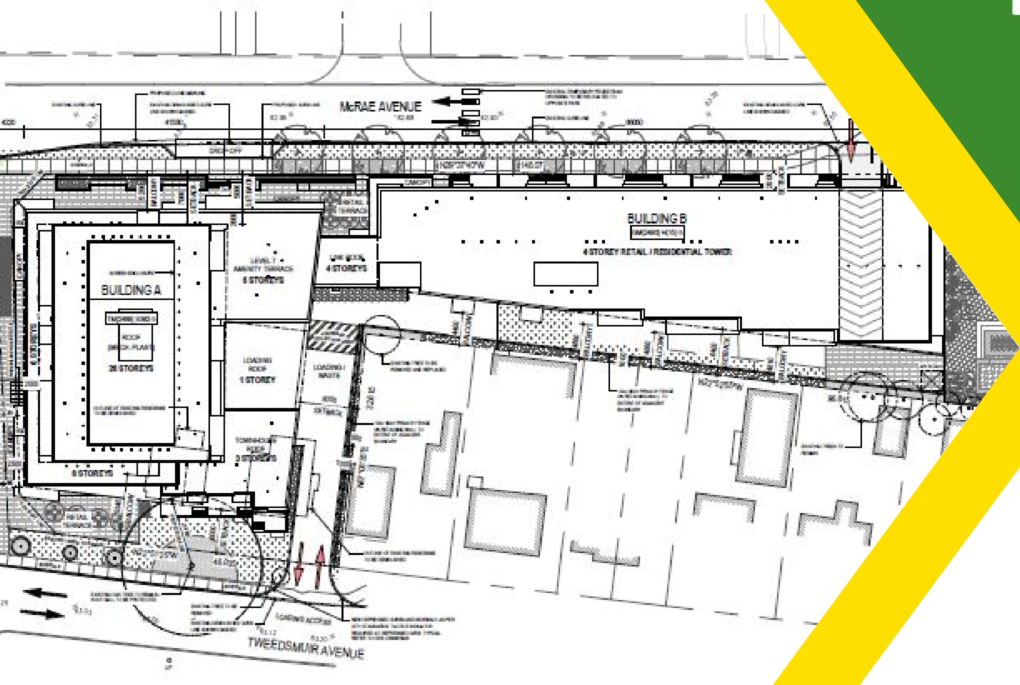
GWL Realty Advisors

320 McRae Ave



Transportation Impact Study

CGH TRANSPORTATION

320 McRae

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report

Prepared for:

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September 2020

PN: 2019-29

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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 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 has been prepared to support a site plan application for 320 McRae Avenue.

2 Existing and Planned Conditions

2.1 Proposed Development

The proposed development located at 320 McRae Avenue is currently a mix of residential and commercial buildings. The site is in an area that is zoned as part Traditional Mainstreet (TM 2489 S382-h), part Parks and Open Space (O 1) and part General Mixed Zone (GM2490 H (15) h). The proposed development is within 400 metres of the future Westboro LRT Station to be built by 2025 and therefore TOD principles apply to the applicable future horizons.

The proposed development is made up of a four-storey commercial / residential tower, and a commercial / residential tower with both a 26-storey and a six-storey component. The development is expected to have 820 square metres (8,826 square feet) of commercial space, 325 apartment units, 11 townhouse units, 183 underground automobile parking spaces and 187 bicycle parking spaces. Of the 187 bicycle spaces, 177 will be on the ground floor as well as underground, and 10 bicycle parking spaces will be outside and located along McRae Avenue and Scott Street. The site is proposed to have two full-movement accesses, one approximately 50 metres, intersection centreline to intersection centreline, south of Scott Street on Tweedsmuir Avenue (Site Access #1) and the second approximately 130 metres, intersection centreline to intersection centreline, south of Scott Street on McRae Avenue (Site Access #2). Site Access #1 is a loading access and is intended for truck use only. A drop-off area is located on McRae Avenue, approximately 23 metres, curb to curb, south of Scott Street. The anticipated full build-out and occupancy horizon is 2022. Figure 1 illustrates the Study Area Context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan

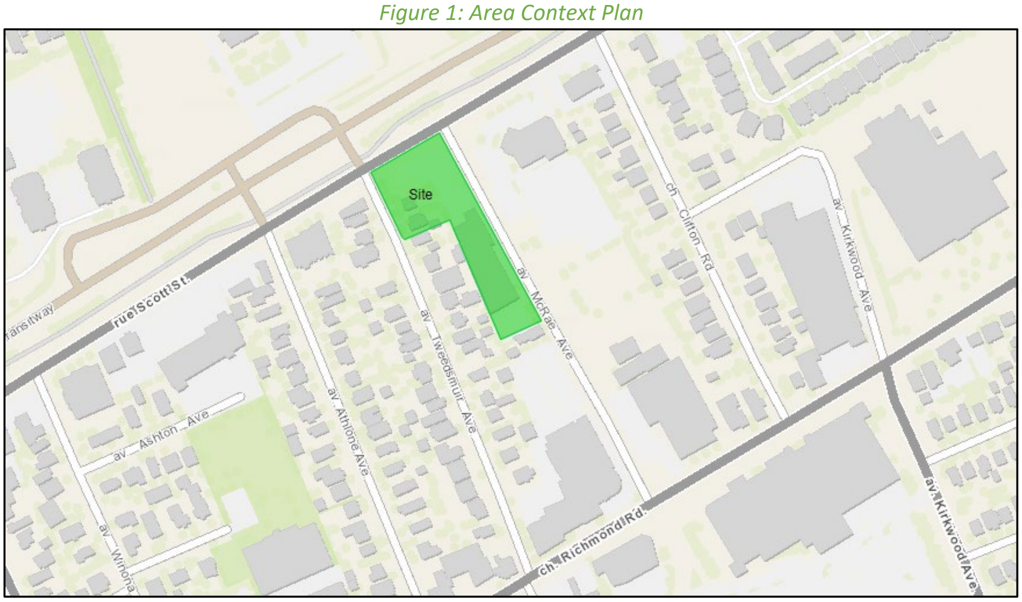
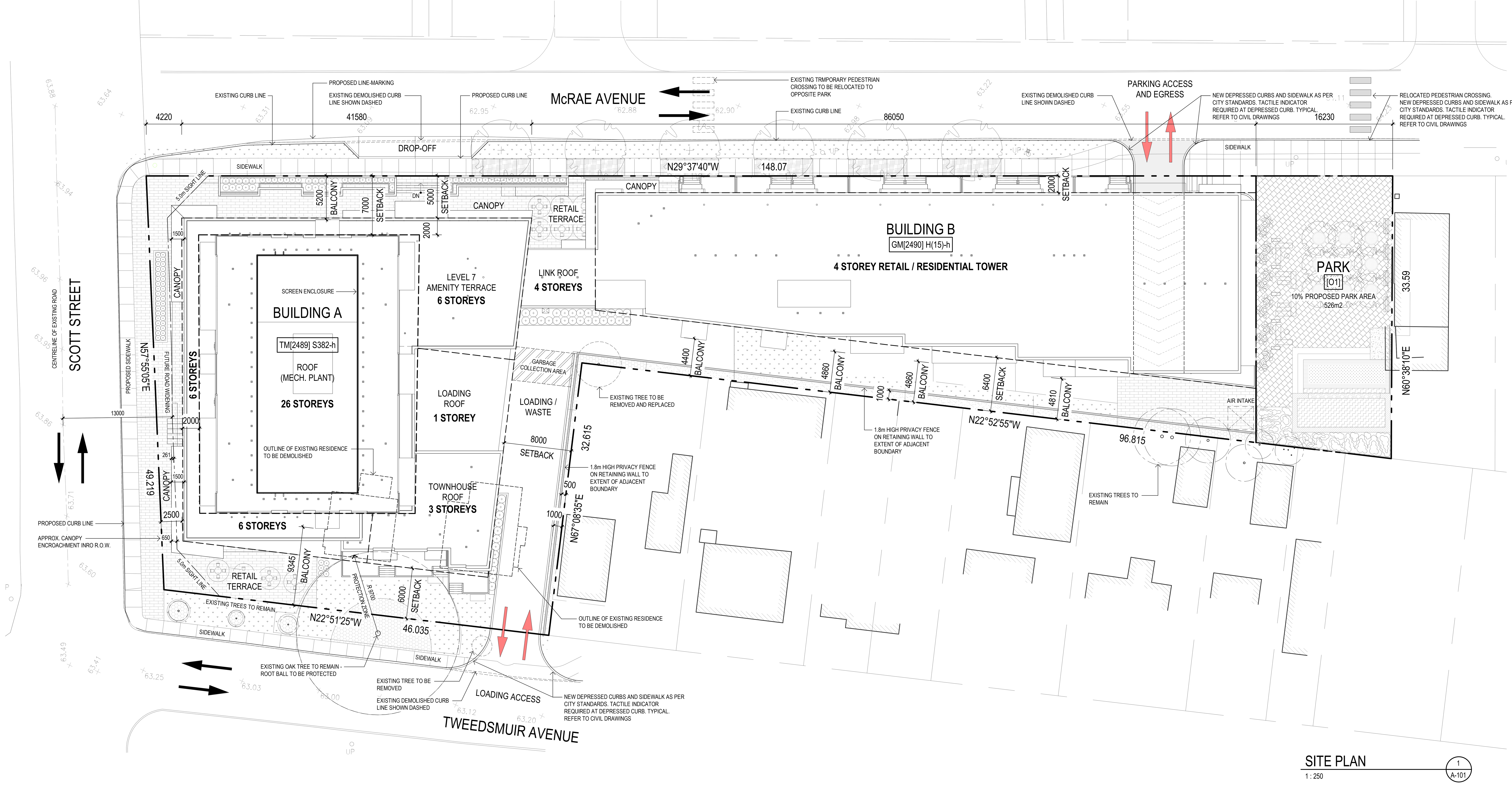


Figure 2: Concept Plan



PROJECT INFORMATION	
ZONING	TM[2489] S382-h
	GM[2490] H(15)-h
	O1
SITE AREA	5260m2
BUILDING HEIGHT (TM[2489] S382-h)	78m
BUILDING HEIGHT (GM[2490] H(15)-h)	15m
FLOOR SPACE INDEX	
SETBACKS (TM[2489] S382-h)	PER SCHEDULE 382
SETBACKS (GM[2490] H(15)-h)	
FRONT	2.0m
REAR	6.4m
INTERIOR YARD	1.2m
INTERIOR YARD (ABUTTING PARK)	0.0m

320 McRAE AVENUE, OTTAWA

PROJECT STATISTICS

PROJECT STATISTICS	
SCOTT STREET BUILDING	
BUILDING HEIGHT	79.75m
FRONT YARD SETBACK	VARIES
CORNER SIDE YARD SETBACK (McRAE AVENUE)	5.0m-7.0m
CORNER SIDE YARD SETBACK (TWEEDSMUIR AVENUE)	6.0m
REAR YARD SETBACK	8.0m
McRAE AVENUE BUILDING	
BUILDING HEIGHT	13.6m
FRONT YARD SETBACK	2.0m
SIDE YARD SETBACK (PARK)	0.0m
SIDE YARD SETBACK	0.0m
REAR YARD SETBACK	6.4m
TWEEDSMUIR AVENUE BUILDING	
BUILDING HEIGHT	10.4m
FRONT YARD SETBACK	6.0m
SIDE YARD SETBACK	8.0m
LANDSCAPE OPEN SPACE	
DRIVING SURFACE	300m2 (6%)
BUILDING FOOTPRINT	2958m2 (56%)
PROPOSED PARK AREA	526m2 (10%)
LANDSCAPE OPEN SPACE	1476m2 (28%)
TOTAL	5260m2 (100%)

BUILDING STATISTICS

GROSS FLOOR AREA (CITY OF OTTAWA DEFINITION)		
SCOTT STREET BUILDING		
GROUND FLOOR		678 m2
LEVEL 2		1025 m2
LEVEL 3		1089 m2
LEVEL 4		938 m2
LEVELS 5 & 6	(943m2 x 2)	1886 m2
LEVEL 7 *(AMENITY)*		-
LEVELS 8-23	(568m2 x 16)	9088 m2
LEVELS 24-26	(519m2 x 3)	1557 m2
TOTAL		16,261 m2
McRAE AVENUE BUILDING (INC. LINK)		
GROUND FLOOR		1007 m2
LEVEL 2		1178 m2
LEVEL 3		1149 m2
LEVEL 4		1149 m2
TOTAL		4,483 m2
PROJECT TOTAL (INC. COMMERCIAL)		**20,744** m2
(COMMERCIAL / RETAIL)		820 m2

UNIT STATISTICS	
SCOTT STREET BUILDING	
STUDIO	50
1 BED	158
2 BED	55
3 BED	7
GUEST SUITE	2
TOWNHOUSE	3
TOTAL	275
McRAE AVENUE BUILDING	
STUDIO	6
1 BED	28
2 BED	19
3 BED	0
TOWNHOUSE	8
TOTAL	61
PROJECT TOTAL	**336**

PARKING	
CAR PARKING	
REQUIRED	
RESIDENCE *(0.5 PER UNIT AFTER 12 UNITS)*	162
-10% (Section 101(6)(c) of the Zoning By-law)	(-16)
COMMERCIAL *(1.25 PER 100m2 OF GFA)*	0
AFTER 500m2 OF GFA PER UNIT	
VISITOR *(0.1 SPACES/DWELLING UNIT)*	30
TO A MAXIMUM OF 30 SPACES	
TOTAL	176
TOTAL PARKING SPACES PROVIDED	183
BICYCLE PARKING	
REQUIRED	
RESIDENCE *(0.5 SPACES/DWELLING UNIT)*	168
COMMERCIAL *(1 SPACE/250m2 GFA)*	4
TOTAL	172
TOTAL BICYCLE PARKING SPACES PROVIDED	187
(INC. 10 EXTERIOR SPACES)	

AMENITY	
REQUIRED	
TOTAL AMENITY: 336 UNITS x 6m2	2016m2
MIN. 50% COMMUNAL AREA	1008m2
PROVIDED	
PRIVATE TERRACE/BALCONIES TOTAL	2213m2
SCOTT STREET BULDING COMMUNAL	
LEVEL 7 - INTERIOR	440m2
LEVEL 7 - EXTERIOR	581m2
TOTAL COMMUNAL SPACE PROVIDED	1021m2
TOTAL AMENITY PROVIDED	3234m2

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ARCHITECT(E)S
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SHEET PRINT DATE: 2020-09-23 4:18:46 PM

CLIENT Client

GWL REALTY ADVISORS

OUVRAGE Project

320 McRAE AVENUE

EMPLACEMENT Location
1976 SCOTT ST & 320 McRAE AVE
OTTAWA, ON

NO PROJET No.
12087

NO	REVISION	DATE
	SITE PLAN APPROVAL	2020 03 20
1.6	SITE PLAN APPROVAL RESUBMISSION	2020 09 23

Preliminary
DO NOT USE FOR CONSTRUCTION

DESSINÉ PAR Drawn by: DH
VÉRIFIÉ PAR Checked: HG
DATE: 20/03/20
ÉCHELLE Scale: 1 : 250

TITRE DU DESSIN Drawing Title

SITE PLAN & PROJECT INFORMATION

RÉVISION Revision: 1.6
NO. DESSIN Dwg Number: A-101

D07-12-20-0035

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2.2 Existing Conditions

2.2.1 Area Road Network

Scott Street: Scott Street is a City of Ottawa arterial road with a two-lane cross-section and has a posted speed limit of 50 km/h. Scott Street primarily has curbs and gutters on the south side of the road and has a gravel shoulder on the north side. Intermittent parking lanes exist on the south side of the street. Bicycle lanes are present on both sides of the road. The south side has a sidewalk and the north side has a pedestrian asphalt pathway. The existing right-of-way is 26.0 metres. Scott Street is a designated as a truck route (full loads).

McRae Avenue: McRae Avenue is a local road with a two-lane cross-section. There is an unposted speed limit of 50 km/h. McRae Avenue has curbs and gutters, as well as sidewalks on both sides of the road. The measured right-of-way is 17.0 metres to the south of Scott Street and gradually narrows to 16.0 metres just north of Richmond Road. McRae Avenue is a designated truck route (restricted loads).

Richmond Road: Richmond Road is a City of Ottawa arterial road with a four-lane cross-section and on-street parking allowed on both sides. Within the Study Area, Richmond Road has curbs and gutters as well as sidewalks on both sides of the street. The posted speed limit is 50 km/h. The measured existing right-of-way within the Study Area varies between 15.0 metres and 21.0 metres. Richmond Road is designated as a full trucking route.

Tweedsmuir Avenue: Tweedsmuir Avenue is a local road with a two-lane cross-section. There is an unposted speed limit of 50 km/h. Tweedsmuir Avenue has curbs and gutters, as well as a sidewalk on the east side of the road. There is on-street parking allowed on both the east and west side. The measured right-of-way is 18.0 metres.

2.2.2 Existing Intersections

Scott Street / Tweedsmuir Avenue

The intersection at Scott Street / Tweedsmuir Avenue is a two-way stop-controlled intersection with stop control on the north and south legs. Directly to the east of this intersection, on Scott Street, is a signalized pedestrian crossing that will be considered part of the intersection. The northern leg does not allow vehicle entry as it is a driveway for buses entering and exiting Westboro Station. The intersection is therefore subject to the appropriate passenger vehicle movement restrictions; no eastbound left-turn, westbound right-turn or northbound through movements. The westbound approach consists of a shared left-turn/through/right-turn lane, the eastbound approach is made up of a shared left-turn/through/right-turn lane and the northbound approach consists of a shared left-turn/through/right-turn lane. Trucks are not permitted south of the intersection along Tweedsmuir Avenue.

Scott Street / McRae Avenue

The intersection at Scott Street / McRae Avenue is an unsignalized T-intersection. The northbound movement on McRae Avenue is stop-controlled and is a shared left-turn/right-turn lane. The eastbound movement is a shared through/right-turn lane and the westbound movement is a shared through/left-turn lane. No turn restrictions were noted.

Richmond Road / Tweedsmuir Avenue

The intersection at Richmond Road / Tweedsmuir Avenue is an unsignalized intersection. Both the northbound and southbound movements are stop-controlled, shared left-turn/through/right-turn lanes. The eastbound movement consists of a shared left-turn/through/right-turn lane and the westbound movement consists of a shared left-turn/through lane and a right-turn lane. No turn restrictions were noted.

Richmond Road / McRae Avenue

The intersection at Richmond Road / McRae Avenue is a signalized intersection. The northbound and westbound movements both have auxiliary left-turn lanes and a shared through/right-turn lane. The eastbound movement has an auxiliary left-turn lane and a shared through/right-turn lane. The southbound movement is a shared left-turn/through/right-turn movement. No turn restrictions were noted.

2.2.3 Existing Driveways

Within 200 metres of the proposed site access there are multiple existing driveways along Tweedsmuir Avenue, Scott Street, and McRae Avenue. Tweedsmuir Avenue has multiple residential driveways on both sides of the road and McRae Avenue has multiple office, residential and retail driveways on both sides of the road. The primary driveway along Scott Street within 200 metres of the proposed site is the bus entrance and exit to the Westboro Station which is just north of the proposed site.

The north and South Driveways to 319 McRae Avenue are expected to generate significant traffic Both the north and south driveways situated on the east side of McRae Avenue, which provide a connection to 319 McRae Avenue, are considered to have a two-lane cross-section and an unposted speed-limit of 30km/h. The north driveway to 319 McRae is located approximately 65 metres north of Site Access #2, measured intersection centreline to intersection centreline, and the south driveway to 319 McRae is located approximately 35 metres south of Site Access #2, measured intersection centreline to intersection centreline. 319 McRae Avenue is a mixed-use development with 146 residential units, 32,023 ft^2 of retail and 86,589 ft^2 of office space, and 290 vehicle parking spaces.

None of the other driveways provide access to significant traffic generators and would therefore have no impact on this TIA.

2.2.4 Cycling and Pedestrian Facilities

Sidewalks are provided along one side of Scott Street and Tweedsmuir Avenue in the Study Area. Additionally, a multi-use pathway is provided on the other side of Scott Street. Sidewalks are provided along both sides of Richmond Road and McRae Avenue. The cycling network consists of bike lanes on Scott Street, a pathway just north of Scott Street and a suggested spine route along Richmond Road and Scott Street. Figure 3 illustrates the pedestrian facilities in the Study Area and Figure 4 illustrates the cycling facilities.

Figure 3: Study Area Pedestrian Facilities

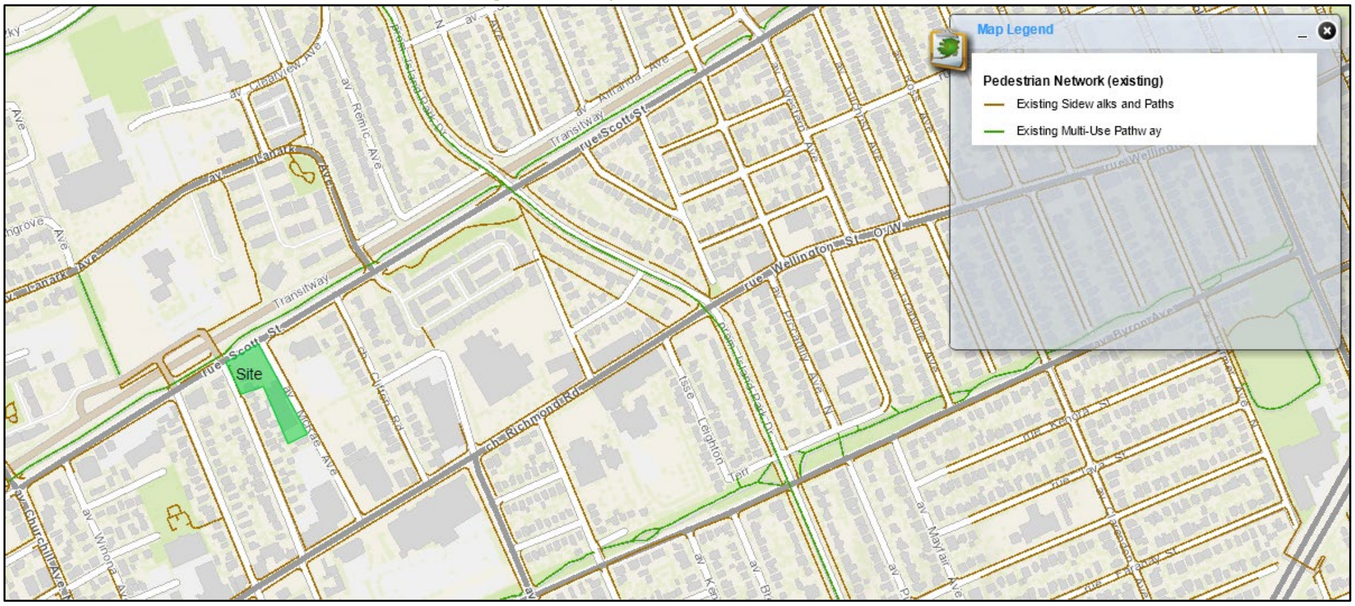
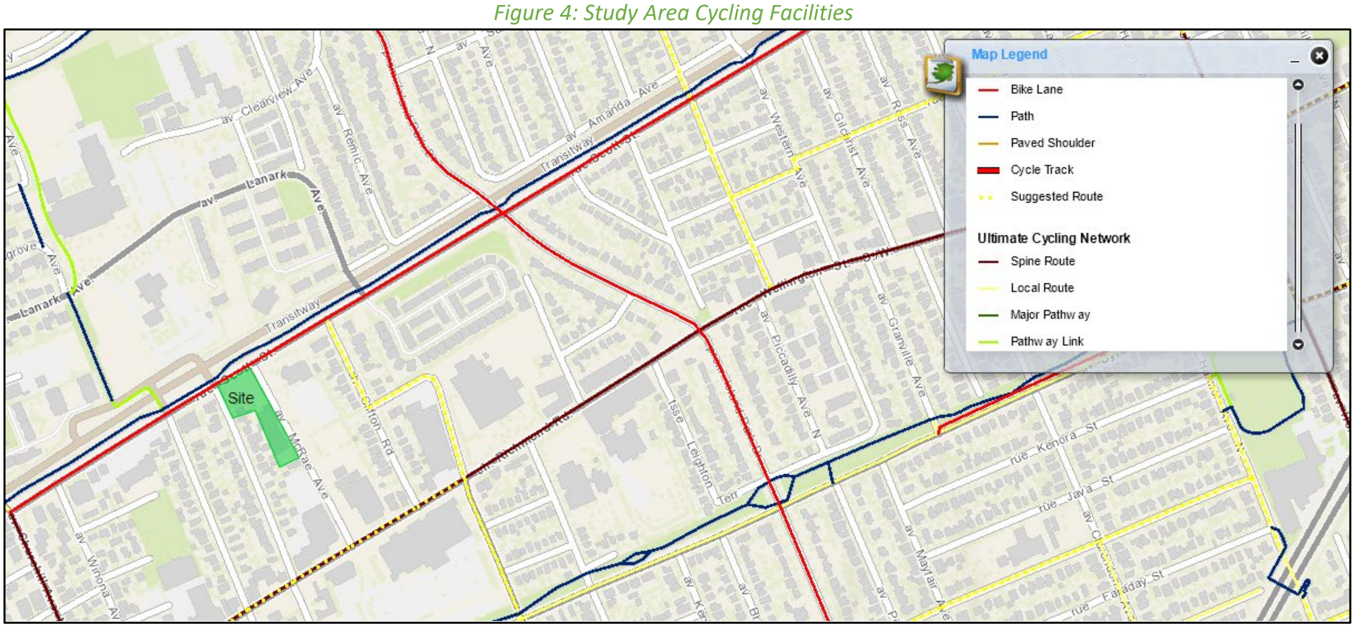


Figure 4: Study Area Cycling Facilities



2.2.5 Existing Transit

Within the Study Area, Route #11 has two stops at the intersection of McRae Avenue and Richmond Road. The stop on the northeast corner is also shared by Routes #81 and 153. Along McRae Avenue three stops are shared by Routes #81 and 153.

The frequencies of these routes within the proximity of the proposed site currently are:

- Route #11— every 15 minutes from AM to PM weekday peak hours and mid-day weekend peak hours, and 30 minutes in the off-peak times
- Route #50— every 15 minutes in the peak direction, and 30 minutes in the off-peak direction, off-peak times and Saturdays with no operation on Sundays

- Route #81— every 15-20 minutes in the peak direction, and 30 minutes in the off-peak direction, off-peak times and Saturdays with no operation on Sundays
- Route #153— every two hours from approximately 11AM to 6PM

Additionally, the Westboro Rapid Route station is located approximately 50 metres northwest of the development. This station is part of the Transitway.

Figure 5 illustrates the transit system map and summarizes the route information for Westboro Station. Figure 6 illustrates the transit stops in the Study Area.

Figure 5: Existing Study Area Transit Service

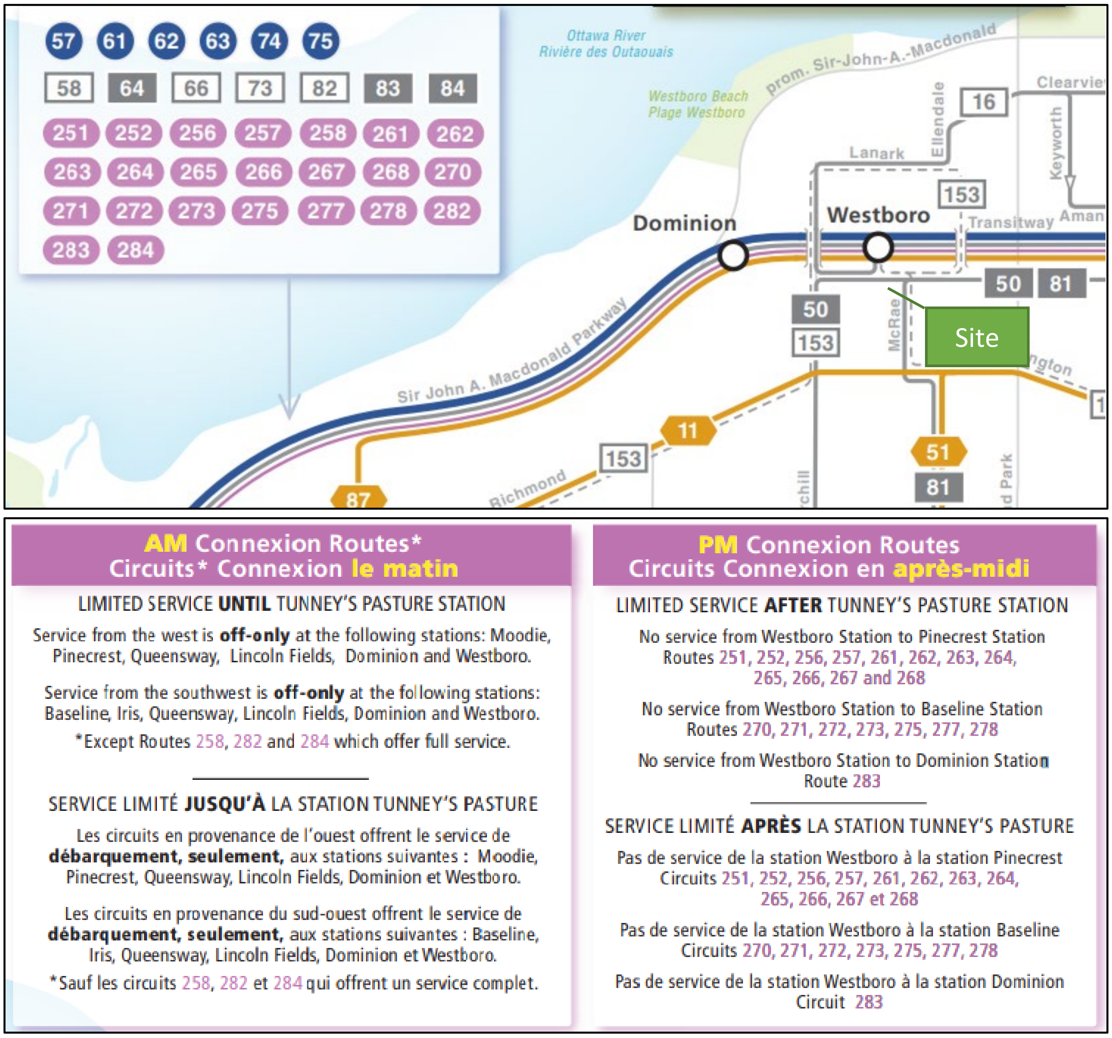
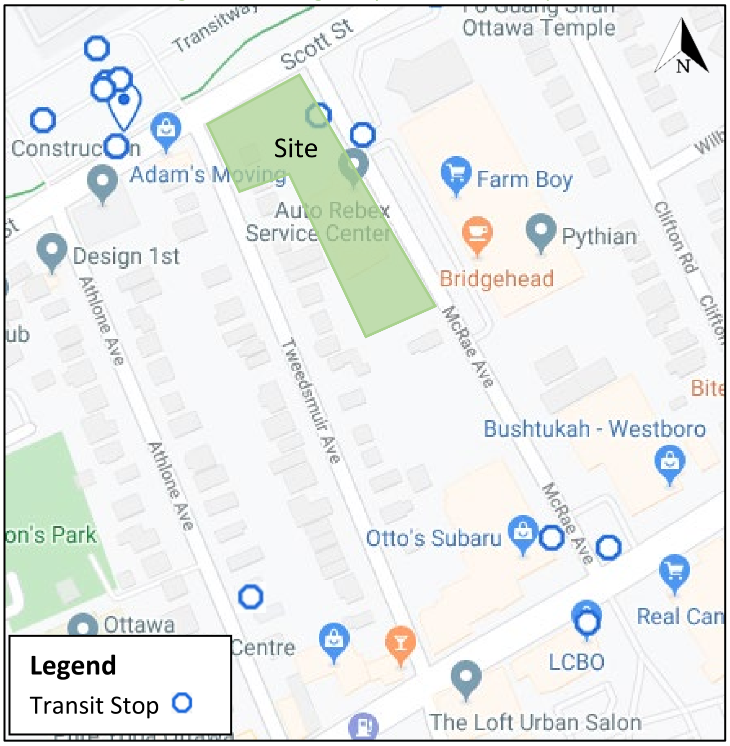


Figure 6: Existing Study Area Transit Stops



2.2.6 Existing Area Traffic Management Measures

Existing traffic management measures within the Study Area take the form of:

- Truck turning restrictions at Scott Street and Tweedsmuir Avenue – no EBR or WBL turns
- Turning restrictions (buses exempt) at Scott Street and Tweedsmuir – no EBL, NBT or WBR turns
- Truck turning restrictions at Richmond Road and Tweedsmuir Avenue – no EBL or WBR turns

2.2.7 Existing Peak Hour Travel Demand

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

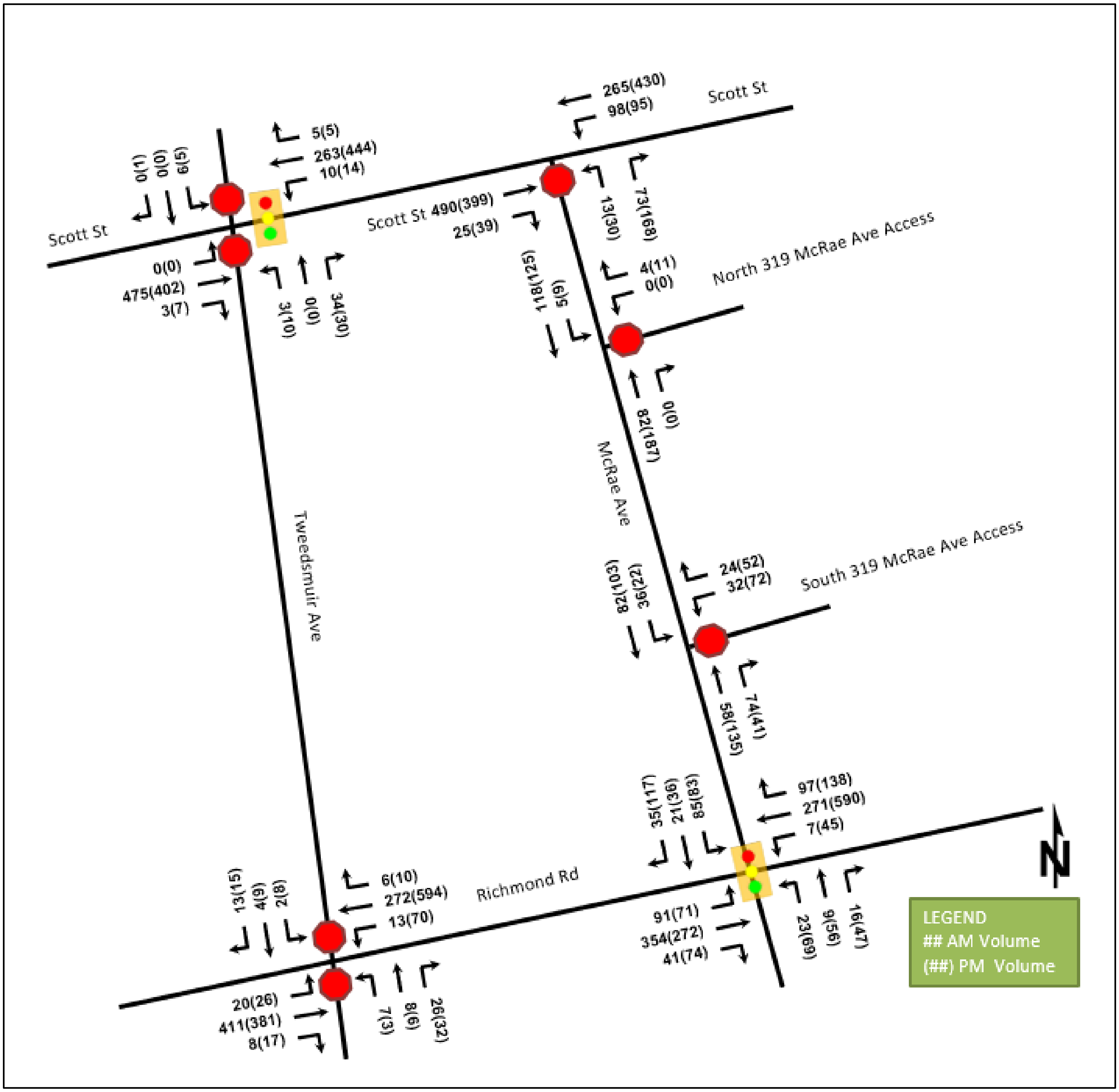
Table 1: Intersection Count Date and Data Sources

Intersection	Count Date	Data Source
Scott Street @ Tweedsmuir Avenue	Thursday July 18, 2019	Traffic Specialists
Scott Street @ McRae Avenue	Thursday July 18, 2019	Traffic Specialists
Richmond Road @ Tweedsmuir Avenue	Thursday July 18, 2019	Traffic Specialists
Richmond Road @ McRae Avenue	Thursday April 20, 2017	City of Ottawa

Additionally, both the north and south driveways of the existing 319 McRae Avenue development will be considered alongside the Study Area intersections identified above. As a result of the COVID-19 pandemic, accurate count information cannot be collected at the two driveways. As such, the projected site-generated volumes at these driveways have been taken from the *319 McRae Avenue – Mixed-Use Development Traffic Impact Study Addendum #3* report.

Figure 7 illustrates the 2019 existing horizon traffic volumes. As shown above, the turning movement count data has been collected over different years. An adjacent area transportation study has used a 2% traffic growth within the Study Area of this report. As such, an annual background growth of 2% will be used in order to remain uniform with that study and produce a consistent horizon year. Detailed turning movement count data, the projected 319 McRae Avenue driveway volumes, and signal timing plans are included in Appendix B.

Figure 7: 2019 Existing Horizon Traffic Volumes



Additionally, the collected intersection counts also provided existing pedestrian and cyclist demands at the four Study Area intersections for both AM and PM peak periods. Figure 8 illustrates the existing pedestrian volumes and Figure 9 illustrates the existing cyclist volumes at the Study Area intersections

Figure 8: Existing Pedestrian Volumes

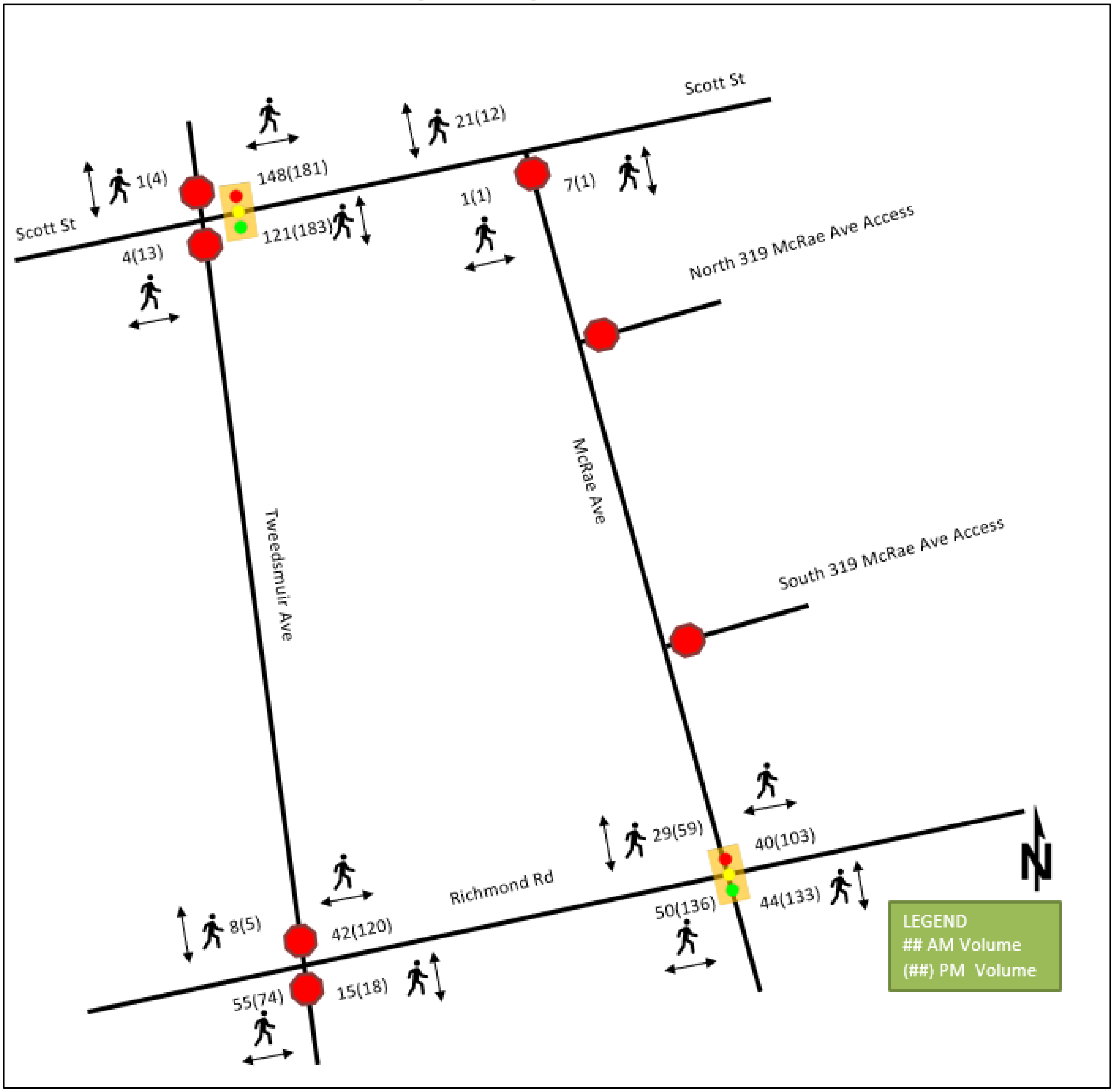
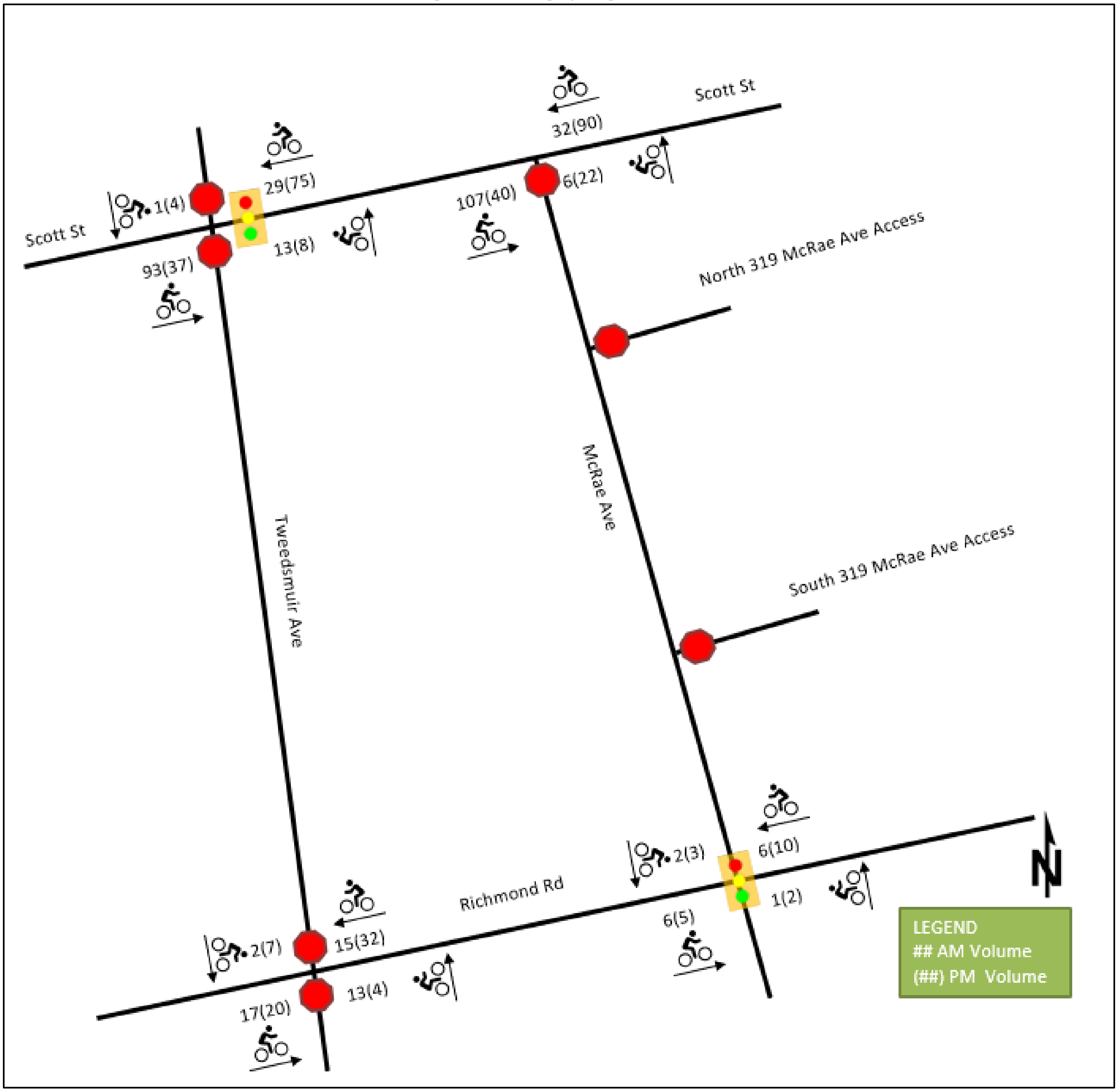


Figure 9: Existing Cycling Volumes



2.2.8 Collision Analysis

Collision data has been acquired from the City of Ottawa for five years prior to the commencement of this TIA at each of the Study Area intersections. Specific attention is directed to the four primary intersections within the Study Area. Figure 10 illustrates the intersections and segments analyzed, and Table 2 summarizes the total collisions for the intersections of interest. Collision data is included in Appendix C.

Figure 10: Study Area Representation of Collision Locations

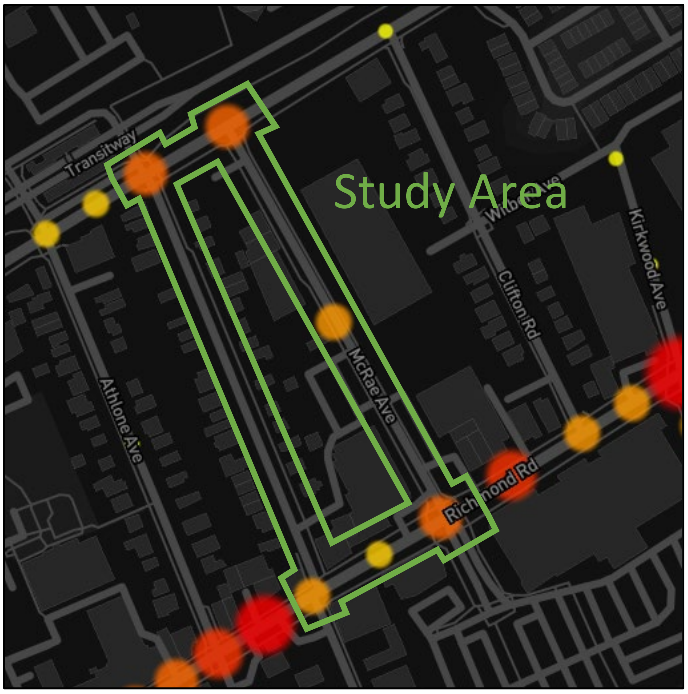


Table 2: Summary of Collision Locations

	Number	%
Intersections / Segments	**27**	**100%**
Scott St @ Tweedsmuir Ave	4	15%
Scott St @ McRae Ave	7	26%
Richmond Rd @ Tweedsmuir Ave	11	41%
Richmond Rd @ McRae Ave	5	18%

Overall, no fatal collisions were documented in the Study Area and a total of 4 collisions were noted involving pedestrians or cyclists. Three of these collisions involved pedestrians, all of which occurred at the intersection of McRae Avenue and Richmond Road. One collision involved a cyclist and it occurred at the intersection of Tweedsmuir Avenue and Richmond Road.

Table 3, Table 4, Table 5, and Table 6 summarize the collision types and conditions of the four intersections of interest within the Study Area on an individual basis.

Scott Street and Tweedsmuir Avenue experienced four collisions between 2013-2017. Three of those collisions resulted in property damage only, while one resulted in a non-fatal injury. Three collisions fall under the Rear End impact type and one falls under the Angle impact type. Weather/road conditions are considered a contributing factor for 25.00% of collisions at this intersection.

Table 3: Scott Street at Tweedsmuir Avenue Collision Summary

Total Collisions		**Number**	**%**
		4	**100.00%**
Classification	Fatality	0	0.00%
	Non-Fatal Injury	1	25.00%
	Property Damage Only	3	75.00%
Initial Impact Type	Angle	1	25.00%

	Rear end	3	75.00%
Road Surface Condition	Dry	3	75.00%
	Wet	1	25.00%
Pedestrian Involved		**0**	**0.00%**
Cyclist Involved		**0**	**0.00%**

Scott Street and McRae Avenue experienced seven collisions between 2013-2017. Six of those collisions resulted in property damage only, while one resulted in a non-fatal injury. Three collisions fall under the Rear End impact type and four fall under the Angle impact type. Weather/road conditions are considered a contributing factor for 14.29% of collisions at this intersection.

Table 4: Scott Street and McRae Collision Summary

Total Collisions		**Number**	**%**
		7	**100.00%**
Classification	Fatality	0	0.00%
	Non-Fatal Injury	1	14.29%
	Property Damage Only	6	85.71%
Initial Impact Type	Angle	4	42.86%
	Rear end	3	42.86%
Road Surface Condition	Dry	6	85.71%
	Wet	1	14.29%
Pedestrian Involved		**0**	**0.00%**
Cyclist Involved		**0**	**0.00%**

Richmond Road and McRae Avenue experienced 11 collisions between 2013-2017. Eight of those collisions resulted in property damage only, while three resulted in non-fatal injuries. The collision impact types vary between Angle, Rear End, Turning Movement, and SMV Other at 9.09%, 54.55%, 9.09%, and 27.27% of the 11 collisions respectively. Weather/road conditions are considered a contributing factor for 45.45% of collisions at this intersection.

Table 5: McRae Avenue and Richmond Road Collision Summary

Total Collisions		**Number**	**%**
		11	**100.00%**
Classification	Fatality	0	0.00%
	Non-Fatal Injury	3	27.27%
	Property Damage Only	8	72.73%
Initial Impact Type	Angle	1	9.09%
	Rear end	6	54.55%
	Turning Movement	1	9.09%
	SMV Other	3	27.27%
Road Surface Condition	Dry	6	54.55%
	Wet	4	36.36%
	Loose Snow	1	9.09%
Pedestrian Involved		**3**	**27.27%**
Cyclist Involved		**0**	**0.00%**

Richmond Road and Tweedsmuir Avenue experienced five collisions between 2013-2017. Three of those collisions resulted in property damage only, while two resulted in non-fatal injuries. The collision impact types vary between Angle, Turning Movement, SMV Unattended Vehicle, and SMV Other at 40.00%, 20.00%, 20.00%, and 20.00% of the five collisions respectively. Weather/road conditions are considered a contributing factor for 60.00% of collisions at this intersection.

Table 6: Tweedsmuir Avenue at Richmond Road Collision Summary

Total Collisions		Number	%
		5	**100.00%**
Classification	Fatality	0	0.00%
	Non-Fatal Injury	2	40.00%
	Property Damage Only	3	60.00%
Initial Impact Type	Angle	2	40.00%
	Turning Movement	1	20.00%
	SMV unattended vehicle	1	20.00%
	SMV Other	1	20.00%
Road Surface Condition	Dry	2	40.00%
	Wet	2	40.00%
	Packed Snow	1	20.00%
Pedestrian Involved		**0**	**0.00%**
Cyclist Involved		**1**	**20.00%**

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

The proposed development is subject to the Richmond Road / Westboro Secondary Plan as well as TOD principles, both of which promote a shift towards more sustainable modes of transportation in the area. These plans are expressed as elements of the Ottawa Official Plan, Ottawa Transportation Master Plan, Ottawa Pedestrian Plan and the Ottawa Cycling Plan. Measures to be implemented include:

- A pedestrian / cycling path along McRae Avenue within the Study Area (unspecified date)
- Pedestrian specific infrastructure improvements (unspecified date)
- Implementation of pedestrian specific safety programming and promotion (unspecified date)
- A cycling spine route along Richmond Road and Scott Street within the Study Area as part of the City of Ottawa Ultimate Cycling Plan

Additionally, as stated by the City of Ottawa, during the construction of the Stage 2 Confederation Line West extension, Scott Street is planned to be used for a Transitway detour between Churchill Avenue and Tunney's Pasture. The detour has been indicated to be in place from late 2021 / early 2022 to the planned completion of the Westboro LRT Station (2025). The main changes to Scott Street within the Study Area as part of the detour are a new sidewalk between Tweedsmuir and McRae Avenue with no on-street parking. The proposed detour plan can be found in Appendix D.

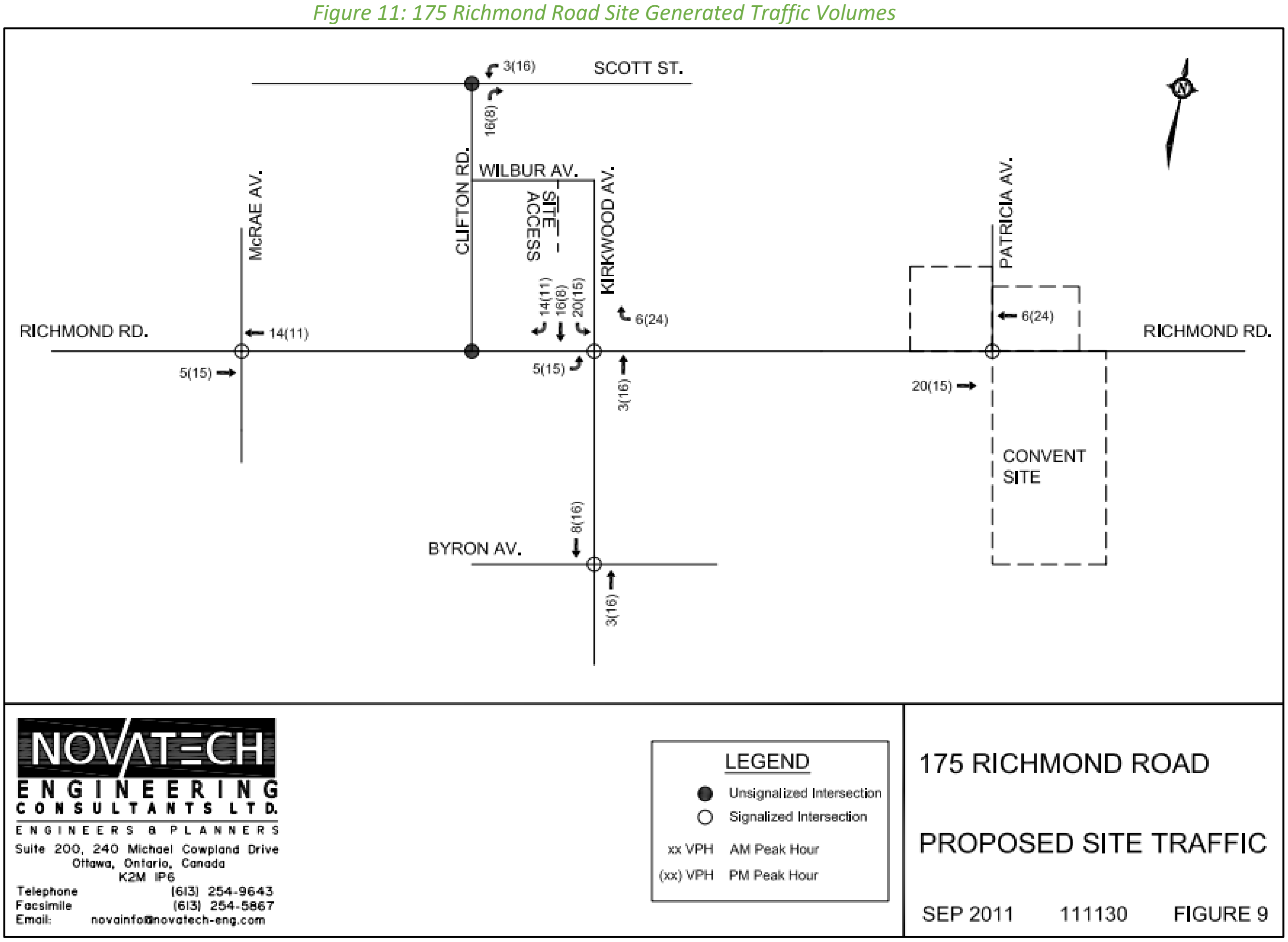
The City of Ottawa has also mentioned "long term plans" to upgrade Scott Street to a "complete street" following the removal of the Transitway detour. As the timing and funding of these plans are uncertain at this time, it has been assumed that they will occur beyond the proposed development's future analysis horizons. Email correspondence with the City of Ottawa regarding Scott Street can be found in Appendix E.

2.3.2 Other Study Area Developments

At the time of this report, a few development applications were available for the adjacent properties as listed on the City's Development Application Search tool:

- 403 Tweedsmuir Avenue – The City of Ottawa has received a Zoning By-law Amendment application to allow a six-storey mixed-use building for residential and hotel uses. A proposed underground parking garage will include 25 vehicle parking spaces. At this time, it is unclear as to the impact the trip generation from this development will have on the surrounding area
- 175 Richmond Road – The City of Ottawa has received a Zoning By-law Amendment and Site Plan Control application to allow a stepped nine-storey, six-storey, and four-storey mixed-use building. A total of 241 residential units and 675 square metres of retail commercial area are proposed. The anticipated trip generation can be seen in Figure 11 and is an excerpt from the 175 Richmond Road Transportation Brief prepared by Novatech Engineering Consultants Ltd.

