1649 Montreal Road & 741 Blair Road

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report

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1 Screening

This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for the TIA Study PM. As shown in the Screening Form, a TIA is required including the Network Impact Component. This report accompanies a zoning by-law amendment.

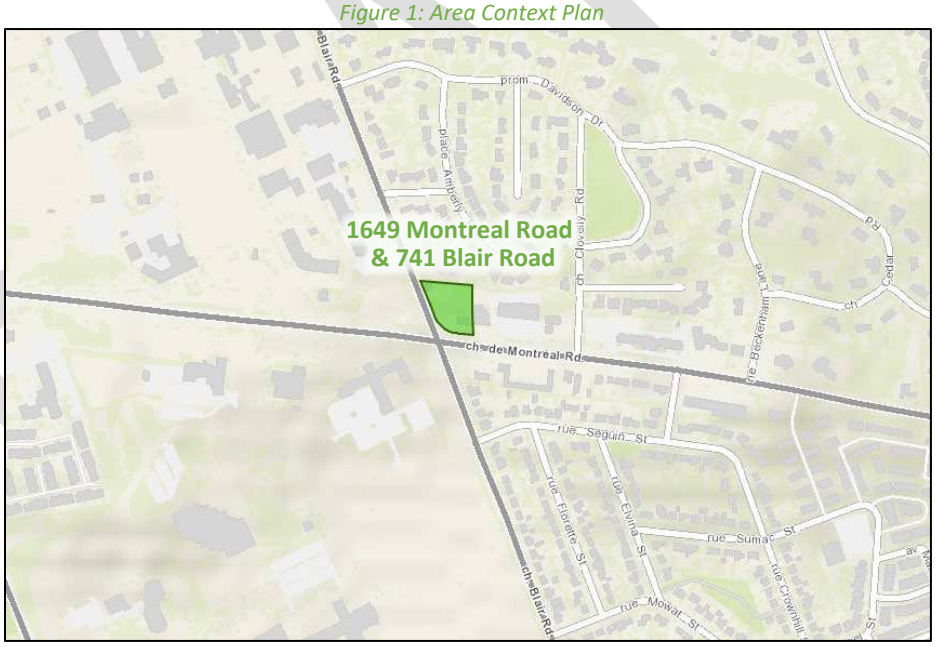
2 Existing and Planned Conditions

2.1 Proposed Development

The subject site, currently zoned as Arterial Mainstreet (AM10[2199]) for the 1649 Montreal Road parcel and Residential Third Density (R3K[1631]) for the 741 Blair Road parcel, intersects the Montreal Arterial Mainstreet Design Priority Area and currently consists of a mostly treed residential lot with a single detached dwelling, and an auto garage with surface parking lot. The subject development proposes the construction of a 26-storey mixed-use building on a six storey-podium, massed mostly on the 1649 Montreal Road parcel, comprising 243 residential dwelling units and 8,320 ft^2 of ground floor commercial use. The site access is proposed as being a full-movement access onto Blair Road. Parking is anticipated to be via nine surface spaces and 298 underground spaces across three levels, and the development is anticipated to be built-out in a single phase by 2024.

Figure 1 illustrates the Study Area Context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: February 10, 2021

DEVELOPMENT SUMMARY:

ZONING	AM10[2199] Arterial Mainstreet Zone
SITE AREA	1,976.51 sq m (21,274.96) sq ft

BUILDING STATISTICS:

PROPOSED GFA (Construction Area)		24012.8 sq m (258,472) sq ft
PROPOSED FSI (CITY OF OTTAWA'S DEFINITION)		
BUILDING HEIGHT		26 STOREYS (88.0 m)
TOTAL UNITS	1 BEDROOM UNITS = 79 (32.5%) 2 BEDROOM UNITS = 169 (67.5%)	243 DUs
COMMERCIAL AREA (ON GROUND FLOOR)		773 sq m 8,320 sq ft
TOWER FLOOR PLATE		827.3 sq m 8,905 sq ft

CAR PARKING:

REQUIRED		
RESIDENTS	@ 1.2 PER UNIT	292
VISITORS	@ 0.2 PER UNIT	49
COMMERCIAL AREA (RESTAURANT)	@ 10 PER 100 sq m of GFA	70
TOTAL		411

PROVIDED (3 Levels)	
SURFACE PARKING SPACES	9
LEVEL P1 PARKING SPACES	98
LEVEL P2 PARKING SPACES	98
LEVEL P3 PARKING SPACES	102
TOTAL	307

RODERICKLAHEY
ARCHITECT INC

SITE PLAN

April 23, 2021

ZONING AMENDMENT

1649 MONTREAL ROAD

OTTAWA ONTARIO

PROJECT # 2037

2.2 Existing Conditions

2.2.1 Area Road Network

Montreal Road: Montreal Road is a City of Ottawa arterial road with a divided four-lane urban cross-section within the study area, with sidewalks on both sides of the road. The posted speed limit is 60 km/h and the Ottawa Official Plan reserves a 37.5-metre right of way within the study area. Montreal Road is a truck route.

Blair Road: Blair Road is a City of Ottawa arterial road south of Montreal Road, and a major collector road to the north, each with a two-lane cross-section. South of Nicol Street, Blair Road has a semi-urban cross-section curbed with a sidewalk and curbside bike lane on the east side of the road and with a paved shoulder on the west side of the road. North of Nicol Street, the cross-section is rural with paved shoulders on both sides of the road. The posted speed limit is 50 km/h, and the Ottawa Official Plan reserves a 30.0-metre right of way south of Montreal Road, where Blair Road is a truck route, and the measured right of way is 20.0 metres to the north.

Elwood Street: Elwood Street is a City of Ottawa local road with a two-lane urban cross-section. The posted speed limit is 40 km/h and the measured right of way is 20.0 metres.

2.2.2 Existing Intersections

The existing signalized area intersections within 400 metres of the site have been summarized below:

Montreal Road at Blair Road	The intersection of Montreal Road and Blair Road is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane, a through lane, and an auxiliary right-turn lane and the southbound approach consists of an auxiliary left-turn lane, a shared through/channelized right-turn lane, and a bike lane. The eastbound approach consists of an auxiliary left-turn lane, two through lanes, and an auxiliary channelized right-turn lane and the westbound approach consists of an auxiliary left-turn lane, two through lanes, and a channelized auxiliary right-turn lane. No turn restrictions were noted.
Montreal Road at Elwood Street	The intersection of Montreal Road and Elwood Street is a signalized intersection. The northbound approach and the private southbound approach each consist of a shared all-movements. The eastbound and westbound approaches each consist of an auxiliary left-turn lane, a through lane, and a shared through/right-turn lane. No turn restrictions were noted.

2.2.3 Existing Driveways

Within 200 metres of the site access, on the east side of Blair Road, south of Montreal Street, there is a bank access, and three driveways to detached homes. Just beyond 200 metres south of the access is a driveway to a detached home. None of the driveways would provide access to significant traffic generators and would therefore have no impact on this TIA.

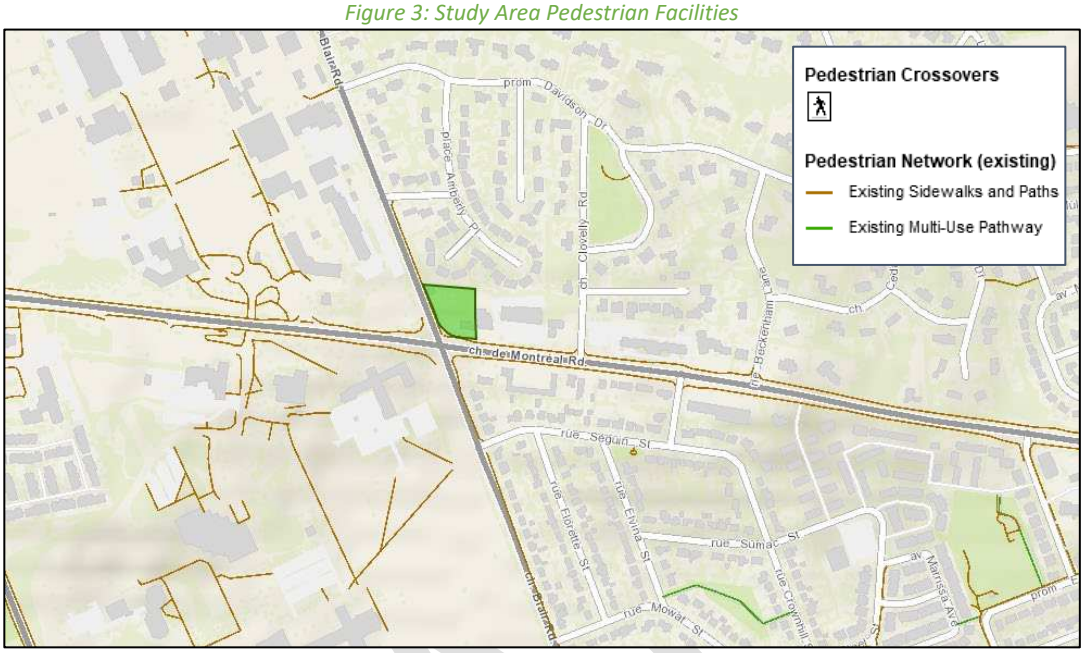
2.2.4 Cycling and Pedestrian Facilities

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

Sidewalks are provided along both sides of Montreal Road and on the east side of Blair Road, and area cycling facilities include a bike lane on the east side of Blair Road and a paved shoulder on the west side of Blair Road

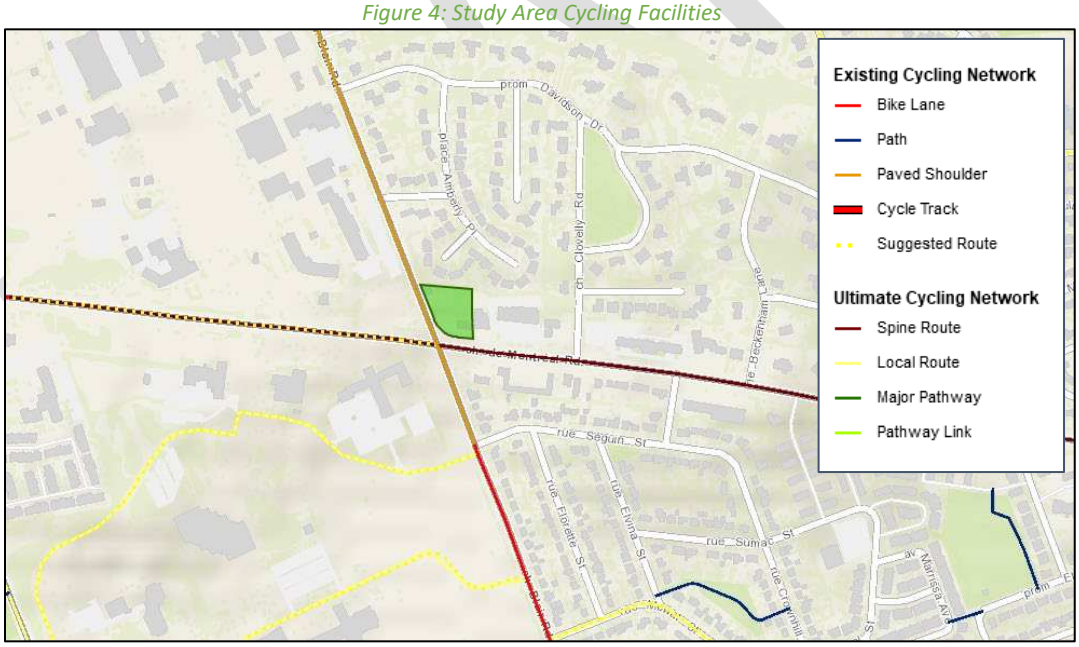
south of Nicol Street, and paved shoulders on both sides of Blair Road to the north. Montreal Road and Blair Road are spine cycling routes.

Figure 3: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: February 10, 2021

Figure 4: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: February 10, 2021

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

Figure 5: Existing Pedestrian Counts

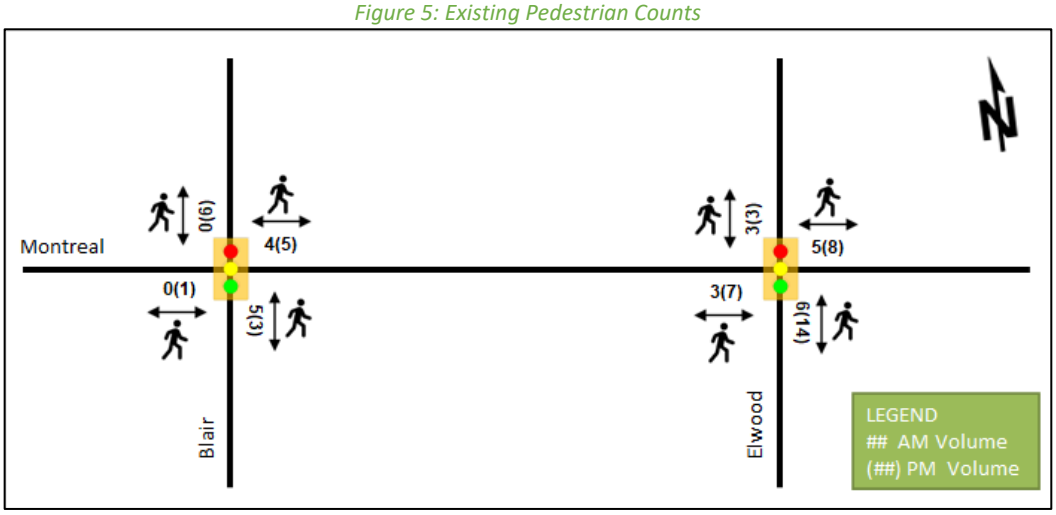
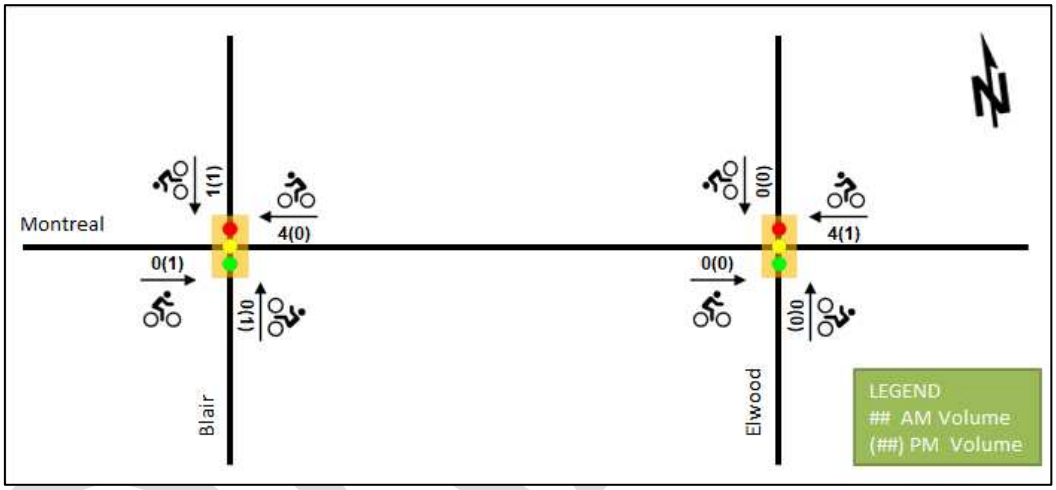


Figure 6: Existing Cyclist Counts



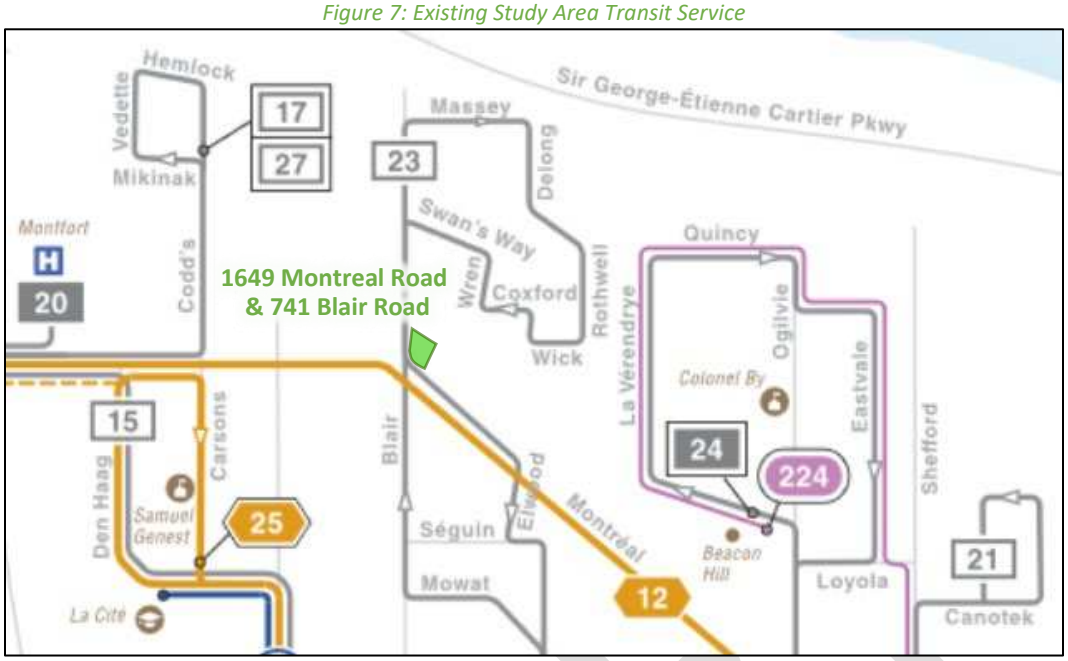
2.2.5 Existing Transit

Within the study area, the route #12 travels along Montreal Road with connections to Blair Station and Rideau Station, and route #23 loops through the neighbourhoods both north and south of Montreal Road, travelling along Blair Road to cross Montreal Road. The frequency of these routes within proximity of the proposed site currently are:

- Route # 12 – 15-minute service all day, 30-minute service early mornings and late nights
- Route # 23 – 30-minute service at peak hours with two midday buses

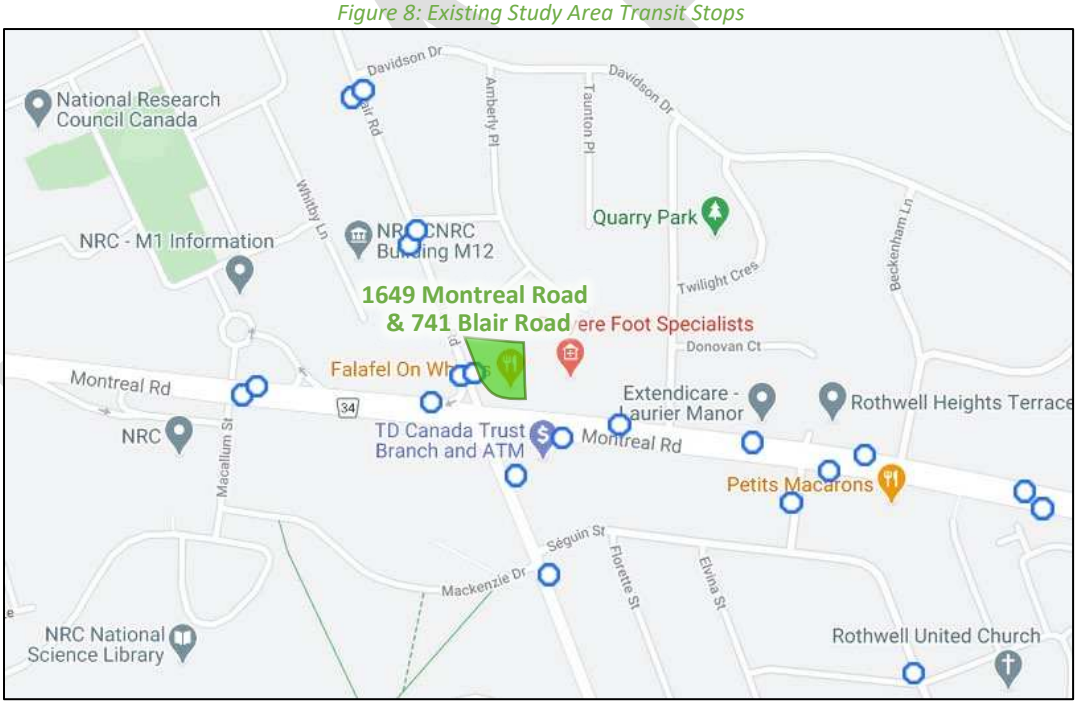
Figure 7 illustrates the transit system map in the study area and Figure 8 illustrates nearby transit stops.

Figure 7: Existing Study Area Transit Service



Source: http://www.octranspo.com/ Accessed: February 16, 2021

Figure 8: Existing Study Area Transit Stops



Source: http://www.octranspo.com/ Accessed: February 16, 2021

2.2.6 Existing Area Traffic Management Measures

There are no existing area traffic management measures within the Study Area other than on-road speed limit messaging on Blair Road south of Montreal Road.

2.2.7 Existing Peak Hour Travel Demand

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

Table 1: Intersection Count Date

Intersection	Count Date
Montreal Road at Blair Road	Thursday, November 15, 2018
Montreal Road at Elwood Street	Thursday, November 15, 2018

Figure 9 illustrates the existing traffic counts, balanced along Montreal Road, and Table 2 summarizes the existing intersection operations. The level of service for signalized intersections is based on HCM 2010 v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. Detailed turning movement count data is included in Appendix B and the Synchro worksheets are provided in Appendix C.

Figure 9: Existing Traffic Counts

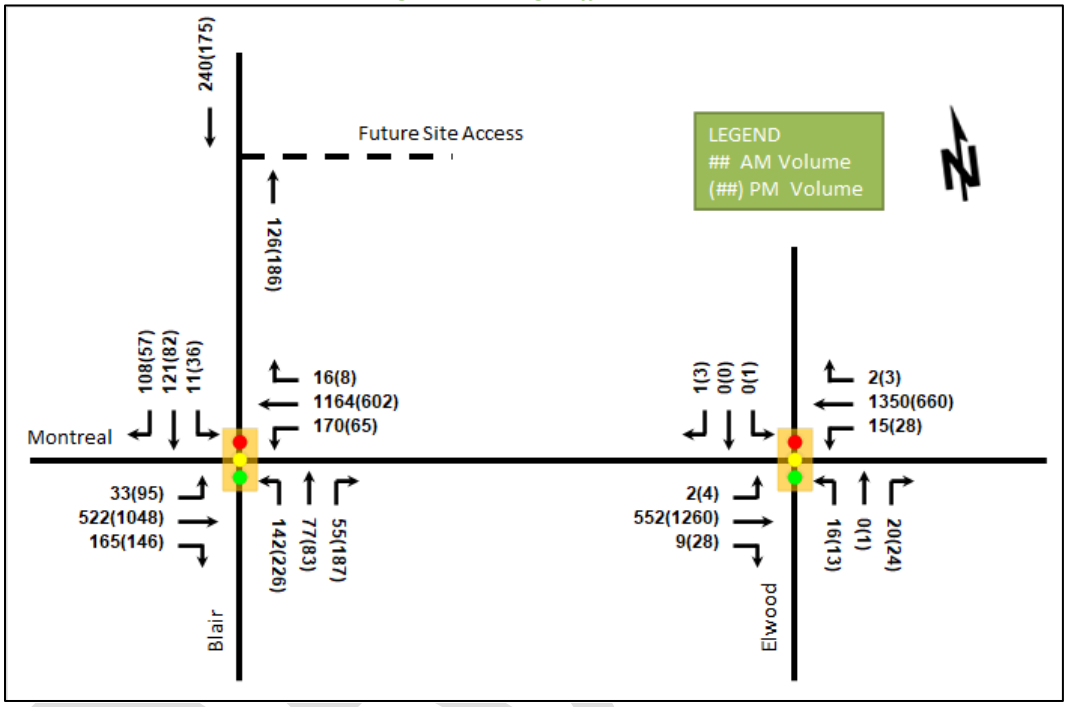


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Montreal Road at Blair Road ***Signalized***	EBL	A	0.23	17.9	13.4	A	0.30	17.1	27.0
	EBT	A	0.30	11.1	50.3	B	0.65	18.6	**#126.7**
	EBR	A	0.19	2.8	11.6	A	0.19	7.2	19.9
	WBL	A	0.42	14.8	28.2	A	0.43	33.0	**#27.4**
	WBT	B	0.66	14.3	**#151.1**	A	0.37	16.8	61.2
	WBR	A	0.02	3.0	m0.5	A	0.01	3.2	m0.8
	NBL	C	0.77	53.3	35.9	C	0.76	42.1	53.6
	NBT	A	0.21	24.8	17.3	A	0.18	21.5	18.3
	NBR	A	0.15	6.0	6.7	A	0.45	21.6	33.6
	SBL	A	0.05	20.4	4.3	A	0.13	20.3	9.9
	SBT/R	B	0.62	33.4	44.9	A	0.30	15.4	22.4
	Overall	**B**	**0.69**	**16.9**	-	**B**	**0.69**	**20.0**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Montreal Road at Elwood Street *Signalized*	EBL	A	0.01	10.0	m0.5	A	0.01	7.8	m0.5
	EBT/R	A	0.25	5.3	29.6	A	0.57	6.8	#160.4
	WBL	A	0.03	7.8	5.0	A	0.14	10.4	9.7
	WBT/R	A	0.58	9.9	#177.0	A	0.28	6.2	57.1
	NB	A	0.16	12.8	7.0	A	0.17	18.3	8.6
	SB	A	0.00	0.0	0.0	A	0.02	0.0	0.0
	Overall	**A**	**0.55**	**8.6**	-	**A**	**0.54**	**6.8**	-

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 0.90
m = metered queue
# = queue exceeds storage or mid-block length

During both the AM and PM peak hours, the study area intersections operate well. No capacity issues are noted outside of queuing at the intersection of Montreal Road at Blair Road on the westbound through movement during the AM peak hour and on the eastbound through and westbound left movements during the PM peak hour, and at the intersection of Montreal Road at Elwood Street on the westbound through movement during the AM peak hour and on the eastbound through movement during the PM peak hour.

