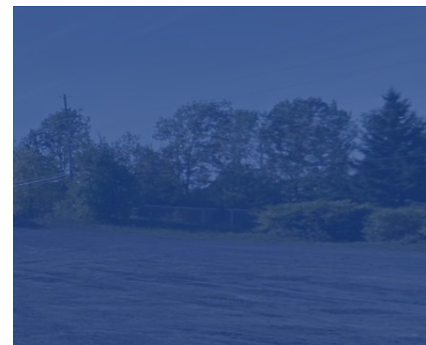


1740 St Laurent Blvd

TIA Strategy Report



Prepared for:



Prepared by:

PARSONS

1740 St Laurent Blvd

TIA Strategy Report

prepared for:
Groupe Heafey
768 Boulevard Saint-Joseph #100
Gatineau, QC, J8Y 4B8

prepared by:
PARSONS
1223 Michael Street North
Suite 100
Ottawa, ON K1J 7T2

May 16, 2019

477122 - 01000

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TIA Strategy Report

1. SCREENING FORM

The screening form was completed for the subject development and included as part of the subsequent report. The Trip Generation, Location and Safety triggers were all checked against their respective criteria and it was determined that only the Trip Generation trigger is met (i.e. the development is anticipated to generate more than 60 vehicles/hour). Since at least one of the triggers was met, a Transportation Impact Assessment (TIA) report must be completed based on the City of Ottawa's TIA Guidelines. The screening form is provided in Appendix A.

2. SCOPING REPORT

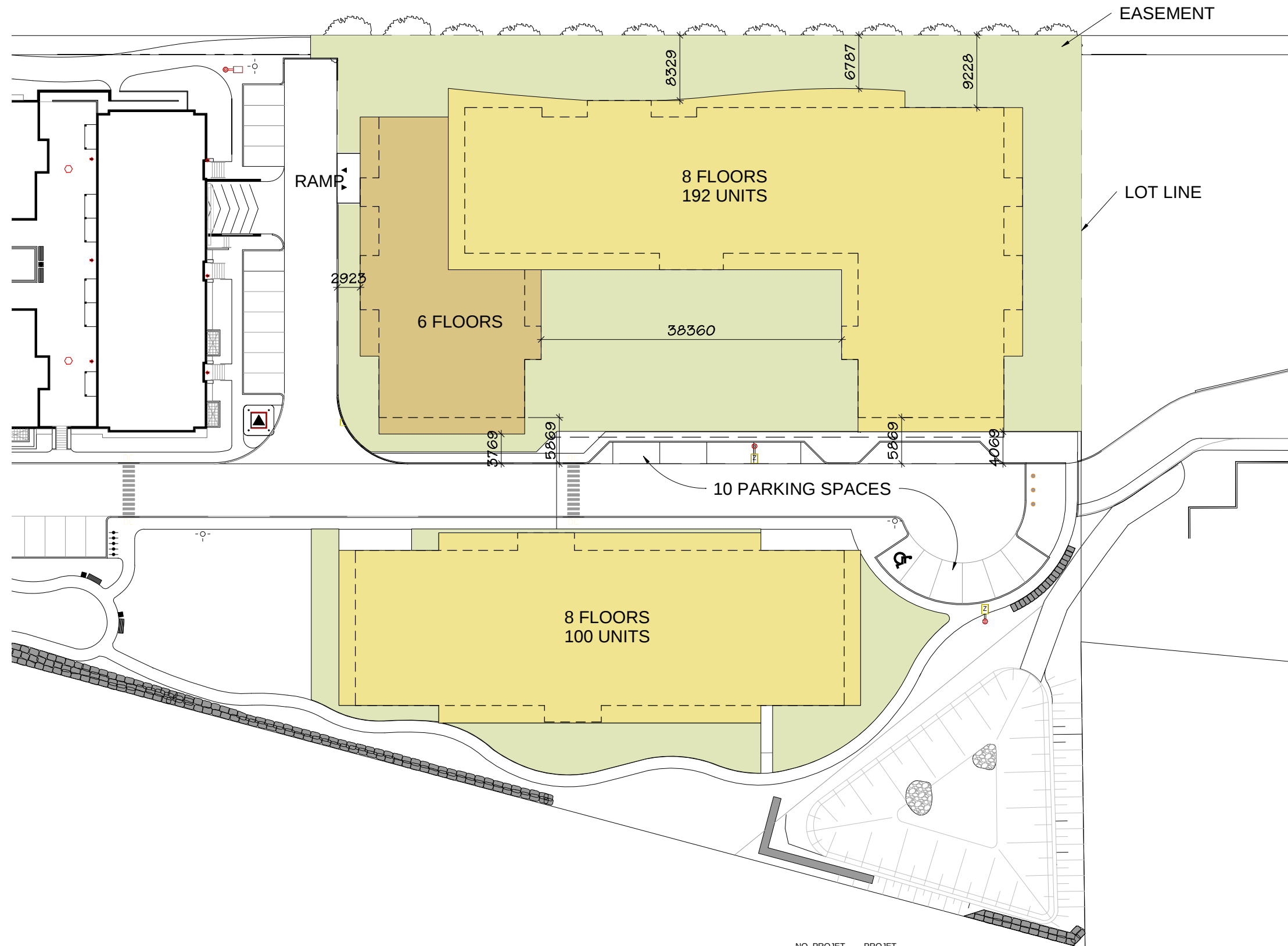
2.1. EXISTING AND PLANNED CONDITIONS

2.1.1. PROPOSED DEVELOPMENT

This study has been prepared as part of the new planned residential development taking place at the municipal address, 1740 St Laurent Blvd. **Figure 1** provides area context regarding the location of the planned future development and the surrounding road network. The residential development is expected to consist of a total of 292 apartment units. 192 units are located in a 6-to-8 storey building at the northern site, while 100 units are located in an 8-storey building at the southern site. The developments are anticipated to be fully constructed in a single phase by 2020. Parking spaces are provided in the form of surface parking and underground parking garages. A total of 375 new parking spaces (365 underground and 10 surface) will be provided to accommodate the residential developments. **Figure 2** shows the proposed site plan of the future developments. The northern site will be accessed through Blackcomb Priv, while the southern site will be accessed through Everest Priv. The development site is classified as an Arterial Mainstreet Zone according to Zoning By-Law.

Figure 1: Local Context





2.1.2. EXISTING CONDITIONS

Area Road Network

St Laurent Blvd is a north-south arterial roadway within the study area, with a 4-lane cross-section and auxiliary turn lanes at major intersections. Bus lanes and cycle tracks exist on the west side of St Laurent Blvd, between Industrial Ave and Smyth Rd and on the east side of the roadway between Industrial Ave and Bourassa St. The roadway extends from Sandridge Rd in the north to Walkley Rd in the south, where it curves west to intersect with Conroy Rd and end at Don Reid Dr. The posted speed limit along St Laurent Blvd is 70 km/h north of Smyth and 50 km/h south of Smyth Rd.

Industrial Ave is an east-west arterial roadway with a 4-lane cross-section and auxiliary turn lanes at major intersections. It extends from Riverside Dr in the west to St Laurent Blvd in the east. The posted speed limit along Industrial Ave is 60 km/h.

Russell Rd is a northwest-southeast roadway that has been cut into 4 parts over time due to undergoing some major intersection modifications. Within the study area, Russell Rd is classified as a collector roadway and runs from Industrial Ave in the northwest to Smyth Rd in the southeast with a 2-lane cross-section and a posted speed limit of 50 km/h.

Smyth Rd is an east-west arterial roadway with a 4-lane cross-section and auxiliary turn lanes at major intersections. It extends from Riverside Dr in the west to St Laurent Blvd in the east. The posted speed limit along Smyth Rd is 50 km/h.

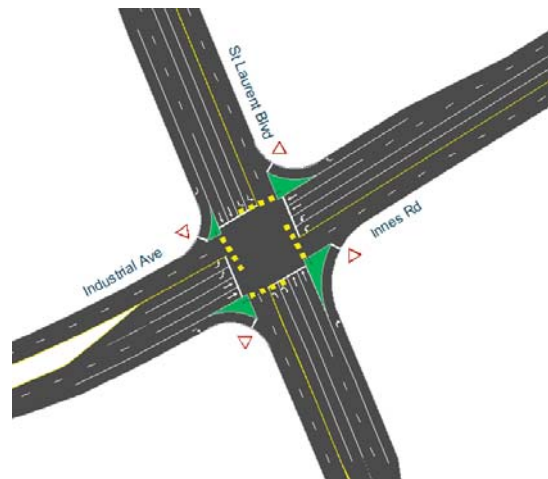
Everest Priv. is an east-west local roadway with a 2-lane cross-section. It extends from Russell Rd in the west to the west edge of the St Hubert Rotisserie parking lot. The assumed speed limit along Everest Priv. is 40 km/h.

Haig Dr is a north-south collector roadway with a 2-lane cross-section. It extends from Russell Rd in the north to Kilborn Ave in the south, where Haig Dr continues as Canterbury Ave. The assumed speed limit along Haig Dr is 50 km/h.

Existing Study Area Intersections

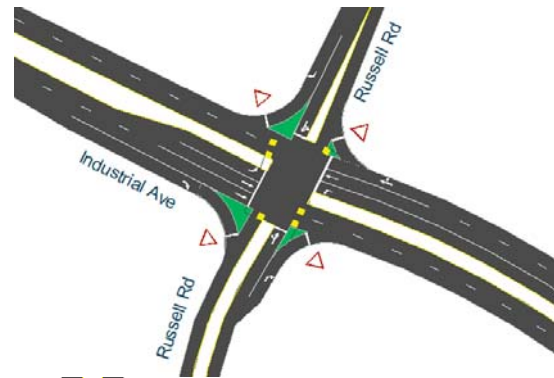
St Laurent/Industrial/Innes

The St Laurent/Industrial/Innes is a signalized four-legged intersection with fully protected left-turn lanes on each leg of the intersection. All legs of the intersection consist of two thru lanes, two left-turn lanes and a YIELD-controlled channelized right-turn lane. There are no restricted movements at this intersection.



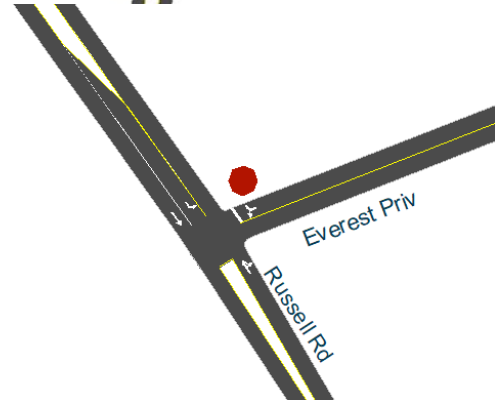
Russell/Industrial

The Russell/Industrial intersection is a signalized four-legged intersection. The east and west legs of the intersection consist of two thru lanes, one left-turn lane and one YIELD-controlled channelized right-turn lane. The north and south legs of the intersection consist of a shared thru/left-turn lane and a YIELD-controlled channelized right-turn lane. There are no restricted movements at this intersection.



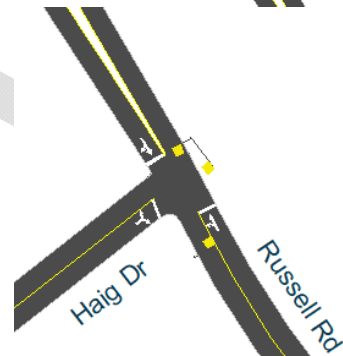
Russell/Everest

The Russell/Everest intersection is an unsignalized 'T' intersection with STOP-control on the east leg of the intersection. The east and south legs of the intersection consist of a single all-movement lane, while the north leg consists of a thru lane and an auxiliary left-turn lane. There are no restricted movements at this intersection.



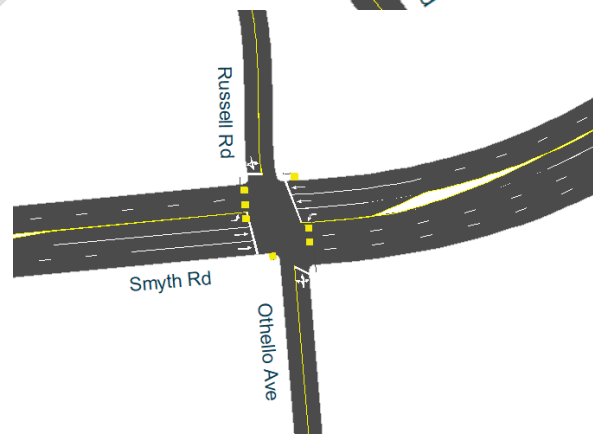
Russell/Haig

The Russell/Haig intersection is a signalized 'T' intersection. All approaches of the intersection consist of a single all-movement lane. There are no restricted movements at this intersection.



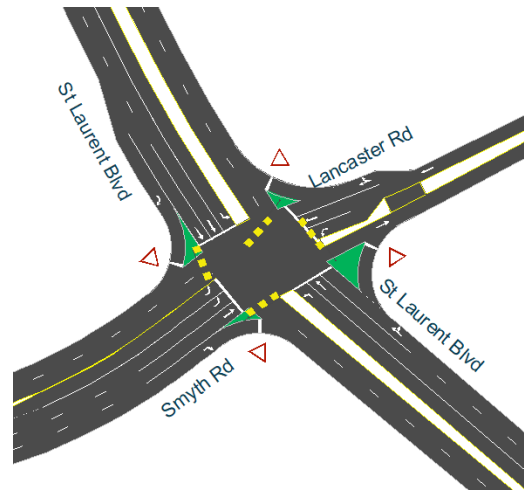
Russell/Smyth/Othello

The Russell/Smyth/Othello intersection is a signalized four-legged intersection. The east and west legs of the intersection consist of an exclusive thru lane, a shared thru/right-turn lane and a left-turn auxiliary lane, while the north and south legs consist of a single all-movement lane. There are no restricted movements at this intersection.



St Laurent/Smyth/Lancaster

The St Laurent/Smyth/Lancaster intersection is a signalized four-legged intersection. The north and south legs consist of two thru lanes, an auxiliary left-turn lane and a YIELD-controlled channelized right-turn lane. The west leg consists of two left-turn lanes, a single thru lane and a YIELD-controlled channelized right-turn lane. The east leg consists of two thru lanes, an auxiliary left-turn lane and a YIELD-controlled channelized right-turn lane. All left-turn movements at the intersection are fully protected. There are no restricted movements at the intersection.



Existing Driveways to Adjacent Developments

Connectivity to the residential apartments to/from St Laurent Blvd will be limited to pedestrians, cyclists and emergency vehicles. As such, all traffic generated by both existing and planned future residential developments along Everest Priv will be directed to/from Russell Rd only. There are no existing driveways between the planned future development sites and Russell Rd (200 m radius).

Pedestrian/Cycling Network

With regards to pedestrians, sidewalk facilities and pathways are provided throughout Everest Priv and provide connectivity to Russell Rd and St Laurent Blvd. Along Russell Rd, sidewalks are provided on both the east and west sides of the roadway, between the Perley-Rideau access and Smyth Rd, and on the east side only of the roadway between the Perley-Rideau access and Industrial Ave. A pedestrian crossing signal (PXO) is provided at the south crosswalk of the Perley-Rideau driveway access. Along St Laurent Blvd, pedestrians have access to the sidewalk on the west side of the roadway.

With regards to cyclists, Russell Rd allows mixed traffic, while St Laurent Blvd is classified as a spine route and provides elevated cycling tracks on both sides of the roadway.

Transit Network and Bus Services

The following OC Transpo bus routes operate within the study area:

- **Route #40 (St Laurent <-> Greenboro, Hurdman):** identified by OC Transpo as a “Frequent Route”, this route operates at an average rate of every 15 minutes during weekday peak hours periods. The nearest bus stops to the site are available along St Laurent Blvd.
- **Route #42 (Blair <-> Hurdman):** identified by OC Transpo as a “Local Route”, this route operates at a rate of every 15-or-30 minutes during weekday morning and afternoon peak hour periods. The nearest bus stops to the future development site are available along Industrial Ave.
- **Route #86 (Elmvale <-> Baseline):** identified by OC Transpo as a “Local Route”, this route operates at a rate of every 5-to-15 minutes during weekday morning and afternoon peak hour periods. The route runs along Russell Rd.
- **Route #106 (Riverside <-> St Laurent):** identified by OC Transpo as a “Local Rote”, this route operates at a rate of every 15 minutes during weekday peak hour periods. The nearest bus stops to the development site are available along St Laurent Blvd.

The noted OC Transpo route maps are provided in Appendix B. **Figure 3** below illustrates the area transit network as portrayed in the OC Transpo System Map, while **Figure 4** provides the locations of bus stops nearest to the site.

Figure 3: Area Transit Network

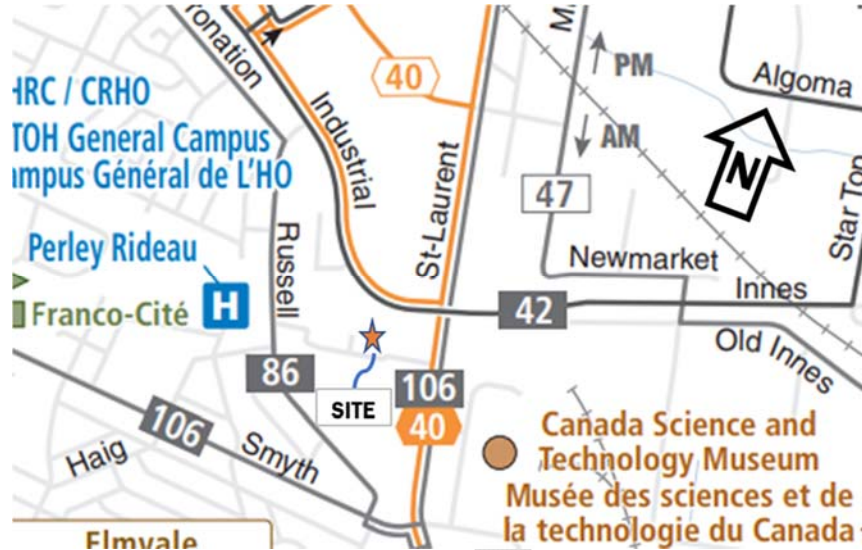
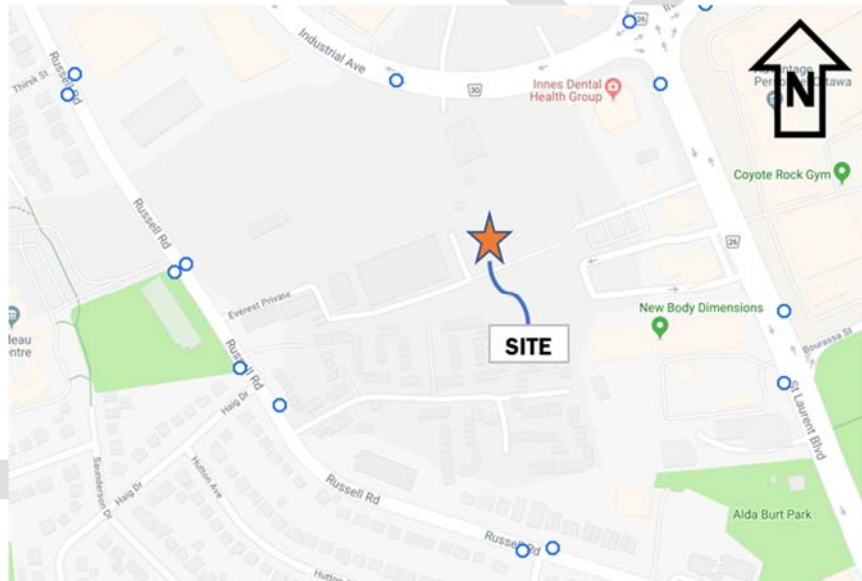


Figure 4: Bus Stop Locations



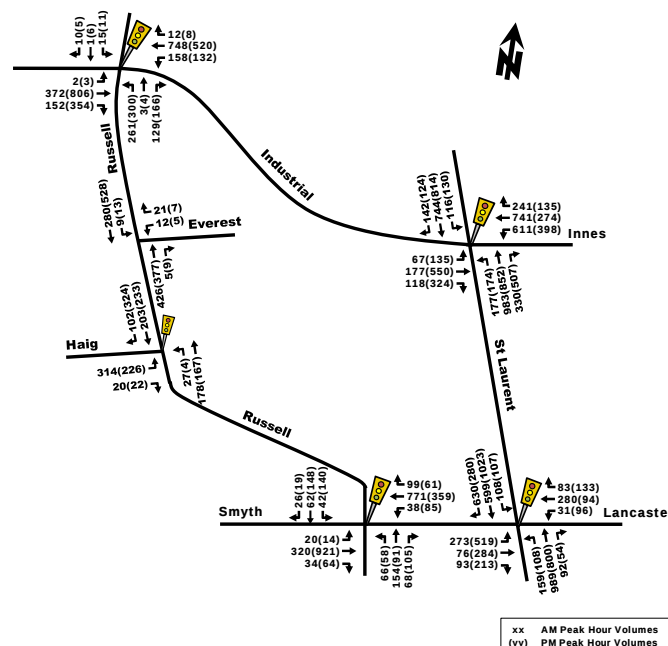
Peak hour travel demands

In order to establish a baseline for local traffic conditions, existing traffic count data was obtained from the City of Ottawa for the following signalized intersections within the study area:

- Industrial Ave/Innes Rd at St Laurent Blvd (2019)
- Industrial Ave at Russell Rd (2015)
- Haig Dr at Russell Rd (2019)
- Smyth Rd/Othello Ave at Russell Rd (2016)
- Smyth Rd/Lancaster Rd at St Laurent Blvd (2016)

Traffic counts were also undertaken at the STOP-Controlled intersection of Everest Private and Russell Rd on Tuesday, April 9, 2019. **Figure 5** provides an illustration of the existing traffic volumes (raw and unbalanced) at intersections within the study area. All traffic count data is provided in Appendix C.

Figure 5: Existing Peak Hour Traffic Volumes



Along Russell Rd, just north of the Everest Priv access, is the unsignalized driveway access serving the Perley and Rideau Veterans' Health Centre. This intersection is not included as part of the analysis provided herein. Field observation indicates that there are modest delays for vehicles exiting the driveway during the shift change close to 3pm, but otherwise there are no known operational issues at this driveway.

Existing Road Safety Conditions

A five-year collision history report (2014-2018, inclusive) was obtained from the City of Ottawa for the following road segments and intersections along Russell Rd:

- Russell/Haig intersection
- Russell/Everest intersection
- Russell road segment between Thirsk and Haig
- Russell Road Segment between Haig and Cuba

A total of 10 collisions were recorded at the above locations, all of which involved property damage only. 40% of collisions involved rear end, 10% involved turning movement, 20% involved sideswipe and 30% involved angle collisions.

A standard unit of measure for assessing collisions at an intersection is based on the number of collisions per million entering vehicles (MEV). At the intersection of Russell/Haig, reported collisions have historically taken place at a rate of 0.15/MEV. Source and detailed collision data can be found in Appendix D.

2.1.3. PLANNED CONDITIONS

Planned Study Area Transportation Network Changes

According to the "2031 Affordable Network" (Map 11), 2015 revision, of the City of Ottawa's Transportation Master Plan, there are no notable transportation network changes planned within the study area by 2031.

Other Area Developments

According to the City's development application search tool, the following developments are planned within the vicinity of the subject site:

Dymon Storage – 851 Industrial Ave

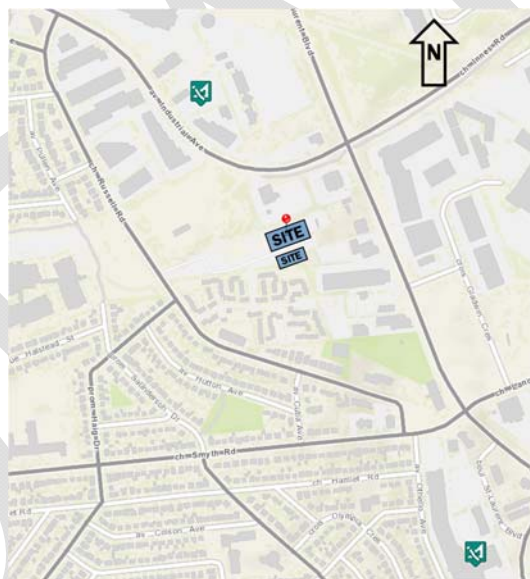
A five-storey building consisting mainly of storage spaces and a small retail space, with an expected occupancy date of this 2020. The development site is anticipated to generate a minimal number of person trips (less than 60 person trips during weekday peak hours). As such, this development will have no effect on the road network surrounding the planned future residential development at 1740 St Laurent Blvd.

Elmvale Acres Shopping Centre Redevelopment (Phase 1) – 1910 St-Laurent Blvd

The Elmvale Acres Shopping Centre is planned to undergo redevelopment and expansion over multiple phases. Phase 1 involves replacing the Kelseys Restaurant at the north end of the Shopping Centre with a residential apartment tower (by RIOCAN) consisting of 168 apartment units and approximately 1100 m² of retail space. The anticipated full build-out year of Phase 1 is 2021. As such, site-generated traffic of Phase 1 of the redevelopment will be included in future analysis of this report.

Figure 6 illustrates the locations of the other area developments relative to the site, obtained from the Development Applications tool provided by the City of Ottawa's In My Neighbourhood Map. The northern green bubble represents 851 Industrial Ave, while the southern green bubble represents 1910 St Laurent Blvd.

Figure 6: Other Area Developments



2.2. STUDY AREA AND TIME PERIODS

The proposed study area intersections to be included in the analysis are outlined below and illustrated in **Figure 7**.

- St Laurent/Industrial/Innes
- Industrial/Russell
- Russell/Everest
- Russell/Haig
- Russell/Smyth/Othello
- St Laurent/Smyth/Lancaster

Figure 7: Study Area



The critical time periods of the future residential apartment buildings development are expected to coincide with the critical peak periods of background travel demand of the adjacent network. Typically, the critical time periods of the road network are the weekday morning and afternoon peak hours. As such, operational analysis in this report will rely on these two peak time periods.

In order to remain consistent with the requirements of the TIA Guidelines, the horizon years to be analyzed are the anticipated year of development full build-out (i.e. 2020) and five years after the development reaches full build-out (i.e. 2025).

2.3. EXEMPTION REVIEW

Based on the City's TIA guidelines and the subject site, the following modules/elements of the TIA process, summarized in **Table 1**, are recommended to be exempt in the subsequent steps of the TIA process:

Table 1: Exemptions Review Summary

Module	Element	Exemption Consideration
4.1 Development Design	4.1.3 New Street Networks	Not required for applications involving site plans.
4.2 Parking	4.2.2 Spillover Parking	The parking is expected to meet By-Law requirements.
4.8 Review of Network Concept	All elements	The site is not expected to generate 200 trips more than the established zoning. This will be confirmed in Step 3.

3. FORECASTING

3.1. DEVELOPMENT GENERATED TRAVEL DEMAND

3.1.1. TRIP GENERATION AND MODE SHARES

The proposed development will consist of 292 apartment dwelling units, housed within two mid-rise buildings (6-8 floors). Appropriate trip generation rates were obtained from the 2009 TRANS Trip Generation Residential Trip Rates report, Table 6.3, which have been summarized in **Table 2**.

Table 2: TRANS Trip Generation Residential Trip Rates

Land Use	Data Source	Trip Rates	
		AM Peak	PM Peak
Mid-Rise Apartments (3-10 floors)	TRANS	T = 0.24(du);	T = 0.28(du);
Notes: T = Average Vehicle Trip Ends du = Dwelling unit			

Using the trip rates shown in **Table 2**, the number of vehicles per hour were determined as shown in **Table 3** below.

Table 3: Apartment Units Vehicle Trip Generation

Land Use	Dwelling Units	AM Peak (Vehicles/h)			PM Peak (Vehicles/h)		
		In	Out	Total	In	Out	Total
Mid-Rise Apartments (3-10 floors)	292	16	54	70	50	32	82

The total vehicle trips shown in **Table 3** for the apartment units were then converted to total person trips using modal share percentages found in the 2009 TRANS Trip Generation Study Report. The total person trips were then used to determine person trips/h for each travel mode, based on their respective mode shares. **Table 4** summarizes the results for the travel modes of the proposed development.

Table 4: Mode Shares for the Residential Buildings Development

Travel Mode	Mode Share	AM Peak (Person Trips/h)			Mode Share	PM Peak (Person Trips/h)		
		In (24%)	Out (76%)	Total		In (24%)	Out (76%)	Total
Auto Driver	37%	16	54	70	40%	50	32	82
Auto Passenger	8%	4	12	16	9%	12	7	19
Transit	41%	19	58	77	37%	47	29	76
Non-motorized	14%	7	19	26	14%	17	11	28
Total Person Trips	100%	46	143	189	100%	126	79	205
Total 'New' Auto Trips		16	54	70		50	32	82

As shown in **Table 4**, the resulting number of Total Person Trips expected to be generated by the proposed development are approximately 189 and 205 person trips/h in the morning and afternoon peak hours respectively. The projected 'new' vehicle trips are approximately 70 and 82 veh/h in the weekday morning and afternoon peak hours respectively.

However, while the 2009 TRANS Trip Generation Study Report provides mode share percentages that are based on the different travel modes, it may not be accurately representative of the travel patterns observed in different districts of Ottawa, as illustrated by the 2011 NCR Household Origin-Destination Survey. As such, the total person trips determined in **Table 4** were used to determine the person trips shown in **Table 5**, based on mode share percentages derived from the 2011 OD Survey for the Alta Vista district.

Table 5: OD Survey Mode Shares – Alta Vista District

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In (24%)	Out (76%)	Total	In (24%)	Out (76%)	Total
Auto Driver	55%	24	80	104	69	43	112
Auto Passenger	15%	7	22	29	19	12	31
Transit	20%	8	29	37	25	16	41
Non-motorized	10%	4	15	19	13	8	21
Total Person Trips	100%	43	146	189	126	79	205
Total 'New' Auto Trips		24	80	104	69	43	112

The new auto trips expected to be generated by the future residential development are 104 and 112 veh/h during the morning and afternoon peak hour periods, respectively.

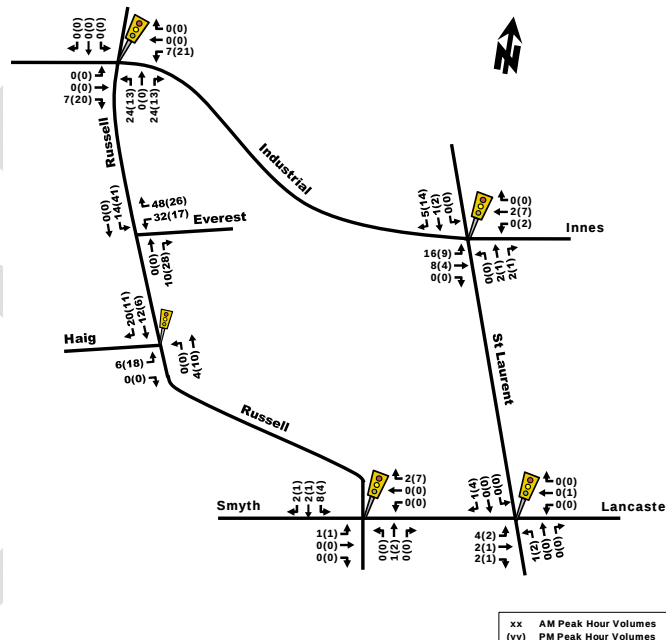
3.1.2. TRIP DISTRIBUTION AND ASSIGNMENT

Based on the 2011 OD Survey (Alta Vista district) and the location of adjacent arterial roadways and neighbourhoods, the distribution of site-generated traffic volumes was estimated as follows:

- 45% to/from the north;
- 25% to/from the south;
- 10% to/from the east; and,
- 20% to/from the west.

The expected site-generated auto trips in **Table 5** were then assigned to the road networks as shown in **Figure 8** below.

Figure 8: Residential Development Site-Generated Traffic



As discussed previously, access to the west side of Everest Priv, where existing and planned future residential developments are located, will be directed to/from Russell Rd only for all non-emergency auto vehicles.

3.2. BACKGROUND NETWORK TRAFFIC

3.2.1. TRANSPORTATION NETWORK PLANS

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

3.2.2. BACKGROUND GROWTH

Based on available historical traffic count data, the intersections of St Laurent/Smyth/Lancaster (years 2012, 2015 and 2016) and St Laurent/Industrial/Innes (year 2008, 2015 and 2019) have experienced a decline in background traffic growth on all legs of the intersections. The percent changes showing this decline are summarized in **Table 6**. Detailed background traffic growth analysis is provided in Appendix E.