Figure 11: 175 Richmond Road Site Generated Traffic Volumes

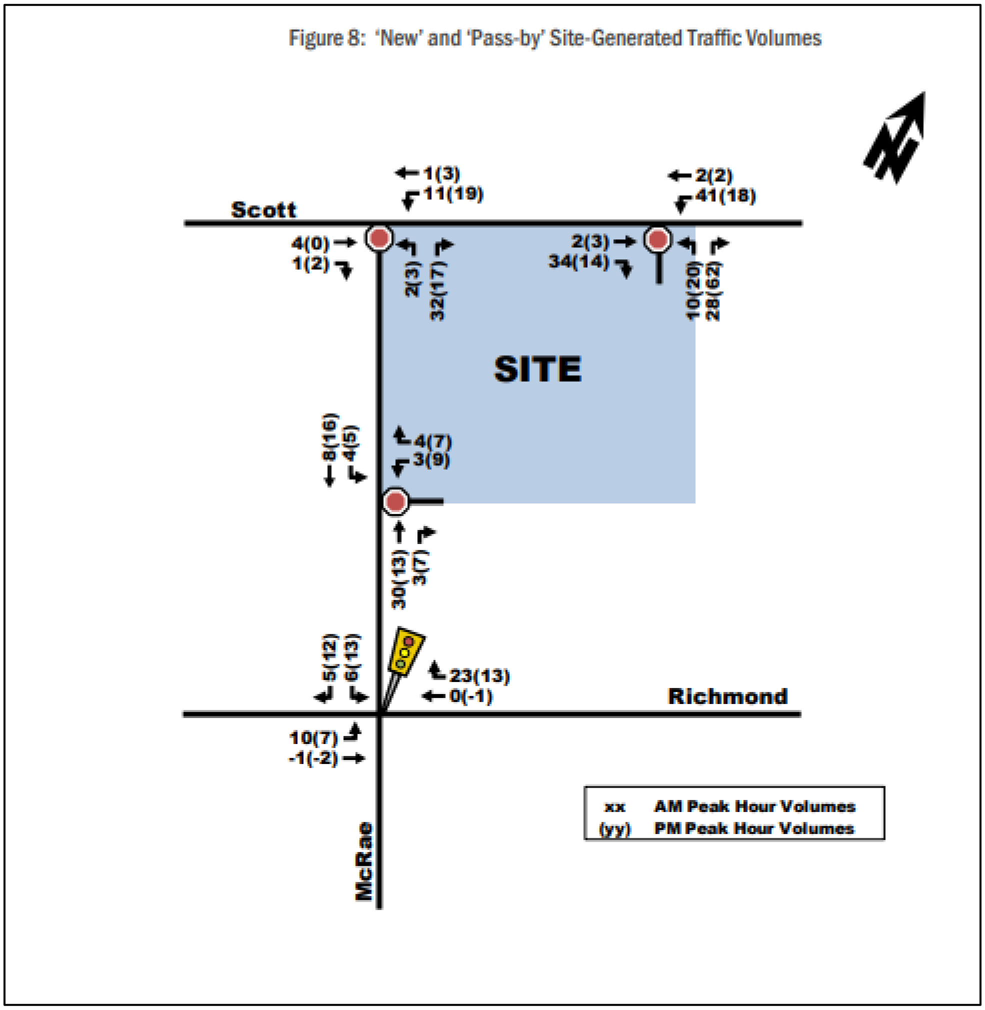


Source: Residential Development 175 Richmond Road Transportation Brief-September 2011

- 341/343 Tweedsmuir Avenue – The City of Ottawa has received Zoning Bylaw Amendment and Site Plan Control applications to facilitate the establishment of a fourth unit in the basement of these three-unit dwellings. Trip generation is expected to have negligible impacts on the surrounding area.
- 1946 Scott Street – 12-storey residential building with 60 units and 13 above ground parking spaces. As the trip generation trigger is not met, no site generated trips are provided and so the impact of the trips generated from this development on the surrounding area is unknown

- 320 Bloomfield Avenue – The planned redevelopment of the City Works Yard includes changes to both the building and parking facilities. At this time, limited information is provided and so the impact of trips generated from this development on the surrounding area is unknown.
- 1960 Scott Street – 22-storey mixed-use development of 120 residential units, 6889 square metres of office space and 1341 square metres of retail space. An estimated 159 parking spaces and 100 bicycle spaces have been proposed. The anticipated trip generation can be seen in Figure 12 and is an excerpt from the 1960 Scott Street Transportation Brief prepared by Parsons

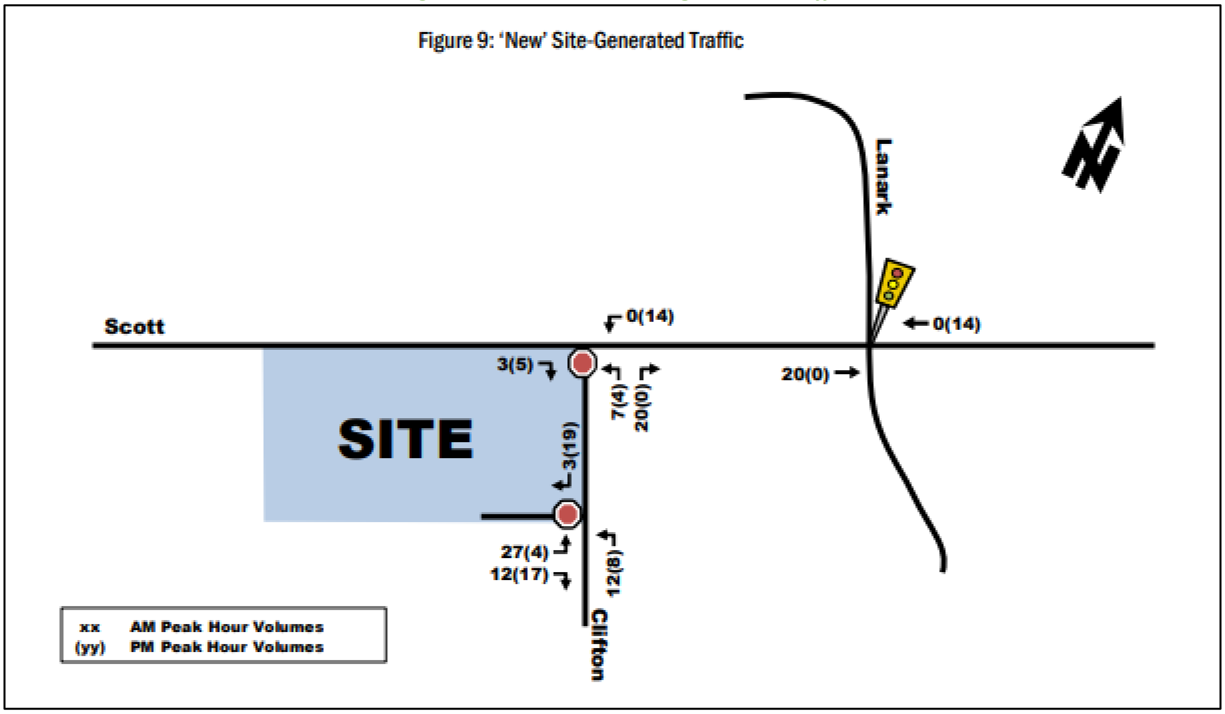
Figure 12: 1960 Scott St Site-generated Trips



Source: 1960 Scott Street-Transportation Brief-July 31, 2017

- 1950 Scott St – The City of Ottawa has received a Zoning By-law Amendment application to permit a 20-storey residential building with 141 units, 162 parking spaces and 10 visitor parking spaces. The anticipated trip generation can be seen in Figure 13 and is an excerpt from the 1950 Scott Street TIA Strategy Report prepared by Parsons.

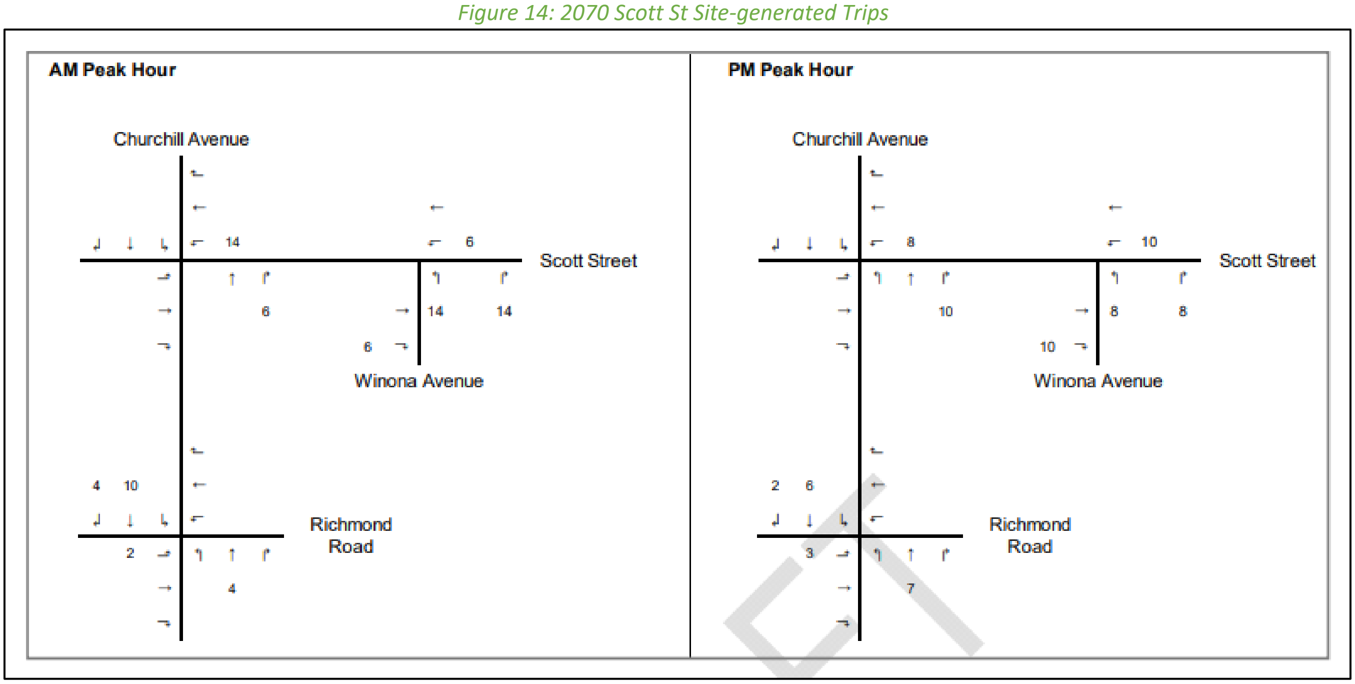
Figure 13: 1950 Scott St Site-generated Traffic



Source: 1950 Scott Street-Transportation Impact Assessment Strategy Report-July 2018

- 2070 Scott Street – 23-storey mixed-use development of 241 residential units, and 5,500 square feet of retail space. Full build-out is expected in 2022. The anticipated trip generation can be seen in Figure 14 is an excerpt from the 2070 Scott Street Transportation Impact Assessment prepared by Stantec.

Figure 14: 2070 Scott St Site-generated Trips



Source: 2070 Scott Street-Transportation Impact Assessment-November 1, 2019

3 Study Area and Time Periods

3.1 Study Area

The Study Area will include the intersections of Scott Street and Tweedsmuir Avenue, Scott Street and McRae Avenue, Richmond Road and Tweedsmuir Avenue, and Richmond Road and McRae Avenue. The Study Area will also include the north and south driveway accesses to the development of 319 McRae Avenue. Scott Street, Tweedsmuir Avenue, and McRae Avenue are noted as the boundary roads for the site.

As part of the Step 2 review process, comments requesting additional intersections be considered as part of the Study Area were received from the City of Ottawa Transportation Project Manager. These intersections were Richmond Road at Churchill Avenue, Scott Street at Island Park Drive, and Richmond Road at Kirkwood Avenue. In response to this, a preliminary trip generation for the site using TOD mode shares was conducted at the time of these comments. While these findings were subject to refinement as the site plan was being finalized, it was found that the subject site would generate approximately 24 single direction trips at its peak for the ultimate future horizon within this study. By the time these trips distribute to the road network, the amount of traffic impacting the requested additional intersections would be negligible. As can be seen in the following sections, it is estimated that the subject site will generate approximately 25 single direction trips, supporting the above conclusions. Therefore, the Study Area as defined above, is adequate to capture the auto impacts of the proposed development and no additional intersections are required to be analyzed.

3.2 Time Periods

The AM and PM peak hours will be examined for the proposed development.

3.3 Horizon Years

The anticipated build-out year is 2022. As a result, the full build-out plus five years horizon year is 2027.

4 Exemption Review

Table 7 summarizes the exemptions for this TIA.

Table 7: 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	Exempt
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 (for residential portion only)
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	Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt

5 Development-Generated Travel Demand

5.1 Trip Generation and Mode Shares

This TIA has been prepared using the vehicle and person trip rates for the residential components using the TRANS Trip Generation Study Report (2009) and the vehicle trip rates for the retail components, a factor of 1.28 has been applied to the ITE rates. Table 8 summarizes the person trip rates for the proposed land uses.

Table 8: Trip Generation Person Trip Rates

Dwelling Type	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates
Townhouses	224 (TRANS)	AM	0.51	1.13
		PM	0.51	0.96
Mid-rise Apartments	223 (TRANS)	AM	0.24	0.65
		PM	0.28	0.70
High-rise Apartments	222 (TRANS)	AM	0.24	0.65
		PM	0.27	0.68
Shopping Centre	820	AM	0.94	1.20
		PM	3.81	4.88

Internal capture rates from the ITE Trip Generation Handbook 3rd Edition have been assigned to the development for the retail components for mixed-use developments. The retail portion of this development is the smaller of the two land uses. Therefore, the residential land use is treated as the anchor for this development and is not reduced based on the multi-use capture rate. The smaller portion of the development, the retail portion, has been reduced to reflect residents of the site utilizing the on-site retail instead of leaving the site and/or as a pass-by trip on the way to an ultimate destination (ie. work). The rates summarized in Table 9 represent the percentage of trips to/from the retail uses based on the residential component.

Table 9: Internal Capture Rates

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

Using the above Person Trip rates and the internal capture rates, the total person trip generation has been estimated. Following the completion of the analysis of this report, a minor decrease in the commercial space (9,020 square feet to 8,826 square feet) occurred. As this change is considered minor and is expected to have a negligible impact on site generated trips, no changes have been made to the total person trip generation. Additionally, as the commercial space area was decreased, the current person trip generation will produce a slightly conservative analysis. Table 10 below illustrates the total person trip generation by dwelling type.

Table 10: Total Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Townhouses	11 units	4	8	12	6	5	11
Mid-Rise Apartments	53 units	8	26	34	23	14	37
High-Rise Apartments	272 units	42	135	177	115	70	185
Shopping Centre	9,020 sq.ft	7	4	11	21	23	44
	Internal Capture	-1	-1	-2	-2	-6	-8
	Total Person Trips	**60**	**172**	**232**	**163**	**106**	**269**

Using the most recent National Capital Region Origin-Destination (OD Survey), the existing mode shares for Ottawa West as well as TOD mode shares, have been summarized in Table 11. The mode shares for Ottawa West will be used to develop interim trip generation for the 2022 future horizon as per the request of the City of Ottawa. This mode share is considered to be very conservative in nature and will produce a "worst case scenario" given the proposed development is within 400 metres of the existing Westboro Transitway Station. The new Westboro LRT Station is projected to be constructed and operational by 2025. As such, a TOD mode share will be used for the 2027 future horizon.

Table 11: Mode Share

Travel Mode	Ottawa West	TOD Mode Share
Auto Driver	50%	15%
Auto Passenger	15%	5%
Transit	20%	65%
Cycling	5%	5%
Walking	10%	10%
Total	100%	100%

Using the above mode shares and person trip rates, the person trips by mode have been projected for the 2022 future horizon using the Ottawa West mode shares and for the 2027 future horizon using the TOD mode shares. Table 12 summarizes the trip generation by mode for the 2022 horizon and Table 13 summarizes the trip generation by mode for the 2027 horizon.

Table 12: 2022 Trip Generation by Mode

Travel Mode	Mode Share	In	Out	Total	In	Out	Total
Auto Driver	50%	30	87	117	82	52	134
Auto Passenger	15%	9	25	34	24	17	41
Transit	20%	12	35	47	33	20	53
Cycling	5%	3	8	11	8	5	13
Walking	10%	6	17	23	16	12	28
Total	100%	60	172	232	163	106	269

As shown above, 117 AM and 134 PM new peak hour two-way vehicle trips are projected as a result of the proposed development in the 2022 future horizon.

Table 13: 2027 Trip Generation by Mode

Travel Mode	Mode Share	In	Out	Total	In	Out	Total
Auto Driver	15%	9	25	34	24	16	41
Auto Passenger	5%	2	8	10	8	6	14
Transit	65%	40	114	154	107	66	173
Cycling	5%	3	8	11	8	5	13
Walking	10%	6	17	23	16	12	28
Total	100%	60	172	232	163	106	269

As shown above, 34 AM and 41 PM new peak hour two-way vehicle trips are projected as a result of the proposed development in the 2027 future horizon.

5.2 Trip Distribution

To understand the travel patterns of the subject development, the OD survey has been reviewed to determine the existing travel patterns that will be applied to the new vehicle trips. Table 14 below summarizes the distribution for Ottawa West.

Table 14: OD Survey Existing Distribution - Ottawa West

To/From	% of Trips
North	15%
South	35%
East	35%
West	15%
Total	100%

5.3 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. No trips have been assigned to the loading access on Tweedsmuir Avenue as this access will be used only during off-peak hours. Figure 15 illustrates the new site traffic assignment by percentage. Figure 16 and Figure 17 illustrate the new site generated volumes for the 2022 future horizon and the 2027 future horizons respectively.

Figure 15: New Site Generation Assignment (%)

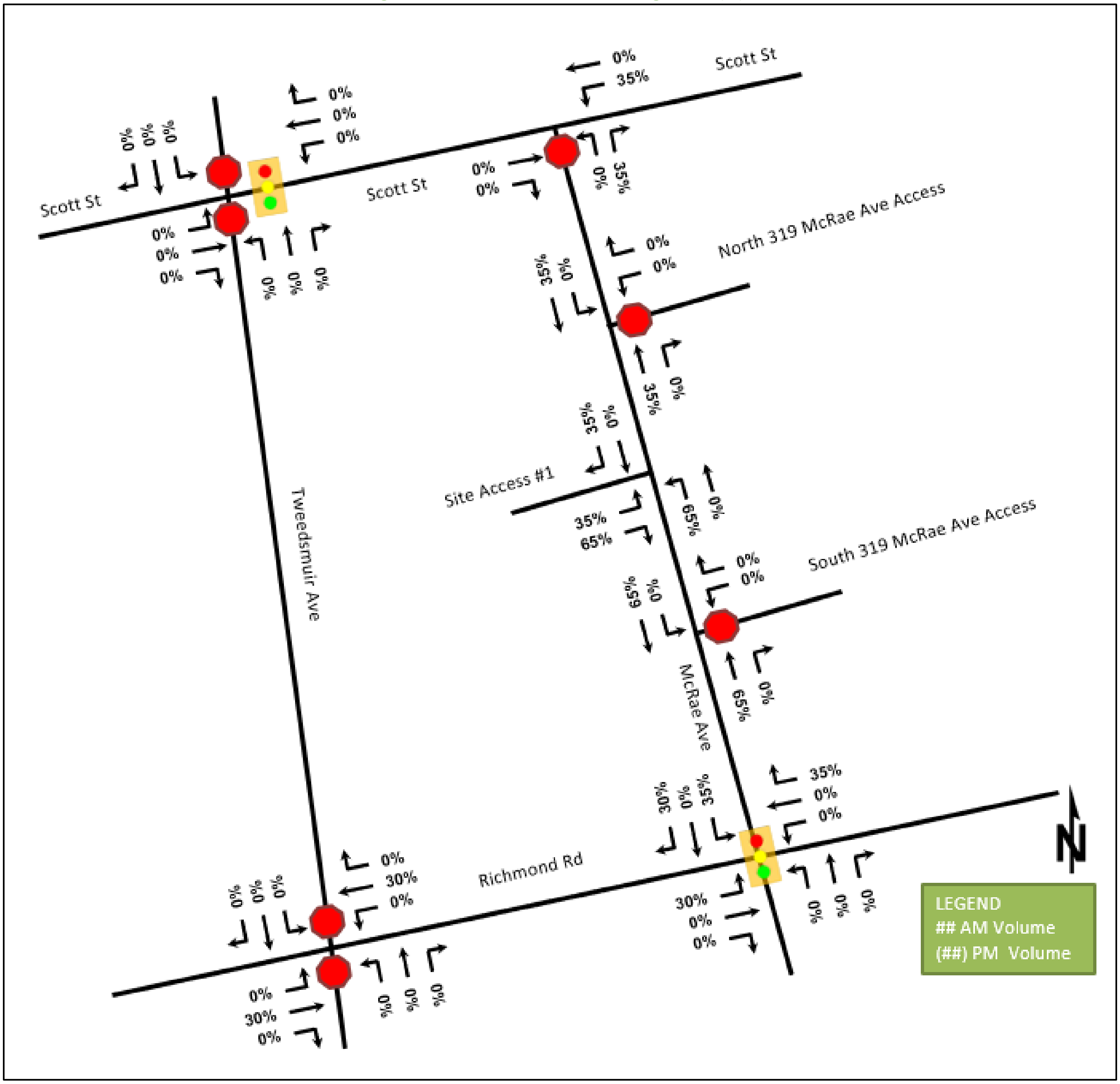


Figure 16: New 2022 Site Generation Auto Volumes

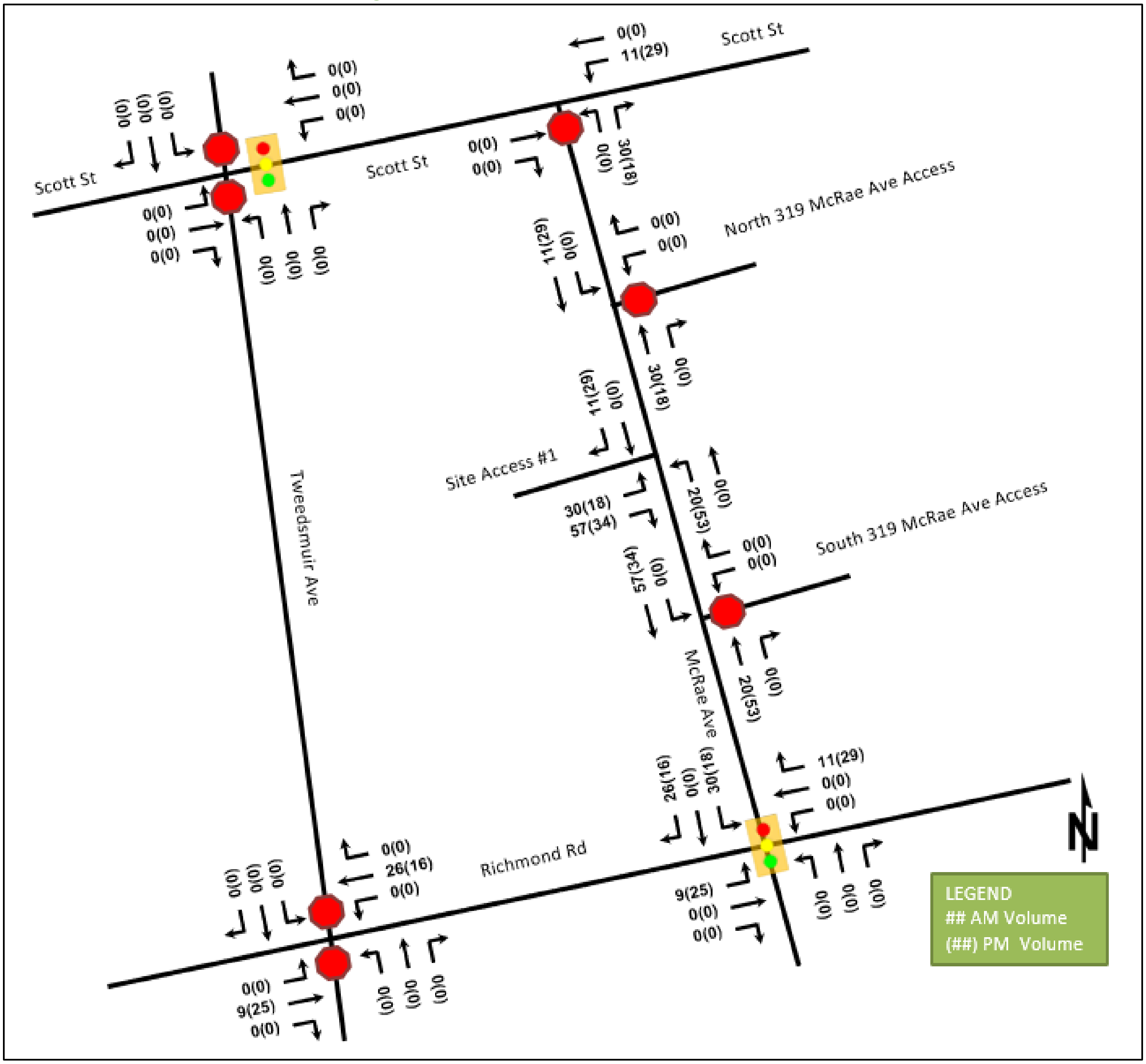
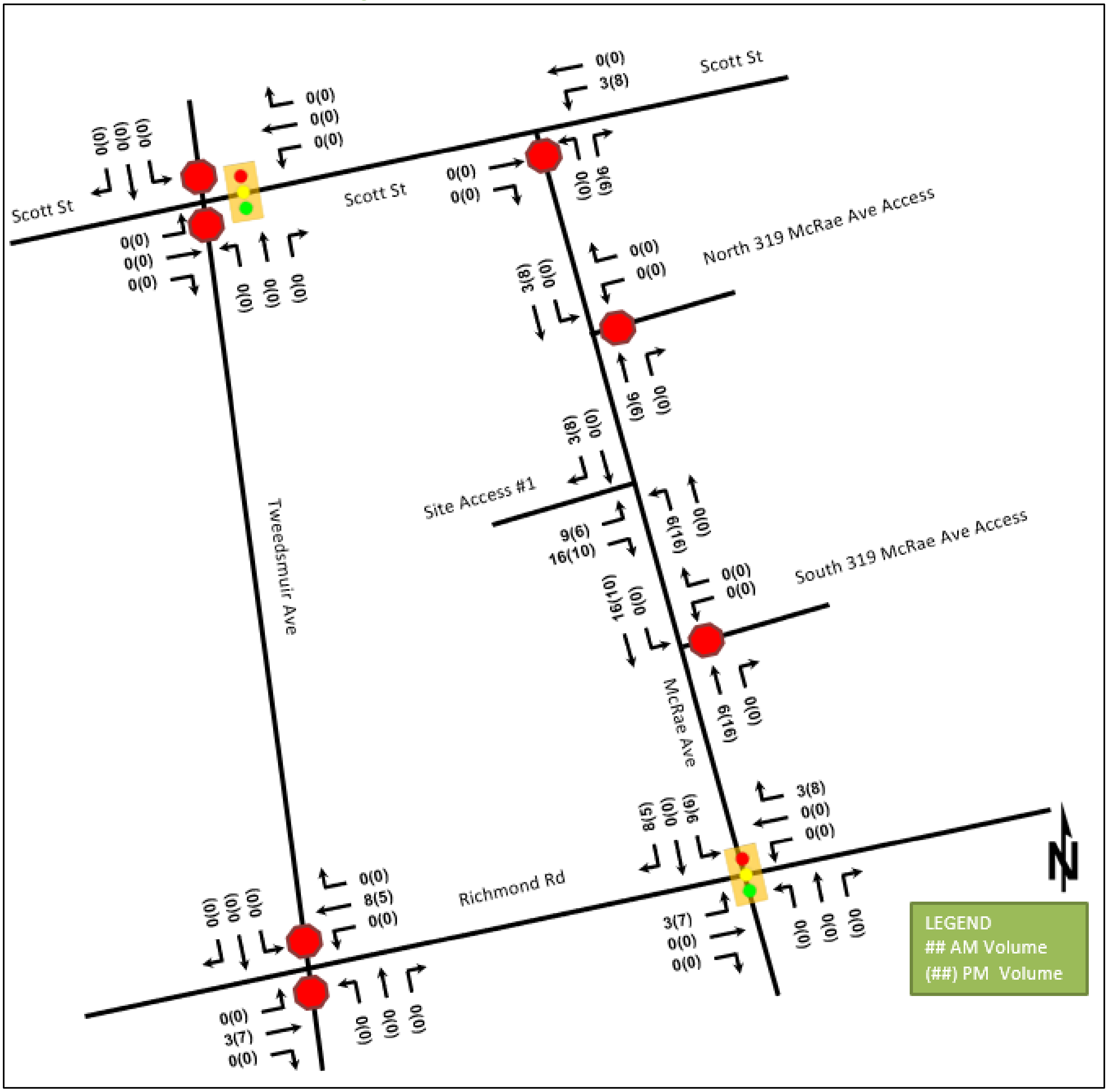


Figure 17: New 2027 Site Generation Auto Volumes



6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3.1. The opening of the Westboro LRT station and Dominion LRT station, isolated measure transit priority along Richmond Road and TOD policies have been accounted for within the modal share assumptions. The City of Ottawa has indicated that during the construction of the Stage 2 Confederation Line West extension, Scott Street is planned to be used for a Transitway detour between Churchill Avenue and Tunney's Pasture. The detour has been indicated to be in place from late 2021 /

early 2022 to the planned completion of the Westboro LRT Station (2025). The main changes to Scott Street within the Study Area as part of the detour are a new sidewalk between Tweedsmuir and McRae Avenue with no on-street parking. No other road improvements within the study horizons are noted for this area.

The additional connectivity provided by future bicycle spine routes along Scott Street and Richmond Road as part of the City of Ottawa ultimate cycling plan will improve the active mode network.

6.2 Background Growth and Other Developments

As stated in Section 2.2.7, an adjacent area transportation study has used a 2% traffic growth within the Study Area of this report. As such, an annual background growth of 2% has been applied to remain consistent with that study and produce a conservative estimate of growth.

The background developments explicitly considered in the background conditions include 175 Richmond Road, 1960 Scott Street, 1950 Scott Street, and 2020 Scott Street. These developments are discussed in Section 2.3.2.

Figure 18 illustrates the 2022 background volumes and Figure 19 illustrates the 2027 background volumes.

Figure 18: Future Background 2022 Volumes

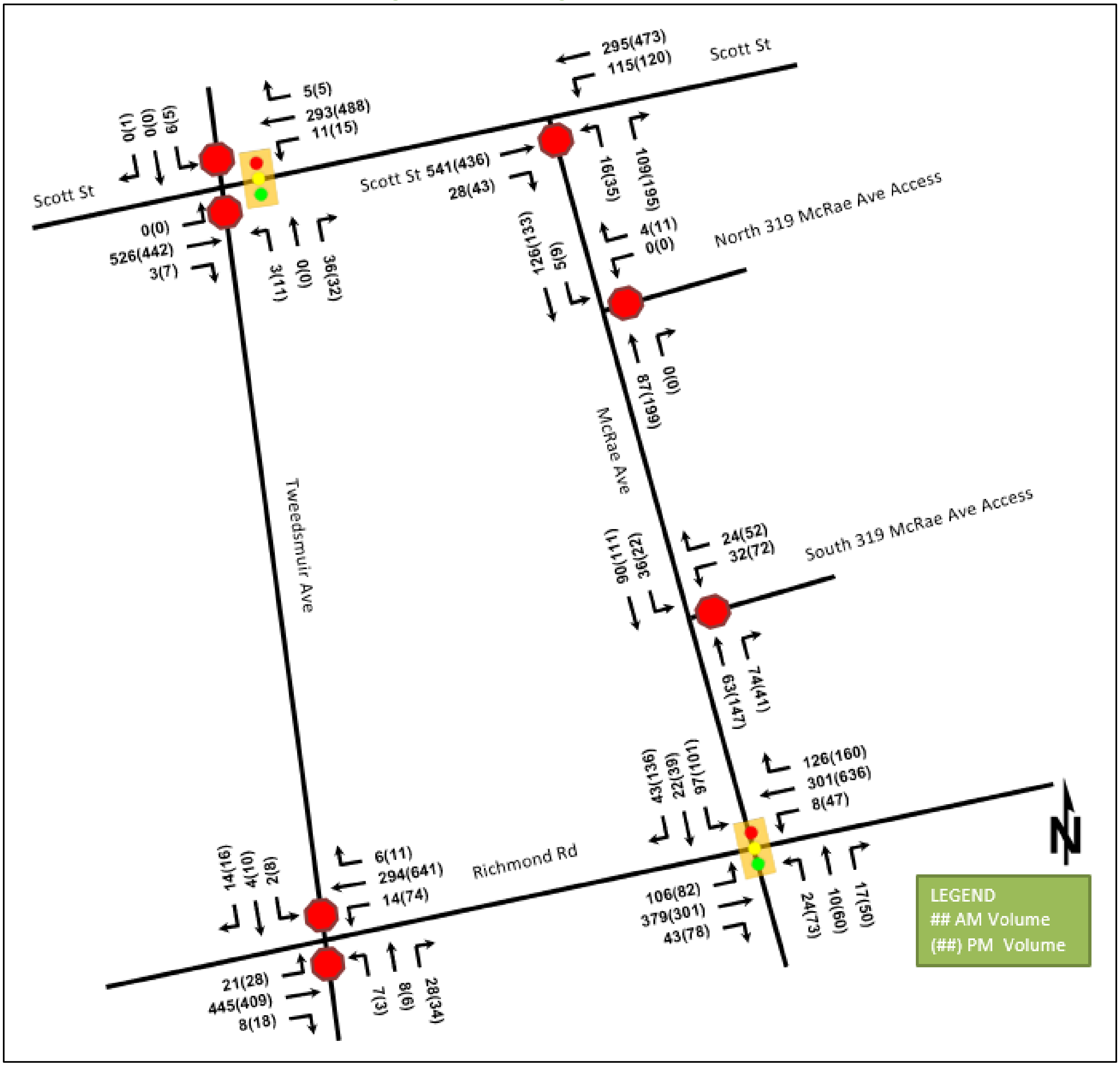
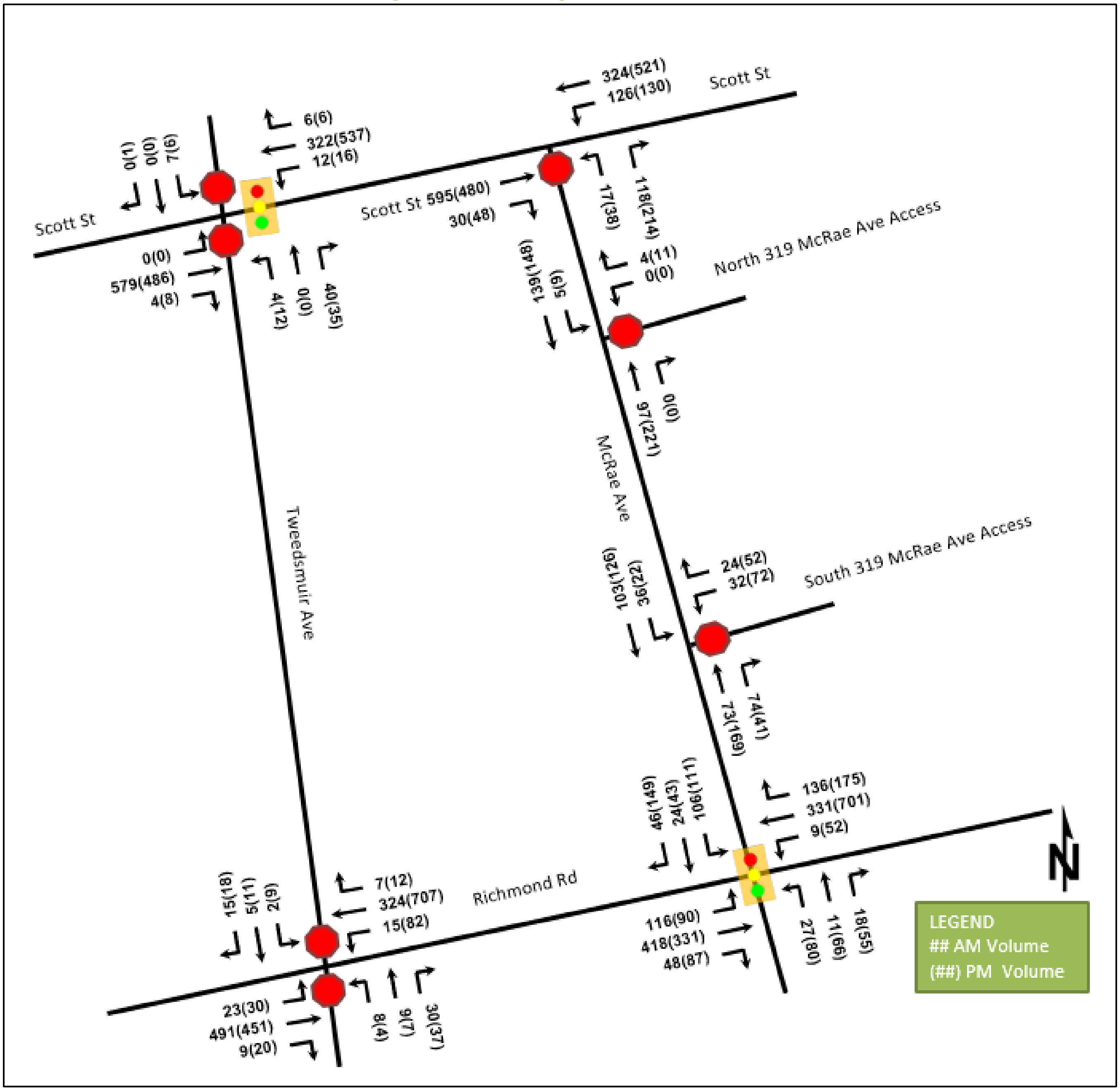


Figure 19: Future Background 2027 Volumes



Additionally, pedestrian and cycling volumes have been projected for both the 2022 future background and the 2027 future background horizon demands at the four Study Area intersections for both AM and PM peak periods by applying a calculated growth rate to the existing cyclist and pedestrian volumes. Intersection growth rates were calculated based on the background vehicle volumes shown in Figure 18 and Figure 19 above. Calculations for these growth rates can be found in Appendix F. The resulting projected pedestrian volumes for the 2022 and 20227 future background horizons can be found in Figure 20 and Figure 21, respectively. The resulting projected cyclist volumes for the 2022 and 20227 future background horizons can be found in Figure 22 and Figure 23, respectively.

Figure 20: Future Background 2022 Pedestrian Volumes

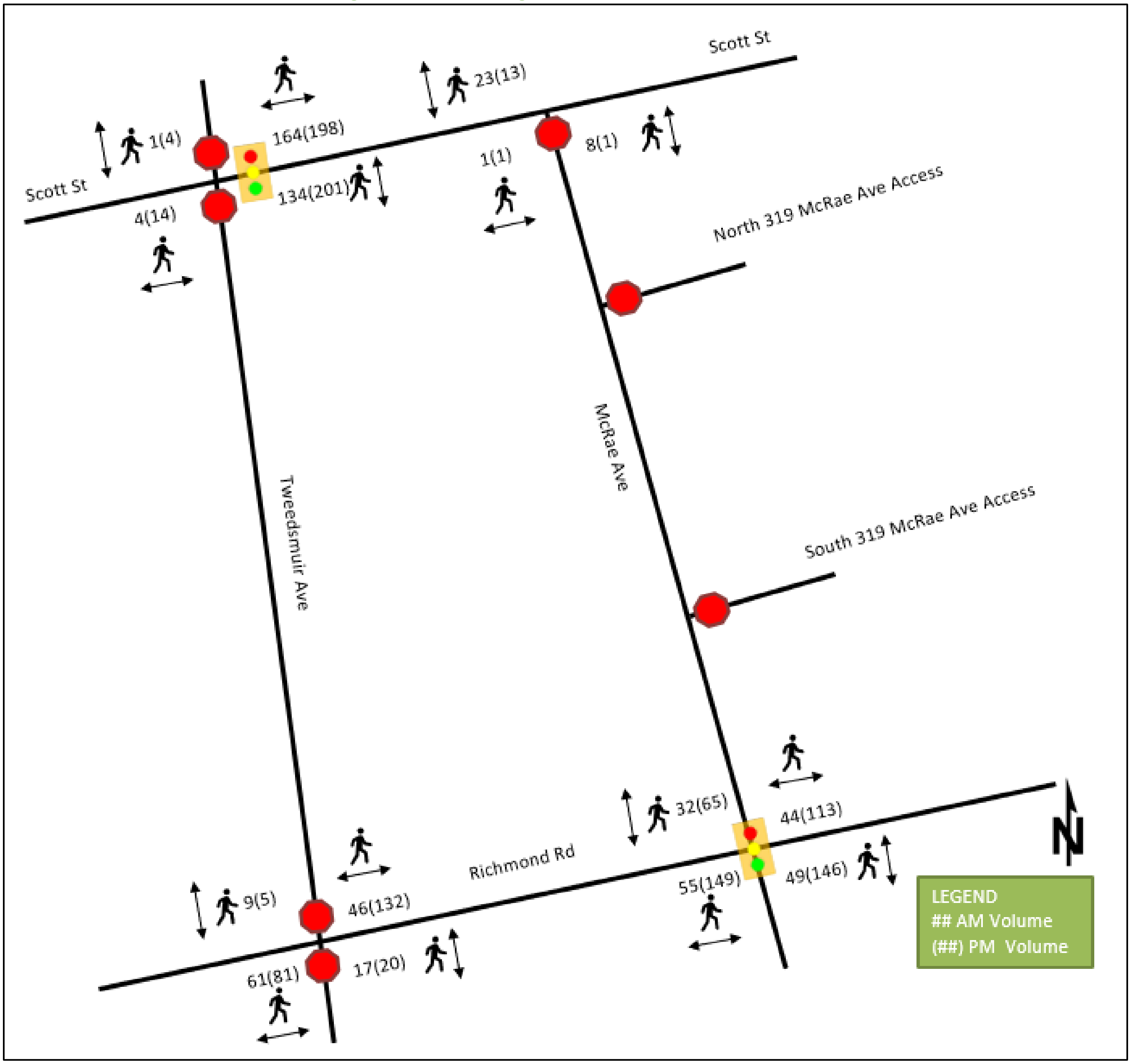


Figure 21: Future Background 2027 Pedestrian Volumes

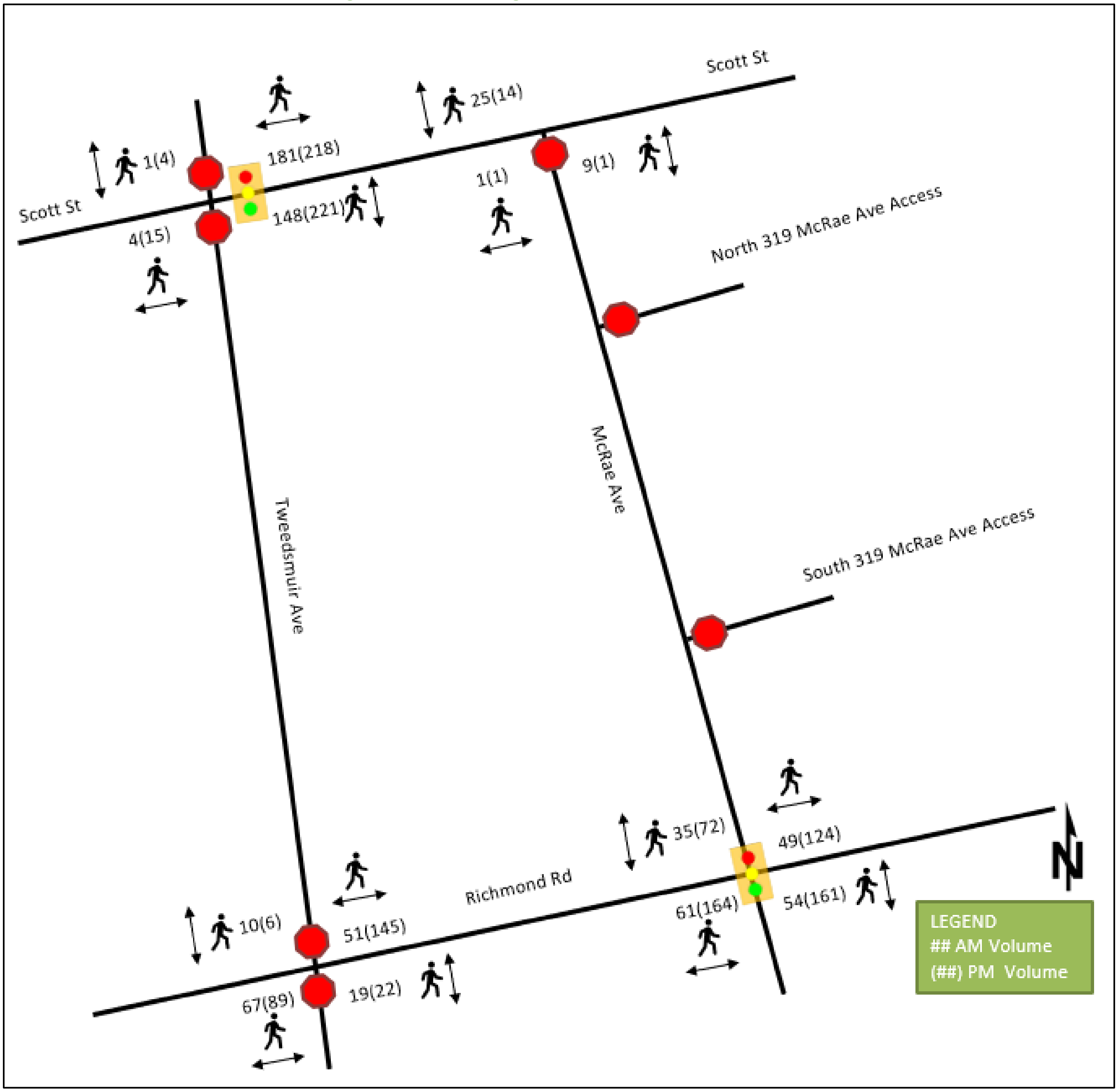


Figure 22: Future Background 2022 Cyclist Volumes

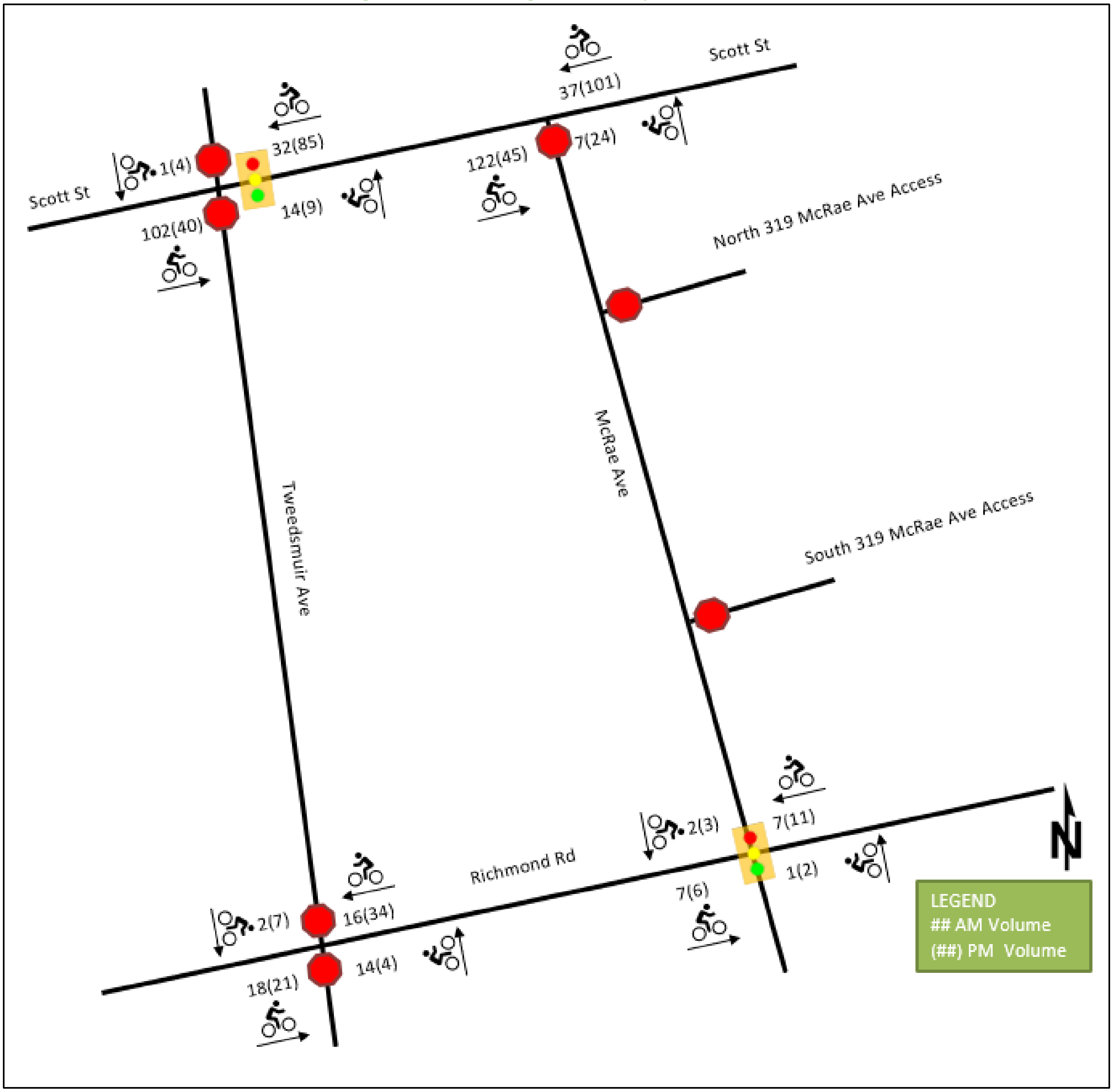
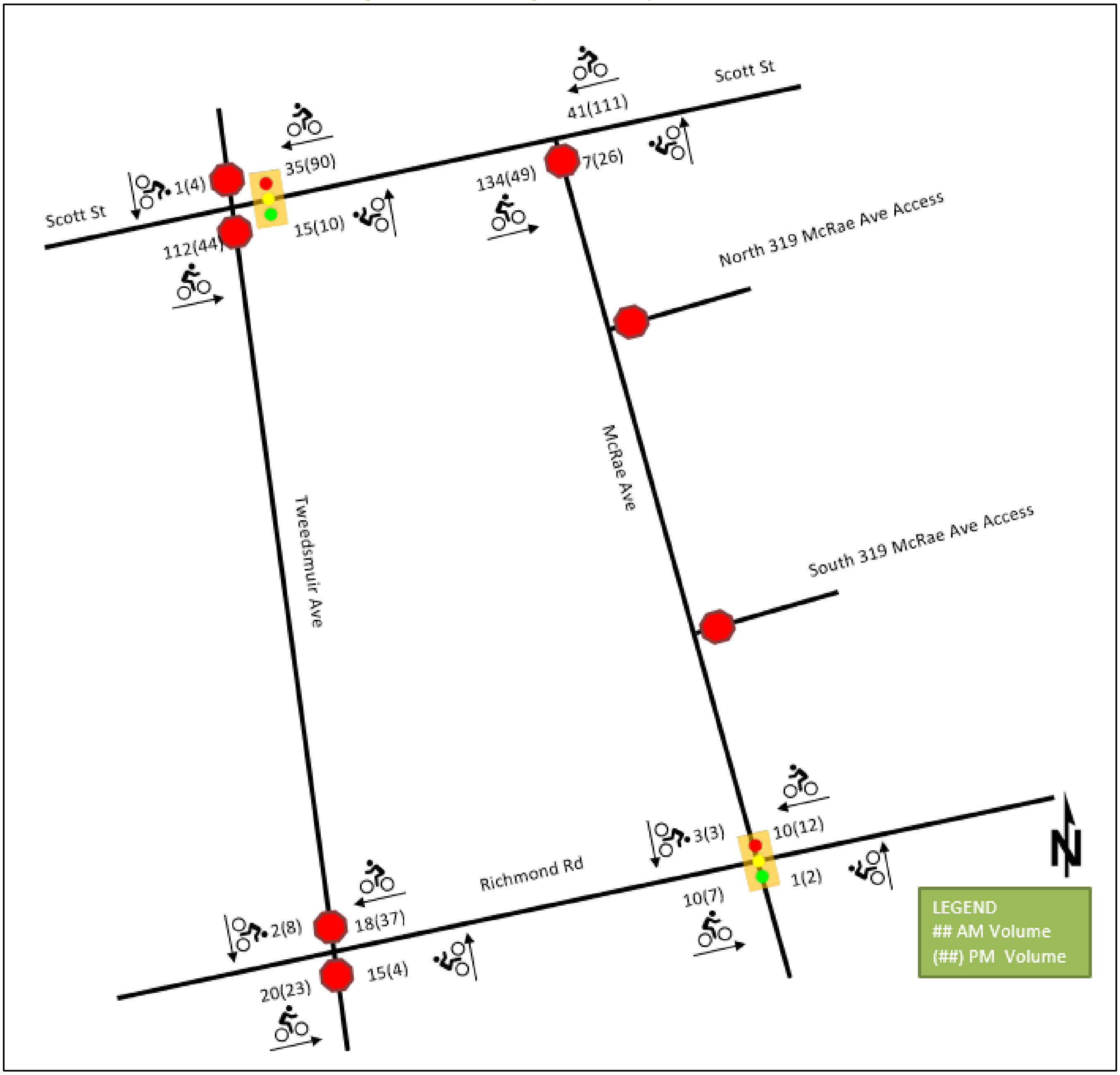


Figure 23: Future Background 2027 Cyclist Volumes



7 Demand Rationalization

Changes in traffic volumes between existing and future conditions will come from the applied 2% background growth rate, 175 Richmond Road, 1960 Scott Street, 1950 Scott Street, 2070 Scott Street and the proposed development within this report. Additionally, the trip generation of this development will change due to a shift from the Ottawa West mode share used in 2022 to the TOD modal shares in 2027, as can be seen in Section 5, to conservatively account for the Westboro LRT. The future total 2022 and 2027 volumes are illustrated in Figure 24 and Figure 25 respectively.

Figure 24: Future Total 2022 Volumes

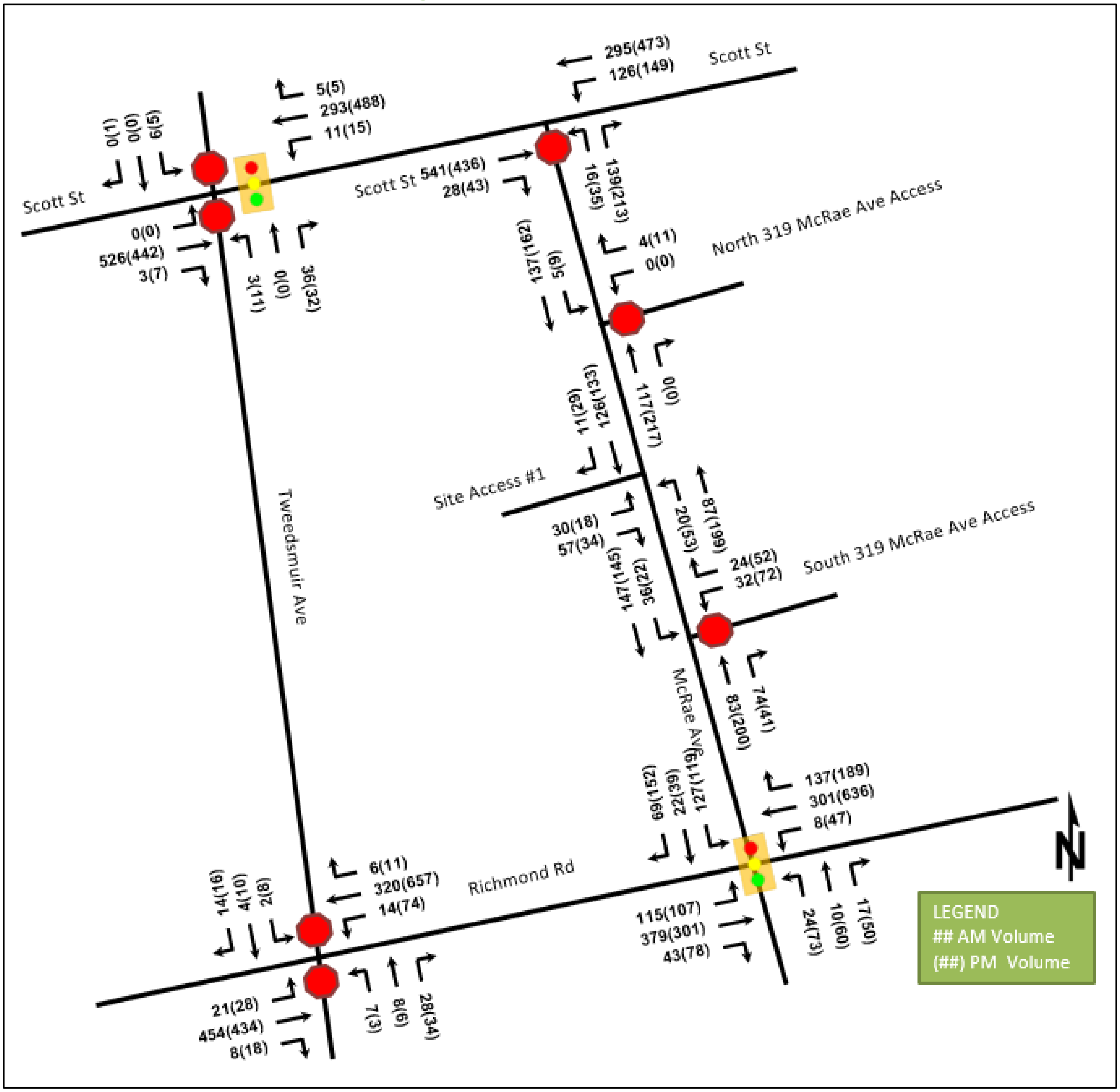
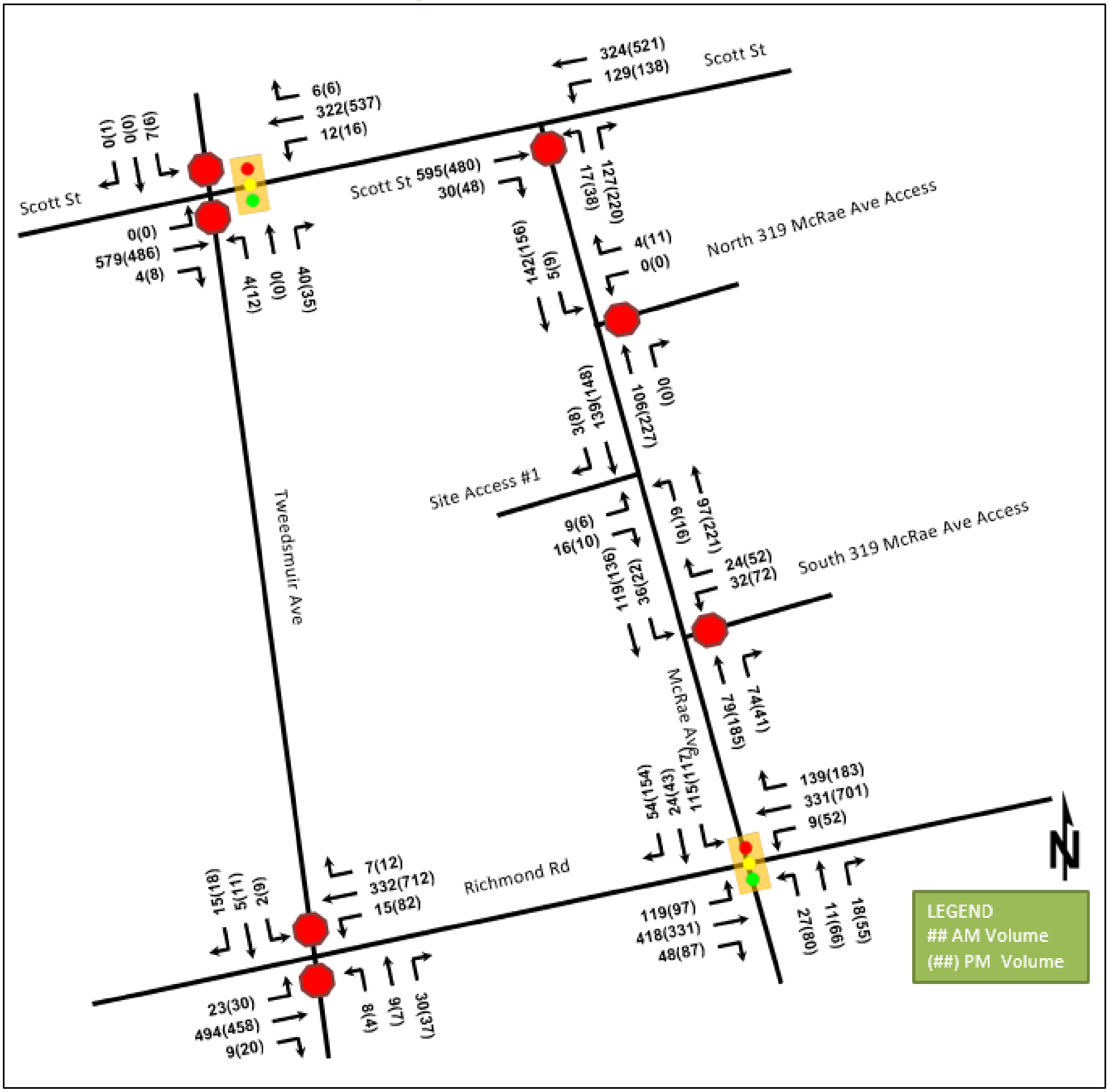


Figure 25: Future Total 2027 Volumes



Given the Study Area is subject to TOD policies, an expected shift in mode share is anticipated following the implementation of future TOD policies as well as the building of both the Dominion and Westboro LRT Stations. This shift is anticipated to result in an auto driver mode reduction and an increase in transit and non-auto mode shares.

Additionally, pedestrian and cycling volumes have been projected for both the 2022 future total and the 2027 future total horizon demands at the four Study Area intersections for both AM and PM peak periods. As previously discussed, intersection growth rates were calculated based on the background vehicle volumes shown in Figure 18 and Figure 19 above to determine future background pedestrian and cyclist volumes. The site generated pedestrian and cyclist volumes were then distributed through the Study Area network based on proximity to the Westboro LRT Station, the general context of the proposed development and the Ottawa West distribution percentages. The resulting projected pedestrian volumes for the 2022 and 2027 future total horizons can be found in Figure 26 and Figure 27, respectively. The resulting projected cyclist volumes for the 2022 and 20227 future total horizons can be found in Figure 28 and Figure 29, respectively.