2.2.8 Collision Analysis

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

Table 3: Study Area Collision Summary, 2015-2019

		Number	%
Total Collisions		**48**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	13	27%
	Property Damage Only	35	73%
Initial Impact Type	**Angled**	7	15%
	Rear end	22	46%
	Sideswipe	2	4%
	Turning Movement	11	23%
	SMV Other	5	10%
	Other	1	2%
Road Surface Condition	**Dry**	29	60%
	Wet	12	25%
	Loose Snow	2	4%
	Slush	1	2%
	Ice	4	8%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

Figure 10: Study Area Collision Records – Representation of 2015-2019

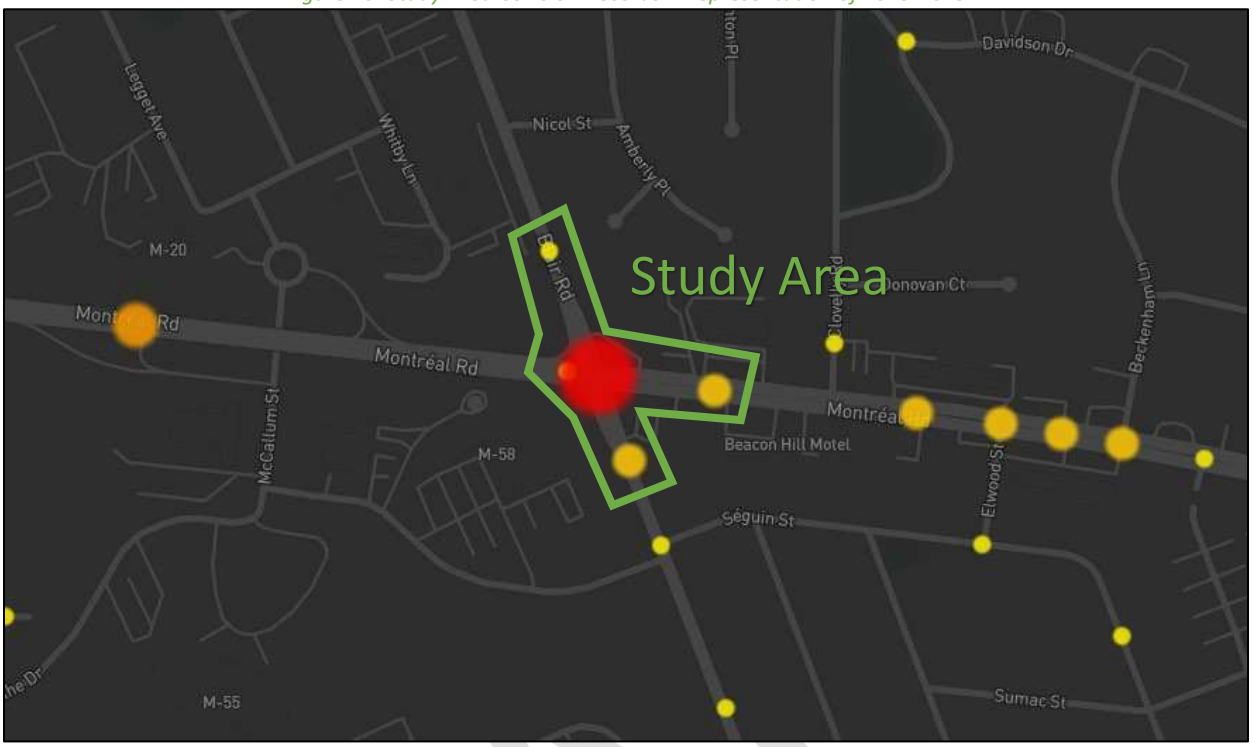


Table 4: Summary of Collision Locations, 2015-2019

	Number	%
Intersections / Segments	**48**	**100%**
Montreal Road at Blair Road	37	77%
Blair Road between Nicol Street and Montreal Road	1	2%
Blair Road between Montreal Road and Seguin Street	4	8%
Montreal Road between Montreal Road and Blair Road	2	4%
Montreal Road between Blair Road and Clovelly Road	4	8%

Within the study area, the intersection of Blair Road at Montreal Road is noted to have experienced higher collisions than other locations. Table 5 summarizes the collision types and conditions for each of the Blair Road at Montreal Road.

Table 5: Montreal Road at Blair Road Collision Summary

		Number	%
Total Collisions		**37**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	11	30%
	Property Damage Only	26	70%
Initial Impact Type	**Angle**	5	14%
	Rear end	18	49%
	Sideswipe	1	3%
	Turning Movement	10	27%
	SMV Other	2	5%
	Other	1	3%
Road Surface Condition	**Dry**	21	57%
	Wet	11	30%
	Loose Snow	1	3%

	Number	%
Total Collisions	**37**	**100%**
Ice	4	11%
Pedestrian Involved	0	0%
Cyclists Involved	0	0%

The Montreal Road at Blair Road intersection had a total of 37 collisions during the 2015-2019 time period, with 26 involving property damage only and the remaining 11 having non-fatal injuries. The collision types are most represented by rear end with 18, followed by turning movement with ten, angle with five, SMV (other) with two, and one each as sideswipe and other. Rear end collisions are typically associated with congestion, and these collisions within the analysis period are clustered around the AM, PM, and mid-day peaks. The right-turn channels on the eastbound and southbound approaches may influence turning movement collisions and the City should consider their conversion to smart channels with future roadway rehabilitation projects. Weather conditions may affect collisions at this location, particularly rear end collisions where 10 out of 18 occurred with non-dry road surface conditions. The city may wish to investigate alternative paving treatments with the aim of reducing collisions at this intersection.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

Within the Transportation Master Plan (TMP), the Rapid Transit and Transit Priority Network (RTTP) Affordable Network diagram shows a transit priority corridor along Montreal Road through the study area and along Blair Road south of Montreal Road.

Montreal-Blair Road Transit Priority Corridor Planning and Environmental Assessment Study is currently proposing Transit Only Lanes from St. Laurent Boulevard to Shefford Road, to be coordinated with the Montreal Road Revitalization Project. Alternatives for the typical cross-sections are being explored; however, the recommended solution has not been released by the city. It is understood that the interim proposal will focus on isolated transit priority measures and the enhancement of the pedestrian and cycling facilities within the corridor. The EA will be continuing with public consultation through 2021 and is assumed as being implemented after 2024.

From the Planned Construction Projects portal, Blair Road south of Montreal Road is due to receive new sidewalks commencing within the next 4-7 years.

2.3.2 Other Study Area Developments

At the time of this report, no other development applications were available for the adjacent properties.

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of Montreal Road at Blair Road and Montreal Road at Elwood Street, and the intersection of site access and Blair Road.

The boundary roads will be Montreal Road and Blair Road and no screenlines are present within proximity to the site.

3.2 Time Periods

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

3.3 Horizon Years

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

4 Exemption Review

Table 6 summarizes the exemptions for this TIA.

Table 6: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Exempt – Will be required at Site Plan Application
	4.1.3 New Street Networks	Only required for plans of subdivision	Exempt
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Exempt – Will be required at Site Plan Application
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt – May be required at Site Plan Application
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Required
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	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 high-rise apartment using the TRANS Trip Generation Study Report (2009) and the vehicle trip rates and derived person trip rates for retail component from the ITE Trip Generation Manual 10th Edition (2017) using the City-prescribed conversion factor of 1.28. Table 7 summarizes the person trip rates for the proposed land uses.

Table 7: Trip Generation Person Trip Rates

Dwelling Type	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates
High-Rise Apartments	222 (TRANS)	AM	0.24	0.65
		PM	0.27	0.68
Shopping Centre	820 (ITE)	AM	0.94	1.20
		PM	3.81	4.88

Using the above Person Trip rates, the total person trip generation has been estimates. Table 8 below illustrates the total person trip generation for the high-rise apartment and shopping centre land uses.

Table 8: Total Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
High-Rise Apartments	243	38	120	158	102	63	165
Shopping Centre	8,320	6	4	10	20	21	41

Using the most recent National Capital Region Origin-Destination survey (OD Survey), the existing mode shares for Beacon Hill have been determined and compared to various modes share breakdowns identified by City Staff as potential interpretations of the data. As the transit priority measures are assumed to be implemented after build-out, the mode shares presented will be consistent with existing data. Table 9 summarizes these modal shares.

Table 9: Mode Shares

Travel Mode	Beacon Hill (average)	Beacon Hill (AM from/within)	Beacon Hill (PM to/within)
Auto Driver	60%	60%	60%
Auto Passenger	15%	10%	20%
Transit	20%	20%	15%
Cycling	0%	1%	1%
Walking	5%	9%	4%
Total	100%	100%	100%

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

Table 10: Internal Capture Rates

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

Pass-by reductions applied to the retail trip generation at a rate of 35% have been included, a value taken as a moderately conservative interpretation from the rates presented in the ITE Trip Generation Handbook 3rd Edition.

Using the mode share targets for the peak hours, the person trips by mode, internal capture, and pass-by reductions have been projected. Table 11 summarizes the trip generation by mode.

Table 11: Trip Generation by Mode

Travel Mode	Mode Share (AM)	AM Peak Hour			Mode Share (PM)	PM Peak Hour		
		In	Out	Total		In	Out	Total
Auto Driver	60%	25	74	98	60%	68	44	112
Auto Passenger	10%	4	12	17	20%	22	15	37
Transit	20%	9	25	33	15%	17	11	28
Cycling	1%	0	1	2	1%	1	1	2
Walking	9%	3	11	14	4%	4	3	8
Pass-by	*35%*	*-1*	*-0*	*-1*	*35%*	*-1*	*-4*	*-5*
Internal Capture	*(varies)*	*-2*	*-1*	*-4*	*(varies)*	*-7*	*-7*	*-14*
Total	**100%**	**41**	**123**	**163**	**100%**	**113**	**73**	**186**

As shown above, 98 new AM and 112 new PM peak hour two-way vehicle trips are projected as a result of the proposed development.

5.2 Trip Distribution

To understand the travel patterns of the subject development, the OD Survey has been reviewed to determine the existing district travel and these patterns were applied based on the build-out of Beacon Hill. Table 12 below summarizes the distributions.

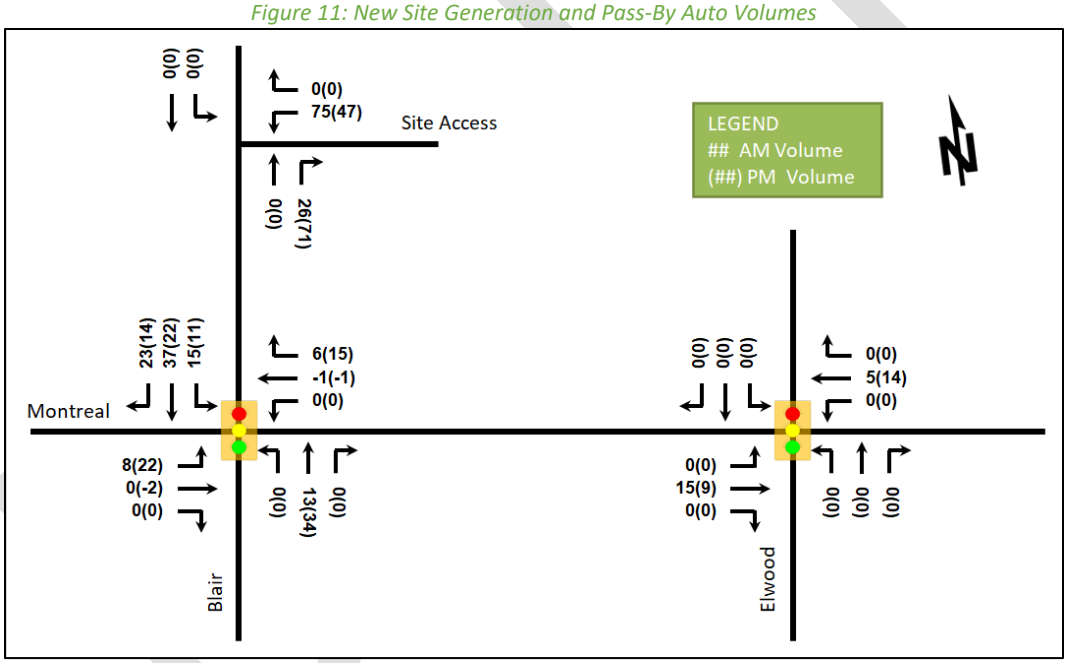
Table 12: OD Survey Distribution – Beacon Hill

To/From	% of Trips	Via
North	5%	Montreal Rd (W)
South	30%	Blair Rd
East	20%	Montreal Rd
West	45%	25% Montreal Rd, 20% Blair Rd
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. Figure 11 illustrates the new site generated and pass-by volumes.

Figure 11: New Site Generation and Pass-By Auto Volumes



6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3. The Montreal-Blair Road Transit Priority Corridor is the only confirmed project within the study expected to impact traffic operations. The City's project team has noted that transit priority lanes, cycletracks, and wider sidewalks will be included along this portion of Montreal Road. This work is assumed to be planned for completion between the TIA study horizons and will be modelled in all 2029 future conditions.

6.2 Background Growth

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

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

Street	Direction Growth % from 2011 to 2031		Direction Growth % from Existing to 2031	
	Eastbound	**Westbound**	**Eastbound**	**Westbound**
Montreal Road	1.44%	0.36%	-0.81%	1.36%
	Northbound	**Southbound**	**Northbound**	**Southbound**
Blair Road	-1.52%	3.05%	-7.51%	4.83%

Volumes on the study area roadways are generally forecasted grow in the peak directions. When accounting for the existing volumes, it can be seen that the eastbound growth predicted during the AM peak hour on Montreal Road has been largely achieved. Growth rates from the existing volumes, rounded to the nearest 0.25%, have been applied to mainline volumes and major turning movements on Montreal Road and Blair Road and reversed in the PM peak hour, with negative growth rates taken as zero.

6.3 Other Developments

As no active development files are present within the study area, all growth on the study area network is assumed to be captured by the background growth rates applied.

Through the examination, traffic from the Wateridge Village development is understood to be captured within the 2031 horizon of the TRANS model. As background growth rates derived from this forecasted have been applied to the forecasted horizons, the Wateridge Village development is considered to be included the background conditions.

7 Demand Rationalization

7.1 2024 Future Background Operations

Figure 12 illustrates the 2024 background volumes and Table 14 summarizes the 2024 background intersection operations. The level of service for signalized intersections is based on HCM 2010 v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2024 future background horizon are provided in Appendix F.

Figure 12: 2024 Future Background Volumes

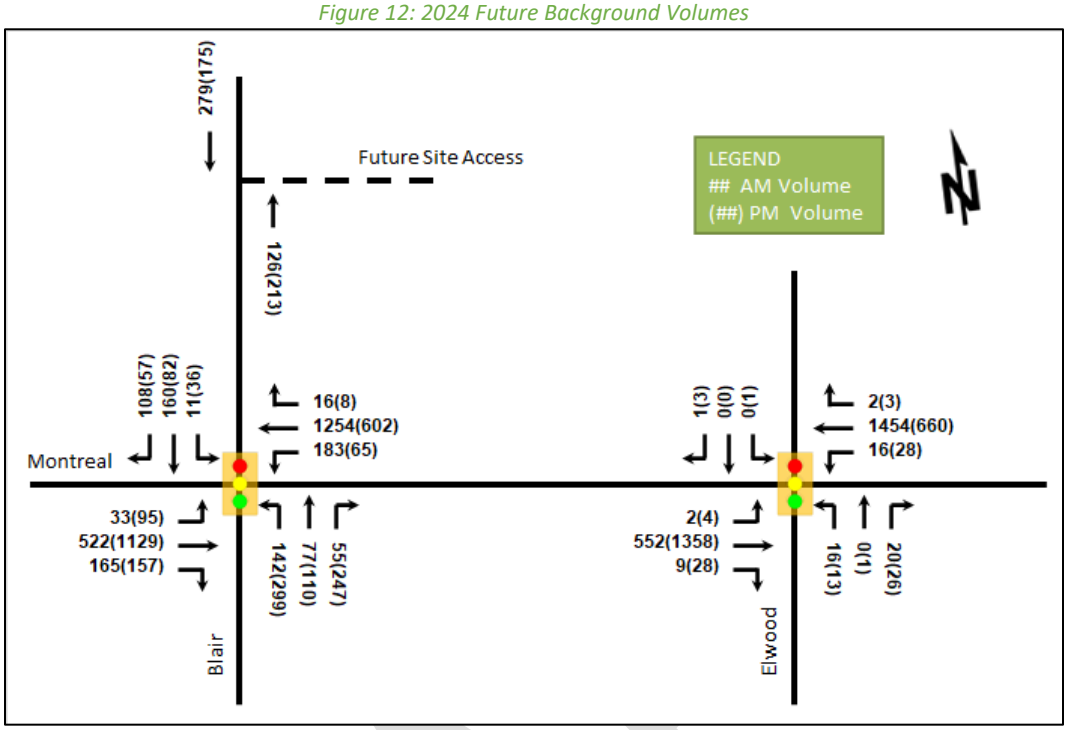


Table 14: 2024 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Montreal Road at Blair Road *Signalized*	EBL	A	0.19	16.2	11.7	A	0.27	17.7	23.7
	EBT	A	0.27	10.7	44.8	B	0.67	20.6	**#122.8**
	EBR	A	0.17	2.9	11.0	A	0.20	7.8	19.4
	WBL	A	0.38	13.9	27.5	A	0.42	34.3	**#24.2**
	WBT	B	0.64	13.8	**#143.4**	A	0.36	17.5	53.8
	WBR	A	0.02	2.6	m0.3	A	0.01	2.5	m0.6
	NBL	C	0.74	51.5	32.6	C	0.80	43.0	64.9
	NBT	A	0.19	24.6	15.8	A	0.20	20.2	20.8
	NBR	A	0.14	6.2	6.4	A	0.49	21.6	40.3
	SBL	A	0.04	20.5	4.1	A	0.11	18.3	9.0
	SBT/R	B	0.65	34.6	47.0	A	0.24	13.0	19.6
	Overall	**B**	**0.67**	**16.7**	-	**C**	**0.72**	**21.4**	-
Montreal Road at Elwood Street *Signalized*	EBL	A	0.01	8.0	m0.4	A	0.01	7.8	m0.5
	EBT/R	A	0.22	4.4	22.6	A	0.55	6.4	**#65.1**
	WBL	A	0.03	7.8	4.7	A	0.12	9.9	8.6
	WBT/R	A	0.56	9.6	**#168.0**	A	0.26	6.0	50.4
	NB	A	0.15	11.4	6.2	A	0.16	16.4	7.9
	SB	A	0.00	0.0	0.0	A	0.02	0.0	0.0
	Overall	**A**	**0.53**	**8.2**	-	**A**	**0.52**	**6.5**	-

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00
m = metered queue
# = queue exceeds storage or mid-block length

During both the AM and PM peak hours, the study area intersections operate well and similarly to the existing conditions. No new capacity issues are noted.

7.2 2029 Future Background Operations

Figure 13 illustrates the 2029 background volumes and Table 15 summarizes the 2029 background intersection operations. The level of service for signalized intersections is based on HCM 2010 v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2029 future background horizon are provided in Appendix G.

Figure 13: 2029 Future Background Volumes

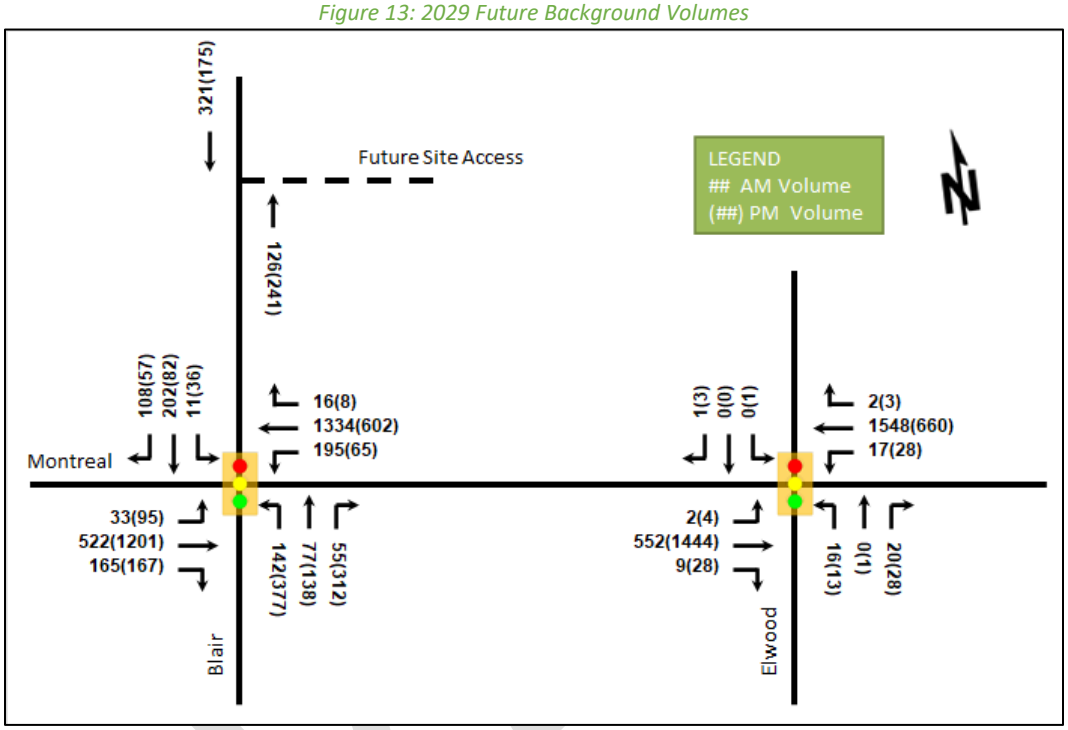


Table 15: 2029 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Montreal Road at Blair Road *Signalized*	EBL	A	0.24	19.5	12.8	A	0.31	20.9	24.0
	EBT	A	0.28	11.5	44.8	C	0.80	27.2	**#143.6**
	EBR	A	0.18	3.0	11.0	A	0.22	3.7	11.2
	WBL	A	0.42	14.8	28.8	B	0.64	59.0	**#30.4**
	WBT	B	0.70	15.7	**#159.2**	A	0.40	19.8	53.8
	WBR	A	0.02	2.6	m0.2	A	0.01	2.5	m0.6
	NBL	C	0.77	54.3	34.5	D	0.87	46.5	**#98.4**
	NBT	A	0.17	23.2	15.8	A	0.21	18.1	25.3
	NBR	A	0.13	5.9	6.4	A	0.53	21.1	53.5
	SBL	A	0.04	19.5	4.1	A	0.09	16.1	9.0
	SBT/R	B	0.70	35.6	55.8	A	0.21	11.3	19.6
	Overall	**C**	**0.72**	**18.2**	-	**D**	**0.83**	**25.4**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Montreal Road at Elwood Street *Signalized*	EBL	A	0.01	8.0	m0.4	A	0.01	8.5	m0.5
	EBT/R	A	0.22	4.4	22.6	A	0.58	7.6	**#168.7**
	WBL	A	0.03	7.8	4.9	A	0.14	10.5	9.0
	WBT/R	A	0.60	10.3	**#186.3**	A	0.26	6.0	50.4
	NB	A	0.15	11.4	6.2	A	0.17	19.9	9.0
	SB	A	0.00	0.0	0.0	A	0.02	0.0	0.0
	Overall	**A**	**0.56**	**8.8**	-	**A**	**0.56**	**7.4**	-

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00
m = metered queue
# = queue exceeds storage or mid-block length

During both the AM and PM peak hours at the 2029 future background horizon, the study area intersections operate well and similarly to the 2024 background conditions. It is noted that the signal timing remains as existing. The northbound left movement at the intersection of Montreal and Blair Road is forecasted to exhibit queuing at this horizon during the PM peak hour.