Table 6: St Laurent/Smyth/Lancaster Historical Traffic Growth (2012-2016)

Time Period	Percent Annual Change				
	North Leg	South Leg	East Leg	West Leg	Overall
St Laurent/Smyth/Lancaster					
8 hrs	-6.67%	-4.42%	-30.77%	-11.52%	-8.61%
AM Peak	-8.51%	-6.00%	-24.98%	-9.82%	-9.51%
PM Peak	-5.18%	-3.82%	-30.94%	-12.10%	-8.03%
St Laurent/Industrial/Innes					
8 hrs	-1.80%	-1.51%	-0.17%	0.19%	-0.97%
AM Peak	-0.52%	-1.27%	0.10%	0.16%	-0.50%
PM Peak	-2.02%	-1.53%	-0.81%	0.11%	-1.19%

Based on the above background growth analysis results and in order to achieve a conservative output, traffic growth is assumed to be 1% per year for future horizon years 2020 and 2025.

As such, traffic volumes anticipated for the future background horizon years 2020 and 2025 are illustrated in **Figure 9** and **Figure 10**.

Figure 9: Future Background 2020 Traffic Volumes

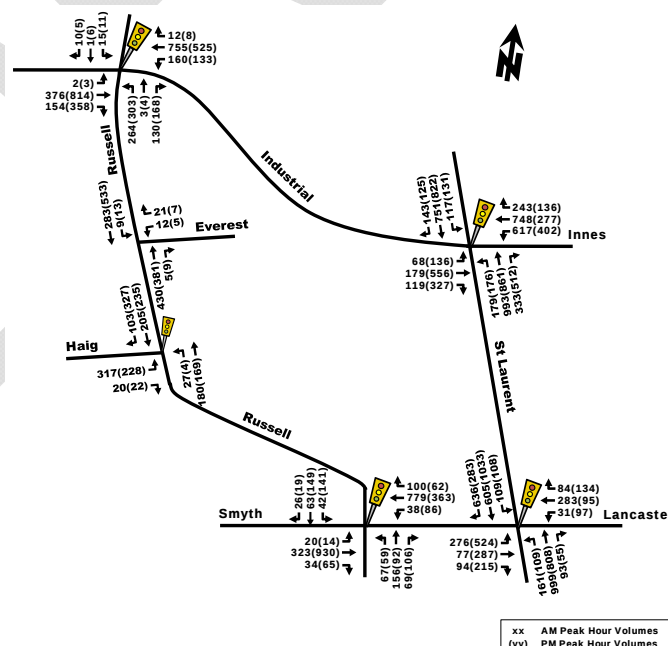
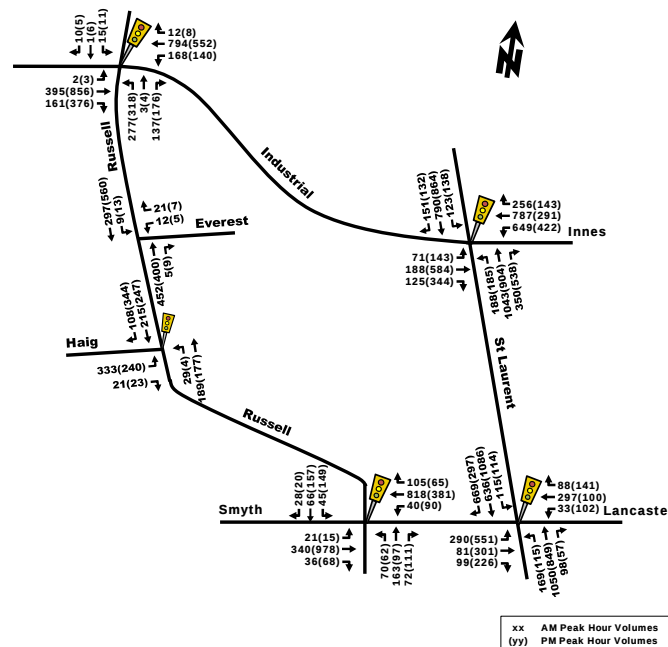


Figure 10: Future Background 2025 Traffic Volumes



3.2.3. OTHER DEVELOPMENTS

Description of other area developments taking place within the study area was provided in **Section 2.1.3 - Other Area Developments**. For the purposes of this report, traffic volumes generated by the Elmvale Acres Shopping Centre Redevelopment (Phase 1), illustrated in **Figure 11**, will be taken into consideration with regards to analysis of future background and future total projected 2025 conditions.

Figure 11: Other Area Developments Traffic Volumes

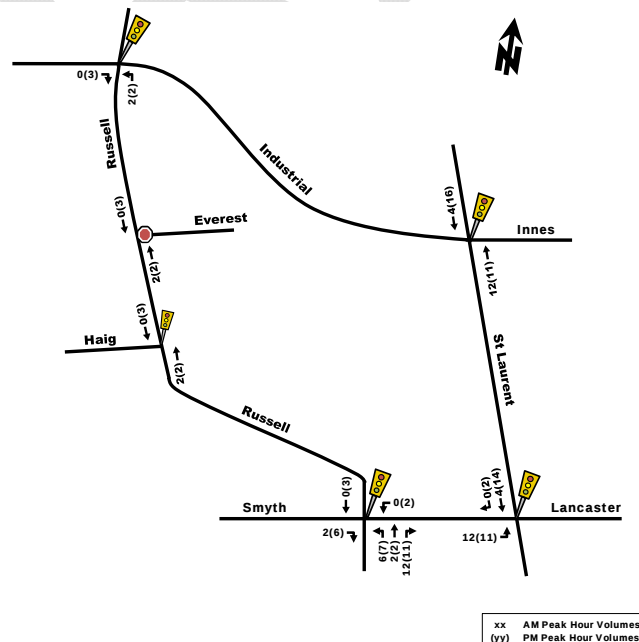
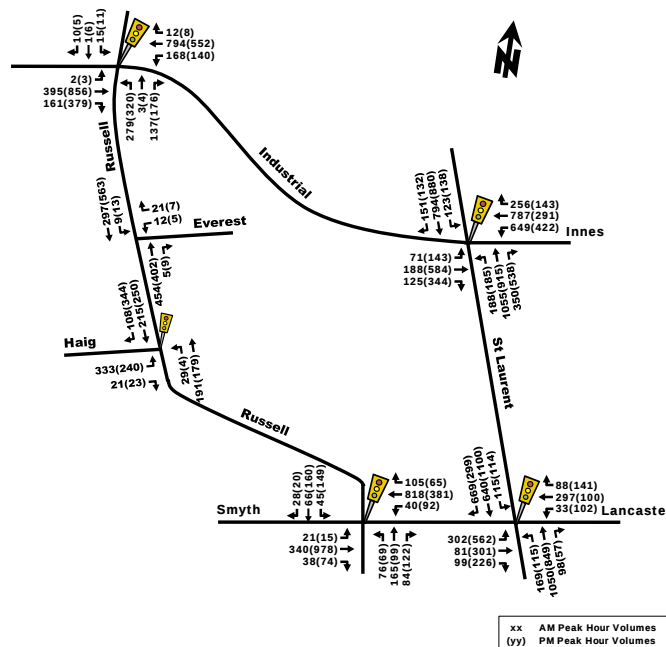


Figure 12 illustrates the total future background traffic volumes for 2025, which consists of future background 2025 peak hour traffic volumes provided in **Figure 10** and other area developments traffic volumes provided in **Figure 11**.

Figure 12: Total Future Background 2025 Traffic Volumes



3.3. DEMAND RATIONALIZATION

The study area road network is expected to accommodate projected volumes. There are currently no anticipated capacity issues. The capacity of the roadways will be further explored in a more detailed review of the total projected traffic volumes and intersection design in the ensuing Strategy Report.

4. ANALYSIS

4.1. DEVELOPMENT DESIGN

4.1.1. DESIGN FOR SUSTAINABLE MODES

Pedestrian access to the site is facilitated by the connectivity of internal pathways along Everest Priv to sidewalks along the east side of St Laurent Blvd and the west side of Russell Rd. Furthermore, cyclists can use the existing road network to access elevated cycling tracks on the west and east sides of St Laurent Blvd.

With regards to transit, several existing bus stops are within walking distance of the site. The bus stops are located on the west and east sides of Russell Rd, approximately 30 m north of Russell/Everest, and on the west side of St Laurent Blvd, approximately 80 m north of the Petro-Canada Gas Station to the east of the residential development site.

4.1.2. CIRCULATION AND ACCESS

In order to access the future development site, traffic is to be directed to/from Russell Rd to the west. Connectivity to St Laurent Blvd is limited to pedestrians, cyclists and emergency vehicles. Along the south side of Everest Priv, directly east of Blackcomb Priv, a parking garage ramp will provide access to the underground parking area of the southern development site. A parking garage ramp along Blackcomb Priv will provide access to the underground parking lots of the northern development site.

4.2. PARKING

4.2.1. PARKING SUPPLY

Vehicle Parking

A total of 365 underground vehicle parking spaces (251 for northern site and 114 for southern site) are proposed to serve the subject development. This exceeds the minimum vehicle parking required by the City's By-Law. 10 surface parking spaces will also be added along Everest Priv. The parking space dimensions are noted to be 5.2 m in length and 2.6 m in width, which meets the City's By-Law requirements.

Bicycle Parking

As per the City's By-Law requirements, bicycle parking spaces will be provided in well-lit, highly visible areas. The number of bicycle parking spaces have yet to be determined, however, they are anticipated to meet the minimum requirements.

4.3. BOUNDARY STREET DESIGN

The boundary streets analyzed using MMLOS methodology are Everest Priv, Russell Rd and St Laurent Blvd.

Everest Private's (Local Road) existing geometry along the frontage of the Sites' property consists of the following features:

- 1 vehicle travel lane in each direction;
- No sidewalks along the frontage of the sites;
- Assumed operating speed of 30 to 50 km/h;
- Undivided/No median;
- 3.3 m wide lanes; and
- No on-street parking and no bus stops.

Russell Road's (Collector Road) existing geometry consists of the following features:

- 1 vehicle travel lane in each direction;
- 1.6 m sidewalks on the east and west sides of the roadway;
- More than 3000 average daily curb traffic;
- Posted speed limit of 50 km/h, assumed operating speed of 40 to 50 km/h;
- Undivided/No median.
- 3.7 m wide lanes;
- Nearest bus stops located to the north of Russell/Everest; and
- No on-street parking.

St Laurent Blvd's (Arterial Road) existing geometry consists of the following features:

- 2 vehicle travel lanes and a dedicated bus lane in each direction;
- 2.0 m sidewalks on the east and west sides of the roadway;
- 2.0 m cycle tracks on both sides of the roadway;
- More than 3000 average daily curb traffic;
- Posted speed limit of 70 km/h;
- Approximately 2.3 m median.
- 3.3 m wide lanes;
- Nearest bus stop located to the north of the Petro-Canada/St Hubert access; and
- No on-street parking.

The multi-modal level of service analysis for road segments along Everest Priv, Russell Rd and St Laurent Blvd adjacent to the site is summarized in **Table 7**, with detail analysis provided in Appendix F. The table also identifies the target LOS set

by the MMLOS Guidelines, based on the road classifications of the road segments and the Urban Policy Plan designation of the area, identified by the City of Ottawa's Transportation Master Plan. Within the study area, Everest Priv and Russell Rd are both located in a General Urban Area, whereas St Laurent Blvd is identified as an Arterial Mainstreet.

Table 7: MMLOS – Existing Boundary Road Conditions

Road Segment	Level of Service							
	Pedestrian (PLOS)		Bicycle (BLOS)		Transit (TLOS)		Truck (TkLOS)	
	PLOS	Target	BLOS	Target	TLOS	Target	TkLOS	Target
Everest Priv	F	C	A	D	D	No target	D	Not a truck route/no target
Russell Rd	E	C	B	D	E	No target	B	Not a truck route/no target
St Laurent Blvd	D	C	A	C	B	D	A	D

Red letters in the table above indicate that a LOS result does not meet the target MMLOS set by the MMLOS Guidelines.

As shown in **Table 7** above, none of the road segments meet the target Pedestrian LOS. Along St Laurent Blvd, failing to meet the target can be attributed to either the high daily curb lane traffic volumes, or having an operating speed greater than 60 km/h. Along Russell Rd, the PLOS does not meet the target PLOS due to both the high daily curb lane traffic volumes and having a narrow sidewalk of 1.6 m. Along Everest Priv, the lack of sidewalks in existing conditions at the frontage of the site causes a fail in PLOS. However, in future conditions, sidewalk facilities are proposed at the frontage of the site, which allows the PLOS to meet the target (as shown in the detailed analysis in Appendix F).

With regards to cyclists, St Laurent Blvd is identified as a Spine Route, while Everest Priv and Russell Rd allow mixed traffic. All road segments meet their target BLOS.

With regards to transit, St Laurent Blvd is designated as a Transit Priority Corridor (Isolated Measures), while Everest Priv and Russell Rd have no designation and as such, no target TLOS. St Laurent Blvd meets the target TLOS.

With regards to trucks, Everest Priv and Russell Rd have no target TkLOS as they are not designated as part of the City of Ottawa Truck Route. On the other hand, St Laurent Blvd is designated as part of the City of Ottawa Truck Route and meets the target TkLOS.

4.4. ACCESS INTERSECTION DESIGN

4.4.1. LOCATION AND DESIGN OF ACCESS

The development sites are proposed to use existing streets and driveways to access the proposed future residential apartment building. The underground parking garage of the southern development site will be accessed through a full-movement ramp that connects to Everest Priv. Similarly, the underground parking garage of the northern development site will be accessed through a full-movement ramp that connects to Blackcomb Priv.

4.4.2. INTERSECTION CONTROL AND DESIGN

Given that the proposed future residential development will rely on existing streets and accesses, the existing intersection controls within the study area are anticipated to be able to handle the future site-generated traffic of the development. As such, no changes are necessary to the existing intersection controls of the road network.

Furthermore, the TIA Guidelines require intersection MMLOS analysis to be provided for existing and future conditions of travel demands. However, since there are no signalized intersections at the frontage of the development site, this analysis cannot be provided.

4.5. TRANSPORTATION DEMAND MANAGEMENT

The TDM checklist is provided in Appendix G.

4.6. NEIGHBOURHOOD TRAFFIC MANAGEMENT

Neighbourhood Traffic Management involves assessing the need to change the existing classification of a local or collector street that provide access to the proposed development. Since Everest Priv is classified as a local street and is fronting the development site, it qualifies for this assessment.

Based on the existing peak hour traffic volumes shown in Figure 5 and the site-generated traffic volumes shown in Figure 8, the highest observed one-way traffic volume along Everest Priv in future conditions is approximately 55 veh/h during the morning peak hour period. The threshold set by the TIA Guidelines with regards to one-way traffic volumes along Local roads is 120 veh/h. Since traffic volumes in future conditions do not exceed the set threshold, no changes are recommended to the classification of Everest Priv.

4.7. TRANSIT

In the 2031 Affordable Network Plan, the City of Ottawa's Transportation Master Plan identifies St Laurent Blvd as a Transit Priority Corridor (Isolated Measures) between Industrial Ave/Innes Rd and Smyth Rd/Lancaster Rd. No other notable transit changes are anticipated within the study area.

4.8. REVIEW OF NETWORK CONCEPT

Exempt – See Section 2.3.

4.9. INTERSECTION DESIGN

4.9.1. INTERSECTION CONTROL

There are no recommended changes or improvements to intersections within the study area. At the intersection of Russell/Everest, the southbound left-turn lane provides adequate storage space based on TAC auxiliary lanes requirements.

4.9.2. INTERSECTION DESIGN

EXISTING CONDITIONS

SYNCHRO (V10) Trafficware was used to analyze intersections within the study area. The following **Table 8** provides a summary of the existing traffic operations based on the existing peak hour traffic volumes (**Figure 5**). Critical movements at signalized intersections were assessed in terms of the volume-to-capacity (v/c) ratio and the corresponding Level of Service (LOS), while the intersection 'as a whole' was assessed based on weighted v/c ratio. Critical movements at unsignalized study area intersections were assessed based on average delay. The SYNCHRO model output of existing conditions is provided in Appendix H.

Table 8: Existing Conditions Intersection Performance

Intersection	Weekday AM Peak (PM Peak) [Saturday]					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
St Laurent Blvd/Industrial Ave/Innes Rd (S)	C(C)	0.76(0.76)	NBT(NBT)	37.5(38.2)	C(B)	0.71(0.69)
Russell Rd/Industrial Ave (S)	A(B)	0.60(0.65)	WBT(WBL)	17.7(15.4)	A(A)	0.54(0.53)
Russell Rd/Haig Dr (S)	B(B)	0.70(0.61)	EBL(EBL)	18.3(13.4)	A(A)	0.43(0.47)
Othello Ave/Russell Rd/Smyth Rd (S)	D(D)	0.82(0.90)	NBT(EBT)	30.8(49.7)	B(D)	0.63(0.86)
St Laurent Blvd/Smyth Rd/Lancaster Rd (S)	C(D)	0.74(0.86)	NBT(EBL)	35.6(33.5)	B(C)	0.70(0.71)
Russell Rd/Everest Priv (U)	B(B)	12.9(14.3)	WB(WB)	0.7(0.3)	-	-
Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane. (S) - Signalized intersection. (U) - Unsignalized intersection.						

As shown in **Table 8**, critical movements at signalized intersections operate at a LOS 'D' or better during the morning and afternoon peak hour periods. Signalized intersections 'as a whole' also operate at a LOS 'D' or better during the morning and afternoon peak hour periods.

The critical movement at the unsignalized intersection of Russell/Everest operates at a LOS 'B' for both morning and afternoon peak hour periods.

FUTURE BACKGROUND 2020 CONDITIONS

Table 9 below provides a summary of SYNCHRO analysis at study area intersections, based on future background 2020 traffic volumes (**Figure 9**). The SYNCHRO model output for future background 2020 conditions is provided in Appendix I.

Table 9: Future Background 2020 Intersection Performance

Intersection	Weekday AM Peak (PM Peak) [Saturday]					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
St Laurent Blvd/Industrial Ave/Innes Rd (S)	C(C)	0.78(0.77)	NBT(NBT)	37.7(38.6)	C(B)	0.72(0.70)
Russell Rd/Industrial Ave (S)	A(B)	0.60(0.66)	WBT(WBL)	17.7(15.5)	A(A)	0.55(0.54)
Russell Rd/Haig Dr (S)	B(B)	0.70(0.61)	EBL(EBL)	18.4(13.5)	A(A)	0.43(0.47)
Othello Ave/Russell Rd/Smyth Rd (S)	D(E)	0.87(0.91)	NBT(EBT)	32.9(50.5)	B(D)	0.65(0.87)
St Laurent Blvd/Smyth Rd/Lancaster Rd (S)	C(D)	0.75(0.87)	NBT(EBL)	36.0(33.7)	C(C)	0.71(0.72)
Russell Rd/Everest Priv (U)	B(B)	12.9(14.4)	WB(WB)	0.7(0.3)	-	-
Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane. (S) - Signalized intersection. (U) - Unsignalized intersection.						

As shown in **Table 9** above, intersections in future background 2020 conditions are projected to operate similar to existing conditions, with slightly higher delays and v/c ratios.

TOTAL FUTURE BACKGROUND 2025 CONDITIONS

Table 10 below provides a summary of SYNCHRO analysis at study area intersections, based on total future background 2025 traffic volumes (**Figure 12**). The SYNCHRO model output for total future background 2025 conditions is provided in Appendix J.

Table 10: Total Future Background 2025 Intersection Performance

Intersection	Weekday (PM Peak) [Saturday]					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
St Laurent Blvd/Industrial Ave/Innes Rd (S)	D(D)	0.85(0.84)	NBT(NBT)	39.4(41.3)	C(C)	0.76(0.74)
Russell Rd/Industrial Ave (S)	B(C)	0.63(0.75)	WBT(WBL)	18.2(16.5)	A(A)	0.57(0.57)
Russell Rd/Haig Dr (S)	C(B)	0.72(0.63)	EBL(EBL)	18.8(14.1)	A(A)	0.45(0.50)
Othello Ave/Russell Rd/Smyth Rd (S)	E(E)	0.96(0.97)	NBT(EBT)	37.4(57.4)	B(E)	0.70(0.93)
St Laurent Blvd/Smyth Rd/Lancaster Rd (S)	C(E)	0.80(0.92)	NBT(EBL)	38.3(35.5)	C(C)	0.75(0.77)
Russell Rd/Everest Priv (U)	B(B)	13.3(15.0)	WB(WB)	0.6(0.3)	-	-

Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane.
 (S) - Signalized intersection.
 (U) - Unsignalized intersection.

As shown in **Table 10** above, critical movements at all intersections within the study area are projected to operate at acceptable LOS 'E' or better during the morning and afternoon peak hour periods. Signalized intersections 'as a whole' are also projected to operate with at an acceptable LOS 'E' or better during the morning and afternoon peak hour periods.

TOTAL PROJECTED 2020 CONDITIONS – FULL BUILD OUT

The total projected 2020 traffic volumes were derived by superimposing the site-generated traffic volumes (**Figure 8**) onto projected 2020 background traffic volumes (**Figure 9**). The resulting total projected 2020 traffic volumes are illustrated in **Figure 13**.

Figure 13: Total Projected 2020 Traffic Volumes

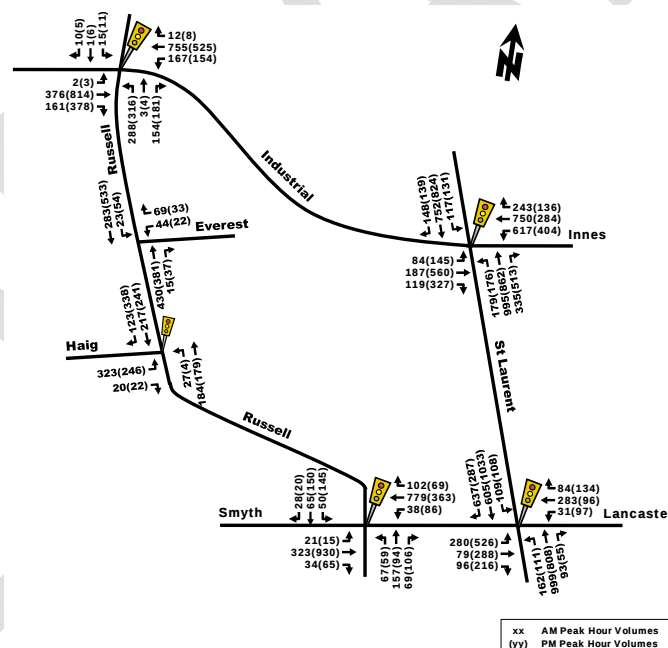


Table 11 below provides a summary of SYNCHRO analysis at study area intersections, based on the total projected 2020 traffic volumes. The SYNCHRO model output of the total projected 2020 conditions is provided in Appendix K.

Table 11: Total Projected 2020 Performance

Intersection	Weekday PM Peak [Saturday]					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
St Laurent Blvd/Industrial Ave/Innes Rd (S)	C(C)	0.79(0.78)	NBT(NBT)	38.6(38.7)	C(B)	0.74(0.70)
Russell Rd/Industrial Ave (S)	A(C)	0.60(0.77)	WBT(WBL)	17.7(16.4)	A(A)	0.56(0.56)
Russell Rd/Haig Dr (S)	C(B)	0.71(0.64)	EBL(EBL)	18.3(14.2)	A(A)	0.44(0.49)
Othello Ave/Russell Rd/Smyth Rd (S)	D(E)	0.87(0.93)	NBT(SBT)	33.1(50.9)	B(D)	0.65(0.87)
St Laurent Blvd/Smyth Rd/Lancaster Rd (S)	C(D)	0.75(0.87)	NBT(EBL)	36.1(33.8)	C(C)	0.71(0.72)
Russell Rd/Everest Priv (U)	C(C)	15.3(17.0)	WB(WB)	2.2(1.3)	-	-

Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane.
 (S) - Signalized intersection.
 (U) - Unsignalized intersection.

As shown in **Table 11** above, SYNCHRO output results show an increase in max v/c and average delays of the critical movements at study area intersections, compared to the future background 2020 conditions. Critical movements at signalized intersections are projected to operate at acceptable LOS 'E' or better during the morning and afternoon peak hour periods. Signalized intersections 'as a whole' operate similar to future background 2020 conditions.

The critical movement at the unsignalized intersection of Russell/Everest is projected to operate at a LOS 'C' during both morning and afternoon peak hour periods. As such, delay at the Everest Private access is anticipated to increase by less than 3 seconds during peak hours, relative to the delay experienced in existing conditions.

TOTAL PROJECTED 2025 CONDITIONS – BUILD-OUT PLUS FIVE YEARS

The total projected 2025 traffic volumes were derived by superimposing the site-generated traffic volumes (**Figure 8**) onto total future background 2025 traffic volumes (**Figure 12**). The resulting total projected 2025 traffic volumes are illustrated in **Figure 14**.

Figure 14: Total Projected 2025 Traffic Volumes

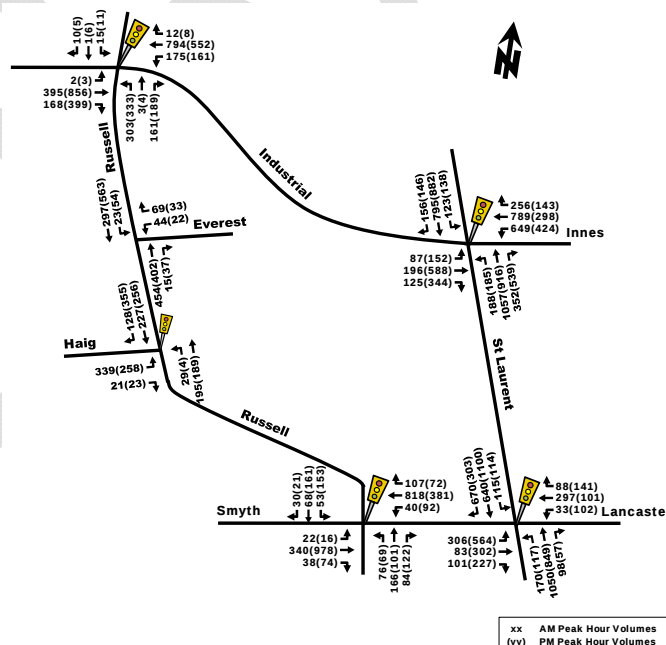


Table 12 below provides a summary of SYNCHRO analysis at study area intersections, based on the total projected 2020 traffic volumes. The SYNCHRO model output of the total projected 2020 conditions is provided in Appendix L.

Table 12: Total Projected 2025 Performance

Intersection	Weekday PM Peak [Saturday]					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
St Laurent Blvd/Industrial Ave/Innes Rd (S)	D(D)	0.87(0.84)	NBT(NBT)	40.5(41.4)	C(C)	0.79(0.74)
Russell Rd/Industrial Ave (S)	B(D)	0.63(0.87)	WBT(WBL)	18.2(17.8)	A(A)	0.58(0.60)
Russell Rd/Haig Dr (S)	C(B)	0.72(0.65)	EBL(EBL)	18.8(14.8)	A(A)	0.46(0.52)
Othello Ave/Russell Rd/Smyth Rd (S)	E(E)	0.97(0.98)	NBT(SBT)	37.7(58.0)	B(E)	0.70(0.93)
St Laurent Blvd/Smyth Rd/Lancaster Rd (S)	C(E)	0.80(0.93)	NBT(EBL)	38.4(35.6)	C(C)	0.75(0.78)
Russell Rd/Everest Priv (U)	C(C)	15.9(18.0)	WB(WB)	2.2(1.3)	-	-
Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane. (S) - Signalized intersection. (U) - Unsignalized intersection.						

As shown in **Table 12** above, critical movements at signalized intersections are projected to operate at acceptable LOS 'E' or better during the morning and afternoon peak hour period. Note that the critical movements at the intersection of Othello/Russell/Smyth operate near capacity during both morning and afternoon peak hour periods. Due to the intersection's close proximity to the signalized intersection of St Laurent/Smyth/Lancaster, it is assumed that the phasing sequence and timing plans of each of the two intersections are coordinated to provide optimal traffic operations. As such, phase time splits at the intersection of Othello/Russell/Smyth were not optimized.

The critical movement at the unsignalized intersection of Russell/Everest is projected to operate at a LOS 'C' during both morning and afternoon peak hour periods. As such, delay at the Everest Private access is anticipated to increase by less than 4 seconds in the peak hours, relative to the delay experienced in existing conditions.

5. FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Based on the results summarized herein the following transportation related conclusions are offered:

- The proposed development is anticipated to consist of two mid-rise residential buildings with 6 to 8 storeys each and a total of 292 apartment units. The proposed development residential buildings are to be located on the north and south sides of Everest Priv, at 1740 St Laurent Blvd.
- At the northern building, a total of 251 underground vehicle parking spaces are anticipated to be provided. At the southern building, a total of 114 underground vehicle parking spaces are anticipated to be provided. A total of 10 surface parking will also be provided along Everest Priv. The number of vehicle parking spaces provided are understood to exceed the requirements set by the City's By-Law.
- Access the developments sites is proposed via the existing Everest Priv and Blackcomb Priv, where the underground parking garage ramps are proposed to connect. Furthermore, all traffic will be directed to/from Russell Rd and access to St Laurent Blvd will be limited to pedestrians, cyclists and emergency vehicles.
- The development is expected to generate a total of 104 and 112 new vehicle trips per hour during the morning and afternoon peak hour periods, respectively;
- Based on the decline shown in historic traffic data and the lack of other area developments, a conservative 1% per annum growth rate was applied to the traffic volumes at intersections within the study area;
- The existing MMLOS analysis for road segments at Everest Priv, Russell Rd and St Laurent Blvd indicates the following:
 - The Pedestrian LOS is not met at any of the road segments. At Everest Priv, this is due to the lack of sidewalks at the frontage of the site in existing conditions. Along Russell Rd, it is due to narrow sidewalks and high daily curb lane traffic volumes. Along St Laurent Blvd, it is due to either the high daily curb lane traffic volumes or having operating speeds greater than 60 km/h;

- o Bicycle LOS targets along all road segments is achieved;
 - o Transit and Truck LOS targets are met at St Laurent Blvd, but no targets are set for Everest Priv and Russell Rd.
- All of the existing study area signalized intersections currently operate acceptably for critical movements, with a LOS 'D' or better during the morning and afternoon peak hour periods. The unsignalized intersection of Russell/Everest operates at a LOS 'B' during both morning and afternoon peak hour periods, with delays of less than 15 seconds leaving the development.
- In total projected 2020 conditions, the following traffic operations are noted:
 - o Study area intersections are projected to experience a slight overall increase in the max v/c ratios and average delays in comparison to the existing conditions, with signalized intersections operating at a LOS 'E' or better during the morning and afternoon peak hour periods:
 - o The unsignalized intersection of Russell/Everest operates at a LOS 'C' for both morning and afternoon peak hour periods, with projected delays of approximately 17.0 seconds leaving the development.
- In total projected 2025 conditions, the following traffic operations are noted:
 - o Signalized intersections are projected to operate at an acceptable LOS 'E' or better during the morning and afternoon peak hour periods. While critical movements at the intersection of Othello/Russell/Smyth operate near capacity, phase time splits were not optimized in order to maintain timing coordination with the signalized intersection of St Laurent/Smyth/Lancaster.
 - o The unsignalized intersection of Russell/Everest operates at a LOS 'C' during both morning and afternoon peak hour periods.
 - o Overall, delay at the intersection of Russell/Everest increased by approximately 3 seconds in the morning peak and 4 seconds in the afternoon peak, relative to existing conditions delays.

Based on the foregoing, the proposed development is recommended to proceed from a transportation perspective.