Figure 26: Future Total 2022 Pedestrian Volumes

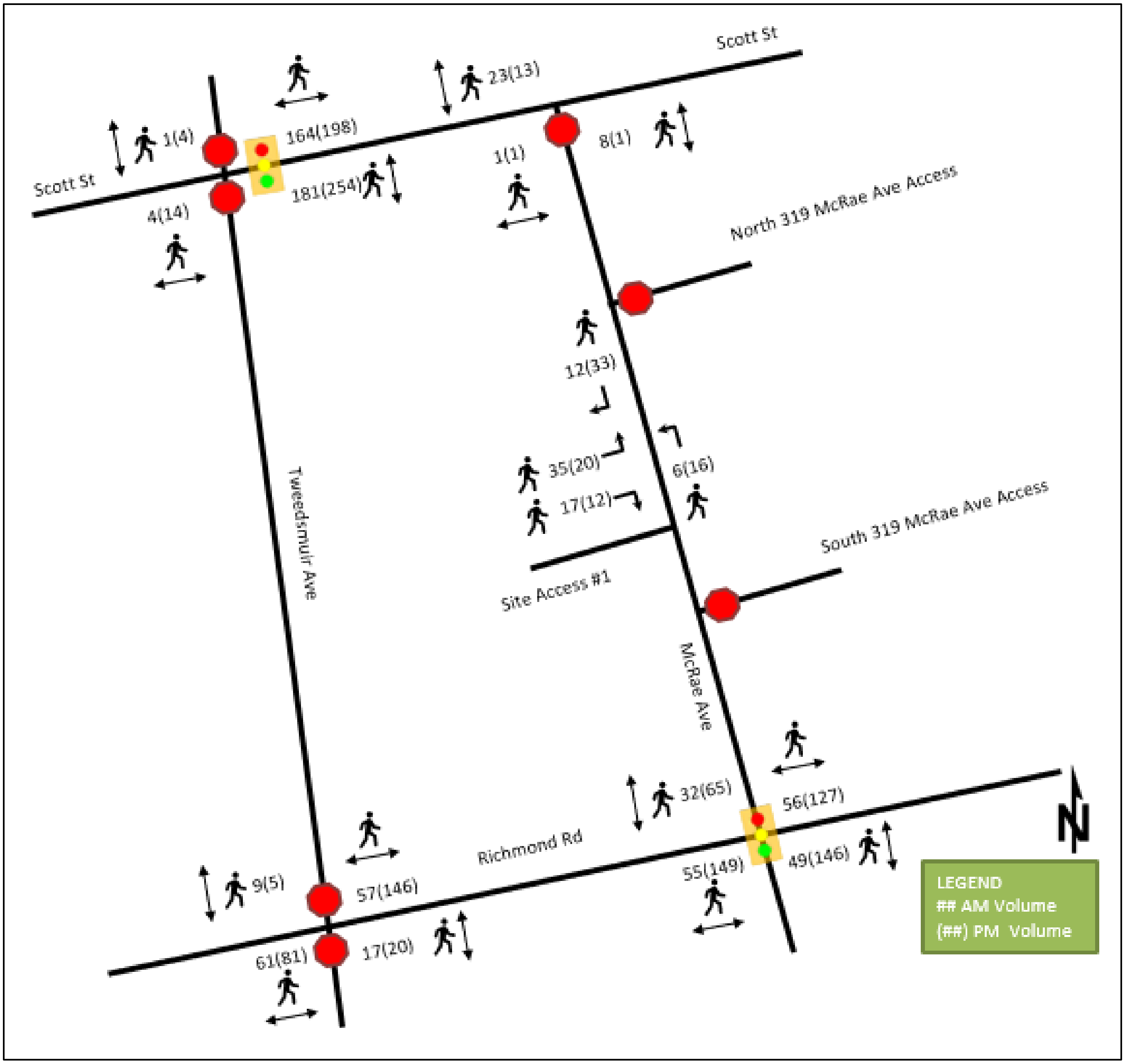


Figure 27: Future Total 2027 Pedestrian Volumes

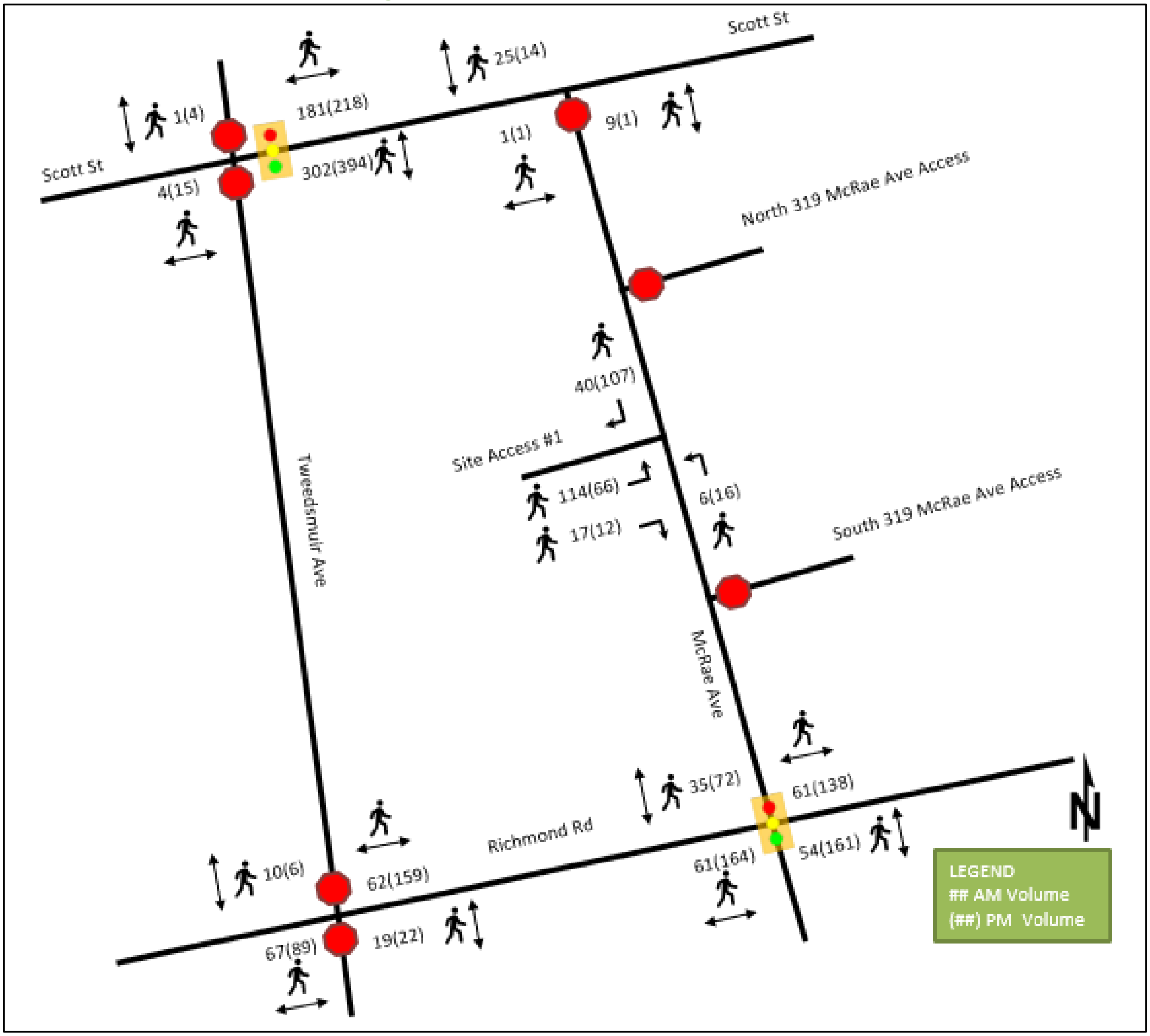


Figure 28: Future Total 2022 Cyclist Volumes

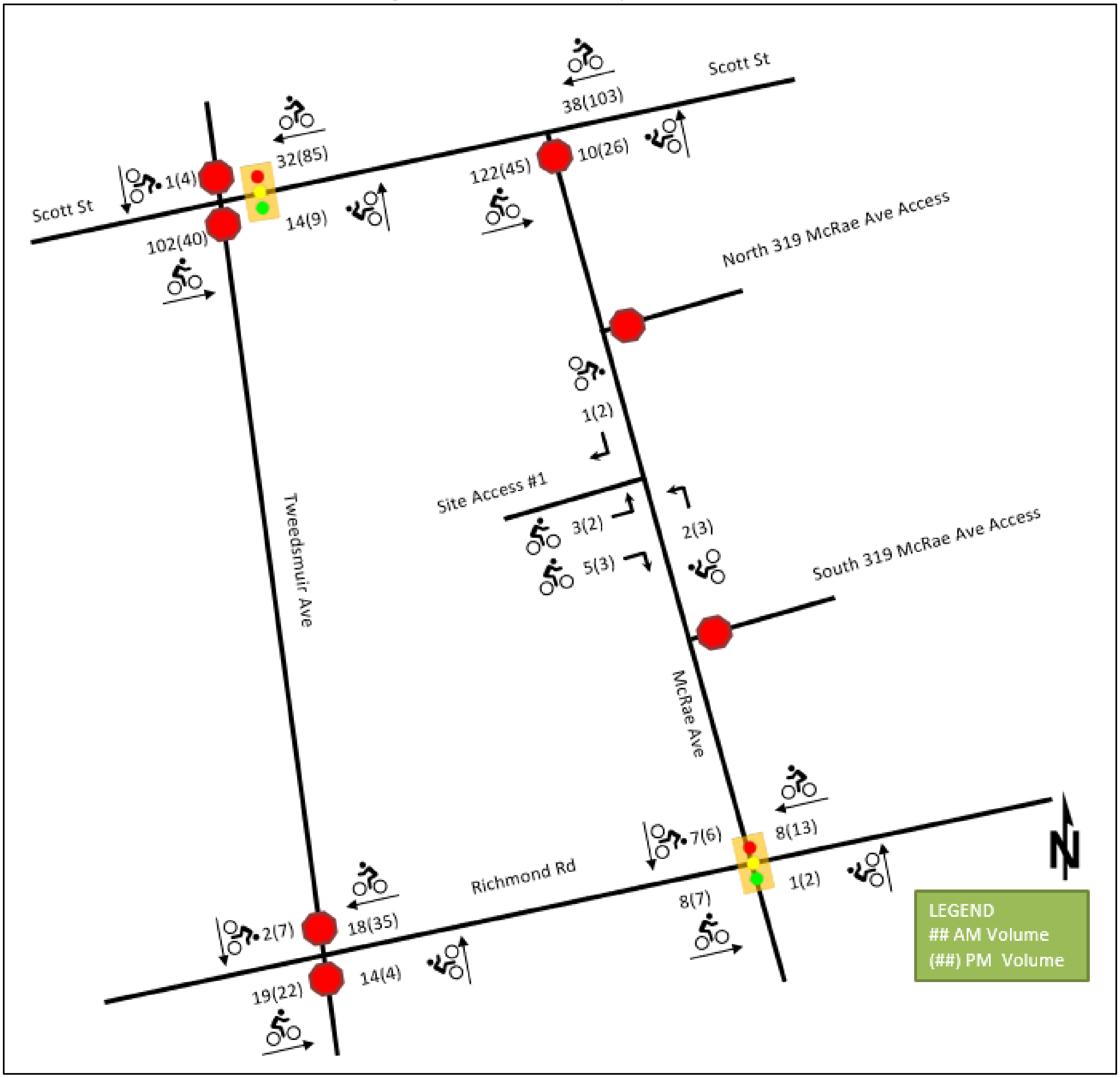
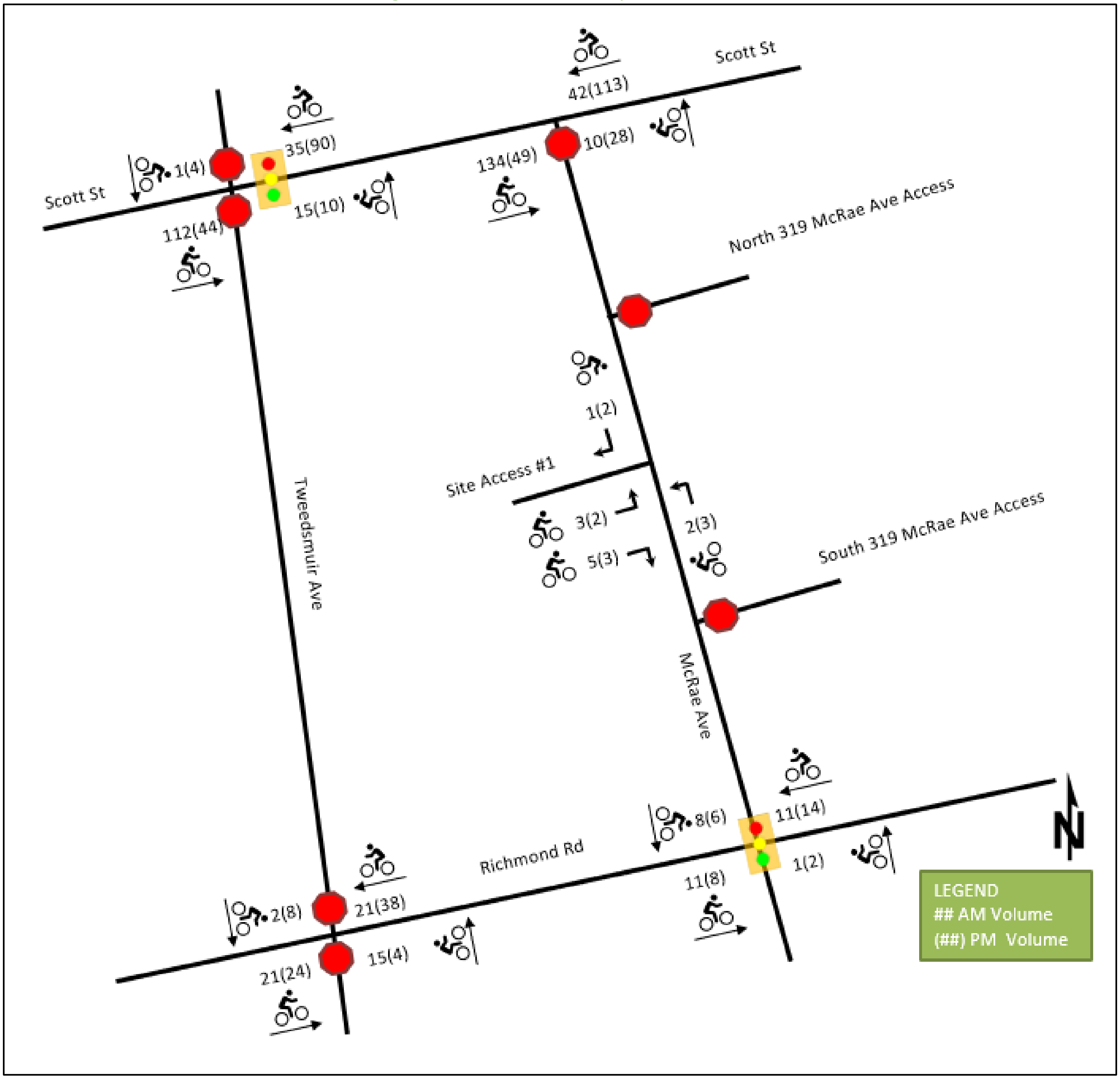


Figure 29: Future Total 2027 Cyclist Volumes



8 Development Design

8.1 Design for Sustainable Modes

The proposed development is a commercial/residential development divided into two buildings with underground automobile and bicycle parking.

The proposed development is bordered by existing pedestrian and cyclist facilities along Scott Street, existing pedestrian facilities along Tweedsmuir Avenue and McRae Avenue, and planned future cyclist facilities along McRae Avenue. A temporary unsignalized pedestrian crossing is located on McRae Avenue approximately 75 metres south of Scott Street. The existing Westboro station is within 400 metres from the development and can be accessed by these facilities. As such, the future Westboro LRT Station will be within 400 metres of the proposed development and will be able to be accessed by these facilities as well.

The proposed widths of the sidewalks and boulevards along the proposed development's boundary can be seen in Table 15.

Table 15: Boundary Street Pedestrian Facility Information

	McRae Avenue	Scott Street	Tweedsmuir Avenue
Sidewalk Width (m)	2	1.8	1.5
Boulevard Width (m)	>2	0	0

Measures which are required for zoning and standard site design that are supportive of sustainable modes in the City of Ottawa's TDM-supportive Development Design and Infrastructure Checklist, are recommended. The following additional measures could be implemented:

- Locate building close to the street, and do not locate parking areas between the street and building entrances (*to be implemented*)
- Locate building entrances in order to minimize walking distances to sidewalks and transit facilities (*to be implemented*)
- Locate building doors and entrances to ensure visibility of pedestrians from the building (*to be implemented*)
- Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails (*to be implemented*)
- Provide a permanent bike repair station (*to be implemented*)
- Provide a designated area for carpool drivers to drop off or pick up passengers without using fire lanes or other no-stopping zones. This provided as a lay-by on Scott Street (*to be implemented*)
- 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 (*to be implemented*)
- Provide separate area for short-term and long-term parking to permit access controls and simplify enforcement (*to be implemented*)

TDM Checklists for both residential and non-residential land uses can be found in Appendix G.

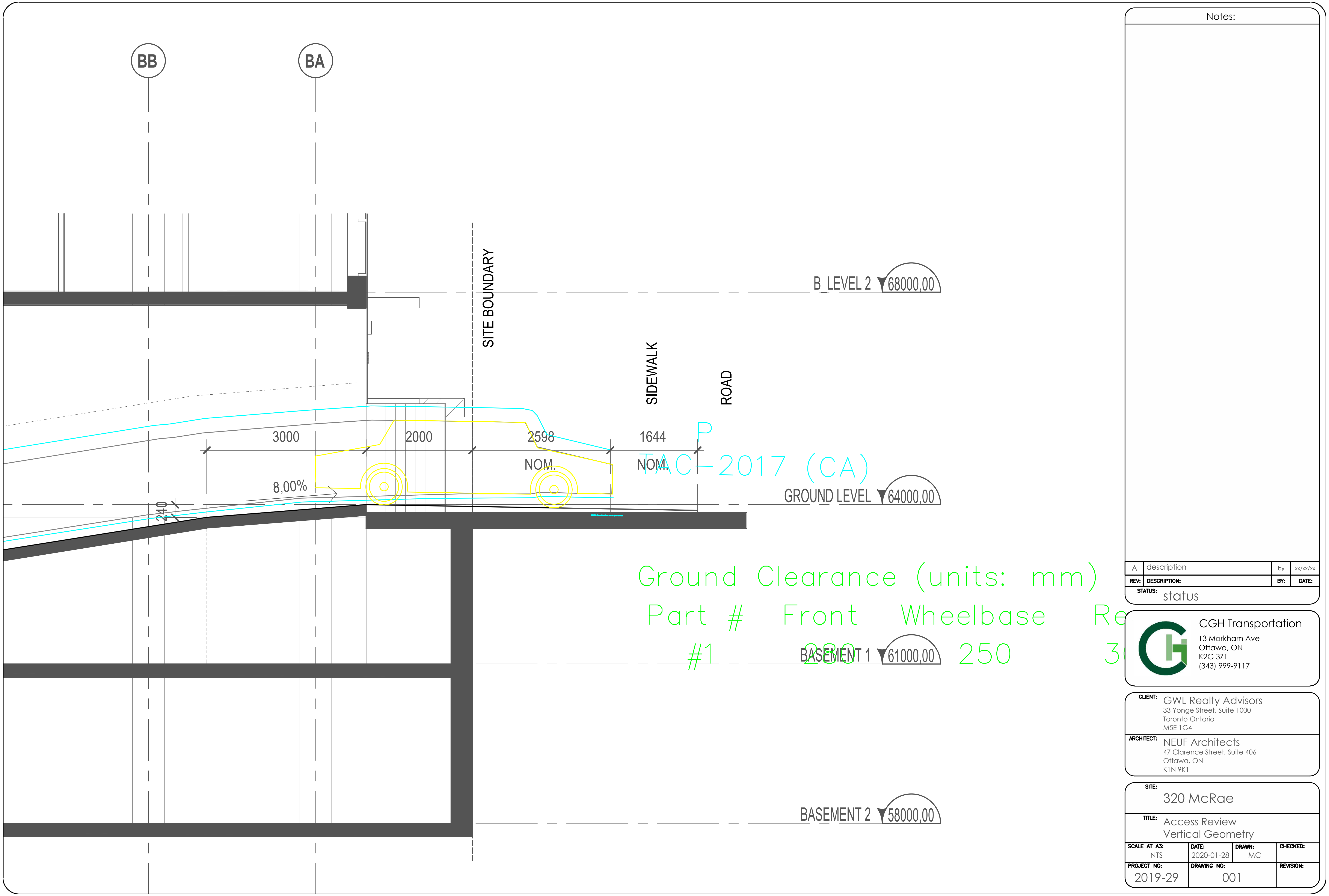
8.2 Circulation and Access

The primary Access #1 on McRae Avenue will accommodate passenger vehicles accessing the underground automobile parking using a covered ramp access. Access #2 on Tweedsmuir Avenue is considered the primary entrance/exit to the loading area and will accommodate minimal truck volumes primarily during off-peak hours. Access #2 is also expected to be used by garbage trucks to access the development. As Tweedsmuir Avenue is not considered an existing truck route, additional signage allowing trucks on Tweedsmuir to the north of the site access will be implemented to allow for truck access to the site while still preventing through truck traffic on Tweedsmuir.

While the horizontal geometry of each access point is relatively straightforward, and meets the private approach by-law, the vertical geometry of the underground parking lot does not meet Section 25.1.u. (No person shall construct a private approach serving a parking area with more than 50 parking spaces, with a grade exceeding 2% within the private property for a distance of 9 metres from the highway line or future highway line). Therefore, a review of the vertical geometry has been examined. As shown in Figure 30, a vehicle outbound on the proposed ramp would be able to exit the building and see the sidewalk and the road, without blocking the sidewalk or the road.

Additionally, turning templates have been developed for passenger cars on both parking levels as well as garbage trucks at the intersection of Scott Street and Tweedsmuir Avenue, and at Access #2. The provision of transition ramps for passenger cars will decrease the psychological barrier that some drivers may face when using the access ramps. Garbage trucks will pull into the loading area where members of staff will bring out garbage and act as spotters to help the garbage truck back-up onto Tweedsmuir Avenue. An existing pavement marking and signage plan for the boundary streets has been prepared and is included with the turning templates found in Appendix H.

Figure 30: Underground Parking Vertical Geometry



8.3 New Street Networks

This TIA is exempt from this Module (See Table 7).

9 Parking

9.1 Parking Supply

The parking requirements and provisions for the proposed development are summarized in Table 16.

Table 16: Parking Provisions

Land Use	Parking Rate	Parking Required	Parking Provided
Residential	0.5 spaces/unit after 12 units	162	183
	-10% (Section 101(6)(c) of Zoning By-law)	-16	
Visitor	0.1 spaces/dwelling unit to a maximum of 30	30	
Commercial	1.25 spaces/100m^2 for units with GFA > 500 m^2	0	
Total Vehicle Parking		**176**	
Residential (bicycle)	0.5 spaces/dwelling unit	168	187
Commercial (bicycle)	1 space/250m^2 GFA	4	
Total Bicycle Parking		**172**	

The parking supply has been evaluated for the ultimate horizon conditions. Despite the assumption that the Westboro LRT Station will be completed and that the surrounding area is operating as a TOD area, the City of Ottawa has opted to apply an Area Y designation here. An Area Y designation has minimum residential and retail parking rates in comparison to a TOD area where no minimum automobile parking space requirements apply, with the exception of residential visitor parking.

Based on the City of Ottawa Zoning By-laws, a total of 146 residential automobile parking spaces are required as a minimum, and 30 residential visitor vehicle parking spaces are required. No commercial vehicle parking is required as vehicle parking spaces are not required for commercial / retail uses with a GFA less than 500 m^2. Within the proposed development, no individual commercial use has a GFA greater than 500 m^2. As can be seen in Table 16, the required parking space provisions for automobile parking are met in excess of seven spaces.

A total of 168 residential bicycle parking spaces and four commercial bicycle parking spaces are required. As can be seen in Table 16, the required parking space provisions for bicycle parking have been met in excess of 15 spaces. It is noted that of the 187 bicycle spaces, 177 will be on the ground floor as well as underground, and 10 bicycle parking spaces will be outside and located along McRae Avenue and Scott Street.

9.2 Spillover Parking

This TIA is exempt from this Module (See Table 7).

10 Boundary Street Design

For the purposes of this TIA, Scott Street, Tweedsmuir Avenue and McRae Avenue are considered boundary streets for the existing, 2022 and 2027 horizons. All three boundary streets are not currently Complete Streets and no plans exist to upgrade them within the future analysis horizons. Segment MMLOS is broken down into the

Pedestrian Level of Service (PLOS), Bicycle Level of Service (BLOS), Transit Level of Service (TLOS) and Truck Level of Service (TkLOS). A summary of the MMLOS results can be seen in Table 17. The segment MMLOS worksheets have been provided in Appendix I.

Table 17: Segment MMLOS Summary

Road Segment	Horizon	MMLOS							
		PLOS		BLOS		TLOS		TkLOS	
		Actual	Target	Actual	Target	Actual	Target	Actual	Target
Tweedsmuir Ave	Existing	F	A	D	B	N/A	N/A	N/A	N/A
	2022 FB								
	2022 FT								
	2027 FB								
	2027 FT								
Scott St	Existing	D	A	D	D	E	D	D	D
	2022 FB							B	
	2022 FT							B	
	2027 FB							B	
	2027 FT							B	
McRae Ave	Existing	C	A	D	D	D	D	F	N/A
	2022 FB								
	2022 FT								
	2027 FB								
	2027 FT								

The target levels of service within 600 metres of a rapid transit station were used to evaluate the Study Area intersections.

The road segment of Tweedsmuir Avenue will not meet its pedestrian LOS target due to small sidewalk and boulevard widths and will not meet its bicycle LOS targets due to mixed traffic conditions. A wider sidewalk and boulevard is not proposed on Tweedsmuir Avenue adjacent to the development as the intention is to match the existing sidewalk at this location. Additionally, improvements to the sidewalk are not proposed in order to protect the large existing oak tree. As Tweedsmuir Avenue is not a truck route and is not part of a transit route, no truck or transit LOS could be determined.

The road segment of Scott Street will not meet the pedestrian LOS target due to small sidewalk and boulevard widths and a high average daily curb lane traffic volume. As the sidewalk and boulevard widths proposed along the site boundary on Scott Street are based on those proposed in the temporary Scott Street Bus Detour Plan, no changes are recommended to the sidewalk or boulevard as this is a temporary condition. At the time of the implementation of the "ultimate design" of Scott Street it is expected that the pedestrian LOS will improve. As this is beyond the future analysis horizons of this development, this "ultimate design" has not been considered. The transit LOS was not met due to mixed traffic conditions. Scott Street meets both the bicycle and truck LOS targets.

The road segment of McRae Avenue will not meet its pedestrian LOS target due to small sidewalk and boulevard widths on the east side of McRae Avenue and on the west side of McRae Avenue south of the proposed development. The portion of McRae Avenue bordering the proposed development will meet the PLOS target.

McRae Avenue meets the bicycle and truck LOS targets. As McRae Avenue is a local road, no truck LOS target is available.

Future network plans mentioned in both Section 2.3.1 and Section 6.1 are anticipated to increase connectivity and improve the active mode network within the Study Area. These changes have the potential to improve the MMLOS of the boundary streets.

11 Access Intersections Design

11.1 Location and Design of Access

Two unsignalized full-movement site accesses are planned for the proposed development. Site Access #1 is approximately 40 metres south of Scott Street on Tweedsmuir Avenue and Site Access #2 is approximately 120 metres south of Scott Street on McRae Avenue. Site Access #1 is a loading access and is intended for truck use only.

11.2 Intersection Control

Based on the projected volumes, the two site accesses will have stop-control on the minor approach for both future total horizons. No further traffic control is warranted to address operational issues. Signalization warrants for Site Access #1 can be found in Appendix J.

11.3 Intersection Design

Left-turn lane warrants for unsignalized intersections were examined at Site Access #1 for both 2022 and 2027 total future horizons using the MTO Geometric Design Standards for Ontario Highways, Section E. A left-turn lane was not found to be warranted. Left-turn lane warrant nomographs can be found in Appendix K.

12 Transportation Demand Management

12.1 Context for TDM

The proposed mixed-use development is located within 600 metres of a rapid transit station. The proposed development is expected to have 820 square metres (8,826 square feet) of commercial space, 325 apartment units, and 11 townhouse units. The unit breakdown of the 336 proposed residential units can be seen in Table 18 below.

Table 18: Proposed Residential Unit Statistics

Unit Type	Number of Units
Studio	56
One Bedroom	186
Two Bedroom	82
Three Bedroom	10
Guest	2
Total	336

Approximately 183 underground automobile parking spaces and 187 bicycle parking spaces have been proposed. Of the 187 bicycle spaces, 177 will be on the ground floor as well as underground, and 10 bicycle parking spaces will be outside and located along McRae Avenue and Scott Street.

12.2 Need and Opportunity

A failure to meet the proposed sustainable mode share targets will negatively impact transit and motor vehicle users, pedestrians, and cyclists accessing the site as well as those in the general Study Area. Motor vehicle users will experience and higher delays and worse LOS, depending on the magnitude of the reduction in transit users, OC Transpo may struggle to fund the transit infrastructure within the Study Area, and pedestrian and cyclists will experience higher volumes of vehicles and therefore may have worse LOS.

As discussed in Section 5.1, the 2022 future horizon is expected to follow the Ottawa West mode share while the 2027 future horizon is expected to follow a TOD mode share which has a higher transit mode share and a lower auto mode share than the Ottawa West mode share. As such, a comparison of the 2022 FT analysis results and the 2027 FT analysis results can be used as an indication of the potential impacts of not meeting the proposed sustainable mode share targets.

The program of post occupancy TDM measures is anticipated to improve the likelihood of achieving the proposed sustainable TOD mode share targets.

12.3 TDM Program

Transportation Demand Management measures are implemented to encourage the use of non-auto modes of travel. This is aimed at reducing the reliance on single occupant auto trips in the City of Ottawa. The proposed development adheres to the City's TDM principles by facilitating connections to adjacent pedestrian, cycling and transit facilities. As the proposed development will be in a designated Transit-oriented Development (TOD) zone a TOD mode share has been used for the 2027 horizon.

The following measures, consistent with the TDM Checklist for both non-residential and residential land uses are included in Appendix G, could be implemented to ensure that the travel mode shares meet the TOD targets.

- Provide online links to OC Transpo information (*to be implemented*)
- Unbundle parking cost from monthly rent (*to be implemented*)
- Provide a multimodal travel option online information package to new residents (*to be implemented*)
- Offer more bicycle parking than minimum (*to be implemented*)
- Offer PRESTO cards preloaded with one monthly transit pass on first round of resident move-in (*recommended*)

13 Neighbourhood Traffic Management

13.1 McRae Avenue

Table 19 summarizes the McRae Avenue peak hour volumes, estimated Average Annual Daily Traffic (AADT) in the peak direction for the proposed development as well as future background volumes.

Table 19: McRae Avenue Road Volumes - NTM Review

North of the Site Access				
Segment	**AM Peak**		**PM Peak**	
	North	**South**	**North**	**South**
320 McRae Avenue	9 (90 AADT)	3	6	8 (80 AADT)
2027 FB Volumes	135	155 (1550 AADT)	252 (2520 AADT)	182
Total	**144**	**158 (1580 AADT)**	**258 (2580 AADT)**	**190**

South of the Site Access				
Segment	**AM Peak**		**PM Peak**	
	North	**South**	**North**	**South**
320 McRae Avenue	6	16 (160 AADT)	16 (160 AADT)	10
2027 FB Volumes	263 (2240 AADT)	176	331 (3310 AADT)	303
Total	**269 (2690 AADT)**	**192**	**347 (3470 AADT)**	**313**
South of Richmond Road				
Segment	**AM Peak**		**PM Peak**	
	North	**South**	**North**	**South**
320 McRae Avenue	0	0	0	0
2027 FB Volumes	56	81 (810 AADT)	201 (2010 AADT)	182
Total	**58**	**86 (860 AADT)**	**206 (2060 AADT)**	**185**

Notes:
1 – AADT generated using a conservative 10:1 ratio

The TIA guidelines outline a local road threshold of 1,000 vehicles per day (AADT), or 120 vehicles in a given peak hour for Neighbourhood Traffic Management review. As illustrated above, McRae Avenue will exceed these volume thresholds in 2027. As these thresholds are exceeded independently of the subject development, which makes up 5% or less of the total future volumes on McRae Avenue, no Neighbourhood Traffic Management Plans are recommended as a result of the proposed development's site generated traffic.

13.2 Tweedsmuir Avenue

Table 20 summarizes the Tweedsmuir Avenue peak hour volumes, estimated AADT in the peak direction for the proposed development as well as future background volumes.

Table 20: Tweedsmuir Avenue Road Volumes - NTM Review

North of Scott Street				
Segment	**AM Peak**		**PM Peak**	
	North	**South**	**North**	**South**
320 McRae Avenue	0	0	0	0
2027 FB Volumes	6	7 (70 AADT)	6	7 (70 AADT)
Total	**6**	**7 (70 AADT)**	**6**	**7 (70 AADT)**

South of Scott Street				
Segment	**AM Peak**		**PM Peak**	
	North	**South**	**North**	**South**
320 McRae Avenue	0	0	0	0
2027 FB Volumes	44 (440 AADT)	16	47 (470 AADT)	24
Total	**44 (440 AADT)**	**16**	**47 (470 AADT)**	**240**

South of Richmond Road				
Segment	AM Peak		PM Peak	
	North	South	North	South
320 McRae Avenue	0	0	0	0
2027 FB Volumes	47 (470 AADT)	29	48	113 (1130 AADT)
Total	**47 (470 AADT)**	**29**	**48**	**113 (1130 AADT)**

Notes:
1 – AADT generated using a conservative 10:1 ratio

The TIA guidelines outline a local road threshold of 1,000 vehicles per day (AADT), or 120 vehicles in a given peak hour for Neighbourhood Traffic Management review. As illustrated above, Tweedsmuir Avenue will not exceed these volume thresholds in 2027 with the exception of the southbound PM Peak volumes south of Richmond Road. As this threshold is exceeded independently of the subject development, which is expected to have no influence on Tweedsmuir Avenue south of Richmond Road. As such, no Neighbourhood Traffic Management Plans are recommended as a result of the proposed development's site generated traffic.

14 Transit

In Section 5.1 the trip generation by mode was estimated, including the number of transit trips that will be generated by the proposed development. Table 21 summarizes the transit trip generation for the ultimate future horizon year of 2027.

Table 21: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
	65%	40	114	154	107	66	173

The Westboro LRT Station is expected to provide adequate transit capacity to support the increase in travel demand by the proposed development.

15 Review of Network Concept

This TIA is exempt from this Module (See Table 7).

16 Intersection Design

16.1 Intersection Control

A signal warrant analysis was performed for the intersections of Richmond Road and Tweedsmuir Avenue and McRae Avenue and Scott Street. Signalization was not warranted at either of the intersections analyzed. As such, the intersection method of control will remain consistent with existing methods of control for all Study Area intersections at both future horizons. Signal warrants can be found in Appendix J.

16.2 Intersection Design

To understand the intersection design, an MMLOS analysis of existing, 2022 future horizon, and 2027 future horizon demands is required. The existing and future segment MMLOS has been discussed in Section 10. The following sections will discuss the vehicle LOS at Study Area intersections which is based on the HCM criteria for average delay at unsignalized intersections. At signalized intersections, the level of service for individual movements is based on the V/C ratio as required by the City of Ottawa. The overall LOS for signalized intersections is based on the HCM 2000 V/C ratio.

The intersection of Scott Street and Tweedsmuir Avenue is made up of a two-way stop-controlled intersection with stop control on the north and south legs and a signalized pedestrian crossing directly to the east on Scott Street. The limitations of Synchro are such that this intersection is required to be modelled as two intersections as close to one another as is allowable in Synchro. This approach was confirmed by the City of Ottawa.

Additionally, left-turn lane warrants for unsignalized intersections were examined at the intersection of Scott Street and McRae Avenue only. A westbound left-turn lane was found to be warranted in the existing, 2022 future background, 2027 future background, 2022 future total and the 2027 future total horizons using the MTO Geometric Design Standards for Ontario Highways, Section E. Left-turn lane warrant nomographs can be found in Appendix K.

No other left-turn lane warrants were examined at the other unsignalized intersections as a result of the low volume increases and acceptable intersection operations.

This will be followed by a discussion of the intersection MMLOS for other modes.

16.2.1 Existing Conditions

The existing intersection volumes have been analyzed to establish a baseline condition and determine the impact of the subject development on the Study Area road network. Table 22 summarizes the operational analysis of the 2019 existing conditions. Appendix L contains the 2019 Existing Conditions Synchro sheets.

Table 22: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95th)	LOS	Delay	V/C	Q (95th)
Scott Street & Tweedsmuir Avenue ***Unsignalized***	EBL/T/R	A	0	-	0	A	0	-	0
	WBL/T/R	A	9	0.01	<1	A	8	0.01	<1
	NBL/T/R	B	13	0.08	2	B	15	0.11	3
	SBL/T/R	E	38	0.06	2	E	46	0.07	2
Scott Street & Pedestrian Crossing ***Signalized***	EBT	A	10	0.49	64	A	9	0.41	51
	WBT	A	7	0.26	29	A	9	0.44	55
	Overall	**A**	**9**	**0.39**	**-**	**A**	**9**	**0.35**	**-**
Scott Street & McRae Avenue ***Unsignalized***	EBT/R	-	-	-	-	-	-	-	-
	WBL/T	A	9	0.11	3	A	9	0.10	3
	NBL/R	C	16	0.23	6	C	21	0.50	20
Sensitivity Analysis – WBL Lane									
Scott Street & McRae Avenue Unsignalized	*EBT/R*	-	-	-	-	-	-	-	-
	WBL	*A*	*9*	*0.11*	*3*	*A*	*9*	*0.10*	*3*
	WBT	-	-	-	-	-	-	-	-
	NBL/R	*C*	*16*	*0.23*	*6*	*C*	*21*	*0.50*	*20*
Richmond Road & Tweedsmuir Avenue ***Unsignalized***	EBL/T/R	A	8	0.02	<1	B	10	0.04	1
	WBL/T	A	9	0.02	<1	A	9	0.08	2
	WBR	-	-	-	-	-	-	-	-
	NBL/T/R	C	17	0.13	4	C	24	0.19	8
	SBL/T/R	B	14	0.05	1	E	47	0.30	14
Richmond Road & McRae Avenue ***Signalized***	EBL	A	9	0.21	15	A	24	0.40	#26
	EBT/R	A	10	0.46	57	A	17	0.49	75
	WBL	A	7	0.02	2	A	9	0.12	8
	WBT/R	A	9	0.44	49	D	30	0.89	#203
	NBL	A	22	0.12	8	A	29	0.37	20
	NBT/R	A	13	0.09	6	A	15	0.29	19
	SBL/T/R	A	31	0.59	32	C	37	0.77	54
	Overall	**A**	**13**	**0.50**	**-**	**E**	**26**	**0.92**	**-**
North 319 McRae Avenue Access ***Unsignalized***	WBL/R	A	9	0.01	<1	A	9	0.02	<1
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	7	0.00	<1	A	8	0.01	<1
South 319 McRae Avenue Access ***Unsignalized***	WBL/R	B	10	0.08	2	B	11	0.19	5
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	8	0.03	1	A	8	0.02	<1
Notes:	Saturation flow rate of 1800 veh/h/lane								
	PHF = 0.90								
	# indicates the volume for the 95th percentile cycle exceeds capacity								

In general, the existing intersections operated well during the peak hours with no high delays or capacity issues noted. At the intersection of Richmond Road and McRae Avenue, the 95th percentile cycle exceeds capacity for the eastbound left-turn, and the westbound shared through / right movement in the PM peak. The V/C ratio for these movements is less than one and it can therefore be assumed that in practice the 95th percentile queues will rarely be exceeded.

While a left-turn lane has been found to be warranted at the intersection of Scott Street and McRae Avenue, analysis of the intersection with a westbound left-turn lane has been performed as part of a “sensitivity analysis” in order to also analyze the true existing conditions at this intersection.

16.2.2 2022 Future Background

The 2022 future background intersection volumes and other development traffic has been analyzed to allow a comparison between the future volumes with and without the proposed development. Table 23 summarizes the operational analysis of 2022 future background conditions. Appendix M contains the 2022 Future Background Synchro sheets.

Table 23: 2022 Future Background Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95th)	LOS	Delay	V/C	Q (95th)
Scott Street & Tweedsmuir Avenue ***Unsignalized***	EBL/T/R	A	0	-	0	A	0	-	0
	WBL/T/R	A	9	0.01	<1	A	8	0.01	<1
	NBL/T/R	B	13	0.08	2	B	15	0.10	3
	SBL/T/R	E	39	0.05	2	E	47	0.07	2
Scott Street & Pedestrian Crossing ***Signalized***	EBT	A	10	0.48	63	A	9	0.41	50
	WBT	A	7	0.26	29	A	9	0.43	54
	Overall	**A**	**9**	**0.38**	**-**	**A**	**9**	**0.34**	**-**
Scott Street & McRae Avenue ***Unsignalized***	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	9	0.12	3	A	9	0.11	3
	WBT	-	-	-	-	-	-	-	-
	NBL/R	C	17	0.29	9	C	21	0.52	22
Richmond Road & Tweedsmuir Avenue ***Unsignalized***	EBL/T/R	A	8	0.02	<1	B	10	0.04	1
	WBL/T	A	9	0.01	<1	A	9	0.08	2
	WBR	-	-	-	-	-	-	-	-
	NBL/T/R	C	16	0.12	3	C	23	0.17	5
	SBL/T/R	B	14	0.05	1	E	44	0.27	8
Richmond Road & McRae Avenue ***Signalized***	EBL	A	9	0.23	16	A	24	0.44	#26
	EBT/R	A	10	0.44	54	A	17	0.50	75
	WBL	A	7	0.02	2	A	9	0.12	8
	WBT/R	A	10	0.46	53	D	30	0.90	#203
	NBL	A	22	0.11	8	A	29	0.32	20
	NBT/R	A	13	0.09	6	A	15	0.27	19
	SBL/T/R	B	32	0.61	34	C	37	0.80	54
	Overall	**A**	**13**	**0.50**	**-**	**E**	**28**	**0.94**	**-**
North 319 McRae Avenue Access ***Unsignalized***	WBL/R	A	9	0.00	<1	A	9	0.01	<1
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	7	0.00	<1	A	8	0.01	<1
South 319 McRae Avenue Access ***Unsignalized***	WBL/R	A	10	0.07	2	B	11	0.17	5
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	8	0.03	1	A	8	0.02	<1
Notes:	Saturation flow rate of 1800 veh/h/lane								
	PHF = 1.00								
	# indicates the volume for the 95th percentile cycle exceeds capacity								

With the addition of background growth to reflect the 2022 horizon as well as traffic generated from surrounding developments, the existing intersections are anticipated to operate with similar operational characteristics to the existing conditions, and well within the City of Ottawa operational thresholds.

At the intersection of Richmond Road and McRae Avenue, the 95th percentile cycle exceeds capacity for the eastbound left-turn, and the westbound shared through / right movement in the PM peak. The V/C ratio for these movements is less than one and it can therefore be assumed that in practice the 95^{th} percentile queues will rarely be exceeded.

It is noted that the intersection LOS in the PM peak at Richmond Road and McRae Avenue is approaching a LOS F primarily as a result of the westbound through / right-turn movement. It is recognized that a right-turn lane would improve the operation of this movement to a more favourable LOS and therefore reduce the overall intersection LOS. Given the space constraints of the hydro pylon on the northeast corner of the intersection, a right-turn lane is not a feasible mitigation measure. Additionally, no individual movements have a LOS F.

16.2.3 2027 Future Background

The 2027 future background intersection volumes and other development traffic has been analyzed to allow a comparison between the future volumes with and without the proposed development. Table 24 summarizes the operational analysis of 2027 future background conditions. Appendix N contains the 2027 Future Background Synchro sheets.

Table 24: 2027 Future Background Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95th)	LOS	Delay	V/C	Q (95th)
Scott Street & Tweedsmuir Avenue ***Unsignalized***	EBL/T/R	A	0	-	0	A	0	-	0
	WBL/T/R	A	9	0.01	<1	A	9	0.02	<1
	NBL/T/R	B	14	0.10	3	C	16	0.13	4
	SBL/T/R	E	48	0.08	2	**F**	**60**	**0.10**	**3**
Scott Street & Pedestrian Crossing ***Signalized***	EBT	B	10	0.53	73	A	9	0.45	57
	WBT	A	8	0.29	33	A	10	0.48	62
	Overall	**A**	**9**	**0.42**	**-**	**A**	**9**	**0.38**	**-**
Scott Street & McRae Avenue ***Unsignalized***	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	9	0.13	4	A	9	0.13	3
	WBT	-	-	-	-	-	-	-	-
	NBL/R	C	19	0.34	11	D	28	0.63	32
Richmond Road & Tweedsmuir Avenue ***Unsignalized***	EBL/T/R	A	8	0.02	1	B	11	0.05	1
	WBL/T	A	9	0.02	<1	A	9	0.09	2
	WBR	-	-	-	-	-	-	-	-
	NBL/T/R	C	19	0.15	4	D	30	0.25	16
	SBL/T/R	C	15	0.06	2	**F**	**66**	**0.40**	**27**
Richmond Road & McRae Avenue ***Signalized***	EBL	A	10	0.27	18	C	63	0.74	#42
	EBT/R	A	11	0.49	62	A	21	0.57	84
	WBL	A	7	0.02	2	A	10	0.14	9
	WBT/R	A	11	0.51	60	**F**	**61**	**1.03**	**#229**
	NBL	A	22	0.12	8	A	26	0.34	21
	NBT/R	A	13	0.09	7	A	14	0.28	20
	SBL/T/R	B	34	0.65	37	D	44	0.84	#78
	Overall	**A**	**14**	**0.55**	**-**	**F**	**44**	**1.05**	**-**
North 319 McRae Avenue Access ***Unsignalized***	WBL/R	A	9	0.00	<1	A	10	0.01	<1
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	7	0.00	<1	A	8	0.01	<1
South 319 McRae Avenue Access ***Unsignalized***	WBL/R	B	10	0.07	2	B	11	0.18	5
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	8	0.03	1	A	8	0.02	1
Notes:	Saturation flow rate of 1800 veh/h/lane								
	PHF = 1.00								
	# indicates the volume for the 95th percentile cycle exceeds capacity								

With the addition of background growth to reflect the 2027 horizon as well as traffic generated from surrounding developments, with a few exceptions, the existing intersections are anticipated to operate with similar operational characteristics to the existing conditions, and well within the City of Ottawa operational thresholds.

At the intersection of Richmond Road and McRae Avenue, the 95th percentile cycle exceeds capacity for the eastbound left-turn, the shared southbound left / through / right movement, and the westbound shared through

/ right movement in the PM peak. The V/C ratio for the eastbound left-turn, and the shared southbound left / through / right movement movements is less than one and it can therefore be assumed that in practice the 95th percentile queues will rarely be exceeded.

The southbound shared left-turn / through / right-turn movement at the intersection of Scott Street and Tweedsmuir Avenue is shown to operate with a LOS F during the PM peak period. At this intersection, the southbound approach volumes are very low and the eastbound and westbound through volumes are very high in comparison. Additionally, the southbound approach volumes will be primarily buses and as such have been coded as a 100% Heavy Vehicle percentage. Considering these factors, as well as the low V/C ratio of 0.10 for this movement, no mitigation measures are suggested in order to improve operation of the southbound approach.

The southbound shared left-turn / through / right-turn movement at the intersection of Richmond Road and Tweedsmuir Avenue is shown to operate with a LOS F during the PM peak period. At this intersection, the southbound approach volumes are very low and the eastbound and westbound through volumes are very high in comparison. Additionally, a low V/C ratio of 0.40 is shown for this movement. As such, no mitigation measures are suggested in order to improve operation of the southbound approach.

The westbound shared through / right-turn movement at the intersection of Richmond Road and McRae Avenue is shown to operate with a LOS F during the PM peak period. At this intersection, it is recognized that a right-turn lane would improve the operation of this movement to a more favourable LOS however, given the space constraints of the hydro pylon on the northeast corner of the intersection, a right-turn lane is not a feasible mitigation measure. As such, no mitigation measures are suggested in order to improve operation of the westbound approach.

16.2.4 2022 Total Future

The 2022 total future intersection volumes, including the site generated traffic and other development traffic, has been analyzed to understand the impact of the subject development on the Study Area intersections. Table 25 summarizes the operational analysis of the 2022 total future conditions. Appendix O contains the 2022 Future Total Synchro Sheets.

Table 25: 2022 Total Future Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95th)	LOS	Delay	V/C	Q (95th)
Scott Street & Tweedsmuir Avenue ***Unsignalized***	EBL/T/R	A	0	-	0	A	0	-	0
	WBL/T/R	A	9	0.01	<1	A	8	0.01	<1
	NBL/T/R	B	13	0.08	2	B	15	0.10	3
	SBL/T/R	E	39	0.05	2	E	47	0.07	2
Scott Street & Pedestrian Crossing ***Signalized***	EBT	A	10	0.48	63	A	10	0.47	50
	WBT	A	7	0.26	29	B	10	0.49	54
	Overall	**A**	**9**	**0.38**	**-**	**A**	**10**	**0.34**	**-**
Scott Street & McRae Avenue ***Unsignalized***	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	9	0.13	3	A	9	0.14	4
	WBT	-	-	-	-	-	-	-	-
	NBL/R	C	17	0.35	11	C	24	0.57	26
Richmond Road & Tweedsmuir Avenue ***Unsignalized***	EBL/T/R	A	8	0.02	<1	B	10	0.04	1
	WBL/T	A	9	0.01	<1	A	9	0.08	2
	WBR	-	-	-	-	-	-	-	-
	NBL/T/R	C	17	0.13	3	C	24	0.19	5
	SBL/T/R	B	15	0.05	1	**F**	**50**	**0.30**	**9**
Richmond Road & McRae Avenue ***Signalized***	EBL	A	10	0.27	18	C	57	0.74	#46
	EBT/R	A	11	0.46	54	A	19	0.52	73
	WBL	A	8	0.02	2	A	10	0.12	8
	WBT/R	A	11	0.49	54	E	49	0.99	#211
	NBL	A	21	0.11	8	A	24	0.30	19
	NBT/R	A	13	0.08	6	A	13	0.25	18
	SBL/T/R	C	39	0.75	#47	D	44	0.85	#81
	Overall	**A**	**16**	**0.57**	**-**	**F**	**39**	**1.02**	**-**
North 319 McRae Avenue Access ***Unsignalized***	WBL/R	A	9	0.00	<1	A	9	0.01	<1
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	8	0.00	<1	A	8	0.01	<1
South 319 McRae Avenue Access ***Unsignalized***	WBL/R	B	10	0.08	2	B	12	0.19	5
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	8	0.03	1	A	8	0.02	<1
McRae Avenue & Site Access #1 ***Unsignalized***	EBL/R	B	10	0.11	3	B	11	0.08	2
	NBL/T	A	8	0.01	<1	A	8	0.04	1
	SBT/R	-	-	-	-	-	-	-	-
Notes:	Saturation flow rate of 1800 veh/h/lane								
	PHF = 1.00								
	# indicates the volume for the 95th percentile cycle exceeds capacity								

With the addition of the site generated traffic, the Study Area intersections are expected to operate with similar operational characteristics as the 2022 future background conditions, and well within the City of Ottawa operational thresholds.

At the intersection of Richmond Road and McRae Avenue, the 95th percentile cycle exceeds capacity for the southbound left / through / right movement in the AM peak period and the eastbound left-turn, the shared southbound left / through / right movement, and the westbound shared through / right movement in the PM peak. The V/C ratio for these movements is less than one and it can therefore be assumed that in practice the 95th percentile queues will rarely be exceeded.

The southbound shared left-turn / through / right-turn movement at the intersection of Richmond Road and Tweedsmuir Avenue is shown to operate with a LOS F during the PM peak period. At this intersection, the southbound approach volumes are very low and the eastbound and westbound through volumes are very high in comparison. Additionally, a low V/C ratio of 0.30 is shown for this movement. As such, no mitigation measures are suggested in order to improve operation of the southbound approach.

It is noted that the intersection LOS in the PM peak at Richmond Road and McRae Avenue is a LOS F, primarily as a result of the westbound through / right-turn movement. It is recognized that a right-turn lane would improve the operation of this movement to a more favourable LOS and therefore reduce the overall intersection LOS. Given the space constraints of the hydro pylon on the northeast corner of the intersection, a right-turn lane is not a feasible mitigation measure. Additionally, no individual movements have a LOS F.

16.2.5 2027 Total Future

The 2027 total future intersection volumes, including the site generated traffic and other development traffic, has been analyzed to understand the impact of the subject development on the Study Area intersections. Table 26 summarizes the operational analysis of the 2027 total future conditions. Appendix P contains the 2027 Future Total Synchro Sheets.

Table 26: 2027 Total Future Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95th)	LOS	Delay	V/C	Q (95th)
Scott Street & Tweedsmuir Avenue ***Unsignalized***	EBL/T/R	A	0	-	0	A	0	-	0
	WBL/T/R	A	9	0.01	<1	A	9	0.02	<1
	NBL/T/R	B	14	0.10	3	C	16	0.13	4
	SBL/T/R	E	48	0.08	2	**F**	**60**	**0.10**	**3**
Scott Street & Pedestrian Crossing ***Signalized***	EBT	B	12	0.61	73	B	10	0.51	57
	WBT	A	8	0.33	33	B	11	0.54	62
	Overall	**A**	**11**	**0.42**	**-**	**A**	**11**	**0.37**	**-**
Scott Street & McRae Avenue ***Unsignalized***	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	9	0.14	4	A	9	0.13	4
	WBT	-	-	-	-	-	-	-	-
	NBL/R	C	19	0.37	12	D	29	0.65	34
Richmond Road & Tweedsmuir Avenue ***Unsignalized***	EBL/T/R	A	8	0.02	1	B	11	0.05	1
	WBL/T	A	9	0.02	<1	A	9	0.09	2
	WBR	-	-	-	-	-	-	-	-
	NBL/T/R	C	19	0.15	4	D	32	0.26	17
	SBL/T/R	C	16	0.06	2	**F**	**72**	**0.42**	**29**
Richmond Road & McRae Avenue ***Signalized***	EBL	A	11	0.29	19	E	119	0.98	#48
	EBT/R	A	11	0.49	62	A	21	0.59	84
	WBL	A	8	0.02	2	A	10	0.15	9
	WBT/R	A	11	0.52	61	**F**	**75**	**1.08**	**#233**
	NBL	A	22	0.12	8	A	25	0.32	21
	NBT/R	A	13	0.09	7	A	14	0.27	20
	SBL/T/R	B	37	0.70	41	D	44	0.85	#84
	Overall	**A**	**15**	**0.57**	**-**	**F**	**53**	**1.07**	**-**
North 319 McRae Avenue Access ***Unsignalized***	WBL/R	A	9	0.00	<1	A	10	0.01	<1
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	7	0.00	<1	A	8	0.01	<1
South 319 McRae Avenue Access ***Unsignalized***	WBL/R	B	10	0.07	2	B	11	0.18	5
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	A	8	0.03	1	A	8	0.02	<1
McRae Avenue & Site Access #1 ***Unsignalized***	EBL/R	A	10	0.03	1	B	10	0.02	1
	NBL/T	A	8	0.01	<1	A	8	0.01	<1
	SBT/R	-	-	-	-	-	-	-	-
Notes:	Saturation flow rate of 1800 veh/h/lane								
	PHF = 1.00								
	# indicates the volume for the 95th percentile cycle exceeds capacity								

With the addition of the site generated traffic, the Study Area intersections are expected to operate with similar operational characteristics as the 2027 future background conditions, and, with a few exceptions, well within the City of Ottawa operational thresholds.

At the intersection of Richmond Road and McRae Avenue, the 95th percentile cycle exceeds capacity for the eastbound left-turn, the shared southbound left / through / right movement, and the westbound shared through / right movement in the PM peak. The V/C ratio for the eastbound left-turn, and the shared southbound left / through / right movement movements is less than one and it can therefore be assumed that in practice the 95th percentile queues will rarely be exceeded.

The southbound shared left-turn / through / right-turn movement at the intersection of Scott Street and Tweedsmuir Avenue is shown to operate with a LOS F during the PM peak period. At this intersection, the southbound approach volumes are very low and the eastbound and westbound through volumes are very high in comparison. Additionally, the southbound approach volumes will be primarily buses and as such have been coded as a 100% Heavy Vehicle percentage. Considering these factors, as well as the low V/C ratio of 0.10 for this movement, no mitigation measures are suggested in order to improve operation of the southbound approach.

The southbound shared left-turn / through / right-turn movement at the intersection of Richmond Road and Tweedsmuir Avenue is shown to operate with a LOS F during the PM peak period. At this intersection, the southbound approach volumes are very low and the eastbound and westbound through volumes are very high in comparison. Additionally, a low V/C ratio of 0.42 is shown for this movement. As such, no mitigation measures are suggested in order to improve operation of the southbound approach.

The westbound shared through / right-turn movement at the intersection of Richmond Road and McRae Avenue is shown to operate with a LOS F during the PM peak period. At this intersection, it is recognized that a right-turn lane would improve the operation of this movement to a more favourable LOS however, given the space constraints of the hydro pylon on the northeast corner of the intersection, a right-turn lane is not a feasible mitigation measure. As such, no mitigation measures are suggested in order to improve operation of the westbound approach.

16.2.6 Intersection MMLOS

As intersection MMLOS is only undertaken at signalized intersections, only the intersection of Richmond Road and McRae Avenue and the intersection of Tweedsmuir Avenue and Scott Street can be analyzed. The MMLOS worksheets have been provided in Appendix I.

Table 27 summarizes the MMLOS analysis for the network signalized intersection in the Study Area for all horizons.

Table 27: Study Area Intersection MMLOS Analysis-All Horizons

Intersection	Horizon	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
		PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Richmond Road & McRae Avenue	Existing	**E**	A	D	D	**E(E)**	D	**E**	D	B(C)	E
	2022 FB	**E**		D		**E(E)**		**E**		A(C)	
	2022 FT	**E**		D		**E(F)**		**E**		B(D)	
	2027 FB	**E**		D		**E(F)**		**E**		B(E)	
	2027 FT	**E**		D		**E(F)**		**E**		B(E)	
Tweedsmuir Avenue & Scott Street	Existing	**B**	A	C	D	B(B)	D	N/A	N/A	A(A)	E
	2022 FB	**B**		C		B(B)				A(A)	
	2022 FT	**B**		C		B(C)				A(A)	
	2027 FB	**B**		C		C(B)				A(A)	
	2027 FT	**B**		C		C(C)				A(A)	

The target levels of service within 600 metres of a rapid transit station were used to evaluate the Study Area intersections.

The existing pedestrian LOS does not meet the target at either intersection at any analysis horizon due to large pedestrian crossing distances. The bicycle LOS meets the targets at both intersections. The transit LOS target is met at the intersection of Tweedsmuir Avenue and Scott Street in both peak periods but is not met at the intersection of Richmond Road and McRae Avenue in either peak period as it is limited due to signal delay. The truck LOS is not met at intersection of Richmond Road and McRae Avenue due to low number of receiving lanes on the departure from the intersection and has not been evaluated at the intersection of Tweedsmuir Avenue and Scott Street as Tweedsmuir Avenue is not a truck route, arterial road, or key delivery access. Auto LOS meets the targets at both intersections.

16.2.7 Intersection Design

No intersection changes are recommended based on the above PLOS, BLOS, TLOS, TkLOS or vehicle LOS analysis above.

17 Conclusions

This Transportation Impact Assessment has documented the existing and future transportation conditions, for all travel modes, in the Study Area. The following conclusions can be offered based on the foregoing:

A. The proposed development, located at 320 McRae Avenue, is a mixed-use development which will consist of a four-storey commercial / residential tower, and a commercial / residential tower with both a 26-storey and a six-storey component. The development is expected to have 820 square metres of commercial space, 325 apartment units, 11 townhouse units, 183 underground automobile parking spaces and 187 bicycle parking spaces
B. The proposed development will have two full-movement accesses, one approximately 40 metres, curb to curb, south of Scott Street on Tweedsmuir Avenue (Site Access #1) and the second approximately 120 metres, curb to curb, south of Scott Street on McRae Avenue (Site Access #2). Site Access #1 is a loading access and is intended for truck use only. A drop-off area is located on McRae Avenue, approximately 23 metres, curb to curb, south of Scott Street.
C. The proposed development is within 400 metres of the existing Westboro Transitway Station and will be within 400 metres of the future Westboro LRT Station. As such, can be considered a Transit Oriented Development area.
D. The existing Study Area is currently served by bus routes #11, 50, 81 and 153 as well as the Westboro Transitway Station.
E. The previous five years of collision history at the existing Study Area intersections has been reviewed. No patterns emerged that indicated that mitigation measures or further monitoring was required.
F. Using the TRANS study, the residential trip generation rates were calculated and using the ITE trip generation equations, the retail rates were calculated.
G. The Ottawa West area mode shares were used for the 2022 horizon and the TOD mode shares were used for the 2027 horizon to determine the trip generation by mode.
H. The proposed development is anticipated to generate an estimated 117 AM and 134 PM peak hour two-way person trips in the 2022 horizon and an estimated 34 AM and 41 PM peak hour two-way person trips in the 2027 horizon.

I. Minimum vehicle parking space requirements are met with an excess of eight spaces and bicycle parking space requirements are met in excess of ten spaces.
J. The vertical geometry of the underground parking ramp has been examined and analyzed.
K. Turning templates indicate that the proposed accesses and circulation route within the development can accommodate the expected garbage trucks and vehicles.
L. It was found that the road segments of Tweedsmuir Avenue, Scott Street and McRae Avenue will not meet the PLOS target. Additionally, Tweedsmuir Avenue will not meet the BLOS target and Scott Street will not meet the Scott Street target. No resulting improvements are recommended.
M. Signal warrants and turning lane warrants were examined for Site Access #1. Neither signalization or turning lanes were warranted.
N. Signal warrants have been examined at the unsignalized intersections within the Study Area. Signalization was not found to be warranted.
O. A westbound left-turn lane was found to be warranted in the existing, 2022 future background, 2027 future background, 2022 future total and the 2027 future total horizons for the intersection of Scott Street and McRae Avenue.
P. The Study Area intersections operate satisfactorily during the peak hours in the existing conditions operational analysis.
Q. The Study Area intersections operate satisfactorily during the peak hours in the 2022 future background operational analysis.
R. The Study Area intersections operate satisfactorily during the peak hours in the 2022 future total operational analysis with similar operational characteristics as the 2022 future background conditions.
S. The Study Area intersections operate satisfactorily during the peak hours in the 2027 future background operational analysis.
T. The Study Area intersections operate satisfactorily during the peak hours in the 2027 future total operational analysis with similar operational characteristics as the 2027 future background conditions.
U. The PLOS, BLOS, TLOS, and TkLOS were evaluated at both signalized Study Area intersections (Scott Street at Tweedsmuir Avenue and Richmond Road at McRae Avenue). In some cases, the MMLOS targets were not met. No intersection alterations or mitigation measures are suggested.