7.3 Modal Share Sensitivity

No capacity constraints are noted within the study area. As the district mode shares have been applied, no rationalization is required for this TIA.

8 Transportation Demand Management

8.1 Context for TDM

The mode shares used within the TIA represent the unmodified district modal shares. Given the plans for transit priority on the Montreal Road and Blair Road corridors, these transit mode shares are considered conservative moving beyond the construction of the transit priority measures. Supporting TDM measures should be provided to transition towards transit mode adoption within the development in advance of the implementation of the transit priority measures.

The subject site is within the Montreal Arterial Mainstreet Design Priority Area.

The total bedroom count currently considered by the development is 417 and no age restrictions are noted.

8.2 Need and Opportunity

The subject site has been assumed to rely predominantly on auto travel with no increase in transit ridership based upon the build-out horizon of the transit priority measures, and these assumptions have been carried through the analysis. The study area intersections are anticipated to have residual capacity, and as such, the risks from not achieving the 60% auto mode shares are low.

8.3 TDM Program

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

- Designate a program coordinator
- Display local area pedestrian, cycling, and transit information at building entrances
- Provide a multimodal travel option information package
- Contract with provider to install on-site micromobility (e.g. scooter or bike share) station
- Inclusion of a 1-year Presto card for first time new townhome purchase and apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site

- Unbundle parking cost from purchase or rental costs

9 Neighbourhood Traffic Management

The proposed development will connect to the arterial road network at Montreal Road via Blair Road, which is a major collector road to the north of Montreal Road. Between the site access and Montreal Road, the two-way volumes at the 2029 future total horizon are forecasted as being 547 during the AM peak hour and 528 during the PM peak hour. These volumes are below the threshold of 600 vehicles during the peak hour from the TIA guidelines, and thus no further discussion is required.

10 Transit

10.1 Route Capacity

In Section 5.1 the trip generation by mode was estimated, including an estimate of the number of transit trips that will be generated by the proposed development. Table 16 summarizes the transit trip generation.

Table 16: Trip Generation by Transit Mode

Travel Mode	Mode Share AM(PM)	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Transit	20%(15%)	9	25	33	17	11	28

The proposed development is anticipated to generate an additional 33 AM peak hour transit trips and 28 PM peak hour transit trips using the unmodified district modal shares. Of these trips, 25 outbound AM trips and 17 inbound PM trips are anticipated. Assuming all northbound and southbound trips first travel west via the route #12, the resultant increase in ridership would be five riders per peak direction bus in the AM peak hour and four riders per peak direction bus in the PM peak hour. This increase in ridership would necessitate at most one higher capacity bus per hour to be accommodated.

10.2 Transit Priority

Site-generated traffic is not anticipated appreciably increase delay on the transit movements along Montreal Road and no transit priority considerations are explicitly required at build-out.

In the 2029 conditions, the westbound right movement is planned as part of the transit priority study to be a shared transit through movement, and delays on this movement with the addition of site-generated traffic remain under ten seconds. No other impacts to transit priority are anticipated.

11 Network Intersection Design

11.1 Network Intersection Control

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

11.2 Network Intersection Design

11.2.1 2024 Future Total Network Intersection Operations

The 2024 future total volumes are illustrated in Figure 14 and the network intersection operations are summarized below in Table 17. The level of service for signalized intersections is based on HCM 2010 v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and HCM average delay for unsignalized intersections. The synchro worksheets have been provided in Appendix I.

Figure 14: 2024 Future Total Volumes

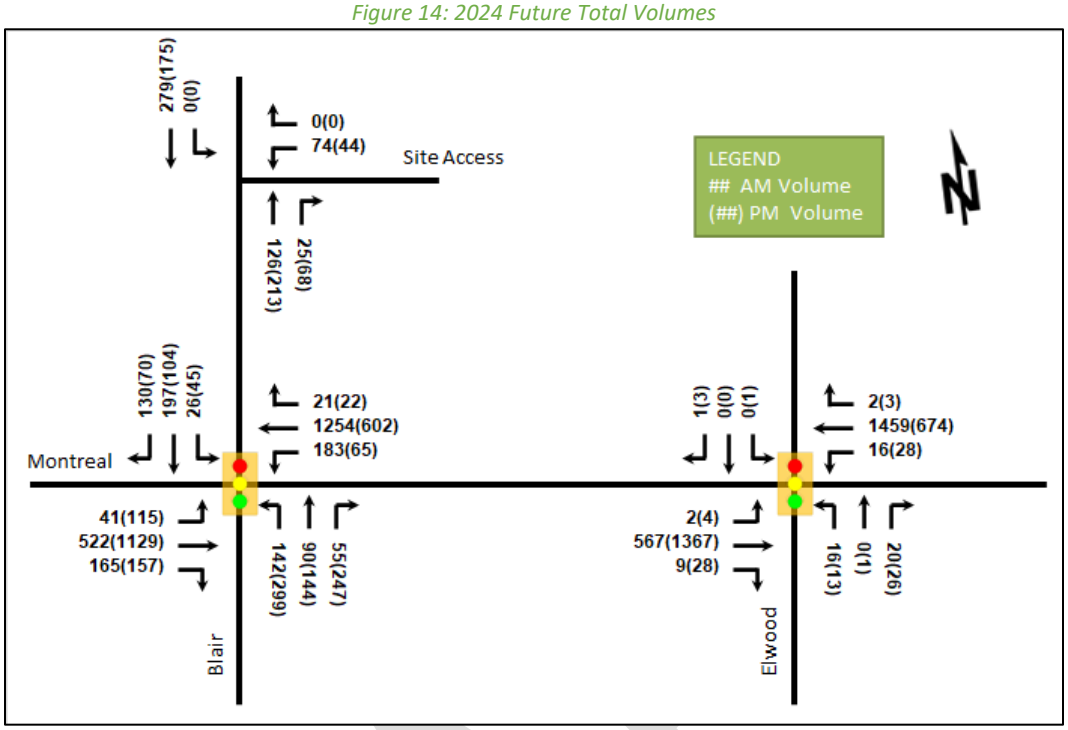


Table 17: 2024 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Montreal Road at Blair Road *Signalized*	EBL	A	0.27	19.9	14.9	A	0.32	18.8	29.1
	EBT	A	0.28	11.8	44.8	B	0.68	20.7	**#122.8**
	EBR	A	0.18	3.0	11.0	A	0.20	7.8	19.4
	WBL	A	0.40	14.9	27.5	A	0.42	34.6	**#24.6**
	WBT	B	0.67	15.3	**#143.4**	A	0.36	17.6	54.3
	WBR	A	0.02	3.6	m0.9	A	0.03	7.4	4.4
	NBL	C	0.78	56.5	35.4	D	0.83	45.7	66.3
	NBT	A	0.20	23.3	18.0	A	0.26	21.2	26.3
	NBR	A	0.13	5.9	6.4	A	0.48	21.5	40.3
	SBL	A	0.09	21.0	7.2	A	0.14	18.8	10.8
	SBT/R	C	0.72	35.7	59.1	A	0.30	15.5	25.4
	Overall	**B**	**0.70**	**18.5**	-	**C**	**0.73**	**21.8**	-
Montreal Road at Elwood Street *Signalized*	EBL	A	0.01	8.0	m0.5	A	0.01	8.0	m0.5
	EBT/R	A	0.23	4.4	24.0	A	0.55	6.5	**#67.1**
	WBL	A	0.03	7.8	4.8	A	0.12	9.9	8.7
	WBT/R	A	0.56	9.6	**#168.9**	A	0.26	6.0	51.7
	NB	A	0.15	11.4	6.2	A	0.16	16.8	8.0
	SB	A	0.00	0.0	0.0	A	0.02	0.0	0.0
	Overall	**A**	**0.53**	**8.2**	-	**A**	**0.53**	**6.6**	-

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00
m = metered queue
# = queue exceeds storage or mid-block length

The network intersection operations for the 2024 future total horizon operate similarly to the 2024 future background conditions. No new capacity issues are noted.

11.2.2 2029 Future Total Network Intersection Operations

The 2029 future total volumes are illustrated in Figure 15 and the network intersection operations are summarized below in Table 18. The level of service for signalized intersections is based on HCM 2010 v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and HCM average delay for unsignalized intersections. The synchro worksheets have been provided in Appendix J.

Figure 15: 2029 Future Total Volumes

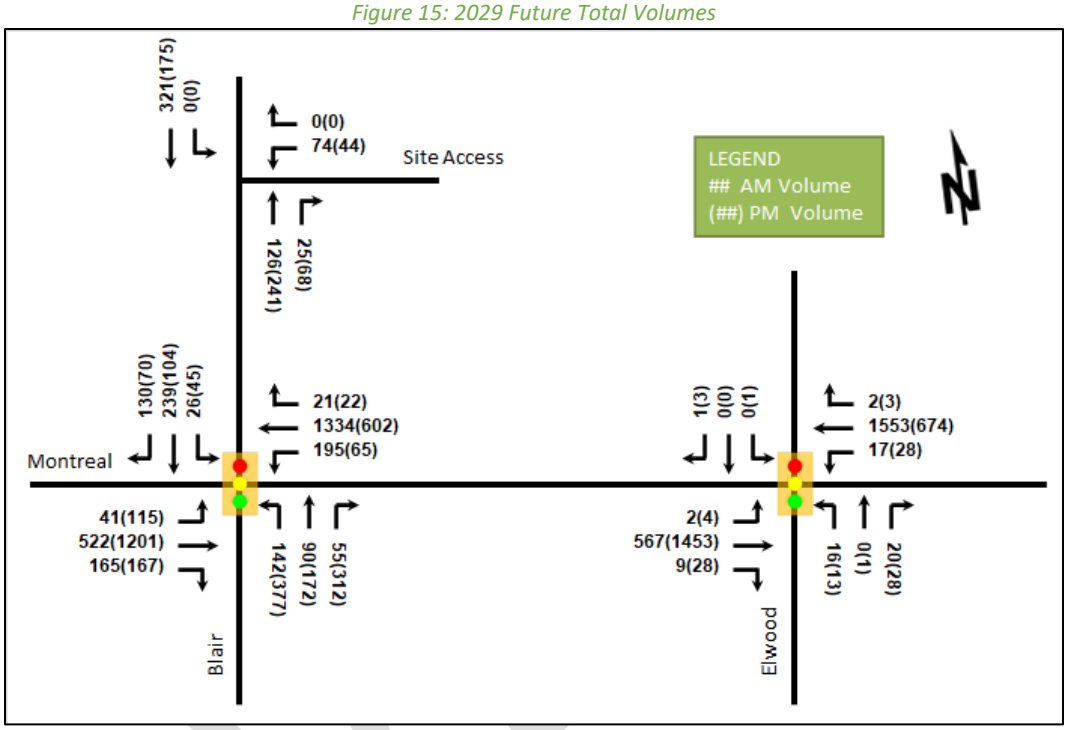


Table 18: 2029 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Montreal Road at Blair Road *Signalized*	EBL	A	0.34	25.9	**#18.8**	A	0.37	22.4	29.5
	EBT	A	0.29	12.7	44.8	C	0.80	27.4	**#143.6**
	EBR	A	0.18	3.1	11.0	A	0.22	3.7	11.2
	WBL	A	0.45	16.2	28.8	B	0.64	59.0	**#30.5**
	WBT	C	0.74	17.7	**#159.3**	A	0.40	20.0	54.3
	WBR	A	0.03	3.6	m0.8	A	0.03	7.5	4.4
	NBL	D	0.81	60.3	37.9	D	0.90	50.6	**#101.3**
	NBT	A	0.18	21.9	18.0	A	0.27	18.8	30.8
	NBR	A	0.12	5.6	6.4	A	0.53	21.0	53.5
	SBL	A	0.08	19.8	7.2	A	0.12	16.5	10.8
	SBT/R	C	0.75	36.5	68.6	A	0.27	13.2	25.4
	Overall	**C**	**0.76**	**20.2**	-	**D**	**0.84**	**25.8**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Montreal Road at Elwood Street *Signalized*	EBL	A	0.01	8.0	m0.5	A	0.01	8.5	m0.5
	EBT/R	A	0.23	4.4	24.0	A	0.59	7.7	#170.5
	WBL	A	0.03	7.8	5.0	A	0.14	10.6	9.1
	WBT/R	A	0.60	10.3	#187.3	A	0.26	6.0	51.7
	NB	A	0.15	11.4	6.2	A	0.17	19.9	9.0
	SB	A	0.00	0.0	0.0	A	0.02	0.0	0.0
	Overall	**A**	**0.56**	**8.8**	-	**A**	**0.56**	**7.5**	-

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00
m = metered queue
# = queue exceeds storage or mid-block length

The network intersection operations for the 2029 future total horizon operate similarly to the 2029 future background conditions. It is noted that the signal timing remains as existing. The intersection of Montreal Road at Blair Road may exhibit extended queuing on the eastbound left movement during the AM peak hour, however the movement is expected to otherwise operate well.

11.2.3 Network Intersection MMLOS

Table 19 summarizes the MMLOS analysis for the network intersections of Montreal Road at Blair Road and Montreal Road at Elwood Street. Per the Montreal-Blair Road Transit Priority Corridor EA Study, the existing and future conditions for both intersections will differ and are considered in separate rows. The intersection analysis is based on the land use designation of "Employment Area" for the intersection of Montreal Road at Blair Road and of "Arterial Main Street" for the intersection of Montreal Road and Elwood Street. The MMLOS worksheets has been provided in Appendix K.

Table 19: Study Area Intersection MMLOS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Montreal Rd & Blair Rd (Ex.)	F	C	E	C	D	C	C	B	B	D
Montreal Rd & Blair Rd (Fut.)	F	C	A	C	B	C	C	B	D	D
Montreal Rd & Elwood St (Ex.)	F	C	E	C	B	C	-	-	A	D
Montreal Rd & Elwood St (Ex.)	E	C	B	C	C	C	-	-	A	D

The MMLOS targets will not be met under the existing conditions for the pedestrian and bicycle LOS at both network intersections and for transit and truck LOS at the intersection of Montreal Road at Blair Road.

Pedestrian LOS will additionally not be met under the planned conditions at both network intersections and the truck LOS will not be met at the intersection of Montreal Road and Blair Road under the future conditions.

The pedestrian level of service would require a maximum of three lanes at a crossing to meet a LOS C. Based upon the nature of arterial roadways the pedestrian LOS cannot be met at this intersection.

The truck LOS would require two receiving lanes on the south leg of the intersection of Montreal Road at Blair Road. The truck LOS targets are also higher for its land use designation than for the overridden land use designation of "Arterial Main Street" whose targets would be met by the intersection geometry. Furthermore, the employment area has major accesses onto Montreal Road and Ogilvie Road, and therefore the high targets for the intersection with Blair Road may be unnecessarily high given this arrangement.

Finally, as the City is currently redesigning the intersection as part of the ongoing EA study, it is assumed that these LOS scores meet the City's design objectives.

11.2.4 Recommended Design Elements

A review of the turn lane storage lengths was requested by the City within this TIA. As such, the turn lane storage length considerations at the intersection of Montreal Road and Blair Road are summarized in Table 20. The calculations are based both upon the equation 9.14.1 from Chapter 9 of the Geometric Design Guide for Canadian Roads manual (TAC, 2017) and the storage length calculation from the TIA guidelines assuming a 90 second cycle length along with the potential increase in storage required to meet the minimums.

Table 20: Turn Lane Storage Analysis

Movement	Existing Lane Length (m)	AM Peak Hour			PM Peak Hour		
		Length Per TIA Guidelines (m)	Length Per TAC Manual (m)	Potential Nominal Storage Length (m)	Length Per TIA Guidelines (m)	Length Per TAC Manual (m)	Potential Nominal Storage Length (m)
NBL	90	37.3	33.1	-	78.5	69.8	-
NBR	40	14.4	12.8	-	64.8	57.6	65
SBL	30	6.8	6.1	-	11.8	10.5	-
SBR	0	34.1	30.3	35	18.4	16.3	20
EBL	60	10.8	9.6	-	30.2	26.8	-
EBR	100	43.3	38.5	-	41.2	36.6	-
WBL	65	48.0	42.7	-	17.1	15.2	-
WBR	15	5.5	4.9	-	5.8	5.1	-

All minimum turn-lane storage lengths are met by the existing auxiliary lane lengths except for the northbound right-turn lane which site-generated traffic is not forecasted to impact. The northbound right-turn movement is anticipated by 2024 to require a 65-metre storage length per the TIA guidelines and the planned lane length is approximately 35 metres per the current Montreal-Blair Road Corridor Transit Priority EA Study recommendations.

These current recommendations are presently being reviewed by the City and notably do not provide a southbound right-turn lane. The satisfactory operational performance of the movement supports the decision for the exclusion of this dedicated turn lane within the design. It is noteworthy that the site-generated traffic accounts for just under 14% of the forecasted future total volumes on this movement, and that absent the site volumes, the nominal storage length per the TIA guidelines would be 30 metres, a difference of five metres. The inclusion of a southbound right-turn lane is not recommended or required to support the subject development.

12 Summary of Improvements Indicated and Modifications Options

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

Proposed Site and Screening

- The site is currently zoned as AM10 and R3K
- The proposed site includes 243 high-rise dwelling units and 8,320 ft^2 of ground floor commercial use
- Accesses is proposed onto Blair Road via a full-moves access
- The development is proposed to be completed as a single phase by 2024
- The Trip Generation, Location, and Safety triggers were met for the TIA Screening
- This TIA accompanies a zoning by-law amendment

Existing Conditions

- Montreal Road and Blair Road are arterial roads in the study area Where Blair Road is a major collector road north of Montreal Road
- Sidewalks are provided along both sides of Montreal Road and along the east side of Blair Road, and cycling facilities include paved shoulders on Blair Road, where Montreal Road and Blair Road are spine routes
- The high volumes roadways have produced a high number of collisions at the intersection of Montreal Road and Blair Road
- The collisions are predominantly rear end and turning collisions suggesting that they may be influenced by congestion and the turn channels
- Some queueing is noted at on the peak directional through movements at both study area intersections during both peak hours

Development Generated Travel Demand

- The proposed development is forecasted produce 168 two-way people trips during the AM peak hour and 206 two-way people trips during the PM peak hour
- Of the forecasted people trips, 98 two-way trips will be vehicle trips during the AM peak hour and 112 two-way trips will be vehicle trips during the PM peak hour based on a 60% auto modal share target
- Of the forecasted trips, 5% are anticipated to travel north, 30% to travel south, 20% to travel east, and 45% to travel west

Background Conditions

- No background developments were explicitly included in the background conditions, and a total background growth of 1.25% westbound on Montreal Road and 4.75% southbound on Blair Road in the AM peak hour were applied and to mainline volumes and major turning movements, reversed in the PM peak
- The study area intersections at both horizons will operate similarly to the existing conditions

TDM

- Supportive TDM measures to be included within the proposed development should include:
  - Designate a program coordinator
  - Display local area pedestrian, cycling, and transit information at building entrances
  - Provide a multimodal travel option information package
  - Contract with provider to install on-site micromobility station
  - Inclusion of a 1-year Presto card for first time new townhome purchase and apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
  - Unbundle parking cost from purchase or rental costs

NTM

- The major collector thresholds on Blair Road are not exceeded with the 2029 future total traffic

Transit

- 25 outbound AM peak hour transit trips and 17 inbound PM peak hour transit trips are anticipated

- To meet forecasted transit use, a maximum of one single higher order bus in the peak direction/hour should be required
- No transit priority considerations are required at build-out and future transit priority is not anticipated to be impacted as a result of development

Network Intersection Design

- Generally, the network intersections will operate similarly to the background conditions at both horizons
- Despite the planned improvements, the MMLOS targets will not be met for the pedestrian LOS at both network intersections and the truck LOS at the intersection of Montreal Road at Blair Road
- The pedestrian crossings would be required to be reduced to three or fewer lanes to meet LOS targets, and the south leg of the intersection of Montreal Road and Blair road would require two receiving lanes to meet truck LOS
- A southbound left-turn lane has not been included within the current transit priority EA study design and may be warranted under existing conditions, however is not recommended or required to support the development
- The northbound right-turn lane may not have adequate storage under planned conditions

13 Next Steps

Following the circulation and review of the TIA, any outstanding comments will be documents within the context of the zoning by-law amendment in the Step 4 Strategy Report. Once remaining TIA Steps are completed and sign-off has been received from City Transportation Project Manager, a signed and stamped final report will be provided to City staff.

Appendix A

TIA Screening Form and PM Certification Form

13 Markham Avenue
Ottawa ON K2G 3Z1

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: 16-Feb-20
Project Number: 2021-003
Project Reference: 1649 Montreal

1.1 Description of Proposed Development	
Municipal Address	1649 Montreal Road, 741 Blair Road
Description of Location	Northeast corner of Blair Road at Montreal Road
Land Use Classification	Arterial Mainstreet (AM10[2199]), Residential Third (R3K[1631])
Development Size	216 Units
Accesses	One all moves onto Blair Road, loading/garbage access onto Montreal Road, both at existing
Phase of Development	One phase
Buildout Year	2024
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Townhomes or apartments	
Development Size	216	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	Existing access onto Montreal Road / Blair Road Spine routes
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	Yes	Montreal Arterial Mainstreet DPA
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)?	No	Existing driveway within proximity to Montreal Road at Blair Road
Is the proposed driveway within auxiliary lanes of an intersection?	No	Existing garbage/loading access proposed within the taper of the auxiliary WBR on Montreal Rd at Blair Rd
Does the proposed driveway make use of an existing median break that serves an existing site?	No	
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	Yes	Montreal Rd at Blair Rd: 37 Collisions 2015-2019
Does the development include a drive-thru facility?	No	
Safety Trigger	Yes	

TIA Plan Reports

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

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

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

CERTIFICATION

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

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

City Of Ottawa
Infrastructure Services and Community Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
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Fax: 613-560-6006

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

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

Name: _____Andrew Harte_____
(Please Print)