Appendix A

Screening Form

DRAFT

City of Ottawa 2017 TIA Guidelines

Date

22-Apr-19

TIA Screening Form

Project

1740 St. Laurent Blvd

Project Number

477122-01000

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

Module 1.1 - Description of Proposed Development	
Municipal Address	1740 St. Laurent Blvd, Ottawa, Ontario
Description of location	Along Everest Private, directly east of existing res. apartments
Land Use	Residential Apartments
Development Size	Total of 292 residential units in two buildings (6-8 storeys)
Number of Accesses and Locations	1 access (Blackcomb Private) to/from Russell Road
Development Phasing	1
Buildout Year	2020
Sketch Plan / Site Plan	See attached

Module 1.2 - Trip Generation Trigger		
Land Use Type	Townhomes or Apartments	
Development Size	292	Units
Trip Generation Trigger Met?	Yes	

Module 1.3 - Location Triggers	
Development Proposes a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit, or Spine Bicycle Networks (See Sheet 3)	No
Development is in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone. (See Sheet 3)	No
Location Trigger Met?	No

Module 1.4 - Safety Triggers		
Posted Speed Limit on any boundary road	<80	km/h
Horizontal / Vertical Curvature on a boundary street limits sight lines at a proposed driveway	No	
A proposed driveway is within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions) or within auxiliary lanes of an intersection;	No	
A proposed driveway makes use of an existing median break that serves an existing site	No	
There is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development	No	
The development includes a drive-thru facility	No	
Safety Trigger Met?	No	

Appendix B

OC Transpo Route Maps

DRAFT

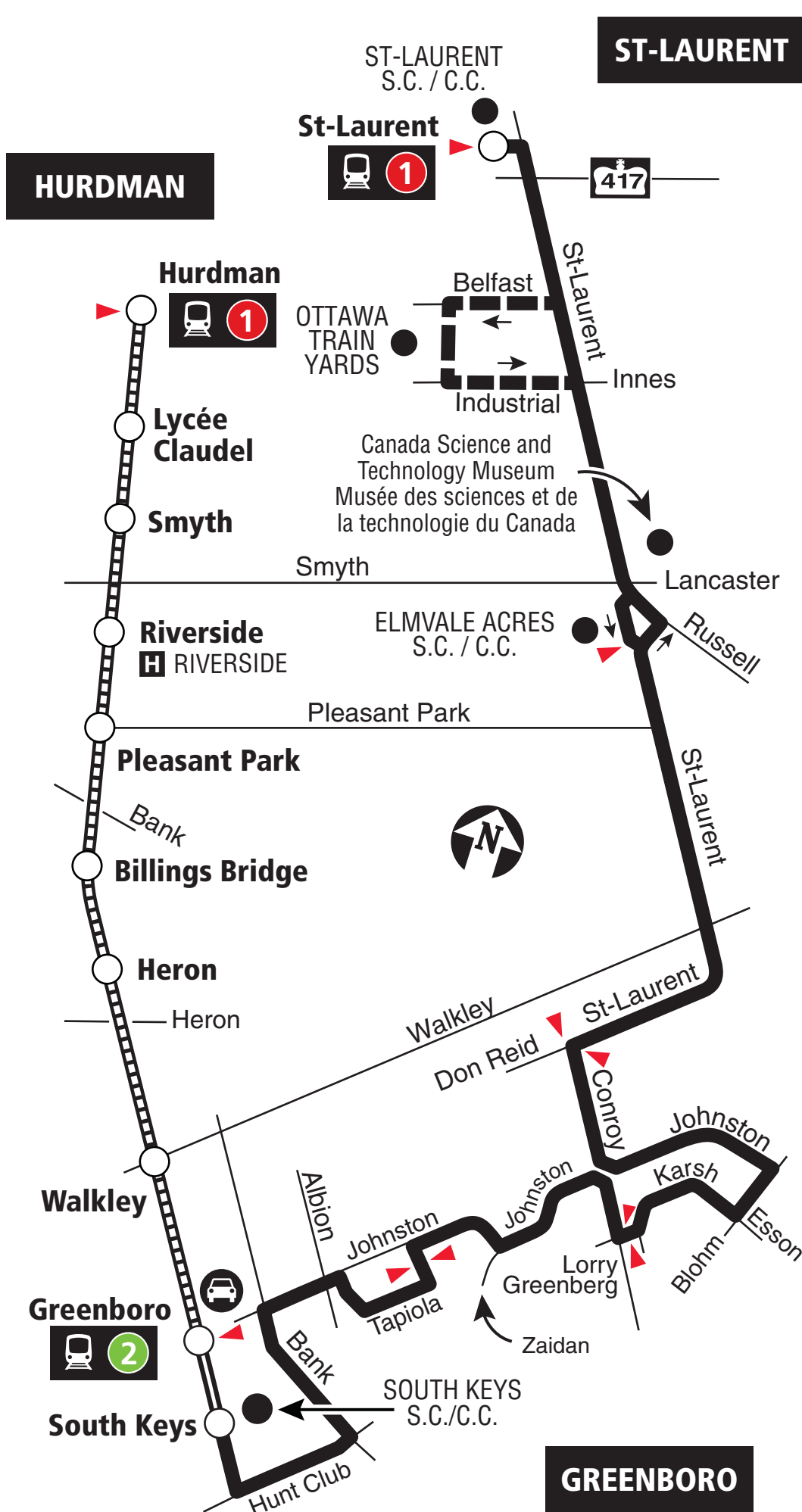


Fréquent

7 days a week / 7 jours par semaine

All day service

Service toute la journée



-  Transitway & Station
-  Peak periods / Périodes de pointe
-  Some trips early morning only /
Quelques trajets tôt le matin seulement
-  Park & Ride / Parc-o-Bus
-  Timepointe / Heures de passage

2017.10



Text / Texto560560

plus your four digit bus stop number / plus votre numéro d'arrêt à quatre chiffres

Customer Relations

Service à la clientèle 613-842-3600

Lost and Found / Objets perdus..... 613-563-4011

Security / Sécurité 613-741-2478

Effective September 3, 2017

En vigueur 3 septembre 2017



INFO 613-741-4390
octranspo.com

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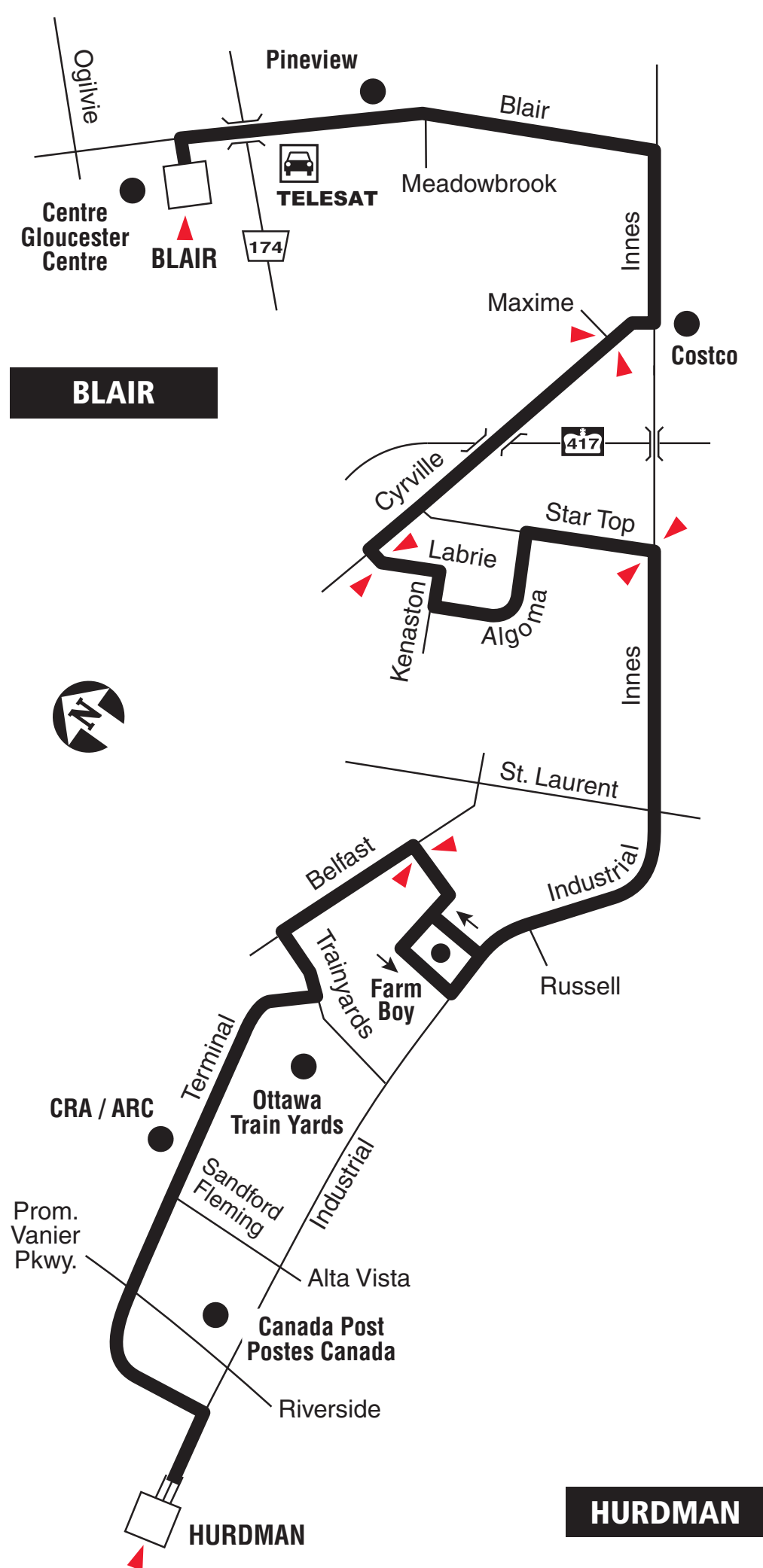
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BLAIR HURDMAN

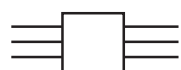
Local

7 days a week / 7 jours par semaine

No late eve. service Mon. to Fri. No eve. service weekends / Aucun service en fin de soirée du lun. au ven. Aucun service le soir les fins de semaine.



Legend • Légende



Transitway & Station



Park & Ride / Parc-o-bus



Timepoint / Heures de passage

2017.06



Schedule / Horaire.....613-560-1000

Text / Texto560560

plus your four digit bus stop number / plus votre numéro d'arrêt à quatre chiffres

Customer Relations

Service à la clientèle **613-842-3600**

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité **613-741-2478**

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En vigueur 25 juin 2017



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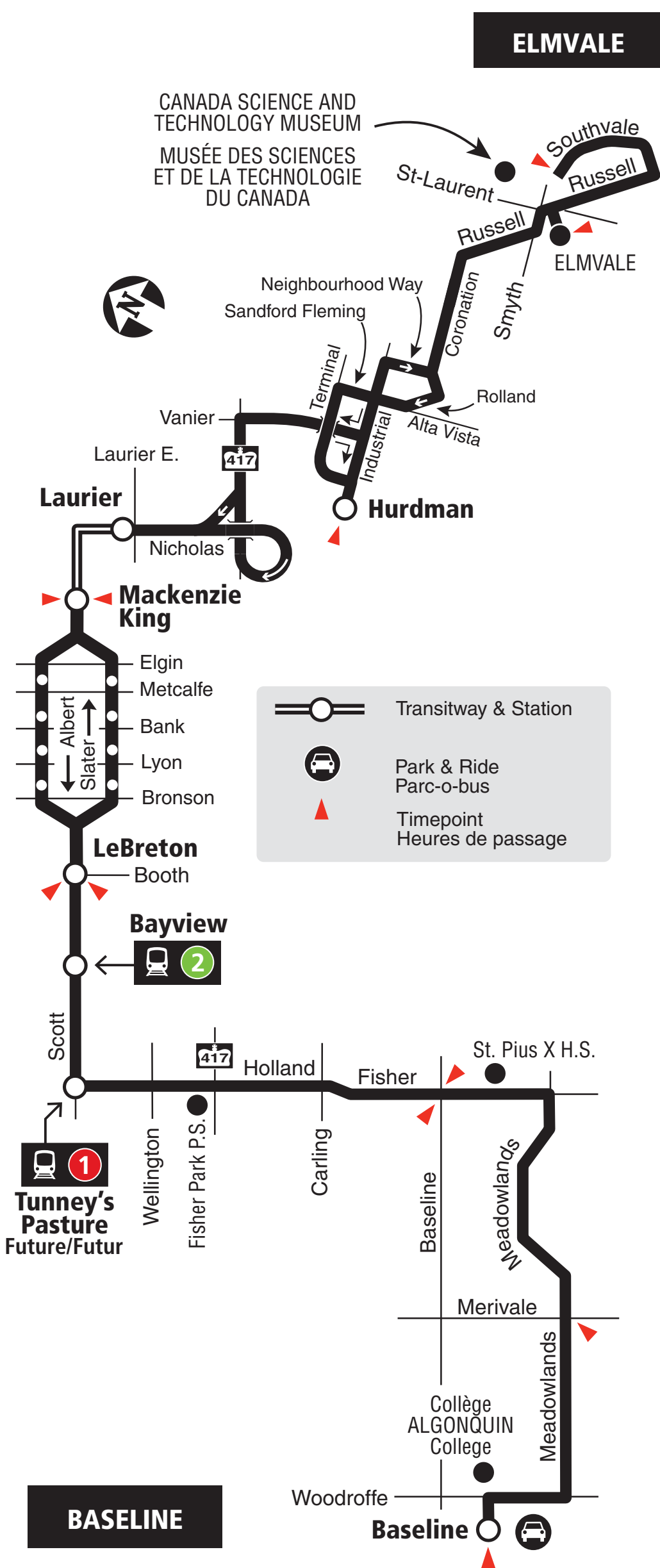
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ELMVALE BASELINE

Local

7 days a week / 7 jours par semaine
All day service
Service toute la journée



2018.06



Schedule / Horaire.....613-560-1000

Text / Texto560560

plus your four digit bus stop number / plus votre numéro d'arrêt à quatre chiffres

Customer Relations

Service à la clientèle **613-842-3600**

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité **613-741-2478**

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En vigueur 24 juin 2018



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RIVERSIDE ST-LAURENT

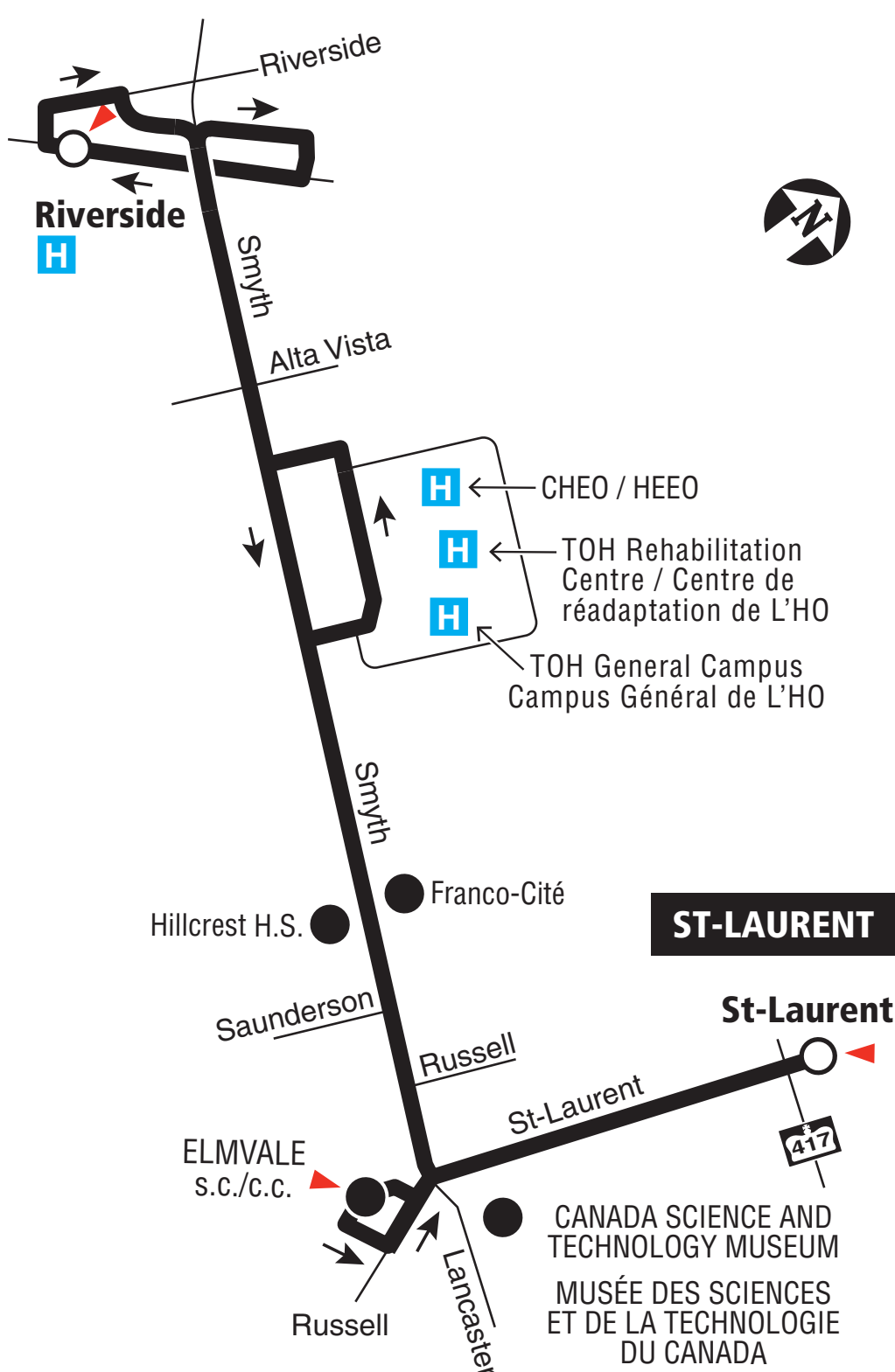
Local

7 days a week / 7 jours par semaine

All day service

Service toute la journée

RIVERSIDE



Transitway & Station



Timepointe / Heures de passage

2018.09



Schedule / Horaire.....613-560-1000

Text / Texto560560

plus your four digit bus stop number / plus votre numéro d'arrêt à quatre chiffres

Customer Relations

Service à la clientèle **613-741-4390**

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité **613-741-2478**

Effective September 2, 2018

En vigueur 2 septembre 2018



INFO 613-741-4390
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Appendix C

Traffic Counts

DRAFT

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:40	0	11	0	2	0	0	0	23	1	0	0	0	37
07:45	1	53	1	4	0	7	0	106	1	0	0	0	173
08:00	3	62	0	4	0	7	1	112	0	0	0	0	189
08:15	1	63	0	2	0	4	0	112	2	0	0	0	184
08:30	2	74	0	3	0	7	0	104	1	0	0	0	191
08:45	3	81	0	3	0	3	0	98	2	1	0	0	191
09:00	0	50	0	3	0	1	0	85	0	0	0	0	139

Car traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:40	0	11	0	2	0	0	0	22	1	0	0	0	36
07:45	1	50	1	4	0	7	0	103	1	0	0	0	167
08:00	3	59	0	4	0	6	1	110	0	0	0	0	183
08:15	1	58	0	2	0	4	0	110	2	0	0	0	177
08:30	2	73	0	3	0	6	0	102	1	0	0	0	187
08:45	3	78	0	3	0	3	0	94	2	1	0	0	184
09:00	0	47	0	3	0	1	0	79	0	0	0	0	130

Truck traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:40	0	0	0	0	0	0	0	1	0	0	0	0	1
07:45	0	3	0	0	0	0	0	3	0	0	0	0	6
08:00	0	3	0	0	0	0	0	2	0	0	0	0	5
08:15	0	5	0	0	0	0	0	2	0	0	0	0	7
08:30	0	1	0	0	0	0	0	2	0	0	0	0	3
08:45	0	3	0	0	0	0	0	4	0	0	0	0	7
09:00	0	3	0	0	0	0	0	6	0	0	0	0	9

Bicycle traffic

[illegible]

Pedestrian volumes

[illegible]

Intersection Peak Hour

08:00 - 09:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	9	280	0	12	0	21	1	426	5	1	0	0	755
Factor	0.75	0.86	0.00	0.75	0.00	0.75	0.25	0.95	0.62	0.25	0.00	0.00	0.99
Approach Factor	0.86			0.75			0.95			0.25			

Peak Hour Vehicle Summary

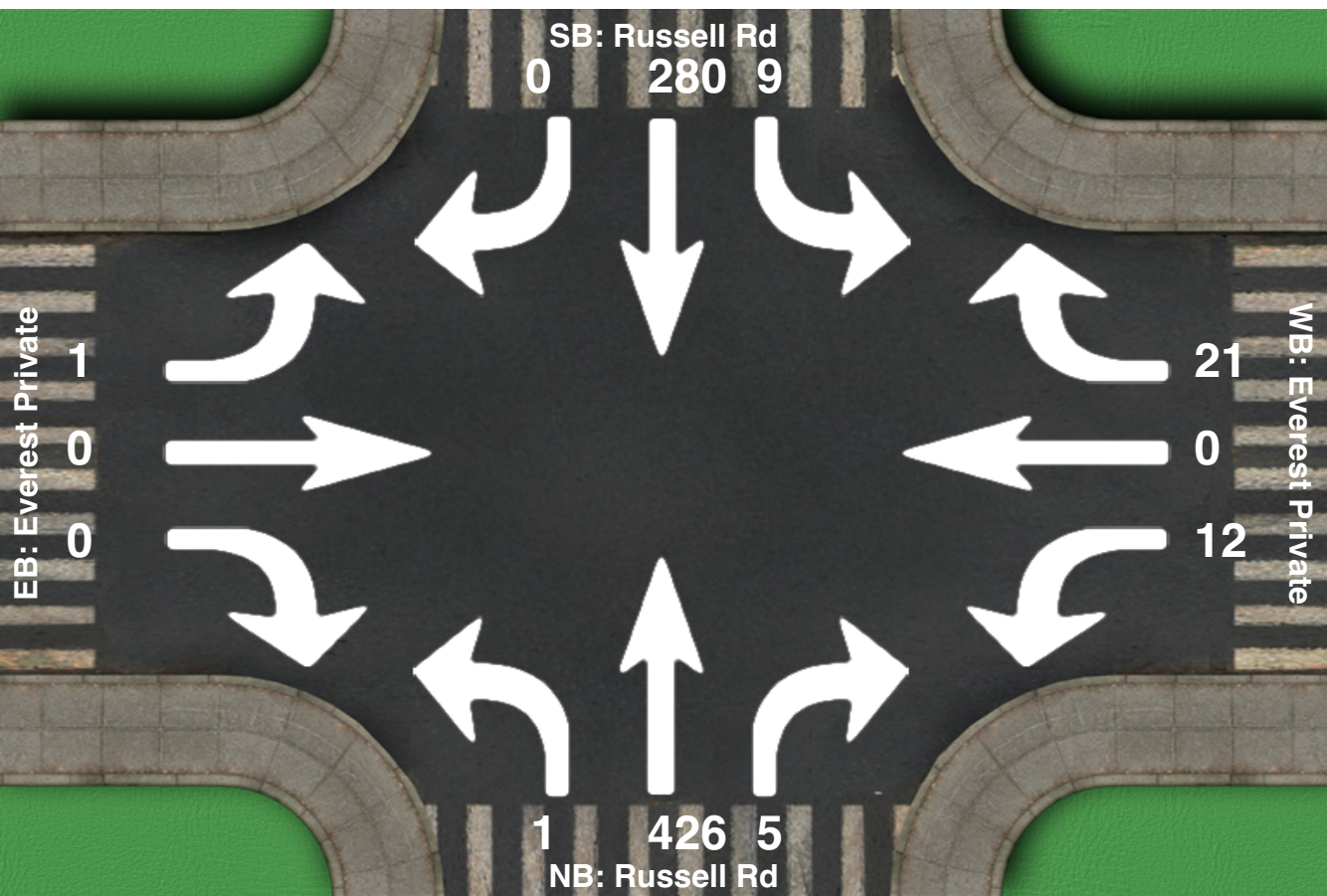
Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	9	268	0	12	0	19	1	416	5	1	0	0	731
Truck	0	12	0	0	0	0	0	10	0	0	0	0	22
Bicycle	0	0	0	0	0	2	0	0	0	0	0	0	2

Peak Hour Pedestrians

	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
Pedestrians	3	0	3	0	0	0	0	0	0	1	3	4	7

Intersection Peak Hour

Location: Russell Rd at Everest Private, Ottawa, ON
GPS Coordinates:
Date: 2019-04-11
Day of week: Thursday
Weather: Sunny
Analyst: Basel Ansari



Intersection Peak Hour

08:00 - 09:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	9	280	0	12	0	21	1	426	5	1	0	0	755
Factor	0.75	0.86	0.00	0.75	0.00	0.75	0.25	0.95	0.62	0.25	0.00	0.00	0.99
Approach Factor	0.86			0.75			0.95			0.25			

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
15:35	3	82	0	2	0	1	0	73	1	0	0	0	162
15:45	3	116	0	2	0	2	0	96	2	0	0	0	221
16:00	4	134	0	1	0	2	0	92	3	0	0	0	236
16:15	4	120	0	1	0	3	0	92	2	0	0	0	222
16:30	4	126	0	1	0	1	0	101	2	0	0	0	235
16:45	1	148	0	2	0	1	0	92	2	0	0	0	246

Car traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
15:35	2	80	0	2	0	1	0	71	1	0	0	0	157
15:45	3	114	0	2	0	2	0	91	2	0	0	0	214
16:00	4	131	0	1	0	2	0	90	3	0	0	0	231
16:15	4	118	0	1	0	2	0	89	2	0	0	0	216
16:30	4	124	0	1	0	1	0	98	2	0	0	0	230
16:45	1	145	0	2	0	1	0	90	2	0	0	0	241

Truck traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
15:35	0	2	0	0	0	0	0	2	0	0	0	0	4
15:45	0	2	0	0	0	0	0	5	0	0	0	0	7
16:00	0	3	0	0	0	0	0	2	0	0	0	0	5
16:15	0	2	0	0	0	0	0	3	0	0	0	0	5
16:30	0	2	0	0	0	0	0	3	0	0	0	0	5
16:45	0	3	0	0	0	0	0	2	0	0	0	0	5

Bicycle traffic

[illegible]

Pedestrian volumes

[illegible]

Intersection Peak Hour

16:00 - 17:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	13	528	0	5	0	7	0	377	9	0	0	0	939
Factor	0.81	0.89	0.00	0.62	0.00	0.58	0.00	0.93	0.75	0.00	0.00	0.00	0.95
Approach Factor	0.91			0.75			0.94			0.00			

Peak Hour Vehicle Summary

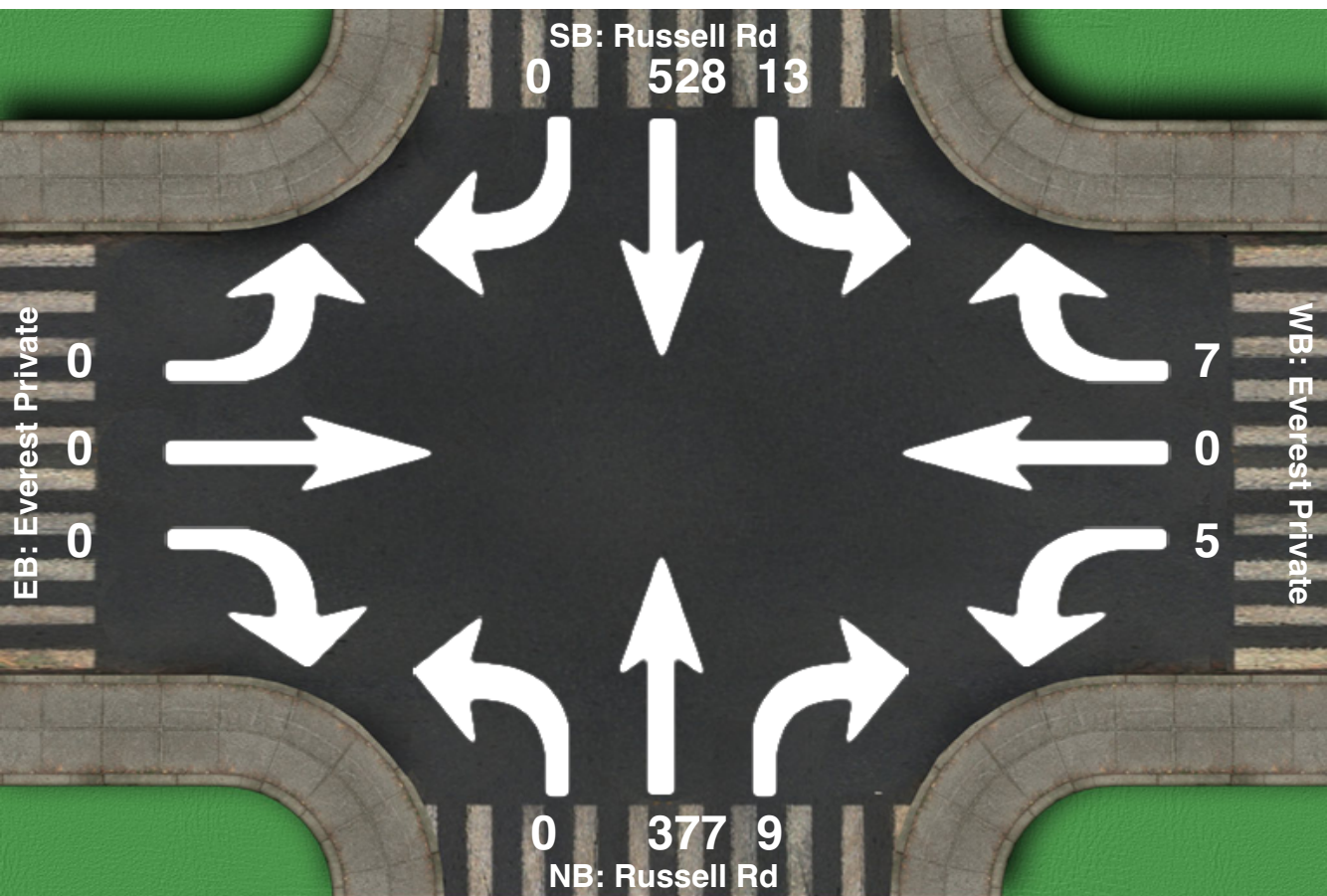
Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	13	518	0	5	0	6	0	367	9	0	0	0	918
Truck	0	10	0	0	0	0	0	10	0	0	0	0	20
Bicycle	0	0	0	0	0	1	0	0	0	0	0	0	1

Peak Hour Pedestrians

	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
Pedestrians	10	0	10	0	0	0	0	0	0	0	4	4	14

Intersection Peak Hour

Location: Russell Rd at Everest Private, Ottawa, ON
GPS Coordinates:
Date: 2019-04-11
Day of week: Thursday
Weather: Sunny
Analyst: Basel Ansari



Intersection Peak Hour

16:00 - 17:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	13	528	0	5	0	7	0	377	9	0	0	0	939
Factor	0.81	0.89	0.00	0.62	0.00	0.58	0.00	0.93	0.75	0.00	0.00	0.00	0.95
Approach Factor	0.91			0.75			0.94			0.00			