The proposed development will function within the Study Area Road Network. It is recommended that, from a transportation perspective, the proposed development application process proceed.

Prepared By:

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Reviewed By:

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M. B. CROCKFORD
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September 21, 2020
PROVINCE OF ONTARIO

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Appendix A

TIA Screening Form and PM Certification Form

TIA Plan Reports

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

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

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

CERTIFICATION

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

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

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

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

Dated at ___Newmarket__________ this __26__ day of ________July________, 2019.
(City)

Name: ____________Mark Crockford______________________________
(Please Print)

Professional Title: __________Professional Engineer___________________________

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

Office Contact Information (Please Print)
Address: 628 Haines Road
City / Postal Code: Newmarket / L3Y 6V5
Telephone / Extension: (905) 251-4070
E-Mail Address: Mark.Crockford@CGHTransportation.com

LICENSED PROFESSIONAL ENGINEER
M. B. CROCKFORD
100152912
July 26, 2019
PROVINCE OF ONTARIO

CGH TRANSPORTATION

13 Markham Avenue
Ottawa ON K2G 3Z1

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: 21-Sep-20
Project Number: 2019-29
Project Reference: GWL 320 McRae

1.1 Description of Proposed Development	
Municipal Address	320 McRae Avenue
Description of Location	PLAN 263 LOTS 24 AND 25 PLAN; 273 LOT 12 TO 19
Land Use Classification	Traditional Mainstreet Zone, Parks and Open Spcae Zo
Development Size	336 residential units, 820 square metres of commercial retail, 183 parking spaces, 187 bicycle parking spaces
Accesses	Access on McRae Ave (approximately 130 metres south of the Scott St / McRae Ave intersection). Access on Tweedsmuir Ave (approximately 50 metres south of Scott St / Tweedsmuir Ave intersection)
Phase of Development	Single Phase
Buildout Year	2022
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Townhomes or apartments	
Development Size	336	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?	No
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	Yes
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
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 development?	No
Does the development include a drive-thru facility?	No
Safety Trigger	Yes

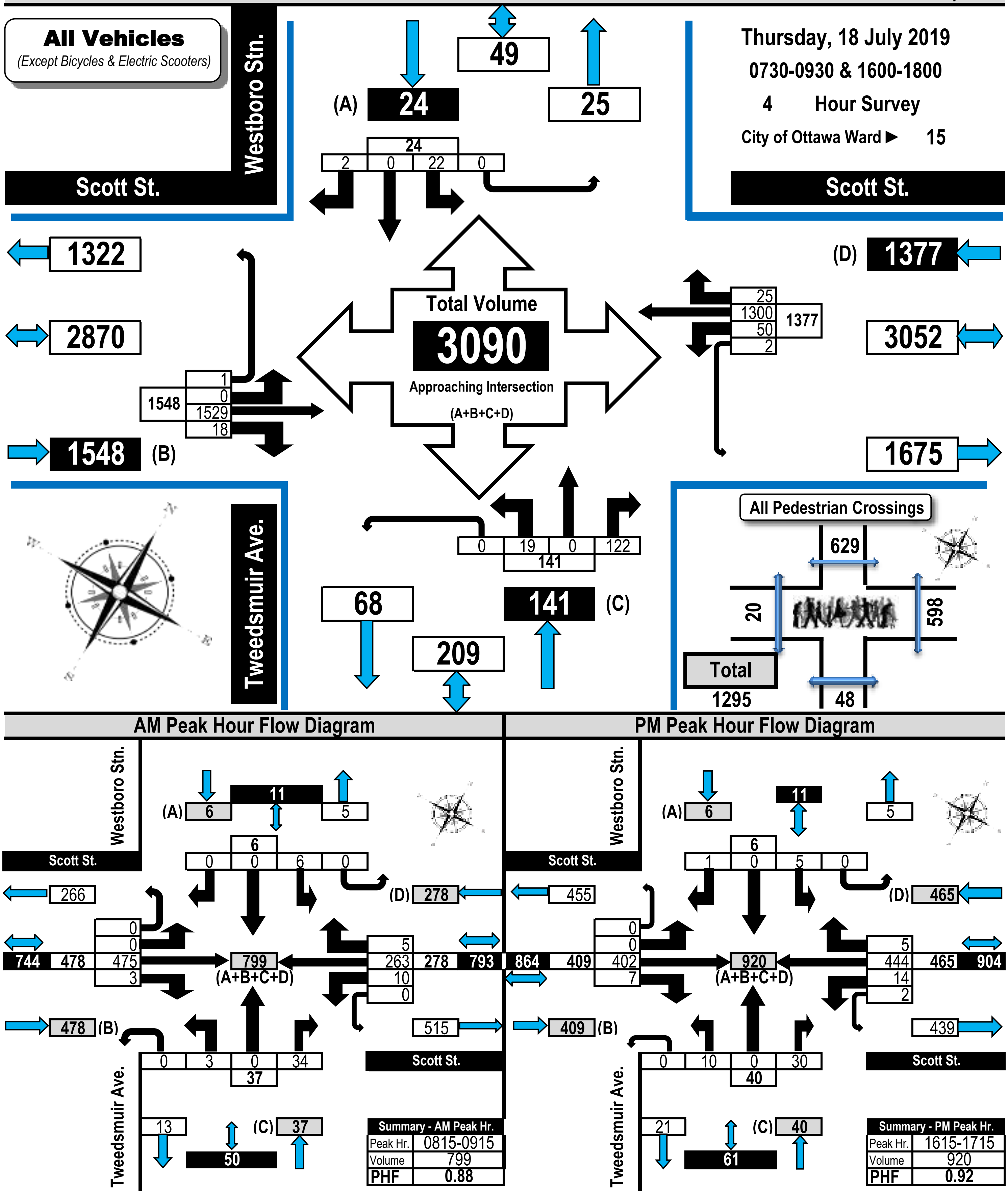
Appendix B

Traffic Data

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

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

Scott Street & Tweedsmuir Avenue — **Ottawa, ON**

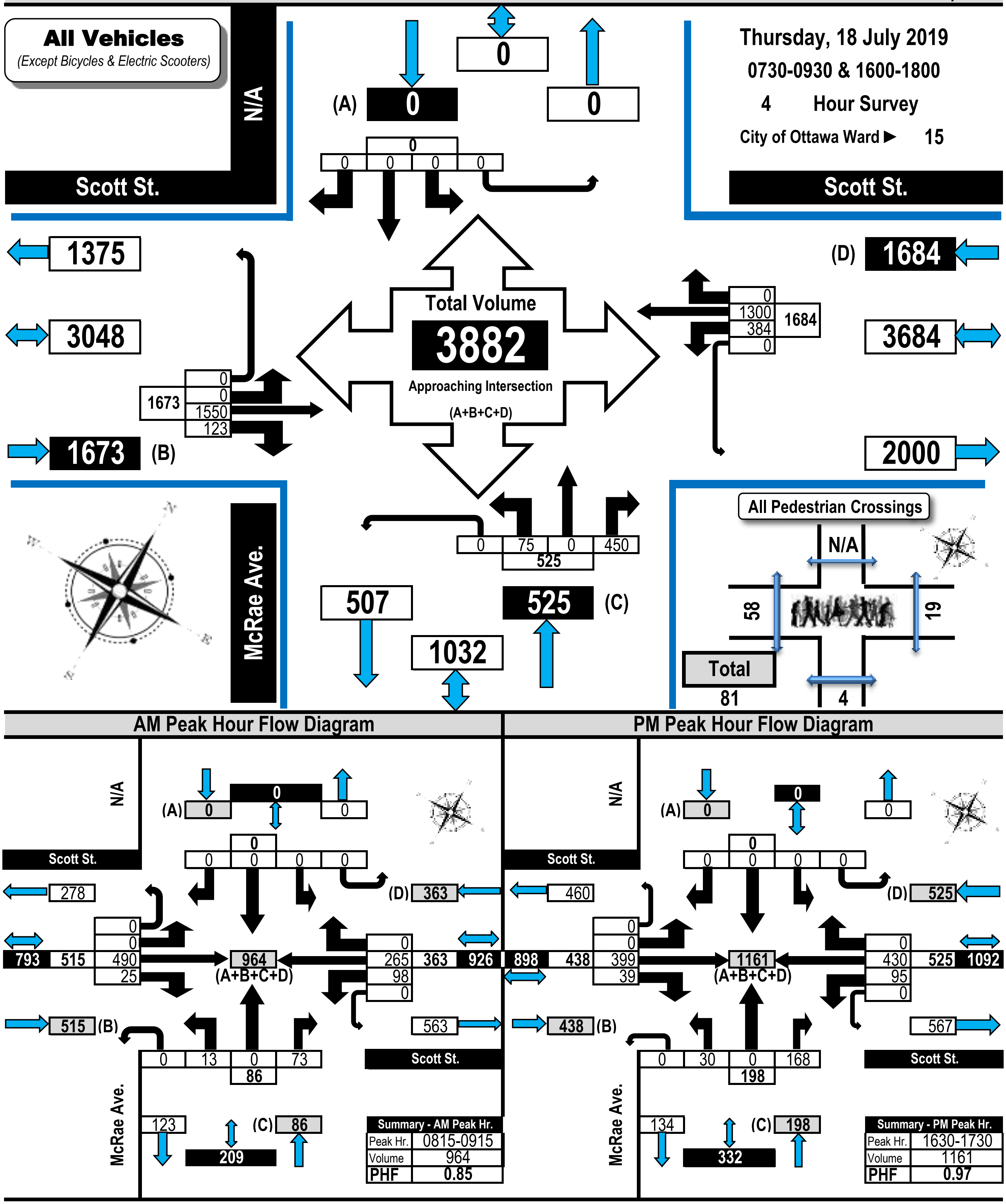


Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams

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

McRae Avenue & Scott Street — **Ottawa, ON**

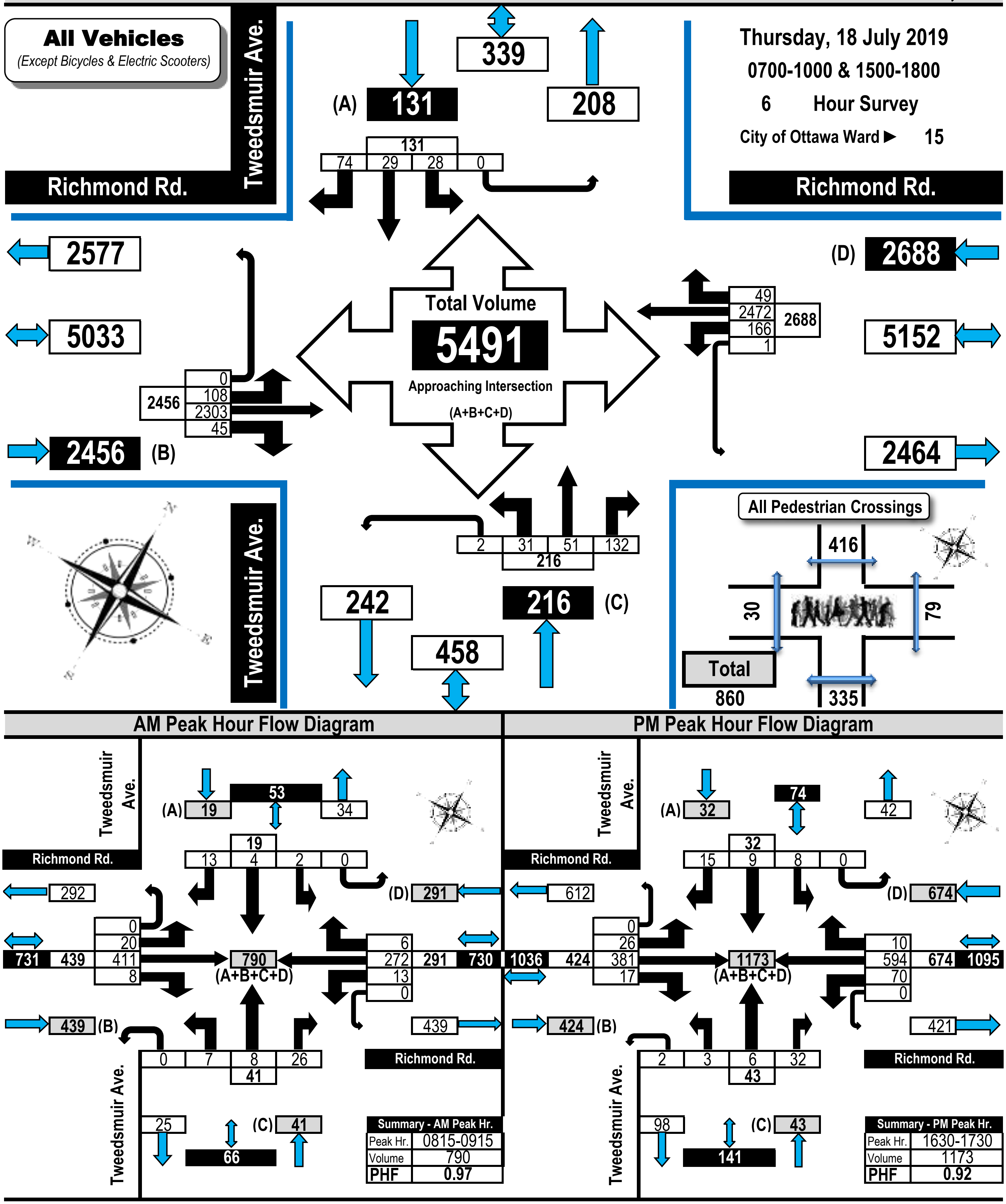
Thursday, 18 July 2019
0730-0930 & 1600-1800
4 Hour Survey
City of Ottawa Ward ▶ 15



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

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

Richmond Road & Tweedsmuir Avenue — Ottawa, ON



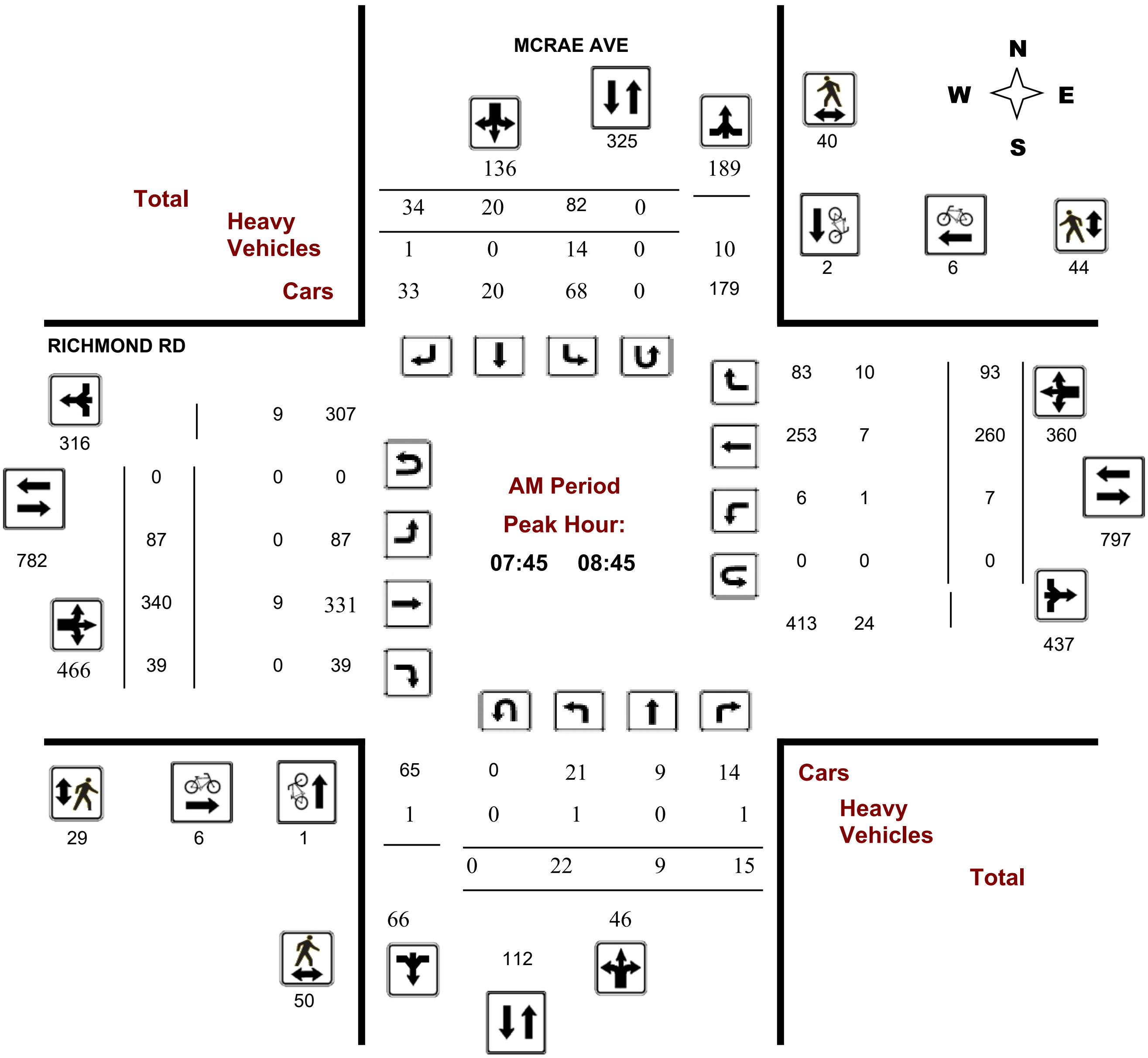
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

MCRAE AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017 **WO No:** 36957

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



Comments

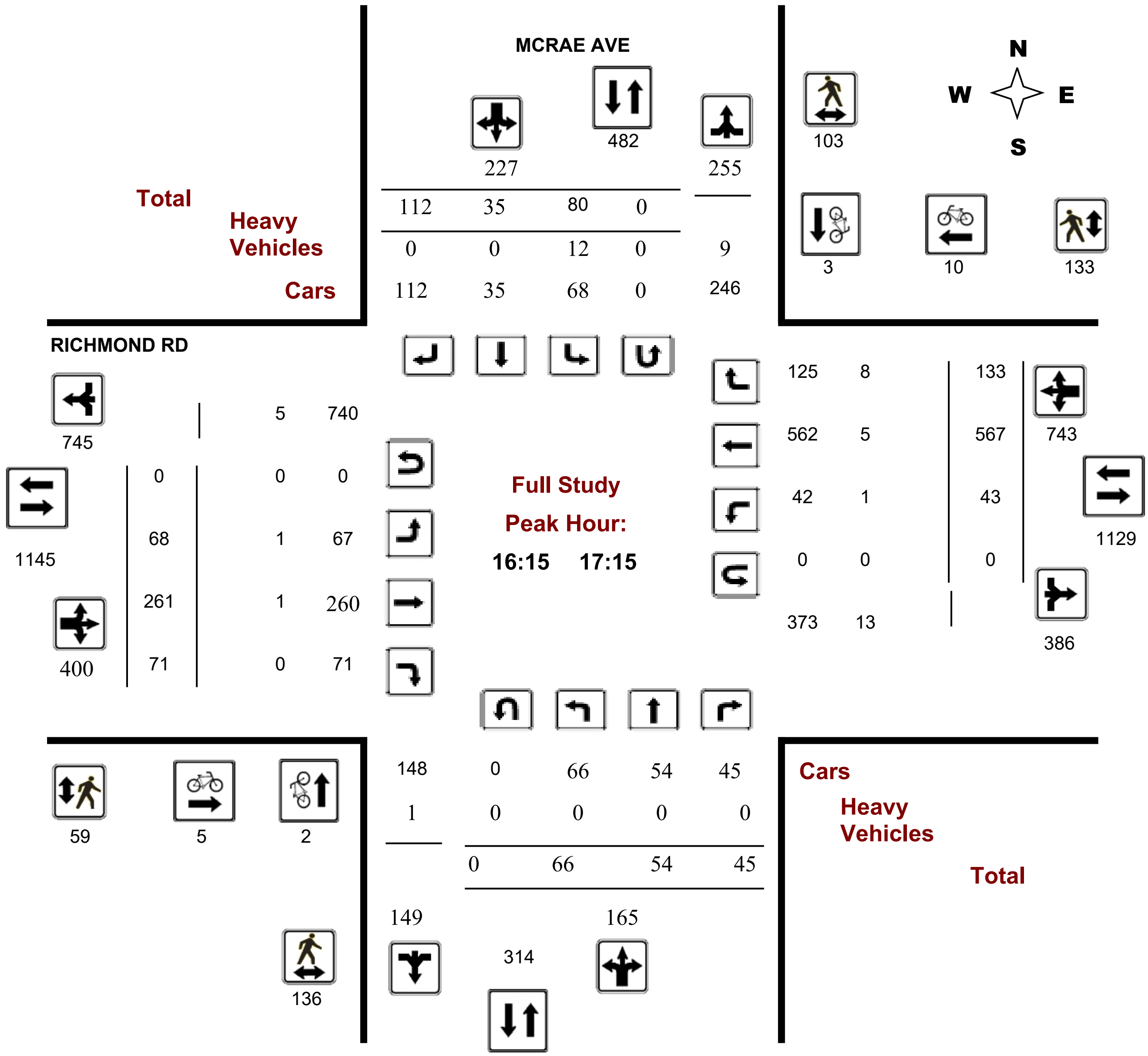
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

MCRAE AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017 **WO No:** 36957

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



Comments

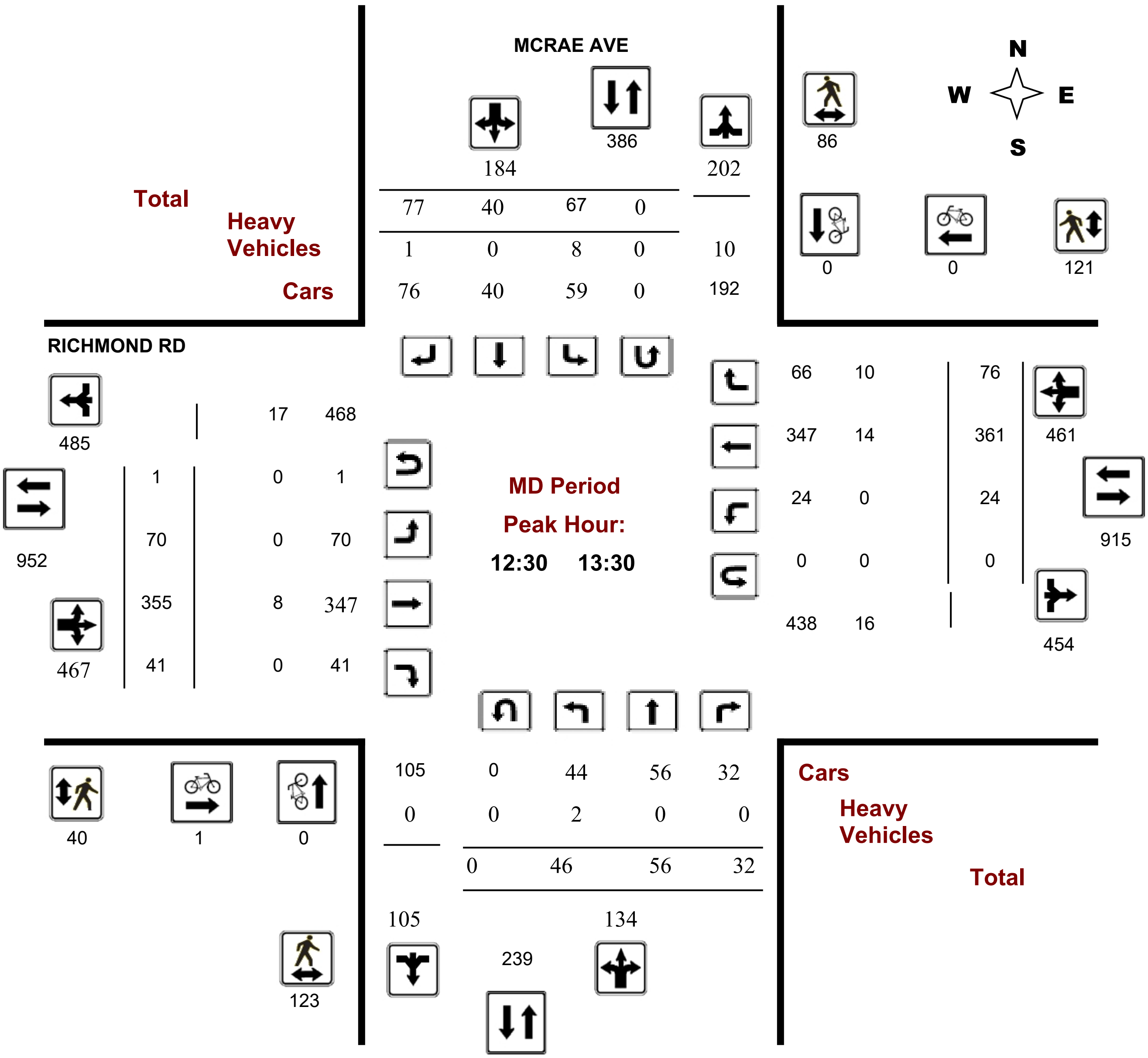
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

MCRAE AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017 **WO No:** 36957

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



Comments

Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

MCRAE AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017

Start Time: 07:00

WO No: 36957

Device: Miovision

MCRAE AVE

N W E S

	227		482		255
Total	112	35	80	0	
Heavy Vehicles	0	0	12	0	9
Cars	112	35	68	0	246

103 | 3 | 10 | 133

RICHMOND RD

745		5	740
	0	0	0
1145	68	1	67
	261	1	260
400	71	0	71

PM Period

Peak Hour:

16:15 17:15

125	8	133	
562	5	567	743
42	1	43	1129
0	0	0	
373	13		386

59 | 5 | 2

Cars	0	66	54	45
Heavy Vehicles	0	0	0	0
Total	0	66	54	45

148 | 1 | 149 | 165 | 314

136

Comments

Transportation Services - Traffic Services

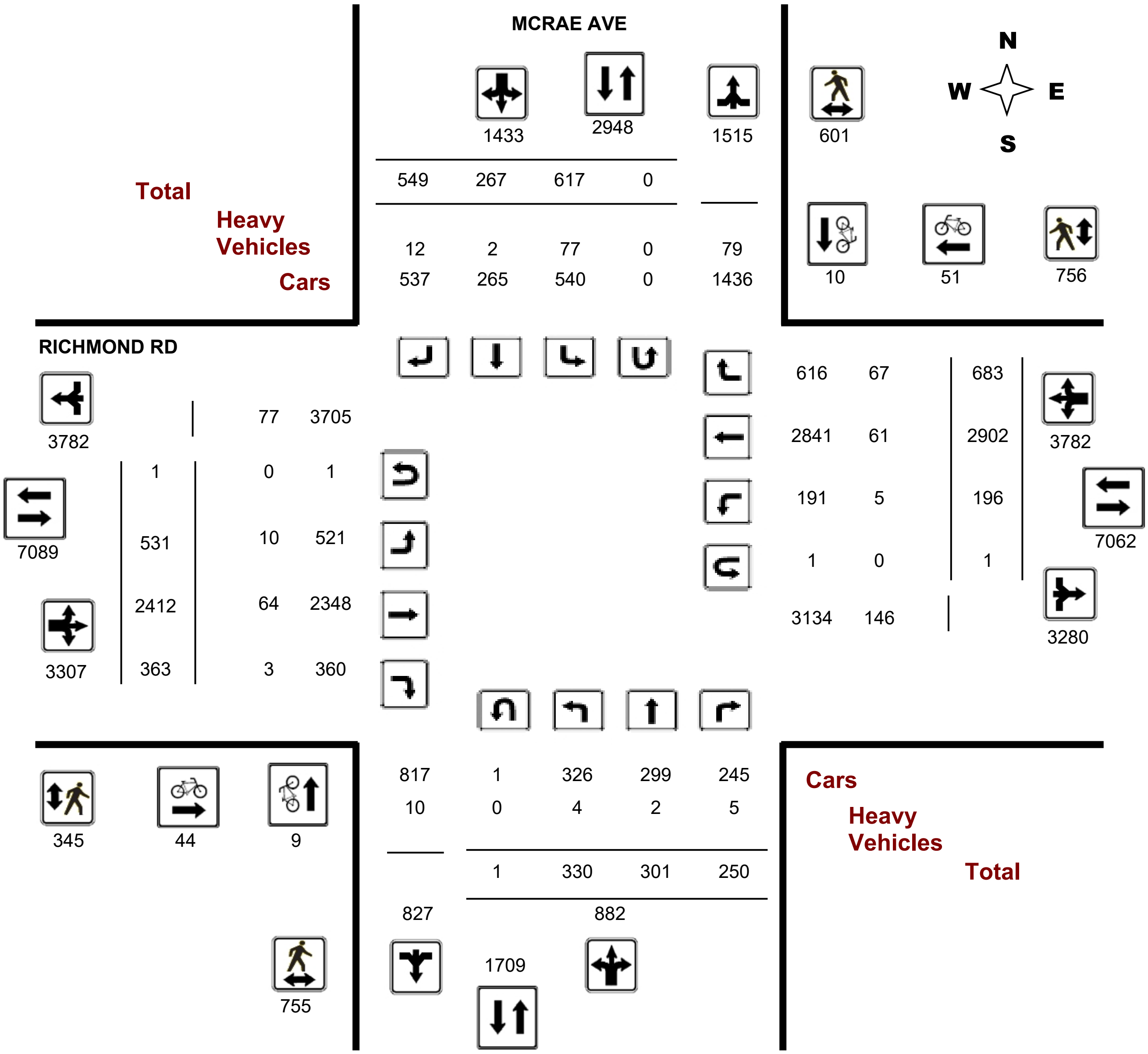
Turning Movement Count - Full Study Diagram

MCRAE AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017

WO#: 36957

Device: Miovision



Comments

Transportation Services - Traffic Services

Work Order
36957

Turning Movement Count - Full Study Summary Report

MCRAE AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017

Total Observed U-Turns

Northbound: 1 Southbound: 0
Eastbound: 1 Westbound: 1

AADT Factor
.90

Full Study

	MCRAE AVE									RICHMOND RD										
	Northbound				Southbound					Eastbound				Westbound						
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	17	6	12	**35**	61	16	25	**102**	**137**	67	310	29	**406**	6	194	67	**267**	**673**	**810**
08:00 09:00	19	12	12	**43**	88	19	41	**148**	**191**	80	318	36	**434**	7	252	93	**352**	**786**	**977**
09:00 10:00	25	18	11	**54**	53	31	41	**125**	**179**	65	277	34	**376**	14	273	66	**353**	**729**	**908**
11:30 12:30	43	36	46	**125**	82	37	72	**191**	**316**	68	327	52	**447**	31	353	68	**452**	**899**	**1215**
12:30 13:30	46	56	32	**134**	67	40	77	**184**	**318**	70	355	41	**466**	24	361	76	**461**	**927**	**1245**
15:00 16:00	53	51	42	**146**	87	33	84	**204**	**350**	54	284	50	**388**	32	423	77	**532**	**920**	**1270**
16:00 17:00	65	54	50	**169**	82	37	106	**225**	**394**	59	255	63	**377**	43	528	137	**708**	**1085**	**1479**
17:00 18:00	62	68	45	**175**	97	54	103	**254**	**429**	68	286	58	**412**	39	518	99	**656**	**1068**	**1497**
Sub Total	330	301	250	**881**	617	267	549	**1433**	**2314**	531	2412	363	**3306**	196	2902	683	**3781**	**7087**	**9401**
U Turns				**1**				**0**	**1**				**1**				**1**	**2**	**3**
Total	330	301	250	**882**	617	267	549	**1433**	**2315**	531	2412	363	**3307**	196	2902	683	**3782**	**7089**	**9404**
EQ 12Hr	459	418	348	**1226**	858	371	763	**1992**	**3218**	738	3353	505	**4597**	272	4034	949	**5257**	**9854**	**13072**
AVG 12Hr	413	377	313	**1103**	772	334	687	**1793**	**2896**	664	3017	454	**4137**	245	3630	854	**4731**	**8868**	**11764**
AVG 24Hr	541	493	410	**1445**	1011	438	900	**2348**	**3793**	870	3953	595	**5420**	321	4756	1119	**6198**	**11618**	**15411**

Note: These values are calculated by multiplying the totals by the appropriate expansion factor. **1.39**

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **.90**

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

Comments:

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

Transportation Services - Traffic Services

W.O. 36957

Turning Movement Count - 15 Minute Summary Report

MCRAE AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017

Total Observed U-Turns

Northbound: 1 Southbound: 0
Eastbound: 1 Westbound: 1

	MCRAE AVE									RICHMOND RD									
	Northbound				Southbound					Eastbound				Westbound					
Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	1	0	0	**1**	13	2	5	**20**	**21**	12	63	5	**80**	2	42	10	**54**	**134**	**155**
07:15 07:30	5	3	0	**8**	11	1	7	**19**	**27**	15	65	6	**86**	2	36	15	**53**	**139**	**166**
07:30 07:45	4	3	8	**15**	20	6	6	**32**	**47**	12	83	6	**101**	1	45	22	**68**	**169**	**216**
07:45 08:00	7	0	4	**11**	17	7	7	**31**	**42**	28	99	12	**139**	1	71	20	**92**	**231**	**273**
08:00 08:15	4	2	4	**10**	24	2	5	**31**	**41**	20	81	9	**110**	2	54	22	**78**	**188**	**229**
08:15 08:30	4	3	3	**10**	22	3	12	**37**	**47**	18	78	10	**106**	2	63	29	**94**	**200**	**247**
08:30 08:45	7	4	4	**15**	19	8	10	**37**	**52**	21	82	8	**111**	2	72	22	**96**	**207**	**259**
08:45 09:00	4	3	1	**8**	23	6	14	**43**	**51**	21	77	9	**107**	1	63	20	**84**	**191**	**242**
09:00 09:15	6	3	2	**11**	15	7	9	**31**	**42**	20	79	7	**106**	4	50	16	**70**	**176**	**218**
09:15 09:30	3	3	3	**9**	16	6	18	**40**	**49**	16	61	8	**85**	2	78	18	**98**	**183**	**232**
09:30 09:45	7	3	3	**13**	14	4	8	**26**	**39**	17	69	11	**97**	2	71	12	**85**	**182**	**221**
09:45 10:00	9	9	3	**21**	8	14	6	**28**	**49**	12	68	8	**88**	6	74	20	**100**	**188**	**237**
11:30 11:45	12	8	16	**36**	23	7	17	**47**	**83**	20	83	13	**116**	9	80	17	**106**	**222**	**305**
11:45 12:00	11	5	9	**25**	12	9	15	**36**	**61**	16	90	14	**120**	8	94	13	**115**	**235**	**296**
12:00 12:15	10	10	10	**30**	17	12	20	**49**	**79**	15	81	14	**110**	9	89	22	**120**	**230**	**309**
12:15 12:30	10	13	11	**34**	30	9	20	**59**	**93**	17	73	11	**101**	5	90	16	**111**	**212**	**305**
12:30 12:45	12	15	6	**33**	22	10	25	**57**	**90**	23	77	13	**113**	6	89	12	**107**	**220**	**310**
12:45 13:00	7	14	15	**36**	7	10	17	**34**	**70**	10	88	11	**109**	4	95	19	**118**	**227**	**297**
13:00 13:15	12	17	4	**33**	16	6	18	**40**	**73**	17	87	7	**112**	8	86	20	**114**	**226**	**299**
13:15 13:30	15	10	7	**32**	22	14	17	**53**	**85**	20	103	10	**133**	6	91	25	**122**	**255**	**340**
15:00 15:15	12	16	11	**39**	18	11	16	**45**	**84**	16	78	12	**106**	3	93	18	**114**	**220**	**304**
15:15 15:30	18	10	7	**35**	24	8	18	**50**	**85**	13	78	12	**103**	8	87	18	**113**	**216**	**301**
15:30 15:45	13	8	10	**31**	19	6	25	**50**	**81**	14	70	10	**94**	11	124	24	**159**	**253**	**334**
15:45 16:00	10	17	14	**41**	26	8	25	**59**	**100**	11	58	16	**85**	10	119	17	**146**	**231**	**331**
16:00 16:15	13	17	12	**42**	30	10	20	**60**	**102**	12	60	13	**85**	11	116	24	**152**	**237**	**339**
16:15 16:30	13	12	11	**36**	13	9	28	**50**	**86**	15	59	10	**84**	13	149	50	**212**	**296**	**382**
16:30 16:45	19	8	11	**38**	15	9	31	**55**	**93**	13	73	16	**102**	11	130	35	**176**	**278**	**371**
16:45 17:00	20	17	16	**53**	24	9	27	**60**	**113**	19	63	24	**106**	8	133	28	**169**	**275**	**388**
17:00 17:15	14	17	7	**38**	28	8	26	**62**	**100**	21	66	21	**108**	11	155	20	**186**	**294**	**394**
17:15 17:30	13	15	16	**45**	25	10	26	**61**	**106**	13	69	11	**93**	6	135	26	**167**	**260**	**366**
17:30 17:45	10	17	8	**35**	19	21	27	**67**	**102**	19	79	13	**111**	9	133	27	**169**	**280**	**382**
17:45 18:00	25	19	14	**58**	25	15	24	**64**	**122**	15	72	13	**100**	13	95	26	**134**	**234**	**356**
TOTAL:	330	301	250	**882**	617	267	549	**1433**	**2315**	531	2412	363	**3307**	196	2902	683	**3782**	**7089**	**9404**

Note: U-Turns are included in Totals.

Comment:

Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order
36957

MCRAE AVE @ RICHMOND RD

Count Date: Thursday, April 20, 2017

Start Time: 07:00

Time Period	MCRAE AVE Northbound	MCRAE AVE Southbound	**Street Total**	RICHMOND RD Eastbound	RICHMOND RD Westbound	**Street Total**	**Grand Total**
07:00 08:00	1	1	**2**	12	4	**16**	**18**
08:00 09:00	2	1	**3**	7	8	**15**	**18**
09:00 10:00	2	0	**2**	4	6	**10**	**12**
11:30 12:30	0	1	**1**	3	1	**4**	**5**
12:30 13:30	0	0	**0**	1	0	**1**	**1**
15:00 16:00	0	2	**2**	5	5	**10**	**12**
16:00 17:00	2	1	**3**	8	10	**18**	**21**
17:00 18:00	2	4	**6**	4	17	**21**	**27**
Total	9	10	**19**	44	51	**95**	**114**

Comment:

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

Transportation Services - Traffic Services

W.O.
36957

Turning Movement Count - Heavy Vehicle Report

MCRAE AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017

	MCRAE AVE									RICHMOND RD										
	Northbound				Southbound					Eastbound				Westbound						
Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 08:00	0	0	0	**0**	10	0	2	**12**	**12**	1	10	0	**11**	1	7	10	**18**	**29**	**41**
08:00 09:00	1	0	1	**2**	14	0	1	**15**	**17**	0	10	0	**10**	1	6	13	**20**	**30**	**47**
09:00 10:00	0	1	0	**1**	9	1	3	**13**	**14**	4	8	1	**13**	0	7	7	**14**	**27**	**41**
11:30 12:30	1	0	3	**4**	7	1	2	**10**	**14**	4	18	1	**23**	2	14	7	**23**	**46**	**60**
12:30 13:30	2	0	0	**2**	8	0	1	**9**	**11**	0	8	0	**8**	0	14	10	**24**	**32**	**43**
15:00 16:00	0	0	1	**1**	9	0	3	**12**	**13**	0	8	0	**8**	0	5	6	**11**	**19**	**32**
16:00 17:00	0	1	0	**1**	11	0	0	**11**	**12**	1	0	1	**2**	1	4	7	**12**	**14**	**26**
17:00 18:00	0	0	0	**0**	9	0	0	**9**	**9**	0	2	0	**2**	0	4	7	**11**	**13**	**22**
Sub Total	4	2	5	**11**	77	2	12	**91**	**102**	10	64	3	**77**	5	61	67	**133**	**210**	**312**
U-Turns (Heavy Vehicles)				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	4	2	5	**0**	77	2	12	**91**	**102**	10	64	3	**77**	5	61	67	**133**	**210**	**312**

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
36957

Turning Movement Count - Pedestrian Volume Report

MCRAE AVE @ RICHMOND RD

Count Date: Thursday, April 20, 2017 **Start Time:** 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	7	1	**8**	5	3	**8**	**16**
07:15 07:30	2	6	**8**	5	2	**7**	**15**
07:30 07:45	8	7	**15**	7	9	**16**	**31**
07:45 08:00	17	8	**25**	16	14	**30**	**55**
07:00 08:00	34	22	**56**	33	28	**61**	**117**
08:00 08:15	14	12	**26**	5	13	**18**	**44**
08:15 08:30	10	11	**21**	5	8	**13**	**34**
08:30 08:45	9	9	**18**	3	9	**12**	**30**
08:45 09:00	12	17	**29**	9	21	**30**	**59**
08:00 09:00	45	49	**94**	22	51	**73**	**167**
09:00 09:15	19	4	**23**	2	8	**10**	**33**
09:15 09:30	12	6	**18**	2	18	**20**	**38**
09:30 09:45	13	19	**32**	3	14	**17**	**49**
09:45 10:00	13	25	**38**	0	20	**20**	**58**
09:00 10:00	57	54	**111**	7	60	**67**	**178**
11:30 11:45	42	19	**61**	9	31	**40**	**101**
11:45 12:00	21	20	**41**	11	27	**38**	**79**
12:00 12:15	19	25	**44**	7	24	**31**	**75**
12:15 12:30	21	34	**55**	10	34	**44**	**99**
11:30 12:30	103	98	**201**	37	116	**153**	**354**
12:30 12:45	42	31	**73**	12	34	**46**	**119**
12:45 13:00	37	17	**54**	9	29	**38**	**92**
13:00 13:15	21	18	**39**	8	32	**40**	**79**
13:15 13:30	23	20	**43**	11	26	**37**	**80**
12:30 13:30	123	86	**209**	40	121	**161**	**370**
15:00 15:15	16	20	**36**	6	23	**29**	**65**
15:15 15:30	43	24	**67**	20	33	**53**	**120**
15:30 15:45	27	15	**42**	6	22	**28**	**70**
15:45 16:00	30	26	**56**	11	36	**47**	**103**
15:00 16:00	116	85	**201**	43	114	**157**	**358**
16:00 16:15	26	25	**51**	10	42	**52**	**103**
16:15 16:30	32	21	**53**	9	41	**50**	**103**
16:30 16:45	39	25	**64**	14	36	**50**	**114**
16:45 17:00	30	29	**59**	12	23	**35**	**94**
16:00 17:00	127	100	**227**	45	142	**187**	**414**
17:00 17:15	35	28	**63**	24	33	**57**	**120**
17:15 17:30	41	26	**67**	36	40	**76**	**143**
17:30 17:45	28	30	**58**	34	27	**61**	**119**
17:45 18:00	46	23	**69**	24	24	**48**	**117**
17:00 18:00	150	107	**257**	118	124	**242**	**499**
Total	755	601	**1356**	345	756	**1101**	**2457**

Comment:

Transportation Services - Traffic Services

Work Order
36957

Turning Movement Count - 15 Min U-Turn Total Report

MCRAE AVE @ RICHMOND RD

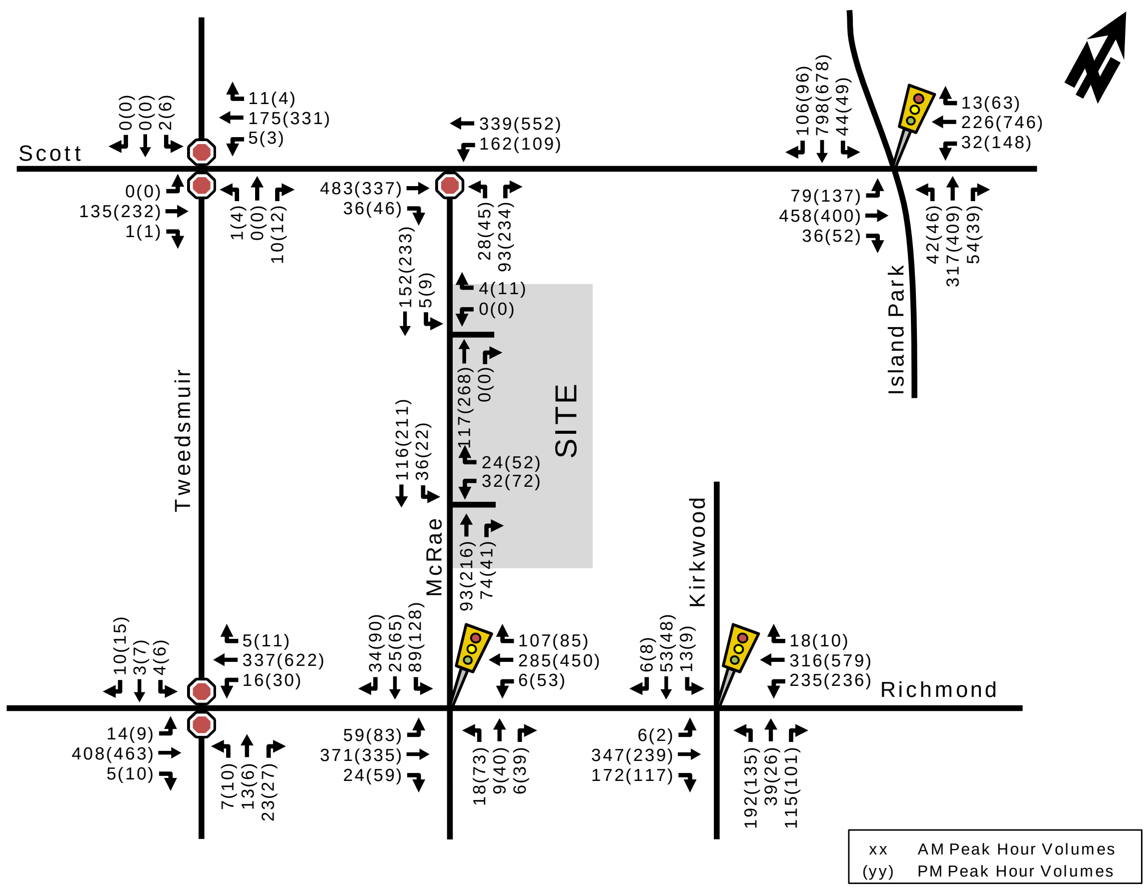
Survey Date: Thursday, April 20, 2017

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	1	0	1
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	1	1
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	1	0	0	0	1
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		1	0	1	1	3

When compared to the original TIS report, there is a net increase of 1 and 11 veh/h during the weekday morning and afternoon peak hours, respectively. This increase in traffic is considered negligible and therefore, the impact on the projected performance of study area intersections and the findings/conclusions of the original Traffic Impact Study remain valid.

It should be noted, the proposed location of the parking garage access/egress has been relocated to be in line with the southern driveway connection to McRae Avenue (originally located behind the proposed on-site building with access/egress closer to the northern driveway connection to McRae Avenue). This will result in a shift in site-generated traffic to/from the southern driveway connection, as depicted in the following Figure 1.

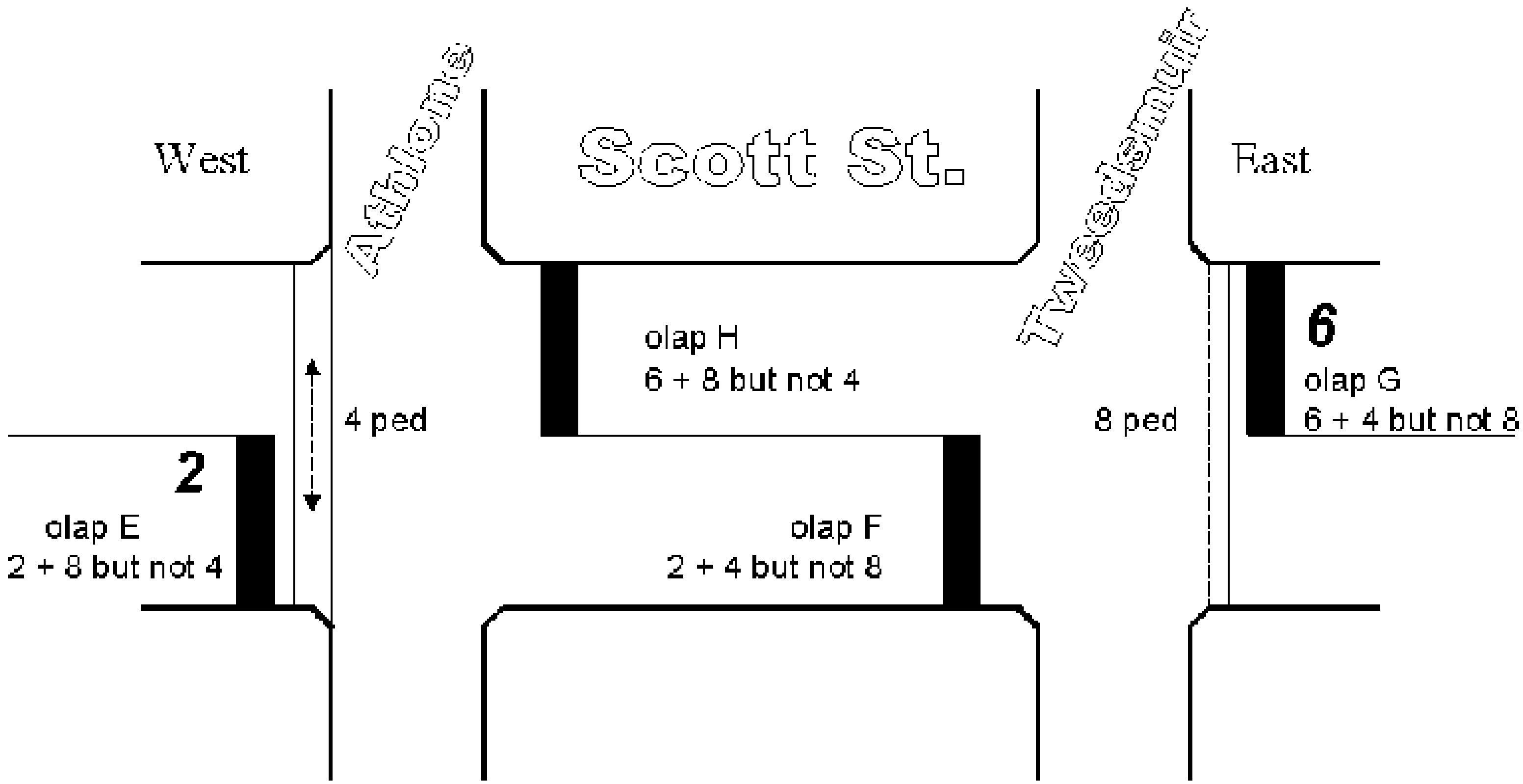
Figure 1: Revised Total Projected 2020 Peak Hour Traffic Volumes



This shift in site generated traffic from the northern McRae Avenue driveway connection to the southern McRae Avenue driveway connection will not affect the findings or conclusions summarized in the original TIS report.

Scott St & Tweedsmuir/Athlone (int #5781) 09-Jul-2019

The one MS3200 controller provides phasing for these 2 intersections (both are Intersection Ped Signals).



NOTES:

1. When the NS ped at Athlone (4 ped) is actuated, Olap F and G have a green display. Olap E and H have a red display.
2. When the NS ped at Tweedsmuir (8 ped) is actuated, Olap E and H have a green display. Olap F and G have a red display.
3. When both NS peds are actuated, all Olaps have a red display.

TIMING:

Please see excel file for Timing info.

Traffic Signal Timing

City of Ottawa, Transportation Services Department

Traffic Signal Operations Unit

Intersection:	**Main:** Scott	**Side:**	Tweedsmuir/Athlone
Controller:	**MS-3200**	**TSD:**	5781
Author:	Matthew Anderson	**Date:**	11-Jul-2019

Existing Timing Plans†

	Plan					Ped Minimum Time		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	***Walk***	***DW***	***A+R***
Cycle	FREE	FREE	FREE	FREE	FREE			
Offset	X	X	X	X	X			
EB Thru	min=30.8	min=30.8	min=30.8	min=30.8	min=30.8	-	-	3.3+2.5
WB Thru	min=30.8	min=30.8	min=30.8	min=30.8	min=30.8	-	-	3.3+2.5
West Walk	max=24.0	max=24.0	max=24.0	max=24.0	max=24.0	7	11	3.0+1.0
East Walk	max=24.0	max=24.0	max=24.0	max=24.0	max=24.0	7	11	3.0+1.0

NOTE:

Please see attached PDF file for detailed signal phasing information.

Schedule

Weekday

Time	Plan
0:15	4
6:30	1
9:30	2
15:00	3
18:30	2
21:30	4

Weekend

Time	Plan
0:15	4
6:30	2
11:00	5
19:30	2
22:00	4

Notes

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

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

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◀·········▶ Pedestrian signal

Cost is $57.63 ($51 + HST)

Traffic Signal Timing

City of Ottawa, Transportation Services Department

Traffic Signal Operations Unit

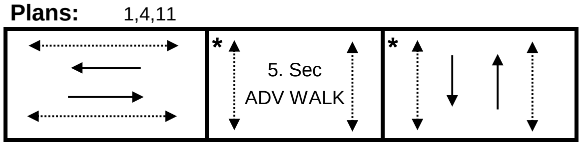
Intersection: Main: Richmond Side: McRae
Controller: MS-3200 **TSD:** 6589
Author: Jean Nabolle **Date:** 11-Jul-2019

Existing Timing Plans†

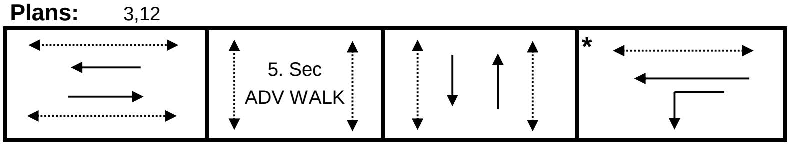
	Plan							Ped Minimum Time		
	AM Peak 1	Evening 2	PM Peak 3	Night 4	Weekend 5	AM Heavy 11	Off Peak 12	*Walk*	*DW*	*A+R*
Cycle	75	80	85	65	80	75	75			
Offset	X	X	1	X	X	16	X			
EB Thru	48	35	40	35	35	48	35	9	20	3.3+2.9
WB Thru	48	35	51	35	48	48	48	9	20	3.3+2.9
NB Thru	27	32	34	30	32	27	27	7	13	3.3+2.2
SB Thru	27	32	34	30	32	27	27	7	13	3.3+2.2
WB Left	-	13	11	-	13	-	13	-	-	3.3+2.8

Phasing Sequence‡

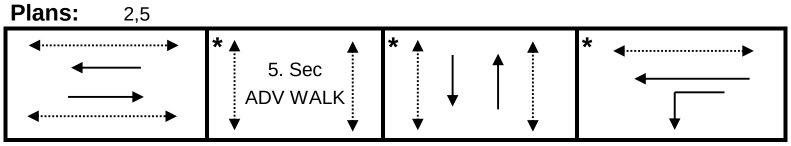
Plans: 1,4,11



Plans: 3,12



Plans: 2,5



Schedule

Weekday

Time	Plan
0:15	4
6:30	1
7:30	11
9:30	12
15:00	3
18:30	2
22:30	4

Saturday

Time	Plan
0:15	4
6:30	2
9:00	5
18:30	2
22:30	4

Sunday

Time	Plan
0:15	4
6:30	2
9:00	5
18:00	2
22:30	4

Notes

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

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

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·········► Pedestrian signal

Cost is $57.63 ($51 + HST)

Appendix C

Collision Data

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2013-02-01	2013	1:56:00 PM	MCRAE AVE @ SCOTT ST	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2013-06-15	2013	9:20:00 AM	MCRAE AVE @ SCOTT ST	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2014-11-23	2014	1:30:00 PM	MCRAE AVE @ SCOTT ST	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2015-02-05	2015	1:15:00 PM	MCRAE AVE @ SCOTT ST	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	02 - Angle	02 - Wet
2016-09-02	2016	10:10:00 AM	MCRAE AVE @ SCOTT ST	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	02 - Angle	01 - Dry
2016-08-08	2016	1:00:00 PM	MCRAE AVE @ SCOTT ST	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	02 - Angle	01 - Dry
2017-06-05	2017	1:09:00 PM	MCRAE AVE @ SCOTT ST	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	02 - Angle	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-03-02	2014	4:00:00 PM	TWEEDSMUIR AVE @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	02 - Wet
2015-06-21	2015	12:50:00 PM	TWEEDSMUIR AVE @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2016-10-03	2016	8:03:00 AM	TWEEDSMUIR AVE @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	03 - Rear end	01 - Dry
2016-06-09	2016	12:15:00 PM	TWEEDSMUIR AVE @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2013-03-26	2013	3:27:00 PM	MCRAE AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2013-06-01	2013	6:12:00 PM	MCRAE AVE @ RICHMOND RD	02 - Rain	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	02 - Wet
2013-09-12	2013	6:00:00 PM	MCRAE AVE @ RICHMOND RD	02 - Rain	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	02 - Wet
2013-11-17	2013	5:16:00 PM	MCRAE AVE @ RICHMOND RD	01 - Clear	07 - Dark	01 - Traffic signal	02 - Non-fatal injury	07 - SMV other	02 - Wet
2014-08-26	2014	6:41:00 PM	MCRAE AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2014-11-04	2014	5:46:00 PM	MCRAE AVE @ RICHMOND RD	03 - Snow	07 - Dark	01 - Traffic signal	03 - P.D. only	03 - Rear end	02 - Wet
2015-08-29	2015	8:15:00 AM	MCRAE AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2015-12-12	2015	8:55:00 AM	MCRAE AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	01 - Dry
2017-07-15	2017	1:28:00 PM	MCRAE AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	07 - SMV other	01 - Dry
2017-01-30	2017	1:48:00 PM	MCRAE AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	07 - SMV other	01 - Dry
2017-12-23	2017	3:30:00 PM	MCRAE AVE @ RICHMOND RD	03 - Snow	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	03 - Loose snow

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2013-11-30	2013	9:19:00 AM	RICHMOND RD @ TWEEDSMUIR AVE	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	06 - SMV unattended vehicle	02 - Wet
2015-08-22	2015	2:58:00 PM	RICHMOND RD @ TWEEDSMUIR AVE	02 - Rain	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	07 - SMV other	02 - Wet
2015-06-10	2015	12:17:00 PM	RICHMOND RD @ TWEEDSMUIR AVE	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2015-03-03	2015	6:55:00 PM	RICHMOND RD @ TWEEDSMUIR AVE	03 - Snow	07 - Dark	02 - Stop sign	03 - P.D. only	02 - Angle	05 - Packed snow
2017-09-16	2017	6:42:00 PM	RICHMOND RD @ TWEEDSMUIR AVE	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	02 - Angle	01 - Dry

LOCATION & GEOID	TOTAL_COLLISIONS	TOTAL_CYCLIST_COLLISIONS	TOTAL_PEDESTRIAN_COLLISIONS
MCRAE AVE @ SCOTT ST (0006868)	7	0	0
TWEEDSMUIR AVE @ SCOTT ST (0006371)	4	0	0
MCRAE AVE @ RICHMOND RD (0006867)	11	0	3
RICHMOND RD @ TWEEDSMUIR AVE (0006681)	5	1	0

Appendix D

Scott Street Bus Detour and Cycling Concept

Ottawa

Transportation Sevice Department

SCOTT STREET

Transportation Planning Branch
Strategic Planning Unit

Checked By:	Drawing No.: 1
Compiled by:	
Scale: Date:	

Appendix E

City of Ottawa Email Correspondence – Scott Street

Robin Marinac

From: Mark Crockford
Sent: August 10, 2020 8:31 AM
To: Robin Marinac
Subject: FW: 320 McRae TIA Comments

Mark Crockford, P.Eng.
CGH Transportation Inc.
P:905-251-4070
E:Mark.Crockford@CGHTransportation.com

From: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Sent: August 10, 2020 7:07 AM
To: Mark Crockford <mark.crockford@cghtransportation.com>
Subject: RE: 320 McRae TIA Comments

Mark,

Please see response to your questions in blue below.

Wally Dubyk
Transportation Project Manager - Transportation Approvals
Development Review, Central & South Branches
613-580-2424 x13783

From: Mark Crockford <mark.crockford@cghtransportation.com>
Sent: August 06, 2020 11:22 AM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Cc: Robin Marinac <robin.marinac@cghtransportation.com>
Subject: RE: 320 McRae TIA Comments

Great, Thanks Wally!

Mark

Mark Crockford, P.Eng.

CGH Transportation Inc.
P:905-251-4070
E:Mark.Crockford@CGHTransportation.com

From: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Sent: August 6, 2020 11:21 AM
To: Mark Crockford <mark.crockford@cghtransportation.com>
Cc: Robin Marinac <robin.marinac@cghtransportation.com>
Subject: RE: 320 McRae TIA Comments

Hi Mark,

Your comments had been sent to Transportation Engineering Services. I will send them a reminder.