Professional Title: _____Professional Engineer_____

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

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

Appendix B

Turning Movement Counts

Transportation Services - Traffic Services

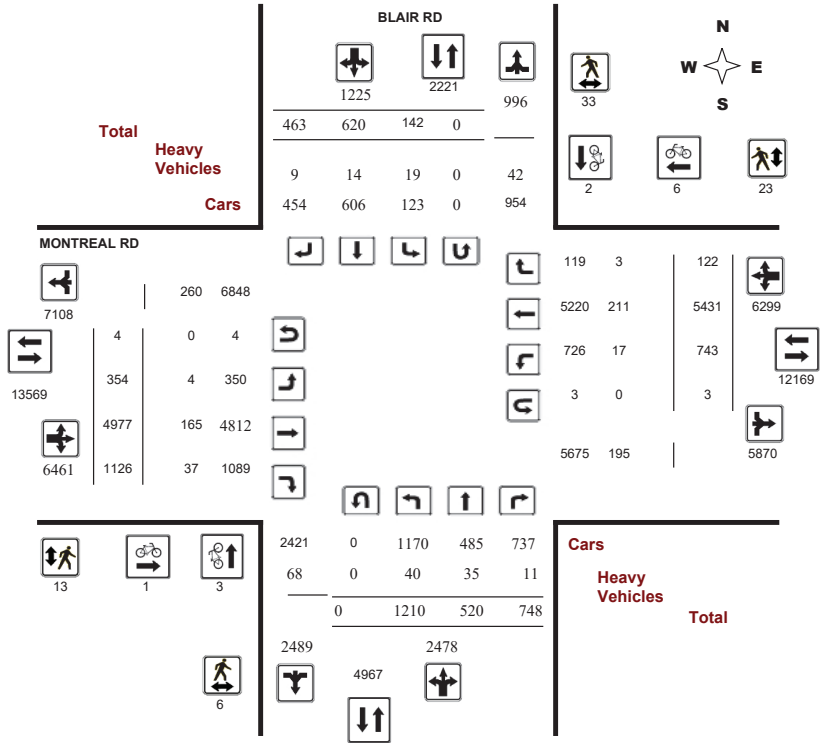
Turning Movement Count - Study Results

BLAIR RD @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38125

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

Full Study Diagram



Transportation Services - Traffic Services

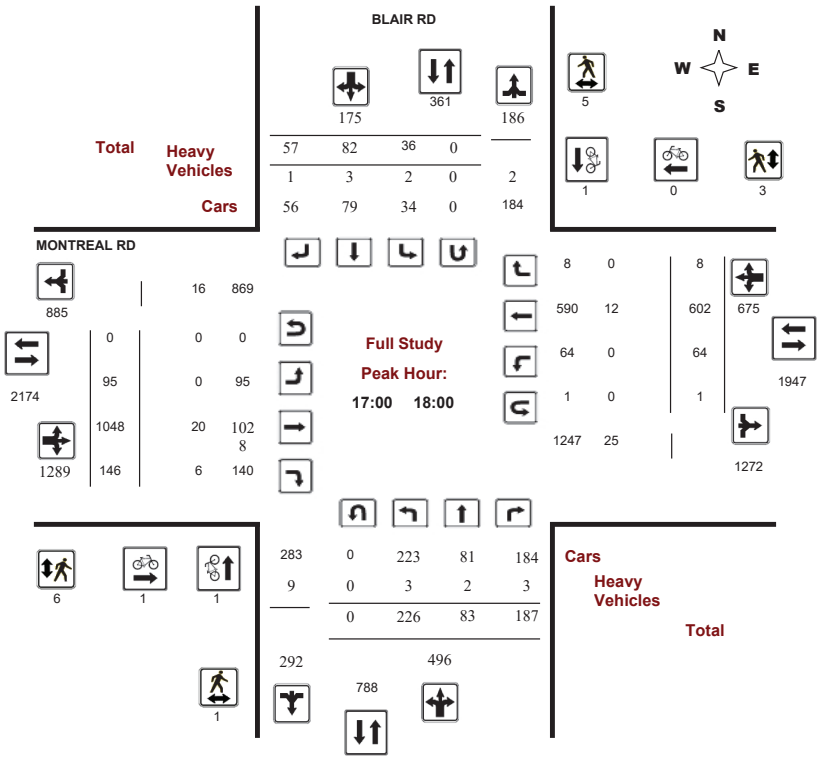
Turning Movement Count - Study Results

BLAIR RD @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38125

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

Full Study Peak Hour Diagram



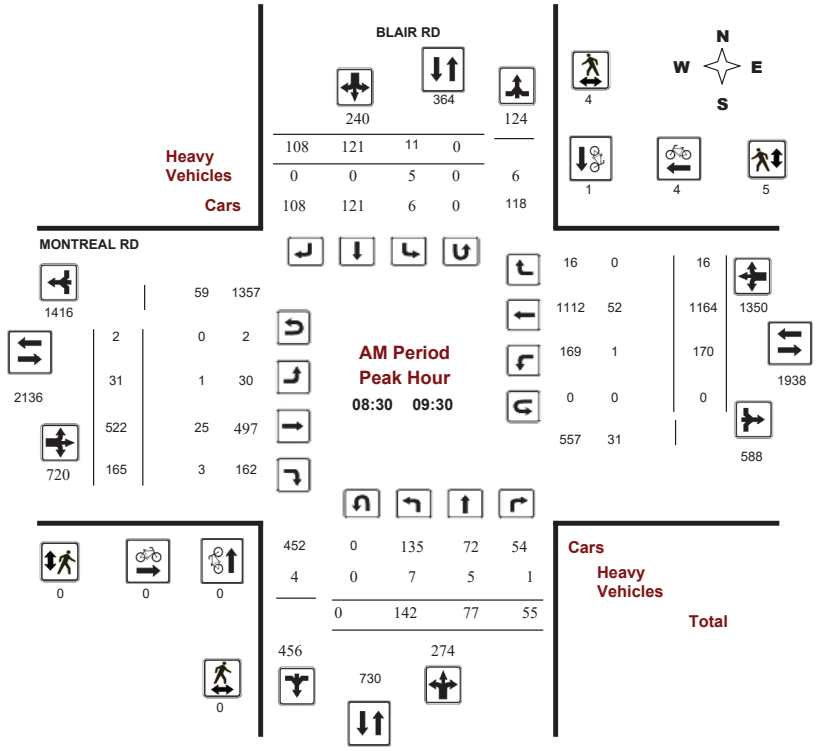
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BLAIR RD @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38125

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



Comments

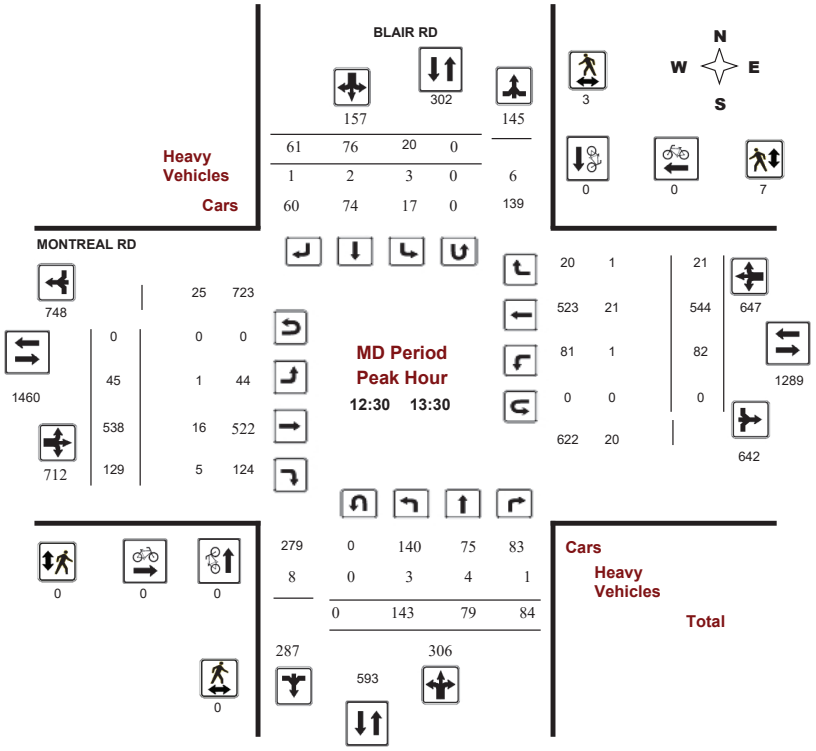
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BLAIR RD @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38125

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



Comments

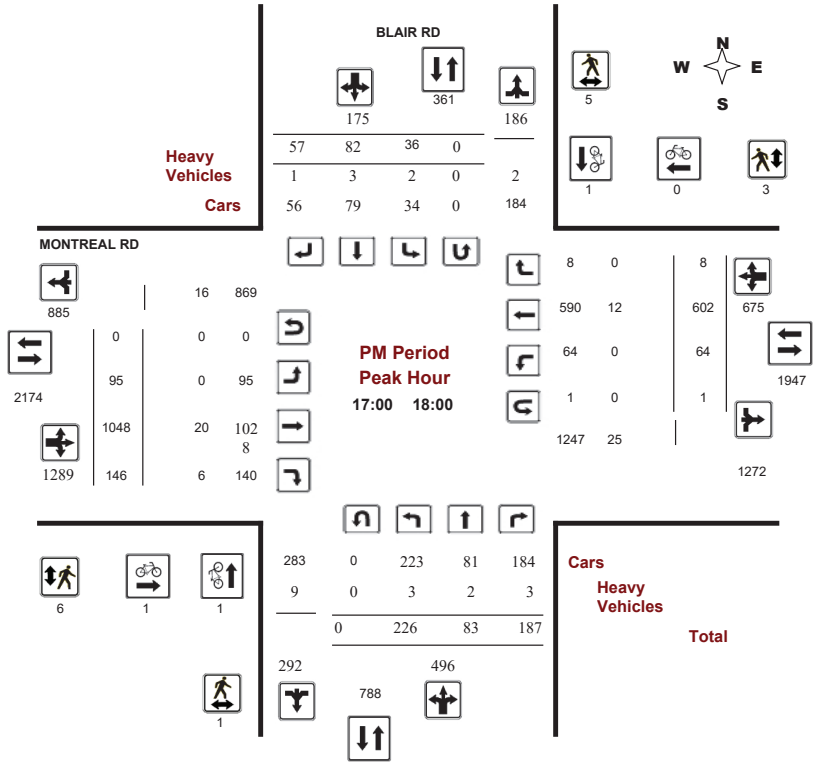
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BLAIR RD @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38125

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



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BLAIR RD @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38125

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

Full Study Summary (8 HR Standard)

Survey Date: Thursday, November 15, 2018

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 4 Westbound: 3

AADT Factor .90

	BLAIR RD								MONTREAL 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	79	41	26	**146**	2	30	25	**57**	**203**	14	228	113	**355**	51	465	10	**526**	**881**	**1084**
08:00 09:00	154	67	51	**272**	12	93	89	**194**	**466**	27	491	137	**655**	162	1086	24	**1272**	**1927**	**2393**
09:00 10:00	136	82	55	**273**	16	105	74	**195**	**468**	36	520	196	**752**	144	994	20	**1158**	**1910**	**2378**
11:30 12:30	100	48	65	**213**	14	91	47	**152**	**365**	32	544	128	**704**	70	526	12	**608**	**1312**	**1677**
12:30 13:30	143	79	84	**306**	20	76	61	**157**	**463**	45	538	129	**712**	82	544	21	**647**	**1359**	**1822**
15:00 16:00	128	64	96	**288**	15	64	49	**128**	**416**	41	720	145	**906**	93	572	14	**679**	**1585**	**2001**
16:00 17:00	244	56	184	**484**	27	79	61	**167**	**651**	64	888	132	**1084**	77	642	13	**732**	**1816**	**2467**
17:00 18:00	226	83	187	**496**	36	82	57	**175**	**671**	95	1048	146	**1289**	64	602	8	**674**	**1963**	**2634**
Sub Total	1210	520	748	**2478**	142	620	463	**1225**	**3703**	354	4977	1126	**6457**	743	5431	122	**6296**	**12753**	**16456**
U Turns	0			**0**	0			**0**	**0**	**4**			**4**	3			**3**	**7**	**7**
Total	1210	520	748	**2478**	142	620	463	**1225**	**3703**	358	4977	1126	**6461**	746	5431	122	**6299**	**12760**	**16463**
EQ 12Hr	1682	723	1040	**3445**	197	862	644	**1703**	**5148**	498	6918	1565	**8981**	1037	7549	170	**8756**	**17737**	**22885**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	1514	651	936	**3101**	177	776	580	**1533**	**4634**	448	6226	1408	**8082**	933	6794	153	**7880**	**15962**	**20596**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**.90**					
AVG 24Hr	1983	853	1226	**4062**	232	1017	760	**2009**	**6071**	587	8156	1844	**10587**	1222	8900	200	**10322**	**20909**	**26980**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

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

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BLAIR RD @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38125

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

Full Study 15 Minute Increments

		BLAIR RD									MONTREAL 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	9	4	6	19	0	1	1	2	**21**	1	32	21	54	8	52	1	61	**115**	**136**
07:15	07:30	15	10	13	38	0	7	3	10	**48**	4	56	13	73	12	110	1	123	**196**	**244**
07:30	07:45	31	9	3	43	1	11	10	22	**65**	3	73	35	111	12	127	2	141	**252**	**317**
07:45	08:00	24	18	4	46	1	11	11	23	**69**	6	67	44	117	21	176	6	203	**320**	**389**
08:00	08:15	39	13	4	56	4	14	18	36	**92**	8	90	30	128	35	218	11	264	**392**	**484**
08:15	08:30	39	18	14	71	2	18	9	29	**100**	4	115	34	153	34	264	5	303	**456**	**556**
08:30	08:45	42	16	15	73	3	29	22	54	**127**	7	129	35	171	43	287	2	332	**503**	**630**
08:45	09:00	34	20	18	72	3	32	40	75	**147**	9	157	38	204	50	317	6	373	**577**	**724**
09:00	09:15	29	17	9	55	2	28	24	54	**109**	10	96	44	150	34	303	3	340	**490**	**599**
09:15	09:30	37	24	13	74	3	32	22	57	**131**	7	140	48	195	43	257	5	305	**500**	**631**
09:30	09:45	32	24	13	69	7	21	14	42	**111**	11	150	48	209	39	209	5	253	**462**	**573**
09:45	10:00	38	17	20	75	4	24	14	42	**117**	9	134	56	199	28	225	7	260	**459**	**576**
11:30	11:45	16	6	10	32	4	34	15	53	**85**	6	131	39	176	21	130	7	158	**334**	**419**
11:45	12:00	33	17	13	63	5	19	12	36	**99**	10	135	28	173	13	136	1	150	**323**	**422**
12:00	12:15	28	14	19	61	4	17	12	33	**94**	8	139	31	178	15	132	1	148	**326**	**420**
12:15	12:30	23	11	23	57	1	21	8	30	**87**	9	139	30	178	21	128	3	152	**330**	**417**
12:30	12:45	32	20	13	65	5	22	14	41	**106**	7	122	37	166	22	124	5	151	**317**	**423**
12:45	13:00	40	18	11	69	6	19	13	38	**107**	11	147	26	184	18	123	5	146	**330**	**437**
13:00	13:15	40	23	32	95	4	23	18	45	**140**	16	140	36	192	21	136	3	160	**352**	**492**
13:15	13:30	31	18	28	77	5	12	16	33	**110**	11	129	30	170	21	161	8	190	**360**	**470**
15:00	15:15	28	23	23	74	2	18	9	29	**103**	9	179	32	220	16	113	3	132	**352**	**455**
15:15	15:30	30	10	29	69	5	14	16	35	**104**	9	153	27	189	24	118	4	146	**335**	**439**
15:30	15:45	35	15	17	67	3	14	13	30	**97**	11	193	44	248	29	171	4	204	**452**	**549**
15:45	16:00	35	16	27	78	5	18	11	34	**112**	12	195	42	249	24	170	3	197	**446**	**558**
16:00	16:15	72	12	44	128	3	17	15	35	**163**	16	239	37	292	31	167	1	199	**491**	**654**
16:15	16:30	63	13	40	116	11	17	16	44	**160**	10	211	29	250	17	155	2	174	**424**	**584**
16:30	16:45	45	15	54	114	7	19	14	40	**154**	16	223	39	278	16	153	4	173	**451**	**605**
16:45	17:00	64	16	46	126	6	26	16	48	**174**	23	215	27	265	13	167	6	186	**451**	**625**
17:00	17:15	59	9	52	120	11	28	16	55	**175**	16	292	45	353	13	139	0	152	**505**	**680**
17:15	17:30	54	22	48	124	9	22	15	46	**170**	23	262	37	322	12	160	2	174	**496**	**666**
17:30	17:45	55	26	50	131	8	9	13	30	**161**	23	256	29	308	19	144	3	166	**474**	**635**
17:45	18:00	58	26	37	121	8	23	13	44	**165**	33	238	35	306	21	159	3	183	**489**	**654**
Total:		1210	520	748	2478	142	620	463	1225	**3703**	358	4977	1126	6461	746	5431	122	6299	**3703**	**16,463**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BLAIR RD @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38125

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

Full Study Cyclist Volume

		BLAIR RD			MONTREAL RD			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	**0**	0	0	**0**	**0**
07:15	07:30	0	0	**0**	0	0	**0**	**0**
07:30	07:45	0	0	**0**	0	0	**0**	**0**
07:45	08:00	0	0	**0**	0	0	**0**	**0**
08:00	08:15	0	0	**0**	0	0	**0**	**0**
08:15	08:30	0	0	**0**	0	0	**0**	**0**
08:30	08:45	0	0	**0**	0	2	**2**	**2**
08:45	09:00	0	1	**1**	0	2	**2**	**3**
09:00	09:15	0	0	**0**	0	0	**0**	**0**
09:15	09:30	0	0	**0**	0	0	**0**	**0**
09:30	09:45	0	0	**0**	0	0	**0**	**0**
09:45	10:00	0	0	**0**	0	0	**0**	**0**
11:30	11:45	0	0	**0**	0	0	**0**	**0**
11:45	12:00	0	0	**0**	0	0	**0**	**0**
12:00	12:15	0	0	**0**	0	0	**0**	**0**
12:15	12:30	2	0	**2**	0	2	**2**	**4**
12:30	12:45	0	0	**0**	0	0	**0**	**0**
12:45	13:00	0	0	**0**	0	0	**0**	**0**
13:00	13:15	0	0	**0**	0	0	**0**	**0**
13:15	13:30	0	0	**0**	0	0	**0**	**0**
15:00	15:15	0	0	**0**	0	0	**0**	**0**
15:15	15:30	0	0	**0**	0	0	**0**	**0**
15:30	15:45	0	0	**0**	0	0	**0**	**0**
15:45	16:00	0	0	**0**	0	0	**0**	**0**
16:00	16:15	0	0	**0**	0	0	**0**	**0**
16:15	16:30	0	0	**0**	0	0	**0**	**0**
16:30	16:45	0	0	**0**	0	0	**0**	**0**
16:45	17:00	0	0	**0**	0	0	**0**	**0**
17:00	17:15	0	1	**1**	0	0	**0**	**1**
17:15	17:30	0	0	**0**	0	0	**0**	**0**
17:30	17:45	1	0	**1**	0	0	**0**	**1**
17:45	18:00	0	0	**0**	1	0	**1**	**1**
Total		3	2	**5**	1	6	**7**	**12**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BLAIR RD @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38125

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

Full Study Pedestrian Volume

Time Period	BLAIR RD NB Approach (E or W Crossing)	BLAIR RD SB Approach (E or W Crossing)	BLAIR RD Total	MONTREAL RD EB Approach (N or S Crossing)	MONTREAL RD WB Approach (N or S Crossing)	MONTREAL RD Total	Grand Total
07:00 07:15	0	0	**0**	0	0	**0**	**0**
07:15 07:30	1	0	**1**	1	0	**1**	**2**
07:30 07:45	0	1	**1**	0	0	**0**	**1**
07:45 08:00	0	1	**1**	0	1	**1**	**2**
08:00 08:15	0	1	**1**	0	0	**0**	**1**
08:15 08:30	0	1	**1**	0	1	**1**	**2**
08:30 08:45	0	0	**0**	0	0	**0**	**0**
08:45 09:00	0	2	**2**	0	2	**2**	**4**
09:00 09:15	0	1	**1**	0	1	**1**	**2**
09:15 09:30	0	1	**1**	0	2	**2**	**3**
09:30 09:45	1	2	**3**	2	0	**2**	**5**
09:45 10:00	0	2	**2**	1	2	**3**	**5**
11:30 11:45	0	1	**1**	0	0	**0**	**1**
11:45 12:00	0	0	**0**	0	0	**0**	**0**
12:00 12:15	0	3	**3**	0	0	**0**	**3**
12:15 12:30	0	0	**0**	0	1	**1**	**1**
12:30 12:45	0	2	**2**	0	3	**3**	**5**
12:45 13:00	0	0	**0**	0	1	**1**	**1**
13:00 13:15	0	1	**1**	0	1	**1**	**2**
13:15 13:30	0	0	**0**	0	2	**2**	**2**
15:00 15:15	0	3	**3**	1	0	**1**	**4**
15:15 15:30	1	0	**1**	0	0	**0**	**1**
15:30 15:45	0	0	**0**	0	1	**1**	**1**
15:45 16:00	0	0	**0**	0	0	**0**	**0**
16:00 16:15	0	1	**1**	0	0	**0**	**1**
16:15 16:30	0	1	**1**	1	0	**1**	**2**
16:30 16:45	1	1	**2**	1	0	**1**	**3**
16:45 17:00	1	3	**4**	0	2	**2**	**6**
17:00 17:15	0	3	**3**	3	1	**4**	**7**
17:15 17:30	0	0	**0**	0	0	**0**	**0**
17:30 17:45	1	1	**2**	2	1	**3**	**5**
17:45 18:00	0	1	**1**	1	1	**2**	**3**
Total	6	33	**39**	13	23	**36**	**75**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BLAIR RD @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38125

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

Full Study Heavy Vehicles

Time Period		BLAIR RD Northbound LT	ST	RT	N TOT	BLAIR RD Southbound LT	ST	RT	S TOT	STR TOT	MONTREAL RD Eastbound LT	ST	RT	E TOT	MONTREAL RD Westbound LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	1	0	1	**2**	0	0	0	**0**	**2**	0	1	1	**2**	1	3	0	**4**	**6**	**8**
07:15	07:30	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	2	0	**2**	**2**	**2**
07:30	07:45	0	2	0	**2**	1	0	0	**1**	**3**	0	4	0	**4**	0	2	1	**3**	**7**	**10**
07:45	08:00	1	0	0	**1**	0	0	0	**0**	**1**	0	0	0	**0**	0	3	0	**3**	**3**	**4**
08:00	08:15	3	3	0	**6**	1	0	0	**1**	**7**	0	3	1	**4**	2	8	0	**10**	**14**	**21**
08:15	08:30	3	2	0	**5**	2	1	0	**3**	**8**	0	2	1	**3**	1	13	0	**14**	**17**	**25**
08:30	08:45	1	1	1	**3**	1	0	0	**1**	**4**	0	5	1	**6**	0	13	0	**13**	**19**	**23**
08:45	09:00	3	2	0	**5**	2	0	0	**2**	**7**	0	8	1	**9**	0	13	0	**13**	**22**	**29**
09:00	09:15	0	2	0	**2**	1	0	0	**1**	**3**	1	3	0	**4**	0	13	0	**13**	**17**	**20**
09:15	09:30	3	0	0	**3**	1	0	0	**1**	**4**	0	9	1	**10**	1	13	0	**14**	**24**	**28**
09:30	09:45	0	2	0	**2**	2	0	1	**3**	**5**	0	9	0	**9**	1	9	0	**10**	**19**	**24**
09:45	10:00	2	1	0	**3**	1	0	0	**1**	**4**	0	6	2	**8**	1	10	0	**11**	**19**	**23**
11:30	11:45	1	0	2	**3**	0	2	0	**2**	**5**	0	4	0	**4**	0	3	0	**3**	**7**	**12**
11:45	12:00	5	4	0	**9**	0	1	0	**1**	**10**	0	5	1	**6**	0	4	0	**4**	**10**	**20**
12:00	12:15	2	2	0	**4**	0	2	0	**2**	**6**	0	8	1	**9**	0	3	0	**3**	**12**	**18**
12:15	12:30	0	0	0	**0**	0	0	0	**0**	**0**	0	8	1	**9**	0	7	1	**8**	**17**	**17**
12:30	12:45	0	0	0	**0**	1	2	1	**4**	**4**	0	7	1	**8**	1	6	0	**7**	**15**	**19**
12:45	13:00	3	1	0	**4**	1	0	0	**1**	**5**	0	1	1	**2**	0	6	0	**6**	**8**	**13**
13:00	13:15	0	1	0	**1**	0	0	0	**0**	**1**	1	2	2	**5**	0	5	0	**5**	**10**	**11**
13:15	13:30	0	2	1	**3**	1	0	0	**1**	**4**	0	6	1	**7**	0	4	1	**5**	**12**	**16**
15:00	15:15	4	1	0	**5**	0	0	0	**0**	**5**	1	9	1	**11**	3	7	0	**10**	**21**	**26**
15:15	15:30	0	1	1	**2**	0	0	0	**0**	**2**	0	4	1	**5**	2	6	0	**8**	**13**	**15**
15:30	15:45	0	1	0	**1**	0	1	2	**3**	**4**	0	11	3	**14**	1	10	0	**11**	**25**	**29**
15:45	16:00	0	1	0	**1**	0	2	2	**4**	**5**	0	7	2	**9**	0	11	0	**11**	**20**	**25**
16:00	16:15	2	0	1	**3**	0	0	1	**1**	**4**	0	5	2	**7**	3	9	0	**12**	**19**	**23**
16:15	16:30	1	2	0	**3**	1	0	0	**1**	**4**	0	6	2	**8**	0	6	0	**6**	**14**	**18**
16:30	16:45	0	2	0	**2**	0	0	1	**1**	**3**	0	8	2	**10**	0	7	0	**7**	**17**	**20**
16:45	17:00	2	0	1	**3**	1	0	0	**1**	**4**	1	4	2	**7**	0	3	0	**3**	**10**	**14**
17:00	17:15	1	0	2	**3**	0	1	1	**2**	**5**	0	7	3	**10**	0	4	0	**4**	**14**	**19**
17:15	17:30	2	1	1	**4**	1	0	0	**1**	**5**	0	4	1	**5**	0	3	0	**3**	**8**	**13**
17:30	17:45	0	0	0	**0**	0	0	0	**0**	**0**	0	6	2	**8**	0	4	0	**4**	**12**	**12**
17:45	18:00	0	1	0	**1**	1	2	0	**3**	**4**	0	3	0	**3**	0	1	0	**1**	**4**	**8**
Total:	None	40	35	11	**86**	19	14	9	**42**	**128**	4	165	37	**206**	17	211	3	**231**	**437**	**565**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BLAIR RD @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38125

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

Full Study 15 Minute U-Turn Total

Time Period		BLAIR RD Northbound U-Turn Total	BLAIR RD Southbound U-Turn Total	MONTREAL RD Eastbound U-Turn Total	MONTREAL RD Westbound U-Turn Total	Total
07:00	07:15	0	0	0	1	**1**
07:15	07:30	0	0	0	0	**0**
07:30	07:45	0	0	0	0	**0**
07:45	08:00	0	0	0	1	**1**
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	1	0	**1**
09:00	09:15	0	0	1	0	**1**
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	1	0	**1**
12:30	12:45	0	0	0	0	**0**
12:45	13:00	0	0	0	0	**0**
13:00	13:15	0	0	0	0	**0**
13:15	13:30	0	0	0	0	**0**
15:00	15:15	0	0	0	0	**0**
15:15	15:30	0	0	0	0	**0**
15:30	15:45	0	0	0	0	**0**
15:45	16:00	0	0	0	0	**0**
16:00	16:15	0	0	0	0	**0**
16:15	16:30	0	0	0	0	**0**
16:30	16:45	0	0	1	0	**1**
16:45	17:00	0	0	0	0	**0**
17:00	17:15	0	0	0	0	**0**
17:15	17:30	0	0	0	0	**0**
17:30	17:45	0	0	0	1	**1**
17:45	18:00	0	0	0	0	**0**
Total		0	0	4	3	**7**