Turning Movement Count - Peak Hour Diagram

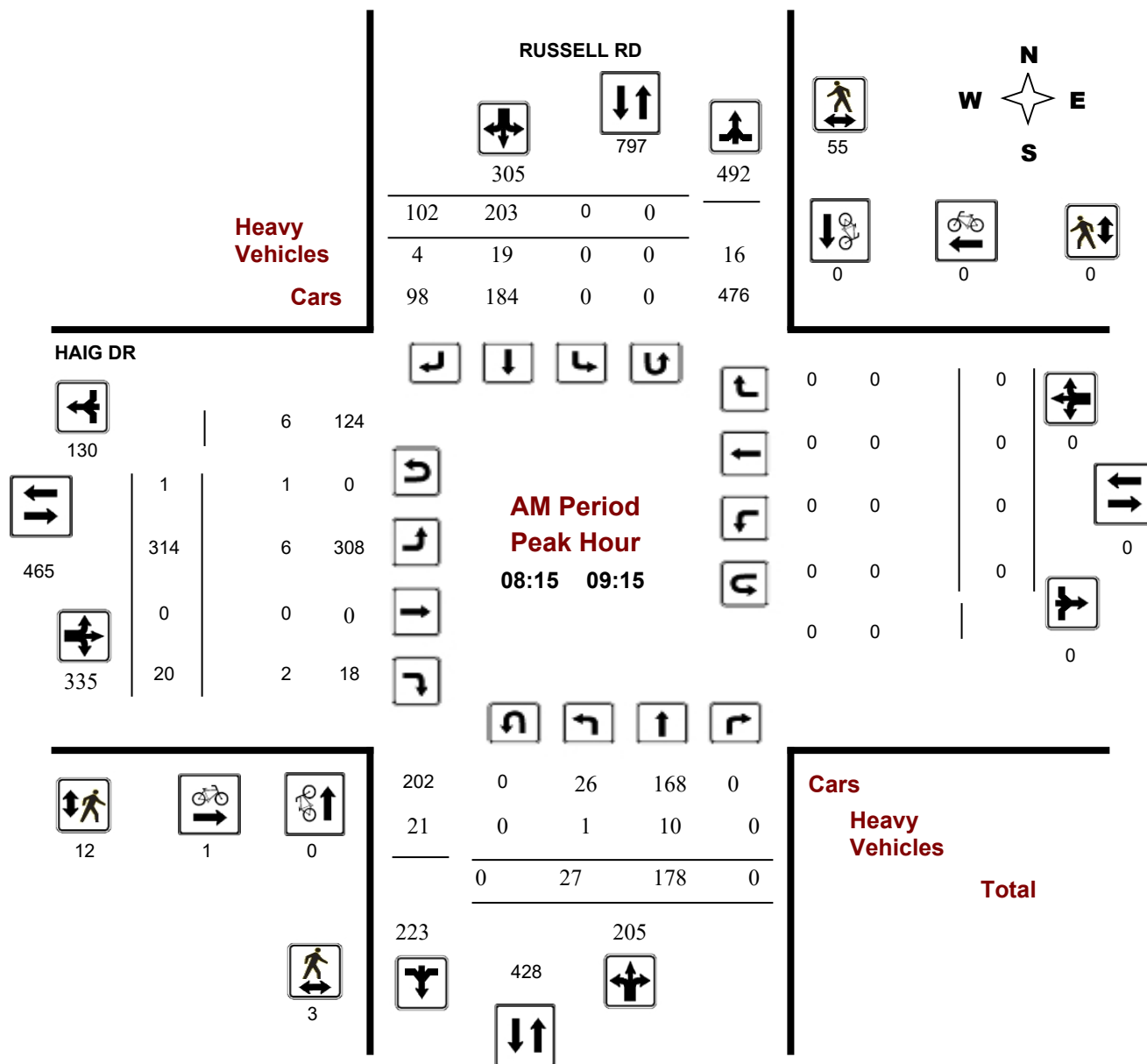
HAIG DR @ RUSSELL RD

Survey Date: Tuesday, January 08, 2019

Start Time: 07:00

WO No: 38245

Device: Miovision



Comments

Turning Movement Count - Peak Hour Diagram

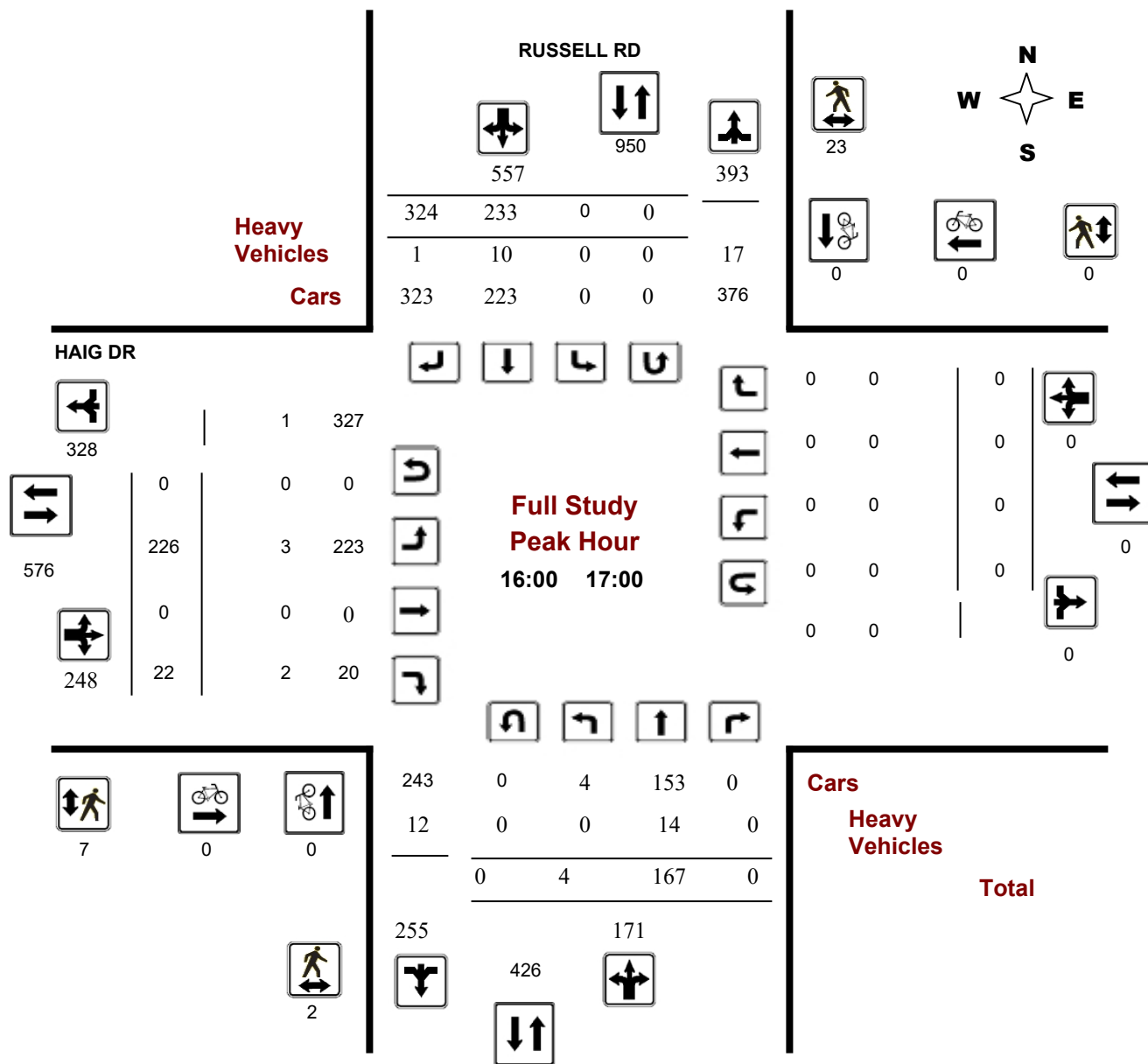
HAIG DR @ RUSSELL RD

Survey Date: Tuesday, January 08, 2019

Start Time: 07:00

WO No: 38245

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

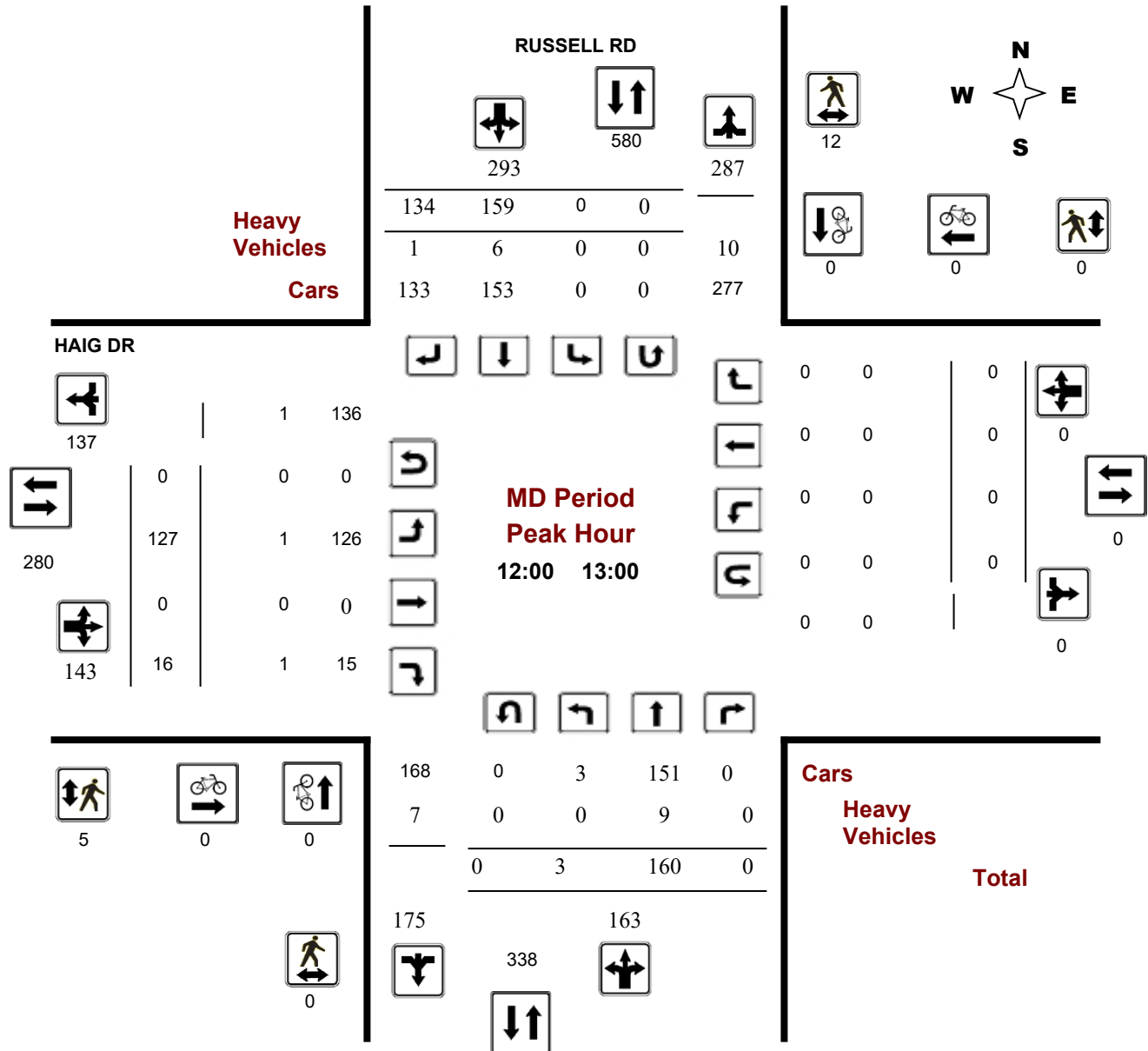
HAIG DR @ RUSSELL RD

Survey Date: Tuesday, January 08, 2019

Start Time: 07:00

WO No: 38245

Device: Miovision



Turning Movement Count - Peak Hour Diagram

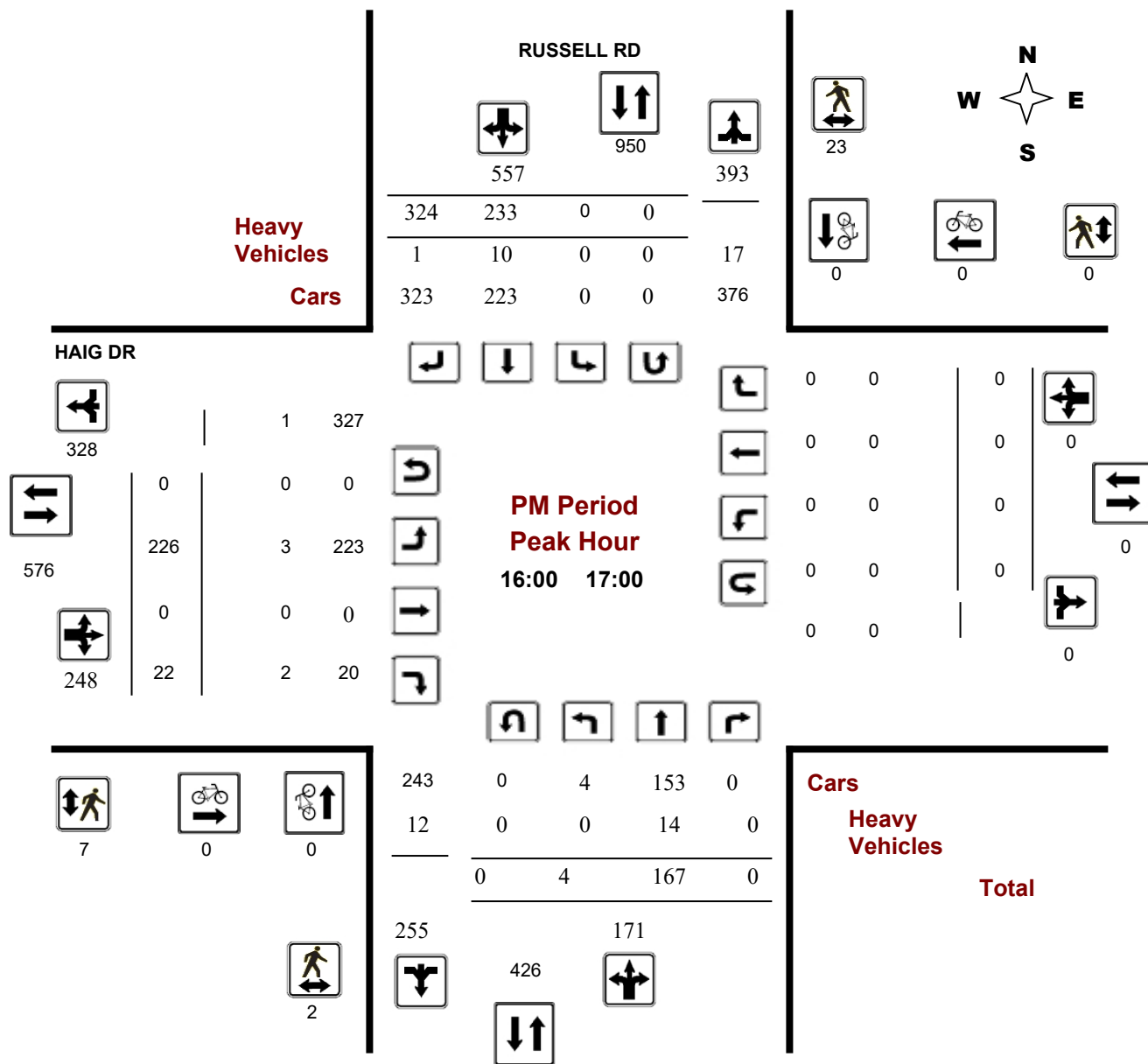
HAIG DR @ RUSSELL RD

Survey Date: Tuesday, January 08, 2019

Start Time: 07:00

WO No: 38245

Device: Miovision



Transportation Services - Traffic Services

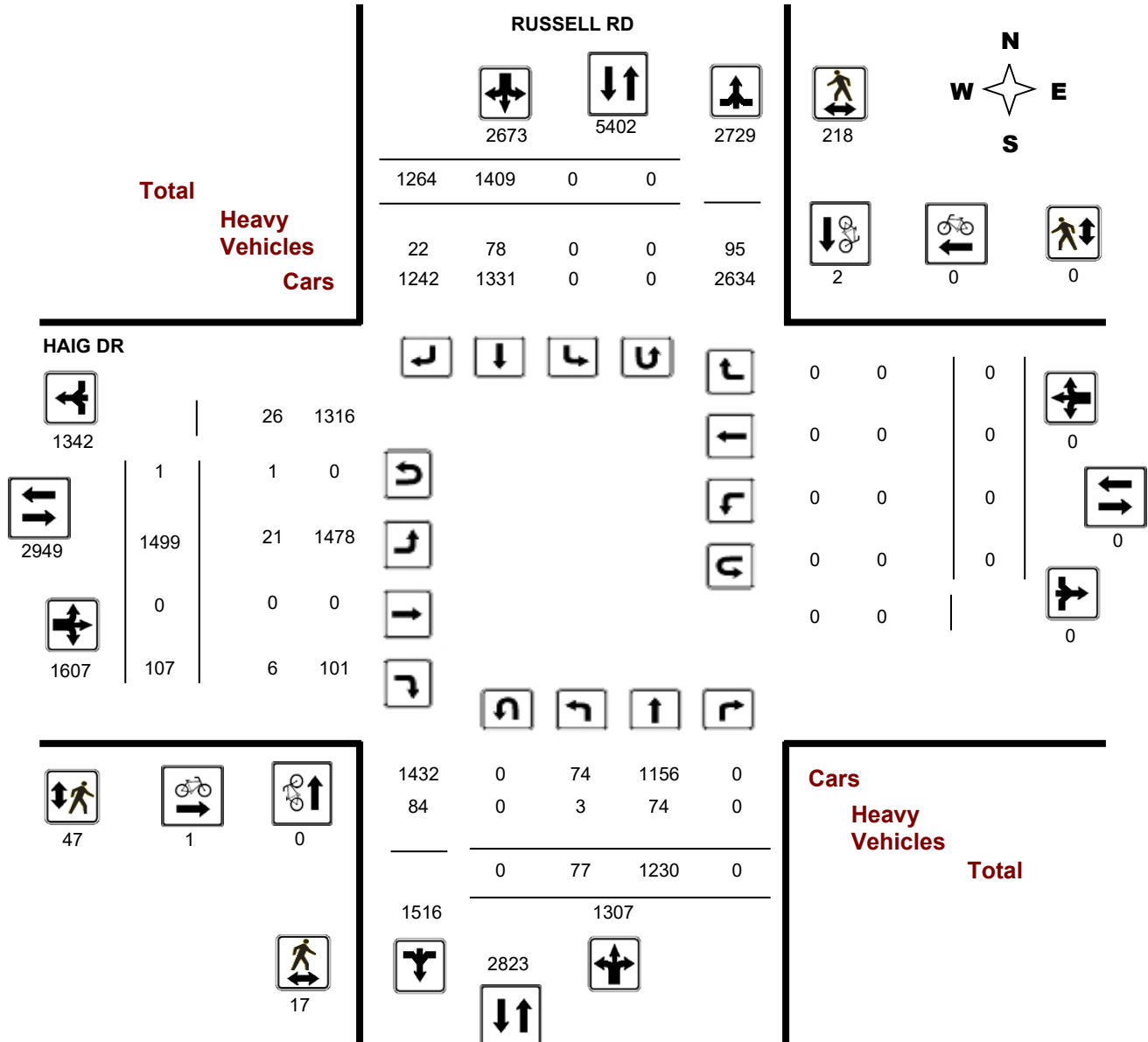
Turning Movement Count - Full Study Diagram

HAIG DR @ RUSSELL RD

Survey Date: Tuesday, January 08, 2019

WO#: 38245

Device: Miovision



Turning Movement Count - Full Study Summary Report

HAIG DR @ RUSSELL RD

Survey Date: Tuesday, January 08, 2019

Total Observed U-Turns

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

AADT Factor

1.10

Full Study
RUSSELL RD
HAIG DR

Period	Northbound				Southbound				STR TOT	Eastbound				Westbound				STR TOT	Grand Total
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT		LT	ST	RT	EB TOT	LT	ST	RT	WB TOT		
07:00 08:00	10	126	0	136	0	156	45	201	337	161	0	3	164	0	0	0	0	164	501
08:00 09:00	31	168	0	199	0	237	77	314	513	302	0	22	324	0	0	0	0	324	837
09:00 10:00	11	135	0	146	0	93	115	208	354	176	0	8	184	0	0	0	0	184	538
11:30 12:30	4	172	0	176	0	144	111	255	431	115	0	13	128	0	0	0	0	128	559
12:30 13:30	4	147	0	151	0	152	116	268	419	134	0	8	142	0	0	0	0	142	561
15:00 16:00	4	160	0	164	0	192	262	454	618	235	0	23	258	0	0	0	0	258	876
16:00 17:00	4	167	0	171	0	233	324	557	728	226	0	22	248	0	0	0	0	248	976
17:00 18:00	9	155	0	164	0	202	214	416	580	150	0	8	158	0	0	0	0	158	738
Sub Total	77	1230	0	1307	0	1409	1264	2673	3980	1499	0	107	1606	0	0	0	0	1606	5586
U Turns				0				0	0				1				0	1	1
Total	77	1230	0	1307	0	1409	1264	2673	3980	1499	0	107	1607	0	0	0	0	1607	5587
EQ 12Hr	107	1710	0	1817	0	1959	1757	3715	5532	2084	0	149	2234	0	0	0	0	2234	7766
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													1.39						
AVG 12Hr	118	1881	0	1998	0	2154	1933	4087	6085	2292	0	164	2457	0	0	0	0	2457	8542
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													1.10						
AVG 24Hr	154	2464	0	2618	0	2822	2532	5354	7972	3002	0	214	3219	0	0	0	0	3219	11191
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													1.31						

Comments:

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



Turning Movement Count - 15 Minute Summary Report

HAIG DR @ RUSSELL RD

Survey Date: Tuesday, January 08, 2019

Total Observed U-Turns

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

RUSSELL RD

HAIG DR

		Northbound				Southbound				Eastbound				Westbound						
					N				S	STR				E				W	STR	Grand
Time Period		LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	Total
07:00	07:15	3	23	0	26	0	24	13	37	63	18	0	1	19	0	0	0	0	19	82
07:15	07:30	1	20	0	21	0	44	12	56	77	39	0	1	40	0	0	0	0	40	117
07:30	07:45	2	37	0	39	0	36	9	45	84	39	0	1	40	0	0	0	0	40	124
07:45	08:00	4	46	0	50	0	52	11	63	113	65	0	0	65	0	0	0	0	65	178
08:00	08:15	9	37	0	46	0	58	15	73	119	60	0	4	64	0	0	0	0	64	183
08:15	08:30	10	41	0	51	0	68	9	77	128	86	0	6	92	0	0	0	0	92	220
08:30	08:45	5	40	0	45	0	50	13	63	108	78	0	5	83	0	0	0	0	83	191
08:45	09:00	7	50	0	57	0	61	40	101	158	78	0	7	85	0	0	0	0	85	243
09:00	09:15	5	47	0	52	0	24	40	64	116	72	0	2	75	0	0	0	0	75	191
09:15	09:30	2	30	0	32	0	26	27	53	85	44	0	4	48	0	0	0	0	48	133
09:30	09:45	4	29	0	33	0	18	18	36	69	31	0	1	32	0	0	0	0	32	101
09:45	10:00	0	29	0	29	0	25	30	55	84	29	0	1	30	0	0	0	0	30	114
11:30	11:45	2	50	0	52	0	30	16	46	98	23	0	2	25	0	0	0	0	25	123
11:45	12:00	0	43	0	43	0	34	25	59	102	28	0	1	29	0	0	0	0	29	131
12:00	12:15	0	41	0	41	0	51	31	82	123	36	0	4	40	0	0	0	0	40	163
12:15	12:30	2	38	0	40	0	29	39	68	108	28	0	6	34	0	0	0	0	34	142
12:30	12:45	0	40	0	40	0	38	32	70	110	31	0	3	34	0	0	0	0	34	144
12:45	13:00	1	41	0	42	0	41	32	73	115	32	0	3	35	0	0	0	0	35	150
13:00	13:15	1	36	0	37	0	36	25	61	98	37	0	1	38	0	0	0	0	38	136
13:15	13:30	2	30	0	32	0	37	27	64	96	34	0	1	35	0	0	0	0	35	131
15:00	15:15	1	40	0	41	0	44	71	115	156	49	0	9	58	0	0	0	0	58	214
15:15	15:30	0	52	0	52	0	56	61	117	169	65	0	4	69	0	0	0	0	69	238
15:30	15:45	1	36	0	37	0	53	72	125	162	56	0	3	59	0	0	0	0	59	221
15:45	16:00	2	32	0	34	0	39	58	97	131	65	0	7	72	0	0	0	0	72	203
16:00	16:15	1	45	0	46	0	57	81	138	184	67	0	7	74	0	0	0	0	74	258
16:15	16:30	0	41	0	41	0	59	72	131	172	60	0	8	68	0	0	0	0	68	240
16:30	16:45	2	40	0	42	0	52	83	135	177	48	0	4	52	0	0	0	0	52	229
16:45	17:00	1	41	0	42	0	65	88	153	195	51	0	3	54	0	0	0	0	54	249
17:00	17:15	3	34	0	37	0	51	66	117	154	42	0	3	45	0	0	0	0	45	199
17:15	17:30	0	50	0	50	0	59	57	116	166	46	0	1	47	0	0	0	0	47	213
17:30	17:45	3	35	0	38	0	43	54	97	135	35	0	2	37	0	0	0	0	37	172
17:45	18:00	3	36	0	39	0	49	37	86	125	27	0	2	29	0	0	0	0	29	154
TOTAL:		77	1230	0	1307	0	1409	1264	2673	3980	1499	0	107	1607	0	0	0	0	1607	5587

Note: U-Turns are included in Totals.

Comment:



Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order
38245

HAIG DR @ RUSSELL RD

Count Date: Tuesday, January 08, 2019

Start Time: 07:00

Time Period	RUSSELL RD			HAIG DR			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	0	1	1	0	0	0	1
08:00 09:00	0	1	1	0	0	0	1
09:00 10:00	0	0	0	1	0	1	1
11:30 12:30	0	0	0	0	0	0	0
12:30 13:30	0	0	0	0	0	0	0
15:00 16:00	0	0	0	0	0	0	0
16:00 17:00	0	0	0	0	0	0	0
17:00 18:00	0	0	0	0	0	0	0
Total	0	2	2	1	0	1	3

Comment:

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



Transportation Services - Traffic Services

W.O.
38245

Turning Movement Count - Heavy Vehicle Report

HAIG DR @ RUSSELL RD

Survey Date: Tuesday, January 08, 2019

RUSSELL RD										HAIG DR										Grand Total
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		
07:00 08:00	1	11	0	12	0	5	2	7	19	0	0	0	0	0	0	0	0	0	19	
08:00 09:00	1	6	0	7	0	20	4	24	31	2	0	2	4	0	0	0	0	4	35	
09:00 10:00	0	9	0	9	0	8	4	12	21	9	0	0	10	0	0	0	0	10	31	
11:30 12:30	0	11	0	11	0	7	1	8	19	0	0	0	0	0	0	0	0	0	19	
12:30 13:30	0	5	0	5	0	7	3	10	15	3	0	1	4	0	0	0	0	4	19	
15:00 16:00	0	13	0	13	0	7	5	12	25	3	0	1	4	0	0	0	0	4	29	
16:00 17:00	0	14	0	14	0	10	1	11	25	3	0	2	5	0	0	0	0	5	30	
17:00 18:00	1	5	0	6	0	14	2	16	22	1	0	0	1	0	0	0	0	1	23	
Sub Total	3	74	0	77	0	78	22	100	177	21	0	6	28	0	0	0	0	28	205	
U-Turns (Heavy Vehicles)				0				0	0				1				0	1	1	
Total	3	74	0	0	0	78	22	100	177	21	0	6	29	0	0	0	0	29	206	

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



Transportation Services - Traffic Services

Work Order

38245

Turning Movement Count - Pedestrian Volume Report

HAIG DR @ RUSSELL RD

Count Date: Tuesday, January 08, 2019

Start Time: 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	2	2	4	1	0	1	5
07:15 07:30	1	2	3	2	0	2	5
07:30 07:45	2	3	5	2	0	2	7
07:45 08:00	0	8	8	2	0	2	10
07:00 08:00	5	15	20	7	0	7	27
08:00 08:15	2	6	8	3	0	3	11
08:15 08:30	3	13	16	7	0	7	23
08:30 08:45	0	19	19	1	0	1	20
08:45 09:00	0	16	16	2	0	2	18
08:00 09:00	5	54	59	13	0	13	72
09:00 09:15	0	7	7	2	0	2	9
09:15 09:30	0	1	1	1	0	1	2
09:30 09:45	0	0	0	1	0	1	1
09:45 10:00	0	0	0	0	0	0	0
09:00 10:00	0	8	8	4	0	4	12
11:30 11:45	1	1	2	1	0	1	3
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	3	3	2	0	2	5
12:15 12:30	0	0	0	0	0	0	0
11:30 12:30	1	4	5	3	0	3	8
12:30 12:45	0	8	8	2	0	2	10
12:45 13:00	0	1	1	1	0	1	2
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0
12:30 13:30	0	9	9	3	0	3	12
15:00 15:15	1	21	22	4	0	4	26
15:15 15:30	1	33	34	0	0	0	34
15:30 15:45	1	16	17	2	0	2	19
15:45 16:00	1	16	17	1	0	1	18
15:00 16:00	4	86	90	7	0	7	97
16:00 16:15	0	14	14	3	0	3	17
16:15 16:30	1	5	6	2	0	2	8
16:30 16:45	0	4	4	2	0	2	6
16:45 17:00	1	0	1	0	0	0	1
16:00 17:00	2	23	25	7	0	7	32
17:00 17:15	0	6	6	2	0	2	8
17:15 17:30	0	3	3	0	0	0	3
17:30 17:45	0	5	5	1	0	1	6
17:45 18:00	0	5	5	0	0	0	5
17:00 18:00	0	19	19	3	0	3	22
Total	17	218	235	47	0	47	282

Comment:

Turning Movement Count - 15 Min U-Turn Total Report

HAIG DR @ RUSSELL RD

Survey Date: Tuesday, January 08, 2019

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



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

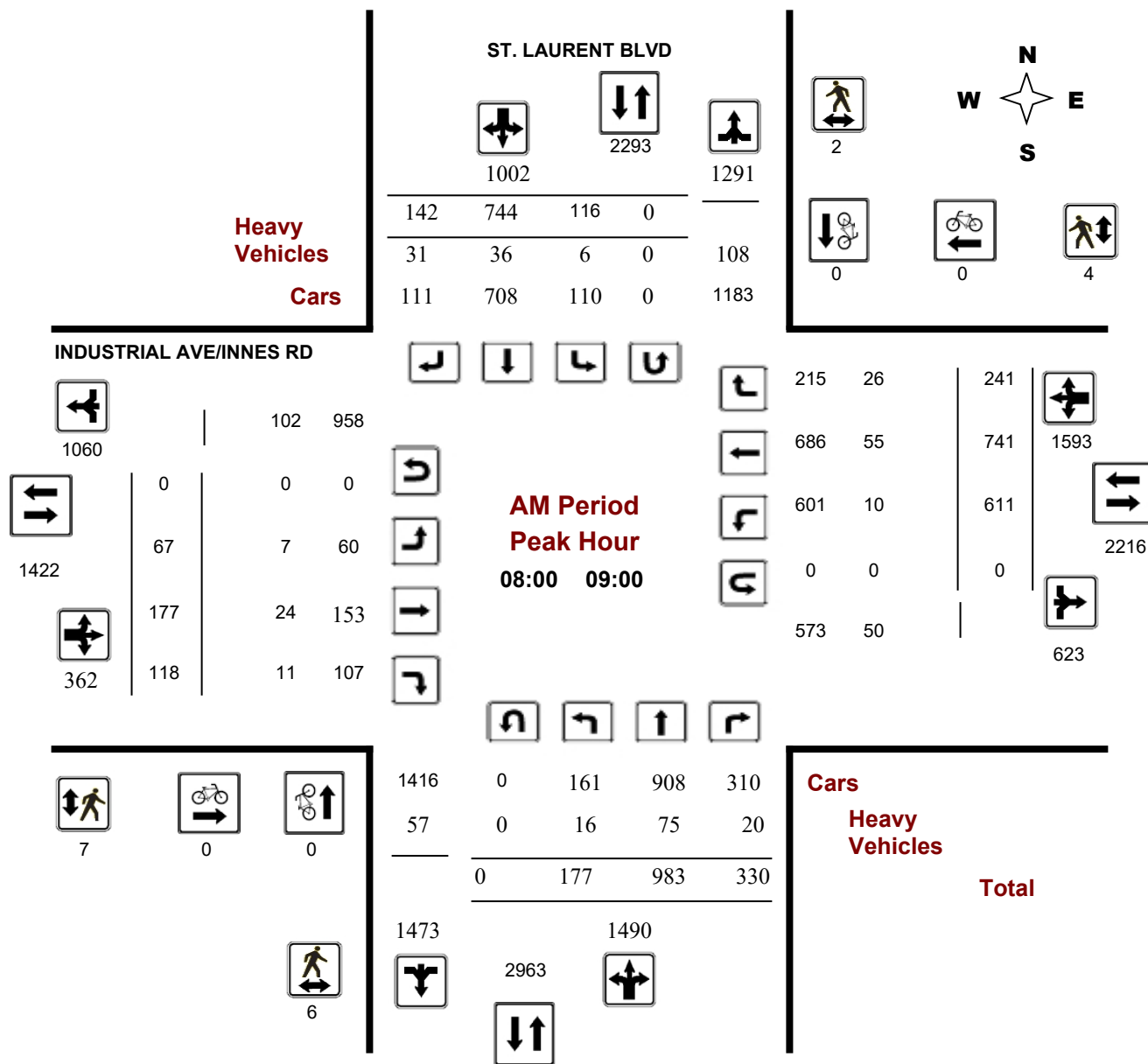
INDUSTRIAL AVE/INNES RD @ ST. LAURENT BLVD

