)	<input checked="" type="checkbox"/>

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

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

TDM-supportive design & infrastructure measures: 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	<input type="checkbox"/>
5. CARSHARING & BIKESHARING		
5.1 Carshare parking spaces		
BETTER	5.1.1 Provide up to three carshare parking spaces in an R3, R4 or RS Zone for specified residential uses (see <i>Zoning By-law Section 94</i>)	<input type="checkbox"/>
5.2 Bikeshare station location		
BETTER	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	<input type="checkbox"/>
6. PARKING		
6.1 Number of parking spaces		
REQUIRED	6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	<input type="checkbox"/>
BASIC	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	<input type="checkbox"/>
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (see <i>Zoning By-law Section 104</i>)	<input type="checkbox"/>
BETTER	6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking (see <i>Zoning By-law Section 111</i>)	<input type="checkbox"/>
6.2 Separate long-term & short-term parking areas		
BETTER	6.2.1 Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	<input type="checkbox"/>