Transportation Services - Traffic Services

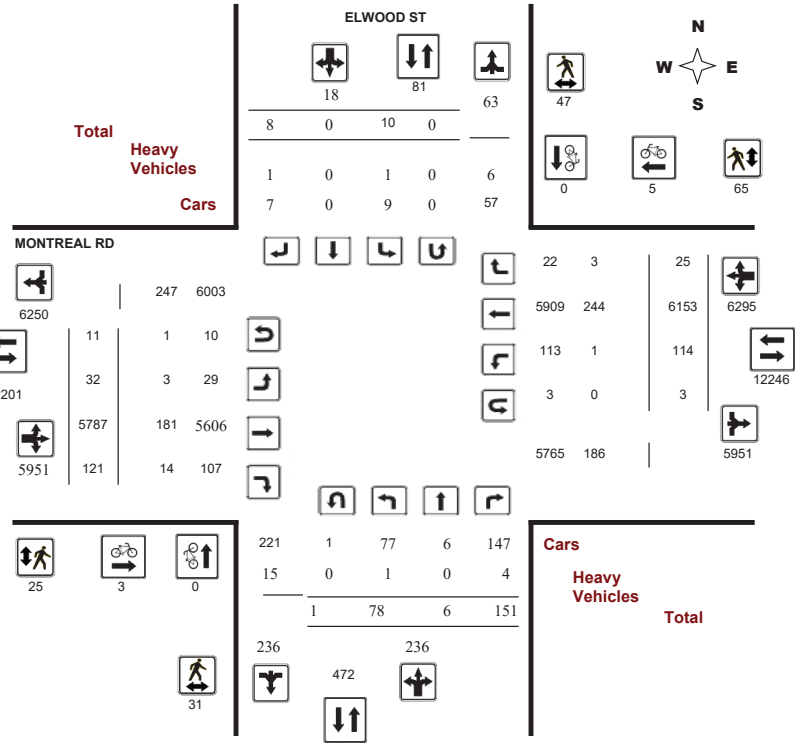
Turning Movement Count - Study Results

ELWOOD ST @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38124

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

Full Study Diagram



Transportation Services - Traffic Services

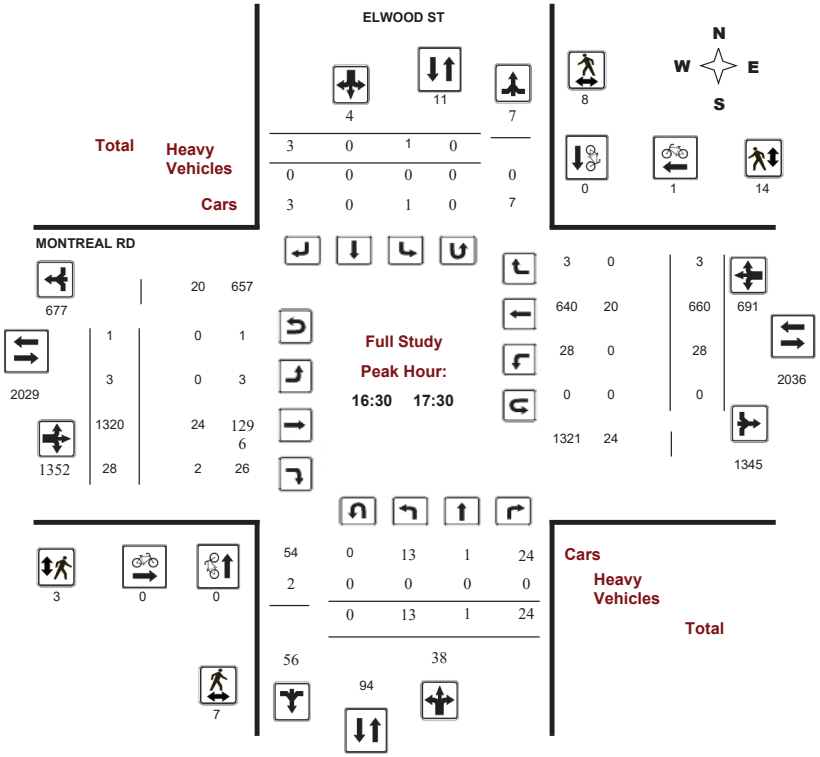
Turning Movement Count - Study Results

ELWOOD ST @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38124

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

Full Study Peak Hour Diagram



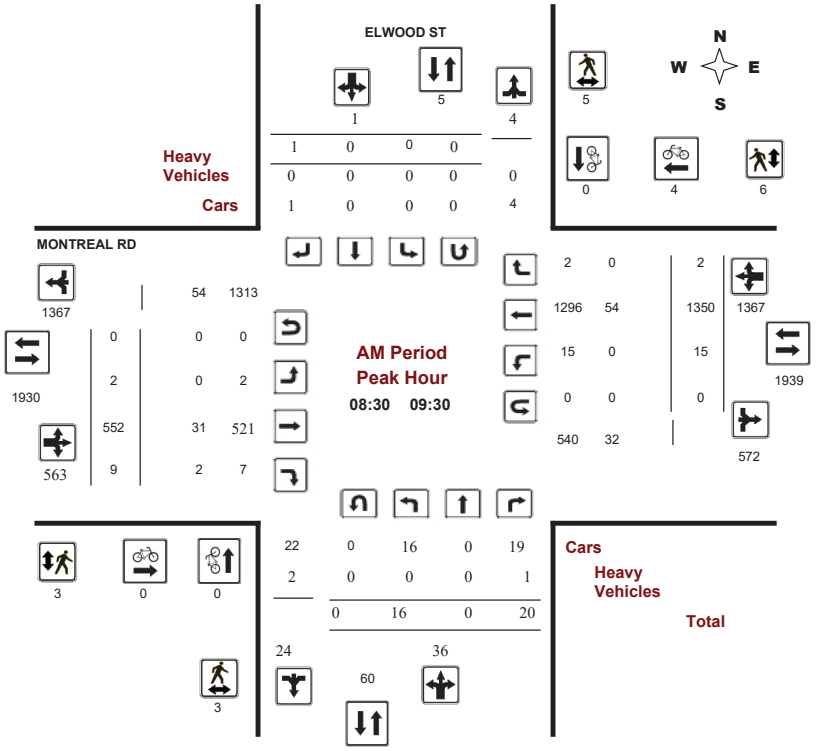
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ELWOOD ST @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38124

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



Comments

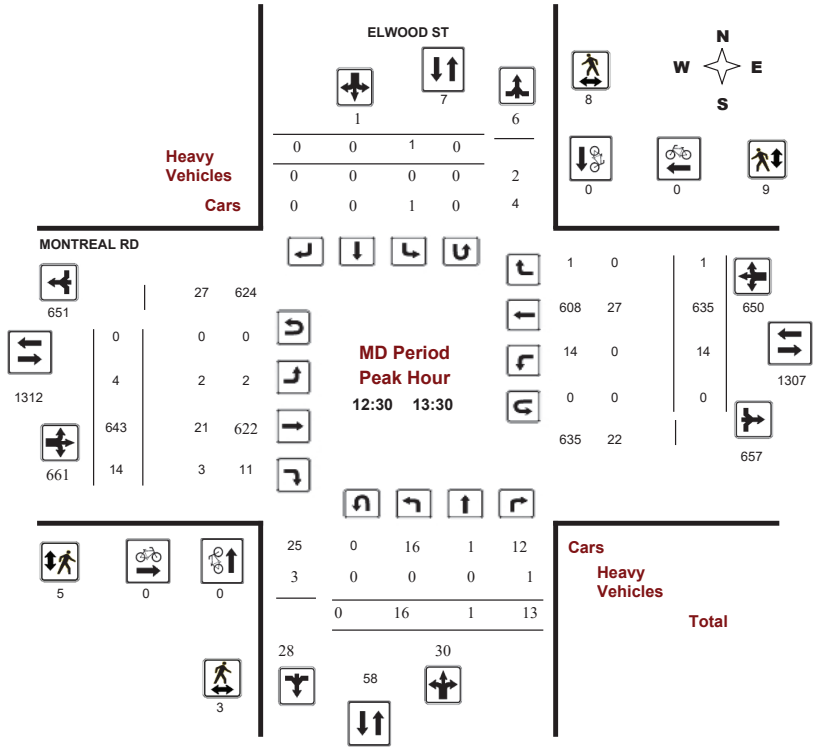
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ELWOOD ST @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38124

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



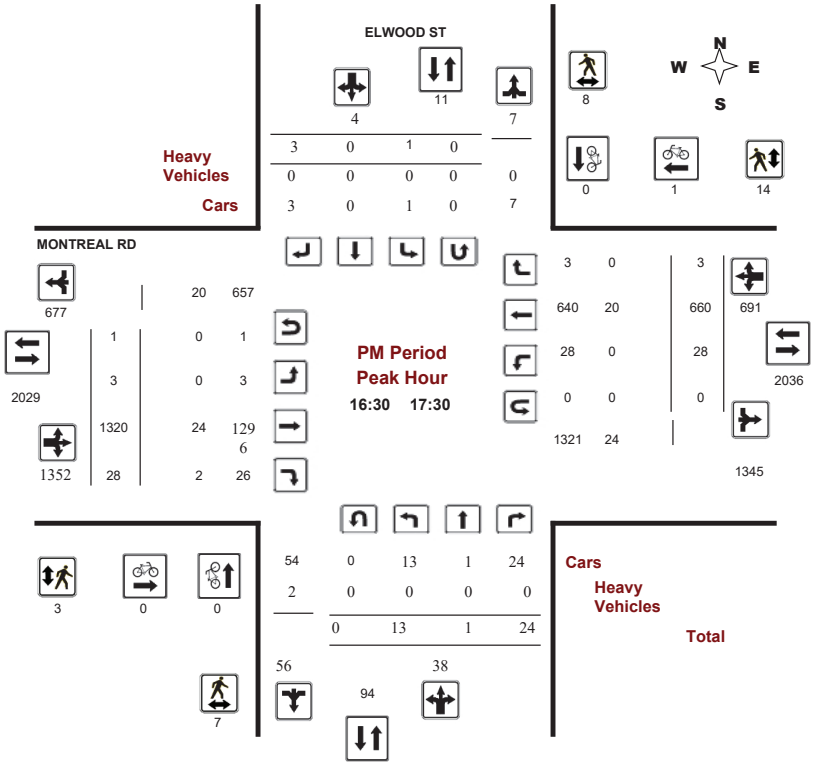
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ELWOOD ST @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38124

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



Transportation Services - Traffic Services

Turning Movement Count - Study Results

ELWOOD ST @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38124

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

Full Study Summary (8 HR Standard)

Survey Date: Thursday, November 15, 2018

Total Observed U-Turns

Northbound: 1 Southbound: 0

Eastbound: 11 Westbound: 3

AADT Factor .90

	ELWOOD ST								MONTREAL 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	2	1	6	**9**	0	0	0	**0**	**9**	8	198	5	**211**	1	460	5	**466**	**677**	**686**
08:00 09:00	9	0	17	**26**	0	0	1	**1**	**27**	1	468	9	**478**	4	1265	2	**1271**	**1749**	**1776**
09:00 10:00	9	0	20	**29**	0	0	1	**1**	**30**	2	562	8	**572**	22	1188	1	**1211**	**1783**	**1813**
11:30 12:30	5	0	20	**25**	0	0	0	**0**	**25**	0	592	8	**600**	16	600	2	**618**	**1218**	**1243**
12:30 13:30	16	1	13	**30**	1	0	0	**1**	**31**	4	643	14	**661**	14	635	1	**650**	**1311**	**1342**
15:00 16:00	14	1	25	**40**	5	0	3	**8**	**48**	7	798	18	**823**	9	635	10	**654**	**1477**	**1525**
16:00 17:00	14	3	24	**41**	4	0	2	**6**	**47**	5	1259	21	**1285**	24	689	2	**715**	**2000**	**2047**
17:00 18:00	9	0	26	**35**	0	0	1	**1**	**36**	5	1267	38	**1310**	24	681	2	**707**	**2017**	**2053**
Sub Total	78	6	151	**235**	10	0	8	**18**	**253**	32	5787	121	**5940**	114	6153	25	**6292**	**12232**	**12485**
U Turns	1			**1**	0			**0**	**1**	**11**			**11**	3			**3**	**14**	**15**
Total	79	6	151	**236**	10	0	8	**18**	**254**	43	5787	121	**5951**	117	6153	25	**6295**	**12246**	**12500**
EQ 12Hr	110	8	210	**328**	14	0	11	**25**	**353**	60	8044	168	**8272**	163	8553	35	**8751**	**17023**	**17376**

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

AVG 12Hr	99	7	189	**295**	13	0	10	**23**	**318**	54	7240	151	**7445**	147	7698	32	**7877**	**15322**	**15640**

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

AVG 24Hr	130	9	248	**387**	17	0	13	**30**	**417**	71	9484	198	**9753**	193	10084	42	**10319**	**20072**	**20489**

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

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

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ELWOOD ST @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38124

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

Full Study 15 Minute Increments

		ELWOOD ST									MONTREAL 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	0	0	0	0	0	0	0	0	**0**	4	33	0	37	1	60	1	62	**99**	**99**
07:15	07:30	1	0	3	4	0	0	0	0	**4**	6	43	2	51	0	90	2	92	**143**	**147**
07:30	07:45	0	0	2	2	0	0	0	0	**2**	2	58	0	60	0	133	2	135	**195**	**197**
07:45	08:00	1	1	1	3	0	0	0	0	**3**	4	64	3	71	0	177	0	177	**248**	**251**
08:00	08:15	0	0	1	1	0	0	0	0	**1**	0	68	0	68	4	249	0	253	**321**	**322**
08:15	08:30	0	0	5	5	0	0	0	0	**5**	0	105	3	108	1	321	0	322	**430**	**435**
08:30	08:45	5	0	2	7	0	0	1	1	**8**	1	143	4	148	0	317	1	318	**466**	**474**
08:45	09:00	4	0	9	13	0	0	0	0	**13**	0	152	2	154	0	378	1	379	**533**	**546**
09:00	09:15	0	0	4	4	0	0	0	0	**4**	1	137	0	138	6	343	0	349	**487**	**491**
09:15	09:30	7	0	5	12	0	0	0	0	**12**	0	120	3	123	9	312	0	321	**444**	**456**
09:30	09:45	1	0	6	7	0	0	0	0	**7**	1	164	2	167	3	275	1	279	**446**	**453**
09:45	10:00	1	0	5	6	0	0	1	1	**7**	1	141	3	145	4	258	0	262	**407**	**414**
11:30	11:45	1	0	6	7	0	0	0	0	**7**	0	149	3	152	7	157	0	164	**316**	**323**
11:45	12:00	0	0	4	4	0	0	0	0	**4**	0	161	1	162	3	151	2	156	**318**	**322**
12:00	12:15	3	0	5	8	0	0	0	0	**8**	0	145	1	146	2	137	0	139	**285**	**293**
12:15	12:30	1	0	5	6	0	0	0	0	**6**	0	137	3	140	6	155	0	161	**301**	**307**
12:30	12:45	4	1	7	12	0	0	0	0	**12**	0	145	1	146	6	138	0	144	**290**	**302**
12:45	13:00	6	0	3	9	0	0	0	0	**9**	1	183	4	188	3	150	0	153	**341**	**350**
13:00	13:15	3	0	2	5	1	0	0	1	**6**	0	157	4	161	2	168	1	171	**332**	**338**
13:15	13:30	3	0	1	4	0	0	0	0	**4**	3	158	5	166	3	179	0	182	**348**	**352**
15:00	15:15	3	0	9	12	0	0	0	0	**12**	1	182	3	186	3	131	5	139	**325**	**337**
15:15	15:30	3	0	5	8	1	0	0	1	**9**	3	203	5	211	3	143	4	150	**361**	**370**
15:30	15:45	2	1	5	8	0	0	3	3	**11**	3	195	7	205	1	179	0	180	**385**	**396**
15:45	16:00	6	0	6	12	4	0	0	4	**16**	1	218	3	222	2	182	1	185	**407**	**423**
16:00	16:15	3	0	5	8	1	0	0	1	**9**	3	309	5	317	5	187	1	193	**510**	**519**
16:15	16:30	4	2	7	13	2	0	0	2	**15**	2	300	6	308	5	169	0	174	**482**	**497**
16:30	16:45	4	1	6	11	0	0	1	1	**12**	1	321	6	328	9	154	0	163	**491**	**503**
16:45	17:00	4	0	6	10	1	0	1	2	**12**	0	329	4	333	5	179	1	185	**518**	**530**
17:00	17:15	3	0	7	10	0	0	1	1	**11**	0	320	11	331	7	176	1	184	**515**	**526**
17:15	17:30	2	0	5	7	0	0	0	0	**7**	3	350	7	360	7	151	1	159	**519**	**526**
17:30	17:45	2	0	5	7	0	0	0	0	**7**	1	311	7	319	7	163	0	170	**489**	**496**
17:45	18:00	2	0	9	11	0	0	0	0	**11**	1	286	13	300	3	191	0	194	**494**	**505**
Total:		79	6	151	236	10	0	8	18	**254**	43	5787	121	5951	117	6153	25	6295	**254**	**12,500**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ELWOOD ST @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38124

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

Full Study Cyclist Volume

Time Period		ELWOOD ST			MONTREAL RD			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	**0**	0	0	**0**	**0**
07:15	07:30	0	0	**0**	0	0	**0**	**0**
07:30	07:45	0	0	**0**	0	0	**0**	**0**
07:45	08:00	0	0	**0**	0	0	**0**	**0**
08:00	08:15	0	0	**0**	0	0	**0**	**0**
08:15	08:30	0	0	**0**	1	0	**1**	**1**
08:30	08:45	0	0	**0**	0	1	**1**	**1**
08:45	09:00	0	0	**0**	0	2	**2**	**2**
09:00	09:15	0	0	**0**	0	1	**1**	**1**
09:15	09:30	0	0	**0**	0	0	**0**	**0**
09:30	09:45	0	0	**0**	0	0	**0**	**0**
09:45	10:00	0	0	**0**	0	0	**0**	**0**
11:30	11:45	0	0	**0**	0	0	**0**	**0**
11:45	12:00	0	0	**0**	0	0	**0**	**0**
12:00	12:15	0	0	**0**	0	0	**0**	**0**
12:15	12:30	0	0	**0**	0	0	**0**	**0**
12:30	12:45	0	0	**0**	0	0	**0**	**0**
12:45	13:00	0	0	**0**	0	0	**0**	**0**
13:00	13:15	0	0	**0**	0	0	**0**	**0**
13:15	13:30	0	0	**0**	0	0	**0**	**0**
15:00	15:15	0	0	**0**	0	0	**0**	**0**
15:15	15:30	0	0	**0**	0	0	**0**	**0**
15:30	15:45	0	0	**0**	0	0	**0**	**0**
15:45	16:00	0	0	**0**	0	0	**0**	**0**
16:00	16:15	0	0	**0**	0	0	**0**	**0**
16:15	16:30	0	0	**0**	0	0	**0**	**0**
16:30	16:45	0	0	**0**	0	0	**0**	**0**
16:45	17:00	0	0	**0**	0	0	**0**	**0**
17:00	17:15	0	0	**0**	0	1	**1**	**1**
17:15	17:30	0	0	**0**	0	0	**0**	**0**
17:30	17:45	0	0	**0**	0	0	**0**	**0**
17:45	18:00	0	0	**0**	2	0	**2**	**2**
Total		0	0	**0**	3	5	**8**	**8**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ELWOOD ST @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38124

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

Full Study Pedestrian Volume

Time Period		ELWOOD ST			MONTREAL RD			
		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	0	2	**2**	0	1	**1**	**3**
07:15	07:30	1	4	**5**	2	1	**3**	**8**
07:30	07:45	0	1	**1**	1	0	**1**	**2**
07:45	08:00	1	2	**3**	1	2	**3**	**6**
08:00	08:15	1	0	**1**	0	1	**1**	**2**
08:15	08:30	0	0	**0**	1	0	**1**	**1**
08:30	08:45	1	1	**2**	3	1	**4**	**6**
08:45	09:00	0	1	**1**	0	3	**3**	**4**
09:00	09:15	0	2	**2**	0	0	**0**	**2**
09:15	09:30	2	1	**3**	0	2	**2**	**5**
09:30	09:45	1	1	**2**	1	0	**1**	**3**
09:45	10:00	1	2	**3**	1	1	**2**	**5**
11:30	11:45	0	2	**2**	1	1	**2**	**4**
11:45	12:00	1	1	**2**	0	2	**2**	**4**
12:00	12:15	0	0	**0**	0	0	**0**	**0**
12:15	12:30	1	3	**4**	1	3	**4**	**8**
12:30	12:45	0	3	**3**	3	0	**3**	**6**
12:45	13:00	0	0	**0**	0	1	**1**	**1**
13:00	13:15	1	3	**4**	0	5	**5**	**9**
13:15	13:30	2	2	**4**	2	3	**5**	**9**
15:00	15:15	1	0	**1**	1	3	**4**	**5**
15:15	15:30	1	1	**2**	1	2	**3**	**5**
15:30	15:45	1	0	**1**	1	0	**1**	**2**
15:45	16:00	0	1	**1**	0	2	**2**	**3**
16:00	16:15	4	2	**6**	2	6	**8**	**14**
16:15	16:30	2	1	**3**	0	7	**7**	**10**
16:30	16:45	5	2	**7**	3	3	**6**	**13**
16:45	17:00	0	5	**5**	0	0	**0**	**5**
17:00	17:15	1	0	**1**	0	6	**6**	**7**
17:15	17:30	1	1	**2**	0	5	**5**	**7**
17:30	17:45	2	1	**3**	0	1	**1**	**4**
17:45	18:00	0	2	**2**	0	3	**3**	**5**
Total	.....	31	47	**78**	25	65	**90**	**168**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ELWOOD ST @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38124

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

Full Study Heavy Vehicles

ELWOOD ST **MONTREAL RD**

Time Period		Northbound				Southbound					Eastbound				Westbound						
		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	0	0	**0**	0	0	0	**0**	**0**	1	1	0	**2**	0	3	0	**3**	**5**	**6**
07:15	07:30	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	2	0	**2**	**2**	**2**
07:30	07:45	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	3	0	**3**	**5**	**5**
07:45	08:00	0	0	0	**0**	0	0	0	**0**	**0**	0	0	2	**2**	0	3	0	**3**	**5**	**5**
08:00	08:15	0	0	1	**1**	0	0	0	**0**	**1**	0	1	0	**1**	0	10	0	**10**	**11**	**12**
08:15	08:30	0	0	0	**0**	0	0	0	**0**	**0**	0	4	1	**5**	0	15	0	**15**	**20**	**20**
08:30	08:45	0	0	1	**1**	0	0	0	**0**	**1**	0	3	0	**3**	0	13	0	**13**	**16**	**17**
08:45	09:00	0	0	0	**0**	0	0	0	**0**	**0**	0	15	1	**16**	0	12	0	**12**	**28**	**28**
09:00	09:15	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**7**	0	12	0	**12**	**19**	**19**
09:15	09:30	0	0	0	**0**	0	0	0	**0**	**0**	0	6	1	**7**	0	17	0	**17**	**24**	**24**
09:30	09:45	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**7**	0	9	1	**10**	**17**	**17**
09:45	10:00	0	0	0	**0**	0	0	1	**1**	**1**	0	10	1	**11**	0	11	0	**11**	**22**	**23**
11:30	11:45	0	0	0	**0**	0	0	0	**0**	**0**	0	4	0	**4**	0	5	0	**5**	**9**	**9**
11:45	12:00	0	0	0	**0**	0	0	0	**0**	**0**	0	6	0	**6**	1	5	0	**6**	**12**	**12**
12:00	12:15	0	0	0	**0**	0	0	0	**0**	**0**	0	9	0	**9**	0	3	0	**3**	**12**	**12**
12:15	12:30	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**5**	0	9	0	**9**	**14**	**14**
12:30	12:45	0	0	1	**1**	0	0	0	**0**	**1**	0	7	0	**7**	0	7	0	**7**	**14**	**15**
12:45	13:00	0	0	0	**0**	0	0	0	**0**	**0**	1	4	1	**6**	0	5	0	**5**	**11**	**11**
13:00	13:15	0	0	0	**0**	0	0	0	**0**	**0**	0	4	1	**5**	0	6	0	**6**	**11**	**11**
13:15	13:30	0	0	0	**0**	0	0	0	**0**	**0**	1	6	1	**8**	0	9	0	**9**	**17**	**17**
15:00	15:15	0	0	0	**0**	0	0	0	**0**	**0**	0	10	0	**10**	0	10	1	**11**	**21**	**21**
15:15	15:30	0	0	0	**0**	1	0	0	**1**	**1**	0	6	0	**6**	0	9	0	**9**	**15**	**16**
15:30	15:45	0	0	0	**0**	0	0	0	**0**	**0**	0	9	0	**9**	0	8	0	**8**	**17**	**17**
15:45	16:00	1	0	1	**2**	0	0	0	**0**	**2**	0	9	0	**9**	0	11	1	**12**	**21**	**23**
16:00	16:15	0	0	0	**0**	0	0	0	**0**	**0**	0	11	1	**12**	0	11	0	**11**	**23**	**23**
16:15	16:30	0	0	0	**0**	0	0	0	**0**	**0**	0	3	1	**4**	0	8	0	**8**	**12**	**12**
16:30	16:45	0	0	0	**0**	0	0	0	**0**	**0**	0	9	0	**9**	0	7	0	**7**	**16**	**16**
16:45	17:00	0	0	0	**0**	0	0	0	**0**	**0**	0	7	1	**8**	0	4	0	**4**	**12**	**12**
17:00	17:15	0	0	0	**0**	0	0	0	**0**	**0**	0	6	0	**6**	0	5	0	**5**	**11**	**11**
17:15	17:30	0	0	0	**0**	0	0	0	**0**	**0**	0	2	1	**3**	0	4	0	**4**	**7**	**7**
17:30	17:45	0	0	0	**0**	0	0	0	**0**	**0**	0	6	0	**6**	0	6	0	**6**	**12**	**12**
17:45	18:00	0	0	0	**0**	0	0	0	**0**	**0**	0	2	1	**3**	0	2	0	**2**	**5**	**5**
Total:	None	1	0	4	**5**	1	0	1	**2**	**7**	3	181	14	**198**	1	244	3	**248**	**446**	**454**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ELWOOD ST @ MONTREAL RD