Survey Date: Wednesday, January 30, 2019

Start Time: 07:00

WO No: 38336

Device: Miovision



Turning Movement Count - Peak Hour Diagram

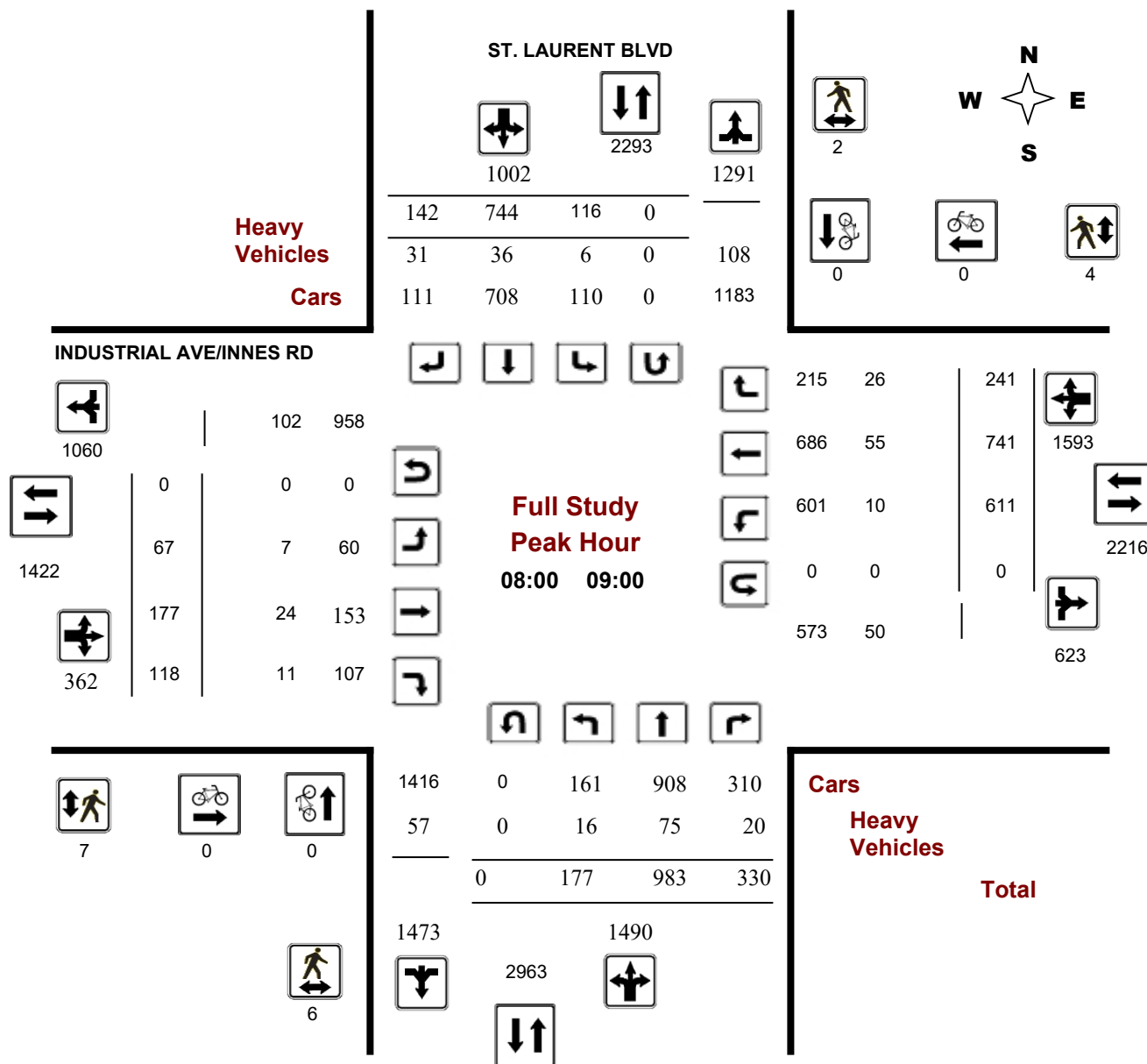
INDUSTRIAL AVE/INNES RD @ ST. LAURENT BLVD

Survey Date: Wednesday, January 30, 2019

Start Time: 07:00

WO No: 38336

Device: Miovision



Comments

Turning Movement Count - Peak Hour Diagram

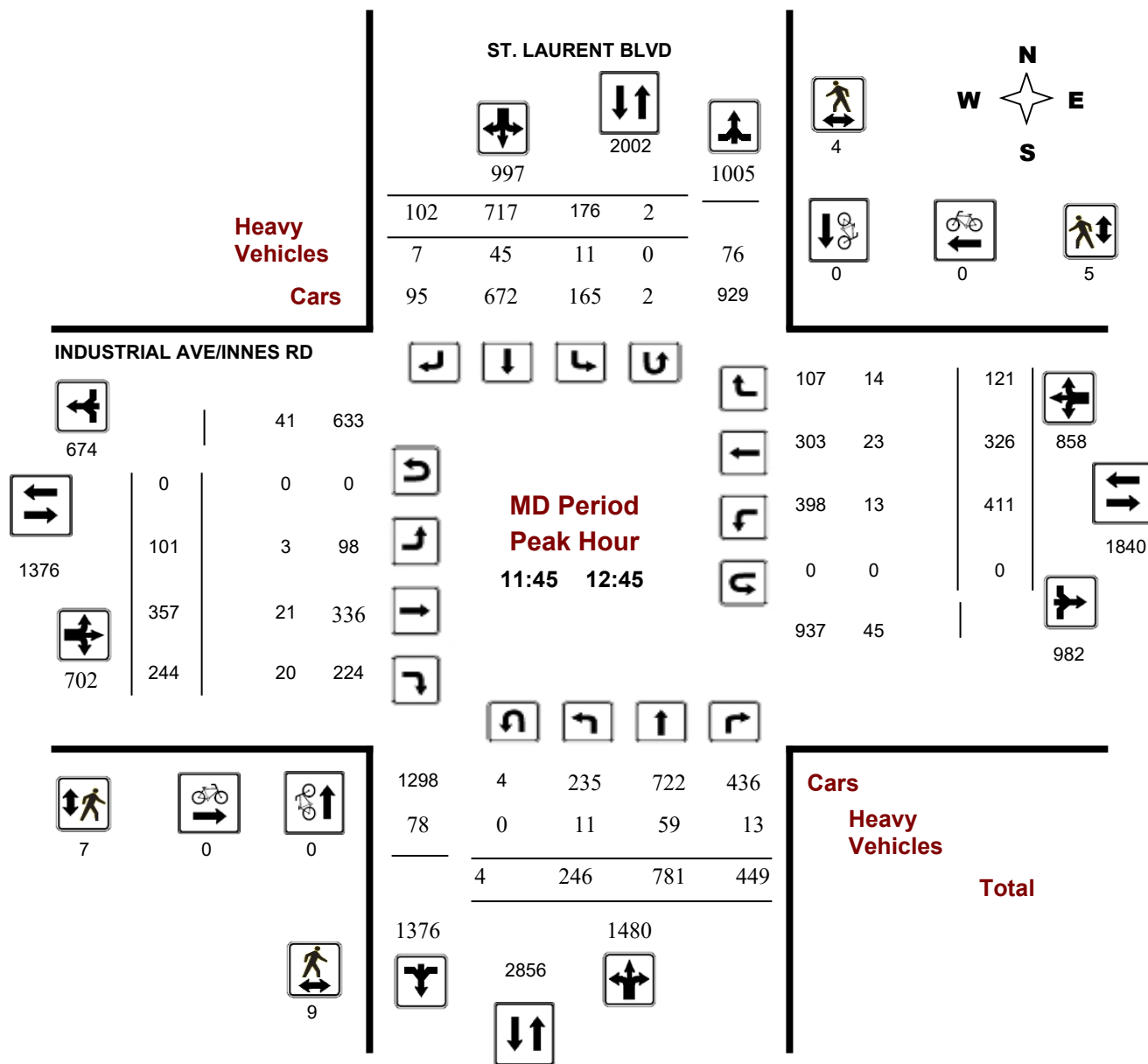
INDUSTRIAL AVE/INNES RD @ ST. LAURENT BLVD

Survey Date: Wednesday, January 30, 2019

Start Time: 07:00

WO No: 38336

Device: Miovision



Comments

Turning Movement Count - Peak Hour Diagram

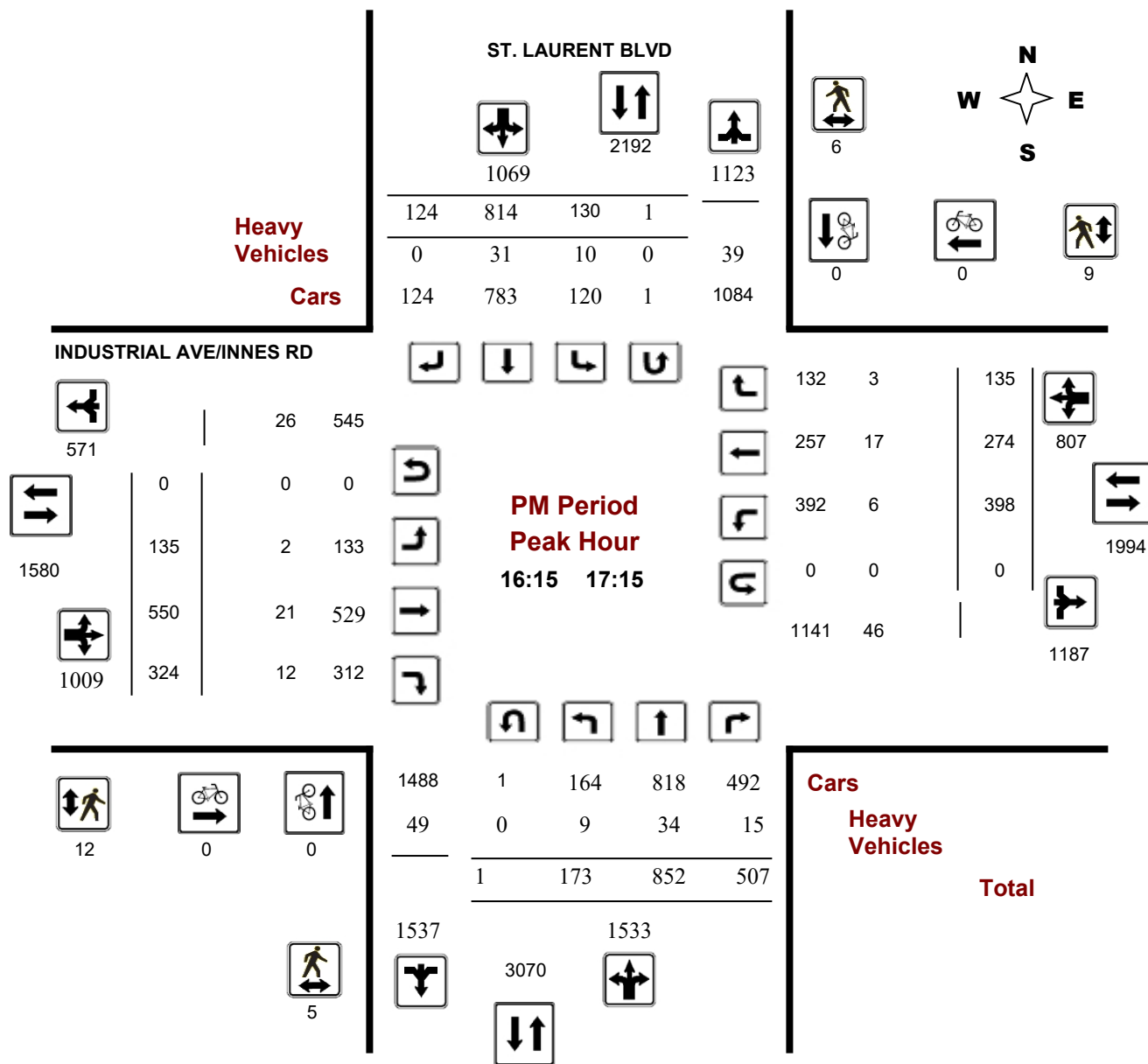
INDUSTRIAL AVE/INNES RD @ ST. LAURENT BLVD

Survey Date: Wednesday, January 30, 2019

Start Time: 07:00

WO No: 38336

Device: Miovision



Transportation Services - Traffic Services

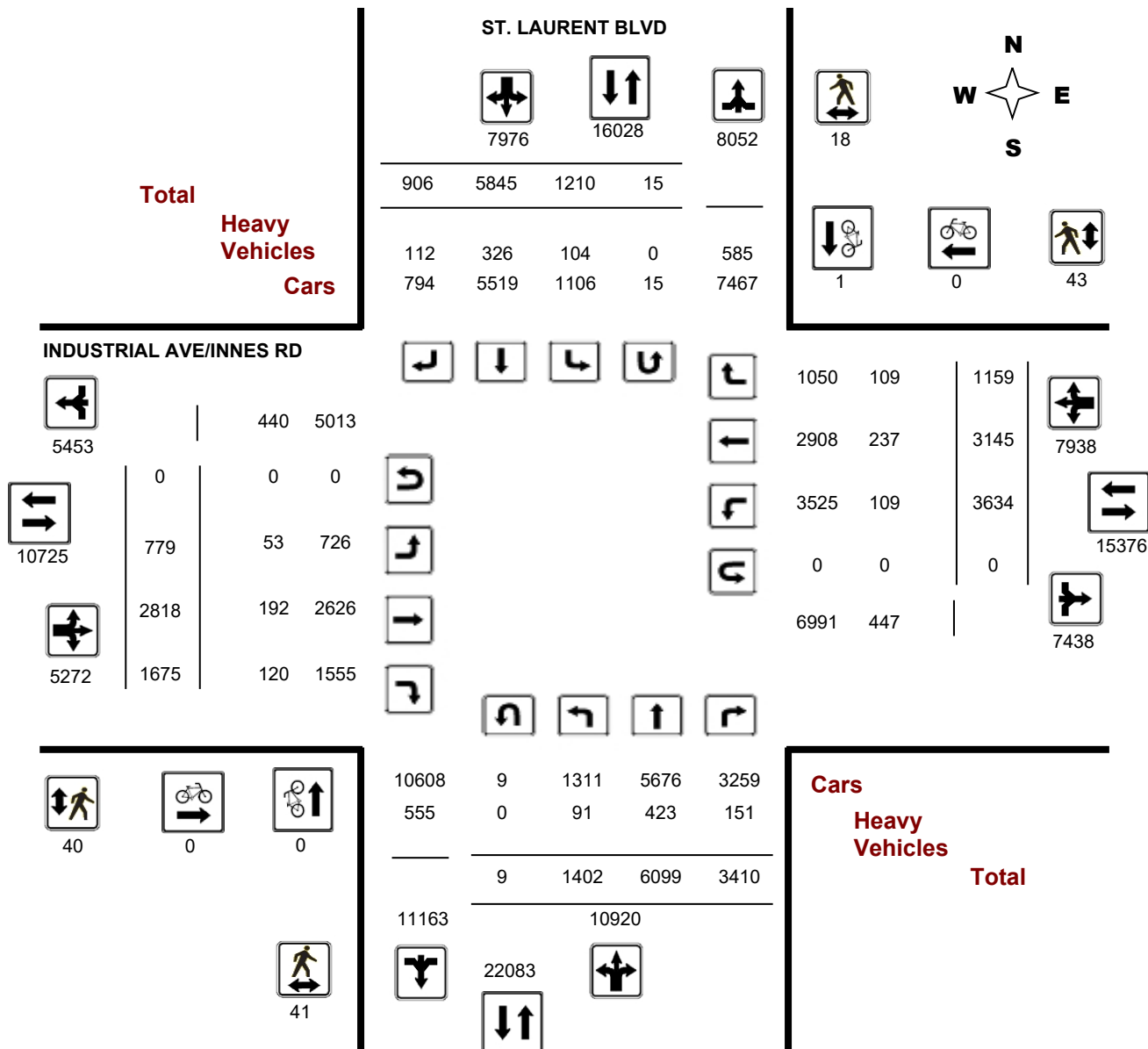
Turning Movement Count - Full Study Diagram

INDUSTRIAL AVE/INNES RD @ ST. LAURENT BLVD

Survey Date: Wednesday, January 30, 2019

WO#: 38336

Device: Miovision



Comments

Turning Movement Count - Full Study Summary Report

INDUSTRIAL AVE/INNES RD @ ST. LAURENT BLVD

Survey Date: Wednesday, January 30, 201

Total Observed U-Turns

Northbound: 9 Southbound: 15
Eastbound: 0 Westbound: 0

AADT Factor

1.00

Full Study

ST. LAURENT BLVD										INDUSTRIAL AVE/INNES 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	188	680	345	1213	158	631	79	868	2081	50	178	139	367	608	530	136	1274	1641	3722
08:00 09:00	177	983	330	1490	116	744	142	1002	2492	67	177	118	362	611	741	241	1593	1955	4447
09:00 10:00	179	657	366	1202	144	625	123	892	2094	79	211	130	420	446	398	145	989	1409	3503
11:30 12:30	237	760	434	1431	172	721	110	1003	2434	91	337	226	654	403	328	135	866	1520	3954
12:30 13:30	171	711	429	1311	191	679	113	983	2294	118	343	222	683	408	310	108	826	1509	3803
15:00 16:00	112	711	554	1377	169	796	119	1084	2461	126	567	238	931	377	323	140	840	1771	4232
16:00 17:00	162	774	528	1464	138	794	115	1047	2511	121	584	313	1018	385	266	130	781	1799	4310
17:00 18:00	176	823	424	1423	122	855	105	1082	2505	127	421	289	837	396	249	124	769	1606	4111
Sub Total	1402	6099	3410	10911	1210	5845	906	7961	18872	779	2818	1675	5272	3634	3145	1159	7938	13210	32082
U Turns				9				15	24				0				0	0	24
Total	1402	6099	3410	10920	1210	5845	906	7976	18896	779	2818	1675	5272	3634	3145	1159	7938	13210	32106
EQ 12Hr	1949	8478	4740	15179	1682	8125	1259	11087	26266	1083	3917	2328	7328	5051	4372	1611	11034	18362	44628
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													1.39						
AVG 12Hr	1949	8478	4740	15179	1682	8125	1259	11087	26266	1083	3917	2328	7328	5051	4372	1611	11034	18362	44628
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													1.00						
AVG 24Hr	2553	11106	6209	19884	2203	10643	1650	14523	34407	1418	5131	3050	9600	6617	5727	2110	14454	24054	58461
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													1.31						

Comments:

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



Turning Movement Count - 15 Minute Summary Report

INDUSTRIAL AVE/INNES RD @ ST. LAURENT BLVD

Survey Date: Wednesday, January 30, 2019

Total Observed U-Turns

Northbound: 9 Southbound: 15
Eastbound: 0 Westbound: 0

ST. LAURENT BLVD										INDUSTRIAL AVE/INNES 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	24	125	67	216	33	120	12	165	381	7	50	25	82	164	124	24	312	394	775	
07:15	07:30	44	171	76	291	45	180	26	251	542	11	39	38	88	133	100	24	257	345	887	
07:30	07:45	53	185	104	342	32	148	19	199	541	12	49	45	106	156	165	45	366	472	1013	
07:45	08:00	67	199	98	364	48	183	22	253	617	20	40	31	91	155	141	43	339	430	1047	
08:00	08:15	39	265	77	381	31	186	28	245	626	10	52	22	84	147	191	40	378	462	1088	
08:15	08:30	41	238	77	356	26	161	42	229	585	20	38	37	95	161	169	61	391	486	1071	
08:30	08:45	42	249	91	382	27	206	33	266	648	15	38	27	80	142	202	62	406	486	1134	
08:45	09:00	55	231	85	371	32	191	39	262	633	22	49	32	103	161	179	78	418	521	1154	
09:00	09:15	55	183	86	324	37	179	25	245	569	20	41	25	86	130	111	55	296	382	951	
09:15	09:30	47	160	105	312	37	151	33	221	533	22	59	29	110	117	110	35	262	372	905	
09:30	09:45	37	162	90	289	38	148	32	218	507	17	56	34	107	93	86	35	214	321	828	
09:45	10:00	40	152	85	277	32	147	33	212	489	20	55	42	117	106	91	20	217	334	823	
11:30	11:45	41	158	110	309	40	170	31	241	550	15	70	47	132	107	80	37	224	356	906	
11:45	12:00	63	205	109	380	40	167	30	237	617	28	80	54	162	94	91	34	219	381	998	
12:00	12:15	64	184	113	361	54	178	26	258	619	27	81	54	162	113	81	26	220	382	1001	
12:15	12:30	69	213	102	385	38	206	23	269	654	21	106	71	198	89	76	38	203	401	1055	
12:30	12:45	50	179	125	354	44	166	23	233	587	25	90	65	180	115	78	23	216	396	983	
12:45	13:00	36	184	99	320	44	176	30	250	570	27	71	54	152	90	80	23	193	345	915	
13:00	13:15	43	175	99	317	57	159	28	244	561	34	86	50	170	124	69	33	226	396	957	
13:15	13:30	42	173	106	321	46	178	32	256	577	32	96	53	181	79	83	29	191	372	949	
15:00	15:15	42	163	127	332	47	184	27	258	590	39	129	52	220	97	92	37	226	446	1036	
15:15	15:30	24	207	144	375	35	185	33	253	628	34	158	69	261	105	80	35	220	481	1109	
15:30	15:45	18	176	148	342	46	204	34	284	626	21	147	57	225	85	87	40	212	437	1063	
15:45	16:00	28	165	135	328	41	223	25	289	617	32	133	60	225	90	64	28	182	407	1024	
16:00	16:15	33	164	130	327	40	197	22	259	586	25	141	86	252	96	58	31	185	437	1023	
16:15	16:30	48	202	148	398	31	196	33	260	658	32	149	67	248	94	79	29	202	450	1108	
16:30	16:45	36	200	134	370	35	214	30	279	649	39	164	87	290	111	68	37	216	506	1155	
16:45	17:00	45	208	116	370	32	187	30	249	619	25	130	73	228	84	61	33	178	406	1025	
17:00	17:15	44	242	109	395	32	217	31	281	676	39	107	97	243	109	66	36	211	454	1130	
17:15	17:30	46	223	105	375	36	245	26	311	686	29	108	64	201	103	73	28	204	405	1091	
17:30	17:45	51	180	116	348	28	169	14	214	562	31	105	64	200	84	57	33	174	374	936	
17:45	18:00	35	178	94	308	26	224	34	285	593	28	101	64	193	100	53	27	180	373	966	
TOTAL:		1402	6099	3410	10920	1210	5845	906	7976	18896	779	2818	1675	5272	3634	3145	1159	7938	13210	32106	

Note: U-Turns are included in Totals.

Comment:



Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order
38336

INDUSTRIAL AVE/INNES RD @ ST. LAURENT BLVD

Count Date: Wednesday, January 30, 2019

Start Time: 07:00

Time Period	ST. LAURENT BLVD			INDUSTRIAL AVE/INNES RD			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	0	0	0	0	0	0	0
08:00 09:00	0	0	0	0	0	0	0
09:00 10:00	0	0	0	0	0	0	0
11:30 12:30	0	0	0	0	0	0	0
12:30 13:30	0	1	1	0	0	0	1
15:00 16:00	0	0	0	0	0	0	0
16:00 17:00	0	0	0	0	0	0	0
17:00 18:00	0	0	0	0	0	0	0
Total	0	1	1	0	0	0	1

Comment:

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



Transportation Services - Traffic Services

W.O.
38336

Turning Movement Count - Heavy Vehicle Report

INDUSTRIAL AVE/INNES RD @ ST. LAURENT BLVD

Survey Date: Wednesday, January 30, 2019

ST. LAURENT BLVD										INDUSTRIAL AVE/INNES RD										Grand Total	
Time Period	Northbound			Southbound			S TOT	STR TOT	Eastbound			Westbound			W TOT	STR TOT					
	LT	ST	RT	N TOT	LT	ST			RT	LT	ST	RT	E TOT	LT			ST	RT			
07:00	08:00	16	48	17	81	33	54	7	94	175	5	23	27	55	32	37	19	88	143	318	
08:00	09:00	16	75	20	111	6	36	31	73	184	7	24	11	42	10	55	26	91	133	317	
09:00	10:00	16	78	34	128	14	44	39	97	225	13	29	5	47	8	42	16	66	113	338	
11:30	12:30	10	56	17	83	11	52	9	72	155	3	22	13	38	15	27	13	55	93	248	
12:30	13:30	5	53	20	78	13	36	10	59	137	8	26	22	56	19	13	11	43	99	236	
15:00	16:00	5	38	21	64	11	47	7	65	129	12	22	16	50	11	24	12	47	97	226	
16:00	17:00	10	46	15	71	11	34	3	48	119	2	32	16	50	7	22	6	35	85	204	
17:00	18:00	13	29	7	49	5	23	6	34	83	3	14	10	27	7	17	6	30	57	140	
Sub Total		91	423	151	665	104	326	112	542	1207	53	192	120	365	109	237	109	455	820	2027	
U-Turns (Heavy Vehicles)					0			0		0		0			0			0		0	
Total		91	423	151	0	104	326	112	542	1207	53	192	120	365	109	237	109	455	820	2027	

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



Transportation Services - Traffic Services

Work Order

38336

Turning Movement Count - Pedestrian Volume Report

INDUSTRIAL AVE/INNES RD @ ST. LAURENT BLVD

Count Date: Wednesday, January 30, 2019

Start Time: 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	1	1	2	1	0	1	3
07:15 07:30	1	0	1	2	0	2	3
07:30 07:45	0	1	1	1	0	1	2
07:45 08:00	0	0	0	0	0	0	0
07:00 08:00	2	2	4	4	0	4	8
08:00 08:15	1	0	1	0	0	0	1
08:15 08:30	2	2	4	3	1	4	8
08:30 08:45	3	0	3	3	2	5	8
08:45 09:00	0	0	0	1	1	2	2
08:00 09:00	6	2	8	7	4	11	19
09:00 09:15	2	0	2	0	2	2	4
09:15 09:30	2	0	2	0	0	0	2
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0
09:00 10:00	4	0	4	0	2	2	6
11:30 11:45	1	0	1	0	1	1	2
11:45 12:00	1	0	1	1	1	2	3
12:00 12:15	1	2	3	4	0	4	7
12:15 12:30	4	2	6	1	2	3	9
11:30 12:30	7	4	11	6	4	10	21
12:30 12:45	3	0	3	1	2	3	6
12:45 13:00	2	0	2	1	3	4	6
13:00 13:15	2	0	2	0	1	1	3
13:15 13:30	1	0	1	2	2	4	5
12:30 13:30	8	0	8	4	8	12	20
15:00 15:15	1	1	2	1	2	3	5
15:15 15:30	1	0	1	1	2	3	4
15:30 15:45	1	1	2	0	1	1	3
15:45 16:00	1	0	1	0	2	2	3
15:00 16:00	4	2	6	2	7	9	15
16:00 16:15	0	0	0	1	0	1	1
16:15 16:30	0	2	2	1	2	3	5
16:30 16:45	3	2	5	5	1	6	11
16:45 17:00	1	1	2	3	3	6	8
16:00 17:00	4	5	9	10	6	16	25
17:00 17:15	1	1	2	3	3	6	8
17:15 17:30	2	2	4	3	1	4	8
17:30 17:45	1	0	1	0	7	7	8
17:45 18:00	2	0	2	1	1	2	4
17:00 18:00	6	3	9	7	12	19	28
Total	41	18	59	40	43	83	142

Comment:

Turning Movement Count - 15 Min U-Turn Total Report

INDUSTRIAL AVE/INNES RD @ ST. LAURENT BLVD

Survey Date: Wednesday, January 30, 2019

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	4	0	0	4
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	3	0	0	0	3
12:00	12:15	0	0	0	0	0
12:15	12:30	1	2	0	0	3
12:30	12:45	0	0	0	0	0
12:45	13:00	1	0	0	0	1
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	1	0	0	0	1
17:00	17:15	0	1	0	0	1
17:15	17:30	1	4	0	0	5
17:30	17:45	1	3	0	0	4
17:45	18:00	1	1	0	0	2
Total		9	15	0	0	24