Wally Dubyk
Transportation Project Manager - Transportation Approvals
Development Review, Central & South Branches
613-580-2424 x13783

From: Mark Crockford <mark.crockford@cghtransportation.com>
Sent: August 06, 2020 11:16 AM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Cc: Robin Marinac <robin.marinac@cghtransportation.com>
Subject: RE: 320 McRae TIA Comments

I hope your summer is going well. I realize you guys are all slammed and I'm sure summer vacations haven't helped that any. That said our client is asking us to update them on when we can re-submit, which I can't do until we have a little more of your feedback. Can you let me know when we might be able to get your response to our questions below? That will allow us to set a realistic timeline for our client.

Thanks and all the best,
Mark

Mark Crockford, P.Eng.
CGH Transportation Inc.
P:905-251-4070
E:Mark.Crockford@CGHTransportation.com

From: Mark Crockford
Sent: July 30, 2020 11:29 AM

To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Cc: Robin Marinac <robin.marinac@cghtransportation.com>
Subject: 320 McRae TIA Comments

Hi Wally,

We are currently working our way through the comments you sent us on the 320 McRae Avenue Step 4 report and have a few questions we are hoping you can answer for us:

Comment: *"There are plans to upgrade Scott Street to a "complete street". During construction of the Stage 2 Confederation Line West extension, Scott Street between Churchill Avenue and Tunney's Pasture will be used for the Transitway detour. The detour will be in place from late 2021 / early 2022 to revenue service of the Stage 2 Confederation Line West extension (2025). Prior to the detour, Scott Street will receive improvements primarily consisting of isolated transit priority measures and protected intersections at signalized intersections throughout the corridor, including at Churchill Avenue (new signalization), Lanark Avenue, and Island Park Drive."*

Comment: *"Currently, improvements to Scott Street adjacent to the development are limited to urbanization of the frontage and a proposed new sidewalk (with no on-street parking) between Tweedsmuir Avenue and McRae Avenue. Following removal of the Transitway detour (2025,) there are long-term plans to further enhance Scott Street with cycle tracks throughout the corridor and various other improvements. A draft functional design has been completed by the City. The applicant may be required to provide for the design and construction to implement the complete street concept along the frontage. This will require further review as the ultimate timing of the development construction is unknown. The new Scott Street curb and sidewalk requires an RMA report and functional design drawings."*

Question: With respect to the two comments above, we are hoping further clarification can be provided on the timeline of changes or improvements along Scott Street as they relate to our analysis. It is our understanding that the "Scott Street Bus Detour and Cycling Concept" design that we received will be implemented in late 2021 / early 2022 and be in place until the mentioned "long term plans to further enhance Scott Street" are implemented. Given that these plans are "long term" with no specified date, is it reasonable to assume that any changes to Scott Street within our Study Area will occur beyond our future horizon of 2027, and that all future horizons will consider the design shown in the "Scott Street Bus Detour and Cycling Concept"?
Agreed that if your site proceeds on the assumed time line that the bus detour concept will still be in place when you have finalized your site. However, the bus detour plan may restrict some ability to landscape and finalize the frontage of your site. Our expectation is that the site plan should accommodate for the ultimate design of Scott Street with cycle tracks and sidewalks and that when the bus detour is removed that the LRT office include this ultimate design in the reinstatement. Funding for this is uncertain at this time.

Additionally, the second comment discusses the need for an RMA report and functional design drawings for the new Scott Street curb and sidewalk. The site plan and analysis is considering the design of this location to be that which is shown in the provided "Scott Street Bus Detour and Cycling Concept". Can you confirm if an RMA and FD is still required if the plan is to follow the City's functional design for Scott Street? If the site is finalized with the Scott Street Bus Detour in place there is no requirement for an RMA or FD. However, if it is agreed that the developer will design and support funding for the ultimate reinstatement of Scott Street post LRT bus detour an RMA and FD may be required to develop the change between the City's design and the proposed frontage. This is very uncertain at this time but we are providing similar feedback on LRT design submissions so that proposed future works can be coordinated with development.

Comment: *"Underground ramps should be limited to a 12% grade and must contain a subsurface melting device when exceeding 6%. Ramp grades greater than 15% can be psychological barriers to some drivers."*

Question: Can further clarification be provided to confirm if a subsurface melting device is required in this case as the ramp will be inside the building? No it is not required if covered and inside the building.

Comment: *"The analysis should depict the projected pedestrian and cyclist volumes for 2022 and 2027 (as outlined in the report) for both signalized locations within the study area. The increase in pedestrian and cyclist volumes could increase delays at existing signals."*

Question: As no clear methodology for accurately growing pedestrian and cyclist volumes in future horizons has been provided, what methodology should be followed? Suggest reviewing the existing mode shares on Scott Street and then converting background trips to TOD mode shares values. Also to clarify the comment, this was related to the Synchro Analysis files for their 2022 & 2027 scenarios and the data inputs related to pedestrian volumes. Basically the comment asks that you ensure that the synchro files (for the future scenarios) are capturing the projected pedestrians / bikes and transit users (who may walk or cycle to their respective stop / station) at the signalized intersections in order to get an understanding of how might these increased volumes potentially impact the signal operation and vehicle delay.

Comment: *"Review the left-turn warrant at Scott Street and McRae Avenue. Previous TIAs in the area have indicated that a westbound left-turn lane may be warranted."*

Question: This will be investigated further however, we would like to request these reports for reference. These reports are available on devapps and locations of development applications can be found in the "In my neighbourhood" feature on geoOttawa. The CTS completed for 1976 Scott St indicated that the left turn was warranted as did 319 McRae TIS.

Comment: *"The proposed drop-off/lay-by on McRae Avenue should be discussed further with staff and the need for street widening to accommodate the space must be reviewed carefully. Currently, this street has no parking on either side and the proposed drop off area is shown in the exact location of the existing McRae/Scott southbound bus stop (4893). Therefore, the proposed drop-off/lay-by must be either relocated or removed. Discuss with OC Transpo the provision of a 15m long bus stop and pad for stop 4893. Also confirm with OC Transpo whether the provision of a shelter per 3.1.2 of the TDM-Supportive Development Design and Infrastructure Checklist is required. An RMA will be required for construction of a lay-by and appropriate signage must be considered."*

Question: Approximately 23 metres have been measured between Scott Street and the north side of the lay-by (measured curb to curb). Is this considered sufficient to accommodate the bus stop and pad for stop 4893? As this comment will require correspondence with OC Transpo, can you please provide the contact information for the appropriate person to discuss this with? Graham Rathwell is the contact for OC Transpo.

Comment: *"To encourage transit usage, providing a prepaid Presto pass is a proven tool."*

Question: The proponent is interested in this, however would like more information regarding the cost and the time period required to provide the pass (i.e. a month, a year etc.). Additionally is this something that would be provided to the first round of move-ins at build-out of the development, or is it expected to be provided every time a new resident moves in? As this comment may require additional correspondence with OC Transpo, can you please provide the contact information for the appropriate person to discuss this with?
Graham Rathwell

Mark Crockford, P.Eng.
CGH Transportation Inc.
P:905-251-4070
E:Mark.Crockford@CGHTransportation.com

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Appendix F

Pedestrian and Cyclist Growth Rates

Scott Street & Tweedsmuir Avenue					
AM					
Horizon		Total Vehicle Volume	Growth	Total Pedestrian Volume	Total Cyclist Volume
Existing	2019	799		274	136
FB	2022	883	3.4%	303	150
FB	2027	974	2.0%	334	165
PM					
Horizon		Total Vehicle Volume	Growth	Total Pedestrian Volume	Total Cyclist Volume
Existing	2019	918		381	124
FB	2022	1006	3.1%	418	136
FB	2027	1107	1.9%	487	158

Scott Street & Tweedsmuir Avenue					
AM Pedestrian					
Horizon		West Leg	South Leg	East Leg	North Leg
Existing	2019	1	4	121	148
FB	2022	1	4	134	164
FB	2027	1	4	148	181
PM Pedestrian					
Horizon		West Leg	South Leg	East Leg	North Leg
Existing	2019	4	13	183	181
FB	2022	4	14	201	198
FB	2027	4	15	221	218

Scott Street & Tweedsmuir Avenue													
AM Cyclist													
Horizon		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	2019	2	90	1	1	25	3	1	1	11	1	0	0
FB	2022	2	99	1	1	28	3	1	1	12	1	0	0
FB	2027	2	109	1	1	31	3	1	1	13	1	0	0
PM Cyclist													
Horizon		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	2019	0	34	3	4	70	1	6	1	1	2	0	2
FB	2022	0	37	3	4	77	1	7	1	1	2	0	2
FB	2027	0	41	3	4	85	1	8	1	1	2	0	2

Scott Street & McRae Avenue					
AM					
Horizon		Total Vehicle Volume	Growth	Total Pedestrian Volume	Total Cyclist Volume
Existing	2019	964		29	145
FB	2022	1104	4.6%	33	166
FB	2027	1210	1.9%	36	182
PM					
Horizon		Total Vehicle Volume	Growth	Total Pedestrian Volume	Total Cyclist Volume
Existing	2019	1161		14	155
FB	2022	1302	3.9%	16	174
FB	2027	1431	1.9%	18	191

Scott Street & McRae Avenue					
AM Pedestrian					
Horizon		West Leg	South Leg	East Leg	North Leg
Existing	2019	21	1	7	
FB	2022	23	1	8	
FB	2027	25	1	9	
PM Pedestrian					
Horizon		West Leg	South Leg	East Leg	North Leg
Existing	2019	12	1	1	
FB	2022	13	1	1	
FB	2027	14	1	1	

Scott Street & McRae Avenue													
AM Cyclist													
Horizon		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	2019	0	105	2	6	26	0	2	0	4	0	0	0
FB	2022	0	120	2	7	30	0	2	0	5	0	0	0
FB	2027	0	132	2	8	33	0	2	0	5	0	0	0
PM Cyclist													
Horizon		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	2019	0	30	10	13	77	0	4	0	18	0	0	0
FB	2022	0	34	11	15	86	0	4	0	20	0	0	0
FB	2027	0	37	12	16	95	0	4	0	22	0	0	0

Richmond Road & Tweedsmuir Avenue					
AM					
Horizon		Total Vehicle Volume	Growth	Total Pedestrian Volume	Total Cyclist Volume
Existing	2019	790		120	47
FB	2022	851	2.5%	129	51
FB	2027	938	2.0%	142	56
PM					
Horizon		Total Vehicle Volume	Growth	Total Pedestrian Volume	Total Cyclist Volume
Existing	2019	1171		211	63
FB	2022	1248	2.1%	225	67
FB	2027	1381	2.0%	249	74

Richmond Road & Tweedsmuir Avenue					
AM Pedestrian					
Horizon		West Leg	South Leg	East Leg	North Leg
Existing	2019	8	55	15	42
FB	2022	9	61	17	46
FB	2027	10	67	19	51
PM Pedestrian					
Horizon		West Leg	South Leg	East Leg	North Leg
Existing	2019	5	74	18	120
FB	2022	5	81	20	132
FB	2027	6	89	22	145

Richmond Road & Tweedsmuir Avenue													
AM Cyclist													
Horizon		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	2019	1	16	0	1	14	0	0	10	3	0	2	0
FB	2022	1	17	0	1	15	0	0	11	3	0	2	0
FB	2027	1	19	0	1	17	0	0	12	3	0	2	0
PM Cyclist													
Horizon		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Existing	2019	0	18	2	3	29	0	2	1	1	0	7	0
FB	2022	0	19	2	3	31	0	2	1	1	0	7	0
FB	2027	0	21	2	3	34	0	2	1	1	0	8	0

Richmond Road & McRae Avenue					
AM					
Horizon		Total Vehicle Volume	Growth	Total Pedestrian Volume	Total Cyclist Volume
Existing	2019	806		163	15
FB	2022	905	3.9%	183	17
FB	2027	1290	7.3%	261	24
PM					
Horizon		Total Vehicle Volume	Growth	Total Pedestrian Volume	Total Cyclist Volume
Existing	2019	1598		401	20
FB	2022	1763	3.3%	442	22
FB	2027	1940	1.9%	486	24

Richmond Road & McRae Avenue					
AM Pedestrian					
Horizon		West Leg	South Leg	East Leg	North Leg
Existing	2019	29	50	44	40
FB	2022	32	55	49	44
FB	2027	35	61	54	49
PM Pedestrian					
Horizon		West Leg	South Leg	East Leg	North Leg
Existing	2019	59	136	133	103
FB	2022	65	149	146	113
FB	2027	72	164	161	124

Richmond Road & McRae Avenue					
AM Cyclist					
Horizon		EB	WB	NB	SB
Existing	2019	6	6	1	2
FB	2022	7	7	1	2
FB	2027	10	10	1	3
PM Cyclist					
Horizon		EB	WB	NB	SB
Existing	2019	5	10	2	3
FB	2022	6	11	2	3
FB	2027	7	12	2	3

Appendix G

TDM Checklists

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

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

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

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

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

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

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

Legend

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

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

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

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☐
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☐
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☐
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☐
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☐
	2.4	**Bicycle repair station**	
BETTER	2.4.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☑

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☑
	4.2	**Carpool parking**	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	**Check if completed & add descriptions, explanations or plan/drawing references**
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☑
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☑
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	☑
	7.	**OTHER**	
	7.1	**On-site amenities to minimize off-site trips**	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	☐

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

Legend

BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance
★	The measure is one of the most dependably effective tools to encourage the use of sustainable modes

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

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

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

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

Legend	
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance
★	The measure is one of the most dependably effective tools to encourage the use of sustainable modes

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

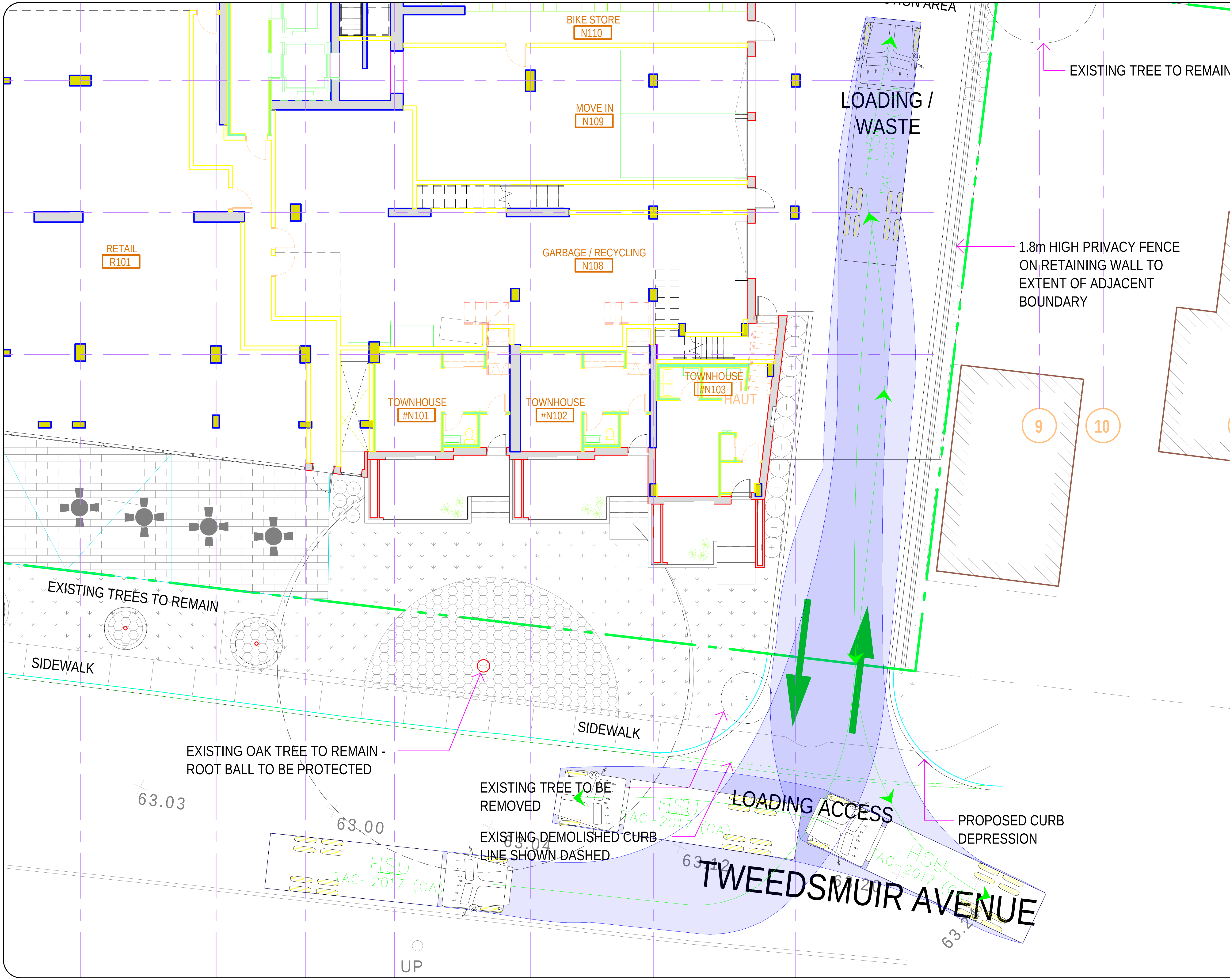
		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
	3.	**TRANSIT**	
	3.1	**Transit information**	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances	☐
BASIC	3.1.2	Provide online links to OC Transpo and STO information	☑
BETTER	3.1.3	Provide real-time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

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

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

Appendix H

Turning Templates



Notes:

REV:	DESCRIPTION:	BY:	DATE:
A	description	by	xx/xx/xx

STATUS:

CGH Transportation
13 Markham Ave
Ottawa, ON
K2G 3Z1
(343) 999-9117

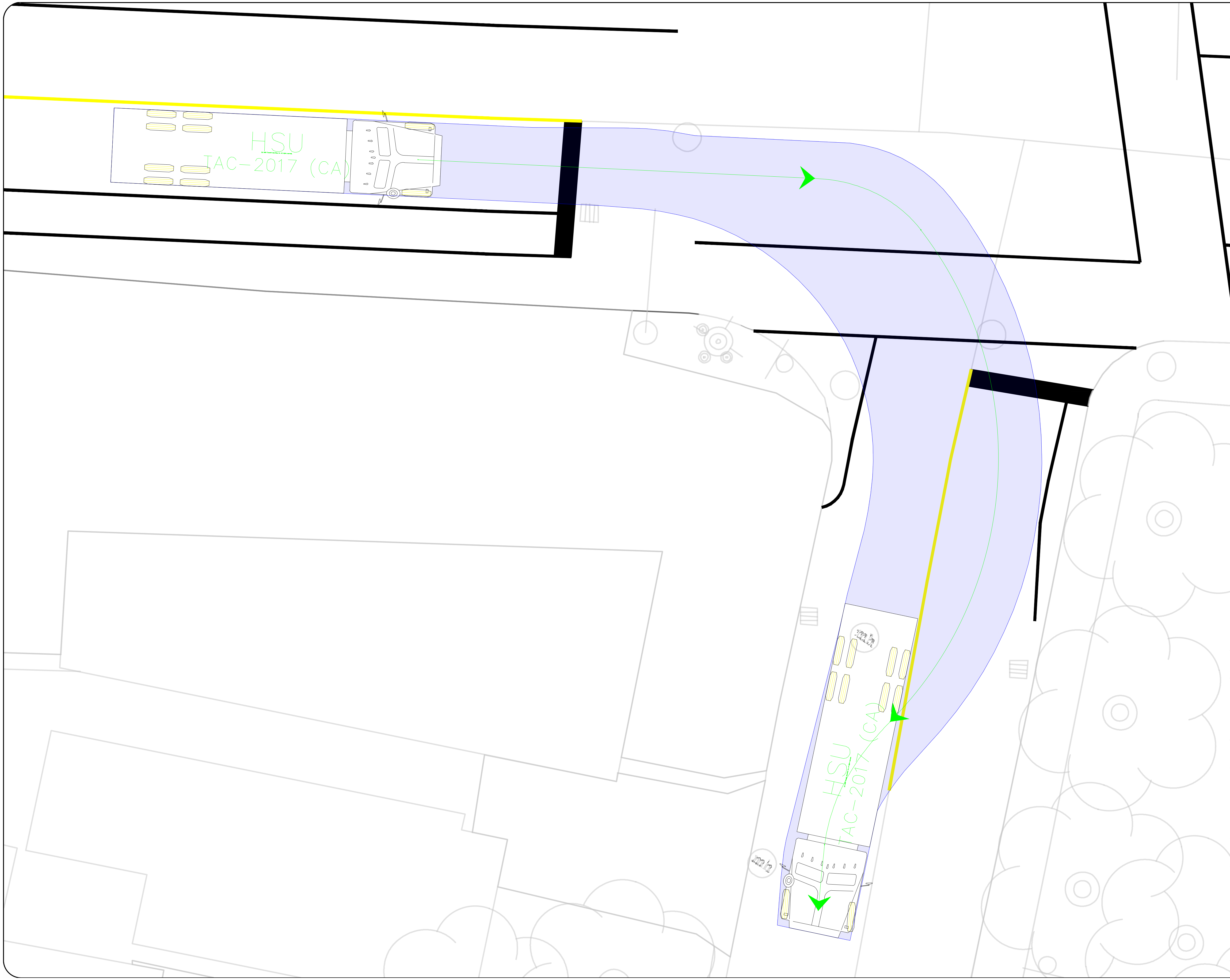
CLIENT: GWL Realty Advisors

ARCHITECT: NEUF Architect(e)s

SITE: 320 McRae Avenue

TITLE: Refuse Collection

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2020-08-13	JK	MC
PROJECT NO: 2019-29	DRAWING NO: 001		REVISION: 02



Notes:

REV:	DESCRIPTION:	BY:	DATE:
A	description	by	xx/xx/xx

STATUS:

CGH Transportation
13 Markham Ave
Ottawa, ON
K2G 3Z1
(343) 999-9117

CLIENT: GWL Realty Advisors

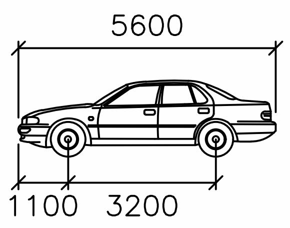
ARCHITECT: NEUF Architect(e)s

SITE: 320 McRae Avenue

TITLE: Tweedsmuir at Scott

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2020-08-13	JK	MC
PROJECT NO:	DRAWING NO:		REVISION:
2019-29	002		-

Notes:



P

	mm
Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

REV:	DESCRIPTION:	BY:	DATE:

STATUS:

CGH Transportation
13 Markham Ave
Ottawa, ON
K2G 3Z1
(343) 999-9117

CLIENT: GWL Realty Advisors

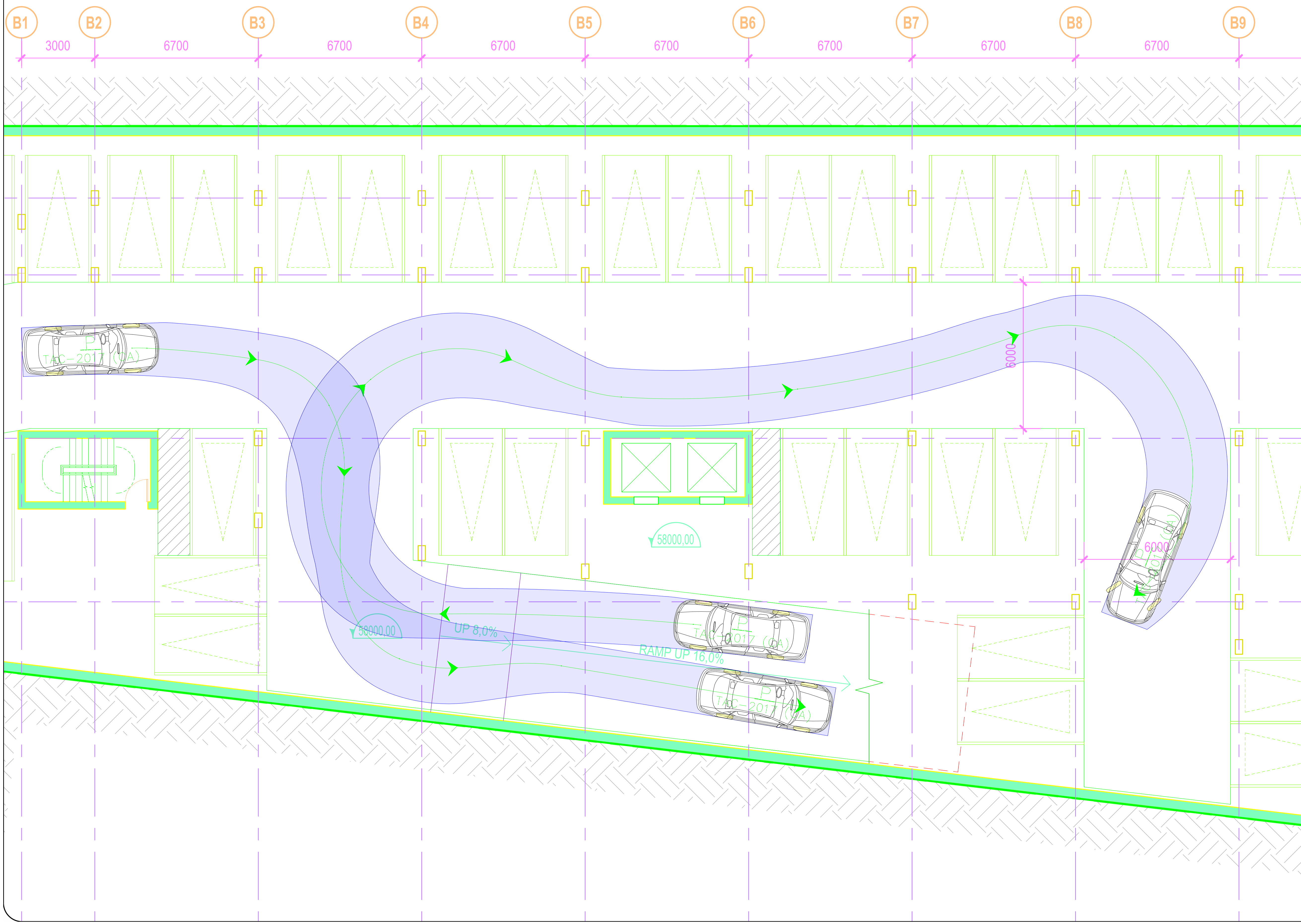
ARCHITECT: NEUF Architect(e)s

SITE: 320 McRae Avenue

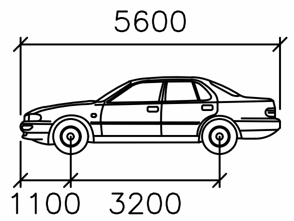
TITLE: P1 Corner Templates

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2020/01/31	JK	MC

PROJECT NO:	DRAWING NO:	REVISION:
2019-29	002	-



Notes:



P

mm

Width : 2000
Track : 2000
Lock to Lock Time : 6.0
Steering Angle : 35.9

REV:	DESCRIPTION:	BY:	DATE:

STATUS:

CGH Transportation
13 Markham Ave
Ottawa, ON
K2G 3Z1
(343) 999-9117

CLIENT: GWL Realty Advisors

ARCHITECT: NEUF Architect(e)s

SITE: 320 McRae Avenue

TITLE: P2 Corner Templates

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	20/01/31	JK	MC
PROJECT NO:	DRAWING NO:		REVISION:
2019-29	003		-

Client: GWL Realty Advisors

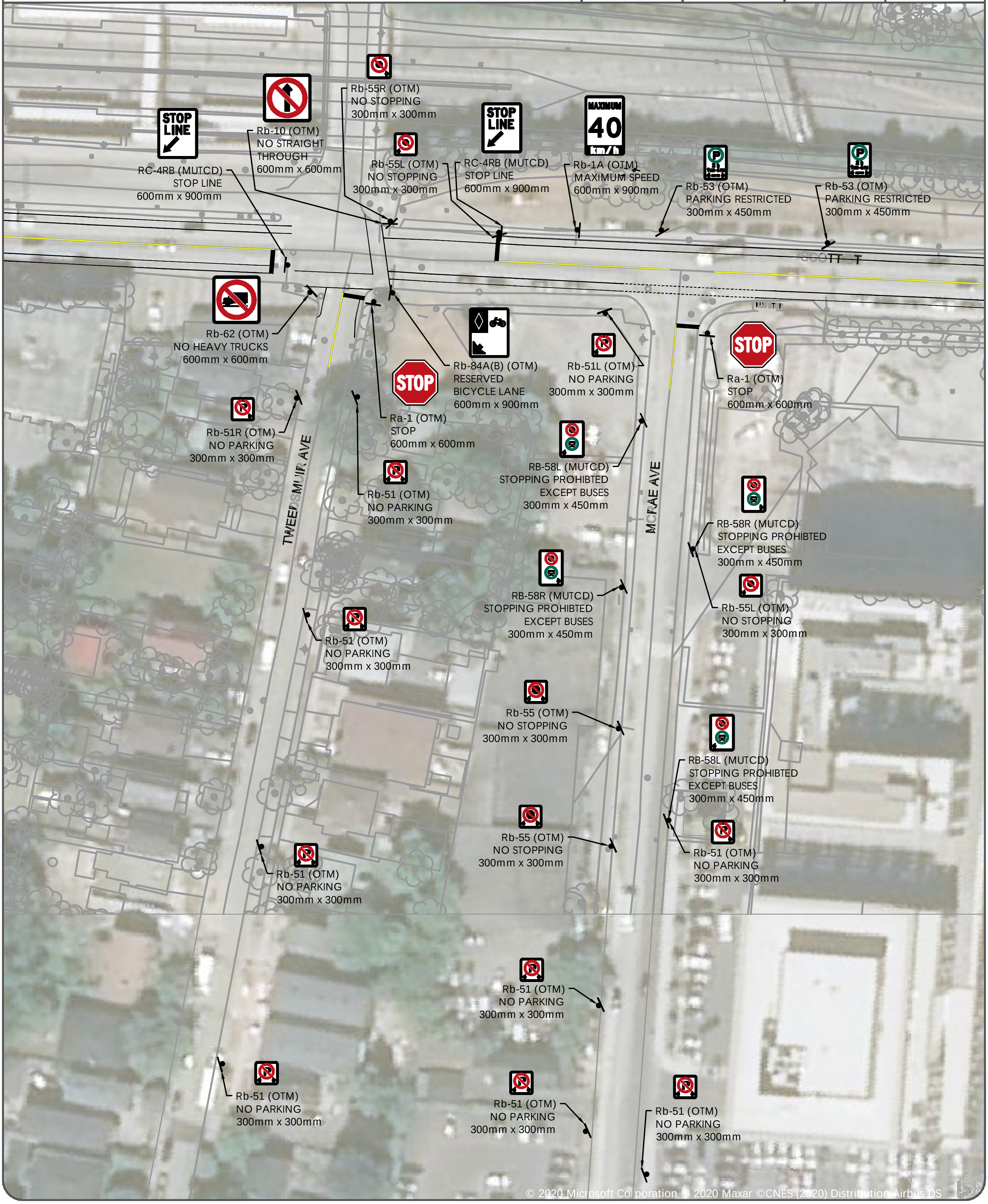
Architect: NEUF Architect(e)s

SITE: 320 McRae Avenue

TITLE: Existing Signage and Pavement Markings

CGH Transportation
13 Markham Ave
Ottawa, ON K2G 3Z1
(343)999-9117

001		2019-29	20/08/13
DRAWING NO.		PROJECT NO.	DATE.
NTS	JK	MC	-
SCALE AT A4.	DRAWN.	CHECKED.	REVISION.



Appendix I

MMLOS Worksheets

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation	**Project**	2019-29
Scenario	Existing AM & PM	**Date**	18-08-2020
Comments			

SEGMENTS		Segment	Tweedsmuir Ave 1	McRae Ave 2	Scott St 3
Pedestrian	Sidewalk Width Boulevard Width	-	1.5 m < 0.5 m	1.8 m < 0.5 m	1.8 m < 0.5 m
	Avg Daily Curb Lane Traffic Volume		≤ 3000	≤ 3000	> 3000
	Operating Speed On-Street Parking		> 50 to 60 km/h yes	> 50 to 60 km/h yes	> 50 to 60 km/h yes
	Exposure to Traffic PLoS		F	C	D
	Effective Sidewalk Width				
	Pedestrian Volume				
	Crowding PLoS		-	-	-
	Level of Service		-	-	-
Bicycle	Type of Cycling Facility	-	Mixed Traffic	Mixed Traffic	Parking beside Bike Lane
	Number of Travel Lanes		≤ 2 (no centreline)	≤ 2 (no centreline)	1 each direction
	Operating Speed		≥ 50 to 60 km/h	≥ 50 to 60 km/h	>50 to <70 km/h
	# of Lanes & Operating Speed LoS		D	D	D
	Bike Lane (+ Parking Lane) Width				≤ 4 m biking + parking width
	Bike Lane Width LoS		-	-	C
	Bike Lane Blockages				Frequent
	Blockage LoS		-	-	C
	Median Refuge Width (no median = < 1.8 m)				
	No. of Lanes at Unsignalized Crossing				
	Sidestreet Operating Speed				
	Unsignalized Crossing - Lowest LoS		-	-	-
	Level of Service		-	-	-
Transit	Facility Type	E		Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed			Vt/Vp ≥ 0.8	Vt/Vp ≤ 0.6
	Level of Service		-	D	E
Truck	Truck Lane Width	F		≤ 3.0 m	≤ 3.3 m
	Travel Lanes per Direction			1	1
	Level of Service		-	F	D
Auto	**Level of Service**	Not Applicable			

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation	**Project**	2019-29
Scenario	All Future Background Horizons - AM & PM	**Date**	18-08-2020
Comments			

SEGMENTS		Segment	Tweedsmuir Ave 1	McRae Ave 2	Scott St 3
Pedestrian	Sidewalk Width Boulevard Width	-	1.5 m < 0.5 m	1.8 m < 0.5 m	1.8 m < 0.5 m
	Avg Daily Curb Lane Traffic Volume		≤ 3000	≤ 3000	> 3000
	Operating Speed On-Street Parking		> 50 to 60 km/h yes	> 50 to 60 km/h yes	> 50 to 60 km/h yes
	Exposure to Traffic PLoS		F	C	D
	Effective Sidewalk Width				
	Pedestrian Volume				
	Crowding PLoS		-	-	-
	Level of Service		-	-	-
Bicycle	Type of Cycling Facility	-	Mixed Traffic	Mixed Traffic	Parking beside Bike Lane
	Number of Travel Lanes		≤ 2 (no centreline)	≤ 2 (no centreline)	1 each direction
	Operating Speed		≥ 50 to 60 km/h	≥ 50 to 60 km/h	>50 to <70 km/h
	# of Lanes & Operating Speed LoS		D	D	D
	Bike Lane (+ Parking Lane) Width				≤ 4 m biking + parking width
	Bike Lane Width LoS		-	-	C
	Bike Lane Blockages				Frequent
	Blockage LoS		-	-	C
	Median Refuge Width (no median = < 1.8 m)				
	No. of Lanes at Unsignalized Crossing				
	Sidestreet Operating Speed				
	Unsignalized Crossing - Lowest LoS		-	-	-
	Level of Service		-	-	-
Transit	Facility Type	E		Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed			Vt/Vp ≥ 0.8	Vt/Vp ≤ 0.6
	Level of Service		-	D	E
Truck	Truck Lane Width	F		≤ 3.0 m	> 3.7 m
	Travel Lanes per Direction			1	1
	Level of Service		-	F	B

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation	**Project**	2019-29
Scenario	All Future Total Horizons - AM & PM	**Date**	18-08-2020
Comments			

SEGMENTS		Segment	Tweedsmuir Ave 1	McRae Ave 2	Scott St 3
Pedestrian	Sidewalk Width Boulevard Width	-	1.5 m < 0.5 m	≥ 2 m < 0.5	1.8 m < 0.5 m
	Avg Daily Curb Lane Traffic Volume		≤ 3000	≤ 3000	> 3000
	Operating Speed On-Street Parking		> 50 to 60 km/h yes	> 50 to 60 km/h yes	> 50 to 60 km/h yes
	Exposure to Traffic PLoS		F	C	D
	Effective Sidewalk Width				
	Pedestrian Volume				
	Crowding PLoS		-	-	-
	Level of Service		-	-	-
Bicycle	Type of Cycling Facility	-	Mixed Traffic	Mixed Traffic	Parking beside Bike Lane
	Number of Travel Lanes		≤ 2 (no centreline)	≤ 2 (no centreline)	1 each direction
	Operating Speed		≥ 50 to 60 km/h	≥ 50 to 60 km/h	>50 to <70 km/h
	# of Lanes & Operating Speed LoS		D	D	D
	Bike Lane (+ Parking Lane) Width				≤ 4 m biking + parking width
	Bike Lane Width LoS		-	-	C
	Bike Lane Blockages				Frequent
	Blockage LoS		-	-	C
	Median Refuge Width (no median = < 1.8 m)				
	No. of Lanes at Unsignalized Crossing				
	Sidestreet Operating Speed				
	Unsignalized Crossing - Lowest LoS		-	-	-
	Level of Service		-	-	-
Transit	Facility Type	E		Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed			Vt/Vp ≥ 0.8	Vt/Vp ≤ 0.6
	Level of Service		-	D	E
Truck	Truck Lane Width	F		≤ 3.0 m	> 3.7 m
	Travel Lanes per Direction			1	1
	Level of Service		-	F	B

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation	Project	2019-29
Scenario	Existing-AM	Date	18-08-2020
Comments			

INTERSECTIONS		McRae Avenue and Richmond Road				Tweedsmuir Avenue and Scott Street			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	0 - 2	3	4	5	0 - 2	0 - 2	3	
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	
	Ped Signal Leading Interval?	No	No	Yes	Yes	No	No	Yes	
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	
	Corner Radius	5-10m	10-15m	10-15m	10-15m	5-10m	5-10m	5-10m	
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	
	PETSI Score	**86**	**70**	**55**	**39**	**91**	**86**	**76**	
	Ped. Exposure to Traffic LoS	**B**	**C**	**D**	**E**	**A**	**B**	**B**	**-**
	Cycle Length								
	Effective Walk Time								
	Average Pedestrian Delay								
	Pedestrian Delay LoS	-	-	-	-	-	-	-	-
	Level of Service	**B**	**C**	**D**	**E**	**A**	**B**	**B**	**-**
		E				**B**			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration				≤ 50 m			Not Applicable	Not Applicable
	Right Turning Speed				≤ 25 km/h			Not Applicable	Not Applicable
	Cyclist relative to RT motorists	**#N/A**	**#N/A**	**#N/A**	**D**	**-**	**#N/A**	**Not Applicable**	
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**-**	**Mixed Traffic**	**Separated**	
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	**B**	**B**	**C**	**C**	**-**	**B**	**C**	**C**
	Level of Service	**#N/A**	**#N/A**	**#N/A**	**D**	**-**	**#N/A**	**C**	**C**
		#N/A				**#N/A**			
Transit	Average Signal Delay	≤ 40 sec		≤ 10 sec	≤ 10 sec			≤ 10 sec	≤ 10 sec
	Level of Service	**E**	**-**	**B**	**B**	**-**	**-**	**B**	**B**
		E				**B**			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m				
	Number of Receiving Lanes on Departure from Intersection	1	≥ 2	1	1				
	Level of Service	**E**	**B**	**E**	**E**	**-**	**-**	**-**	**-**
		E				**-**			
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.0 - 0.60			
	Level of Service	**B**				**A**			

Multi-Modal Level of Service - Intersections Form

Consultant	**CGH Transportation**	**Project**	**2019-29**
Scenario	**Existing-PM**	**Date**	**18-08-2020**
Comments			

	INTERSECTIONS	McRae Avenue and Richmond Road				Tweedsmuir Avenue and Scott Street			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	0 - 2	3	4	5	0 - 2	0 - 2	3	
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	
	Ped Signal Leading Interval?	No	No	Yes	Yes	No	No	Yes	
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	
	Corner Radius	5-10m	10-15m	10-15m	10-15m	5-10m	5-10m	5-10m	
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	
	PETSI Score	**86**	**70**	**55**	**39**	**91**	**86**	**76**	
	Ped. Exposure to Traffic LoS	**B**	**C**	**D**	**E**	**A**	**B**	**B**	**-**
	Cycle Length								
	Effective Walk Time								
	Average Pedestrian Delay								
	Pedestrian Delay LoS	-	-	-	-	-	-	-	-
	Level of Service	**B**	**C**	**D**	**E**	**A**	**B**	**B**	**-**
		E				**B**			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration				≤ 50 m			Not Applicable	Not Applicable
	Right Turning Speed				≤ 25 km/h			Not Applicable	Not Applicable
	Cyclist relative to RT motorists	**#N/A**	**#N/A**	**#N/A**	**D**	**-**	**#N/A**	**Not Applicable**	
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**-**	**Mixed Traffic**	**Separated**	
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	**B**	**B**	**C**	**C**	**-**	**B**	**C**	**C**
	Level of Service	**#N/A**	**#N/A**	**#N/A**	**D**	**-**	**#N/A**	**C**	**C**
		#N/A				**#N/A**			
Transit	Average Signal Delay	≤ 40 sec		≤ 30 sec	≤ 20 sec			≤ 10 sec	≤ 10 sec
	Level of Service	**E**	**-**	**D**	**C**	**-**	**-**	**B**	**B**
		E				**B**			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m				
	Number of Receiving Lanes on Departure from Intersection	1	≥ 2	1	1				
	Level of Service	**E**	**B**	**E**	**E**	**-**	**-**	**-**	**-**
		E				**-**			
Auto	Volume to Capacity Ratio	0.71 - 0.80				0.0 - 0.60			
	Level of Service	**C**				**A**			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation	Project	2019-29
Scenario	2022 FB AM	Date	18-08-2020
Comments			

Mode	INTERSECTIONS	McRae Avenue and Richmond Road				Tweedsmuir Avenue and Scott Street			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	0 - 2	3	4	5	0 - 2	0 - 2	3	
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	
	Ped Signal Leading Interval?	No	No	Yes	Yes	No	No	Yes	
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	
	Corner Radius	5-10m	10-15m	10-15m	10-15m	5-10m	5-10m	5-10m	
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	
	PETSI Score	86	70	55	39	91	86	76	
	Ped. Exposure to Traffic LoS	B	C	D	E	A	B	B	-
	Cycle Length								
	Effective Walk Time								
	Average Pedestrian Delay								
	Pedestrian Delay LoS	-	-	-	-	-	-	-	-
	Level of Service	B	C	D	E	A	B	B	-
		E				B			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration				≤ 50 m				Not Applicable
	Right Turning Speed				≤ 25 km/h				Not Applicable
	Cyclist relative to RT motorists	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	B	B	C	C	-	B	C	C
	Level of Service	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	C
		#N/A				#N/A			
Transit	Average Signal Delay	≤ 40 sec		≤ 10 sec	≤ 10 sec			≤ 10 sec	≤ 10 sec
	Level of Service	E	-	B	B	-	-	B	B
		E				B			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m				
	Number of Receiving Lanes on Departure from Intersection	1	≥ 2	1	1				
	Level of Service	E	B	E	E	-	-	-	-
		E				-			
Auto	Volume to Capacity Ratio	0.0 - 0.60				0.0 - 0.60			
	Level of Service	A				A			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation	Project	2019-29
Scenario	2022 FB PM	Date	18-08-2020
Comments			

	INTERSECTIONS	McRae Avenue and Richmond Road				Tweedsmuir Avenue and Scott Street			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	0 - 2	3	4	5	0 - 2	0 - 2	3	
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	
	Ped Signal Leading Interval?	No	No	Yes	Yes	No	No	Yes	
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	
	Corner Radius	5-10m	10-15m	10-15m	10-15m	5-10m	5-10m	5-10m	
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	
	PETSI Score	86	70	55	39	91	86	76	
	Ped. Exposure to Traffic LoS	B	C	D	E	A	B	B	-
	Cycle Length								
	Effective Walk Time								
	Average Pedestrian Delay								
	Pedestrian Delay LoS	-	-	-	-	-	-	-	-
	Level of Service	B	C	D	E	A	B	B	-
		E				B			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration				≤ 50 m				Not Applicable
	Right Turning Speed				≤ 25 km/h				Not Applicable
	Cyclist relative to RT motorists	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	B	B	C	C	-	B	C	C
	Level of Service	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	C
		#N/A				#N/A			
Transit	Average Signal Delay	≤ 40 sec		≤ 40 sec	≤ 20 sec			≤ 10 sec	≤ 10 sec
	Level of Service	E	-	E	C	-	-	B	B
		E				B			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m				
	Number of Receiving Lanes on Departure from Intersection	1	≥ 2	1	1				
	Level of Service	E	B	E	E	-	-	-	-
		E				-			
Auto	Volume to Capacity Ratio	0.71 - 0.80				0.0 - 0.60			
	Level of Service	C				A			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation	Project	2019-29
Scenario	2022 FT AM	Date	18-08-2020
Comments			

INTERSECTIONS	McRae Avenue and Richmond Road				Tweedsmuir Avenue and Scott Street			
Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian								
Lanes	0 - 2	3	4	5	0 - 2	0 - 2	3	
Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	
Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	
Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	
Ped Signal Leading Interval?	No	No	Yes	Yes	No	No	Yes	
Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	
Corner Radius	5-10m	10-15m	10-15m	10-15m	5-10m	5-10m	5-10m	
Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	
PETSI Score	86	70	55	39	91	86	76	
Ped. Exposure to Traffic LoS	B	C	D	E	A	B	B	-
Cycle Length								
Effective Walk Time								
Average Pedestrian Delay								
Pedestrian Delay LoS	-	-	-	-	-	-	-	-
Level of Service	B	C	D	E	A	B	B	-
	E				B			
Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle								
Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP
Right Turn Lane Configuration				≤ 50 m				Not Applicable
Right Turning Speed				≤ 25 km/h				Not Applicable
Cyclist relative to RT motorists	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	Not Applicable
Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Separated
Left Turn Approach	No lane crossed	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed
Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
Left Turning Cyclist	B	B	C	C	-	B	C	C
Level of Service	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	C
	#N/A				#N/A			
Transit								
Average Signal Delay	≤ 40 sec		≤ 20 sec	≤ 20 sec			≤ 10 sec	≤ 10 sec
Level of Service	E	-	C	C	-	-	B	B
	E				B			
Truck								
Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m				
Number of Receiving Lanes on Departure from Intersection	1	≥ 2	1	1				
Level of Service	E	B	E	E	-	-	-	-
	E				-			
Auto								
Volume to Capacity Ratio	0.61 - 0.70				0.0 - 0.60			
Level of Service	B				A			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation	Project	2019-29
Scenario	2022 FT PM	Date	18-08-2020
Comments			

INTERSECTIONS		McRae Avenue and Richmond Road				Tweedsmuir Avenue and Scott Street			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	0 - 2	3	4	5	0 - 2	0 - 2	3	
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	
	Ped Signal Leading Interval?	No	No	Yes	Yes	No	No	Yes	
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	
	Corner Radius	5-10m	10-15m	10-15m	10-15m	5-10m	5-10m	5-10m	
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	
	PETSI Score	**86**	**70**	**55**	**39**	**91**	**86**	**76**	
	Ped. Exposure to Traffic LoS	**B**	**C**	**D**	**E**	**A**	**B**	**B**	**-**
	Cycle Length								
	Effective Walk Time								
	Average Pedestrian Delay								
	Pedestrian Delay LoS	-	-	-	-	-	-	-	-
	Level of Service	**B**	**C**	**D**	**E**	**A**	**B**	**B**	**-**
		E				**B**			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration				≤ 50 m				Not Applicable
	Right Turning Speed				≤ 25 km/h				Not Applicable
	Cyclist relative to RT motorists	**#N/A**	**#N/A**	**#N/A**	**D**	**-**	**#N/A**	**#N/A**	
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**-**	**Mixed Traffic**	**Mixed Traffic**	
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	**B**	**B**	**C**	**C**	**-**	**B**	**C**	**C**
	Level of Service	**#N/A**	**#N/A**	**#N/A**	**D**	**-**	**#N/A**	**#N/A**	**C**
		#N/A				**#N/A**			
Transit	Average Signal Delay	> 40 sec		> 40 sec	≤ 30 sec			≤ 20 sec	≤ 10 sec
	Level of Service	**F**	**-**	**F**	**D**	**-**	**-**	**C**	**B**
		F				**C**			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m				
	Number of Receiving Lanes on Departure from Intersection	1	≥ 2	1	1				
	Level of Service	**E**	**B**	**E**	**E**	**-**	**-**	**-**	**-**
		E				**-**			
Auto	Volume to Capacity Ratio	0.81 - 0.90				0.0 - 0.60			
	Level of Service	**D**				**A**			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation	Project	2019-29
Scenario	2027 FB AM	Date	18-08-2020
Comments			

	INTERSECTIONS	McRae Avenue and Richmond Road				Tweedsmuir Avenue and Scott Street			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	0 - 2	3	4	5	0 - 2	0 - 2	3	
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	
	Ped Signal Leading Interval?	No	No	Yes	Yes	No	No	Yes	
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	
	Corner Radius	5-10m	10-15m	10-15m	10-15m	5-10m	5-10m	5-10m	
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	
	PETSI Score	86	70	55	39	91	86	76	
	Ped. Exposure to Traffic LoS	B	C	D	E	A	B	B	-
	Cycle Length								
	Effective Walk Time								
	Average Pedestrian Delay								
	Pedestrian Delay LoS	-	-	-	-	-	-	-	-
	Level of Service	B	C	D	E	A	B	B	-
		E				B			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration				≤ 50 m				Not Applicable
	Right Turning Speed				≤ 25 km/h				Not Applicable
	Cyclist relative to RT motorists	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	B	B	C	C	-	B	C	C
	Level of Service	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	C
		#N/A				#N/A			
Transit	Average Signal Delay	≤ 40 sec		≤ 20 sec	≤ 20 sec			≤ 10 sec	≤ 20 sec
	Level of Service	E	-	C	C	-	-	B	C
		E				C			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m				
	Number of Receiving Lanes on Departure from Intersection	1	≥ 2	1	1				
	Level of Service	E	B	E	E	-	-	-	-
		E				-			
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.0 - 0.60			
	Level of Service	B				A			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation	Project	2019-29
Scenario	2027 FB PM	Date	18-08-2020
Comments			

	INTERSECTIONS	McRae Avenue and Richmond Road				Tweedsmuir Avenue and Scott Street			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	0 - 2	3	4	5	0 - 2	0 - 2	3	
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	
	Ped Signal Leading Interval?	No	No	Yes	Yes	No	No	Yes	
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	
	Corner Radius	5-10m	10-15m	10-15m	10-15m	5-10m	5-10m	5-10m	
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	
	PETSI Score	86	70	55	39	91	86	76	
	Ped. Exposure to Traffic LoS	B	C	D	E	A	B	B	-
	Cycle Length								
	Effective Walk Time								
	Average Pedestrian Delay								
	Pedestrian Delay LoS	-	-	-	-	-	-	-	-
	Level of Service	B	C	D	E	A	B	B	-
		E				B			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration				≤ 50 m				Not Applicable
	Right Turning Speed				≤ 25 km/h				Not Applicable
	Cyclist relative to RT motorists	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	B	B	C	C	-	B	C	C
	Level of Service	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	C
		#N/A				#N/A			
Transit	Average Signal Delay	> 40 sec		> 40 sec	≤ 30 sec			≤ 10 sec	≤ 10 sec
	Level of Service	F	-	F	D	-	-	B	B
		F				B			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m				
	Number of Receiving Lanes on Departure from Intersection	1	≥ 2	1	1				
	Level of Service	E	B	E	E	-	-	-	-
		E				-			
Auto	Volume to Capacity Ratio	0.91 - 1.00				0.0 - 0.60			
	Level of Service	E				A			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation	Project	2019-29
Scenario	2027 FT AM	Date	18-08-2020
Comments			

INTERSECTIONS		McRae Avenue and Richmond Road				Tweedsmuir Avenue and Scott Street			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	0 - 2	3	4	5	0 - 2	0 - 2	3	
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	
	Ped Signal Leading Interval?	No	No	Yes	Yes	No	No	Yes	
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	
	Corner Radius	5-10m	10-15m	10-15m	10-15m	5-10m	5-10m	5-10m	
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	
	PETSI Score	86	70	55	39	91	86	76	
	Ped. Exposure to Traffic LoS	B	C	D	E	A	B	B	-
	Cycle Length								
	Effective Walk Time								
	Average Pedestrian Delay								
	Pedestrian Delay LoS	-	-	-	-	-	-	-	-
	Level of Service	B	C	D	E	A	B	B	-
		E				B			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration				≤ 50 m				Not Applicable
	Right Turning Speed				≤ 25 km/h				Not Applicable
	Cyclist relative to RT motorists	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	B	B	C	C	-	B	C	C
	Level of Service	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	C
		#N/A				#N/A			
Transit	Average Signal Delay	≤ 40 sec		≤ 20 sec	≤ 20 sec			≤ 10 sec	≤ 20 sec
	Level of Service	E	-	C	C	-	-	B	C
		E				C			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m				
	Number of Receiving Lanes on Departure from Intersection	1	≥ 2	1	1				
	Level of Service	E	B	E	E	-	-	-	-
		E				-			
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.0 - 0.60			
	Level of Service	B				A			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation	Project	2019-29
Scenario	2027 FT PM	Date	18-08-2020
Comments			

	INTERSECTIONS	McRae Avenue and Richmond Road				Tweedsmuir Avenue and Scott Street			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	0 - 2	3	4	5	0 - 2	0 - 2	3	
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	
	Ped Signal Leading Interval?	No	No	Yes	Yes	No	No	Yes	
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	
	Corner Radius	5-10m	10-15m	10-15m	10-15m	5-10m	5-10m	5-10m	
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	
	PETSI Score	86	70	55	39	91	86	76	
	Ped. Exposure to Traffic LoS	B	C	D	E	A	B	B	-
	Cycle Length								
	Effective Walk Time								
	Average Pedestrian Delay								
	Pedestrian Delay LoS	-	-	-	-	-	-	-	-
	Level of Service	B	C	D	E	A	B	B	-
		E				B			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration				≤ 50 m				Not Applicable
	Right Turning Speed				≤ 25 km/h				Not Applicable
	Cyclist relative to RT motorists	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	B	B	C	C	-	B	C	C
	Level of Service	#N/A	#N/A	#N/A	D	-	#N/A	#N/A	C
		#N/A				#N/A			
Transit	Average Signal Delay	> 40 sec		> 40 sec	≤ 40 sec			≤ 20 sec	≤ 20 sec
	Level of Service	F	-	F	E	-	-	C	C
		F				C			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m				
	Number of Receiving Lanes on Departure from Intersection	1	≥ 2	1	1				
	Level of Service	E	B	E	E	-	-	-	-
		E				-			
Auto	Volume to Capacity Ratio	0.91 - 1.00				0.0 - 0.60			
	Level of Service	E				A			

Appendix J

Signal Warrants

McRae Ave & Site Access #1
2022 FT

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance			Signal
						Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	199	28%	28%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	52	31%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	165	23%	16%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	12	16%		

Notes
1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

McRae Ave & Site Access #1
2027 FT

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance			Signal
						Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	170	24%	9%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	15	9%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	160	22%	5%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	4	5%		

Notes
1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

McRae Avenue & Scott Street
2022 FT

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance			Signal
						Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	624	87%	59%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	101	59%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	523	73%	17%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	13	17%		

Notes
1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

McRae Avenue & Scott Street
2027 FT

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance			Signal
						Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	667	93%	59%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	101	59%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	566	79%	18%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	14	18%		

Notes
1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

Tweedsmuir Avenue and Richmond Road
2022 FT

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance			Signal
						Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	546	76%	21%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	35	21%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	511	71%	11%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	9	11%		

Notes
1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

Tweedsmuir Avenue and Richmond Road
2027 FT

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance			Signal
						Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	587	82%	23%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	39	23%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	549	76%	13%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	10	13%		

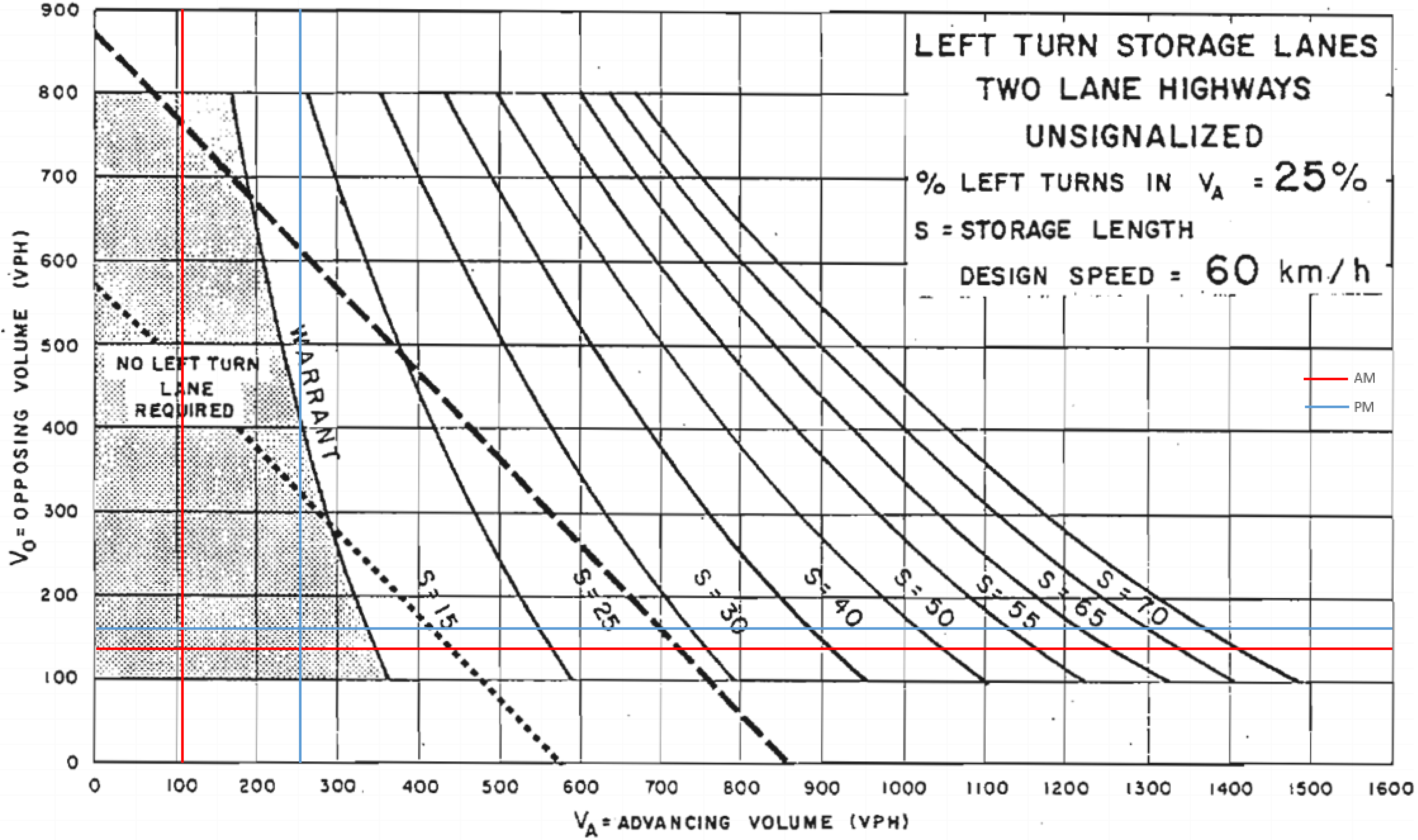
Notes
1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