Survey Date: Thursday, November 15, 2018 **WO No:** 38124

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

Full Study 15 Minute U-Turn Total

ELWOOD ST **MONTREAL RD**

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	1	0	**1**
07:15	07:30	0	0	4	0	**4**
07:30	07:45	0	0	1	0	**1**
07:45	08:00	0	0	2	0	**2**
08:00	08:15	0	0	0	1	**1**
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	1	0	**1**
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	2	**2**
12:30	12:45	0	0	0	0	**0**
12:45	13:00	0	0	0	0	**0**
13:00	13:15	0	0	0	0	**0**
13:15	13:30	0	0	0	0	**0**
15:00	15:15	0	0	0	0	**0**
15:15	15:30	0	0	0	0	**0**
15:30	15:45	0	0	1	0	**1**
15:45	16:00	0	0	0	0	**0**
16:00	16:15	1	0	0	0	**1**
16:15	16:30	0	0	0	0	**0**
16:30	16:45	0	0	1	0	**1**
16:45	17:00	0	0	0	0	**0**
17:00	17:15	0	0	0	0	**0**
17:15	17:30	0	0	0	0	**0**
17:30	17:45	0	0	0	0	**0**
17:45	18:00	0	0	0	0	**0**
Total		1	0	11	3	**15**

Appendix C

Synchro Intersection Worksheets – Existing Conditions

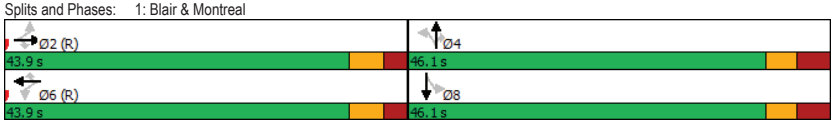
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	33	522	165	170	1164	16	142	77	55	11	121
Future Volume (vph)	33	522	165	170	1164	16	142	77	55	11	121
Lane Group Flow (vph)	37	580	183	189	1293	18	158	86	61	12	254
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			4			8
Permitted Phases	2		2	6		6	4		4	8	
Detector Phase	2	2	2	6	6	6	4	4	4	8	8
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.4	33.4	33.4	33.4	33.4	33.4	46.1	46.1	46.1	46.1	46.1
Total Split (s)	43.9	43.9	43.9	43.9	43.9	43.9	46.1	46.1	46.1	46.1	46.1
Total Split (%)	48.8%	48.8%	48.8%	48.8%	48.8%	48.8%	51.2%	51.2%	51.2%	51.2%	51.2%
Maximum Green (s)	37.5	37.5	37.5	37.5	37.5	37.5	39.0	39.0	39.0	39.0	39.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	3.8	3.8	3.8	3.8	3.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.4	6.4	6.4	6.4	7.1	7.1	7.1	7.1	7.1
Lead/Lag											
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0	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	C-Max	C-Max	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0	20.0	20.0	20.0	20.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)	0	0	0	4	4	4	5	5	5	0	0
Act Effct Green (s)	54.3	54.3	54.3	54.3	54.3	54.3	22.2	22.2	22.2	22.2	22.2
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.60	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.23	0.30	0.19	0.42	0.66	0.02	0.77	0.21	0.15	0.05	0.62
Control Delay	17.9	11.1	2.8	14.8	14.3	3.0	53.3	24.8	6.0	20.4	33.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	11.1	2.8	14.8	14.3	3.0	53.3	24.8	6.0	20.4	33.4
LOS	B	B	A	B	B	A	D	C	A	C	C
Approach Delay		9.5			14.3			35.8			32.8
Approach LOS		A			B			D			C
Queue Length 50th (m)	2.5	21.6	0.0	8.7	31.3	0.0	26.3	12.2	0.0	1.6	38.1
Queue Length 95th (m)	13.4	50.3	11.6	28.2	#151.1	m0.5	35.9	17.3	6.7	4.3	44.9
Internal Link Dist (m)		757.9			347.8			602.6			757.9
Turn Bay Length (m)	60.0		30.0	65.0		15.0	25.0		30.0	25.0	
Base Capacity (vph)	160	1944	967	448	1962	888	361	727	667	456	707
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.30	0.19	0.42	0.66	0.02	0.44	0.12	0.09	0.03	0.36

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 14 (16%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 16.9 — Intersection LOS: B
Intersection Capacity Utilization 86.8% — 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Blair & Montreal



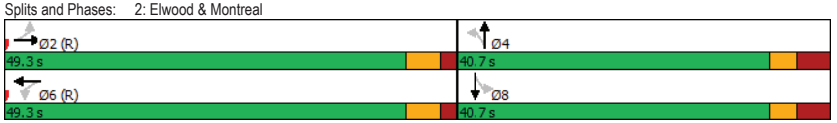
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	2	552	15	1350	16	0	0
Future Volume (vph)	2	552	15	1350	16	0	0
Lane Group Flow (vph)	2	623	17	1502	0	40	1
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		4	8
Permitted Phases	2		6		4		
Detector Phase	2	2	6	6	4	4	8
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	39.6	39.6	40.7	40.7	40.7
Total Split (s)	49.3	49.3	49.3	49.3	40.7	40.7	40.7
Total Split (%)	54.8%	54.8%	54.8%	54.8%	45.2%	45.2%	45.2%
Maximum Green (s)	43.7	43.7	43.7	43.7	34.0	34.0	34.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	3.7	3.7	3.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6		6.7	6.7
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	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
Walk Time (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	24.0	24.0	24.0
Pedestrian Calls (#/hr)	3	3	5	5	6	6	3
Act Effct Green (s)	71.8	71.8	71.8	71.8		14.8	14.8
Actuated g/C Ratio	0.80	0.80	0.80	0.80		0.16	0.16
v/c Ratio	0.01	0.25	0.03	0.58		0.16	0.00
Control Delay	10.0	5.3	7.8	9.9		12.8	0.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	10.0	5.3	7.8	9.9		12.8	0.0
LOS	A	A	A	A		B	A
Approach Delay		5.3		9.9		12.8	
Approach LOS		A		A		B	
Queue Length 50th (m)	0.1	13.7	0.6	50.6		1.3	0.0
Queue Length 95th (m)	m0.5	29.6	5.0	#177.0		7.0	0.0
Internal Link Dist (m)		347.8		504.7		77.8	0.1
Turn Bay Length (m)	35.0		15.0				
Base Capacity (vph)	196	2534	577	2595		528	582
Starvation Cap Reductn	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0
Reduced v/c Ratio	0.01	0.25	0.03	0.58		0.08	0.00

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 8.6 — Intersection LOS: A
Intersection Capacity Utilization 62.4% — ICU Level of Service B
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Elwood & Montreal



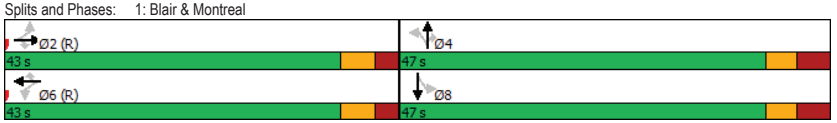
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	95	1048	146	65	602	8	226	83	187	36	82
Future Volume (vph)	95	1048	146	65	602	8	226	83	187	36	82
Lane Group Flow (vph)	106	1164	162	72	669	9	251	92	208	40	154
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			4			8
Permitted Phases	2		2	6		6	4		4	8	
Detector Phase	2	2	2	6	6	6	4	4	4	8	8
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.4	33.4	33.4	33.4	33.4	33.4	46.1	46.1	46.1	46.1	46.1
Total Split (s)	43.0	43.0	43.0	43.0	43.0	43.0	47.0	47.0	47.0	47.0	47.0
Total Split (%)	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%	52.2%	52.2%	52.2%	52.2%	52.2%
Maximum Green (s)	36.6	36.6	36.6	36.6	36.6	36.6	39.9	39.9	39.9	39.9	39.9
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	3.8	3.8	3.8	3.8	3.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.4	6.4	6.4	6.4	7.1	7.1	7.1	7.1	7.1
Lead/Lag											
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0	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	C-Max	C-Max	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0	20.0	20.0	20.0	20.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)	1	1	1	5	5	5	3	3	3	6	6
Act Effct Green (s)	49.7	49.7	49.7	49.7	49.7	49.7	26.8	26.8	26.8	26.8	26.8
Actuated g/C Ratio	0.55	0.55	0.55	0.55	0.55	0.55	0.30	0.30	0.30	0.30	0.30
v/c Ratio	0.30	0.65	0.19	0.43	0.37	0.01	0.76	0.18	0.45	0.13	0.30
Control Delay	17.1	18.6	7.2	33.0	16.8	3.2	42.1	21.5	21.6	20.3	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	18.6	7.2	33.0	16.8	3.2	42.1	21.5	21.6	20.3	15.4
LOS	B	B	A	C	B	A	D	C	C	C	B
Approach Delay		17.2			18.2			30.9			16.4
Approach LOS		B			B			C			B
Queue Length 50th (m)	9.1	68.4	5.6	5.5	26.8	0.0	39.5	11.9	23.1	5.1	13.5
Queue Length 95th (m)	27.0	#126.7	19.9	#27.4	61.2	m0.8	53.6	18.3	33.6	9.9	22.4
Internal Link Dist (m)		757.9			347.8			602.6			757.9
Turn Bay Length (m)	60.0		30.0	65.0		15.0	25.0		30.0	25.0	
Base Capacity (vph)	352	1778	840	166	1795	818	493	744	670	465	749
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.65	0.19	0.43	0.37	0.01	0.51	0.12	0.31	0.09	0.21

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
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: 0.76
Intersection Signal Delay: 20.0 — Intersection LOS: B
Intersection Capacity Utilization 87.5% — 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Blair & Montreal



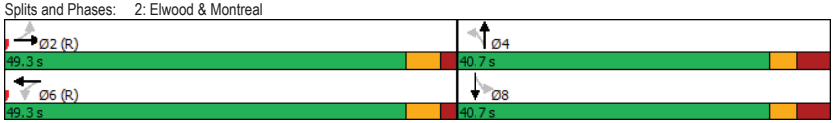
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	4	1260	28	660	13	1	1	0
Future Volume (vph)	4	1260	28	660	13	1	1	0
Lane Group Flow (vph)	4	1431	31	736	0	42	0	4
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	39.6	39.6	40.7	40.7	40.7	40.7
Total Split (s)	49.3	49.3	49.3	49.3	40.7	40.7	40.7	40.7
Total Split (%)	54.8%	54.8%	54.8%	54.8%	45.2%	45.2%	45.2%	45.2%
Maximum Green (s)	43.7	43.7	43.7	43.7	34.0	34.0	34.0	34.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	3.7	3.7	3.7	3.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6		6.7		6.7
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	24.0	24.0	24.0	24.0
Pedestrian Calls (#/hr)	3	3	5	5	6	6	3	3
Act Effct Green (s)	71.8	71.8	71.8	71.8		14.8		14.8
Actuated g/C Ratio	0.80	0.80	0.80	0.80		0.16		0.16
v/c Ratio	0.01	0.57	0.14	0.28		0.17		0.02
Control Delay	7.8	6.8	10.4	6.2		18.3		0.0
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	7.8	6.8	10.4	6.2		18.3		0.0
LOS	A	A	B	A		B		A
Approach Delay		6.8		6.4		18.3		
Approach LOS		A		A		B		
Queue Length 50th (m)	0.1	29.2	1.2	17.2		3.3		0.0
Queue Length 95th (m)	m0.5	#160.4	9.7	57.1		8.6		0.0
Internal Link Dist (m)		347.8		504.7		77.8		0.1
Turn Bay Length (m)	35.0		15.0					
Base Capacity (vph)	509	2528	215	2592		530		564
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.01	0.57	0.14	0.28		0.08		0.01

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 8 (9%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 6.8 — Intersection LOS: A
Intersection Capacity Utilization 63.8% — ICU Level of Service B
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Elwood & Montreal



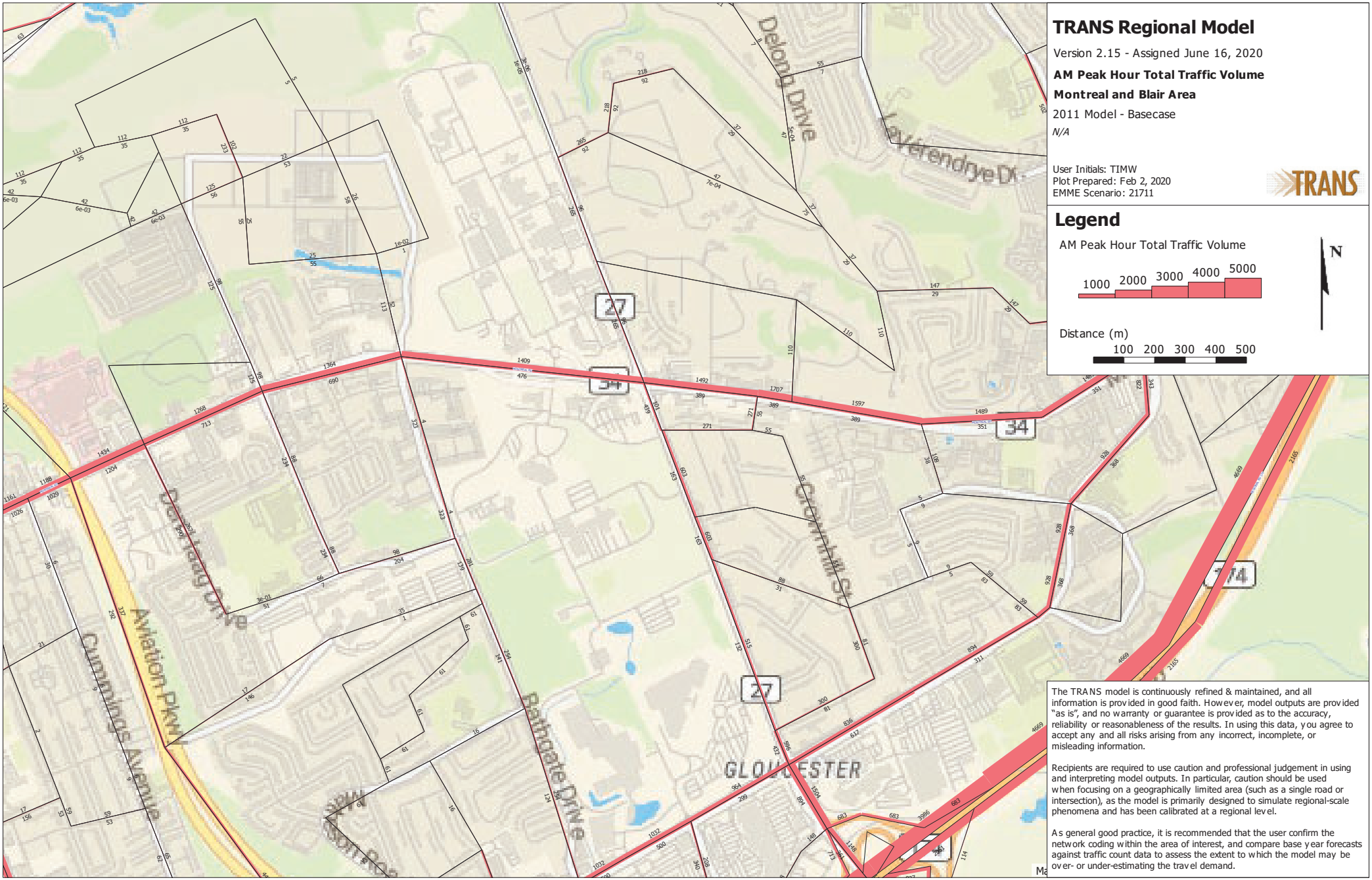
Appendix D

Collision Data

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Traffic Control Condition	Classification Of Accident	Initial Impact Type	Road Surface Condition
2015-05-27	2015	13:25	BLAIR RD @ MONTREAL RD	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	05 - Turning movement	01 - Dry
2015-03-10	2015	8:51	BLAIR RD @ MONTREAL RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	02 - Angle	01 - Dry
2015-01-05	2015	16:00	BLAIR RD @ MONTREAL RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	07 - SMV other	01 - Dry
2015-11-13	2015	12:56	BLAIR RD @ MONTREAL RD	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2015-11-18	2015	8:43	BLAIR RD @ MONTREAL RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	01 - Dry
2016-11-11	2016	20:44	BLAIR RD @ MONTREAL RD	01 - Clear	07 - Dark	01 - Traffic signal		02 - Non-fatal injury	02 - Angle	01 - Dry
2016-02-25	2016	18:28	BLAIR RD @ MONTREAL RD	06 - Strong wind	07 - Dark	01 - Traffic signal		03 - P.D. only	03 - Rear end	06 - Ice
2016-02-25	2016	18:13	BLAIR RD @ MONTREAL RD	03 - Snow	05 - Dusk	01 - Traffic signal		03 - P.D. only	03 - Rear end	06 - Ice
2016-02-26	2016	12:06	BLAIR RD @ MONTREAL RD	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	06 - Ice
2016-08-26	2016	8:28	BLAIR RD @ MONTREAL RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	01 - Dry
2016-04-19	2016	8:27	BLAIR RD @ MONTREAL RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2016-03-02	2016	14:29	BLAIR RD @ MONTREAL RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2017-07-30	2017	16:28	BLAIR RD @ MONTREAL RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	02 - Angle	01 - Dry
2017-08-27	2017	16:00	BLAIR RD @ MONTREAL RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2017-09-28	2017	16:21	BLAIR RD @ MONTREAL RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2017-10-14	2017	8:50	BLAIR RD @ MONTREAL RD	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	07 - SMV other	02 - Wet
2017-10-23	2017	15:30	BLAIR RD @ MONTREAL RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	99 - Other	01 - Dry
2017-12-05	2017	16:40	BLAIR RD @ MONTREAL RD	01 - Clear	05 - Dusk	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2017-11-21	2017	16:57	BLAIR RD @ MONTREAL RD	01 - Clear	07 - Dark	01 - Traffic signal		02 - Non-fatal injury	05 - Turning movement	01 - Dry
2017-12-05	2017	16:54	BLAIR RD @ MONTREAL RD	01 - Clear	05 - Dusk	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2017-02-01	2017	11:30	BLAIR RD @ MONTREAL RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2017-03-08	2017	13:30	BLAIR RD @ MONTREAL RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	02 - Angle	01 - Dry
2017-03-31	2017	14:56	BLAIR RD @ MONTREAL RD	03 - Snow	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	03 - Loose snow
2018-03-26	2018	15:38	BLAIR RD @ MONTREAL RD (0009277)	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2018-04-08	2018	13:52	BLAIR RD @ MONTREAL RD (0009277)	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2018-09-20	2018	15:35	BLAIR RD @ MONTREAL RD (0009277)	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	05 - Turning movement	01 - Dry
2018-09-30	2018	19:38	BLAIR RD @ MONTREAL RD (0009277)	02 - Rain	07 - Dark	01 - Traffic signal		02 - Non-fatal injury	02 - Angle	02 - Wet
2018-11-02	2018	11:52	BLAIR RD @ MONTREAL RD (0009277)	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	02 - Wet
2018-11-05	2018	17:30	BLAIR RD @ MONTREAL RD (0009277)	02 - Rain	07 - Dark	01 - Traffic signal		03 - P.D. only	05 - Turning movement	02 - Wet
2019-01-22	2019	8:20	BLAIR RD @ MONTREAL RD (0009277)	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	03 - Rear end	06 - Ice
2019-02-24	2019	7:16	BLAIR RD @ MONTREAL RD (0009277)	02 - Rain	03 - Dawn	01 - Traffic signal		02 - Non-fatal injury	03 - Rear end	02 - Wet
2019-05-24	2019	8:30	BLAIR RD @ MONTREAL RD (0009277)	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	03 - Rear end	01 - Dry
2019-08-19	2019	16:25	BLAIR RD @ MONTREAL RD (0009277)	02 - Rain	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	03 - Rear end	02 - Wet
2019-08-16	2019	20:29	BLAIR RD @ MONTREAL RD (0009277)	01 - Clear	07 - Dark	01 - Traffic signal		02 - Non-fatal injury	05 - Turning movement	01 - Dry
2019-08-21	2019	9:30	BLAIR RD @ MONTREAL RD (0009277)	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2019-10-10	2019	12:52	BLAIR RD @ MONTREAL RD (0009277)	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	03 - Rear end	01 - Dry
2019-10-17	2019	9:40	BLAIR RD @ MONTREAL RD (0009277)	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2015-11-13	2015	17:22	BLAIR RD btwn MONTREAL RD & SEGUIN ST	01 - Clear	07 - Dark	10 - No control		03 - P.D. only	05 - Turning movement	02 - Wet
2015-12-30	2015	15:14	BLAIR RD btwn MONTREAL RD & SEGUIN ST	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	04 - Sideswipe	04 - Slush
2016-12-17	2016	16:03	BLAIR RD btwn MONTREAL RD & SEGUIN ST	03 - Snow	05 - Dusk	10 - No control		03 - P.D. only	07 - SMV other	03 - Loose snow
2017-10-21	2017	13:50	BLAIR RD btwn MONTREAL RD & SEGUIN ST	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	02 - Angle	01 - Dry
2016-09-16	2016	16:22	BLAIR RD btwn NICOL ST & MONTREAL RD	01 - Clear	01 - Daylight	10 - No control		02 - Non-fatal injury	07 - SMV other	01 - Dry
2016-10-06	2016	14:52	MONTREAL RD btwn BLAIR RD & CLOVELLY RD	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	03 - Rear end	01 - Dry
2017-08-31	2017	18:35	MONTREAL RD btwn BLAIR RD & CLOVELLY RD	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	03 - Rear end	01 - Dry
2018-04-03	2018	17:20	MONTREAL RD btwn BLAIR RD & CLOVELLY RD (__3ZA2D1)	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	02 - Angle	01 - Dry
2018-08-28	2018	16:05	MONTREAL RD btwn BLAIR RD & CLOVELLY RD (__3ZA2D1)	01 - Clear	01 - Daylight	10 - No control		02 - Non-fatal injury	07 - SMV other	01 - Dry
2015-05-19	2015	15:00	MONTREAL RD btwn MONTREAL RD & BLAIR RD	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	03 - Rear end	01 - Dry
2016-03-09	2016	16:30	MONTREAL RD btwn MONTREAL RD & BLAIR RD	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	03 - Rear end	01 - Dry

Appendix E

TRANS Model Plots



TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

Montreal and Blair Area

2011 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: Feb 2, 2020
EMME Scenario: 21711