Turning Movement Count - Peak Hour Diagram

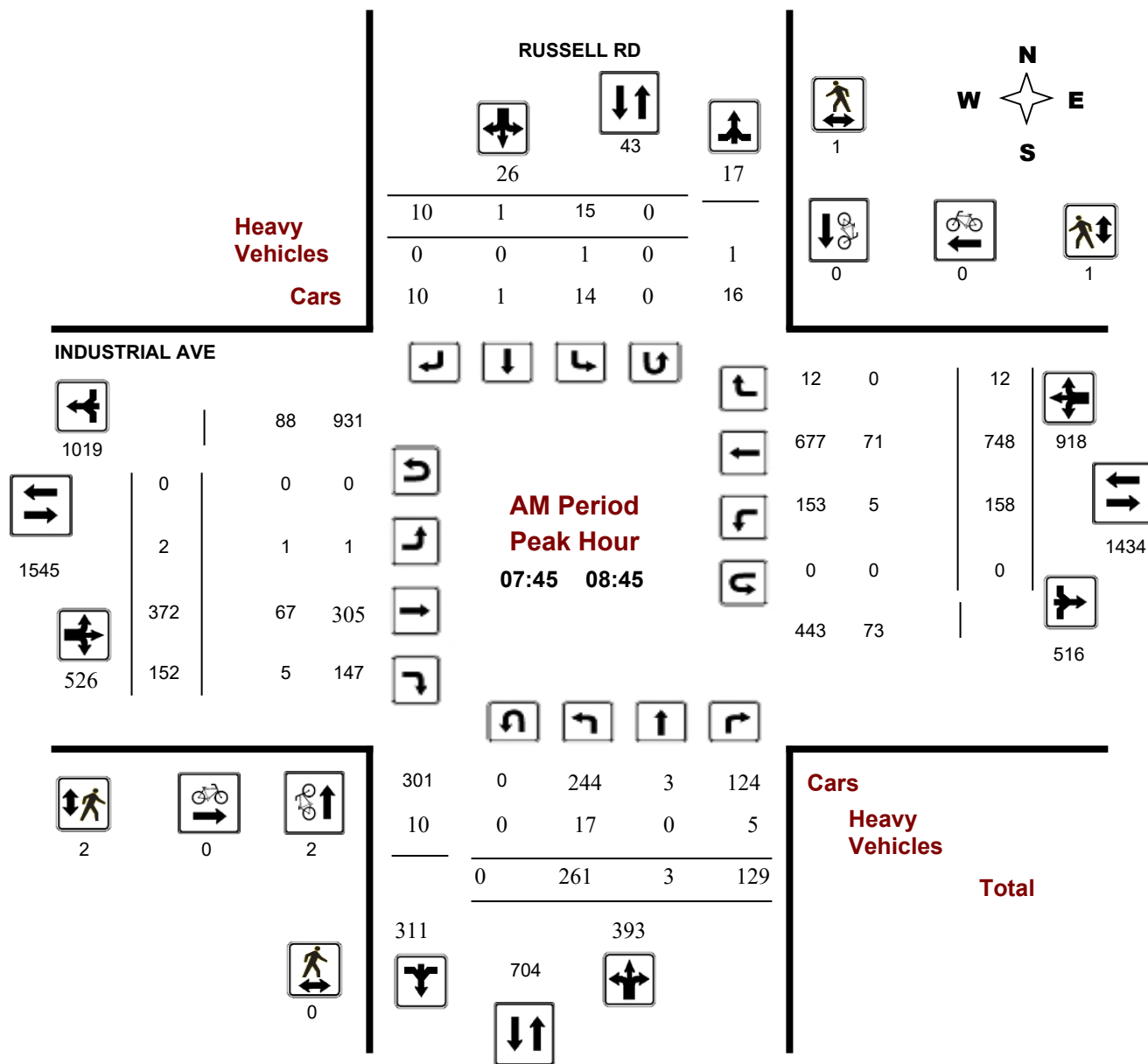
INDUSTRIAL AVE @ RUSSELL RD

Survey Date: Wednesday, November 25, 2015

Start Time: 07:00

WO No: 35525

Device: Miovision



Turning Movement Count - Peak Hour Diagram

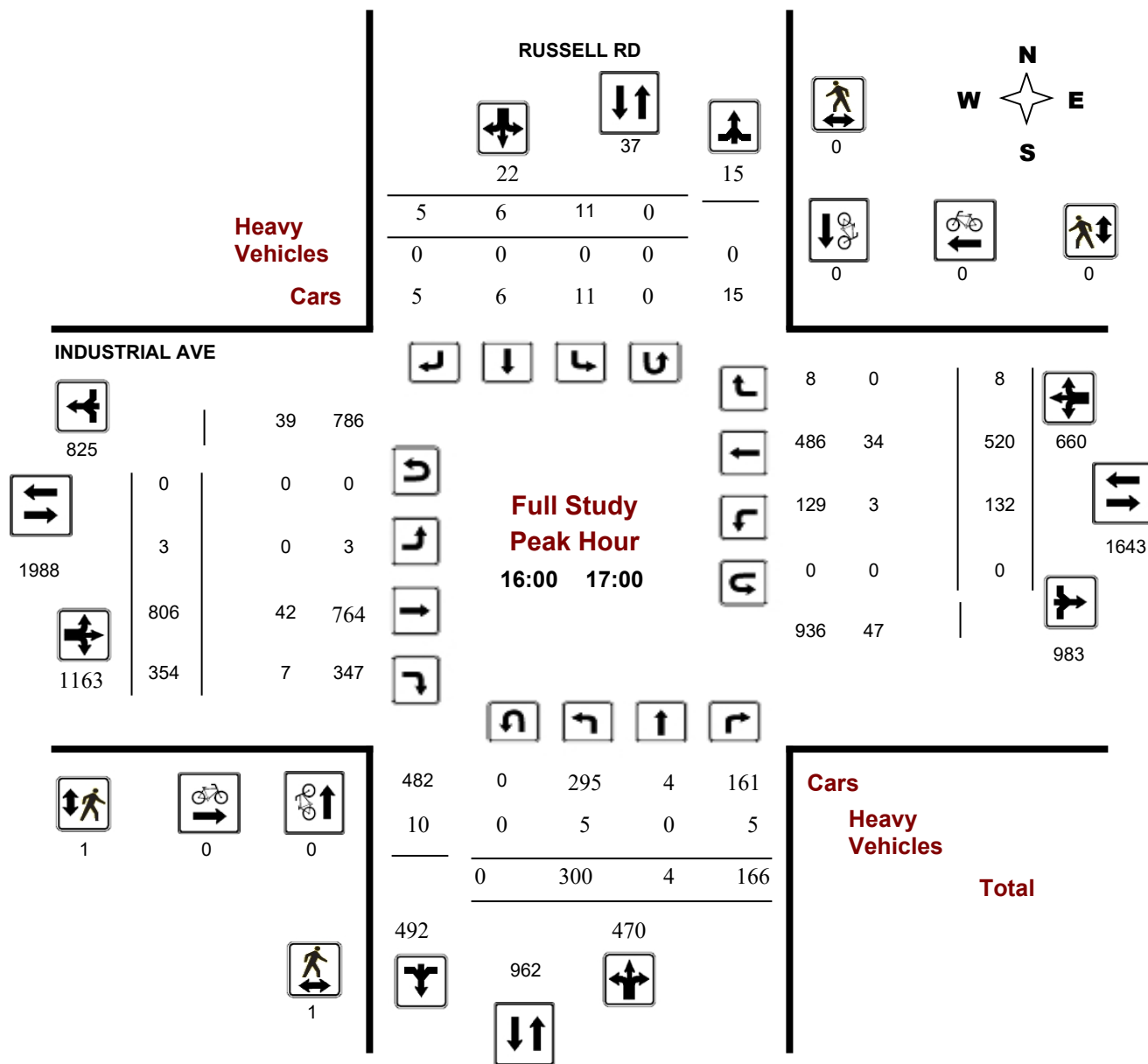
INDUSTRIAL AVE @ RUSSELL RD

Survey Date: Wednesday, November 25, 2015

Start Time: 07:00

WO No: 35525

Device: Miovision



Turning Movement Count - Peak Hour Diagram

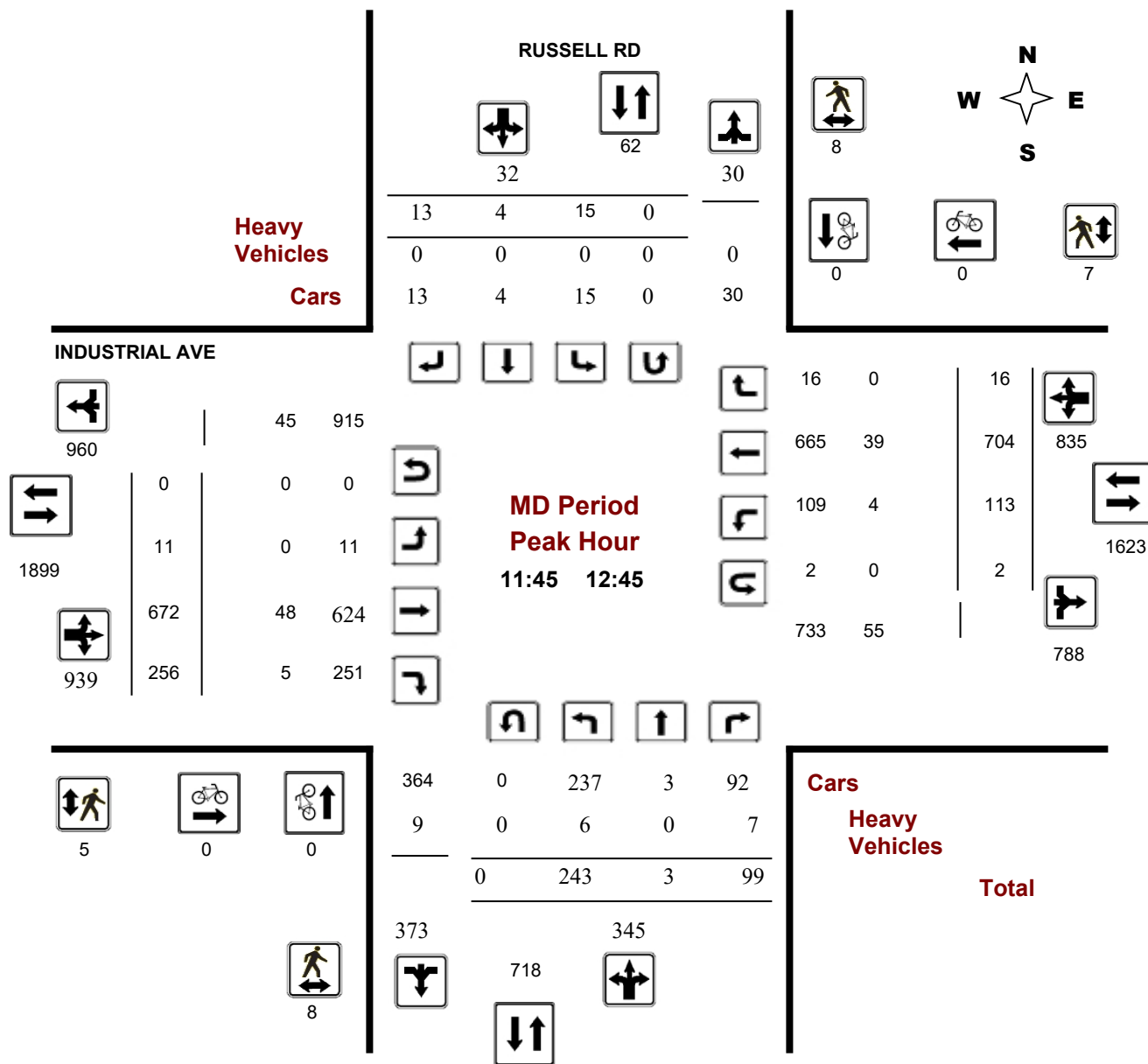
INDUSTRIAL AVE @ RUSSELL RD

Survey Date: Wednesday, November 25, 2015

Start Time: 07:00

WO No: 35525

Device: Miovision



Turning Movement Count - Peak Hour Diagram

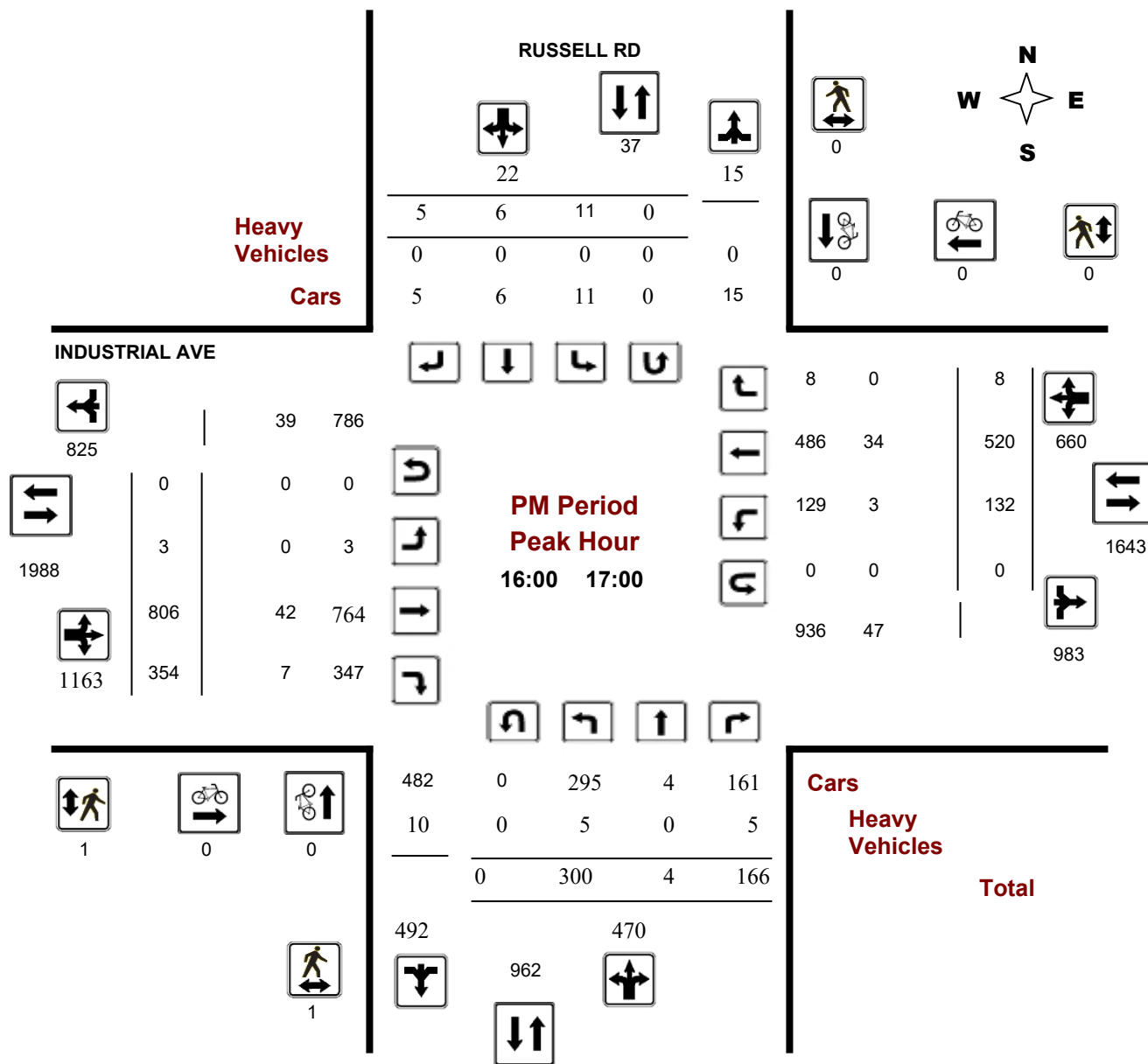
INDUSTRIAL AVE @ RUSSELL RD

Survey Date: Wednesday, November 25, 2015

Start Time: 07:00

WO No: 35525

Device: Miovision



Transportation Services - Traffic Services

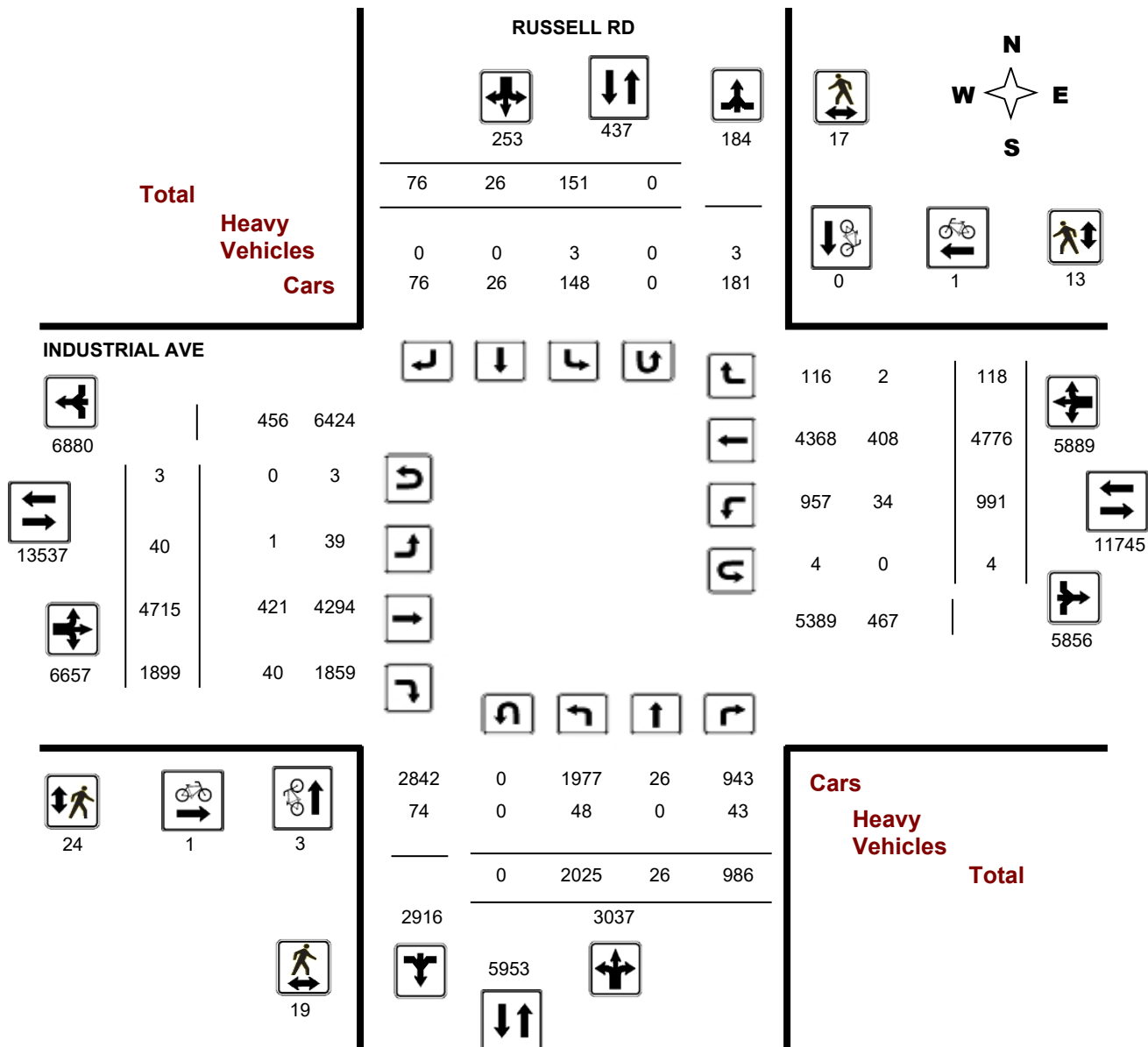
Turning Movement Count - Full Study Diagram

INDUSTRIAL AVE @ RUSSELL RD

Survey Date: Wednesday, November 25, 2015

WO#: 35525

Device: Miovision



Turning Movement Count - Full Study Summary Report

INDUSTRIAL AVE @ RUSSELL RD

Survey Date: Wednesday, November 25, 2015

Total Observed U-Turns

AADT Factor

Northbound: 0 Southbound: 0
Eastbound: 3 Westbound: 4 .90

Full Study

RUSSELL RD											INDUSTRIAL AVE										
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	203	2	93	298	18	2	7	27	325	2	355	132	489	124	696	25	845	1334	1659		
08:00 09:00	257	4	118	379	17	1	13	31	410	2	390	160	552	163	717	12	892	1444	1854		
09:00 10:00	247	3	81	331	25	1	12	38	369	6	417	155	578	91	538	9	638	1216	1585		
11:30 12:30	253	2	91	346	13	2	11	26	372	9	649	236	894	105	698	15	818	1712	2084		
12:30 13:30	241	2	106	349	11	3	11	25	374	5	654	269	928	110	612	15	737	1665	2039		
15:00 16:00	279	5	212	496	34	6	14	54	550	9	764	280	1053	125	512	31	668	1721	2271		
16:00 17:00	300	4	166	470	11	6	5	22	492	3	806	354	1163	132	520	8	660	1823	2315		
17:00 18:00	245	4	119	368	22	5	3	30	398	4	680	313	997	141	483	3	627	1624	2022		
Sub Total	2025	26	986	3037	151	26	76	253	3290	40	4715	1899	6654	991	4776	118	5885	12539	15829		
U Turns				0				0	0				3				4	7	7		
Total	2025	26	986	3037	151	26	76	253	3290	40	4715	1899	6657	991	4776	118	5889	12546	15836		
EQ 12Hr	2815	36	1371	4221	210	36	106	352	4573	56	6554	2640	9253	1377	6639	164	8186	17439	22012		
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													1.39								
AVG 12Hr	2533	33	1233	3799	189	33	95	317	4116	50	5898	2376	8328	1240	5975	148	7367	15695	19811		
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													.90								
AVG 24Hr	3319	43	1616	4977	247	43	125	415	5392	66	7727	3112	10910	1624	7827	193	9651	20561	25953		
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													1.31								

Comments:

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

Turning Movement Count - 15 Minute Summary Report

INDUSTRIAL AVE @ RUSSELL RD

Survey Date: Wednesday, November 25, 2015

Total Observed U-Turns

Northbound: 0 Southbound: 0
Eastbound: 3 Westbound: 4

RUSSELL RD										INDUSTRIAL AVE										Grand Total
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		
07:00 07:15	30	0	18	48	3	0	0	3	51	0	77	30	107	24	156	7	187	294	345	
07:15 07:30	41	0	18	59	3	0	2	5	64	2	79	34	115	31	190	6	227	342	406	
07:30 07:45	62	1	29	92	11	1	3	15	107	0	101	41	142	31	156	7	194	336	443	
07:45 08:00	70	1	28	99	1	1	2	4	103	0	98	27	125	38	194	5	237	362	465	
08:00 08:15	58	0	30	88	1	0	0	1	89	1	88	42	131	34	206	2	242	373	462	
08:15 08:30	67	1	35	103	3	0	2	5	108	0	87	45	132	41	175	3	219	351	459	
08:30 08:45	66	1	36	103	10	0	6	16	119	1	99	38	138	45	173	2	220	358	477	
08:45 09:00	66	2	17	85	3	1	5	9	94	0	116	35	151	43	163	5	211	362	456	
09:00 09:15	61	1	28	90	5	0	4	9	99	1	122	43	166	32	153	3	188	354	453	
09:15 09:30	83	0	19	102	10	0	4	14	116	2	94	32	128	21	143	1	165	293	409	
09:30 09:45	39	0	14	53	5	0	3	8	61	1	95	40	136	14	123	2	139	275	336	
09:45 10:00	64	2	20	86	5	1	1	7	93	2	106	40	148	24	119	3	146	294	387	
11:30 11:45	69	0	22	91	0	0	2	2	93	1	156	49	207	17	147	1	165	372	465	
11:45 12:00	56	1	15	72	6	0	2	8	80	2	141	65	208	33	185	4	222	430	510	
12:00 12:15	72	1	29	102	5	0	3	8	110	1	167	51	219	26	178	5	211	430	540	
12:15 12:30	56	0	25	81	2	2	4	8	89	5	185	71	261	29	188	5	222	483	572	
12:30 12:45	59	1	30	90	2	2	4	8	98	3	179	69	251	25	153	2	180	431	529	
12:45 13:00	57	0	23	80	2	0	4	6	86	1	145	78	224	28	162	5	195	419	505	
13:00 13:15	69	1	30	100	6	1	1	8	108	0	161	60	222	27	141	1	169	391	499	
13:15 13:30	56	0	23	79	1	0	2	3	82	1	169	62	232	30	156	7	193	425	507	
15:00 15:15	76	2	63	141	3	1	2	6	147	1	167	80	248	30	141	15	186	434	581	
15:15 15:30	62	2	46	110	13	1	5	19	129	1	210	75	286	33	138	7	178	464	593	
15:30 15:45	80	0	56	136	18	3	5	26	162	3	192	65	260	30	107	6	144	404	566	
15:45 16:00	61	1	47	109	0	1	2	3	112	4	195	60	259	32	126	3	161	420	532	
16:00 16:15	70	3	41	114	0	2	0	2	116	2	202	99	303	27	143	3	173	476	592	
16:15 16:30	85	1	49	135	5	2	3	10	145	0	206	83	289	32	130	2	164	453	598	
16:30 16:45	76	0	44	120	3	2	1	6	126	0	200	88	288	35	117	0	152	440	566	
16:45 17:00	69	0	32	101	3	0	1	4	105	1	198	84	283	38	130	3	171	454	559	
17:00 17:15	72	4	36	112	2	1	0	3	115	0	192	94	287	41	139	0	180	467	582	
17:15 17:30	71	0	35	106	6	1	1	8	114	1	157	79	237	44	143	0	188	425	539	
17:30 17:45	55	0	27	82	5	2	1	8	90	1	164	70	235	30	118	1	149	384	474	
17:45 18:00	47	0	21	68	9	1	1	11	79	2	167	70	239	26	83	2	111	350	429	
TOTAL:	2025	26	986	3037	151	26	76	253	3290	40	4715	1899	6657	991	4776	118	5889	12546	15836	

Note: U-Turns are included in Totals.

Comment:



Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order
35525

INDUSTRIAL AVE @ RUSSELL RD

Count Date: Wednesday, November 25, 2015

Start Time: 07:00

Time Period	RUSSELL RD			INDUSTRIAL AVE			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	1	0	1	0	0	0	1
08:00 09:00	2	0	2	0	0	0	2
09:00 10:00	0	0	0	0	0	0	0
11:30 12:30	0	0	0	0	0	0	0
12:30 13:30	0	0	0	0	0	0	0
15:00 16:00	0	0	0	1	0	1	1
16:00 17:00	0	0	0	0	0	0	0
17:00 18:00	0	0	0	0	1	1	1
Total	3	0	3	1	1	2	5

Comment:

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



Transportation Services - Traffic Services

W.O.
35525

Turning Movement Count - Heavy Vehicle Report

INDUSTRIAL AVE @ RUSSELL RD

Survey Date: Wednesday, November 25, 2015

RUSSELL RD											INDUSTRIAL AVE										
Time Period		Northbound			Southbound						Eastbound			Westbound						Grand Total	
		LT	ST	RT	N TOT	LT	ST				RT	S TOT	STR TOT	LT	ST	RT					
07:00	08:00	6	0	3	9	0	0	0	0	9	0	43	1	44	12	92	1	105	149	158	
08:00	09:00	15	0	6	21	2	0	0	2	23	1	87	6	94	2	64	0	66	160	183	
09:00	10:00	6	0	10	16	1	0	0	1	17	0	67	6	73	4	66	1	71	144	161	
11:30	12:30	6	0	4	10	0	0	0	0	10	0	43	3	46	5	42	0	47	93	103	
12:30	13:30	2	0	8	10	0	0	0	0	10	0	56	7	63	2	37	0	39	102	112	
15:00	16:00	7	0	5	12	0	0	0	0	12	0	55	4	59	3	49	0	52	111	123	
16:00	17:00	5	0	5	10	0	0	0	0	10	0	42	7	49	3	34	0	37	86	96	
17:00	18:00	1	0	2	3	0	0	0	0	3	0	28	6	34	3	24	0	27	61	64	
Sub Total		48	0	43	91	3	0	0	3	94	1	421	40	462	34	408	2	444	906	1000	
U-Turns (Heavy Vehicles)					0				0	0				0				0	0	0	
Total		48	0	43	0	3	0	0	3	94	1	421	40	462	34	408	2	444	906	1000	
Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.																					



Transportation Services - Traffic Services

Work Order

35525

Turning Movement Count - Pedestrian Volume Report

INDUSTRIAL AVE @ RUSSELL RD

Count Date: Wednesday, November 25, 2015

Start Time: 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	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	1	1	1
07:00 08:00	0	0	0	0	1	1	1
08:00 08:15	0	1	1	0	0	0	1
08:15 08:30	0	0	0	1	0	1	1
08:30 08:45	0	0	0	1	0	1	1
08:45 09:00	0	0	0	1	0	1	1
08:00 09:00	0	1	1	3	0	3	4
09:00 09:15	0	1	1	0	0	0	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	1	0	1	1
09:00 10:00	0	1	1	1	0	1	2
11:30 11:45	0	1	1	0	2	2	3
11:45 12:00	0	2	2	1	2	3	5
12:00 12:15	1	2	3	2	2	4	7
12:15 12:30	1	2	3	2	2	4	7
11:30 12:30	2	7	9	5	8	13	22
12:30 12:45	6	2	8	0	1	1	9
12:45 13:00	2	3	5	1	2	3	8
13:00 13:15	0	0	0	2	0	2	2
13:15 13:30	0	2	2	4	0	4	6
12:30 13:30	8	7	15	7	3	10	25
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	1	0	1	2	0	2	3
15:30 15:45	0	0	0	1	0	1	1
15:45 16:00	3	0	3	1	0	1	4
15:00 16:00	4	0	4	4	0	4	8
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	1	0	1	1
16:45 17:00	1	0	1	0	0	0	1
16:00 17:00	1	0	1	1	0	1	2
17:00 17:15	3	0	3	2	0	2	5
17:15 17:30	0	1	1	0	1	1	2
17:30 17:45	1	0	1	1	0	1	2
17:45 18:00	0	0	0	0	0	0	0
17:00 18:00	4	1	5	3	1	4	9
Total	19	17	36	24	13	37	73

Comment:

Turning Movement Count - 15 Min U-Turn Total Report

INDUSTRIAL AVE @ RUSSELL RD

Survey Date: Wednesday, November 25, 2015

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	1	0	1
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	2	2
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	1	0	1
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	1	1
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	1	0	1
17:15	17:30	0	0	0	1	1
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	3	4	7