Appendix K

Left-turn Lane Warrants

Access #1 2022 FT

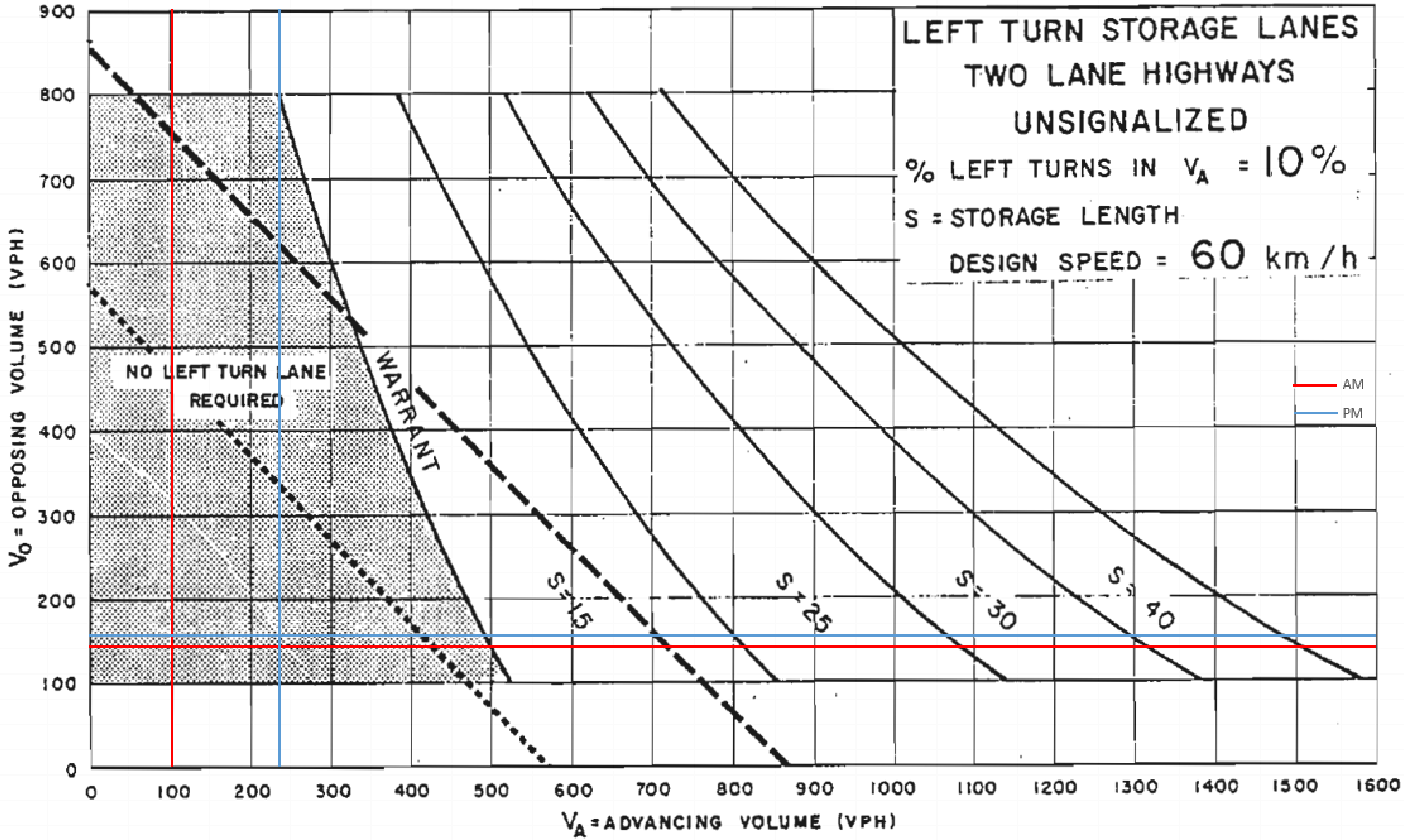
Design Speed		Northbound Left							Yes								
60	km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
		AM	30		57				20	87			126	11	18.7%	107	137
		PM	18		34				53	199			133	29	21.0%	252	162



LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 25%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S = 15
S = 25
S = 30
S = 40
S = 50
S = 55
S = 65
S = 70
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Access #1 2027 FT

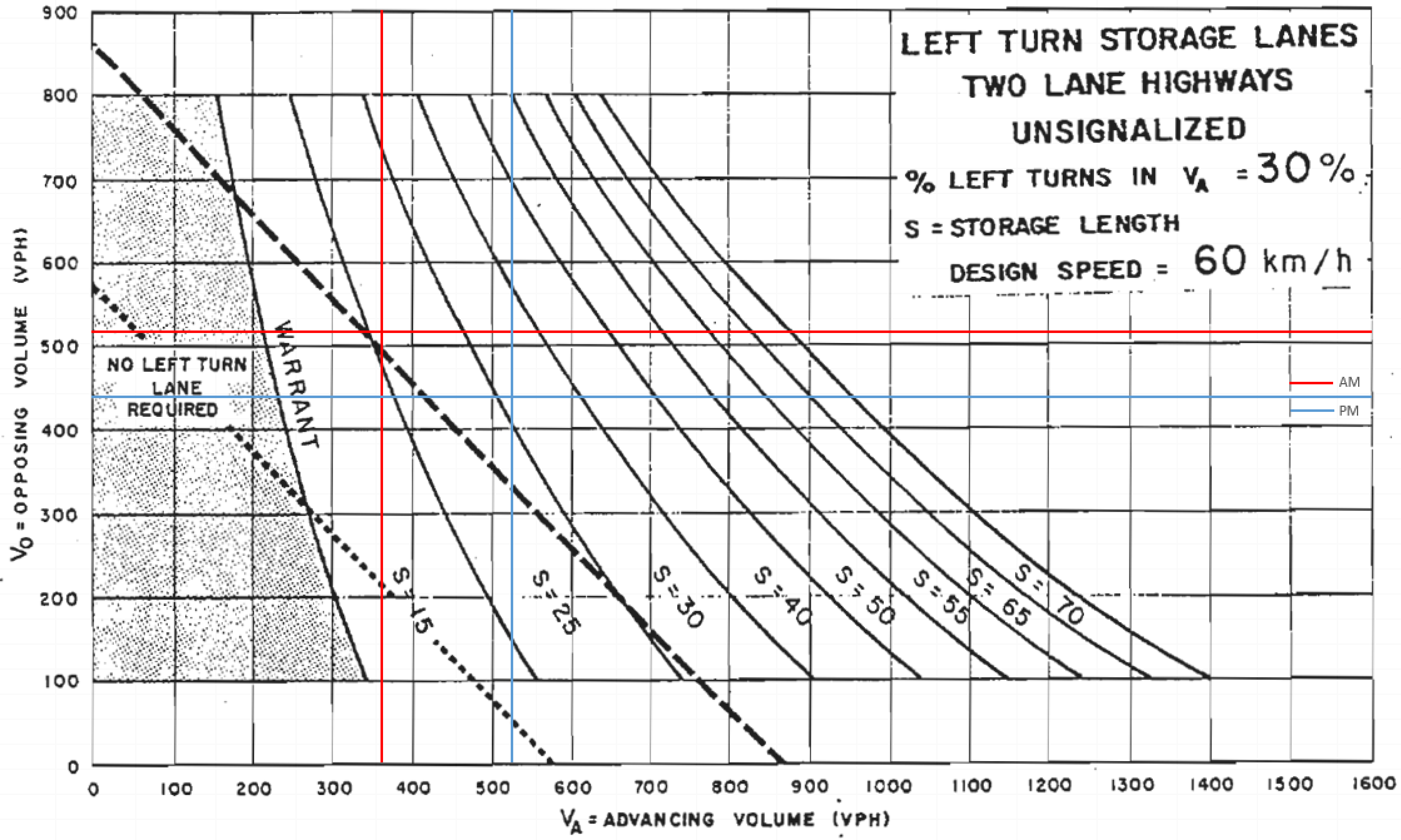
Design Speed		Northbound Left							Yes							
60	km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
		AM	9		16				6	97			139	3	5.8%	103	142
		PM	6		10				16	221			148	8	6.8%	237	156



LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 10%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S = 15
S = 25
S = 30
S = 40
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Scott & McRae Existing

Design Speed	Westbound Left				Yes											
60 km/h			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
		AM	0	490	25	98	265	0	13	0	73	0	0	0	27.0%	363	515
		PM	0	399	39	95	430	0	30	0	168	0	0	0	18.1%	525	438



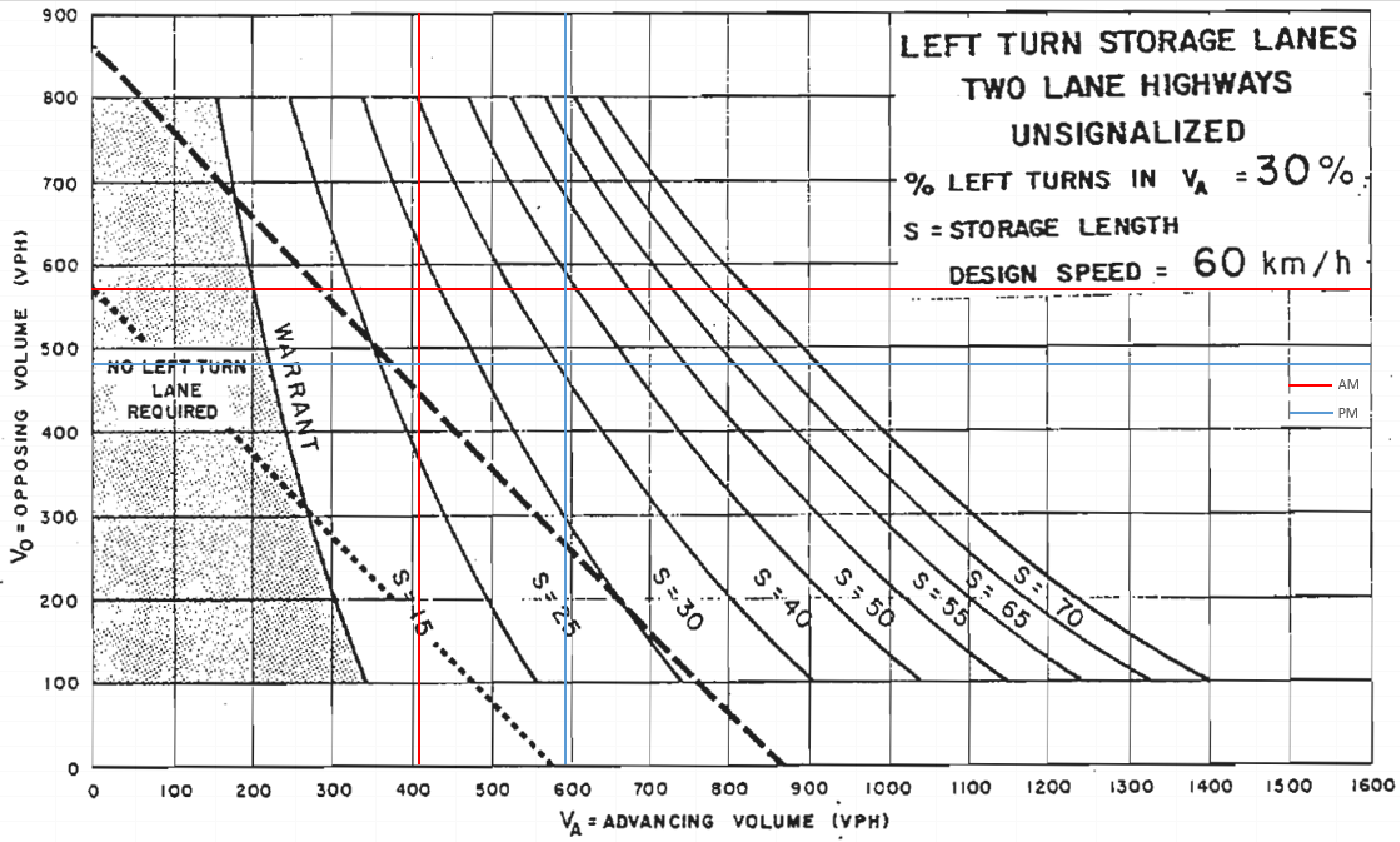
LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 30%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
AM
PM
NO LEFT TURN LANE REQUIRED
WARRANT
S = 15
S = 25
S = 30
S = 40
S = 50
S = 55
S = 65
S = 70
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Scott & McRae 2022 FB

Design Speed Westbound Left Yes

60 km/h

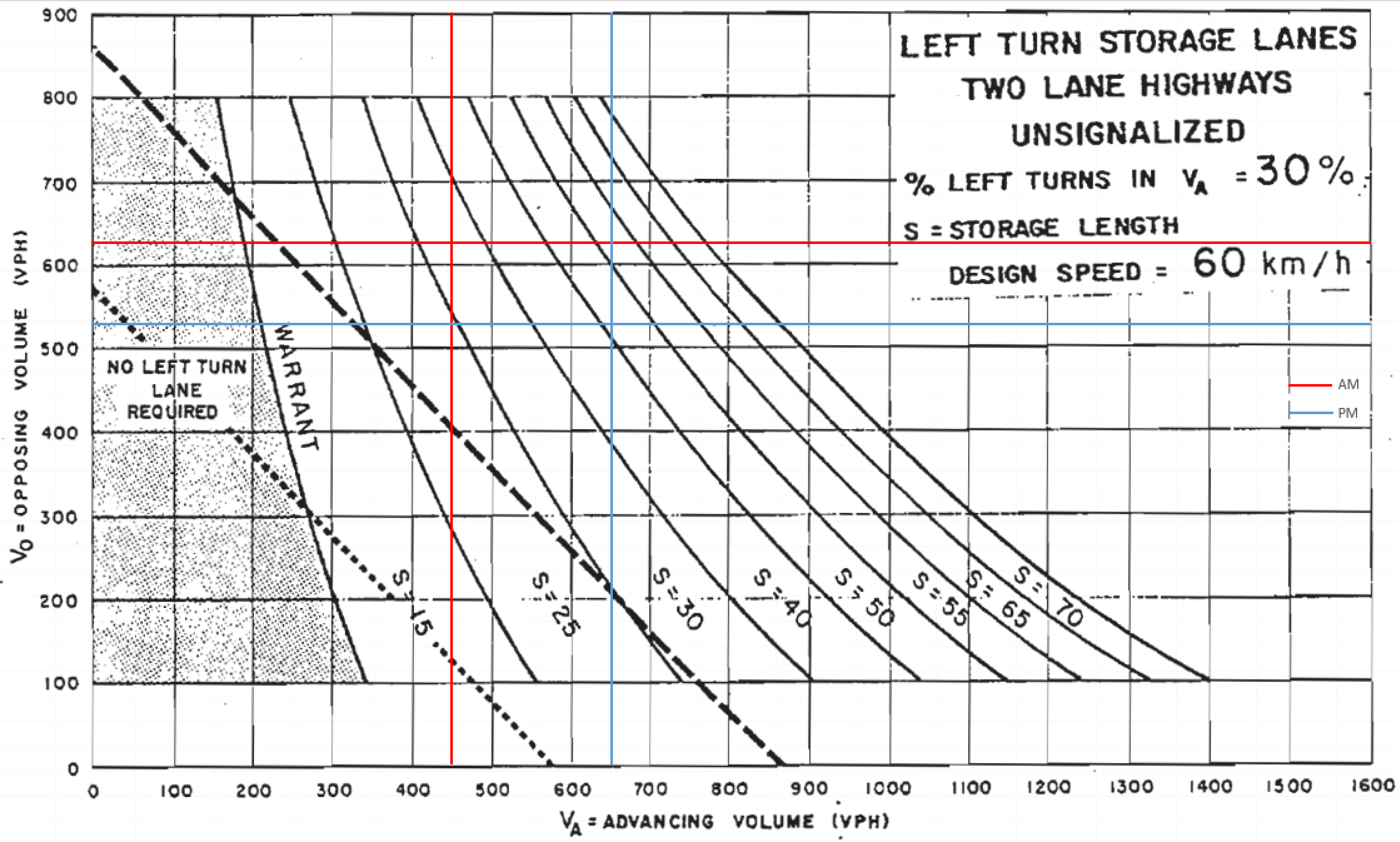
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	0	541	28	115	295	0	16	0	109	0	0	0	28.0%	410	569
PM	0	436	43	120	473	0	35	0	195	0	0	0	20.2%	593	479



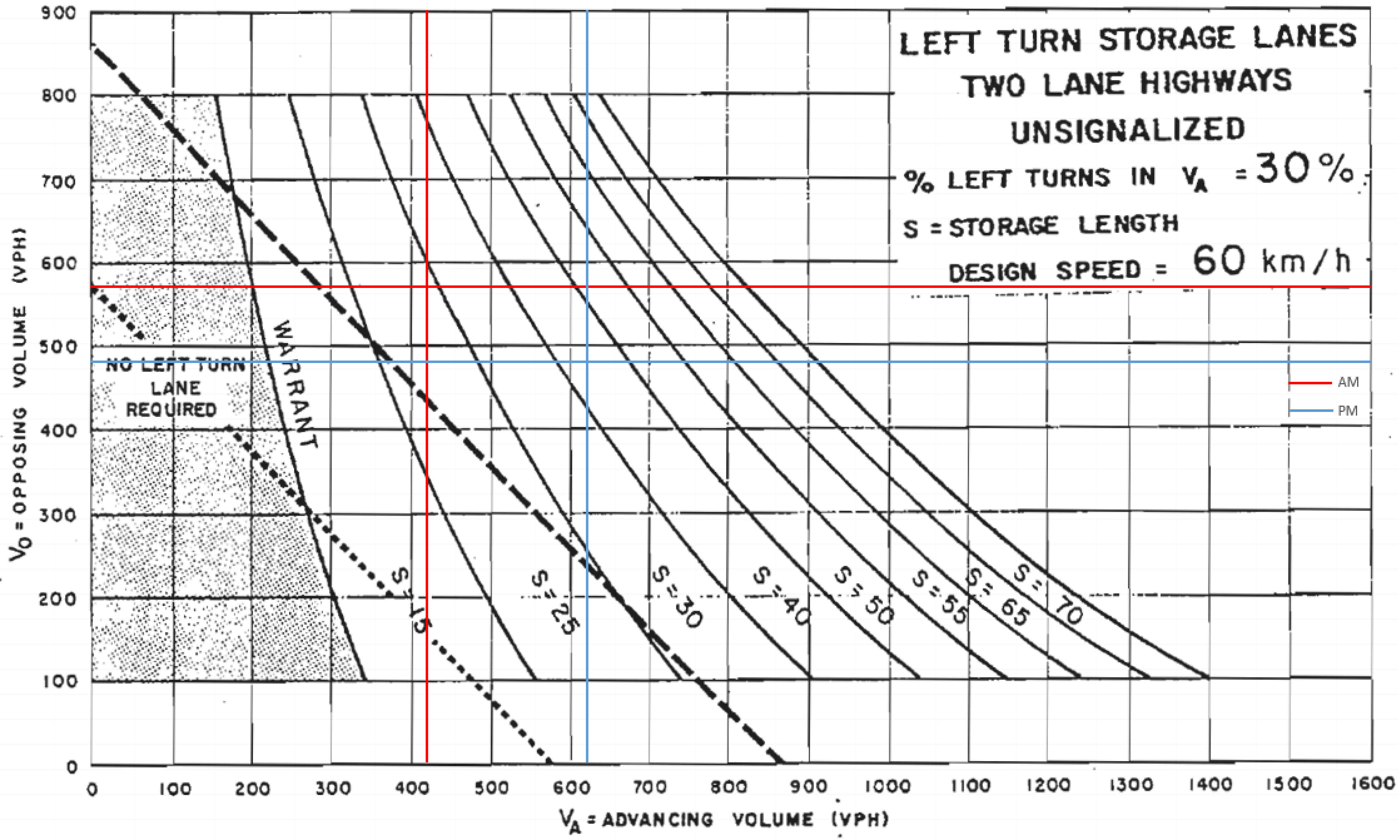
LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 30%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S = 15
S = 25
S = 30
S = 40
S = 50
S = 55
S = 65
S = 70
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)

Scott & McRae 2027 FB

Design Speed	Westbound Left				Yes											
60 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	0	595	30	126	324	0	17	0	118	0	0	0	28.0%	450	625
	PM	0	480	48	130	521	0	38	0	214	0	0	0	20.0%	651	528

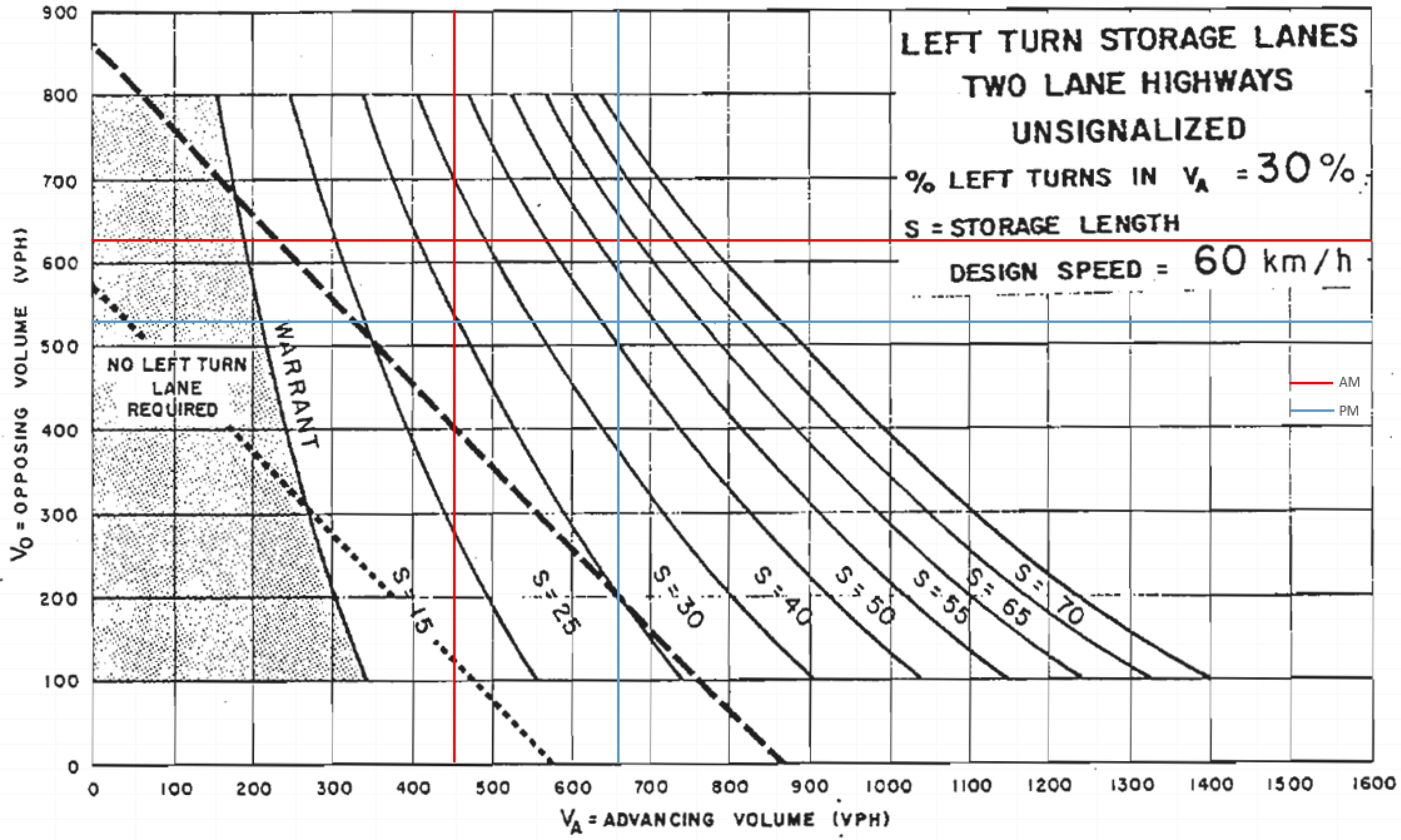

LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 30%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
NO LEFT TURN LANE REQUIRED
WARRANT
S = 15
S = 25
S = 30
S = 40
S = 50
S = 55
S = 65
S = 70
AM
PM
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Scott & McRae 2022 FT																	
Design Speed	Westbound Left					Yes											
60 km/h			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
		AM	0	541	28	126	295	0	16	0	139	0	0	0	29.9%	421	569
		PM	0	436	43	149	473	0	35	0	213	0	0	0	24.0%	622	479


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 30%
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
AM
PM
NO LEFT TURN LANE REQUIRED
WARRANT
S = 15
S = 25
S = 30
S = 40
S = 50
S = 55
S = 65
S = 70
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Scott & McRae 2027 FT

Design Speed	Westbound Left					Yes											
60 km/h			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
		AM	0	595	30	129	324	0	17	0	127	0	0	0	28.5%	453	625
		PM	0	480	48	138	521	0	38	0	220	0	0	0	20.9%	659	528



LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 30 %
S = STORAGE LENGTH
DESIGN SPEED = 60 km/h
AM
PM
NO LEFT TURN LANE REQUIRED
WARRANT
S = 15
S = 25
S = 30
S = 40
S = 50
S = 55
S = 65
S = 70
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Appendix L

2019 Existing Conditions Synchro Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	475	3	10	263	5	3	0	34	6	0	0
Future Volume (vph)	0	475	3	10	263	5	3	0	34	6	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.997			0.875				
Flt Protected					0.998			0.996			0.950	
Satd. Flow (prot)	0	1569	0	0	1534	0	0	1369	0	0	761	0
Flt Permitted					0.998			0.996			0.950	
Satd. Flow (perm)	0	1569	0	0	1534	0	0	1369	0	0	761	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		78.0			22.1			319.9			53.1	
Travel Time (s)		5.6			1.6			23.0			3.8	
Confl. Peds. (#/hr)	148		4	4		148	1					1
Confl. Bikes (#/hr)			90			25			11			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	100%	2%	2%	2%	2%	100%	2%	100%	2%	100%	100%	100%
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	0	528	3	11	292	6	3	0	38	7	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	531	0	0	309	0	0	41	0	0	7	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 39.9%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	475	3	10	263	5	3	0	34	6	0	0
Future Vol, veh/h	0	475	3	10	263	5	3	0	34	6	0	0
Conflicting Peds, #/hr	148	0	4	4	0	148	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	100	2	2	2	2	100	2	100	2	100	100	100
Mvmt Flow	0	528	3	11	292	6	3	0	38	7	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	446	0	0	535	0	0	852	1002	534	1014	1000	444
Stage 1	-	-	-	-	-	-	534	534	-	465	465	-
Stage 2	-	-	-	-	-	-	318	468	-	549	535	-
Critical Hdwy	5.1	-	-	4.12	-	-	7.12	7.5	6.22	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Follow-up Hdwy	3.1	-	-	2.218	-	-	3.518	4.9	3.318	4.4	4.9	4.2
Pot Cap-1 Maneuver	743	-	-	1033	-	-	280	167	546	146	167	452
Stage 1	-	-	-	-	-	-	530	394	-	429	428	-
Stage 2	-	-	-	-	-	-	693	427	-	380	394	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	641	-	-	1029	-	-	276	141	544	116	141	389
Mov Cap-2 Maneuver	-	-	-	-	-	-	276	141	-	116	141	-
Stage 1	-	-	-	-	-	-	528	392	-	370	364	-
Stage 2	-	-	-	-	-	-	683	363	-	354	392	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	12.8	37.9
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	504	641	-	-	1029	-	-	116
HCM Lane V/C Ratio	0.082	-	-	-	0.011	-	-	0.057
HCM Control Delay (s)	12.8	0	-	-	8.5	0	-	37.9
HCM Lane LOS	B	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	490	25	98	265	13	73
Future Volume (vph)	490	25	98	265	13	73
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.993				0.885	
Flt Protected				0.987	0.993	
Satd. Flow (prot)	1560	0	0	1395	1380	0
Flt Permitted				0.987	0.993	
Satd. Flow (perm)	1560	0	0	1395	1380	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.4			138.5	62.1	
Travel Time (s)	4.1			10.0	4.5	
Confl. Peds. (#/hr)		1	1		21	7
Confl. Bikes (#/hr)		105				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Parking (#/hr)		0		0		
Adj. Flow (vph)	544	28	109	294	14	81
Shared Lane Traffic (%)						
Lane Group Flow (vph)	572	0	0	403	95	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.24	1.24	1.24	1.41	1.24	1.24
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 72.9%	ICU Level of Service C
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	2.3					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	490	25	98	265	13	73
Future Vol, veh/h	490	25	98	265	13	73
Conflicting Peds, #/hr	0	1	1	0	21	7
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	544	28	109	294	14	81

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	573	0	1092	566
Stage 1	-	-	-	-	559	-
Stage 2	-	-	-	-	533	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1000	-	237	524
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	588	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	999	-	202	520
Mov Cap-2 Maneuver	-	-	-	-	202	-
Stage 1	-	-	-	-	571	-
Stage 2	-	-	-	-	502	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.4	16.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	420	-	-	999	-
HCM Lane V/C Ratio	0.228	-	-	0.109	-
HCM Control Delay (s)	16.1	-	-	9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0.4	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	411	8	13	272	6	7	8	26	2	4	13
Future Volume (vph)	20	411	8	13	272	6	7	8	26	2	4	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998				0.850		0.915			0.905	
Flt Protected		0.998			0.998			0.991			0.995	
Satd. Flow (prot)	0	1564	0	0	1567	1201	0	1424	0	0	1414	0
Flt Permitted		0.998			0.998			0.991			0.995	
Satd. Flow (perm)	0	1564	0	0	1567	1201	0	1424	0	0	1414	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.3			104.2			72.7			319.9	
Travel Time (s)		5.2			7.5			5.2			23.0	
Confl. Peds. (#/hr)	42		55	55		42	8		15	15		8
Confl. Bikes (#/hr)			16			14			10			2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	22	457	9	14	302	7	8	9	29	2	4	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	488	0	0	316	7	0	46	0	0	20	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.41	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 60.3%	ICU Level of Service B
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	411	8	13	272	6	7	8	26	2	4	13
Future Vol, veh/h	20	411	8	13	272	6	7	8	26	2	4	13
Conflicting Peds, #/hr	42	0	55	55	0	42	8	0	15	15	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	457	9	14	302	7	8	9	29	2	4	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	351	0	0	521	0	0	912	940	532	912	937	352
Stage 1	-	-	-	-	-	-	561	561	-	372	372	-
Stage 2	-	-	-	-	-	-	351	379	-	540	565	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1208	-	-	1045	-	-	255	264	547	255	265	692
Stage 1	-	-	-	-	-	-	512	510	-	648	619	-
Stage 2	-	-	-	-	-	-	666	615	-	526	508	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1161	-	-	991	-	-	224	230	512	214	231	660
Mov Cap-2 Maneuver	-	-	-	-	-	-	224	230	-	214	231	-
Stage 1	-	-	-	-	-	-	473	471	-	607	585	-
Stage 2	-	-	-	-	-	-	631	581	-	468	469	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	16.8	14.3
HCM LOS			C	B

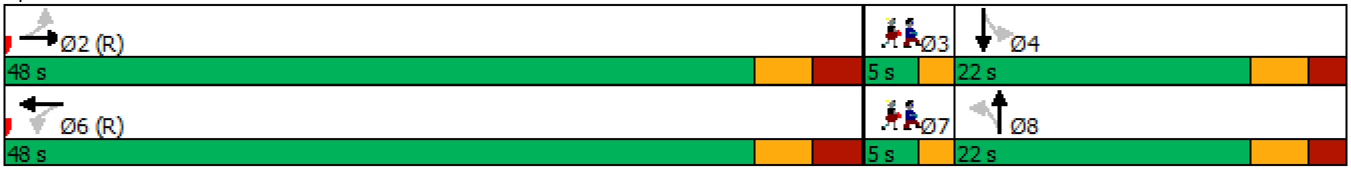
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	351	1161	-	-	991	-	-	410
HCM Lane V/C Ratio	0.13	0.019	-	-	0.015	-	-	0.051
HCM Control Delay (s)	16.8	8.2	0	-	8.7	0	-	14.3
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	354	41	7	271	97	23	9	16	85	21	35
Future Volume (vph)	91	354	41	7	271	97	23	9	16	85	21	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	45.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	30.0			55.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.99		0.97	0.98		0.96	0.93			0.93	
Frt		0.984			0.960			0.904			0.966	
Flt Protected	0.950			0.950			0.950				0.971	
Satd. Flow (prot)	1492	1531	0	1492	1478	0	1492	1325	0	0	1446	0
Flt Permitted	0.498			0.476			0.674				0.799	
Satd. Flow (perm)	761	1531	0	723	1478	0	1017	1325	0	0	1133	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			39			18			21	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.2			101.3			60.6			151.6	
Travel Time (s)		7.5			7.3			4.4			10.9	
Confl. Peds. (#/hr)	40		50	50		40	29		44	44		29
Confl. Bikes (#/hr)			6			6			2			1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Parking (#/hr)			0			0						
Adj. Flow (vph)	101	393	46	8	301	108	26	10	18	94	23	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	439	0	8	409	0	26	28	0	0	156	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template										Left		
Leading Detector (m)	7.0	0.0		22.0	0.0		8.0	8.0		2.0	8.0	
Trailing Detector (m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Position(m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Size(m)	8.0	0.6		8.0	0.6		9.0	9.0		2.0	9.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	3.0	0.0		3.0	0.0		3.0	3.0		0.0	3.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.2	35.2		35.2	35.2		25.5	25.5		25.5	25.5	
Total Split (s)	48.0	48.0		48.0	48.0		22.0	22.0		22.0	22.0	
Total Split (%)	64.0%	64.0%		64.0%	64.0%		29.3%	29.3%		29.3%	29.3%	
Maximum Green (s)	41.8	41.8		41.8	41.8		16.5	16.5		16.5	16.5	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.9	2.9		2.9	2.9		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	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.5	5.5			5.5	
Lead/Lag							Lag	Lag		Lag	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	9.0	9.0		9.0	9.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	50	50		40	40		44	44		29	29	
Act Effct Green (s)	46.7	46.7		46.7	46.7		16.6	16.6			16.6	
Actuated g/C Ratio	0.62	0.62		0.62	0.62		0.22	0.22			0.22	
v/c Ratio	0.21	0.46		0.02	0.44		0.12	0.09			0.59	
Control Delay	9.0	10.2		7.4	9.4		22.1	12.8			30.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	9.0	10.2		7.4	9.4		22.1	12.8			30.7	
LOS	A	B		A	A		C	B			C	
Approach Delay		10.0			9.3			17.3			30.7	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	6.3	32.2		0.5	27.1		2.8	1.1			15.9	
Queue Length 95th (m)	14.9	56.6		2.2	49.4		8.3	6.4			32.2	
Internal Link Dist (m)		80.2			77.3			36.6			127.6	
Turn Bay Length (m)	45.0			60.0								
Base Capacity (vph)	474	959		450	935		256	346			300	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.21	0.46		0.02	0.44		0.10	0.08			0.52	

Intersection Summary	
Area Type: CBD	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 12.9	Intersection LOS: B
Intersection Capacity Utilization 62.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: McRae Ave & Richmond Rd



Lane Group	Ø3	Ø7
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	7%	7%
Maximum Green (s)	3.0	3.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø4
Lane Configurations							
Traffic Volume (vph)	0	515	278	0	0	0	
Future Volume (vph)	0	515	278	0	0	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt							
Flt Protected							
Satd. Flow (prot)	0	1745	1745	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	1745	1745	0	0	0	
Right Turn on Red				No		Yes	
Satd. Flow (RTOR)							
Link Speed (k/h)		50	50		50		
Link Distance (m)		22.1	57.4		18.9		
Travel Time (s)		1.6	4.1		1.4		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	0	572	309	0	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	572	309	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		0.0	0.0		0.0		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		3.0	3.0		3.0		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (k/h)	25			15	25	15	
Number of Detectors		0	0				
Detector Template							
Leading Detector (m)		0.0	0.0				
Trailing Detector (m)		0.0	0.0				
Turn Type		NA	NA				
Protected Phases		2	6				4
Permitted Phases							
Detector Phase		2	6				
Switch Phase							
Minimum Initial (s)		5.0	5.0				10.0
Minimum Split (s)		23.8	23.8				22.0
Total Split (s)		30.8	30.8				24.0
Total Split (%)		56.2%	56.2%				44%
Maximum Green (s)		25.0	25.0				20.0
Yellow Time (s)		3.3	3.3				3.0
All-Red Time (s)		2.5	2.5				1.0
Lost Time Adjust (s)		0.0	0.0				
Total Lost Time (s)		5.8	5.8				
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0				3.0
Recall Mode		Max	Max				None

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø4
Walk Time (s)		7.0	7.0				7.0
Flash Dont Walk (s)		11.0	11.0				11.0
Pedestrian Calls (#/hr)		0	0				121
Act Effct Green (s)		42.6	42.6				
Actuated g/C Ratio		0.67	0.67				
v/c Ratio		0.49	0.26				
Control Delay		9.6	7.3				
Queue Delay		0.0	0.0				
Total Delay		9.6	7.3				
LOS		A	A				
Approach Delay		9.6	7.3				
Approach LOS		A	A				
Queue Length 50th (m)		39.2	17.3				
Queue Length 95th (m)		64.1	29.4				
Internal Link Dist (m)		0.1	33.4		0.1		
Turn Bay Length (m)							
Base Capacity (vph)		1172	1172				
Starvation Cap Reductn		0	0				
Spillback Cap Reductn		0	0				
Storage Cap Reductn		0	0				
Reduced v/c Ratio		0.49	0.26				

Intersection Summary	
Area Type: Other	
Cycle Length: 54.8	
Actuated Cycle Length: 63.4	
Natural Cycle: 55	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 8.8	Intersection LOS: A
Intersection Capacity Utilization 33.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Scott St & Pedestrian Crossing

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	4	82	0	5	118
Future Volume (vph)	0	4	82	0	5	118
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						0.998
Satd. Flow (prot)	1510	0	1745	0	0	1742
Flt Permitted						0.998
Satd. Flow (perm)	1510	0	1745	0	0	1742
Link Speed (k/h)	30		50			50
Link Distance (m)	65.4		107.3			62.1
Travel Time (s)	7.8		7.7			4.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	4	91	0	6	131
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	91	0	0	137
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 20.8% ICU Level of Service A

Analysis Period (min) 15

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	4	82	0	5	118
Future Vol, veh/h	0	4	82	0	5	118
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	4	91	0	6	131

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	234	91	0	0	91	0
Stage 1	91	-	-	-	-	-
Stage 2	143	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	754	967	-	-	1504	-
Stage 1	933	-	-	-	-	-
Stage 2	884	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	751	967	-	-	1504	-
Mov Cap-2 Maneuver	751	-	-	-	-	-
Stage 1	933	-	-	-	-	-
Stage 2	880	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	967	1504	-
HCM Lane V/C Ratio	-	-	0.005	0.004	-
HCM Control Delay (s)	-	-	8.7	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	32	24	58	74	36	82
Future Volume (vph)	32	24	58	74	36	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.942		0.924			
Flt Protected	0.972					0.985
Satd. Flow (prot)	1598	0	1612	0	0	1719
Flt Permitted	0.972					0.985
Satd. Flow (perm)	1598	0	1612	0	0	1719
Link Speed (k/h)	30		50			50
Link Distance (m)	63.1		151.6			107.3
Travel Time (s)	7.6		10.9			7.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	36	27	64	82	40	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	63	0	146	0	0	131
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 28.1%	ICU Level of Service A
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	2.7					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	24	58	74	36	82
Future Vol, veh/h	32	24	58	74	36	82
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	27	64	82	40	91

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	276	105	0	0	146	0
Stage 1	105	-	-	-	-	-
Stage 2	171	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	714	949	-	-	1436	-
Stage 1	919	-	-	-	-	-
Stage 2	859	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	693	949	-	-	1436	-
Mov Cap-2 Maneuver	693	-	-	-	-	-
Stage 1	919	-	-	-	-	-
Stage 2	834	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	2.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	784	1436	-
HCM Lane V/C Ratio	-	-	0.079	0.028	-
HCM Control Delay (s)	-	-	10	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	402	7	14	444	5	10	0	30	5	0	1
Future Volume (vph)	0	402	7	14	444	5	10	0	30	5	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.998			0.899			0.981	
Flt Protected					0.998			0.988			0.959	
Satd. Flow (prot)	0	1567	0	0	1547	0	0	1395	0	0	754	0
Flt Permitted					0.998			0.988			0.959	
Satd. Flow (perm)	0	1567	0	0	1547	0	0	1395	0	0	754	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		78.0			22.1			319.9			53.1	
Travel Time (s)		5.6			1.6			23.0			3.8	
Confl. Peds. (#/hr)	181		13	13		181	4					4
Confl. Bikes (#/hr)			34			70			1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	100%	2%	2%	2%	2%	100%	2%	100%	2%	100%	100%	100%
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	0	447	8	16	493	6	11	0	33	6	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	455	0	0	515	0	0	44	0	0	7	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 52.4%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	402	7	14	444	5	10	0	30	5	0	1
Future Vol, veh/h	0	402	7	14	444	5	10	0	30	5	0	1
Conflicting Peds, #/hr	181	0	13	13	0	181	4	0	0	0	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	100	2	2	2	2	100	2	100	2	100	100	100
Mvmt Flow	0	447	8	16	493	6	11	0	33	6	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	680	0	0	468	0	0	997	1176	464	1177	1177	681
Stage 1	-	-	-	-	-	-	464	464	-	709	709	-
Stage 2	-	-	-	-	-	-	533	712	-	468	468	-
Critical Hdwy	5.1	-	-	4.12	-	-	7.12	7.5	6.22	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Follow-up Hdwy	3.1	-	-	2.218	-	-	3.518	4.9	3.318	4.4	4.9	4.2
Pot Cap-1 Maneuver	586	-	-	1094	-	-	223	127	598	109	127	318
Stage 1	-	-	-	-	-	-	578	429	-	302	318	-
Stage 2	-	-	-	-	-	-	531	317	-	427	427	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	487	-	-	1081	-	-	215	102	591	84	102	263
Mov Cap-2 Maneuver	-	-	-	-	-	-	215	102	-	84	102	-
Stage 1	-	-	-	-	-	-	571	424	-	251	259	-
Stage 2	-	-	-	-	-	-	516	258	-	403	422	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	14.8	45.7
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	411	487	-	-	1081	-	-	95
HCM Lane V/C Ratio	0.108	-	-	-	0.014	-	-	0.07
HCM Control Delay (s)	14.8	0	-	-	8.4	0	-	45.7
HCM Lane LOS	B	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	399	39	95	430	30	168
Future Volume (vph)	399	39	95	430	30	168
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.988				0.885	
Flt Protected				0.991	0.993	
Satd. Flow (prot)	1552	0	0	1401	1380	0
Flt Permitted				0.991	0.993	
Satd. Flow (perm)	1552	0	0	1401	1380	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.4			138.5	62.1	
Travel Time (s)	4.1			10.0	4.5	
Confl. Peds. (#/hr)		1	1		12	1
Confl. Bikes (#/hr)		30				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Parking (#/hr)		0		0		
Adj. Flow (vph)	443	43	106	478	33	187
Shared Lane Traffic (%)						
Lane Group Flow (vph)	486	0	0	584	220	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.24	1.24	1.24	1.41	1.24	1.24
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 84.3%	ICU Level of Service E
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	4.3					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	399	39	95	430	30	168
Future Vol, veh/h	399	39	95	430	30	168
Conflicting Peds, #/hr	0	1	1	0	12	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	443	43	106	478	33	187

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	487	0	1168	467
Stage 1	-	-	-	-	466	-
Stage 2	-	-	-	-	702	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1076	-	214	596
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	491	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1075	-	183	595
Mov Cap-2 Maneuver	-	-	-	-	183	-
Stage 1	-	-	-	-	631	-
Stage 2	-	-	-	-	420	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	20.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	444	-	-	1075	-
HCM Lane V/C Ratio	0.495	-	-	0.098	-
HCM Control Delay (s)	20.8	-	-	8.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.7	-	-	0.3	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	381	17	70	594	10	3	6	32	8	9	15
Future Volume (vph)	26	381	17	70	594	10	3	6	32	8	9	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995				0.850		0.894			0.936	
Flt Protected		0.997			0.995			0.997			0.988	
Satd. Flow (prot)	0	1558	0	0	1563	1201	0	1400	0	0	1452	0
Flt Permitted		0.997			0.995			0.997			0.988	
Satd. Flow (perm)	0	1558	0	0	1563	1201	0	1400	0	0	1452	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.3			104.2			72.7			319.9	
Travel Time (s)		5.2			7.5			5.2			23.0	
Confl. Peds. (#/hr)	120		74	74		120	5		18	18		5
Confl. Bikes (#/hr)			18			29			2			7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	29	423	19	78	660	11	3	7	36	9	10	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	471	0	0	738	11	0	46	0	0	36	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.41	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: CBD

Control Type: Unsignalized

Intersection Capacity Utilization 77.7% ICU Level of Service D

Analysis Period (min) 15

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	381	17	70	594	10	3	6	32	8	9	15
Future Vol, veh/h	26	381	17	70	594	10	3	6	32	8	9	15
Conflicting Peds, #/hr	120	0	74	74	0	120	5	0	18	18	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	423	19	78	660	11	3	7	36	9	10	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	791	0	0	516	0	0	1405	1512	525	1466	1510	785
Stage 1	-	-	-	-	-	-	565	565	-	936	936	-
Stage 2	-	-	-	-	-	-	840	947	-	530	574	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	829	-	-	1050	-	-	117	120	552	106	120	393
Stage 1	-	-	-	-	-	-	510	508	-	318	344	-
Stage 2	-	-	-	-	-	-	360	340	-	533	503	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	736	-	-	978	-	-	81	82	505	70	82	347
Mov Cap-2 Maneuver	-	-	-	-	-	-	81	82	-	70	82	-
Stage 1	-	-	-	-	-	-	450	449	-	268	267	-
Stage 2	-	-	-	-	-	-	287	264	-	455	444	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.9	23.9	47.2
HCM LOS			C	E

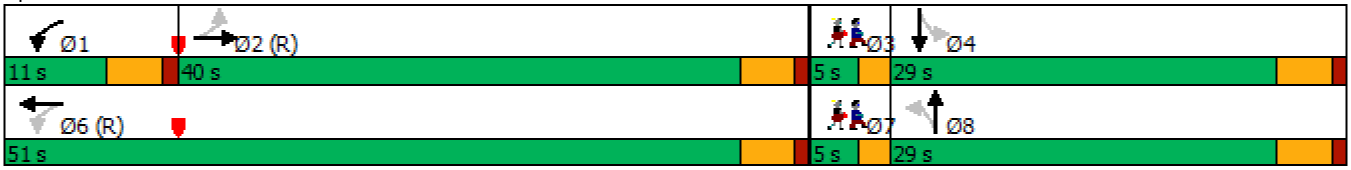
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	236	736	-	-	978	-	-	120
HCM Lane V/C Ratio	0.193	0.039	-	-	0.08	-	-	0.296
HCM Control Delay (s)	23.9	10.1	0	-	9	0	-	47.2
HCM Lane LOS	C	B	A	-	A	A	-	E
HCM 95th %tile Q(veh)	0.7	0.1	-	-	0.3	-	-	1.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	272	74	45	590	138	69	56	47	83	36	117
Future Volume (vph)	71	272	74	45	590	138	69	56	47	83	36	117
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	45.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	30.0			55.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.95		0.91	0.97		0.93	0.86			0.85	
Frt		0.968			0.972			0.932			0.933	
Flt Protected	0.950			0.950			0.950				0.983	
Satd. Flow (prot)	1492	1449	0	1492	1476	0	1492	1264	0	0	1337	0
Flt Permitted	0.242			0.410			0.522				0.847	
Satd. Flow (perm)	367	1449	0	586	1476	0	765	1264	0	0	1054	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			22			50			59	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.2			101.3			60.6			151.6	
Travel Time (s)		7.5			7.3			4.4			10.9	
Confl. Peds. (#/hr)	103		136	136		103	59		133	133		59
Confl. Bikes (#/hr)			5			10			3			2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Parking (#/hr)			0			0						
Adj. Flow (vph)	79	302	82	50	656	153	77	62	52	92	40	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	384	0	50	809	0	77	114	0	0	262	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template										Left		
Leading Detector (m)	7.0	0.0		22.0	0.0		8.0	8.0		2.0	8.0	
Trailing Detector (m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Position(m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Size(m)	8.0	0.6		8.0	0.6		9.0	9.0		2.0	9.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.5	33.5		9.5	33.5		24.5	24.5		24.5	24.5	
Total Split (s)	40.0	40.0		11.0	51.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.1%	47.1%		12.9%	60.0%		34.1%	34.1%		34.1%	34.1%	
Maximum Green (s)	35.5	35.5		6.5	46.5		24.5	24.5		24.5	24.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)	9.0	9.0			9.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0			20.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	136	136			103		133	133		59	59	
Act Effct Green (s)	45.6	45.6		51.9	51.9		24.1	24.1			24.1	
Actuated g/C Ratio	0.54	0.54		0.61	0.61		0.28	0.28			0.28	
v/c Ratio	0.40	0.49		0.12	0.89		0.36	0.29			0.77	
Control Delay	24.2	16.9		8.6	29.7		28.1	15.0			36.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	24.2	16.9		8.6	29.7		28.1	15.0			36.7	
LOS	C	B		A	C		C	B			D	
Approach Delay		18.2			28.4			20.3			36.7	
Approach LOS		B			C			C			D	
Queue Length 50th (m)	7.8	37.9		2.9	96.6		10.0	7.9			30.8	
Queue Length 95th (m)	#26.3	74.6		8.4	#202.8		20.2	18.6			54.3	
Internal Link Dist (m)		80.2			77.3			36.6			127.6	
Turn Bay Length (m)	45.0			60.0								
Base Capacity (vph)	196	785		427	910		234	422			364	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.40	0.49		0.12	0.89		0.33	0.27			0.72	

Intersection Summary	
Area Type: CBD	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 26.1	Intersection LOS: C
Intersection Capacity Utilization 88.2%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 4: McRae Ave & Richmond Rd



Lane Group	Ø3	Ø7
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	6%	6%
Maximum Green (s)	3.0	3.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations							
Traffic Volume (vph)	437	0	0	463	0	0	
Future Volume (vph)	437	0	0	463	0	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt							
Flt Protected							
Satd. Flow (prot)	1745	0	0	1745	0	0	
Flt Permitted							
Satd. Flow (perm)	1745	0	0	1745	0	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)							
Link Speed (k/h)	50			50	50		
Link Distance (m)	22.1			57.4	22.8		
Travel Time (s)	1.6			4.1	1.6		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	486	0	0	514	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	486	0	0	514	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(m)	0.0			0.0	0.0		
Link Offset(m)	0.0			0.0	0.0		
Crosswalk Width(m)	3.0			3.0	3.0		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (k/h)		15	25		25	15	
Number of Detectors	0			0			
Detector Template							
Leading Detector (m)	0.0			0.0			
Trailing Detector (m)	0.0			0.0			
Turn Type	NA			NA			
Protected Phases	2			6			4
Permitted Phases							
Detector Phase	2			6			
Switch Phase							
Minimum Initial (s)	5.0			5.0			10.0
Minimum Split (s)	23.8			23.8			22.0
Total Split (s)	30.8			30.8			24.0
Total Split (%)	56.2%			56.2%			44%
Maximum Green (s)	25.0			25.0			20.0
Yellow Time (s)	3.3			3.3			3.0
All-Red Time (s)	2.5			2.5			1.0
Lost Time Adjust (s)	0.0			0.0			
Total Lost Time (s)	5.8			5.8			
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0			3.0			3.0
Recall Mode	Max			Max			None

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Walk Time (s)	7.0			7.0			7.0
Flash Dont Walk (s)	11.0			11.0			11.0
Pedestrian Calls (#/hr)	0			0			183
Act Effct Green (s)	42.6			42.6			
Actuated g/C Ratio	0.67			0.67			
v/c Ratio	0.41			0.44			
Control Delay	8.7			9.0			
Queue Delay	0.0			0.0			
Total Delay	8.7			9.0			
LOS	A			A			
Approach Delay	8.7			9.0			
Approach LOS	A			A			
Queue Length 50th (m)	31.1			33.6			
Queue Length 95th (m)	50.8			54.9			
Internal Link Dist (m)	0.1			33.4	0.1		
Turn Bay Length (m)							
Base Capacity (vph)	1172			1172			
Starvation Cap Reductn	0			0			
Spillback Cap Reductn	0			0			
Storage Cap Reductn	0			0			
Reduced v/c Ratio	0.41			0.44			

Intersection Summary	
Area Type: Other	
Cycle Length: 54.8	
Actuated Cycle Length: 63.4	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 8.8	Intersection LOS: A
Intersection Capacity Utilization 30.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Pedestrian Crossing & Scott St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	11	187	0	9	125
Future Volume (vph)	0	11	187	0	9	125
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						0.997
Satd. Flow (prot)	1510	0	1745	0	0	1740
Flt Permitted						0.997
Satd. Flow (perm)	1510	0	1745	0	0	1740
Link Speed (k/h)	30		50			50
Link Distance (m)	64.1		107.3			62.1
Travel Time (s)	7.7		7.7			4.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	12	208	0	10	139
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	0	208	0	0	149
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 24.8%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	11	187	0	9	125
Future Vol, veh/h	0	11	187	0	9	125
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	12	208	0	10	139

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	367	208	0	0	208	0
Stage 1	208	-	-	-	-	-
Stage 2	159	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	633	832	-	-	1363	-
Stage 1	827	-	-	-	-	-
Stage 2	870	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	628	832	-	-	1363	-
Mov Cap-2 Maneuver	628	-	-	-	-	-
Stage 1	827	-	-	-	-	-
Stage 2	863	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	832	1363	-
HCM Lane V/C Ratio	-	-	0.015	0.007	-
HCM Control Delay (s)	-	-	9.4	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	72	52	135	41	22	103
Future Volume (vph)	72	52	135	41	22	103
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.943		0.968			
Flt Protected	0.972					0.991
Satd. Flow (prot)	1600	0	1689	0	0	1729
Flt Permitted	0.972					0.991
Satd. Flow (perm)	1600	0	1689	0	0	1729
Link Speed (k/h)	30		50			50
Link Distance (m)	67.7		151.6			107.3
Travel Time (s)	8.1		10.9			7.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	80	58	150	46	24	114
Shared Lane Traffic (%)						
Lane Group Flow (vph)	138	0	196	0	0	138
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 34.7%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	3.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	72	52	135	41	22	103
Future Vol, veh/h	72	52	135	41	22	103
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	58	150	46	24	114

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	335	173	0	0	196	0
Stage 1	173	-	-	-	-	-
Stage 2	162	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	660	871	-	-	1377	-
Stage 1	857	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	647	871	-	-	1377	-
Mov Cap-2 Maneuver	647	-	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	851	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	1.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	725	1377	-
HCM Lane V/C Ratio	-	-	0.19	0.018	-
HCM Control Delay (s)	-	-	11.1	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	490	25	98	265	13	73
Future Volume (vph)	490	25	98	265	13	73
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	10.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.993				0.885	
Flt Protected			0.950		0.993	
Satd. Flow (prot)	1560	0	1492	1414	1380	0
Flt Permitted			0.950		0.993	
Satd. Flow (perm)	1560	0	1492	1414	1380	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.4			138.5	62.1	
Travel Time (s)	4.1			10.0	4.5	
Confl. Peds. (#/hr)		1	1		21	7
Confl. Bikes (#/hr)		105				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Parking (#/hr)		0		0		
Adj. Flow (vph)	544	28	109	294	14	81
Shared Lane Traffic (%)						
Lane Group Flow (vph)	572	0	109	294	95	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.24	1.24	1.24	1.41	1.24	1.24
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 56.5%	ICU Level of Service B
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	2.3					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	490	25	98	265	13	73
Future Vol, veh/h	490	25	98	265	13	73
Conflicting Peds, #/hr	0	1	1	0	21	7
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	544	28	109	294	14	81

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	573	0	1092	566
Stage 1	-	-	-	-	559	-
Stage 2	-	-	-	-	533	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1000	-	237	524
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	588	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	999	-	207	520
Mov Cap-2 Maneuver	-	-	-	-	207	-
Stage 1	-	-	-	-	571	-
Stage 2	-	-	-	-	514	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.4	16
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	423	-	-	999	-
HCM Lane V/C Ratio	0.226	-	-	0.109	-
HCM Control Delay (s)	16	-	-	9	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.9	-	-	0.4	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	399	39	95	430	30	168
Future Volume (vph)	399	39	95	430	30	168
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	10.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.988				0.885	
Flt Protected			0.950		0.993	
Satd. Flow (prot)	1552	0	1492	1414	1380	0
Flt Permitted			0.950		0.993	
Satd. Flow (perm)	1552	0	1492	1414	1380	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.4			138.5	62.1	
Travel Time (s)	4.1			10.0	4.5	
Confl. Peds. (#/hr)		1	1		12	1
Confl. Bikes (#/hr)		30				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Parking (#/hr)		0		0		
Adj. Flow (vph)	443	43	106	478	33	187
Shared Lane Traffic (%)						
Lane Group Flow (vph)	486	0	106	478	220	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.24	1.24	1.24	1.41	1.24	1.24
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 57.8%	ICU Level of Service B
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	4.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	399	39	95	430	30	168
Future Vol, veh/h	399	39	95	430	30	168
Conflicting Peds, #/hr	0	1	1	0	12	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	443	43	106	478	33	187

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	487	0	1168	467
Stage 1	-	-	-	-	466	-
Stage 2	-	-	-	-	702	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1076	-	214	596
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	491	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1075	-	190	595
Mov Cap-2 Maneuver	-	-	-	-	190	-
Stage 1	-	-	-	-	631	-
Stage 2	-	-	-	-	437	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	20.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	450	-	-	1075	-
HCM Lane V/C Ratio	0.489	-	-	0.098	-
HCM Control Delay (s)	20.4	-	-	8.7	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	2.6	-	-	0.3	-

Appendix M

2022 Future Background Synchro Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	526	3	11	293	5	3	0	36	6	0	0
Future Volume (vph)	0	526	3	11	293	5	3	0	36	6	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.998			0.875				
Flt Protected					0.998			0.996			0.950	
Satd. Flow (prot)	0	1569	0	0	1540	0	0	1369	0	0	761	0
Flt Permitted					0.998			0.996			0.950	
Satd. Flow (perm)	0	1569	0	0	1540	0	0	1369	0	0	761	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		78.0			22.1			319.9			53.1	
Travel Time (s)		5.6			1.6			23.0			3.8	
Confl. Peds. (#/hr)	164		4	4		164	1					1
Confl. Bikes (#/hr)			99			28			12			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	2%	2%	2%	2%	100%	2%	100%	2%	100%	100%	100%
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	0	526	3	11	293	5	3	0	36	6	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	529	0	0	309	0	0	39	0	0	6	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: CBD

Control Type: Unsignalized

Intersection Capacity Utilization 43.0% ICU Level of Service A

Analysis Period (min) 15

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	526	3	11	293	5	3	0	36	6	0	0
Future Vol, veh/h	0	526	3	11	293	5	3	0	36	6	0	0
Conflicting Peds, #/hr	164	0	4	4	0	164	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	100	2	2	2	2	100	2	100	2	100	100	100
Mvmt Flow	0	526	3	11	293	5	3	0	36	6	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	462	0	0	533	0	0	851	1016	532	1028	1015	461
Stage 1	-	-	-	-	-	-	532	532	-	482	482	-
Stage 2	-	-	-	-	-	-	319	484	-	546	533	-
Critical Hdwy	5.1	-	-	4.12	-	-	7.12	7.5	6.22	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Follow-up Hdwy	3.1	-	-	2.218	-	-	3.518	4.9	3.318	4.4	4.9	4.2
Pot Cap-1 Maneuver	732	-	-	1035	-	-	280	163	547	142	164	441
Stage 1	-	-	-	-	-	-	531	395	-	418	420	-
Stage 2	-	-	-	-	-	-	693	419	-	382	395	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	620	-	-	1031	-	-	276	136	545	111	137	373
Mov Cap-2 Maneuver	-	-	-	-	-	-	276	136	-	111	137	-
Stage 1	-	-	-	-	-	-	529	393	-	354	351	-
Stage 2	-	-	-	-	-	-	683	350	-	357	393	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	12.7	39.3
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	507	620	-	-	1031	-	-	111
HCM Lane V/C Ratio	0.077	-	-	-	0.011	-	-	0.054
HCM Control Delay (s)	12.7	0	-	-	8.5	0	-	39.3
HCM Lane LOS	B	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	541	28	115	295	16	109
Future Volume (vph)	541	28	115	295	16	109
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	10.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.993				0.882	
Flt Protected			0.950		0.994	
Satd. Flow (prot)	1560	0	1492	1414	1377	0
Flt Permitted			0.950		0.994	
Satd. Flow (perm)	1560	0	1492	1414	1377	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.4			138.5	62.1	
Travel Time (s)	4.1			10.0	4.5	
Confl. Peds. (#/hr)		1	1		23	8
Confl. Bikes (#/hr)		120				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)		0		0		
Adj. Flow (vph)	541	28	115	295	16	109
Shared Lane Traffic (%)						
Lane Group Flow (vph)	569	0	115	295	125	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.24	1.24	1.24	1.41	1.24	1.24
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 63.4%	ICU Level of Service B
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	2.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	541	28	115	295	16	109
Future Vol, veh/h	541	28	115	295	16	109
Conflicting Peds, #/hr	0	1	1	0	23	8
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	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	541	28	115	295	16	109