TRANS

Legend

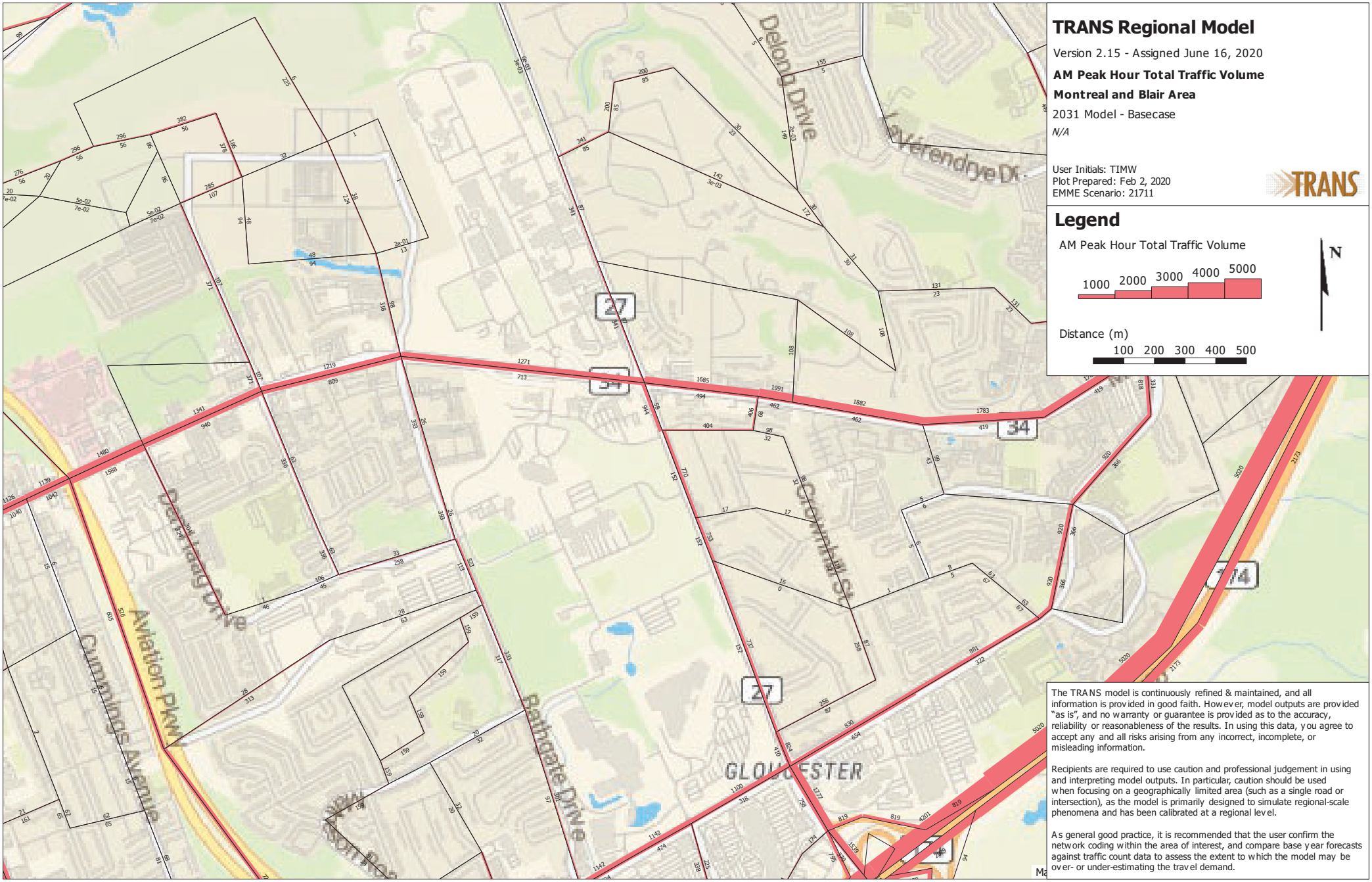
AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

N

Distance (m)

100 200 300 400 500



TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

Montreal and Blair Area

2031 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: Feb 2, 2020
EMME Scenario: 21711

TRANS

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

Distance (m)

100 200 300 400 500

N

Appendix F

Synchro Intersection Worksheets – 2024 Future Background Conditions

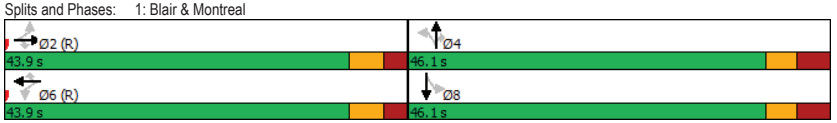
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	33	522	165	183	1254	16	142	77	55	11	160
Future Volume (vph)	33	522	165	183	1254	16	142	77	55	11	160
Lane Group Flow (vph)	33	522	165	183	1254	16	142	77	55	11	268
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			4			8
Permitted Phases	2		2	6		6	4		4	8	
Detector Phase	2	2	2	6	6	6	4	4	4	8	8
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.4	33.4	33.4	33.4	33.4	33.4	46.1	46.1	46.1	46.1	46.1
Total Split (s)	43.9	43.9	43.9	43.9	43.9	43.9	46.1	46.1	46.1	46.1	46.1
Total Split (%)	48.8%	48.8%	48.8%	48.8%	48.8%	48.8%	51.2%	51.2%	51.2%	51.2%	51.2%
Maximum Green (s)	37.5	37.5	37.5	37.5	37.5	37.5	39.0	39.0	39.0	39.0	39.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	3.8	3.8	3.8	3.8	3.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.4	6.4	6.4	6.4	7.1	7.1	7.1	7.1	7.1
Lead/Lag											
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0	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	C-Max	C-Max	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0	20.0	20.0	20.0	20.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)	0	0	0	4	4	4	5	5	5	0	0
Act Effct Green (s)	54.5	54.5	54.5	54.5	54.5	54.5	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.24	0.24	0.24	0.24	0.24
v/c Ratio	0.19	0.27	0.17	0.38	0.64	0.02	0.74	0.19	0.14	0.04	0.65
Control Delay	16.2	10.7	2.9	13.9	13.8	2.6	51.5	24.6	6.2	20.5	34.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.2	10.7	2.9	13.9	13.8	2.6	51.5	24.6	6.2	20.5	34.6
LOS	B	B	A	B	B	A	D	C	A	C	C
Approach Delay		9.1			13.7			34.9			34.0
Approach LOS		A			B			C			C
Queue Length 50th (m)	2.1	18.8	0.0	8.4	30.3	0.0	23.5	11.0	0.0	1.5	40.5
Queue Length 95th (m)	11.7	44.8	11.0	27.5	#143.4	m0.3	32.6	15.8	6.4	4.1	47.0
Internal Link Dist (m)		757.9			347.8			602.6			757.9
Turn Bay Length (m)	60.0		30.0	65.0		15.0	25.0		30.0	25.0	
Base Capacity (vph)	172	1950	963	485	1969	891	341	727	664	460	716
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.27	0.17	0.38	0.64	0.02	0.42	0.11	0.08	0.02	0.37

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 14 (16%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 16.7 — Intersection LOS: B
Intersection Capacity Utilization 91.6% — 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Blair & Montreal



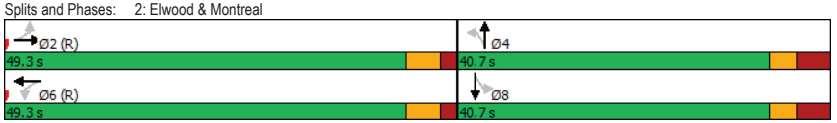
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	2	552	16	1454	16	0	0
Future Volume (vph)	2	552	16	1454	16	0	0
Lane Group Flow (vph)	2	561	16	1456	0	36	1
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		4	8
Permitted Phases	2		6		4		
Detector Phase	2	2	6	6	4	4	8
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	39.6	39.6	40.7	40.7	40.7
Total Split (s)	49.3	49.3	49.3	49.3	40.7	40.7	40.7
Total Split (%)	54.8%	54.8%	54.8%	54.8%	45.2%	45.2%	45.2%
Maximum Green (s)	43.7	43.7	43.7	43.7	34.0	34.0	34.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	3.7	3.7	3.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6		6.7	6.7
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	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
Walk Time (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	24.0	24.0	24.0
Pedestrian Calls (#/hr)	3	3	5	5	6	6	3
Act Effct Green (s)	71.8	71.8	71.8	71.8		14.8	14.8
Actuated g/C Ratio	0.80	0.80	0.80	0.80		0.16	0.16
v/c Ratio	0.01	0.22	0.03	0.56		0.15	0.00
Control Delay	8.0	4.4	7.8	9.6		11.4	0.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	8.0	4.4	7.8	9.6		11.4	0.0
LOS	A	A	A	A		B	A
Approach Delay		4.4		9.6		11.4	
Approach LOS		A		A		B	
Queue Length 50th (m)	0.1	12.0	0.6	47.7		0.6	0.0
Queue Length 95th (m)	m0.4	22.6	4.7	#168.0		6.2	0.0
Internal Link Dist (m)		347.8		504.7		77.8	0.1
Turn Bay Length (m)	35.0		15.0				
Base Capacity (vph)	209	2534	613	2595		528	582
Starvation Cap Reductn	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0
Reduced v/c Ratio	0.01	0.22	0.03	0.56		0.07	0.00

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 8.2 — Intersection LOS: A
Intersection Capacity Utilization 65.5% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Elwood & Montreal



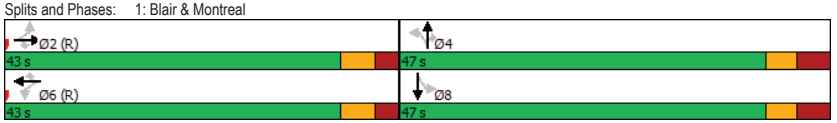
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	95	1129	157	65	602	8	299	110	247	36	82
Future Volume (vph)	95	1129	157	65	602	8	299	110	247	36	82
Lane Group Flow (vph)	95	1129	157	65	602	8	299	110	247	36	139
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			4			8
Permitted Phases	2		2	6		6	4		4	8	
Detector Phase	2	2	2	6	6	6	4	4	4	8	8
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.4	33.4	33.4	33.4	33.4	33.4	46.1	46.1	46.1	46.1	46.1
Total Split (s)	43.0	43.0	43.0	43.0	43.0	43.0	47.0	47.0	47.0	47.0	47.0
Total Split (%)	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%	52.2%	52.2%	52.2%	52.2%	52.2%
Maximum Green (s)	36.6	36.6	36.6	36.6	36.6	36.6	39.9	39.9	39.9	39.9	39.9
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	3.8	3.8	3.8	3.8	3.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.4	6.4	6.4	6.4	7.1	7.1	7.1	7.1	7.1
Lead/Lag											
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0	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	C-Max	C-Max	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0	20.0	20.0	20.0	20.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)	1	1	1	5	5	5	3	3	3	6	6
Act Effct Green (s)	46.8	46.8	46.8	46.8	46.8	46.8	29.7	29.7	29.7	29.7	29.7
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52	0.52	0.33	0.33	0.33	0.33	0.33
v/c Ratio	0.27	0.67	0.20	0.42	0.36	0.01	0.80	0.20	0.49	0.11	0.24
Control Delay	17.7	20.6	7.8	34.3	17.5	2.5	43.0	20.2	21.6	18.3	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	20.6	7.8	34.3	17.5	2.5	43.0	20.2	21.6	18.3	13.0
LOS	B	C	A	C	B	A	D	C	C	B	B
Approach Delay		18.9			18.9			31.1			14.1
Approach LOS		B			B			C			B
Queue Length 50th (m)	8.7	72.4	5.7	5.1	24.7	0.0	46.4	13.5	27.6	4.3	10.8
Queue Length 95th (m)	23.7	#122.8	19.4	#24.2	53.8	m0.6	64.9	20.8	40.3	9.0	19.6
Internal Link Dist (m)		757.9			347.8			602.6			757.9
Turn Bay Length (m)	60.0		30.0	65.0		15.0	25.0		30.0	25.0	
Base Capacity (vph)	357	1675	796	156	1691	774	500	744	670	457	748
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.67	0.20	0.42	0.36	0.01	0.60	0.15	0.37	0.08	0.19

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
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: 0.80
Intersection Signal Delay: 21.4 — Intersection LOS: C
Intersection Capacity Utilization 94.1% — 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Blair & Montreal



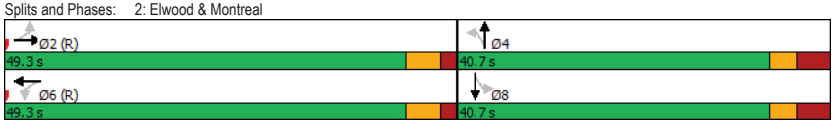
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	4	1358	28	660	13	1	1	0
Future Volume (vph)	4	1358	28	660	13	1	1	0
Lane Group Flow (vph)	4	1386	28	663	0	40	0	4
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	39.6	39.6	40.7	40.7	40.7	40.7
Total Split (s)	49.3	49.3	49.3	49.3	40.7	40.7	40.7	40.7
Total Split (%)	54.8%	54.8%	54.8%	54.8%	45.2%	45.2%	45.2%	45.2%
Maximum Green (s)	43.7	43.7	43.7	43.7	34.0	34.0	34.0	34.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	3.7	3.7	3.7	3.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6		6.7		6.7
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	24.0	24.0	24.0	24.0
Pedestrian Calls (#/hr)	3	3	5	5	6	6	3	3
Act Effct Green (s)	71.8	71.8	71.8	71.8		14.8		14.8
Actuated g/C Ratio	0.80	0.80	0.80	0.80		0.16		0.16
v/c Ratio	0.01	0.55	0.12	0.26		0.16		0.02
Control Delay	7.8	6.4	9.9	6.0		16.4		0.0
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	7.8	6.4	9.9	6.0		16.4		0.0
LOS	A	A	A	A		B		A
Approach Delay		6.4		6.2		16.4		
Approach LOS		A		A		B		
Queue Length 50th (m)	0.1	29.5	1.1	15.1		2.5		0.0
Queue Length 95th (m)	m0.5	#65.1	8.6	50.4		7.9		0.0
Internal Link Dist (m)		347.8		504.7		77.8		0.1
Turn Bay Length (m)	35.0		15.0					
Base Capacity (vph)	553	2529	229	2592		534		564
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.01	0.55	0.12	0.26		0.07		0.01

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 8 (9%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 6.5 — Intersection LOS: A
Intersection Capacity Utilization 66.6% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Elwood & Montreal



Appendix G

Synchro Intersection Worksheets – 2029 Future Background Conditions

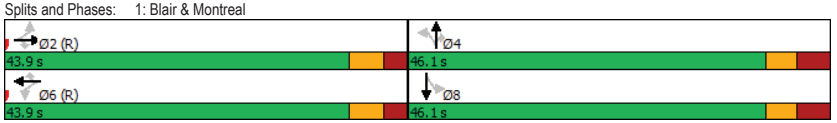
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	33	522	165	195	1334	16	142	77	55	11	202
Future Volume (vph)	33	522	165	195	1334	16	142	77	55	11	202
Lane Group Flow (vph)	33	522	165	195	1334	16	142	77	55	11	310
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			4			8
Permitted Phases	2		2	6		6	4		4	8	
Detector Phase	2	2	2	6	6	6	4	4	4	8	8
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.4	33.4	33.4	33.4	33.4	33.4	46.1	46.1	46.1	46.1	46.1
Total Split (s)	43.9	43.9	43.9	43.9	43.9	43.9	46.1	46.1	46.1	46.1	46.1
Total Split (%)	48.8%	48.8%	48.8%	48.8%	48.8%	48.8%	51.2%	51.2%	51.2%	51.2%	51.2%
Maximum Green (s)	37.5	37.5	37.5	37.5	37.5	37.5	39.0	39.0	39.0	39.0	39.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	3.8	3.8	3.8	3.8	3.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.4	6.4	6.4	6.4	7.1	7.1	7.1	7.1	7.1
Lead/Lag											
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0	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	C-Max	C-Max	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0	20.0	20.0	20.0	20.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)	0	0	0	4	4	4	5	5	5	0	0
Act Effct Green (s)	52.6	52.6	52.6	52.6	52.6	52.6	23.9	23.9	23.9	23.9	23.9
Actuated g/C Ratio	0.58	0.58	0.58	0.58	0.58	0.58	0.27	0.27	0.27	0.27	0.27
v/c Ratio	0.24	0.28	0.18	0.42	0.70	0.02	0.77	0.17	0.13	0.04	0.70
Control Delay	19.5	11.5	3.0	14.8	15.7	2.6	54.3	23.2	5.9	19.5	35.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.5	11.5	3.0	14.8	15.7	2.6	54.3	23.2	5.9	19.5	35.6
LOS	B	B	A	B	B	A	D	C	A	B	D
Approach Delay		9.9			15.5			35.8			35.0
Approach LOS		A			B			D			D
Queue Length 50th (m)	2.4	20.6	0.0	8.9	32.2	0.0	23.3	10.5	0.0	1.5	47.5
Queue Length 95th (m)	12.8	44.8	11.0	28.8	#159.2	m0.2	34.5	15.8	6.4	4.1	55.8
Internal Link Dist (m)		757.9			347.8			602.6			757.9
Turn Bay Length (m)	60.0		100.0	65.0		15.0	90.0		40.0	30.0	
Base Capacity (vph)	138	1883	935	465	1901	862	303	727	664	460	721
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.28	0.18	0.42	0.70	0.02	0.47	0.11	0.08	0.02	0.43

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 14 (16%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 18.2 — Intersection LOS: B
Intersection Capacity Utilization 96.3% — 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Blair & Montreal



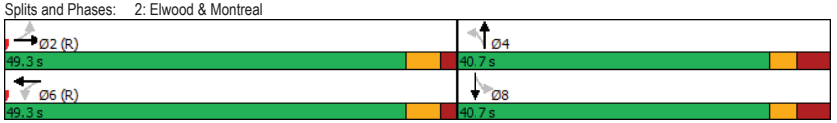
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	2	552	17	1548	16	0	0
Future Volume (vph)	2	552	17	1548	16	0	0
Lane Group Flow (vph)	2	561	17	1550	0	36	1
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		4	8
Permitted Phases	2		6		4		
Detector Phase	2	2	6	6	4	4	8
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	39.6	39.6	40.7	40.7	40.7
Total Split (s)	49.3	49.3	49.3	49.3	40.7	40.7	40.7
Total Split (%)	54.8%	54.8%	54.8%	54.8%	45.2%	45.2%	45.2%
Maximum Green (s)	43.7	43.7	43.7	43.7	34.0	34.0	34.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	3.7	3.7	3.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6		6.7	6.7
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	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
Walk Time (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	24.0	24.0	24.0
Pedestrian Calls (#/hr)	3	3	5	5	6	6	3
Act Effct Green (s)	71.8	71.8	71.8	71.8		14.8	14.8
Actuated g/C Ratio	0.80	0.80	0.80	0.80		0.16	0.16
v/c Ratio	0.01	0.22	0.03	0.60		0.15	0.00
Control Delay	8.0	4.4	7.8	10.3		11.4	0.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	8.0	4.4	7.8	10.3		11.4	0.0
LOS	A	A	A	B		B	A
Approach Delay		4.4		10.2		11.4	
Approach LOS		A		B		B	
Queue Length 50th (m)	0.1	12.0	0.6	53.8		0.6	0.0
Queue Length 95th (m)	m0.4	22.6	4.9	#186.3		6.2	0.0
Internal Link Dist (m)		347.8		504.7		77.8	0.1
Turn Bay Length (m)	35.0		15.0				
Base Capacity (vph)	183	2534	613	2595		528	582
Starvation Cap Reductn	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0
Reduced v/c Ratio	0.01	0.22	0.03	0.60		0.07	0.00

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 8.8 — Intersection LOS: A
Intersection Capacity Utilization 68.2% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Elwood & Montreal



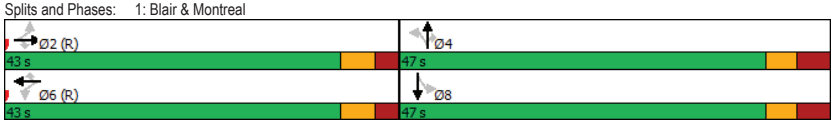
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	95	1201	167	65	602	8	377	138	312	36	82
Future Volume (vph)	95	1201	167	65	602	8	377	138	312	36	82
Lane Group Flow (vph)	95	1201	167	65	602	8	377	138	312	36	139
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			4			8
Permitted Phases	2		2	6		6	4		4	8	
Detector Phase	2	2	2	6	6	6	4	4	4	8	8
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.4	33.4	33.4	33.4	33.4	33.4	46.1	46.1	46.1	46.1	46.1
Total Split (s)	43.0	43.0	43.0	43.0	43.0	43.0	47.0	47.0	47.0	47.0	47.0
Total Split (%)	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%	52.2%	52.2%	52.2%	52.2%	52.2%
Maximum Green (s)	36.6	36.6	36.6	36.6	36.6	36.6	39.9	39.9	39.9	39.9	39.9
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	3.8	3.8	3.8	3.8	3.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.4	6.4	6.4	6.4	7.1	7.1	7.1	7.1	7.1
Lead/Lag											
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0	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	C-Max	C-Max	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0	20.0	20.0	20.0	20.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)	1	1	1	5	5	5	3	3	3	6	6
Act Effct Green (s)	42.0	42.0	42.0	42.0	42.0	42.0	34.5	34.5	34.5	34.5	34.5
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.31	0.80	0.22	0.64	0.40	0.01	0.87	0.21	0.53	0.09	0.21
Control Delay	20.9	27.2	3.7	59.0	19.8	2.5	46.5	18.1	21.1	16.1	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	27.2	3.7	59.0	19.8	2.5	46.5	18.1	21.1	16.1	11.3
LOS	C	C	A	E	B	A	D	B	C	B	B
Approach Delay		24.1			23.4			32.1			12.3
Approach LOS		C			C			C			B
Queue Length 50th (m)	10.4	94.5	0.0	5.2	24.9	0.0	56.3	15.0	33.7	3.7	9.4
Queue Length 95th (m)	24.0	#143.6	11.2	#30.4	53.8	m0.6	#98.4	25.3	53.5	9.0	19.6
Internal Link Dist (m)		757.9			347.8			602.6			757.9
Turn Bay Length (m)	60.0		100.0	65.0		15.0	90.0		40.0	30.0	
Base Capacity (vph)	309	1503	765	101	1517	699	500	744	670	446	748
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.80	0.22	0.64	0.40	0.01	0.75	0.19	0.47	0.08	0.19

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
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: 0.87
Intersection Signal Delay: 25.4 — Intersection LOS: C
Intersection Capacity Utilization 100.8% — ICU Level of Service G
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Blair & Montreal



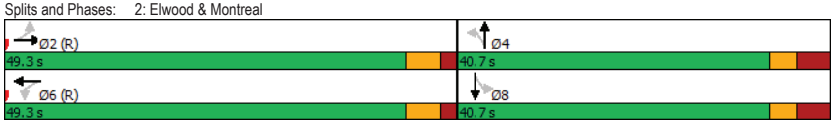
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	4	1444	28	660	13	1	1	0
Future Volume (vph)	4	1444	28	660	13	1	1	0
Lane Group Flow (vph)	4	1472	28	663	0	42	0	4
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	39.6	39.6	40.7	40.7	40.7	40.7
Total Split (s)	49.3	49.3	49.3	49.3	40.7	40.7	40.7	40.7
Total Split (%)	54.8%	54.8%	54.8%	54.8%	45.2%	45.2%	45.2%	45.2%
Maximum Green (s)	43.7	43.7	43.7	43.7	34.0	34.0	34.0	34.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	3.7	3.7	3.7	3.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6		6.7		6.7
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	24.0	24.0	24.0	24.0
Pedestrian Calls (#/hr)	3	3	5	5	6	6	3	3
Act Effct Green (s)	71.8	71.8	71.8	71.8		14.8		14.8
Actuated g/C Ratio	0.80	0.80	0.80	0.80		0.16		0.16
v/c Ratio	0.01	0.58	0.14	0.26		0.17		0.02
Control Delay	8.5	7.6	10.5	6.0		19.9		0.0
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	8.5	7.6	10.5	6.0		19.9		0.0
LOS	A	A	B	A		B		A
Approach Delay		7.6		6.2		19.9		
Approach LOS		A		A		B		
Queue Length 50th (m)	0.1	28.6	1.1	15.1		3.8		0.0
Queue Length 95th (m)	m0.5	#168.7	9.0	50.4		9.0		0.0
Internal Link Dist (m)		347.8		504.7		77.8		0.1
Turn Bay Length (m)	35.0		15.0					
Base Capacity (vph)	553	2530	205	2592		531		564
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.01	0.58	0.14	0.26		0.08		0.01

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 8 (9%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 7.4 — Intersection LOS: A
Intersection Capacity Utilization 69.1% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Elwood & Montreal