Turning Movement Count - Peak Hour Diagram

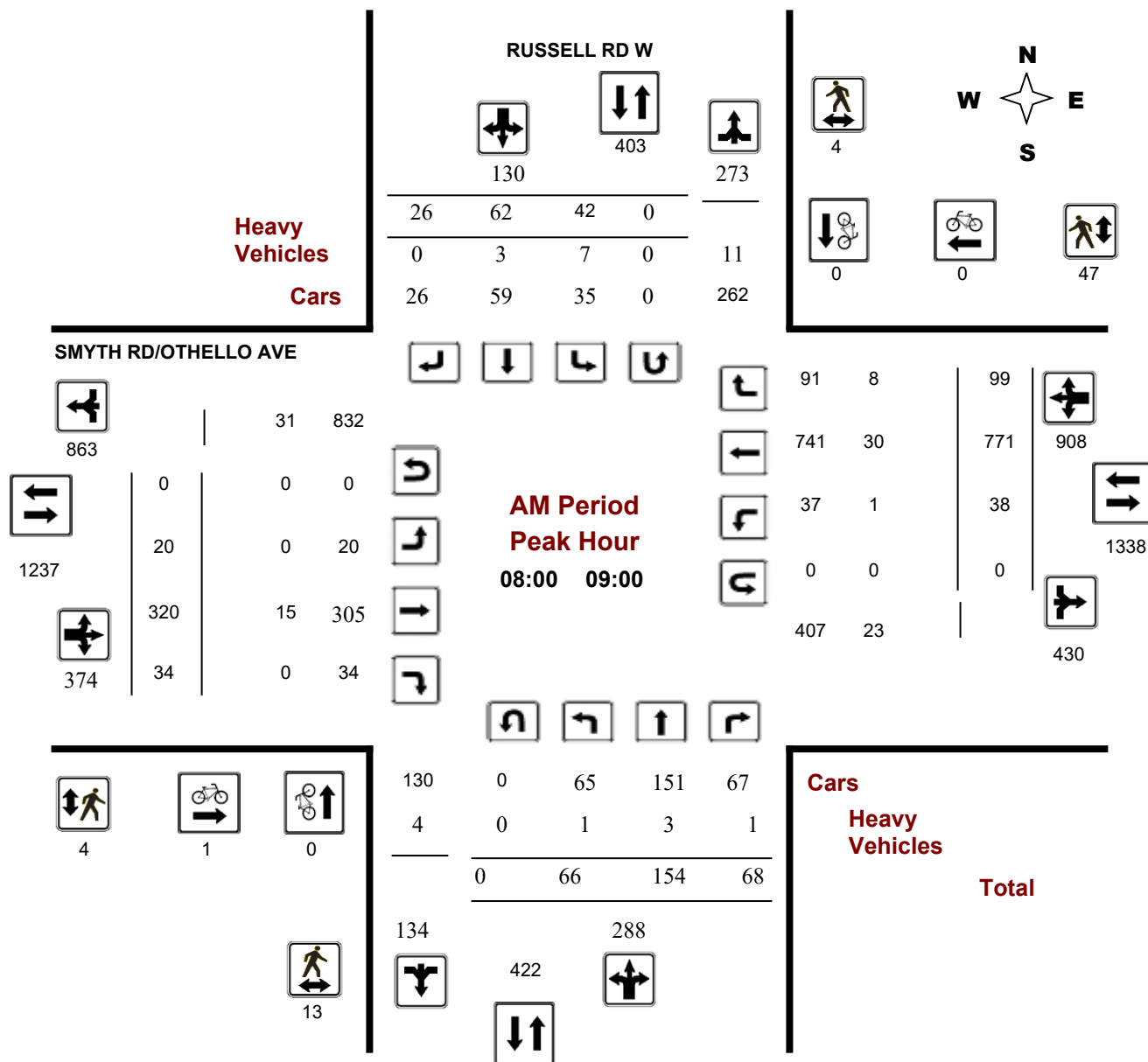
SMYTH RD/OTHELLO AVE @ RUSSELL RD W

Survey Date: Tuesday, November 29, 2016

Start Time: 07:00

WO No: 36552

Device: Miovision



Comments

Turning Movement Count - Peak Hour Diagram

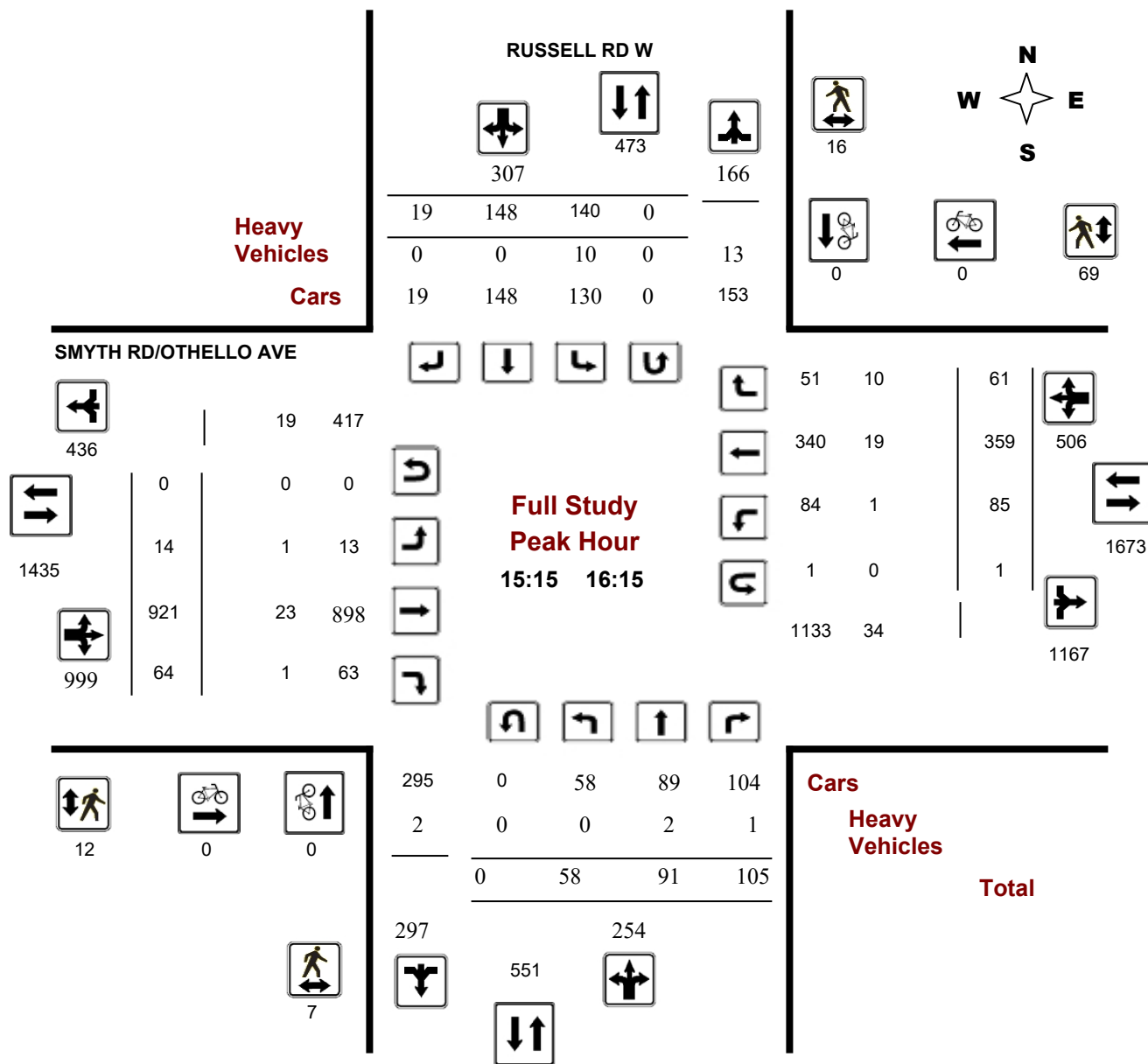
SMYTH RD/OTHELLO AVE @ RUSSELL RD W

Survey Date: Tuesday, November 29, 2016

Start Time: 07:00

WO No: 36552

Device: Miovision



Turning Movement Count - Peak Hour Diagram

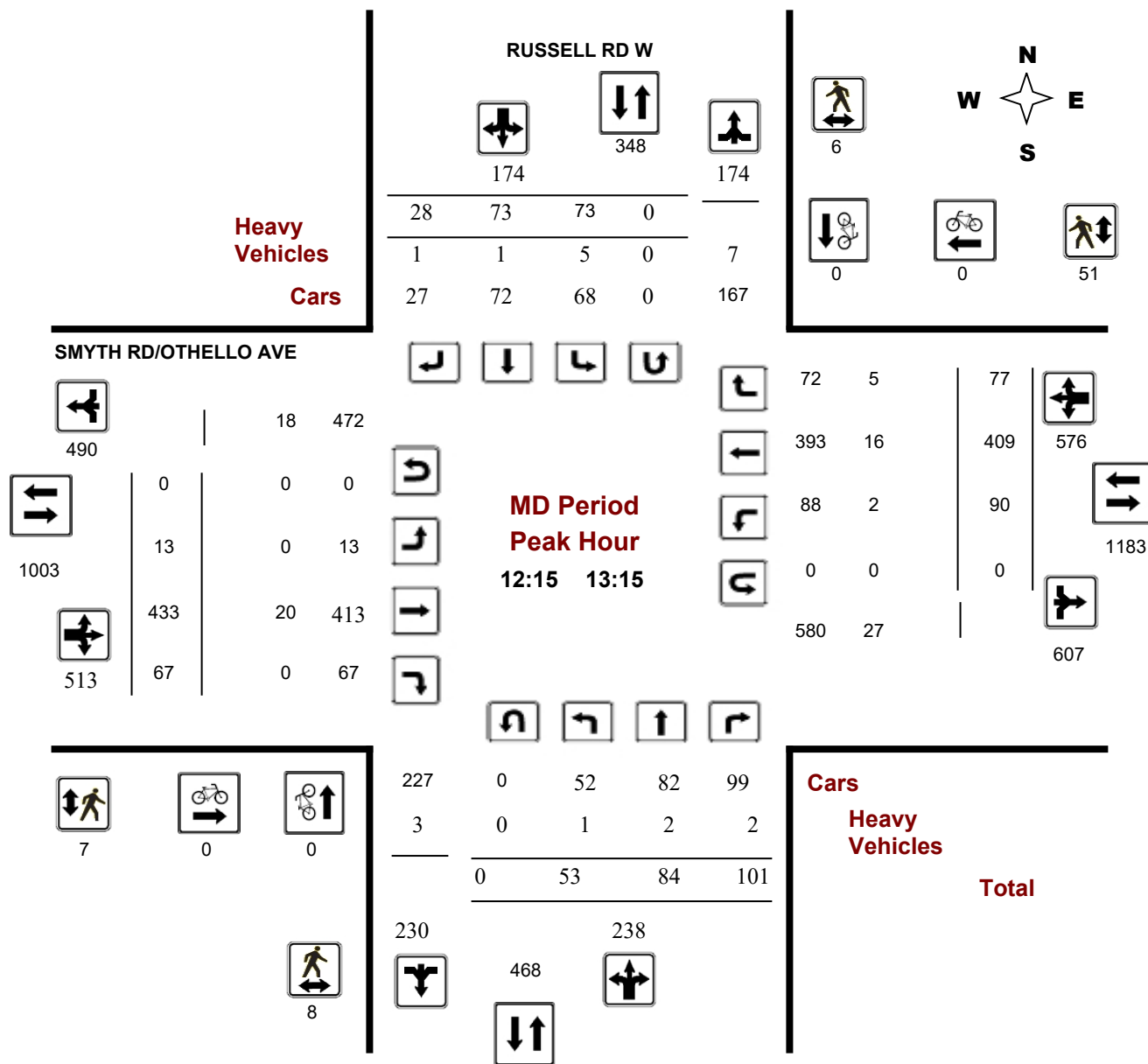
SMYTH RD/OTHELLO AVE @ RUSSELL RD W

Survey Date: Tuesday, November 29, 2016

Start Time: 07:00

WO No: 36552

Device: Miovision



Turning Movement Count - Peak Hour Diagram

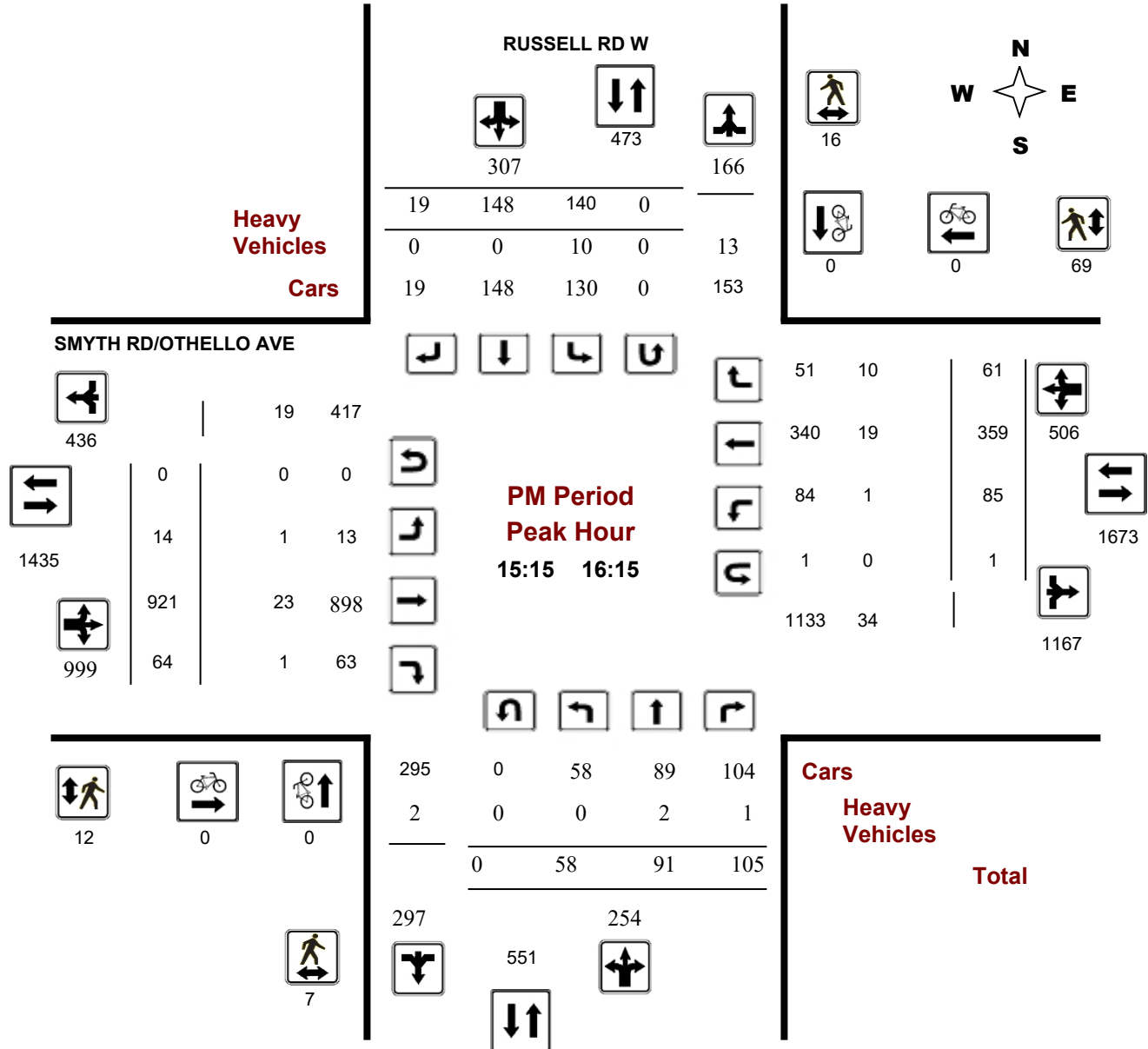
SMYTH RD/OTHELLO AVE @ RUSSELL RD W

Survey Date: Tuesday, November 29, 2016

Start Time: 07:00

WO No: 36552

Device: Miovision



Transportation Services - Traffic Services

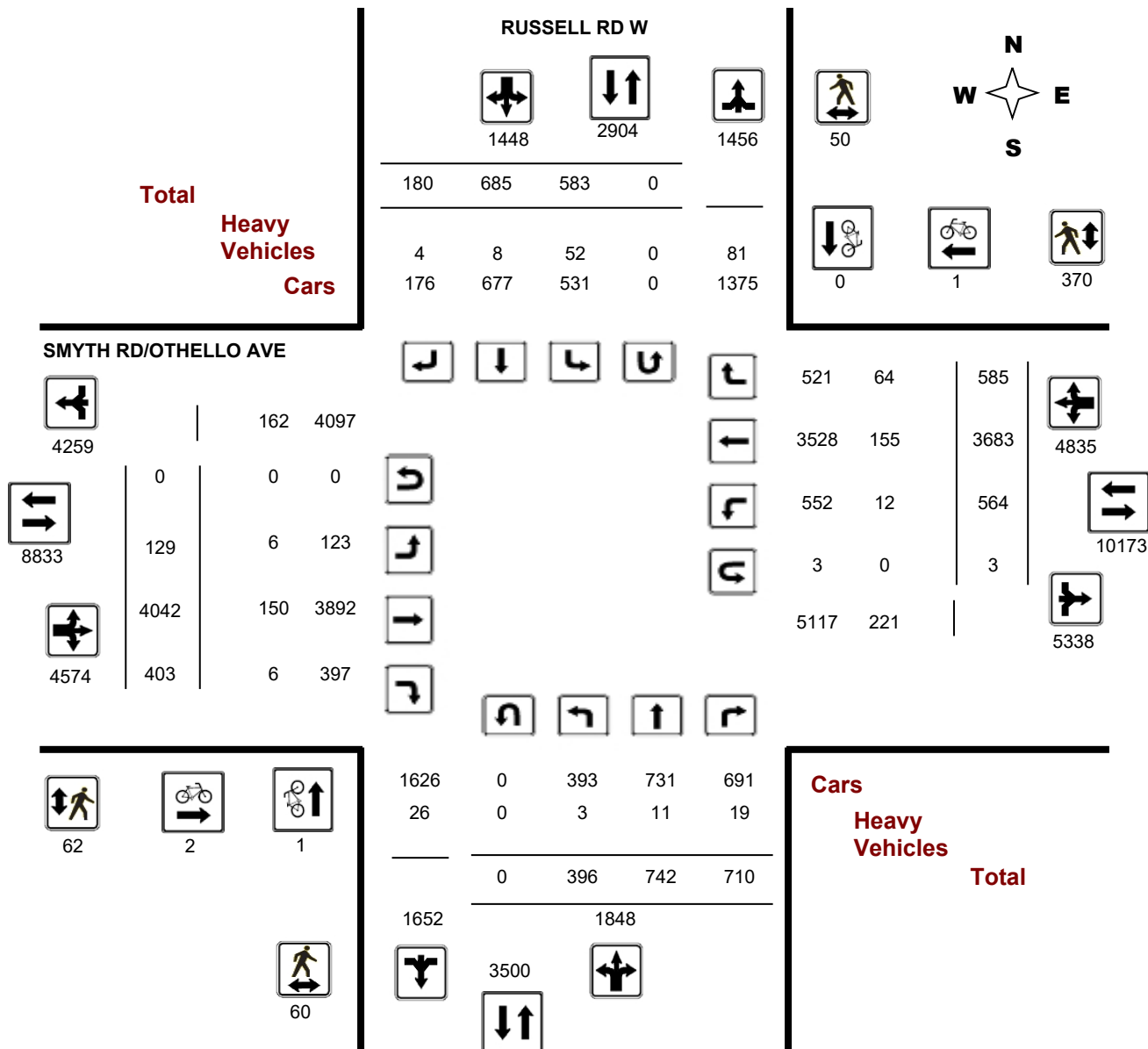
Turning Movement Count - Full Study Diagram

SMYTH RD/OTHELLO AVE @ RUSSELL RD W

Survey Date: Tuesday, November 29, 2016

WO#: 36552

Device: Miovision



Turning Movement Count - Full Study Summary Report

SMYTH RD/OTHELLO AVE @ RUSSELL RD W

Survey Date: Tuesday, November 29, 2016

Total Observed U-Turns

Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 3

AADT Factor

1.00

Full Study

RUSSELL RD W										SMYTH RD/OTHELLO AVE									
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	35	70	67	172	32	57	19	108	280	8	283	25	316	43	722	66	831	1147	1427
08:00 09:00	66	154	68	288	42	62	26	130	418	20	320	34	374	38	771	99	908	1282	1700
09:00 10:00	43	87	73	203	46	71	26	143	346	25	339	38	402	44	475	83	602	1004	1350
11:30 12:30	49	69	93	211	58	66	24	148	359	10	445	54	509	83	379	69	531	1040	1399
12:30 13:30	59	90	96	245	74	70	24	168	413	21	415	64	500	82	401	79	562	1062	1475
15:00 16:00	57	100	95	252	130	126	23	279	531	15	866	66	947	86	354	63	503	1450	1981
16:00 17:00	53	95	117	265	119	148	18	285	550	17	834	70	921	80	316	68	464	1385	1935
17:00 18:00	34	77	101	212	82	85	20	187	399	13	540	52	605	108	265	58	431	1036	1435
Sub Total	396	742	710	1848	583	685	180	1448	3296	129	4042	403	4574	564	3683	585	4832	9406	12702
U Turns				0				0	0				0				3	3	3
Total	396	742	710	1848	583	685	180	1448	3296	129	4042	403	4574	564	3683	585	4835	9409	12705
EQ 12Hr	550	1031	987	2569	810	952	250	2013	4582	179	5618	560	6358	784	5119	813	6721	13079	17661
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													1.39						
AVG 12Hr	550	1031	987	2569	810	952	250	2013	4582	179	5618	560	6358	784	5119	813	6721	13079	17661
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													1.00						
AVG 24Hr	721	1351	1293	3365	1062	1247	328	2637	6002	235	7360	734	8329	1027	6706	1065	8804	17133	23135
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													1.31						

Comments:

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



Turning Movement Count - 15 Minute Summary Report

SMYTH RD/OTHELLO AVE @ RUSSELL RD W

Survey Date: Tuesday, November 29, 2016

Total Observed U-Turns

Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 3

RUSSELL RD W

SMYTH RD/OTHELLO AVE

		Northbound			Southbound						Eastbound						Westbound					
					N				S	STR				E				W	STR	Grand		
Time Period		LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	Total		
07:00	07:15	4	8	15	27	5	11	8	24	51	2	52	7	61	12	183	12	207	268	319		
07:15	07:30	8	16	16	40	6	11	4	21	61	3	61	8	72	6	169	14	189	261	322		
07:30	07:45	12	14	20	46	6	13	2	21	67	2	85	4	91	12	189	20	221	312	379		
07:45	08:00	11	32	16	59	15	22	5	42	101	1	85	6	92	13	181	20	215	307	408		
08:00	08:15	12	25	21	58	3	15	4	22	80	4	63	11	78	13	225	26	264	342	422		
08:15	08:30	19	51	15	85	14	17	7	38	123	5	77	4	86	8	196	28	232	318	441		
08:30	08:45	16	36	18	70	13	15	9	37	107	2	82	13	97	6	188	22	216	313	420		
08:45	09:00	19	42	14	75	12	15	6	33	108	9	98	6	113	11	162	23	196	309	417		
09:00	09:15	13	30	23	66	6	18	6	30	96	10	89	11	110	6	161	22	189	299	395		
09:15	09:30	8	26	14	48	12	20	9	41	89	4	76	5	85	12	92	23	127	212	301		
09:30	09:45	7	18	18	43	13	16	4	33	76	3	95	10	108	20	112	24	156	264	340		
09:45	10:00	15	13	18	46	15	17	7	39	85	8	79	12	99	6	110	14	130	229	314		
11:30	11:45	7	16	18	41	15	13	5	33	74	3	100	9	112	25	96	20	141	253	327		
11:45	12:00	18	17	25	60	13	20	4	37	97	5	113	9	127	21	74	13	108	235	332		
12:00	12:15	15	17	23	55	15	15	6	36	91	0	119	20	139	15	113	22	150	289	380		
12:15	12:30	9	19	27	55	15	18	9	42	97	2	113	16	131	22	96	14	132	263	360		
12:30	12:45	19	25	31	75	24	17	5	46	121	3	130	12	145	23	105	15	143	288	409		
12:45	13:00	11	25	19	55	18	15	6	39	94	3	83	10	96	18	100	21	139	235	329		
13:00	13:15	14	15	24	53	16	23	8	47	100	5	107	29	141	27	108	27	162	303	403		
13:15	13:30	15	25	22	62	16	15	5	36	98	10	95	13	118	14	88	16	118	236	334		
15:00	15:15	11	27	21	59	29	26	5	60	119	4	184	22	210	20	94	18	132	342	461		
15:15	15:30	19	25	22	66	36	34	7	77	143	5	217	14	236	17	72	20	110	346	489		
15:30	15:45	14	30	25	69	36	33	5	74	143	4	255	15	274	26	96	13	135	409	552		
15:45	16:00	13	18	27	58	29	33	6	68	126	2	210	15	227	23	92	12	127	354	480		
16:00	16:15	12	18	31	61	39	48	1	88	149	3	239	20	262	19	99	16	134	396	545		
16:15	16:30	17	28	33	78	26	35	3	64	142	8	208	21	237	20	70	18	108	345	487		
16:30	16:45	8	22	25	55	29	28	8	65	120	2	212	12	226	21	79	21	121	347	467		
16:45	17:00	16	27	28	71	25	37	6	68	139	4	175	17	196	20	68	13	101	297	436		
17:00	17:15	9	21	25	55	21	25	7	53	108	4	157	18	179	33	72	21	126	305	413		
17:15	17:30	10	25	20	55	26	23	6	55	110	3	133	14	150	27	71	13	111	261	371		
17:30	17:45	9	18	22	49	21	22	3	46	95	4	147	13	164	24	71	12	108	272	367		
17:45	18:00	6	13	34	53	14	15	4	33	86	2	103	7	112	24	51	12	87	199	285		
TOTAL:		396	742	710	1848	583	685	180	1448	3296	129	4042	403	4574	564	3683	585	4835	9409	12705		

Note: U-Turns are included in Totals.

Comment:



Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order
36552

SMYTH RD/OTHELLO AVE @ RUSSELL RD W

Count Date: Tuesday, November 29, 2016

Start Time: 07:00

Time Period	RUSSELL RD W			SMYTH RD/OTHELLO AVE			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	0	0	0	1	0	1	1
08:00 09:00	0	0	0	1	0	1	1
09:00 10:00	0	0	0	0	0	0	0
11:30 12:30	0	0	0	0	0	0	0
12:30 13:30	0	0	0	0	0	0	0
15:00 16:00	0	0	0	0	0	0	0
16:00 17:00	0	0	0	0	1	1	1
17:00 18:00	1	0	1	0	0	0	1
Total	1	0	1	2	1	3	4

Comment:

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



Transportation Services - Traffic Services

W.O.
36552

Turning Movement Count - Heavy Vehicle Report

SMYTH RD/OTHELLO AVE @ RUSSELL RD W

Survey Date: Tuesday, November 29, 2016

RUSSELL RD W										SMYTH RD/OTHELLO AVE										
Time Period	Northbound			Southbound				S TOT	STR TOT	Eastbound			Westbound				W TOT	STR TOT	Grand Total	
	LT	ST	RT	N TOT	LT	ST	RT			LT	ST	RT	E TOT	LT	ST	RT				
07:00	08:00	1	0	2	3	3	1	1	5	8	1	14	0	15	2	17	10	29	44	52
08:00	09:00	1	3	1	5	7	3	0	10	15	0	15	0	15	1	30	8	39	54	69
09:00	10:00	0	2	7	9	6	1	1	8	17	2	20	2	24	3	26	12	41	65	82
11:30	12:30	0	4	3	7	3	0	0	3	10	1	22	3	26	3	19	3	25	51	61
12:30	13:30	1	0	3	4	6	1	1	8	12	1	18	0	19	2	17	6	25	44	56
15:00	16:00	0	2	1	3	9	0	0	9	12	1	23	1	25	1	22	9	32	57	69
16:00	17:00	0	0	1	1	11	0	1	12	13	0	26	0	26	0	14	10	24	50	63
17:00	18:00	0	0	1	1	7	2	0	9	10	0	12	0	12	0	10	6	16	28	38
Sub Total		3	11	19	33	52	8	4	64	97	6	150	6	162	12	155	64	231	393	490
U-Turns (Heavy Vehicles)					0				0	0				0				0	0	0
Total		3	11	19	0	52	8	4	64	97	6	150	6	162	12	155	64	231	393	490

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



Transportation Services - Traffic Services

Work Order

36552

Turning Movement Count - Pedestrian Volume Report

SMYTH RD/OTHELLO AVE @ RUSSELL RD W

Count Date: Tuesday, November 29, 2016

Start Time: 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	1	1	2	2	1	3	5
07:15 07:30	3	0	3	2	4	6	9
07:30 07:45	1	2	3	4	11	15	18
07:45 08:00	2	3	5	0	10	10	15
07:00 08:00	7	6	13	8	26	34	47
08:00 08:15	3	1	4	0	14	14	18
08:15 08:30	4	2	6	3	7	10	16
08:30 08:45	2	0	2	1	9	10	12
08:45 09:00	4	1	5	0	17	17	22
08:00 09:00	13	4	17	4	47	51	68
09:00 09:15	2	1	3	0	1	1	4
09:15 09:30	1	0	1	3	11	14	15
09:30 09:45	0	0	0	0	13	13	13
09:45 10:00	4	1	5	1	16	17	22
09:00 10:00	7	2	9	4	41	45	54
11:30 11:45	2	2	4	0	7	7	11
11:45 12:00	1	0	1	0	15	15	16
12:00 12:15	1	0	1	1	11	12	13
12:15 12:30	1	0	1	1	12	13	14
11:30 12:30	5	2	7	2	45	47	54
12:30 12:45	4	0	4	3	15	18	22
12:45 13:00	2	4	6	3	11	14	20
13:00 13:15	1	2	3	0	13	13	16
13:15 13:30	1	1	2	3	11	14	16
12:30 13:30	8	7	15	9	50	59	74
15:00 15:15	2	4	6	2	14	16	22
15:15 15:30	1	4	5	1	22	23	28
15:30 15:45	2	2	4	2	17	19	23
15:45 16:00	1	3	4	6	23	29	33
15:00 16:00	6	13	19	11	76	87	106
16:00 16:15	3	7	10	3	7	10	20
16:15 16:30	3	3	6	5	19	24	30
16:30 16:45	0	3	3	4	15	19	22
16:45 17:00	2	0	2	3	14	17	19
16:00 17:00	8	13	21	15	55	70	91
17:00 17:15	2	1	3	0	8	8	11
17:15 17:30	1	1	2	4	8	12	14
17:30 17:45	1	1	2	0	5	5	7
17:45 18:00	2	0	2	5	9	14	16
17:00 18:00	6	3	9	9	30	39	48
Total	60	50	110	62	370	432	542

Comment:

Turning Movement Count - 15 Min U-Turn Total Report

SMYTH RD/OTHELLO AVE @ RUSSELL RD W

Survey Date: Tuesday, November 29, 2016

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

Turning Movement Count - Peak Hour Diagram

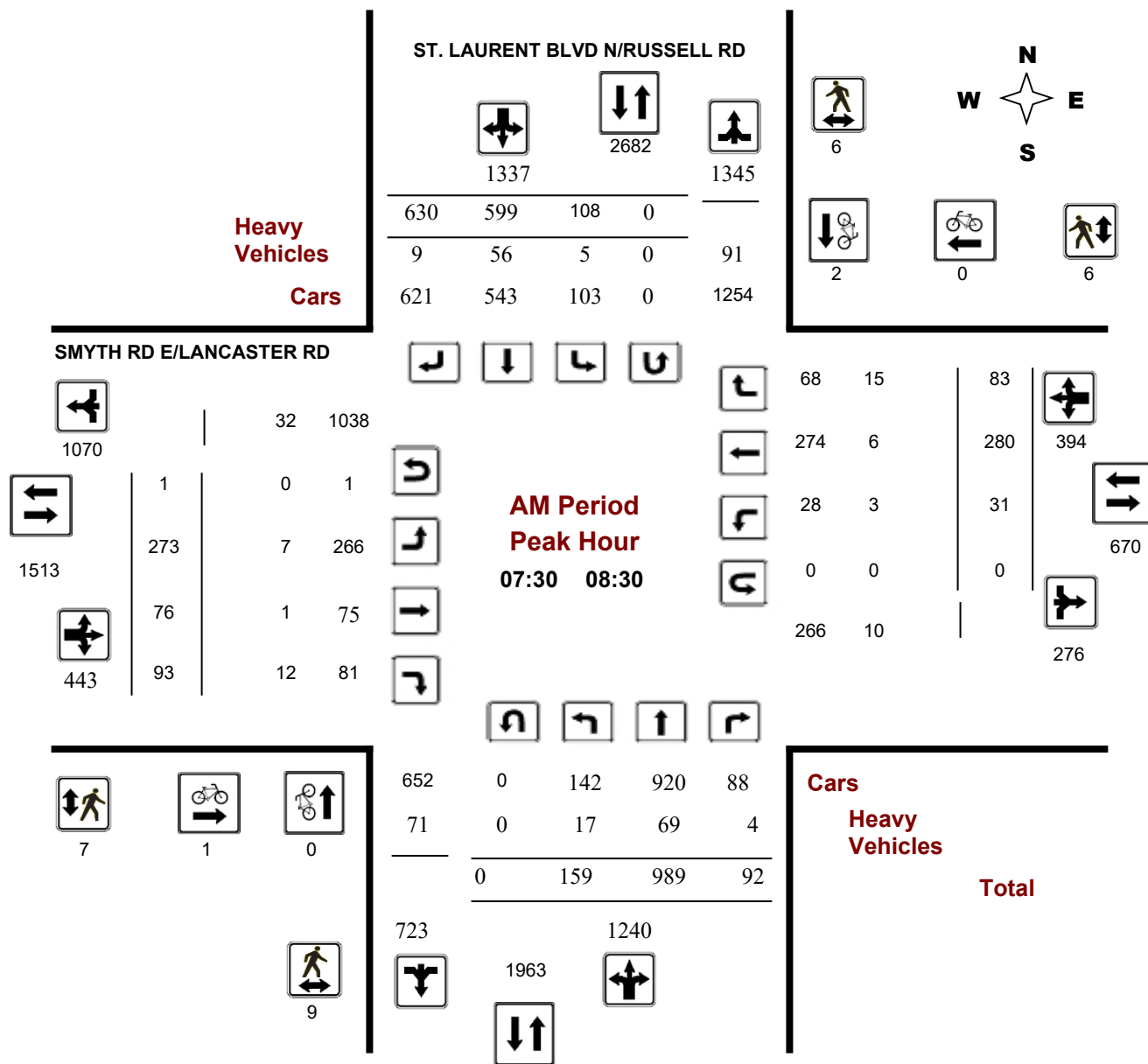
SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, January 28, 2016

Start Time: 07:00

WO No: 37985

Device: Miovision



Turning Movement Count - Peak Hour Diagram

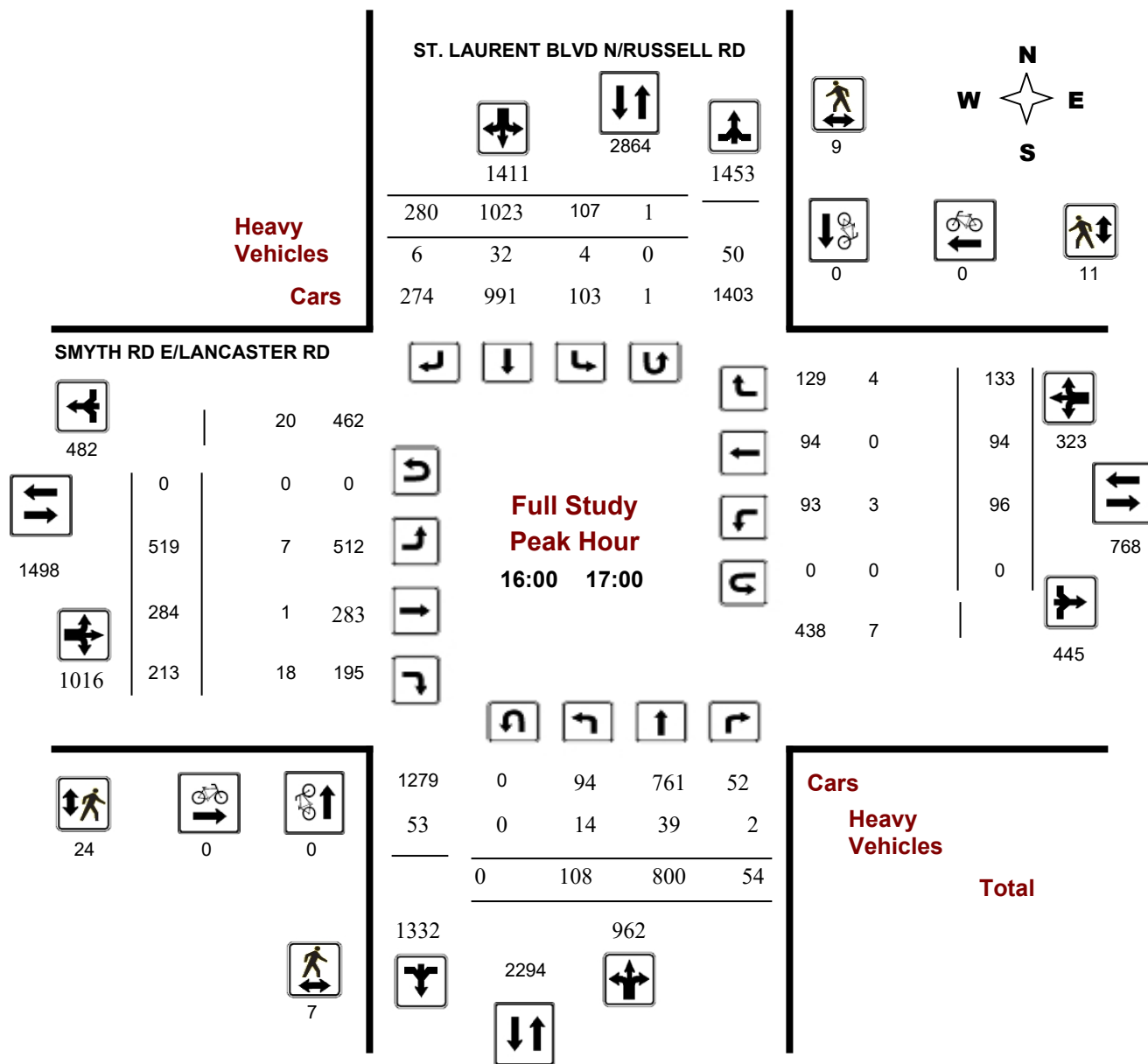
SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, January 28, 2016