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	570	0	1104	564
Stage 1	-	-	-	-	556	-
Stage 2	-	-	-	-	548	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1002	-	234	525
Stage 1	-	-	-	-	574	-
Stage 2	-	-	-	-	579	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1001	-	203	521
Mov Cap-2 Maneuver	-	-	-	-	203	-
Stage 1	-	-	-	-	573	-
Stage 2	-	-	-	-	501	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.5	16.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	434	-	-	1001	-
HCM Lane V/C Ratio	0.288	-	-	0.115	-
HCM Control Delay (s)	16.6	-	-	9.1	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.2	-	-	0.4	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	445	8	14	294	6	7	8	28	2	4	14
Future Volume (vph)	21	445	8	14	294	6	7	8	28	2	4	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998				0.850		0.912			0.905	
Flt Protected		0.998			0.998			0.992			0.995	
Satd. Flow (prot)	0	1564	0	0	1567	1201	0	1421	0	0	1414	0
Flt Permitted		0.998			0.998			0.992			0.995	
Satd. Flow (perm)	0	1564	0	0	1567	1201	0	1421	0	0	1414	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.3			104.2			72.7			319.9	
Travel Time (s)		5.2			7.5			5.2			23.0	
Confl. Peds. (#/hr)	46		61	61		46	9		17	17		9
Confl. Bikes (#/hr)			17			15			11			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	21	445	8	14	294	6	7	8	28	2	4	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	474	0	0	308	6	0	43	0	0	20	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.41	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 63.9%	ICU Level of Service B
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	445	8	14	294	6	7	8	28	2	4	14
Future Vol, veh/h	21	445	8	14	294	6	7	8	28	2	4	14
Conflicting Peds, #/hr	46	0	61	61	0	46	9	0	17	17	0	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	445	8	14	294	6	7	8	28	2	4	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	346	0	0	514	0	0	895	926	527	894	924	349
Stage 1	-	-	-	-	-	-	552	552	-	368	368	-
Stage 2	-	-	-	-	-	-	343	374	-	526	556	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1213	-	-	1052	-	-	261	269	551	262	269	694
Stage 1	-	-	-	-	-	-	518	515	-	652	621	-
Stage 2	-	-	-	-	-	-	672	618	-	535	513	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1161	-	-	992	-	-	228	233	511	220	233	659
Mov Cap-2 Maneuver	-	-	-	-	-	-	228	233	-	220	233	-
Stage 1	-	-	-	-	-	-	477	474	-	609	584	-
Stage 2	-	-	-	-	-	-	637	582	-	478	472	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	16.4	14
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	359	1161	-	-	992	-	-	421
HCM Lane V/C Ratio	0.12	0.018	-	-	0.014	-	-	0.048
HCM Control Delay (s)	16.4	8.2	0	-	8.7	0	-	14
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	379	43	8	301	126	24	10	17	97	22	43
Future Volume (vph)	106	379	43	8	301	126	24	10	17	97	22	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	45.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	30.0			55.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.99		0.96	0.98		0.96	0.93			0.93	
Frt		0.985			0.956			0.906			0.964	
Flt Protected	0.950			0.950			0.950				0.971	
Satd. Flow (prot)	1492	1532	0	1492	1466	0	1492	1323	0	0	1438	0
Flt Permitted	0.485			0.488			0.668				0.801	
Satd. Flow (perm)	739	1532	0	738	1466	0	1004	1323	0	0	1124	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			45			17			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.2			101.3			60.6			151.6	
Travel Time (s)		7.5			7.3			4.4			10.9	
Confl. Peds. (#/hr)	44		55	55		44	32		49	49		32
Confl. Bikes (#/hr)			7			7			1			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0						
Adj. Flow (vph)	106	379	43	8	301	126	24	10	17	97	22	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	422	0	8	427	0	24	27	0	0	162	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template										Left		
Leading Detector (m)	7.0	0.0		22.0	0.0		8.0	8.0		2.0	8.0	
Trailing Detector (m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Position(m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Size(m)	8.0	0.6		8.0	0.6		9.0	9.0		2.0	9.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	3.0	0.0		3.0	0.0		3.0	3.0		0.0	3.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.2	35.2		35.2	35.2		25.5	25.5		25.5	25.5	
Total Split (s)	48.0	48.0		48.0	48.0		22.0	22.0		22.0	22.0	
Total Split (%)	64.0%	64.0%		64.0%	64.0%		29.3%	29.3%		29.3%	29.3%	
Maximum Green (s)	41.8	41.8		41.8	41.8		16.5	16.5		16.5	16.5	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.9	2.9		2.9	2.9		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	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.5	5.5			5.5	
Lead/Lag							Lag	Lag		Lag	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	9.0	9.0		9.0	9.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	50	50		40	40		44	44		29	29	
Act Effct Green (s)	46.6	46.6		46.6	46.6		16.7	16.7			16.7	
Actuated g/C Ratio	0.62	0.62		0.62	0.62		0.22	0.22			0.22	
v/c Ratio	0.23	0.44		0.02	0.46		0.11	0.09			0.61	
Control Delay	9.3	10.0		7.4	9.6		21.9	13.0			31.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	9.3	10.0		7.4	9.6		21.9	13.0			31.6	
LOS	A	B		A	A		C	B			C	
Approach Delay		9.9			9.6			17.2			31.6	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	6.7	30.5		0.5	28.5		2.6	1.1			16.6	
Queue Length 95th (m)	15.9	53.8		2.2	52.6		7.8	6.3			33.5	
Internal Link Dist (m)		80.2			77.3			36.6			127.6	
Turn Bay Length (m)	45.0			60.0								
Base Capacity (vph)	459	957		459	928		252	346			299	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.23	0.44		0.02	0.46		0.10	0.08			0.54	

Intersection Summary

Area Type: CBD

Cycle Length: 75

Actuated Cycle Length: 75

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

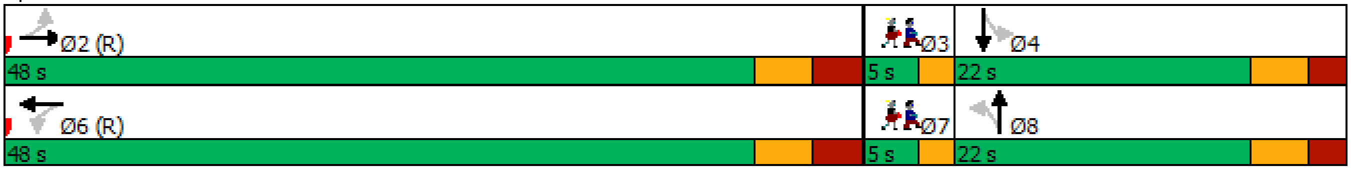
Maximum v/c Ratio: 0.61

Intersection Signal Delay: 13.1 Intersection LOS: B

Intersection Capacity Utilization 68.6% ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: McRae Ave & Richmond Rd



Lane Group	Ø3	Ø7
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	7%	7%
Maximum Green (s)	3.0	3.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø4
Lane Configurations		↑	↑				
Traffic Volume (vph)	0	568	309	0	0	0	
Future Volume (vph)	0	568	309	0	0	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt							
Flt Protected							
Satd. Flow (prot)	0	1745	1745	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	1745	1745	0	0	0	
Right Turn on Red				No		Yes	
Satd. Flow (RTOR)							
Link Speed (k/h)		50	50		50		
Link Distance (m)		22.1	57.4		18.9		
Travel Time (s)		1.6	4.1		1.4		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	0	568	309	0	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	568	309	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		0.0	0.0		0.0		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		3.0	3.0		3.0		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (k/h)	25			15	25	15	
Number of Detectors		0	0				
Detector Template							
Leading Detector (m)		0.0	0.0				
Trailing Detector (m)		0.0	0.0				
Turn Type		NA	NA				
Protected Phases		2	6				4
Permitted Phases							
Detector Phase		2	6				
Switch Phase							
Minimum Initial (s)		5.0	5.0				10.0
Minimum Split (s)		23.8	23.8				22.0
Total Split (s)		30.8	30.8				24.0
Total Split (%)		56.2%	56.2%				44%
Maximum Green (s)		25.0	25.0				20.0
Yellow Time (s)		3.3	3.3				3.0
All-Red Time (s)		2.5	2.5				1.0
Lost Time Adjust (s)		0.0	0.0				
Total Lost Time (s)		5.8	5.8				
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0				3.0
Recall Mode		Max	Max				None

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø4
Walk Time (s)		7.0	7.0				7.0
Flash Dont Walk (s)		11.0	11.0				11.0
Pedestrian Calls (#/hr)		0	0				134
Act Effct Green (s)		42.6	42.6				
Actuated g/C Ratio		0.67	0.67				
v/c Ratio		0.48	0.26				
Control Delay		9.6	7.3				
Queue Delay		0.0	0.0				
Total Delay		9.6	7.3				
LOS		A	A				
Approach Delay		9.6	7.3				
Approach LOS		A	A				
Queue Length 50th (m)		38.8	17.3				
Queue Length 95th (m)		63.4	29.4				
Internal Link Dist (m)		0.1	33.4		0.1		
Turn Bay Length (m)							
Base Capacity (vph)		1172	1172				
Starvation Cap Reductn		0	0				
Spillback Cap Reductn		0	0				
Storage Cap Reductn		0	0				
Reduced v/c Ratio		0.48	0.26				

Intersection Summary	
Area Type: Other	
Cycle Length: 54.8	
Actuated Cycle Length: 63.4	
Natural Cycle: 55	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 8.8	Intersection LOS: A
Intersection Capacity Utilization 36.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Scott St & Pedestrian Crossing

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	4	87	0	5	126
Future Volume (vph)	0	4	87	0	5	126
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						0.998
Satd. Flow (prot)	1510	0	1745	0	0	1742
Flt Permitted						0.998
Satd. Flow (perm)	1510	0	1745	0	0	1742
Link Speed (k/h)	30		50			50
Link Distance (m)	65.4		107.3			62.1
Travel Time (s)	7.8		7.7			4.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	4	87	0	5	126
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	87	0	0	131
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 21.3% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	0.3					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	4	87	0	5	126
Future Vol, veh/h	0	4	87	0	5	126
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	4	87	0	5	126

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	223	87	0	0	87	0
Stage 1	87	-	-	-	-	-
Stage 2	136	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	765	971	-	-	1509	-
Stage 1	936	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	762	971	-	-	1509	-
Mov Cap-2 Maneuver	762	-	-	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	886	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	971	1509	-
HCM Lane V/C Ratio	-	-	0.004	0.003	-
HCM Control Delay (s)	-	-	8.7	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	32	24	63	74	36	90
Future Volume (vph)	32	24	63	74	36	90
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.942		0.927			
Flt Protected	0.972					0.986
Satd. Flow (prot)	1598	0	1618	0	0	1721
Flt Permitted	0.972					0.986
Satd. Flow (perm)	1598	0	1618	0	0	1721
Link Speed (k/h)	30		50			50
Link Distance (m)	63.1		151.6			107.3
Travel Time (s)	7.6		10.9			7.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	32	24	63	74	36	90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	56	0	137	0	0	126
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 28.8% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	2.6					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	24	63	74	36	90
Future Vol, veh/h	32	24	63	74	36	90
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	32	24	63	74	36	90

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	262	100	0	0	137	0
Stage 1	100	-	-	-	-	-
Stage 2	162	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	727	956	-	-	1447	-
Stage 1	924	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	708	956	-	-	1447	-
Mov Cap-2 Maneuver	708	-	-	-	-	-
Stage 1	924	-	-	-	-	-
Stage 2	844	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	2.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	797	1447	-
HCM Lane V/C Ratio	-	-	0.07	0.025	-
HCM Control Delay (s)	-	-	9.9	7.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	442	7	15	488	5	11	0	32	5	0	1
Future Volume (vph)	0	442	7	15	488	5	11	0	32	5	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.999			0.900			0.977	
Flt Protected					0.999			0.987			0.960	
Satd. Flow (prot)	0	1567	0	0	1553	0	0	1395	0	0	751	0
Flt Permitted					0.999			0.987			0.960	
Satd. Flow (perm)	0	1567	0	0	1553	0	0	1395	0	0	751	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		78.0			22.1			319.9			53.1	
Travel Time (s)		5.6			1.6			23.0			3.8	
Confl. Peds. (#/hr)	198		14	14		198	4					4
Confl. Bikes (#/hr)			37			77			1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	2%	2%	2%	2%	100%	2%	100%	2%	100%	100%	100%
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	0	442	7	15	488	5	11	0	32	5	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	449	0	0	508	0	0	43	0	0	6	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 56.0%	ICU Level of Service B
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	442	7	15	488	5	11	0	32	5	0	1
Future Vol, veh/h	0	442	7	15	488	5	11	0	32	5	0	1
Conflicting Peds, #/hr	198	0	14	14	0	198	4	0	0	0	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	100	2	2	2	2	100	2	100	2	100	100	100
Mvmt Flow	0	442	7	15	488	5	11	0	32	5	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	691	0	0	463	0	0	985	1181	460	1181	1182	693
Stage 1	-	-	-	-	-	-	460	460	-	719	719	-
Stage 2	-	-	-	-	-	-	525	721	-	462	463	-
Critical Hdwy	5.1	-	-	4.12	-	-	7.12	7.5	6.22	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Follow-up Hdwy	3.1	-	-	2.218	-	-	3.518	4.9	3.318	4.4	4.9	4.2
Pot Cap-1 Maneuver	579	-	-	1098	-	-	227	126	601	108	126	313
Stage 1	-	-	-	-	-	-	581	431	-	298	315	-
Stage 2	-	-	-	-	-	-	536	314	-	431	429	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	472	-	-	1084	-	-	219	100	593	82	100	254
Mov Cap-2 Maneuver	-	-	-	-	-	-	219	100	-	82	100	-
Stage 1	-	-	-	-	-	-	573	425	-	243	252	-
Stage 2	-	-	-	-	-	-	522	251	-	408	423	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	14.7	46.8
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	413	472	-	-	1084	-	-	92
HCM Lane V/C Ratio	0.104	-	-	-	0.014	-	-	0.065
HCM Control Delay (s)	14.7	0	-	-	8.4	0	-	46.8
HCM Lane LOS	B	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	436	43	120	473	35	195
Future Volume (vph)	436	43	120	473	35	195
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	10.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.988				0.886	
Flt Protected			0.950		0.992	
Satd. Flow (prot)	1552	0	1492	1414	1380	0
Flt Permitted			0.950		0.992	
Satd. Flow (perm)	1552	0	1492	1414	1380	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.4			138.5	62.1	
Travel Time (s)	4.1			10.0	4.5	
Confl. Peds. (#/hr)		1	1		13	1
Confl. Bikes (#/hr)		34				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)		0		0		
Adj. Flow (vph)	436	43	120	473	35	195
Shared Lane Traffic (%)						
Lane Group Flow (vph)	479	0	120	473	230	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.24	1.24	1.24	1.41	1.24	1.24
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 64.3%	ICU Level of Service C
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	4.6					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	436	43	120	473	35	195
Future Vol, veh/h	436	43	120	473	35	195
Conflicting Peds, #/hr	0	1	1	0	13	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	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	436	43	120	473	35	195

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	480	0	1185	460
Stage 1	-	-	-	-	459	-
Stage 2	-	-	-	-	726	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1082	-	209	601
Stage 1	-	-	-	-	636	-
Stage 2	-	-	-	-	479	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1081	-	183	600
Mov Cap-2 Maneuver	-	-	-	-	183	-
Stage 1	-	-	-	-	635	-
Stage 2	-	-	-	-	421	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	21.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	446	-	-	1081	-
HCM Lane V/C Ratio	0.516	-	-	0.111	-
HCM Control Delay (s)	21.4	-	-	8.7	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	2.9	-	-	0.4	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	409	18	74	641	11	3	6	34	8	10	16
Future Volume (vph)	28	409	18	74	641	11	3	6	34	8	10	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995				0.850		0.893			0.936	
Flt Protected		0.997			0.995			0.997			0.988	
Satd. Flow (prot)	0	1558	0	0	1563	1201	0	1398	0	0	1452	0
Flt Permitted		0.997			0.995			0.997			0.988	
Satd. Flow (perm)	0	1558	0	0	1563	1201	0	1398	0	0	1452	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.3			104.2			72.7			319.9	
Travel Time (s)		5.2			7.5			5.2			23.0	
Confl. Peds. (#/hr)	132		81	81		132	5		20	20		5
Confl. Bikes (#/hr)			19			31			1			7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	28	409	18	74	641	11	3	6	34	8	10	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	455	0	0	715	11	0	43	0	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.41	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 82.4%	ICU Level of Service E
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	409	18	74	641	11	3	6	34	8	10	16
Future Vol, veh/h	28	409	18	74	641	11	3	6	34	8	10	16
Conflicting Peds, #/hr	132	0	81	81	0	132	5	0	20	20	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	409	18	74	641	11	3	6	34	8	10	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	784	0	0	508	0	0	1368	1487	519	1435	1485	778
Stage 1	-	-	-	-	-	-	555	555	-	921	921	-
Stage 2	-	-	-	-	-	-	813	932	-	514	564	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	834	-	-	1057	-	-	124	124	557	111	125	396
Stage 1	-	-	-	-	-	-	516	513	-	324	349	-
Stage 2	-	-	-	-	-	-	372	345	-	543	508	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	731	-	-	977	-	-	87	84	505	74	85	346
Mov Cap-2 Maneuver	-	-	-	-	-	-	87	84	-	74	85	-
Stage 1	-	-	-	-	-	-	453	451	-	270	270	-
Stage 2	-	-	-	-	-	-	300	267	-	466	447	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.9	22.5	44.2
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	248	731	-	-	977	-	-	125
HCM Lane V/C Ratio	0.173	0.038	-	-	0.076	-	-	0.272
HCM Control Delay (s)	22.5	10.1	0	-	9	0	-	44.2
HCM Lane LOS	C	B	A	-	A	A	-	E
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.2	-	-	1

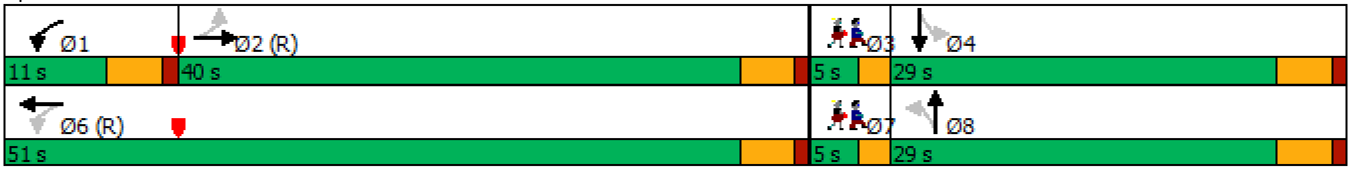
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	301	78	47	636	160	73	60	50	101	39	136
Future Volume (vph)	82	301	78	47	636	160	73	60	50	101	39	136
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	45.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	30.0			55.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.95		0.90	0.96		0.93	0.85			0.83	
Frt		0.969			0.970			0.932			0.933	
Flt Protected	0.950			0.950			0.950				0.982	
Satd. Flow (prot)	1492	1447	0	1492	1466	0	1492	1247	0	0	1326	0
Flt Permitted	0.240			0.407			0.522				0.842	
Satd. Flow (perm)	362	1447	0	576	1466	0	762	1247	0	0	1027	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			24			50			58	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.2			101.3			60.6			151.6	
Travel Time (s)		7.5			7.3			4.4			10.9	
Confl. Peds. (#/hr)	113		149	149		113	65		146	146		65
Confl. Bikes (#/hr)			6			11			2			3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0						
Adj. Flow (vph)	82	301	78	47	636	160	73	60	50	101	39	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	379	0	47	796	0	73	110	0	0	276	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template										Left		
Leading Detector (m)	7.0	0.0		22.0	0.0		8.0	8.0		2.0	8.0	
Trailing Detector (m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Position(m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Size(m)	8.0	0.6		8.0	0.6		9.0	9.0		2.0	9.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.5	33.5		9.5	33.5		24.5	24.5		24.5	24.5	
Total Split (s)	40.0	40.0		11.0	51.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.1%	47.1%		12.9%	60.0%		34.1%	34.1%		34.1%	34.1%	
Maximum Green (s)	35.5	35.5		6.5	46.5		24.5	24.5		24.5	24.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)	9.0	9.0			9.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0			20.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	136	136			103		133	133		59	59	
Act Effct Green (s)	44.3	44.3		50.7	50.7		25.3	25.3			25.3	
Actuated g/C Ratio	0.52	0.52		0.60	0.60		0.30	0.30			0.30	
v/c Ratio	0.44	0.50		0.12	0.90		0.32	0.27			0.80	
Control Delay	27.0	17.9		9.1	32.0		26.1	14.0			38.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	27.0	17.9		9.1	32.0		26.1	14.0			38.9	
LOS	C	B		A	C		C	B			D	
Approach Delay		19.5			30.7			18.8			38.9	
Approach LOS		B			C			B			D	
Queue Length 50th (m)	8.8	40.0		3.0	102.8		9.1	7.1			32.4	
Queue Length 95th (m)	#29.2	73.3		8.0	#198.5		19.2	17.9			#65.8	
Internal Link Dist (m)		80.2			77.3			36.6			127.6	
Turn Bay Length (m)	45.0			60.0								
Base Capacity (vph)	188	763		413	884		240	427			363	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.44	0.50		0.11	0.90		0.30	0.26			0.76	

Intersection Summary

Area Type: CBD
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 27.8 Intersection LOS: C
Intersection Capacity Utilization 96.2% ICU Level of Service F
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: McRae Ave & Richmond Rd



Lane Group	Ø3	Ø7
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	6%	6%
Maximum Green (s)	3.0	3.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations	↑			↑			
Traffic Volume (vph)	479	0	0	508	0	0	
Future Volume (vph)	479	0	0	508	0	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt							
Flt Protected							
Satd. Flow (prot)	1745	0	0	1745	0	0	
Flt Permitted							
Satd. Flow (perm)	1745	0	0	1745	0	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)							
Link Speed (k/h)	50			50	50		
Link Distance (m)	22.1			57.4	22.8		
Travel Time (s)	1.6			4.1	1.6		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	479	0	0	508	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	479	0	0	508	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(m)	0.0			0.0	0.0		
Link Offset(m)	0.0			0.0	0.0		
Crosswalk Width(m)	3.0			3.0	3.0		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (k/h)		15	25		25	15	
Number of Detectors	0			0			
Detector Template							
Leading Detector (m)	0.0			0.0			
Trailing Detector (m)	0.0			0.0			
Turn Type	NA			NA			
Protected Phases	2			6			4
Permitted Phases							
Detector Phase	2			6			
Switch Phase							
Minimum Initial (s)	5.0			5.0			10.0
Minimum Split (s)	23.8			23.8			22.0
Total Split (s)	30.8			30.8			24.0
Total Split (%)	56.2%			56.2%			44%
Maximum Green (s)	25.0			25.0			20.0
Yellow Time (s)	3.3			3.3			3.0
All-Red Time (s)	2.5			2.5			1.0
Lost Time Adjust (s)	0.0			0.0			
Total Lost Time (s)	5.8			5.8			
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0			3.0			3.0
Recall Mode	Max			Max			None

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Walk Time (s)	7.0			7.0			7.0
Flash Dont Walk (s)	11.0			11.0			11.0
Pedestrian Calls (#/hr)	0			0			201
Act Effct Green (s)	42.6			42.6			
Actuated g/C Ratio	0.67			0.67			
v/c Ratio	0.41			0.43			
Control Delay	8.6			8.9			
Queue Delay	0.0			0.0			
Total Delay	8.6			8.9			
LOS	A			A			
Approach Delay	8.6			8.9			
Approach LOS	A			A			
Queue Length 50th (m)	30.4			33.1			
Queue Length 95th (m)	49.8			53.9			
Internal Link Dist (m)	0.1			33.4	0.1		
Turn Bay Length (m)							
Base Capacity (vph)	1172			1172			
Starvation Cap Reductn	0			0			
Spillback Cap Reductn	0			0			
Storage Cap Reductn	0			0			
Reduced v/c Ratio	0.41			0.43			

Intersection Summary	
Area Type: Other	
Cycle Length: 54.8	
Actuated Cycle Length: 63.4	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 8.8	Intersection LOS: A
Intersection Capacity Utilization 33.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Pedestrian Crossing & Scott St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	11	199	0	9	133
Future Volume (vph)	0	11	199	0	9	133
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						0.997
Satd. Flow (prot)	1510	0	1745	0	0	1740
Flt Permitted						0.997
Satd. Flow (perm)	1510	0	1745	0	0	1740
Link Speed (k/h)	30		50			50
Link Distance (m)	64.1		107.3			62.1
Travel Time (s)	7.7		7.7			4.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	11	199	0	9	133
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	199	0	0	142
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 25.2%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	11	199	0	9	133
Future Vol, veh/h	0	11	199	0	9	133
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	11	199	0	9	133

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	350	199	0	0	199	0
Stage 1	199	-	-	-	-	-
Stage 2	151	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	647	842	-	-	1373	-
Stage 1	835	-	-	-	-	-
Stage 2	877	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	642	842	-	-	1373	-
Mov Cap-2 Maneuver	642	-	-	-	-	-
Stage 1	835	-	-	-	-	-
Stage 2	871	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	842	1373	-
HCM Lane V/C Ratio	-	-	0.013	0.007	-
HCM Control Delay (s)	-	-	9.3	7.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	72	52	147	41	22	111
Future Volume (vph)	72	52	147	41	22	111
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.943		0.971			
Flt Protected	0.972					0.992
Satd. Flow (prot)	1600	0	1694	0	0	1731
Flt Permitted	0.972					0.992
Satd. Flow (perm)	1600	0	1694	0	0	1731
Link Speed (k/h)	30		50			50
Link Distance (m)	67.7		151.6			107.3
Travel Time (s)	8.1		10.9			7.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	52	147	41	22	111
Shared Lane Traffic (%)						
Lane Group Flow (vph)	124	0	188	0	0	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary		
Area Type:	Other	
Control Type: Unsignalized		
Intersection Capacity Utilization 35.8%		ICU Level of Service A
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	3.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	72	52	147	41	22	111
Future Vol, veh/h	72	52	147	41	22	111
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	72	52	147	41	22	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	323	168	0	0	188	0
Stage 1	168	-	-	-	-	-
Stage 2	155	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	671	876	-	-	1386	-
Stage 1	862	-	-	-	-	-
Stage 2	873	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	660	876	-	-	1386	-
Mov Cap-2 Maneuver	660	-	-	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	858	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	1.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	736	1386	-
HCM Lane V/C Ratio	-	-	0.168	0.016	-
HCM Control Delay (s)	-	-	10.9	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0	-

Appendix N

2027 Future Background Synchro Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	579	4	12	322	6	4	0	40	7	0	0
Future Volume (vph)	0	579	4	12	322	6	4	0	40	7	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.998			0.877				
Flt Protected					0.998			0.995			0.950	
Satd. Flow (prot)	0	1569	0	0	1538	0	0	1371	0	0	761	0
Flt Permitted					0.998			0.995			0.950	
Satd. Flow (perm)	0	1569	0	0	1538	0	0	1371	0	0	761	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		78.0			22.1			319.9			53.1	
Travel Time (s)		5.6			1.6			23.0			3.8	
Confl. Peds. (#/hr)	181		4	4		181	1					1
Confl. Bikes (#/hr)			109			28			12			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	2%	2%	2%	2%	100%	2%	100%	2%	100%	100%	100%
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	0	579	4	12	322	6	4	0	40	7	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	583	0	0	340	0	0	44	0	0	7	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 46.4%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	579	4	12	322	6	4	0	40	7	0	0
Future Vol, veh/h	0	579	4	12	322	6	4	0	40	7	0	0
Conflicting Peds, #/hr	181	0	4	4	0	181	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	100	2	2	2	2	100	2	100	2	100	100	100
Mvmt Flow	0	579	4	12	322	6	4	0	40	7	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	509	0	0	587	0	0	935	1118	585	1131	1117	507
Stage 1	-	-	-	-	-	-	585	585	-	530	530	-
Stage 2	-	-	-	-	-	-	350	533	-	601	587	-
Critical Hdwy	5.1	-	-	4.12	-	-	7.12	7.5	6.22	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Follow-up Hdwy	3.1	-	-	2.218	-	-	3.518	4.9	3.318	4.4	4.9	4.2
Pot Cap-1 Maneuver	697	-	-	988	-	-	246	139	511	119	139	412
Stage 1	-	-	-	-	-	-	497	371	-	391	396	-
Stage 2	-	-	-	-	-	-	666	395	-	353	370	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	580	-	-	984	-	-	242	113	509	90	113	342
Mov Cap-2 Maneuver	-	-	-	-	-	-	242	113	-	90	113	-
Stage 1	-	-	-	-	-	-	495	370	-	325	324	-
Stage 2	-	-	-	-	-	-	655	324	-	325	369	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	13.6	48.3
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	463	580	-	-	984	-	-	90
HCM Lane V/C Ratio	0.095	-	-	-	0.012	-	-	0.078
HCM Control Delay (s)	13.6	0	-	-	8.7	0	-	48.3
HCM Lane LOS	B	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	595	30	126	324	17	118
Future Volume (vph)	595	30	126	324	17	118
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	10.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.994				0.882	
Flt Protected			0.950		0.994	
Satd. Flow (prot)	1561	0	1492	1414	1377	0
Flt Permitted			0.950		0.994	
Satd. Flow (perm)	1561	0	1492	1414	1377	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.4			138.5	62.1	
Travel Time (s)	4.1			10.0	4.5	
Confl. Peds. (#/hr)		1	1		25	9
Confl. Bikes (#/hr)		132				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)		0		0		
Adj. Flow (vph)	595	30	126	324	17	118
Shared Lane Traffic (%)						
Lane Group Flow (vph)	625	0	126	324	135	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.24	1.24	1.24	1.41	1.24	1.24
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 68.3%	ICU Level of Service C
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	3.1					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	595	30	126	324	17	118
Future Vol, veh/h	595	30	126	324	17	118
Conflicting Peds, #/hr	0	1	1	0	25	9
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	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	595	30	126	324	17	118

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	626	0	1212	620
Stage 1	-	-	-	-	611	-
Stage 2	-	-	-	-	601	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	956	-	201	488
Stage 1	-	-	-	-	542	-
Stage 2	-	-	-	-	547	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	955	-	170	483
Mov Cap-2 Maneuver	-	-	-	-	170	-
Stage 1	-	-	-	-	541	-
Stage 2	-	-	-	-	464	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	18.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	392	-	-	955	-
HCM Lane V/C Ratio	0.344	-	-	0.132	-
HCM Control Delay (s)	18.9	-	-	9.3	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.5	-	-	0.5	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	491	9	15	324	7	8	9	30	2	5	15
Future Volume (vph)	23	491	9	15	324	7	8	9	30	2	5	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998				0.850		0.914			0.908	
Flt Protected		0.998			0.998			0.992			0.995	
Satd. Flow (prot)	0	1564	0	0	1567	1201	0	1424	0	0	1419	0
Flt Permitted		0.998			0.998			0.992			0.995	
Satd. Flow (perm)	0	1564	0	0	1567	1201	0	1424	0	0	1419	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.3			104.2			72.7			319.9	
Travel Time (s)		5.2			7.5			5.2			23.0	
Confl. Peds. (#/hr)	51		67	67		51	10		19	19		10
Confl. Bikes (#/hr)			19			17			12			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	23	491	9	15	324	7	8	9	30	2	5	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	523	0	0	339	7	0	47	0	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.41	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 69.4%	ICU Level of Service C
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	491	9	15	324	7	8	9	30	2	5	15
Future Vol, veh/h	23	491	9	15	324	7	8	9	30	2	5	15
Conflicting Peds, #/hr	51	0	67	67	0	51	10	0	19	19	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	491	9	15	324	7	8	9	30	2	5	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	382	0	0	567	0	0	987	1021	582	985	1018	385
Stage 1	-	-	-	-	-	-	609	609	-	405	405	-
Stage 2	-	-	-	-	-	-	378	412	-	580	613	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1176	-	-	1005	-	-	226	236	513	227	237	663
Stage 1	-	-	-	-	-	-	482	485	-	622	598	-
Stage 2	-	-	-	-	-	-	644	594	-	500	483	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1120	-	-	942	-	-	194	201	472	185	202	626
Mov Cap-2 Maneuver	-	-	-	-	-	-	194	201	-	185	202	-
Stage 1	-	-	-	-	-	-	439	442	-	576	559	-
Stage 2	-	-	-	-	-	-	605	555	-	438	440	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	18.5	15.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	314	1120	-	-	942	-	-	370
HCM Lane V/C Ratio	0.15	0.021	-	-	0.016	-	-	0.059
HCM Control Delay (s)	18.5	8.3	0	-	8.9	0	-	15.3
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	418	48	9	331	136	27	11	18	106	24	46
Future Volume (vph)	116	418	48	9	331	136	27	11	18	106	24	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	45.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	30.0			55.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.99		0.97	0.97		0.95	0.93			0.93	
Frt		0.985			0.956			0.907			0.965	
Flt Protected	0.950			0.950			0.950				0.971	
Satd. Flow (prot)	1492	1532	0	1492	1463	0	1492	1326	0	0	1438	0
Flt Permitted	0.454			0.455			0.656				0.799	
Satd. Flow (perm)	692	1532	0	691	1463	0	984	1326	0	0	1120	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			45			18			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.2			101.3			60.6			151.6	
Travel Time (s)		7.5			7.3			4.4			10.9	
Confl. Peds. (#/hr)	49		54	54		49	35		49	49		35
Confl. Bikes (#/hr)			10			10			1			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0						
Adj. Flow (vph)	116	418	48	9	331	136	27	11	18	106	24	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	116	466	0	9	467	0	27	29	0	0	176	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template										Left		
Leading Detector (m)	7.0	0.0		22.0	0.0		8.0	8.0		2.0	8.0	
Trailing Detector (m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Position(m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Size(m)	8.0	0.6		8.0	0.6		9.0	9.0		2.0	9.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	3.0	0.0		3.0	0.0		3.0	3.0		0.0	3.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.2	35.2		35.2	35.2		25.5	25.5		25.5	25.5	
Total Split (s)	48.0	48.0		48.0	48.0		22.0	22.0		22.0	22.0	
Total Split (%)	64.0%	64.0%		64.0%	64.0%		29.3%	29.3%		29.3%	29.3%	
Maximum Green (s)	41.8	41.8		41.8	41.8		16.5	16.5		16.5	16.5	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.9	2.9		2.9	2.9		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	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.5	5.5			5.5	
Lead/Lag							Lag	Lag		Lag	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	9.0	9.0		9.0	9.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	50	50		40	40		44	44		29	29	
Act Effct Green (s)	46.4	46.4		46.4	46.4		16.9	16.9			16.9	
Actuated g/C Ratio	0.62	0.62		0.62	0.62		0.23	0.23			0.23	
v/c Ratio	0.27	0.49		0.02	0.51		0.12	0.09			0.65	
Control Delay	10.1	10.9		7.4	10.5		22.1	13.0			34.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	10.1	10.9		7.4	10.5		22.1	13.0			34.0	
LOS	B	B		A	B		C	B			C	
Approach Delay		10.7			10.4			17.4			34.0	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	7.6	35.3		0.5	32.8		2.9	1.2			18.6	
Queue Length 95th (m)	17.9	61.9		2.4	60.2		8.4	6.6			36.7	
Internal Link Dist (m)		80.2			77.3			36.6			127.6	
Turn Bay Length (m)	45.0			60.0								
Base Capacity (vph)	428	952		427	922		248	347			298	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.27	0.49		0.02	0.51		0.11	0.08			0.59	

Intersection Summary

Area Type: CBD

Cycle Length: 75

Actuated Cycle Length: 75

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

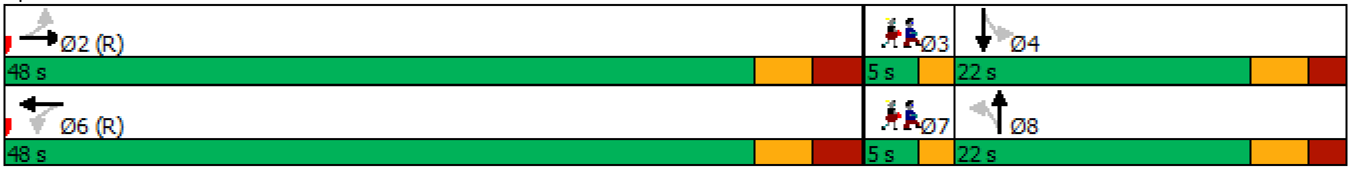
Maximum v/c Ratio: 0.65

Intersection Signal Delay: 14.1 Intersection LOS: B

Intersection Capacity Utilization 72.9% ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: McRae Ave & Richmond Rd



Lane Group	Ø3	Ø7
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	7%	7%
Maximum Green (s)	3.0	3.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø4
Lane Configurations							
Traffic Volume (vph)	0	626	340	0	0	0	
Future Volume (vph)	0	626	340	0	0	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt							
Flt Protected							
Satd. Flow (prot)	0	1745	1745	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	1745	1745	0	0	0	
Right Turn on Red				No		Yes	
Satd. Flow (RTOR)							
Link Speed (k/h)		50	50		50		
Link Distance (m)		22.1	57.4		18.9		
Travel Time (s)		1.6	4.1		1.4		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	0	626	340	0	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	626	340	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		0.0	0.0		0.0		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		3.0	3.0		3.0		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (k/h)	25			15	25	15	
Number of Detectors		0	0				
Detector Template							
Leading Detector (m)		0.0	0.0				
Trailing Detector (m)		0.0	0.0				
Turn Type		NA	NA				
Protected Phases		2	6				4
Permitted Phases							
Detector Phase		2	6				
Switch Phase							
Minimum Initial (s)		5.0	5.0				10.0
Minimum Split (s)		23.8	23.8				22.0
Total Split (s)		30.8	30.8				24.0
Total Split (%)		56.2%	56.2%				44%
Maximum Green (s)		25.0	25.0				20.0
Yellow Time (s)		3.3	3.3				3.0
All-Red Time (s)		2.5	2.5				1.0
Lost Time Adjust (s)		0.0	0.0				
Total Lost Time (s)		5.8	5.8				
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0				3.0
Recall Mode		Max	Max				None

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø4
Walk Time (s)		7.0	7.0				7.0
Flash Dont Walk (s)		11.0	11.0				11.0
Pedestrian Calls (#/hr)		0	0				148
Act Effct Green (s)		42.6	42.6				
Actuated g/C Ratio		0.67	0.67				
v/c Ratio		0.53	0.29				
Control Delay		10.4	7.5				
Queue Delay		0.0	0.0				
Total Delay		10.4	7.5				
LOS		B	A				
Approach Delay		10.4	7.5				
Approach LOS		B	A				
Queue Length 50th (m)		45.0	19.5				
Queue Length 95th (m)		73.4	32.8				
Internal Link Dist (m)		0.1	33.4		0.1		
Turn Bay Length (m)							
Base Capacity (vph)		1172	1172				
Starvation Cap Reductn		0	0				
Spillback Cap Reductn		0	0				
Storage Cap Reductn		0	0				
Reduced v/c Ratio		0.53	0.29				

Intersection Summary	
Area Type: Other	
Cycle Length: 54.8	
Actuated Cycle Length: 63.4	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 9.4	Intersection LOS: A
Intersection Capacity Utilization 39.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Scott St & Pedestrian Crossing

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	4	97	0	5	139
Future Volume (vph)	0	4	97	0	5	139
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						0.998
Satd. Flow (prot)	1510	0	1745	0	0	1742
Flt Permitted						0.998
Satd. Flow (perm)	1510	0	1745	0	0	1742
Link Speed (k/h)	30		50			50
Link Distance (m)	65.4		107.3			62.1
Travel Time (s)	7.8		7.7			4.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	4	97	0	5	139
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	97	0	0	144
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 22.0%	ICU Level of Service A
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	0.3					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	4	97	0	5	139
Future Vol, veh/h	0	4	97	0	5	139
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	4	97	0	5	139

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	246	97	0	0	97	0
Stage 1	97	-	-	-	-	-
Stage 2	149	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	742	959	-	-	1496	-
Stage 1	927	-	-	-	-	-
Stage 2	879	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	739	959	-	-	1496	-
Mov Cap-2 Maneuver	739	-	-	-	-	-
Stage 1	927	-	-	-	-	-
Stage 2	875	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	959	1496	-
HCM Lane V/C Ratio	-	-	0.004	0.003	-
HCM Control Delay (s)	-	-	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	32	24	73	74	36	103
Future Volume (vph)	32	24	73	74	36	103
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.942		0.932			
Flt Protected	0.972					0.987
Satd. Flow (prot)	1598	0	1626	0	0	1722
Flt Permitted	0.972					0.987
Satd. Flow (perm)	1598	0	1626	0	0	1722
Link Speed (k/h)	30		50			50
Link Distance (m)	63.1		151.6			107.3
Travel Time (s)	7.6		10.9			7.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	32	24	73	74	36	103
Shared Lane Traffic (%)						
Lane Group Flow (vph)	56	0	147	0	0	139
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 30.1% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	2.5					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	24	73	74	36	103
Future Vol, veh/h	32	24	73	74	36	103
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	32	24	73	74	36	103

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	285	110	0	0	147	0
Stage 1	110	-	-	-	-	-
Stage 2	175	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	705	943	-	-	1435	-
Stage 1	915	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	686	943	-	-	1435	-
Mov Cap-2 Maneuver	686	-	-	-	-	-
Stage 1	915	-	-	-	-	-
Stage 2	832	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	777	1435	-
HCM Lane V/C Ratio	-	-	0.072	0.025	-
HCM Control Delay (s)	-	-	10	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	486	8	16	537	6	12	0	35	6	0	1
Future Volume (vph)	0	486	8	16	537	6	12	0	35	6	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.999			0.899			0.981	
Flt Protected					0.999			0.987			0.959	
Satd. Flow (prot)	0	1567	0	0	1551	0	0	1394	0	0	754	0
Flt Permitted					0.999			0.987			0.959	
Satd. Flow (perm)	0	1567	0	0	1551	0	0	1394	0	0	754	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		78.0			22.1			319.9			53.1	
Travel Time (s)		5.6			1.6			23.0			3.8	
Confl. Peds. (#/hr)	218		15	15		218	4					4
Confl. Bikes (#/hr)			41			85			1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	2%	2%	2%	2%	100%	2%	100%	2%	100%	100%	100%
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	0	486	8	16	537	6	12	0	35	6	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	494	0	0	559	0	0	47	0	0	7	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 60.1%	ICU Level of Service B
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	486	8	16	537	6	12	0	35	6	0	1
Future Vol, veh/h	0	486	8	16	537	6	12	0	35	6	0	1
Conflicting Peds, #/hr	218	0	15	15	0	218	4	0	0	0	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	100	2	2	2	2	100	2	100	2	100	100	100
Mvmt Flow	0	486	8	16	537	6	12	0	35	6	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	761	0	0	509	0	0	1082	1298	505	1298	1299	762
Stage 1	-	-	-	-	-	-	505	505	-	790	790	-
Stage 2	-	-	-	-	-	-	577	793	-	508	509	-
Critical Hdwy	5.1	-	-	4.12	-	-	7.12	7.5	6.22	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Follow-up Hdwy	3.1	-	-	2.218	-	-	3.518	4.9	3.318	4.4	4.9	4.2
Pot Cap-1 Maneuver	539	-	-	1056	-	-	195	105	567	88	105	282
Stage 1	-	-	-	-	-	-	549	408	-	269	288	-
Stage 2	-	-	-	-	-	-	502	287	-	403	406	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	430	-	-	1041	-	-	188	81	559	65	81	224
Mov Cap-2 Maneuver	-	-	-	-	-	-	188	81	-	65	81	-
Stage 1	-	-	-	-	-	-	541	402	-	214	224	-
Stage 2	-	-	-	-	-	-	487	224	-	378	400	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	16.1	60.3
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	372	430	-	-	1041	-	-	72
HCM Lane V/C Ratio	0.126	-	-	-	0.015	-	-	0.097
HCM Control Delay (s)	16.1	0	-	-	8.5	0	-	60.3
HCM Lane LOS	C	A	-	-	A	A	-	F
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.3

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	480	48	130	521	38	214
Future Volume (vph)	480	48	130	521	38	214
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	10.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.988				0.885	
Flt Protected			0.950		0.993	
Satd. Flow (prot)	1552	0	1492	1414	1380	0
Flt Permitted			0.950		0.993	
Satd. Flow (perm)	1552	0	1492	1414	1380	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.4			138.5	62.1	
Travel Time (s)	4.1			10.0	4.5	
Confl. Peds. (#/hr)		1	1		14	1
Confl. Bikes (#/hr)		37				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)		0		0		
Adj. Flow (vph)	480	48	130	521	38	214
Shared Lane Traffic (%)						
Lane Group Flow (vph)	528	0	130	521	252	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.24	1.24	1.24	1.41	1.24	1.24
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 69.6%	ICU Level of Service C
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	5.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	480	48	130	521	38	214
Future Vol, veh/h	480	48	130	521	38	214
Conflicting Peds, #/hr	0	1	1	0	14	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	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	480	48	130	521	38	214

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	529	0	1300	506
Stage 1	-	-	-	-	505	-
Stage 2	-	-	-	-	795	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1038	-	178	566
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	445	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1037	-	154	565
Mov Cap-2 Maneuver	-	-	-	-	154	-
Stage 1	-	-	-	-	605	-
Stage 2	-	-	-	-	384	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	27.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	403	-	-	1037	-
HCM Lane V/C Ratio	0.625	-	-	0.125	-
HCM Control Delay (s)	27.7	-	-	9	-
HCM Lane LOS	D	-	-	A	-
HCM 95th %tile Q(veh)	4.1	-	-	0.4	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	451	20	82	707	12	4	7	37	9	11	18
Future Volume (vph)	30	451	20	82	707	12	4	7	37	9	11	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995				0.850		0.896			0.936	
Flt Protected		0.997			0.995			0.996			0.988	
Satd. Flow (prot)	0	1558	0	0	1563	1201	0	1402	0	0	1452	0
Flt Permitted		0.997			0.995			0.996			0.988	
Satd. Flow (perm)	0	1558	0	0	1563	1201	0	1402	0	0	1452	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.3			104.2			72.7			319.9	
Travel Time (s)		5.2			7.5			5.2			23.0	
Confl. Peds. (#/hr)	145		89	89		145	6		22	22		6
Confl. Bikes (#/hr)			21			34			1			8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	30	451	20	82	707	12	4	7	37	9	11	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	501	0	0	789	12	0	48	0	0	38	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.41	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: CBD

Control Type: Unsignalized

Intersection Capacity Utilization 90.5% ICU Level of Service E

Analysis Period (min) 15

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	451	20	82	707	12	4	7	37	9	11	18
Future Vol, veh/h	30	451	20	82	707	12	4	7	37	9	11	18
Conflicting Peds, #/hr	145	0	89	89	0	145	6	0	22	22	0	6
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	451	20	82	707	12	4	7	37	9	11	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	864	0	0	560	0	0	1508	1638	572	1581	1636	858
Stage 1	-	-	-	-	-	-	610	610	-	1016	1016	-
Stage 2	-	-	-	-	-	-	898	1028	-	565	620	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	779	-	-	1011	-	-	99	100	520	88	101	357
Stage 1	-	-	-	-	-	-	482	485	-	287	315	-
Stage 2	-	-	-	-	-	-	334	311	-	510	480	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	674	-	-	927	-	-	63	64	467	53	64	307
Mov Cap-2 Maneuver	-	-	-	-	-	-	63	64	-	53	64	-
Stage 1	-	-	-	-	-	-	415	418	-	233	232	-
Stage 2	-	-	-	-	-	-	254	229	-	425	414	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.9	30.2	66.2
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	190	674	-	-	927	-	-	95
HCM Lane V/C Ratio	0.253	0.045	-	-	0.088	-	-	0.4
HCM Control Delay (s)	30.2	10.6	0	-	9.3	0	-	66.2
HCM Lane LOS	D	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	1	0.1	-	-	0.3	-	-	1.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	331	87	52	701	175	80	66	55	111	43	149
Future Volume (vph)	90	331	87	52	701	175	80	66	55	111	43	149
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	45.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	30.0			55.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.95		0.90	0.96		0.93	0.84			0.82	
Frt		0.969			0.970			0.932			0.934	
Flt Protected	0.950			0.950			0.950				0.982	
Satd. Flow (prot)	1492	1439	0	1492	1461	0	1492	1226	0	0	1318	0
Flt Permitted	0.160			0.364			0.511				0.836	
Satd. Flow (perm)	243	1439	0	515	1461	0	744	1226	0	0	1003	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			23			50			58	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.2			101.3			60.6			151.6	
Travel Time (s)		7.5			7.3			4.4			10.9	
Confl. Peds. (#/hr)	124		164	164		124	72		161	161		72
Confl. Bikes (#/hr)			7			12			2			3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0						
Adj. Flow (vph)	90	331	87	52	701	175	80	66	55	111	43	149
Shared Lane Traffic (%)												
Lane Group Flow (vph)	90	418	0	52	876	0	80	121	0	0	303	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template										Left		
Leading Detector (m)	7.0	0.0		22.0	0.0		8.0	8.0		2.0	8.0	
Trailing Detector (m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Position(m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Size(m)	8.0	0.6		8.0	0.6		9.0	9.0		2.0	9.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.5	33.5		9.5	33.5		24.5	24.5		24.5	24.5	
Total Split (s)	40.0	40.0		11.0	51.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.1%	47.1%		12.9%	60.0%		34.1%	34.1%		34.1%	34.1%	
Maximum Green (s)	35.5	35.5		6.5	46.5		24.5	24.5		24.5	24.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)	9.0	9.0			9.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0			20.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	136	136			103		133	133		59	59	
Act Effct Green (s)	42.4	42.4		48.9	48.9		27.1	27.1			27.1	
Actuated g/C Ratio	0.50	0.50		0.58	0.58		0.32	0.32			0.32	
v/c Ratio	0.74	0.57		0.14	1.03		0.34	0.28			0.84	
Control Delay	62.5	20.6		9.9	60.5		25.5	14.3			43.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	62.5	20.6		9.9	60.5		25.5	14.3			43.5	
LOS	E	C		A	E		C	B			D	
Approach Delay		28.0			57.7			18.8			43.5	
Approach LOS		C			E			B			D	
Queue Length 50th (m)	12.9	50.5		3.7	~159.9		9.4	7.9			35.6	
Queue Length 95th (m)	#41.8	84.2		8.6	#229.3		21.0	20.1			#78.2	
Internal Link Dist (m)		80.2			77.3			36.6			127.6	
Turn Bay Length (m)	45.0			60.0								
Base Capacity (vph)	121	727		370	849		245	438			369	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.74	0.57		0.14	1.03		0.33	0.28			0.82	

Intersection Summary

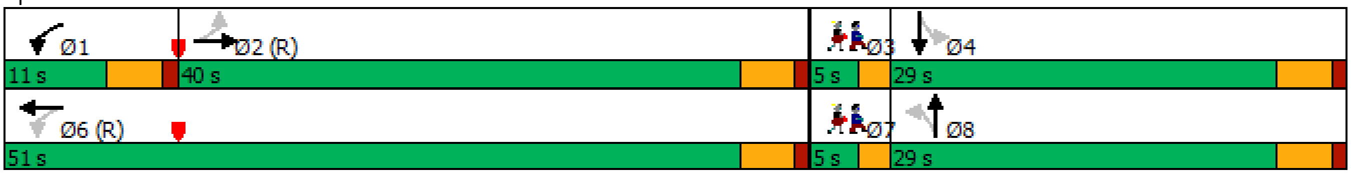
Area Type: CBD
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 43.7 Intersection LOS: D
Intersection Capacity Utilization 117.6% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

Lane Group	Ø3	Ø7
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	6%	6%
Maximum Green (s)	3.0	3.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: McRae Ave & Richmond Rd



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations							
Traffic Volume (vph)	527	0	0	559	0	0	
Future Volume (vph)	527	0	0	559	0	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt							
Flt Protected							
Satd. Flow (prot)	1745	0	0	1745	0	0	
Flt Permitted							
Satd. Flow (perm)	1745	0	0	1745	0	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)							
Link Speed (k/h)	50			50	50		
Link Distance (m)	22.1			57.4	22.8		
Travel Time (s)	1.6			4.1	1.6		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	527	0	0	559	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	527	0	0	559	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(m)	0.0			0.0	0.0		
Link Offset(m)	0.0			0.0	0.0		
Crosswalk Width(m)	3.0			3.0	3.0		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (k/h)		15	25		25	15	
Number of Detectors	0			0			
Detector Template							
Leading Detector (m)	0.0			0.0			
Trailing Detector (m)	0.0			0.0			
Turn Type	NA			NA			
Protected Phases	2			6			4
Permitted Phases							
Detector Phase	2			6			
Switch Phase							
Minimum Initial (s)	5.0			5.0			10.0
Minimum Split (s)	23.8			23.8			22.0
Total Split (s)	30.8			30.8			24.0
Total Split (%)	56.2%			56.2%			44%
Maximum Green (s)	25.0			25.0			20.0
Yellow Time (s)	3.3			3.3			3.0
All-Red Time (s)	2.5			2.5			1.0
Lost Time Adjust (s)	0.0			0.0			
Total Lost Time (s)	5.8			5.8			
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0			3.0			3.0
Recall Mode	Max			Max			None

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Walk Time (s)	7.0			7.0			7.0
Flash Dont Walk (s)	11.0			11.0			11.0
Pedestrian Calls (#/hr)	0			0			183
Act Effct Green (s)	42.6			42.6			
Actuated g/C Ratio	0.67			0.67			
v/c Ratio	0.45			0.48			
Control Delay	9.1			9.5			
Queue Delay	0.0			0.0			
Total Delay	9.1			9.5			
LOS	A			A			
Approach Delay	9.1			9.5			
Approach LOS	A			A			
Queue Length 50th (m)	34.8			37.9			
Queue Length 95th (m)	56.8			61.8			
Internal Link Dist (m)	0.1			33.4	0.1		
Turn Bay Length (m)							
Base Capacity (vph)	1172			1172			
Starvation Cap Reductn	0			0			
Spillback Cap Reductn	0			0			
Storage Cap Reductn	0			0			
Reduced v/c Ratio	0.45			0.48			

Intersection Summary	
Area Type: Other	
Cycle Length: 54.8	
Actuated Cycle Length: 63.4	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 9.3	Intersection LOS: A
Intersection Capacity Utilization 35.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Pedestrian Crossing & Scott St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	11	221	0	9	148
Future Volume (vph)	0	11	221	0	9	148
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						0.997
Satd. Flow (prot)	1510	0	1745	0	0	1740
Flt Permitted						0.997
Satd. Flow (perm)	1510	0	1745	0	0	1740
Link Speed (k/h)	30		50			50
Link Distance (m)	64.1		107.3			62.1
Travel Time (s)	7.7		7.7			4.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	11	221	0	9	148
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	221	0	0	157
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 26.0% ICU Level of Service A

Analysis Period (min) 15

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	11	221	0	9	148
Future Vol, veh/h	0	11	221	0	9	148
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	11	221	0	9	148

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	387	221	0	0	221	0
Stage 1	221	-	-	-	-	-
Stage 2	166	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	616	819	-	-	1348	-
Stage 1	816	-	-	-	-	-
Stage 2	863	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	612	819	-	-	1348	-
Mov Cap-2 Maneuver	612	-	-	-	-	-
Stage 1	816	-	-	-	-	-
Stage 2	857	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	819	1348	-
HCM Lane V/C Ratio	-	-	0.013	0.007	-
HCM Control Delay (s)	-	-	9.5	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	72	52	169	41	22	126
Future Volume (vph)	72	52	169	41	22	126
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.943		0.974			
Flt Protected	0.972					0.993
Satd. Flow (prot)	1600	0	1700	0	0	1733
Flt Permitted	0.972					0.993
Satd. Flow (perm)	1600	0	1700	0	0	1733
Link Speed (k/h)	30		50			50
Link Distance (m)	67.7		151.6			107.3
Travel Time (s)	8.1		10.9			7.7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	52	169	41	22	126
Shared Lane Traffic (%)						
Lane Group Flow (vph)	124	0	210	0	0	148
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 37.9% ICU Level of Service A

Analysis Period (min) 15

Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	72	52	169	41	22	126
Future Vol, veh/h	72	52	169	41	22	126
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	72	52	169	41	22	126

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	360	190	0	0	210	0
Stage 1	190	-	-	-	-	-
Stage 2	170	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	639	852	-	-	1361	-
Stage 1	842	-	-	-	-	-
Stage 2	860	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	628	852	-	-	1361	-
Mov Cap-2 Maneuver	628	-	-	-	-	-
Stage 1	842	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	1.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	706	1361	-
HCM Lane V/C Ratio	-	-	0.176	0.016	-
HCM Control Delay (s)	-	-	11.2	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0	-

Appendix O

2022 Future Total Synchro Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	526	3	11	293	5	3	0	36	6	0	0
Future Volume (vph)	0	526	3	11	293	5	3	0	36	6	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.998			0.875				
Flt Protected					0.998			0.996			0.950	
Satd. Flow (prot)	0	1569	0	0	1540	0	0	1369	0	0	761	0
Flt Permitted					0.998			0.996			0.950	
Satd. Flow (perm)	0	1569	0	0	1540	0	0	1369	0	0	761	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		78.0			22.1			319.9			53.1	
Travel Time (s)		5.6			1.6			23.0			3.8	
Confl. Peds. (#/hr)	164		4	4		164	1					1
Confl. Bikes (#/hr)			99			28			12			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	2%	2%	2%	2%	100%	2%	100%	2%	100%	100%	100%
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	0	526	3	11	293	5	3	0	36	6	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	529	0	0	309	0	0	39	0	0	6	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 43.0%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	526	3	11	293	5	3	0	36	6	0	0
Future Vol, veh/h	0	526	3	11	293	5	3	0	36	6	0	0
Conflicting Peds, #/hr	164	0	4	4	0	164	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	100	2	2	2	2	100	2	100	2	100	100	100
Mvmt Flow	0	526	3	11	293	5	3	0	36	6	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	462	0	0	533	0	0	851	1016	532	1028	1015	461
Stage 1	-	-	-	-	-	-	532	532	-	482	482	-
Stage 2	-	-	-	-	-	-	319	484	-	546	533	-
Critical Hdwy	5.1	-	-	4.12	-	-	7.12	7.5	6.22	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Follow-up Hdwy	3.1	-	-	2.218	-	-	3.518	4.9	3.318	4.4	4.9	4.2
Pot Cap-1 Maneuver	732	-	-	1035	-	-	280	163	547	142	164	441
Stage 1	-	-	-	-	-	-	531	395	-	418	420	-
Stage 2	-	-	-	-	-	-	693	419	-	382	395	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	620	-	-	1031	-	-	276	136	545	111	137	373
Mov Cap-2 Maneuver	-	-	-	-	-	-	276	136	-	111	137	-
Stage 1	-	-	-	-	-	-	529	393	-	354	351	-
Stage 2	-	-	-	-	-	-	683	350	-	357	393	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	12.7	39.3
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	507	620	-	-	1031	-	-	111
HCM Lane V/C Ratio	0.077	-	-	-	0.011	-	-	0.054
HCM Control Delay (s)	12.7	0	-	-	8.5	0	-	39.3
HCM Lane LOS	B	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	541	28	126	295	16	139
Future Volume (vph)	541	28	126	295	16	139
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	10.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.993				0.879	
Flt Protected			0.950		0.995	
Satd. Flow (prot)	1560	0	1492	1414	1374	0
Flt Permitted			0.950		0.995	
Satd. Flow (perm)	1560	0	1492	1414	1374	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.4			138.5	62.1	
Travel Time (s)	4.1			10.0	4.5	
Confl. Peds. (#/hr)		1	1		23	8
Confl. Bikes (#/hr)		120				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)		0		0		
Adj. Flow (vph)	541	28	126	295	16	139
Shared Lane Traffic (%)						
Lane Group Flow (vph)	569	0	126	295	155	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.24	1.24	1.24	1.41	1.24	1.24
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 65.8%	ICU Level of Service C
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	3.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	541	28	126	295	16	139
Future Vol, veh/h	541	28	126	295	16	139
Conflicting Peds, #/hr	0	1	1	0	23	8
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	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	541	28	126	295	16	139

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	570	0	1126	564
Stage 1	-	-	-	-	556	-
Stage 2	-	-	-	-	570	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1002	-	227	525
Stage 1	-	-	-	-	574	-
Stage 2	-	-	-	-	566	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1001	-	194	521
Mov Cap-2 Maneuver	-	-	-	-	194	-
Stage 1	-	-	-	-	573	-
Stage 2	-	-	-	-	484	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	17.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	444	-	-	1001	-
HCM Lane V/C Ratio	0.349	-	-	0.126	-
HCM Control Delay (s)	17.4	-	-	9.1	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.5	-	-	0.4	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	454	8	14	320	6	7	8	28	2	4	14
Future Volume (vph)	21	454	8	14	320	6	7	8	28	2	4	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998				0.850		0.912			0.905	
Flt Protected		0.998			0.998			0.992			0.995	
Satd. Flow (prot)	0	1564	0	0	1567	1201	0	1421	0	0	1414	0
Flt Permitted		0.998			0.998			0.992			0.995	
Satd. Flow (perm)	0	1564	0	0	1567	1201	0	1421	0	0	1414	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.3			104.2			72.7			319.9	
Travel Time (s)		5.2			7.5			5.2			23.0	
Confl. Peds. (#/hr)	57		61	61		57	9		17	17		9
Confl. Bikes (#/hr)			18			17			11			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	21	454	8	14	320	6	7	8	28	2	4	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	483	0	0	334	6	0	43	0	0	20	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.41	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 64.4%	ICU Level of Service C
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	454	8	14	320	6	7	8	28	2	4	14
Future Vol, veh/h	21	454	8	14	320	6	7	8	28	2	4	14
Conflicting Peds, #/hr	57	0	61	61	0	57	9	0	17	17	0	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	454	8	14	320	6	7	8	28	2	4	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	383	0	0	523	0	0	930	972	536	940	970	386
Stage 1	-	-	-	-	-	-	561	561	-	405	405	-
Stage 2	-	-	-	-	-	-	369	411	-	535	565	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1175	-	-	1043	-	-	248	252	545	244	253	662
Stage 1	-	-	-	-	-	-	512	510	-	622	598	-
Stage 2	-	-	-	-	-	-	651	595	-	529	508	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1113	-	-	984	-	-	217	216	506	202	217	622
Mov Cap-2 Maneuver	-	-	-	-	-	-	217	216	-	202	217	-
Stage 1	-	-	-	-	-	-	471	469	-	574	557	-
Stage 2	-	-	-	-	-	-	616	554	-	471	467	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	16.9	14.7
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	345	1113	-	-	984	-	-	393
HCM Lane V/C Ratio	0.125	0.019	-	-	0.014	-	-	0.051
HCM Control Delay (s)	16.9	8.3	0	-	8.7	0	-	14.7
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.2