Appendix H

TDM Checklist

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

Legend

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

		TDM measures: *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	☐

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	☐

Appendix I

Synchro Intersection Worksheets – 2024 Future Total Conditions

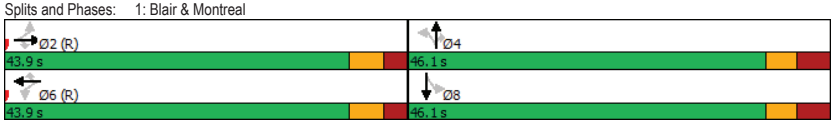
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	41	522	165	183	1254	21	142	90	55	26	197
Future Volume (vph)	41	522	165	183	1254	21	142	90	55	26	197
Lane Group Flow (vph)	41	522	165	183	1254	21	142	90	55	26	327
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			4			8
Permitted Phases	2		2	6		6	4		4	8	
Detector Phase	2	2	2	6	6	6	4	4	4	8	8
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.4	33.4	33.4	33.4	33.4	33.4	46.1	46.1	46.1	46.1	46.1
Total Split (s)	43.9	43.9	43.9	43.9	43.9	43.9	46.1	46.1	46.1	46.1	46.1
Total Split (%)	48.8%	48.8%	48.8%	48.8%	48.8%	48.8%	51.2%	51.2%	51.2%	51.2%	51.2%
Maximum Green (s)	37.5	37.5	37.5	37.5	37.5	37.5	39.0	39.0	39.0	39.0	39.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	3.8	3.8	3.8	3.8	3.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.4	6.4	6.4	6.4	7.1	7.1	7.1	7.1	7.1
Lead/Lag											
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0	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	C-Max	C-Max	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0	20.0	20.0	20.0	20.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)	0	0	0	4	4	4	5	5	5	0	0
Act Effct Green (s)	51.9	51.9	51.9	51.9	51.9	51.9	24.6	24.6	24.6	24.6	24.6
Actuated g/C Ratio	0.58	0.58	0.58	0.58	0.58	0.58	0.27	0.27	0.27	0.27	0.27
v/c Ratio	0.27	0.28	0.18	0.40	0.67	0.02	0.78	0.20	0.13	0.09	0.72
Control Delay	19.9	11.8	3.0	14.9	15.3	3.6	56.5	23.3	5.9	21.0	35.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	11.8	3.0	14.9	15.3	3.6	56.5	23.3	5.9	21.0	35.7
LOS	B	B	A	B	B	A	E	C	A	C	D
Approach Delay		10.3			15.1			36.4			34.6
Approach LOS		B			B			D			C
Queue Length 50th (m)	3.1	21.2	0.0	8.4	30.3	0.0	23.2	12.2	0.0	3.4	49.6
Queue Length 95th (m)	14.9	44.8	11.0	27.5	#143.4	m0.9	35.4	18.0	6.4	7.2	59.1
Internal Link Dist (m)		757.9			347.8			602.6			757.9
Turn Bay Length (m)	60.0		30.0	65.0		15.0	25.0		30.0	25.0	
Base Capacity (vph)	154	1858	925	458	1876	851	288	727	664	455	716
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.28	0.18	0.40	0.67	0.02	0.49	0.12	0.08	0.06	0.46

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 14 (16%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 18.5 — Intersection LOS: B
Intersection Capacity Utilization 95.1% — 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Blair & Montreal



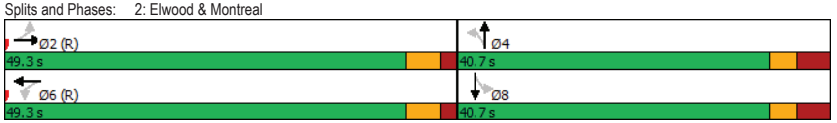
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	2	567	16	1459	16	0	0
Future Volume (vph)	2	567	16	1459	16	0	0
Lane Group Flow (vph)	2	576	16	1461	0	36	1
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		4	8
Permitted Phases	2		6		4		
Detector Phase	2	2	6	6	4	4	8
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	39.6	39.6	40.7	40.7	40.7
Total Split (s)	49.3	49.3	49.3	49.3	40.7	40.7	40.7
Total Split (%)	54.8%	54.8%	54.8%	54.8%	45.2%	45.2%	45.2%
Maximum Green (s)	43.7	43.7	43.7	43.7	34.0	34.0	34.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	3.7	3.7	3.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6		6.7	6.7
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	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
Walk Time (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	24.0	24.0	24.0
Pedestrian Calls (#/hr)	3	3	5	5	6	6	3
Act Effct Green (s)	71.8	71.8	71.8	71.8		14.8	14.8
Actuated g/C Ratio	0.80	0.80	0.80	0.80		0.16	0.16
v/c Ratio	0.01	0.23	0.03	0.56		0.15	0.00
Control Delay	8.0	4.4	7.8	9.6		11.4	0.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	8.0	4.4	7.8	9.6		11.4	0.0
LOS	A	A	A	A		B	A
Approach Delay		4.4		9.6		11.4	
Approach LOS		A		A		B	
Queue Length 50th (m)	0.1	12.1	0.6	48.1		0.6	0.0
Queue Length 95th (m)	m0.5	24.0	4.8	#168.9		6.2	0.0
Internal Link Dist (m)		347.8		504.7		77.8	0.1
Turn Bay Length (m)	35.0		15.0				
Base Capacity (vph)	207	2534	604	2595		528	582
Starvation Cap Reductn	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0
Reduced v/c Ratio	0.01	0.23	0.03	0.56		0.07	0.00

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 8.2 — Intersection LOS: A
Intersection Capacity Utilization 65.6% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Elwood & Montreal



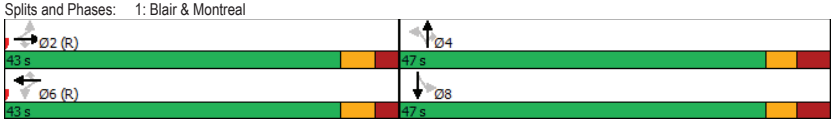
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	115	1129	157	65	602	22	299	144	247	45	104
Future Volume (vph)	115	1129	157	65	602	22	299	144	247	45	104
Lane Group Flow (vph)	115	1129	157	65	602	22	299	144	247	45	174
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			4			8
Permitted Phases	2		2	6		6	4		4	8	
Detector Phase	2	2	2	6	6	6	4	4	4	8	8
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.4	33.4	33.4	33.4	33.4	33.4	46.1	46.1	46.1	46.1	46.1
Total Split (s)	43.0	43.0	43.0	43.0	43.0	43.0	47.0	47.0	47.0	47.0	47.0
Total Split (%)	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%	52.2%	52.2%	52.2%	52.2%	52.2%
Maximum Green (s)	36.6	36.6	36.6	36.6	36.6	36.6	39.9	39.9	39.9	39.9	39.9
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	3.8	3.8	3.8	3.8	3.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.4	6.4	6.4	6.4	7.1	7.1	7.1	7.1	7.1
Lead/Lag											
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0	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	C-Max	C-Max	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0	20.0	20.0	20.0	20.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)	1	1	1	5	5	5	3	3	3	6	6
Act Effct Green (s)	46.7	46.7	46.7	46.7	46.7	46.7	29.8	29.8	29.8	29.8	29.8
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52	0.52	0.33	0.33	0.33	0.33	0.33
v/c Ratio	0.32	0.68	0.20	0.42	0.36	0.03	0.83	0.26	0.48	0.14	0.30
Control Delay	18.8	20.7	7.8	34.6	17.6	7.4	45.7	21.2	21.5	18.8	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.8	20.7	7.8	34.6	17.6	7.4	45.7	21.2	21.5	18.8	15.5
LOS	B	C	A	C	B	A	D	C	C	B	B
Approach Delay		19.1			18.9			31.9			16.2
Approach LOS		B			B			C			B
Queue Length 50th (m)	11.1	73.5	5.8	5.1	24.8	0.0	46.4	17.8	27.3	5.3	15.4
Queue Length 95th (m)	29.1	#122.8	19.4	#24.6	54.3	4.4	66.3	26.3	40.3	10.8	25.4
Internal Link Dist (m)		757.9			347.8			602.6			757.9
Turn Bay Length (m)	60.0		30.0	65.0		15.0	25.0		30.0	25.0	
Base Capacity (vph)	355	1671	794	154	1687	772	484	744	670	443	748
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.68	0.20	0.42	0.36	0.03	0.62	0.19	0.37	0.10	0.23

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
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: 0.83
Intersection Signal Delay: 21.8 — Intersection LOS: C
Intersection Capacity Utilization 95.8% — 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: 1: Blair & Montreal



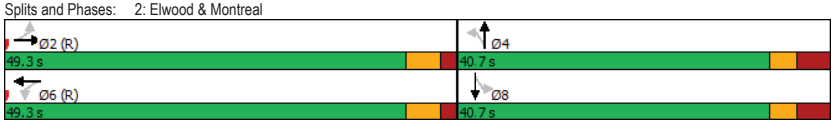
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	4	1367	28	674	13	1	1	0
Future Volume (vph)	4	1367	28	674	13	1	1	0
Lane Group Flow (vph)	4	1395	28	677	0	40	0	4
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	39.6	39.6	40.7	40.7	40.7	40.7
Total Split (s)	49.3	49.3	49.3	49.3	40.7	40.7	40.7	40.7
Total Split (%)	54.8%	54.8%	54.8%	54.8%	45.2%	45.2%	45.2%	45.2%
Maximum Green (s)	43.7	43.7	43.7	43.7	34.0	34.0	34.0	34.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	3.7	3.7	3.7	3.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6		6.7		6.7
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	24.0	24.0	24.0	24.0
Pedestrian Calls (#/hr)	3	3	5	5	6	6	3	3
Act Effct Green (s)	71.8	71.8	71.8	71.8		14.8		14.8
Actuated g/C Ratio	0.80	0.80	0.80	0.80		0.16		0.16
v/c Ratio	0.01	0.55	0.12	0.26		0.16		0.02
Control Delay	8.0	6.5	9.9	6.0		16.8		0.0
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	8.0	6.5	9.9	6.0		16.8		0.0
LOS	A	A	A	A		B		A
Approach Delay		6.5		6.2		16.8		
Approach LOS		A		A		B		
Queue Length 50th (m)	0.1	30.2	1.1	15.5		2.7		0.0
Queue Length 95th (m)	m0.5	#67.1	8.7	51.7		8.0		0.0
Internal Link Dist (m)		347.8		504.7		77.8		0.1
Turn Bay Length (m)	35.0		15.0					
Base Capacity (vph)	545	2529	226	2592		533		564
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.01	0.55	0.12	0.26		0.08		0.01

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 8 (9%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 6.6 — Intersection LOS: A
Intersection Capacity Utilization 66.9% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Elwood & Montreal



Appendix J

Synchro Intersection Worksheets – 2029 Future Total Conditions

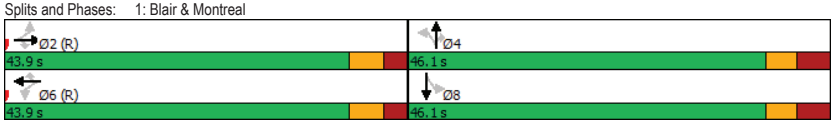
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	41	522	165	195	1334	21	142	90	55	26	239
Future Volume (vph)	41	522	165	195	1334	21	142	90	55	26	239
Lane Group Flow (vph)	41	522	165	195	1334	21	142	90	55	26	369
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			4			8
Permitted Phases	2		2	6		6	4		4	8	
Detector Phase	2	2	2	6	6	6	4	4	4	8	8
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.4	33.4	33.4	33.4	33.4	33.4	46.1	46.1	46.1	46.1	46.1
Total Split (s)	43.9	43.9	43.9	43.9	43.9	43.9	46.1	46.1	46.1	46.1	46.1
Total Split (%)	48.8%	48.8%	48.8%	48.8%	48.8%	48.8%	51.2%	51.2%	51.2%	51.2%	51.2%
Maximum Green (s)	37.5	37.5	37.5	37.5	37.5	37.5	39.0	39.0	39.0	39.0	39.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	3.8	3.8	3.8	3.8	3.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.4	6.4	6.4	6.4	7.1	7.1	7.1	7.1	7.1
Lead/Lag											
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0	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	C-Max	C-Max	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0	20.0	20.0	20.0	20.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)	0	0	0	4	4	4	5	5	5	0	0
Act Effct Green (s)	50.0	50.0	50.0	50.0	50.0	50.0	26.5	26.5	26.5	26.5	26.5
Actuated g/C Ratio	0.56	0.56	0.56	0.56	0.56	0.56	0.29	0.29	0.29	0.29	0.29
v/c Ratio	0.34	0.29	0.18	0.45	0.74	0.03	0.81	0.18	0.12	0.08	0.75
Control Delay	25.9	12.7	3.1	16.2	17.7	3.6	60.3	21.9	5.6	19.8	36.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	12.7	3.1	16.2	17.7	3.6	60.3	21.9	5.6	19.8	36.5
LOS	C	B	A	B	B	A	E	C	A	B	D
Approach Delay		11.3			17.4			37.8			35.4
Approach LOS		B			B			D			D
Queue Length 50th (m)	3.5	22.9	0.0	9.0	32.2	0.0	23.0	11.7	0.0	3.3	56.4
Queue Length 95th (m)	#18.8	44.8	11.0	28.8	#159.3	m0.8	37.9	18.0	6.4	7.2	68.6
Internal Link Dist (m)		757.9			347.8			602.6			757.9
Turn Bay Length (m)	60.0		100.0	65.0		15.0	90.0		40.0	30.0	
Base Capacity (vph)	121	1790	897	437	1808	822	258	727	664	455	720
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.29	0.18	0.45	0.74	0.03	0.55	0.12	0.08	0.06	0.51

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 14 (16%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 20.2 — Intersection LOS: C
Intersection Capacity Utilization 99.7% — 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Blair & Montreal



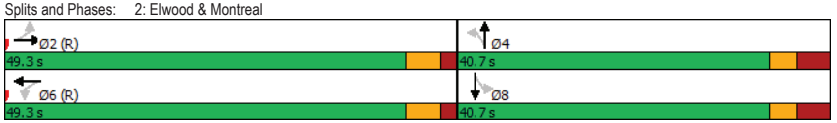
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	2	567	17	1553	16	0	0
Future Volume (vph)	2	567	17	1553	16	0	0
Lane Group Flow (vph)	2	576	17	1555	0	36	1
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		2		6		4	8
Permitted Phases	2		6		4		
Detector Phase	2	2	6	6	4	4	8
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	39.6	39.6	40.7	40.7	40.7
Total Split (s)	49.3	49.3	49.3	49.3	40.7	40.7	40.7
Total Split (%)	54.8%	54.8%	54.8%	54.8%	45.2%	45.2%	45.2%
Maximum Green (s)	43.7	43.7	43.7	43.7	34.0	34.0	34.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	3.7	3.7	3.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6		6.7	6.7
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	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
Walk Time (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	24.0	24.0	24.0
Pedestrian Calls (#/hr)	3	3	5	5	6	6	3
Act Effct Green (s)	71.8	71.8	71.8	71.8		14.8	14.8
Actuated g/C Ratio	0.80	0.80	0.80	0.80		0.16	0.16
v/c Ratio	0.01	0.23	0.03	0.60		0.15	0.00
Control Delay	8.0	4.4	7.8	10.3		11.4	0.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	8.0	4.4	7.8	10.3		11.4	0.0
LOS	A	A	A	B		B	A
Approach Delay		4.4		10.3		11.4	
Approach LOS		A		B		B	
Queue Length 50th (m)	0.1	12.1	0.6	54.0		0.6	0.0
Queue Length 95th (m)	m0.5	24.0	5.0	#187.3		6.2	0.0
Internal Link Dist (m)		347.8		504.7		77.8	0.1
Turn Bay Length (m)	35.0		15.0				
Base Capacity (vph)	181	2534	604	2595		528	582
Starvation Cap Reductn	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0
Reduced v/c Ratio	0.01	0.23	0.03	0.60		0.07	0.00

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 8.8 — Intersection LOS: A
Intersection Capacity Utilization 68.3% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Elwood & Montreal



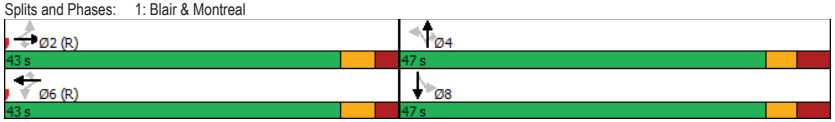
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	115	1201	167	65	602	22	377	172	312	45	104
Future Volume (vph)	115	1201	167	65	602	22	377	172	312	45	104
Lane Group Flow (vph)	115	1201	167	65	602	22	377	172	312	45	174
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			4			8
Permitted Phases	2		2	6		6	4		4	8	
Detector Phase	2	2	2	6	6	6	4	4	4	8	8
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.4	33.4	33.4	33.4	33.4	33.4	46.1	46.1	46.1	46.1	46.1
Total Split (s)	43.0	43.0	43.0	43.0	43.0	43.0	47.0	47.0	47.0	47.0	47.0
Total Split (%)	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%	52.2%	52.2%	52.2%	52.2%	52.2%
Maximum Green (s)	36.6	36.6	36.6	36.6	36.6	36.6	39.9	39.9	39.9	39.9	39.9
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	3.8	3.8	3.8	3.8	3.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.4	6.4	6.4	6.4	7.1	7.1	7.1	7.1	7.1
Lead/Lag											
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0	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	C-Max	C-Max	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0	20.0	20.0	20.0	20.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)	1	1	1	5	5	5	3	3	3	6	6
Act Effct Green (s)	41.9	41.9	41.9	41.9	41.9	41.9	34.6	34.6	34.6	34.6	34.6
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.37	0.80	0.22	0.64	0.40	0.03	0.90	0.27	0.53	0.12	0.27
Control Delay	22.4	27.4	3.7	59.0	20.0	7.5	50.6	18.8	21.0	16.5	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	27.4	3.7	59.0	20.0	7.5	50.6	18.8	21.0	16.5	13.2
LOS	C	C	A	E	B	A	D	B	C	B	B
Approach Delay		24.3			23.3			33.5			13.9
Approach LOS		C			C			C			B
Queue Length 50th (m)	13.1	94.5	0.0	5.2	25.0	0.0	57.3	19.1	33.7	4.7	13.6
Queue Length 95th (m)	29.5	#143.6	11.2	#30.5	54.3	4.4	#101.3	30.8	53.5	10.8	25.4
Internal Link Dist (m)		757.9			347.8			602.6			757.9
Turn Bay Length (m)	60.0		100.0	65.0		15.0	90.0		40.0	30.0	
Base Capacity (vph)	308	1498	763	101	1513	697	484	744	670	433	748
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.80	0.22	0.64	0.40	0.03	0.78	0.23	0.47	0.10	0.23

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
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: 0.90
Intersection Signal Delay: 25.8 — Intersection LOS: C
Intersection Capacity Utilization 102.4% — ICU Level of Service G
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Blair & Montreal



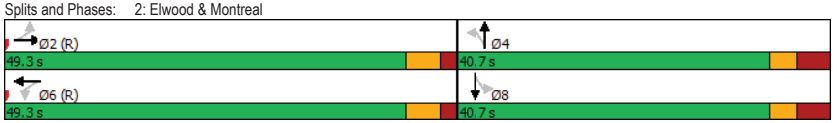
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	4	1453	28	674	13	1	1	0
Future Volume (vph)	4	1453	28	674	13	1	1	0
Lane Group Flow (vph)	4	1481	28	677	0	42	0	4
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	39.6	39.6	40.7	40.7	40.7	40.7
Total Split (s)	49.3	49.3	49.3	49.3	40.7	40.7	40.7	40.7
Total Split (%)	54.8%	54.8%	54.8%	54.8%	45.2%	45.2%	45.2%	45.2%
Maximum Green (s)	43.7	43.7	43.7	43.7	34.0	34.0	34.0	34.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0
All-Red Time (s)	1.9	1.9	1.9	1.9	3.7	3.7	3.7	3.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6		6.7		6.7
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0	10.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	24.0	24.0	24.0	24.0
Pedestrian Calls (#/hr)	3	3	5	5	6	6	3	3
Act Effct Green (s)	71.8	71.8	71.8	71.8		14.8		14.8
Actuated g/C Ratio	0.80	0.80	0.80	0.80		0.16		0.16
v/c Ratio	0.01	0.59	0.14	0.26		0.17		0.02
Control Delay	8.5	7.7	10.6	6.0		19.9		0.0
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	8.5	7.7	10.6	6.0		19.9		0.0
LOS	A	A	B	A		B		A
Approach Delay		7.7		6.2		19.9		
Approach LOS		A		A		B		
Queue Length 50th (m)	0.1	29.7	1.1	15.5		3.8		0.0
Queue Length 95th (m)	m0.5	#170.5	9.1	51.7		9.0		0.0
Internal Link Dist (m)		347.8		504.7		77.8		0.1
Turn Bay Length (m)	35.0		15.0					
Base Capacity (vph)	545	2530	202	2592		531		564
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.01	0.59	0.14	0.26		0.08		0.01

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 8 (9%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 7.5 — Intersection LOS: A
Intersection Capacity Utilization 69.4% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Elwood & Montreal



Appendix K

MMLOS Analysis

Multi-Modal Level of Service - Intersections Form

Consultant	**CGH Transportation Inc.**	**Project**	**2021-003 1649 Montreal**
Scenario	**Existing/Future**	**Date**	**2021-05-05**
Comments			

Unlocked Rows for Replicating

	INTERSECTIONS	Montreal Rd & Blair Rd (Existing)				Montreal Rd & Elwood St (Existing)				Montreal Rd & Blair Rd (Future)				Montreal Rd & Elwood St (Existing)			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	6	8	10+	8	0 - 2	3	8	7	6	8	9	8	0 - 2	3	5	5
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	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	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Right Turn Channel	No Channel	Conv'tl without Receiving Lane	No Channel	Conv'tl without Receiving Lane	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	15-25m	10-15m	15-25m	0-3m	5-10m	5-10m	0-3m	10-15m	15-25m	10-15m	10-15m	0-3m	10-15m	10-15m	0-3m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	PETSI Score	**20**	**-10**	**-45**	**-10**	**88**	**71**	**-11**	**7**	**23**	**-11**	**-26**	**-9**	**91**	**73**	**40**	**43**
	Ped. Exposure to Traffic LoS	**F**	**F**	**#N/A**	**F**	**B**	**C**	**F**	**F**	**F**	**F**	**#N/A**	**F**	**A**	**C**	**E**	**E**
	Cycle Length																
	Effective Walk Time																
	Average Pedestrian Delay																
	Pedestrian Delay LoS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Level of Service	**F**	**F**	**#N/A**	**F**	**B**	**C**	**F**	**F**	**F**	**F**	**#N/A**	**F**	**A**	**C**	**E**	**E**
		#N/A				**F**				**#N/A**				**E**			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Pocket Bike Lane	Mixed Traffic	Mixed Traffic	Mixed Traffic					Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP			Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration	≤ 50 m Introduced right turn lane	≤ 50 m	≤ 50 m	≤ 50 m					Not Applicable	Not Applicable	Not Applicable	Not Applicable			Not Applicable	Not Applicable
	Right Turning Speed	>25 to 30 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h					Not Applicable	Not Applicable	Not Applicable	Not Applicable			Not Applicable	Not Applicable
	Cyclist relative to RT motorists	C	D	D	D	A	A	A	A	Not Applicable	Not Applicable	Not Applicable	Not Applicable	A	A	Not Applicable	Not Applicable
	Separated or Mixed Traffic	Separated	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Separated	Separated	Separated	Separated	-	-	Separated	Separated
	Left Turn Approach	1 lane crossed	One lane crossed	One lane crossed	One lane crossed	No lane crossed	No lane crossed	One lane crossed	One lane crossed	2-stage, LT box	2-stage, LT box	2-stage, LT box	2-stage, LT box	No lane crossed	No lane crossed	2-stage, LT box	2-stage, LT box
	Operating Speed	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	D	E	E	E	B	B	E	E	A	A	A	A	B	B	A	A
	Level of Service	**D**	**E**	**E**	**E**	**B**	**B**	**E**	**E**	**A**	**A**	**A**	**A**	**B**	**B**	**A**	**A**
		E				**E**				**A**				**B**			
Transit	Average Signal Delay	≤ 30 sec	≤ 30 sec	≤ 20 sec	≤ 20 sec			≤ 10 sec	≤ 10 sec		≤ 10 sec	≤ 10 sec	≤ 10 sec			≤ 20 sec	≤ 10 sec
	Level of Service	**D**	**D**	**C**	**C**	**-**	**-**	**B**	**B**	**-**	**B**	**B**	**B**	**-**	**-**	**C**	**B**
		D				**B**				**B**				**C**			
Truck	Effective Corner Radius		10 - 15 m		> 15 m						> 15 m		> 15 m				
	Number of Receiving Lanes on Departure from Intersection		≥ 2		1						≥ 2		1				
	Level of Service	**-**	**B**	**-**	**C**	**-**	**-**	**-**	**-**	**-**	**A**	**-**	**C**	**-**	**-**	**-**	**-**
		C				**-**				**C**				**-**			
Auto	Volume to Capacity Ratio	0.61 - 0.70				0.0 - 0.60				0.81 - 0.90				0.0 - 0.60			
	Level of Service	**B**				**A**				**D**				**A**			