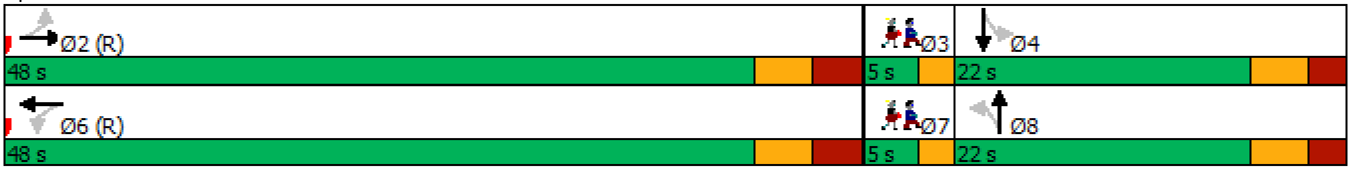
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	379	43	8	301	137	24	10	17	127	22	69
Future Volume (vph)	115	379	43	8	301	137	24	10	17	127	22	69
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	45.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	30.0			55.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.99		0.96	0.97		0.96	0.93			0.92	
Frt		0.985			0.953			0.906			0.957	
Flt Protected	0.950			0.950			0.950				0.972	
Satd. Flow (prot)	1492	1532	0	1492	1452	0	1492	1323	0	0	1423	0
Flt Permitted	0.470			0.482			0.623				0.805	
Satd. Flow (perm)	711	1532	0	729	1452	0	942	1323	0	0	1118	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			49			17			28	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.2			101.3			60.6			151.6	
Travel Time (s)		7.5			7.3			4.4			10.9	
Confl. Peds. (#/hr)	56		55	55		56	32		49	49		32
Confl. Bikes (#/hr)			7			7			1			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0						
Adj. Flow (vph)	115	379	43	8	301	137	24	10	17	127	22	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	115	422	0	8	438	0	24	27	0	0	218	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template										Left		
Leading Detector (m)	7.0	0.0		22.0	0.0		8.0	8.0		2.0	8.0	
Trailing Detector (m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Position(m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Size(m)	8.0	0.6		8.0	0.6		9.0	9.0		2.0	9.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	3.0	0.0		3.0	0.0		3.0	3.0		0.0	3.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.2	35.2		35.2	35.2		25.5	25.5		25.5	25.5	
Total Split (s)	48.0	48.0		48.0	48.0		22.0	22.0		22.0	22.0	
Total Split (%)	64.0%	64.0%		64.0%	64.0%		29.3%	29.3%		29.3%	29.3%	
Maximum Green (s)	41.8	41.8		41.8	41.8		16.5	16.5		16.5	16.5	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.9	2.9		2.9	2.9		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	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.5	5.5			5.5	
Lead/Lag							Lag	Lag		Lag	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	9.0	9.0		9.0	9.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	50	50		40	40		44	44		29	29	
Act Effct Green (s)	45.1	45.1		45.1	45.1		18.2	18.2			18.2	
Actuated g/C Ratio	0.60	0.60		0.60	0.60		0.24	0.24			0.24	
v/c Ratio	0.27	0.46		0.02	0.49		0.11	0.08			0.75	
Control Delay	10.4	10.8		7.6	10.5		21.4	12.7			38.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	10.4	10.8		7.6	10.5		21.4	12.7			38.8	
LOS	B	B		A	B		C	B			D	
Approach Delay		10.7			10.5			16.8			38.8	
Approach LOS		B			B			B			D	
Queue Length 50th (m)	7.4	30.5		0.5	29.4		2.6	1.1			24.0	
Queue Length 95th (m)	17.5	53.8		2.2	54.4		7.8	6.3			#47.4	
Internal Link Dist (m)		80.2			77.3			36.6			127.6	
Turn Bay Length (m)	45.0			60.0								
Base Capacity (vph)	428	926		438	893		241	351			306	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.27	0.46		0.02	0.49		0.10	0.08			0.71	

Intersection Summary

Area Type: CBD
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 15.7 Intersection LOS: B
Intersection Capacity Utilization 74.2% ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: McRae Ave & Richmond Rd



Lane Group	Ø3	Ø7
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	7%	7%
Maximum Green (s)	3.0	3.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	30	57	20	87	126	11
Future Volume (vph)	30	57	20	87	126	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.912				0.989	
Flt Protected	0.983			0.991		
Satd. Flow (prot)	1564	0	0	1729	1726	0
Flt Permitted	0.983			0.991		
Satd. Flow (perm)	1564	0	0	1729	1726	0
Link Speed (k/h)	30			50	50	
Link Distance (m)	65.6			43.0	64.3	
Travel Time (s)	7.9			3.1	4.6	
Confl. Peds. (#/hr)			23			23
Confl. Bikes (#/hr)						5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	57	20	87	126	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	0	0	107	137	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 32.3%	ICU Level of Service A
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	3.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	57	20	87	126	11
Future Vol, veh/h	30	57	20	87	126	11
Conflicting Peds, #/hr	0	0	23	0	0	23
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	30	57	20	87	126	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	282	155	160	0	-	0
Stage 1	155	-	-	-	-	-
Stage 2	127	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	708	891	1419	-	-	-
Stage 1	873	-	-	-	-	-
Stage 2	899	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	668	872	1389	-	-	-
Mov Cap-2 Maneuver	668	-	-	-	-	-
Stage 1	842	-	-	-	-	-
Stage 2	880	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.1	1.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1389	-	789	-	-
HCM Lane V/C Ratio	0.014	-	0.11	-	-
HCM Control Delay (s)	7.6	0	10.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø4
Lane Configurations		↑	↑				
Traffic Volume (vph)	0	568	309	0	0	0	
Future Volume (vph)	0	568	309	0	0	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt							
Flt Protected							
Satd. Flow (prot)	0	1745	1745	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	1745	1745	0	0	0	
Right Turn on Red				No		Yes	
Satd. Flow (RTOR)							
Link Speed (k/h)		50	50		50		
Link Distance (m)		22.1	57.4		18.9		
Travel Time (s)		1.6	4.1		1.4		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	0	568	309	0	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	568	309	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		0.0	0.0		0.0		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		3.0	3.0		3.0		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (k/h)	25			15	25	15	
Number of Detectors		0	0				
Detector Template							
Leading Detector (m)		0.0	0.0				
Trailing Detector (m)		0.0	0.0				
Turn Type		NA	NA				
Protected Phases		2	6				4
Permitted Phases							
Detector Phase		2	6				
Switch Phase							
Minimum Initial (s)		5.0	5.0				10.0
Minimum Split (s)		23.8	23.8				22.0
Total Split (s)		30.8	30.8				24.0
Total Split (%)		56.2%	56.2%				44%
Maximum Green (s)		25.0	25.0				20.0
Yellow Time (s)		3.3	3.3				3.0
All-Red Time (s)		2.5	2.5				1.0
Lost Time Adjust (s)		0.0	0.0				
Total Lost Time (s)		5.8	5.8				
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0				3.0
Recall Mode		Max	Max				None

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø4
Walk Time (s)		7.0	7.0				7.0
Flash Dont Walk (s)		11.0	11.0				11.0
Pedestrian Calls (#/hr)		0	0				181
Act Effct Green (s)		42.6	42.6				
Actuated g/C Ratio		0.67	0.67				
v/c Ratio		0.48	0.26				
Control Delay		9.6	7.3				
Queue Delay		0.0	0.0				
Total Delay		9.6	7.3				
LOS		A	A				
Approach Delay		9.6	7.3				
Approach LOS		A	A				
Queue Length 50th (m)		38.8	17.3				
Queue Length 95th (m)		63.4	29.4				
Internal Link Dist (m)		0.1	33.4		0.1		
Turn Bay Length (m)							
Base Capacity (vph)		1172	1172				
Starvation Cap Reductn		0	0				
Spillback Cap Reductn		0	0				
Storage Cap Reductn		0	0				
Reduced v/c Ratio		0.48	0.26				

Intersection Summary	
Area Type: Other	
Cycle Length: 54.8	
Actuated Cycle Length: 63.4	
Natural Cycle: 55	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 8.8	Intersection LOS: A
Intersection Capacity Utilization 36.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Scott St & Pedestrian Crossing

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	4	117	0	5	137
Future Volume (vph)	0	4	117	0	5	137
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865					
Flt Protected						0.998
Satd. Flow (prot)	1510	0	1745	0	0	1742
Flt Permitted						0.998
Satd. Flow (perm)	1510	0	1745	0	0	1742
Link Speed (k/h)	30		50			50
Link Distance (m)	65.4		64.3			62.1
Travel Time (s)	7.8		4.6			4.5
Confl. Bikes (#/hr)				3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	4	117	0	5	137
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	117	0	0	142
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 21.9%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	4	117	0	5	137
Future Vol, veh/h	0	4	117	0	5	137
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	4	117	0	5	137

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	264	117	0	0	117	0
Stage 1	117	-	-	-	-	-
Stage 2	147	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	725	935	-	-	1471	-
Stage 1	908	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	722	935	-	-	1471	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	908	-	-	-	-	-
Stage 2	876	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	935	1471	-
HCM Lane V/C Ratio	-	-	0.004	0.003	-
HCM Control Delay (s)	-	-	8.9	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	32	24	83	74	36	147
Future Volume (vph)	32	24	83	74	36	147
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.942		0.936			
Flt Protected	0.972					0.990
Satd. Flow (prot)	1598	0	1633	0	0	1728
Flt Permitted	0.972					0.990
Satd. Flow (perm)	1598	0	1633	0	0	1728
Link Speed (k/h)	30		50			50
Link Distance (m)	63.1		151.6			43.0
Travel Time (s)	7.6		10.9			3.1
Confl. Bikes (#/hr)				2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	32	24	83	74	36	147
Shared Lane Traffic (%)						
Lane Group Flow (vph)	56	0	157	0	0	183
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 33.1%	ICU Level of Service A
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	2.1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	24	83	74	36	147
Future Vol, veh/h	32	24	83	74	36	147
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	32	24	83	74	36	147

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	339	120	0	0	157	0
Stage 1	120	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	657	931	-	-	1423	-
Stage 1	905	-	-	-	-	-
Stage 2	817	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	639	931	-	-	1423	-
Mov Cap-2 Maneuver	639	-	-	-	-	-
Stage 1	905	-	-	-	-	-
Stage 2	794	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	1.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	738	1423	-
HCM Lane V/C Ratio	-	-	0.076	0.025	-
HCM Control Delay (s)	-	-	10.3	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	442	7	15	488	5	11	0	32	5	0	1
Future Volume (vph)	0	442	7	15	488	5	11	0	32	5	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.999			0.900			0.977	
Flt Protected					0.999			0.987			0.960	
Satd. Flow (prot)	0	1567	0	0	1553	0	0	1395	0	0	751	0
Flt Permitted					0.999			0.987			0.960	
Satd. Flow (perm)	0	1567	0	0	1553	0	0	1395	0	0	751	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		78.0			22.1			319.9			53.1	
Travel Time (s)		5.6			1.6			23.0			3.8	
Confl. Peds. (#/hr)	198		14	14		198	4					4
Confl. Bikes (#/hr)			37			77			1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	2%	2%	2%	2%	100%	2%	100%	2%	100%	100%	100%
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	0	442	7	15	488	5	11	0	32	5	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	449	0	0	508	0	0	43	0	0	6	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 56.0%	ICU Level of Service B
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	442	7	15	488	5	11	0	32	5	0	1
Future Vol, veh/h	0	442	7	15	488	5	11	0	32	5	0	1
Conflicting Peds, #/hr	198	0	14	14	0	198	4	0	0	0	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	100	2	2	2	2	100	2	100	2	100	100	100
Mvmt Flow	0	442	7	15	488	5	11	0	32	5	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	691	0	0	463	0	0	985	1181	460	1181	1182	693
Stage 1	-	-	-	-	-	-	460	460	-	719	719	-
Stage 2	-	-	-	-	-	-	525	721	-	462	463	-
Critical Hdwy	5.1	-	-	4.12	-	-	7.12	7.5	6.22	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Follow-up Hdwy	3.1	-	-	2.218	-	-	3.518	4.9	3.318	4.4	4.9	4.2
Pot Cap-1 Maneuver	579	-	-	1098	-	-	227	126	601	108	126	313
Stage 1	-	-	-	-	-	-	581	431	-	298	315	-
Stage 2	-	-	-	-	-	-	536	314	-	431	429	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	472	-	-	1084	-	-	219	100	593	82	100	254
Mov Cap-2 Maneuver	-	-	-	-	-	-	219	100	-	82	100	-
Stage 1	-	-	-	-	-	-	573	425	-	243	252	-
Stage 2	-	-	-	-	-	-	522	251	-	408	423	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	14.7	46.8
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	413	472	-	-	1084	-	-	92
HCM Lane V/C Ratio	0.104	-	-	-	0.014	-	-	0.065
HCM Control Delay (s)	14.7	0	-	-	8.4	0	-	46.8
HCM Lane LOS	B	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	436	43	149	473	35	213
Future Volume (vph)	436	43	149	473	35	213
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	10.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.988				0.884	
Flt Protected			0.950		0.993	
Satd. Flow (prot)	1552	0	1492	1414	1379	0
Flt Permitted			0.950		0.993	
Satd. Flow (perm)	1552	0	1492	1414	1379	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.4			138.5	62.1	
Travel Time (s)	4.1			10.0	4.5	
Confl. Peds. (#/hr)		1	1		13	1
Confl. Bikes (#/hr)		34				20
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)		0		0		
Adj. Flow (vph)	436	43	149	473	35	213
Shared Lane Traffic (%)						
Lane Group Flow (vph)	479	0	149	473	248	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.24	1.24	1.24	1.41	1.24	1.24
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 67.5%	ICU Level of Service C
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	5.3					
Movement	**EBT**	**EBR**	**WBL**	**WBT**	**NBL**	**NBR**
Lane Configurations						
Traffic Vol, veh/h	436	43	149	473	35	213
Future Vol, veh/h	436	43	149	473	35	213
Conflicting Peds, #/hr	0	1	1	0	13	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	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	436	43	149	473	35	213
Major/Minor	**Major1**		**Major2**		**Minor1**	
Conflicting Flow All	0	0	480	0	1243	460
Stage 1	-	-	-	-	459	-
Stage 2	-	-	-	-	784	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1082	-	193	601
Stage 1	-	-	-	-	636	-
Stage 2	-	-	-	-	450	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1081	-	164	600
Mov Cap-2 Maneuver	-	-	-	-	164	-
Stage 1	-	-	-	-	635	-
Stage 2	-	-	-	-	383	-
Approach	**EB**		**WB**		**NB**	
HCM Control Delay, s	0		2.1		23.6	
HCM LOS					C	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	436	-	-	1081	-
HCM Lane V/C Ratio	0.569	-	-	0.138	-
HCM Control Delay (s)	23.6	-	-	8.9	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	3.5	-	-	0.5	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	434	18	74	657	11	3	6	34	8	10	16
Future Volume (vph)	28	434	18	74	657	11	3	6	34	8	10	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995				0.850		0.893			0.936	
Flt Protected		0.997			0.995			0.997			0.988	
Satd. Flow (prot)	0	1558	0	0	1563	1201	0	1398	0	0	1452	0
Flt Permitted		0.997			0.995			0.997			0.988	
Satd. Flow (perm)	0	1558	0	0	1563	1201	0	1398	0	0	1452	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.3			104.2			72.7			319.9	
Travel Time (s)		5.2			7.5			5.2			23.0	
Confl. Peds. (#/hr)	146		81	81		146	5		20	20		5
Confl. Bikes (#/hr)			20			32			2			7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	28	434	18	74	657	11	3	6	34	8	10	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	480	0	0	731	11	0	43	0	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.41	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary		
Area Type:	CBD	
Control Type: Unsignalized		
Intersection Capacity Utilization 84.3%		ICU Level of Service E
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	434	18	74	657	11	3	6	34	8	10	16
Future Vol, veh/h	28	434	18	74	657	11	3	6	34	8	10	16
Conflicting Peds, #/hr	146	0	81	81	0	146	5	0	20	20	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	434	18	74	657	11	3	6	34	8	10	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	814	0	0	533	0	0	1409	1542	544	1490	1540	808
Stage 1	-	-	-	-	-	-	580	580	-	951	951	-
Stage 2	-	-	-	-	-	-	829	962	-	539	589	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	813	-	-	1035	-	-	116	115	539	102	115	381
Stage 1	-	-	-	-	-	-	500	500	-	312	338	-
Stage 2	-	-	-	-	-	-	365	334	-	527	495	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	702	-	-	957	-	-	80	76	489	66	76	328
Mov Cap-2 Maneuver	-	-	-	-	-	-	80	76	-	66	76	-
Stage 1	-	-	-	-	-	-	438	438	-	255	256	-
Stage 2	-	-	-	-	-	-	291	253	-	449	434	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.9	24.1	50
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	231	702	-	-	957	-	-	113
HCM Lane V/C Ratio	0.186	0.04	-	-	0.077	-	-	0.301
HCM Control Delay (s)	24.1	10.3	0	-	9.1	0	-	50
HCM Lane LOS	C	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	0.7	0.1	-	-	0.3	-	-	1.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	301	78	47	636	189	73	60	50	119	39	152
Future Volume (vph)	107	301	78	47	636	189	73	60	50	119	39	152
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	45.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	30.0			55.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.95		0.90	0.95		0.94	0.85			0.83	
Frt		0.969			0.966			0.932			0.934	
Flt Protected	0.950			0.950			0.950				0.981	
Satd. Flow (prot)	1492	1447	0	1492	1445	0	1492	1247	0	0	1327	0
Flt Permitted	0.194			0.393			0.514				0.832	
Satd. Flow (perm)	292	1447	0	556	1445	0	755	1247	0	0	1010	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			28			50			57	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.2			101.3			60.6			151.6	
Travel Time (s)		7.5			7.3			4.4			10.9	
Confl. Peds. (#/hr)	127		149	149		127	65		146	146		65
Confl. Bikes (#/hr)			6			11			2			3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0						
Adj. Flow (vph)	107	301	78	47	636	189	73	60	50	119	39	152
Shared Lane Traffic (%)												
Lane Group Flow (vph)	107	379	0	47	825	0	73	110	0	0	310	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template										Left		
Leading Detector (m)	7.0	0.0		22.0	0.0		8.0	8.0		2.0	8.0	
Trailing Detector (m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Position(m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Size(m)	8.0	0.6		8.0	0.6		9.0	9.0		2.0	9.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.5	33.5		9.5	33.5		24.5	24.5		24.5	24.5	
Total Split (s)	40.0	40.0		11.0	51.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.1%	47.1%		12.9%	60.0%		34.1%	34.1%		34.1%	34.1%	
Maximum Green (s)	35.5	35.5		6.5	46.5		24.5	24.5		24.5	24.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)	9.0	9.0			9.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0			20.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	136	136			103		133	133		59	59	
Act Effct Green (s)	42.0	42.0		48.4	48.4		27.6	27.6			27.6	
Actuated g/C Ratio	0.49	0.49		0.57	0.57		0.32	0.32			0.32	
v/c Ratio	0.74	0.52		0.12	0.99		0.30	0.25			0.85	
Control Delay	56.8	19.4		9.8	49.4		24.3	13.3			43.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	56.8	19.4		9.8	49.4		24.3	13.3			43.7	
LOS	E	B		A	D		C	B			D	
Approach Delay		27.6			47.3			17.7			43.7	
Approach LOS		C			D			B			D	
Queue Length 50th (m)	15.2	43.7		3.3	~142.8		8.5	6.6			37.1	
Queue Length 95th (m)	#46.2	73.3		8.0	#210.8		19.2	17.9			#80.8	
Internal Link Dist (m)		80.2			77.3			36.6			127.6	
Turn Bay Length (m)	45.0			60.0								
Base Capacity (vph)	144	723		387	834		251	448			374	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.74	0.52		0.12	0.99		0.29	0.25			0.83	

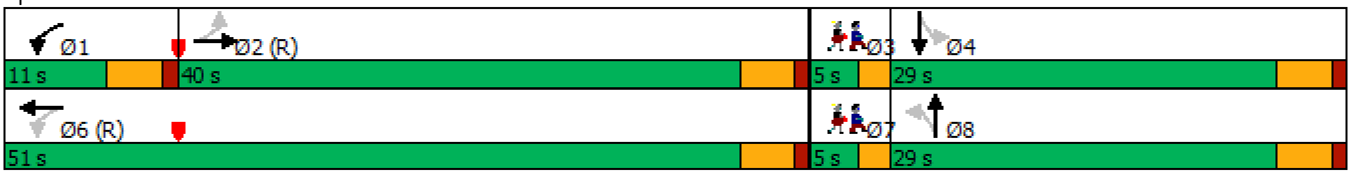
Intersection Summary	
Area Type: CBD	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 38.6	Intersection LOS: D
Intersection Capacity Utilization 102.5%	ICU Level of Service G
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	

Lane Group	Ø3	Ø7
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	6%	6%
Maximum Green (s)	3.0	3.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: McRae Ave & Richmond Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	18	34	53	199	133	29
Future Volume (vph)	18	34	53	199	133	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.912				0.976	
Flt Protected	0.983			0.990		
Satd. Flow (prot)	1564	0	0	1728	1703	0
Flt Permitted	0.983			0.990		
Satd. Flow (perm)	1564	0	0	1728	1703	0
Link Speed (k/h)	30			50	50	
Link Distance (m)	62.6			43.0	64.3	
Travel Time (s)	7.5			3.1	4.6	
Confl. Peds. (#/hr)			28			28
Confl. Bikes (#/hr)						3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	18	34	53	199	133	29
Shared Lane Traffic (%)						
Lane Group Flow (vph)	52	0	0	252	162	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 39.4%	ICU Level of Service A
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	2.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	34	53	199	133	29
Future Vol, veh/h	18	34	53	199	133	29
Conflicting Peds, #/hr	0	0	28	0	0	28
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	18	34	53	199	133	29

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	481	176	190	0	-	0
Stage 1	176	-	-	-	-	-
Stage 2	305	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	544	867	1384	-	-	-
Stage 1	855	-	-	-	-	-
Stage 2	748	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	493	844	1348	-	-	-
Mov Cap-2 Maneuver	493	-	-	-	-	-
Stage 1	796	-	-	-	-	-
Stage 2	729	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	1.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1348	-	677	-	-
HCM Lane V/C Ratio	0.039	-	0.077	-	-
HCM Control Delay (s)	7.8	0	10.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations	↑			↑			
Traffic Volume (vph)	479	0	0	508	0	0	
Future Volume (vph)	479	0	0	508	0	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt							
Flt Protected							
Satd. Flow (prot)	1745	0	0	1745	0	0	
Flt Permitted							
Satd. Flow (perm)	1745	0	0	1745	0	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)							
Link Speed (k/h)	50			50	50		
Link Distance (m)	22.1			57.4	22.8		
Travel Time (s)	1.6			4.1	1.6		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	479	0	0	508	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	479	0	0	508	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(m)	0.0			0.0	0.0		
Link Offset(m)	0.0			0.0	0.0		
Crosswalk Width(m)	3.0			3.0	3.0		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (k/h)		15	25		25	15	
Number of Detectors	0			0			
Detector Template							
Leading Detector (m)	0.0			0.0			
Trailing Detector (m)	0.0			0.0			
Turn Type	NA			NA			
Protected Phases	2			6			4
Permitted Phases							
Detector Phase	2			6			
Switch Phase							
Minimum Initial (s)	5.0			5.0			10.0
Minimum Split (s)	23.8			23.8			22.0
Total Split (s)	30.8			30.8			24.0
Total Split (%)	56.2%			56.2%			44%
Maximum Green (s)	25.0			25.0			20.0
Yellow Time (s)	3.3			3.3			3.0
All-Red Time (s)	2.5			2.5			1.0
Lost Time Adjust (s)	0.0			0.0			
Total Lost Time (s)	5.8			5.8			
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0			3.0			3.0
Recall Mode	Max			Max			None

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Walk Time (s)	7.0			7.0			7.0
Flash Dont Walk (s)	11.0			11.0			11.0
Pedestrian Calls (#/hr)	0			0			254
Act Effct Green (s)	40.0			40.0			
Actuated g/C Ratio	0.59			0.59			
v/c Ratio	0.47			0.49			
Control Delay	9.7			10.1			
Queue Delay	0.0			0.0			
Total Delay	9.7			10.1			
LOS	A			B			
Approach Delay	9.7			10.1			
Approach LOS	A			B			
Queue Length 50th (m)	30.4			33.1			
Queue Length 95th (m)	49.8			53.9			
Internal Link Dist (m)	0.1			33.4	0.1		
Turn Bay Length (m)							
Base Capacity (vph)	1029			1029			
Starvation Cap Reductn	0			0			
Spillback Cap Reductn	0			0			
Storage Cap Reductn	0			0			
Reduced v/c Ratio	0.47			0.49			

Intersection Summary	
Area Type: Other	
Cycle Length: 54.8	
Actuated Cycle Length: 67.8	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 9.9	Intersection LOS: A
Intersection Capacity Utilization 33.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Pedestrian Crossing & Scott St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	11	217	0	9	162
Future Volume (vph)	0	11	217	0	9	162
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						0.997
Satd. Flow (prot)	1510	0	1745	0	0	1740
Flt Permitted						0.997
Satd. Flow (perm)	1510	0	1745	0	0	1740
Link Speed (k/h)	30		50			50
Link Distance (m)	64.1		64.3			62.1
Travel Time (s)	7.7		4.6			4.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	11	217	0	9	162
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	217	0	0	171
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 26.8%	ICU Level of Service A
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	0.4					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	11	217	0	9	162
Future Vol, veh/h	0	11	217	0	9	162
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	11	217	0	9	162

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	397	217	0	0	217	0
Stage 1	217	-	-	-	-	-
Stage 2	180	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	608	823	-	-	1353	-
Stage 1	819	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	604	823	-	-	1353	-
Mov Cap-2 Maneuver	604	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	823	1353	-
HCM Lane V/C Ratio	-	-	0.013	0.007	-
HCM Control Delay (s)	-	-	9.4	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	72	52	200	41	22	145
Future Volume (vph)	72	52	200	41	22	145
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.943		0.977			
Flt Protected	0.972					0.993
Satd. Flow (prot)	1600	0	1705	0	0	1733
Flt Permitted	0.972					0.993
Satd. Flow (perm)	1600	0	1705	0	0	1733
Link Speed (k/h)	30		50			50
Link Distance (m)	67.7		151.6			43.0
Travel Time (s)	8.1		10.9			3.1
Confl. Bikes (#/hr)				3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	52	200	41	22	145
Shared Lane Traffic (%)						
Lane Group Flow (vph)	124	0	241	0	0	167
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 40.6%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	72	52	200	41	22	145
Future Vol, veh/h	72	52	200	41	22	145
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	72	52	200	41	22	145

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	410	221	0	0	241	0
Stage 1	221	-	-	-	-	-
Stage 2	189	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	598	819	-	-	1326	-
Stage 1	816	-	-	-	-	-
Stage 2	843	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	587	819	-	-	1326	-
Mov Cap-2 Maneuver	587	-	-	-	-	-
Stage 1	816	-	-	-	-	-
Stage 2	828	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	666	1326	-
HCM Lane V/C Ratio	-	-	0.186	0.017	-
HCM Control Delay (s)	-	-	11.6	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-

Appendix P

2027 Future Total Synchro Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	579	4	12	322	6	4	0	40	7	0	0
Future Volume (vph)	0	579	4	12	322	6	4	0	40	7	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.998			0.877				
Flt Protected					0.998			0.995			0.950	
Satd. Flow (prot)	0	1569	0	0	1538	0	0	1371	0	0	761	0
Flt Permitted					0.998			0.995			0.950	
Satd. Flow (perm)	0	1569	0	0	1538	0	0	1371	0	0	761	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		78.0			22.1			319.9			53.1	
Travel Time (s)		5.6			1.6			23.0			3.8	
Confl. Peds. (#/hr)	181		4	4		181	1					1
Confl. Bikes (#/hr)			109			31			13			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	2%	2%	2%	2%	100%	2%	100%	2%	100%	100%	100%
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	0	579	4	12	322	6	4	0	40	7	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	583	0	0	340	0	0	44	0	0	7	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 46.4%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	579	4	12	322	6	4	0	40	7	0	0
Future Vol, veh/h	0	579	4	12	322	6	4	0	40	7	0	0
Conflicting Peds, #/hr	181	0	4	4	0	181	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	100	2	2	2	2	100	2	100	2	100	100	100
Mvmt Flow	0	579	4	12	322	6	4	0	40	7	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	509	0	0	587	0	0	935	1118	585	1131	1117	507
Stage 1	-	-	-	-	-	-	585	585	-	530	530	-
Stage 2	-	-	-	-	-	-	350	533	-	601	587	-
Critical Hdwy	5.1	-	-	4.12	-	-	7.12	7.5	6.22	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Follow-up Hdwy	3.1	-	-	2.218	-	-	3.518	4.9	3.318	4.4	4.9	4.2
Pot Cap-1 Maneuver	697	-	-	988	-	-	246	139	511	119	139	412
Stage 1	-	-	-	-	-	-	497	371	-	391	396	-
Stage 2	-	-	-	-	-	-	666	395	-	353	370	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	580	-	-	984	-	-	242	113	509	90	113	342
Mov Cap-2 Maneuver	-	-	-	-	-	-	242	113	-	90	113	-
Stage 1	-	-	-	-	-	-	495	370	-	325	324	-
Stage 2	-	-	-	-	-	-	655	324	-	325	369	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	13.6	48.3
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	463	580	-	-	984	-	-	90
HCM Lane V/C Ratio	0.095	-	-	-	0.012	-	-	0.078
HCM Control Delay (s)	13.6	0	-	-	8.7	0	-	48.3
HCM Lane LOS	B	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	595	30	129	324	17	127
Future Volume (vph)	595	30	129	324	17	127
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	10.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.994				0.881	
Flt Protected			0.950		0.994	
Satd. Flow (prot)	1561	0	1492	1414	1375	0
Flt Permitted			0.950		0.994	
Satd. Flow (perm)	1561	0	1492	1414	1375	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.4			138.5	62.1	
Travel Time (s)	4.1			10.0	4.5	
Confl. Peds. (#/hr)		1	1		25	9
Confl. Bikes (#/hr)		132				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)		0		0		
Adj. Flow (vph)	595	30	129	324	17	127
Shared Lane Traffic (%)						
Lane Group Flow (vph)	625	0	129	324	144	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.24	1.24	1.24	1.41	1.24	1.24
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 68.9%	ICU Level of Service C
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	3.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	595	30	129	324	17	127
Future Vol, veh/h	595	30	129	324	17	127
Conflicting Peds, #/hr	0	1	1	0	25	9
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	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	595	30	129	324	17	127

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	626	0	1218	620
Stage 1	-	-	-	-	611	-
Stage 2	-	-	-	-	607	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	956	-	199	488
Stage 1	-	-	-	-	542	-
Stage 2	-	-	-	-	544	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	955	-	168	483
Mov Cap-2 Maneuver	-	-	-	-	168	-
Stage 1	-	-	-	-	541	-
Stage 2	-	-	-	-	460	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	19.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	395	-	-	955	-
HCM Lane V/C Ratio	0.365	-	-	0.135	-
HCM Control Delay (s)	19.3	-	-	9.4	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.6	-	-	0.5	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	494	9	15	332	7	8	9	30	2	5	15
Future Volume (vph)	23	494	9	15	332	7	8	9	30	2	5	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998				0.850		0.914			0.908	
Flt Protected		0.998			0.998			0.992			0.995	
Satd. Flow (prot)	0	1564	0	0	1567	1201	0	1424	0	0	1419	0
Flt Permitted		0.998			0.998			0.992			0.995	
Satd. Flow (perm)	0	1564	0	0	1567	1201	0	1424	0	0	1419	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.3			104.2			72.7			319.9	
Travel Time (s)		5.2			7.5			5.2			23.0	
Confl. Peds. (#/hr)	62		67	67		62	10		19	19		10
Confl. Bikes (#/hr)			22			19			3			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	23	494	9	15	332	7	8	9	30	2	5	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	526	0	0	347	7	0	47	0	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.41	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 69.6%	ICU Level of Service C
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	494	9	15	332	7	8	9	30	2	5	15
Future Vol, veh/h	23	494	9	15	332	7	8	9	30	2	5	15
Conflicting Peds, #/hr	62	0	67	67	0	62	10	0	19	19	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	494	9	15	332	7	8	9	30	2	5	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	401	0	0	570	0	0	998	1043	585	1007	1040	404
Stage 1	-	-	-	-	-	-	612	612	-	424	424	-
Stage 2	-	-	-	-	-	-	386	431	-	583	616	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1158	-	-	1002	-	-	223	229	511	219	230	647
Stage 1	-	-	-	-	-	-	480	484	-	608	587	-
Stage 2	-	-	-	-	-	-	637	583	-	498	482	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1091	-	-	939	-	-	191	193	471	176	193	604
Mov Cap-2 Maneuver	-	-	-	-	-	-	191	193	-	176	193	-
Stage 1	-	-	-	-	-	-	437	441	-	556	542	-
Stage 2	-	-	-	-	-	-	598	538	-	436	439	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	18.7	15.8
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	309	1091	-	-	939	-	-	354
HCM Lane V/C Ratio	0.152	0.021	-	-	0.016	-	-	0.062
HCM Control Delay (s)	18.7	8.4	0	-	8.9	0	-	15.8
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	418	48	9	331	139	27	11	18	115	24	54
Future Volume (vph)	119	418	48	9	331	139	27	11	18	115	24	54
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	45.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	30.0			55.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.99		0.96	0.97		0.96	0.92			0.92	
Frt		0.985			0.956			0.907			0.962	
Flt Protected	0.950			0.950			0.950				0.971	
Satd. Flow (prot)	1492	1531	0	1492	1456	0	1492	1316	0	0	1431	0
Flt Permitted	0.450			0.453			0.642				0.800	
Satd. Flow (perm)	679	1531	0	685	1456	0	967	1316	0	0	1110	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			46			18			24	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.2			101.3			60.6			151.6	
Travel Time (s)		7.5			7.3			4.4			10.9	
Confl. Peds. (#/hr)	61		61	61		61	35		54	54		35
Confl. Bikes (#/hr)			10			10			2			3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0						
Adj. Flow (vph)	119	418	48	9	331	139	27	11	18	115	24	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	466	0	9	470	0	27	29	0	0	193	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template										Left		
Leading Detector (m)	7.0	0.0		22.0	0.0		8.0	8.0		2.0	8.0	
Trailing Detector (m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Position(m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Size(m)	8.0	0.6		8.0	0.6		9.0	9.0		2.0	9.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	3.0	0.0		3.0	0.0		3.0	3.0		0.0	3.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	35.2	35.2		35.2	35.2		25.5	25.5		25.5	25.5	
Total Split (s)	48.0	48.0		48.0	48.0		22.0	22.0		22.0	22.0	
Total Split (%)	64.0%	64.0%		64.0%	64.0%		29.3%	29.3%		29.3%	29.3%	
Maximum Green (s)	41.8	41.8		41.8	41.8		16.5	16.5		16.5	16.5	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.9	2.9		2.9	2.9		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	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.5	5.5			5.5	
Lead/Lag							Lag	Lag		Lag	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	9.0	9.0		9.0	9.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	50	50		40	40		44	44		29	29	
Act Effct Green (s)	46.0	46.0		46.0	46.0		17.3	17.3			17.3	
Actuated g/C Ratio	0.61	0.61		0.61	0.61		0.23	0.23			0.23	
v/c Ratio	0.29	0.49		0.02	0.52		0.12	0.09			0.70	
Control Delay	10.5	11.1		7.6	10.8		22.0	12.9			36.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	10.5	11.1		7.6	10.8		22.0	12.9			36.6	
LOS	B	B		A	B		C	B			D	
Approach Delay		11.0			10.8			17.3			36.6	
Approach LOS		B			B			B			D	
Queue Length 50th (m)	7.8	35.3		0.5	33.2		2.9	1.2			20.8	
Queue Length 95th (m)	18.6	61.9		2.4	60.9		8.4	6.6			40.6	
Internal Link Dist (m)		80.2			77.3			36.6			127.6	
Turn Bay Length (m)	45.0			60.0								
Base Capacity (vph)	416	943		420	911		245	347			299	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.29	0.49		0.02	0.52		0.11	0.08			0.65	

Intersection Summary

Area Type: CBD

Cycle Length: 75

Actuated Cycle Length: 75

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

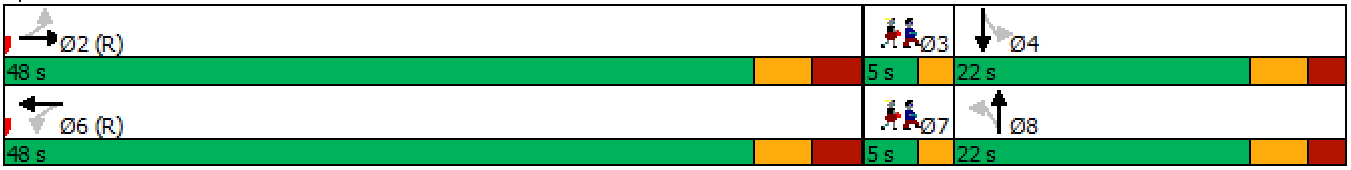
Maximum v/c Ratio: 0.70

Intersection Signal Delay: 14.9 Intersection LOS: B

Intersection Capacity Utilization 74.7% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: McRae Ave & Richmond Rd



Lane Group	Ø3	Ø7
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	7%	7%
Maximum Green (s)	3.0	3.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	9	16	6	97	139	3
Future Volume (vph)	9	16	6	97	139	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.914				0.997	
Flt Protected	0.982			0.997		
Satd. Flow (prot)	1566	0	0	1740	1740	0
Flt Permitted	0.982			0.997		
Satd. Flow (perm)	1566	0	0	1740	1740	0
Link Speed (k/h)	30			50	50	
Link Distance (m)	65.6			43.0	64.3	
Travel Time (s)	7.9			3.1	4.6	
Confl. Peds. (#/hr)			23			23
Confl. Bikes (#/hr)						5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	9	16	6	97	139	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	0	0	103	142	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 20.8%	ICU Level of Service A
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	1.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	16	6	97	139	3
Future Vol, veh/h	9	16	6	97	139	3
Conflicting Peds, #/hr	0	0	23	0	0	23
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	9	16	6	97	139	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	273	164	165	0	-	0
Stage 1	164	-	-	-	-	-
Stage 2	109	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	716	881	1413	-	-	-
Stage 1	865	-	-	-	-	-
Stage 2	916	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	683	862	1383	-	-	-
Mov Cap-2 Maneuver	683	-	-	-	-	-
Stage 1	843	-	-	-	-	-
Stage 2	897	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1383	-	788	-	-
HCM Lane V/C Ratio	0.004	-	0.032	-	-
HCM Control Delay (s)	7.6	0	9.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø4
Lane Configurations		↑	↑				
Traffic Volume (vph)	0	626	340	0	0	0	
Future Volume (vph)	0	626	340	0	0	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt							
Flt Protected							
Satd. Flow (prot)	0	1745	1745	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	1745	1745	0	0	0	
Right Turn on Red				No		Yes	
Satd. Flow (RTOR)							
Link Speed (k/h)		50	50		50		
Link Distance (m)		22.1	57.4		18.9		
Travel Time (s)		1.6	4.1		1.4		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	0	626	340	0	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	626	340	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		0.0	0.0		0.0		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		3.0	3.0		3.0		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (k/h)	25			15	25	15	
Number of Detectors		0	0				
Detector Template							
Leading Detector (m)		0.0	0.0				
Trailing Detector (m)		0.0	0.0				
Turn Type		NA	NA				
Protected Phases		2	6				4
Permitted Phases							
Detector Phase		2	6				
Switch Phase							
Minimum Initial (s)		5.0	5.0				10.0
Minimum Split (s)		23.8	23.8				22.0
Total Split (s)		30.8	30.8				24.0
Total Split (%)		56.2%	56.2%				44%
Maximum Green (s)		25.0	25.0				20.0
Yellow Time (s)		3.3	3.3				3.0
All-Red Time (s)		2.5	2.5				1.0
Lost Time Adjust (s)		0.0	0.0				
Total Lost Time (s)		5.8	5.8				
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0				3.0
Recall Mode		Max	Max				None

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø4
Walk Time (s)		7.0	7.0				7.0
Flash Dont Walk (s)		11.0	11.0				11.0
Pedestrian Calls (#/hr)		0	0				302
Act Effct Green (s)		40.0	40.0				
Actuated g/C Ratio		0.59	0.59				
v/c Ratio		0.61	0.33				
Control Delay		12.1	8.2				
Queue Delay		0.0	0.0				
Total Delay		12.1	8.2				
LOS		B	A				
Approach Delay		12.1	8.2				
Approach LOS		B	A				
Queue Length 50th (m)		45.0	19.5				
Queue Length 95th (m)		73.4	32.8				
Internal Link Dist (m)		0.1	33.4		0.1		
Turn Bay Length (m)							
Base Capacity (vph)		1029	1029				
Starvation Cap Reductn		0	0				
Spillback Cap Reductn		0	0				
Storage Cap Reductn		0	0				
Reduced v/c Ratio		0.61	0.33				

Intersection Summary

Area Type: Other
Cycle Length: 54.8
Actuated Cycle Length: 67.8
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 10.7 — Intersection LOS: B
Intersection Capacity Utilization 39.6% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 6: Scott St & Pedestrian Crossing

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	4	106	0	5	142
Future Volume (vph)	0	4	106	0	5	142
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865					
Flt Protected						0.998
Satd. Flow (prot)	1510	0	1745	0	0	1742
Flt Permitted						0.998
Satd. Flow (perm)	1510	0	1745	0	0	1742
Link Speed (k/h)	30		50			50
Link Distance (m)	65.4		64.3			62.1
Travel Time (s)	7.8		4.6			4.5
Confl. Bikes (#/hr)				3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	4	106	0	5	142
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	106	0	0	147
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 22.2%	ICU Level of Service A
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	0.3					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	4	106	0	5	142
Future Vol, veh/h	0	4	106	0	5	142
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	4	106	0	5	142

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	258	106	0	0	106	0
Stage 1	106	-	-	-	-	-
Stage 2	152	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	731	948	-	-	1485	-
Stage 1	918	-	-	-	-	-
Stage 2	876	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	728	948	-	-	1485	-
Mov Cap-2 Maneuver	728	-	-	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	872	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	948	1485	-
HCM Lane V/C Ratio	-	-	0.004	0.003	-
HCM Control Delay (s)	-	-	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	32	24	79	74	36	119
Future Volume (vph)	32	24	79	74	36	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.942		0.935			
Flt Protected	0.972					0.989
Satd. Flow (prot)	1598	0	1632	0	0	1726
Flt Permitted	0.972					0.989
Satd. Flow (perm)	1598	0	1632	0	0	1726
Link Speed (k/h)	30		50			50
Link Distance (m)	63.1		151.6			43.0
Travel Time (s)	7.6		10.9			3.1
Confl. Peds. (#/hr)				2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	32	24	79	74	36	119
Shared Lane Traffic (%)						
Lane Group Flow (vph)	56	0	153	0	0	155
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 31.7%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	24	79	74	36	119
Future Vol, veh/h	32	24	79	74	36	119
Conflicting Peds, #/hr	0	0	0	2	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	32	24	79	74	36	119

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	309	118	0	0	155	0
Stage 1	118	-	-	-	-	-
Stage 2	191	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	683	934	-	-	1425	-
Stage 1	907	-	-	-	-	-
Stage 2	841	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	663	932	-	-	1422	-
Mov Cap-2 Maneuver	663	-	-	-	-	-
Stage 1	905	-	-	-	-	-
Stage 2	818	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	1.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	757	1422	-
HCM Lane V/C Ratio	-	-	0.074	0.025	-
HCM Control Delay (s)	-	-	10.1	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	486	8	16	537	6	12	0	35	6	0	1
Future Volume (vph)	0	486	8	16	537	6	12	0	35	6	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.999			0.899			0.981	
Flt Protected					0.999			0.987			0.959	
Satd. Flow (prot)	0	1567	0	0	1551	0	0	1394	0	0	754	0
Flt Permitted					0.999			0.987			0.959	
Satd. Flow (perm)	0	1567	0	0	1551	0	0	1394	0	0	754	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		78.0			22.1			319.9			53.1	
Travel Time (s)		5.6			1.6			23.0			3.8	
Confl. Peds. (#/hr)	218		15	15		218	4					4
Confl. Bikes (#/hr)			41			85			1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	100%	2%	2%	2%	2%	100%	2%	100%	2%	100%	100%	100%
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	0	486	8	16	537	6	12	0	35	6	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	494	0	0	559	0	0	47	0	0	7	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 60.1%	ICU Level of Service B
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	486	8	16	537	6	12	0	35	6	0	1
Future Vol, veh/h	0	486	8	16	537	6	12	0	35	6	0	1
Conflicting Peds, #/hr	218	0	15	15	0	218	4	0	0	0	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	100	2	2	2	2	100	2	100	2	100	100	100
Mvmt Flow	0	486	8	16	537	6	12	0	35	6	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	761	0	0	509	0	0	1082	1298	505	1298	1299	762
Stage 1	-	-	-	-	-	-	505	505	-	790	790	-
Stage 2	-	-	-	-	-	-	577	793	-	508	509	-
Critical Hdwy	5.1	-	-	4.12	-	-	7.12	7.5	6.22	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	6.5	-	7.1	6.5	-
Follow-up Hdwy	3.1	-	-	2.218	-	-	3.518	4.9	3.318	4.4	4.9	4.2
Pot Cap-1 Maneuver	539	-	-	1056	-	-	195	105	567	88	105	282
Stage 1	-	-	-	-	-	-	549	408	-	269	288	-
Stage 2	-	-	-	-	-	-	502	287	-	403	406	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	430	-	-	1041	-	-	188	81	559	65	81	224
Mov Cap-2 Maneuver	-	-	-	-	-	-	188	81	-	65	81	-
Stage 1	-	-	-	-	-	-	541	402	-	214	224	-
Stage 2	-	-	-	-	-	-	487	224	-	378	400	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	16.1	60.3
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	372	430	-	-	1041	-	-	72
HCM Lane V/C Ratio	0.126	-	-	-	0.015	-	-	0.097
HCM Control Delay (s)	16.1	0	-	-	8.5	0	-	60.3
HCM Lane LOS	C	A	-	-	A	A	-	F
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.3

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	480	48	138	521	38	220
Future Volume (vph)	480	48	138	521	38	220
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	10.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.988				0.885	
Flt Protected			0.950		0.993	
Satd. Flow (prot)	1552	0	1492	1414	1380	0
Flt Permitted			0.950		0.993	
Satd. Flow (perm)	1552	0	1492	1414	1380	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.4			138.5	62.1	
Travel Time (s)	4.1			10.0	4.5	
Confl. Peds. (#/hr)		1	1		14	1
Confl. Bikes (#/hr)		37				
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)		0		0		
Adj. Flow (vph)	480	48	138	521	38	220
Shared Lane Traffic (%)						
Lane Group Flow (vph)	528	0	138	521	258	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.24	1.24	1.24	1.41	1.24	1.24
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: CBD
Control Type: Unsignalized
Intersection Capacity Utilization 70.5% ICU Level of Service C
Analysis Period (min) 15

Intersection	
Int Delay, s/veh	6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	480	48	138	521	38	220
Future Vol, veh/h	480	48	138	521	38	220
Conflicting Peds, #/hr	0	1	1	0	14	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	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	480	48	138	521	38	220

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	529	0	1316	506
Stage 1	-	-	-	-	505	-
Stage 2	-	-	-	-	811	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1038	-	174	566
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	437	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1037	-	149	565
Mov Cap-2 Maneuver	-	-	-	-	149	-
Stage 1	-	-	-	-	605	-
Stage 2	-	-	-	-	374	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.9	29
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	400	-	-	1037	-
HCM Lane V/C Ratio	0.645	-	-	0.133	-
HCM Control Delay (s)	29	-	-	9	-
HCM Lane LOS	D	-	-	A	-
HCM 95th %tile Q(veh)	4.4	-	-	0.5	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	458	20	82	712	12	4	7	37	9	11	18
Future Volume (vph)	30	458	20	82	712	12	4	7	37	9	11	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		10.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995				0.850		0.896			0.936	
Flt Protected		0.997			0.995			0.996			0.988	
Satd. Flow (prot)	0	1558	0	0	1563	1201	0	1402	0	0	1452	0
Flt Permitted		0.997			0.995			0.996			0.988	
Satd. Flow (perm)	0	1558	0	0	1563	1201	0	1402	0	0	1452	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.3			104.2			72.7			319.9	
Travel Time (s)		5.2			7.5			5.2			23.0	
Confl. Peds. (#/hr)	159		89	89		159	6		22	22		6
Confl. Bikes (#/hr)			22			35			1			8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0			0			0
Adj. Flow (vph)	30	458	20	82	712	12	4	7	37	9	11	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	508	0	0	794	12	0	48	0	0	38	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.41	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: CBD

Control Type: Unsignalized

Intersection Capacity Utilization 91.1% ICU Level of Service F

Analysis Period (min) 15

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	458	20	82	712	12	4	7	37	9	11	18
Future Vol, veh/h	30	458	20	82	712	12	4	7	37	9	11	18
Conflicting Peds, #/hr	159	0	89	89	0	159	6	0	22	22	0	6
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	458	20	82	712	12	4	7	37	9	11	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	883	0	0	567	0	0	1520	1664	579	1607	1662	877
Stage 1	-	-	-	-	-	-	617	617	-	1035	1035	-
Stage 2	-	-	-	-	-	-	903	1047	-	572	627	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	766	-	-	1005	-	-	97	97	515	85	97	348
Stage 1	-	-	-	-	-	-	477	481	-	280	309	-
Stage 2	-	-	-	-	-	-	332	305	-	505	476	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	653	-	-	922	-	-	61	60	463	50	60	295
Mov Cap-2 Maneuver	-	-	-	-	-	-	61	60	-	50	60	-
Stage 1	-	-	-	-	-	-	410	413	-	223	224	-
Stage 2	-	-	-	-	-	-	251	221	-	419	409	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.9	31.5	71.5
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	183	653	-	-	922	-	-	90
HCM Lane V/C Ratio	0.262	0.046	-	-	0.089	-	-	0.422
HCM Control Delay (s)	31.5	10.8	0	-	9.3	0	-	71.5
HCM Lane LOS	D	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	1	0.1	-	-	0.3	-	-	1.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	331	87	52	701	183	80	66	55	117	43	154
Future Volume (vph)	97	331	87	52	701	183	80	66	55	117	43	154
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	45.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (m)	30.0			55.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.95	0.95		0.90	0.95		0.93	0.84			0.82	
Frt		0.969			0.969			0.932			0.934	
Flt Protected	0.950			0.950			0.950				0.982	
Satd. Flow (prot)	1492	1439	0	1492	1451	0	1492	1226	0	0	1318	0
Flt Permitted	0.137			0.354			0.512				0.833	
Satd. Flow (perm)	205	1439	0	501	1451	0	747	1226	0	0	998	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			24			50			57	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.2			101.3			60.6			151.6	
Travel Time (s)		7.5			7.3			4.4			10.9	
Confl. Peds. (#/hr)	138		164	164		138	72		161	161		72
Confl. Bikes (#/hr)			7			12			2			3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking (#/hr)			0			0						
Adj. Flow (vph)	97	331	87	52	701	183	80	66	55	117	43	154
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	418	0	52	884	0	80	121	0	0	314	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	0		1	0		1	1		1	1	
Detector Template										Left		
Leading Detector (m)	7.0	0.0		22.0	0.0		8.0	8.0		2.0	8.0	
Trailing Detector (m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Position(m)	-1.0	0.0		14.0	0.0		-1.0	-1.0		0.0	-1.0	
Detector 1 Size(m)	8.0	0.6		8.0	0.6		9.0	9.0		2.0	9.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	33.5	33.5		9.5	33.5		24.5	24.5		24.5	24.5	
Total Split (s)	40.0	40.0		11.0	51.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.1%	47.1%		12.9%	60.0%		34.1%	34.1%		34.1%	34.1%	
Maximum Green (s)	35.5	35.5		6.5	46.5		24.5	24.5		24.5	24.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)	9.0	9.0			9.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	20.0	20.0			20.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	136	136			103		133	133		59	59	
Act Effct Green (s)	41.1	41.1		47.6	47.6		28.4	28.4			28.4	
Actuated g/C Ratio	0.48	0.48		0.56	0.56		0.33	0.33			0.33	
v/c Ratio	0.98	0.59		0.15	1.08		0.32	0.27			0.85	
Control Delay	119.1	21.4		10.1	74.9		24.8	14.1			43.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	119.1	21.4		10.1	74.9		24.8	14.1			43.6	
LOS	F	C		B	E		C	B			D	
Approach Delay		39.8			71.3			18.3			43.6	
Approach LOS		D			E			B			D	
Queue Length 50th (m)	~18.3	50.5		3.7	~163.5		9.4	7.9			38.2	
Queue Length 95th (m)	#47.7	84.2		8.6	#233.0		20.9	20.1			#83.6	
Internal Link Dist (m)		80.2			77.3			36.6			127.6	
Turn Bay Length (m)	45.0			60.0								
Base Capacity (vph)	99	706		355	822		250	444			372	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.98	0.59		0.15	1.08		0.32	0.27			0.84	

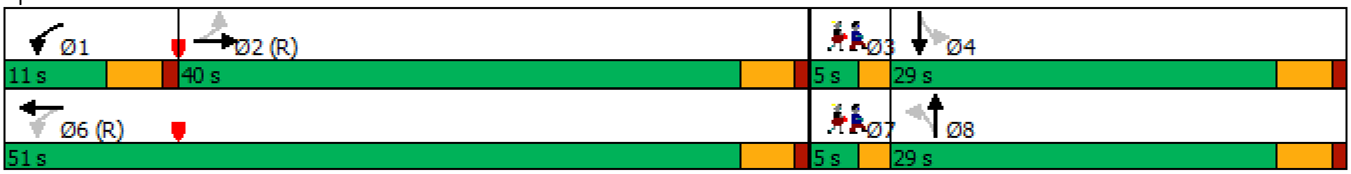
Intersection Summary	
Area Type: CBD	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 53.2	Intersection LOS: D
Intersection Capacity Utilization 119.5%	ICU Level of Service H
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	

Lane Group	Ø3	Ø7
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	6%	6%
Maximum Green (s)	3.0	3.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: McRae Ave & Richmond Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	6	10	16	221	148	8
Future Volume (vph)	6	10	16	221	148	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.916				0.993	
Flt Protected	0.982			0.997		
Satd. Flow (prot)	1570	0	0	1740	1733	0
Flt Permitted	0.982			0.997		
Satd. Flow (perm)	1570	0	0	1740	1733	0
Link Speed (k/h)	30			50	50	
Link Distance (m)	62.6			43.0	64.3	
Travel Time (s)	7.5			3.1	4.6	
Confl. Peds. (#/hr)			28			28
Confl. Bikes (#/hr)						3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	6	10	16	221	148	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	237	156	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 36.2%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	10	16	221	148	8
Future Vol, veh/h	6	10	16	221	148	8
Conflicting Peds, #/hr	0	0	28	0	0	28
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	6	10	16	221	148	8

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	433	180	184	0	-	0
Stage 1	180	-	-	-	-	-
Stage 2	253	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	580	863	1391	-	-	-
Stage 1	851	-	-	-	-	-
Stage 2	789	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	543	840	1355	-	-	-
Mov Cap-2 Maneuver	543	-	-	-	-	-
Stage 1	818	-	-	-	-	-
Stage 2	768	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1355	-	697	-	-
HCM Lane V/C Ratio	0.012	-	0.023	-	-
HCM Control Delay (s)	7.7	0	10.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Lane Configurations							
Traffic Volume (vph)	527	0	0	559	0	0	
Future Volume (vph)	527	0	0	559	0	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt							
Flt Protected							
Satd. Flow (prot)	1745	0	0	1745	0	0	
Flt Permitted							
Satd. Flow (perm)	1745	0	0	1745	0	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)							
Link Speed (k/h)	50			50	50		
Link Distance (m)	22.1			57.4	22.8		
Travel Time (s)	1.6			4.1	1.6		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	527	0	0	559	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	527	0	0	559	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(m)	0.0			0.0	0.0		
Link Offset(m)	0.0			0.0	0.0		
Crosswalk Width(m)	3.0			3.0	3.0		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (k/h)		15	25		25	15	
Number of Detectors	0			0			
Detector Template							
Leading Detector (m)	0.0			0.0			
Trailing Detector (m)	0.0			0.0			
Turn Type	NA			NA			
Protected Phases	2			6			4
Permitted Phases							
Detector Phase	2			6			
Switch Phase							
Minimum Initial (s)	5.0			5.0			10.0
Minimum Split (s)	23.8			23.8			22.0
Total Split (s)	30.8			30.8			24.0
Total Split (%)	56.2%			56.2%			44%
Maximum Green (s)	25.0			25.0			20.0
Yellow Time (s)	3.3			3.3			3.0
All-Red Time (s)	2.5			2.5			1.0
Lost Time Adjust (s)	0.0			0.0			
Total Lost Time (s)	5.8			5.8			
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0			3.0			3.0
Recall Mode	Max			Max			None

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø4
Walk Time (s)	7.0			7.0			7.0
Flash Dont Walk (s)	11.0			11.0			11.0
Pedestrian Calls (#/hr)	0			0			394
Act Effct Green (s)	40.0			40.0			
Actuated g/C Ratio	0.59			0.59			
v/c Ratio	0.51			0.54			
Control Delay	10.4			10.9			
Queue Delay	0.0			0.0			
Total Delay	10.4			10.9			
LOS	B			B			
Approach Delay	10.4			10.9			
Approach LOS	B			B			
Queue Length 50th (m)	34.8			37.9			
Queue Length 95th (m)	56.8			61.8			
Internal Link Dist (m)	0.1			33.4	0.1		
Turn Bay Length (m)							
Base Capacity (vph)	1029			1029			
Starvation Cap Reductn	0			0			
Spillback Cap Reductn	0			0			
Storage Cap Reductn	0			0			
Reduced v/c Ratio	0.51			0.54			

Intersection Summary	
Area Type: Other	
Cycle Length: 54.8	
Actuated Cycle Length: 67.8	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 10.6	Intersection LOS: B
Intersection Capacity Utilization 35.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Pedestrian Crossing & Scott St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	11	227	0	9	156
Future Volume (vph)	0	11	227	0	9	156
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865					
Flt Protected						0.997
Satd. Flow (prot)	1510	0	1745	0	0	1740
Flt Permitted						0.997
Satd. Flow (perm)	1510	0	1745	0	0	1740
Link Speed (k/h)	30		50			50
Link Distance (m)	64.1		64.3			62.1
Travel Time (s)	7.7		4.6			4.5
Confl. Bikes (#/hr)				2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	11	227	0	9	156
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	227	0	0	165
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 26.4%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	11	227	0	9	156
Future Vol, veh/h	0	11	227	0	9	156
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	11	227	0	9	156

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	401	227	0	0	227	0
Stage 1	227	-	-	-	-	-
Stage 2	174	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	605	812	-	-	1341	-
Stage 1	811	-	-	-	-	-
Stage 2	856	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	601	812	-	-	1341	-
Mov Cap-2 Maneuver	601	-	-	-	-	-
Stage 1	811	-	-	-	-	-
Stage 2	850	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	812	1341	-
HCM Lane V/C Ratio	-	-	0.014	0.007	-
HCM Control Delay (s)	-	-	9.5	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	72	52	185	41	22	136
Future Volume (vph)	72	52	185	41	22	136
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.943		0.976			
Flt Protected	0.972					0.993
Satd. Flow (prot)	1600	0	1703	0	0	1733
Flt Permitted	0.972					0.993
Satd. Flow (perm)	1600	0	1703	0	0	1733
Link Speed (k/h)	30		50			50
Link Distance (m)	67.7		151.6			43.0
Travel Time (s)	8.1		10.9			3.1
Confl. Bikes (#/hr)				3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	52	185	41	22	136
Shared Lane Traffic (%)						
Lane Group Flow (vph)	124	0	226	0	0	158
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 39.3% ICU Level of Service A
Analysis Period (min) 15

Intersection						
Int Delay, s/veh	3.1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	72	52	185	41	22	136
Future Vol, veh/h	72	52	185	41	22	136
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	72	52	185	41	22	136

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	386	206	0	0	226	0
Stage 1	206	-	-	-	-	-
Stage 2	180	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	617	835	-	-	1342	-
Stage 1	829	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	606	835	-	-	1342	-
Mov Cap-2 Maneuver	606	-	-	-	-	-
Stage 1	829	-	-	-	-	-
Stage 2	836	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.4	0	1.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	685	1342	-
HCM Lane V/C Ratio	-	-	0.181	0.016	-
HCM Control Delay (s)	-	-	11.4	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-