Start Time: 07:00

WO No: 37985

Device: Miovision



Turning Movement Count - Peak Hour Diagram

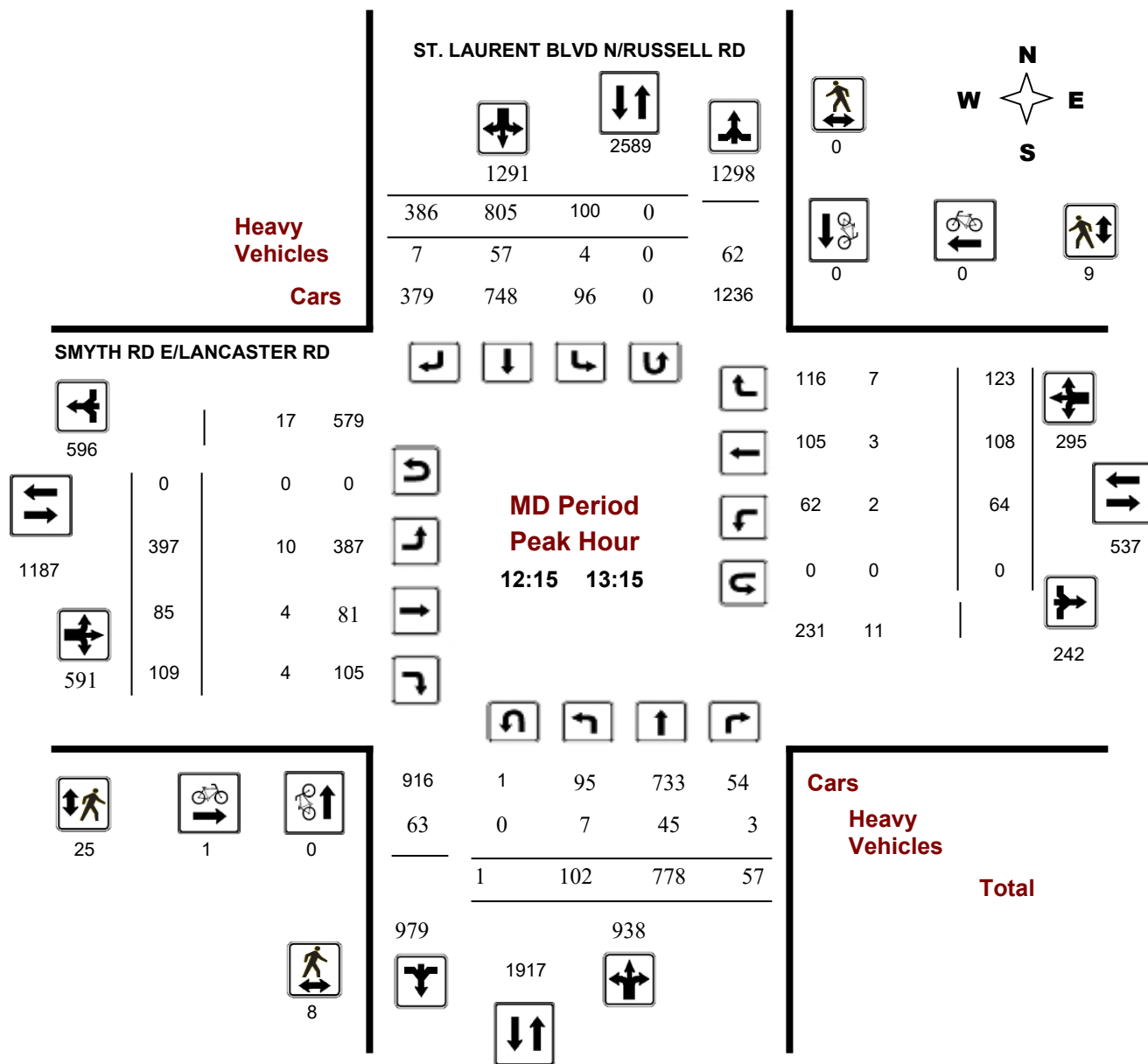
SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, January 28, 2016

Start Time: 07:00

WO No: 37985

Device: Miovision



Turning Movement Count - Peak Hour Diagram

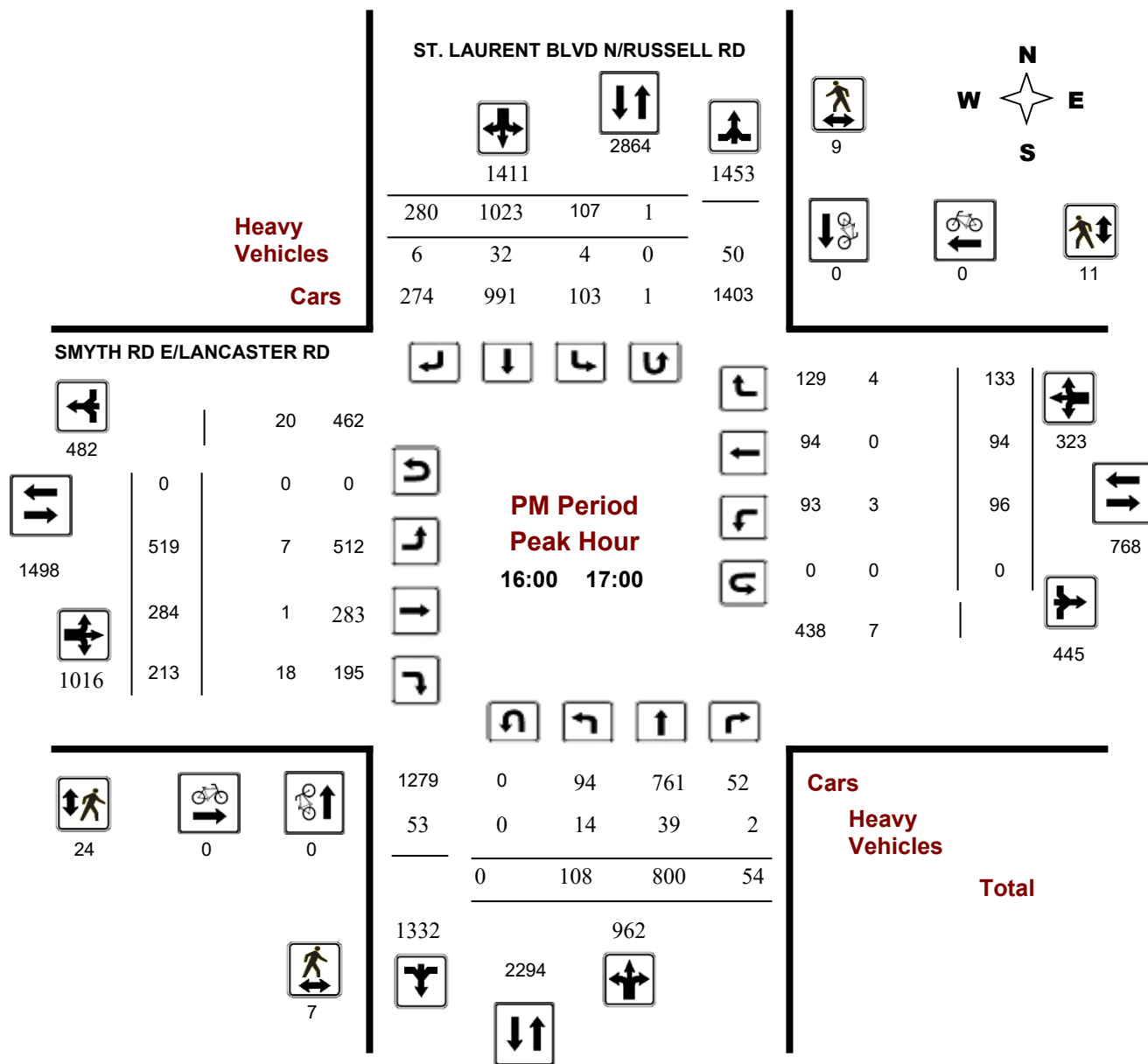
SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, January 28, 2016

Start Time: 07:00

WO No: 37985

Device: Miovision



Transportation Services - Traffic Services

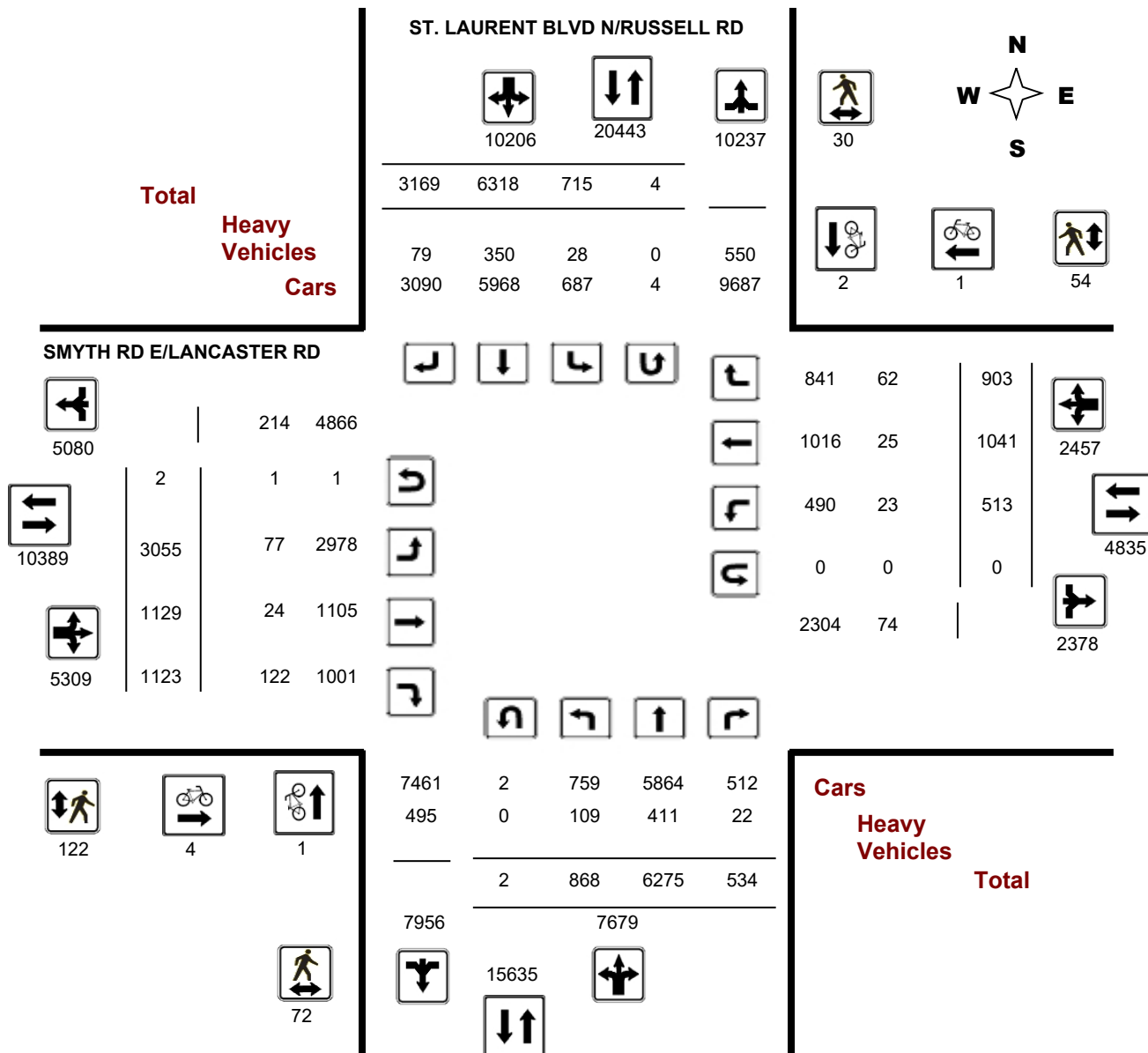
Turning Movement Count - Full Study Diagram

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, January 28, 2016

WO#: 37985

Device: Miovision



Turning Movement Count - Full Study Summary Report

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, January 28, 2016

Total Observed U-Turns

Northbound:	2	Southbound:	4
Eastbound:	2	Westbound:	0

AADT Factor

1.00

Full Study

ST. LAURENT BLVD N/RUSSELL RD										SMYTH RD E/LANCASTER RD										Grand Total
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	149	891	79	1119	98	615	633	1346	2465	208	67	86	361	21	276	70	367	728	3193	
08:00 09:00	151	927	95	1173	116	563	589	1268	2441	298	87	103	488	37	231	79	347	835	3276	
09:00 10:00	119	740	70	929	89	568	358	1015	1944	274	83	93	450	53	98	99	250	700	2644	
11:30 12:30	97	793	58	948	80	737	321	1138	2086	401	92	123	616	65	87	147	299	915	3001	
12:30 13:30	95	725	62	882	95	828	415	1338	2220	378	91	111	580	69	102	120	291	871	3091	
15:00 16:00	75	703	60	838	72	995	318	1385	2223	568	264	220	1052	81	75	107	263	1315	3538	
16:00 17:00	108	800	54	962	107	1023	280	1410	2372	519	284	213	1016	96	94	133	323	1339	3711	
17:00 18:00	74	696	56	826	58	989	255	1302	2128	409	161	174	744	91	78	148	317	1061	3189	
Sub Total	868	6275	534	7677	715	6318	3169	10202	17879	3055	1129	1123	5307	513	1041	903	2457	7764	25643	
U Turns				2				4	6				2				0	2	8	
Total	868	6275	534	7679	715	6318	3169	10206	17885	3055	1129	1123	5309	513	1041	903	2457	7766	25651	
EQ 12Hr	1207	8722	742	10674	994	8782	4405	14186	24860	4246	1569	1561	7380	713	1447	1255	3415	10795	35655	
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													1.39							
AVG 12Hr	1207	8722	742	10674	994	8782	4405	14186	24860	4246	1569	1561	7380	713	1447	1255	3415	10795	35655	
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													1.00							
AVG 24Hr	1581	11426	972	13983	1302	11504	5770	18584	32567	5563	2056	2045	9667	934	1896	1644	4474	14141	46708	
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													1.31							

Comments:

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

Turning Movement Count - 15 Minute Summary Report

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, January 28, 2016

Total Observed U-Turns

Northbound: 2 Southbound: 4
Eastbound: 2 Westbound: 0

ST. LAURENT BLVD N/RUSSELL R

SMYTH RD E/LANCASTER RD

Time Period	Northbound				Southbound				Eastbound				Westbound						Grand Total
	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	
07:00 07:15	23	171	15	209	18	129	154	301	510	36	13	22	71	2	70	4	76	147	657
07:15 07:30	43	189	22	254	24	164	163	351	605	32	11	18	61	9	59	22	90	151	756
07:30 07:45	33	301	19	353	22	159	152	333	686	66	16	21	103	4	93	23	120	223	909
07:45 08:00	50	230	23	303	34	163	164	361	664	74	27	25	126	6	54	21	81	207	871
08:00 08:15	25	251	22	298	22	133	170	325	623	63	11	17	91	11	74	22	107	198	821
08:15 08:30	51	207	28	286	30	144	144	318	604	70	22	30	123	10	59	17	86	209	813
08:30 08:45	41	262	23	326	30	147	151	328	654	84	25	27	136	7	51	16	74	210	864
08:45 09:00	34	207	22	263	34	139	124	297	560	81	29	29	139	9	47	24	80	219	779
09:00 09:15	32	182	18	232	29	136	102	267	499	89	31	27	147	17	33	34	84	231	730
09:15 09:30	33	202	11	246	19	164	96	279	525	51	24	22	97	10	17	21	48	145	670
09:30 09:45	24	183	23	230	20	127	88	235	465	76	11	20	107	13	27	18	58	165	630
09:45 10:00	30	173	18	221	21	141	72	234	455	58	17	24	99	13	21	26	60	159	614
11:30 11:45	19	187	11	217	12	191	67	270	487	87	20	32	139	17	17	38	72	211	698
11:45 12:00	24	199	15	238	20	205	99	325	563	97	29	31	157	15	28	38	81	238	801
12:00 12:15	30	198	22	250	18	146	74	238	488	113	23	35	171	20	20	32	72	243	731
12:15 12:30	24	209	10	243	30	195	81	306	549	104	20	25	149	13	22	39	74	223	772
12:30 12:45	27	218	10	256	27	163	110	300	556	94	18	29	141	21	33	32	86	227	783
12:45 13:00	29	182	20	231	25	241	113	379	610	94	25	30	149	13	21	31	65	214	824
13:00 13:15	22	169	17	208	18	206	82	306	514	105	22	25	152	17	32	21	70	222	736
13:15 13:30	17	156	15	189	25	218	110	353	542	85	26	27	139	18	16	36	70	209	751
15:00 15:15	26	156	16	198	14	199	99	312	510	132	56	49	237	17	23	39	79	316	826
15:15 15:30	14	193	13	220	24	257	85	367	587	142	53	60	255	24	18	22	64	319	906
15:30 15:45	17	190	15	222	19	276	78	373	595	147	96	55	298	22	17	27	66	364	959
15:45 16:00	18	164	16	198	15	263	56	334	532	147	59	56	262	18	17	19	54	316	848
16:00 16:15	23	202	19	244	29	262	62	353	597	136	78	49	263	22	17	46	85	348	945
16:15 16:30	27	192	9	228	26	240	70	337	565	137	92	63	292	17	27	23	67	359	924
16:30 16:45	29	211	12	252	33	287	71	391	643	124	67	56	247	34	32	34	100	347	990
16:45 17:00	29	195	14	238	19	234	77	330	568	122	47	45	214	23	18	30	71	285	853
17:00 17:15	19	183	15	217	19	276	60	355	572	113	52	34	199	29	13	38	80	279	851
17:15 17:30	25	150	18	193	18	237	66	322	515	105	38	52	195	23	17	34	74	269	784
17:30 17:45	13	193	14	220	16	273	68	357	577	85	34	48	167	24	23	42	89	256	833
17:45 18:00	17	170	9	196	5	203	61	269	465	106	37	40	183	15	25	34	74	257	722
TOTAL:	868	6275	534	7679	715	6318	3169	10206	17885	3055	1129	1123	5309	513	1041	903	2457	7766	25651

Note: U-Turns are included in Totals.

Comment:



Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order
37985

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Count Date: Thursday, January 28, 2016

Start Time: 07:00

Time Period	ST. LAURENT BLVD N/RUSSELL RD			SMYTH RD E/LANCASTER RD			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	0	0	0	1	0	1	1
08:00 09:00	1	2	3	1	1	2	5
09:00 10:00	0	0	0	0	0	0	0
11:30 12:30	0	0	0	0	0	0	0
12:30 13:30	0	0	0	1	0	1	1
15:00 16:00	0	0	0	0	0	0	0
16:00 17:00	0	0	0	0	0	0	0
17:00 18:00	0	0	0	1	0	1	1
Total	1	2	3	4	1	5	8

Comment:

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



Transportation Services - Traffic Services

W.O.
37985

Turning Movement Count - Heavy Vehicle Report

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, January 28, 2016

ST. LAURENT BLVD N/RUSSELL R										SMYTH RD E/LANCASTER RD										Grand Total
Time Period	Northbound			Southbound			S TOT	STR TOT	Eastbound			Westbound			W TOT	STR TOT				
	LT	ST	RT	N TOT	LT	ST			RT	LT	ST	RT	E TOT	LT			ST	RT		
07:00	08:00	21	54	6	81	2	56	15	73	154	4	1	9	14	1	2	9	12	26	180
08:00	09:00	18	86	2	106	8	51	8	67	173	20	6	17	43	5	9	12	26	69	242
09:00	10:00	16	76	3	95	4	46	15	65	160	17	4	17	38	4	6	11	21	59	219
11:30	12:30	8	48	1	57	1	41	7	49	106	12	6	11	29	4	2	11	17	46	152
12:30	13:30	7	34	3	44	4	61	8	73	117	12	4	6	23	4	4	7	15	38	155
15:00	16:00	14	33	2	49	3	36	17	56	105	4	2	27	33	0	1	5	6	39	144
16:00	17:00	14	39	2	55	4	32	6	42	97	7	1	18	26	3	0	4	7	33	130
17:00	18:00	11	41	3	55	2	27	3	32	87	1	0	17	18	2	1	3	6	24	111
Sub Total		109	411	22	542	28	350	79	457	999	77	24	122	224	23	25	62	110	334	1333
U-Turns (Heavy Vehicles)					0				0	0				1				0	1	1
Total		109	411	22	0	28	350	79	457	999	77	24	122	225	23	25	62	110	335	1334

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



Transportation Services - Traffic Services

Work Order

37985

Turning Movement Count - Pedestrian Volume Report

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Count Date: Thursday, January 28, 2016

Start Time: 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	4	1	5	3	4	7	12
07:15 07:30	2	0	2	3	1	4	6
07:30 07:45	5	1	6	3	2	5	11
07:45 08:00	1	4	5	0	4	4	9
07:00 08:00	12	6	18	9	11	20	38
08:00 08:15	2	1	3	4	0	4	7
08:15 08:30	1	0	1	0	0	0	1
08:30 08:45	3	1	4	1	1	2	6
08:45 09:00	5	0	5	2	1	3	8
08:00 09:00	11	2	13	7	2	9	22
09:00 09:15	0	0	0	4	0	4	4
09:15 09:30	0	0	0	3	0	3	3
09:30 09:45	1	0	1	5	0	5	6
09:45 10:00	2	0	2	4	0	4	6
09:00 10:00	3	0	3	16	0	16	19
11:30 11:45	1	1	2	3	2	5	7
11:45 12:00	2	2	4	8	2	10	14
12:00 12:15	6	0	6	4	2	6	12
12:15 12:30	4	0	4	1	1	2	6
11:30 12:30	13	3	16	16	7	23	39
12:30 12:45	2	0	2	9	1	10	12
12:45 13:00	1	0	1	11	5	16	17
13:00 13:15	1	0	1	4	2	6	7
13:15 13:30	0	1	1	4	4	8	9
12:30 13:30	4	1	5	28	12	40	45
15:00 15:15	4	0	4	3	1	4	8
15:15 15:30	2	3	5	3	2	5	10
15:30 15:45	0	1	1	3	1	4	5
15:45 16:00	2	1	3	3	1	4	7
15:00 16:00	8	5	13	12	5	17	30
16:00 16:15	1	3	4	11	3	14	18
16:15 16:30	3	0	3	4	3	7	10
16:30 16:45	2	4	6	4	3	7	13
16:45 17:00	1	2	3	5	2	7	10
16:00 17:00	7	9	16	24	11	35	51
17:00 17:15	9	1	10	3	1	4	14
17:15 17:30	3	1	4	4	3	7	11
17:30 17:45	1	1	2	0	1	1	3
17:45 18:00	1	1	2	3	1	4	6
17:00 18:00	14	4	18	10	6	16	34
Total	72	30	102	122	54	176	278

Comment:

Turning Movement Count - 15 Min U-Turn Total Report

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, January 28, 2016

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	1	0	1
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	1	0	0	1
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	1	0	0	0	1
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	1	0	1	0	2
15:00	15:15	0	0	0	0	0
15:15	15:30	0	1	0	0	1
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	1	0	0	1
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	1	0	0	1
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		2	4	2	0	8

Appendix D

Collision Data

DRAFT

Total Area

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	4	1	2	3	0	0	0	0	10	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	4	1	2	3	0	0	0	0	10	100%
	# 1 or 40%	# 4 or 10%	# 3 or 20%	# 2 or 30%	# 5 or 0%	# 5 or 0%	# 5 or 0%	# 5 or 0%		

HAIG / RUSSELL

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	3	11,191	1825	0.15

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	1	0	2	0	0	0	0	0	3	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	1	0	2	0	0	0	0	0	3	100%
	33%	0%	67%	0%	0%	0%	0%	0%		

RUSSELL, THIRSK to HAIG

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	2	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	2	0	0	0	0	0	0	0	2	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	2	0	0	0	0	0	0	0	2	100%
	100%	0%	0%	0%	0%	0%	0%	0%		

RUSSELL, HAIG to CUBA

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	2	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	1	1	0	0	0	0	0	0	2	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	1	1	0	0	0	0	0	0	2	100%
	50%	50%	0%	0%	0%	0%	0%	0%		

EVEREST / RUSSELL

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	3	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	0	0	0	3	0	0	0	0	3	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	0	0	0	3	0	0	0	0	3	100%
	0%	0%	0%	100%	0%	0%	0%	0%		



City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2013 **To:** December 31, 2017

Location: CORONATION AVE @ RUSSELL RD

Traffic Control: Stop sign

Total Collisions: 5

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-Sep-26, Sat,13:30	Clear	SMV other	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Curb	
2016-Oct-05, Wed,14:01	Clear	Angle	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Passenger van	Other motor vehicle	
2013-Mar-08, Fri,13:35	Clear	Rear end	P.D. only	Dry	South	Turning right	Passenger van	Other motor vehicle	
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2013-Sep-27, Fri,14:17	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2013-Dec-27, Fri,00:15	Clear	Angle	P.D. only	Loose snow	East	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Tow truck	Other motor vehicle	

Location: CUBA AVE @ RUSSELL RD

Traffic Control: Stop sign

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
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2016-Jan-01, Fri,20:39	Snow	Sideswipe	P.D. only	Loose snow	South	Going ahead	Municipal transit bus	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle

Location: EVEREST PRIV @ RUSSELL RD

Traffic Control: Stop sign

Total Collisions: 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Jan-05, Thu,08:00	Clear	Angle	P.D. only	Ice	West	Turning left	Pick-up truck	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Dec-23, Fri,15:36	Clear	Angle	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Pick-up truck	Other motor vehicle	

Location: HAIG DR @ RUSSELL RD

Traffic Control: Traffic signal

Total Collisions: 4

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Mar-25, Tue,09:00	Clear	Sideswipe	P.D. only	Dry	East	Overtaking	Passenger van	Other motor vehicle	
					East	Stopped	Municipal transit bus	Other motor vehicle	
2014-Jul-23, Wed,12:20	Clear	Sideswipe	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Construction equipment	Other motor vehicle	
2017-Mar-26, Sun,14:17	Clear	Rear end	P.D. only	Dry	North	Unknown	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	

2013-Aug-18, Sun,17:59	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle

Location: INDUSTRIAL AVE @ RUSSELL RD

Traffic Control: Traffic signal

Total Collisions: 33

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Jan-27, Mon,07:19	Drifting Snow	SMV other	P.D. only	Packed snow	East	Going ahead	Automobile, station wagon	Skidding/sliding	
2014-Mar-04, Tue,18:45	Rain	Turning movement	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Aug-12, Tue,19:13	Rain	SMV other	Non-fatal injury	Wet	West	Slowing or stopping	Motorcycle	Skidding/sliding	
2014-Aug-21, Thu,15:05	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Passenger van	Other motor vehicle	
2014-Oct-30, Thu,12:25	Clear	Rear end	P.D. only	Dry	West	Going ahead	Pick-up truck	Other motor vehicle	
					West	Stopped	Pick-up truck	Other motor vehicle	
2014-Dec-02, Tue,21:28	Snow	SMV other	P.D. only	Loose snow	North	Turning right	Automobile, station wagon	Curb	
2015-Sep-11, Fri,15:01	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	

2015-Feb-23, Mon,09:45	Clear	Rear end	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle
					East	Turning right	Passenger van	Other motor vehicle
2015-Jan-26, Mon,19:00	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jul-17, Fri,21:43	Rain	Turning movement	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-May-20, Wed,08:46	Clear	Rear end	Non-fatal injury	Dry	West	Slowing or stopping	Pick-up truck	Other motor vehicle
					West	Stopped	Pick-up truck	Other motor vehicle
2016-May-11, Wed,15:15	Clear	Rear end	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle
2016-Jan-18, Mon,12:17	Clear	Rear end	Non-fatal injury	Dry	East	Other	Automobile, station wagon	Other motor vehicle
					East	Turning right	Automobile, station wagon	Other motor vehicle
2015-Nov-03, Tue,05:57	Clear	Turning movement	Non-fatal injury	Wet	West	Turning left	Passenger van	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle

2016-Jun-20, Mon,15:11	Clear	Turning movement	Non-fatal injury	Dry	East	Going ahead	Passenger van	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle
					North	Stopped	Pick-up truck	Other motor vehicle
2016-May-17, Tue,13:02	Clear	Turning movement	Non-fatal injury	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Oct-27, Thu,19:00	Snow	Turning movement	P.D. only	Wet	West	Turning left	Pick-up truck	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Nov-03, Thu,07:13	Rain	Sideswipe	P.D. only	Wet	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Jan-06, Fri,17:16	Clear	Rear end	P.D. only	Ice	East	Turning right	Automobile, station wagon	Other motor vehicle
					East	Turning right	Automobile, station wagon	Other motor vehicle
2016-Dec-11, Sun,00:43	Clear	SMV other	P.D. only	Dry	North	Turning left	Automobile, station wagon	Skidding/sliding
2016-Dec-08, Thu,21:43	Snow	Angle	Non-fatal injury	Ice	East	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle
2016-Dec-18, Sun,00:43	Snow	SMV other	P.D. only	Loose snow	North	Turning left	Automobile, station wagon	Curb

2017-Nov-26, Sun,20:28	Snow	Turning movement	Non-fatal injury	Loose snow	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2017-Nov-09, Thu,16:47	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2013-Feb-26, Tue,13:21	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2013-Feb-15, Fri,06:48	Clear	Turning movement	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2013-Apr-17, Wed,13:08	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2013-May-16, Thu,15:41	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2013-May-30, Thu,08:08	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle

					North	Turning left	Automobile, station wagon	Other motor vehicle
2013-May-24, Fri,08:50	Rain	Sideswipe	P.D. only	Wet	East	Going ahead	Pick-up truck	Other motor vehicle
					East	Going ahead	Passenger van	Other motor vehicle
2013-Jun-10, Mon,21:18	Rain	Turning movement	Non-fatal injury	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Delivery van	Other motor vehicle
2013-Jul-19, Fri,15:39	Rain	Rear end	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle
2013-Dec-05, Thu,15:07	Clear	Rear end	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle

Location: RUSSELL RD @ THIRSK ST

Traffic Control: Stop sign

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Feb-18, Thu,14:04	Snow	Angle	P.D. only	Wet	East	Turning left	Unknown	Other motor vehicle	
					South	Going ahead	Passenger van	Other motor vehicle	

Location: RUSSELL RD btwn CUBA AVE & SMYTH RD

Traffic Control: No control

Total Collisions: 11

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Feb-20, Thu,09:42	Clear	Sideswipe	P.D. only	Wet	East	Pulling away from shoulder or curb	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Oct-14, Tue,10:29	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Slowing or stopping	Pick-up truck	Other motor vehicle	
2015-Feb-04, Wed,17:30	Clear	Approaching	P.D. only	Slush	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Pick-up truck	Other motor vehicle	
2015-May-25, Mon,23:15	Rain	Angle	Non-fatal injury	Wet	South	Turning left	Pick-up truck	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jan-16, Sat,10:04	Snow	Approaching	P.D. only	Ice	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Dec-08, Thu,22:14	Snow	Approaching	P.D. only	Ice	South	Going ahead	Pick-up truck	Skidding/sliding	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Apr-20, Thu,11:07	Clear	SMV unattended vehicle	P.D. only	Dry	East	Going ahead	Pick-up truck	Unattended vehicle	

2017-Oct-31, Tue,09:58	Clear	Turning movement	P.D. only	Dry	North	Making "U" turn	Passenger van	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2013-Jan-28, Mon,12:12	Snow	Approaching	P.D. only	Loose snow	South	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Municipal transit bus	Other motor vehicle
2013-Jan-17, Thu,21:29	Clear	Sideswipe	P.D. only	Dry	South	Overtaking	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Municipal transit bus	Other motor vehicle
2013-Jan-18, Fri,10:59	Clear	Angle	P.D. only	Dry	North	Reversing	Delivery van	Other motor vehicle
					West	Stopped	Pick-up truck	Other motor vehicle

Location: RUSSELL RD btwn HAIG DR & CUBA AVE

Traffic Control: No control

Total Collisions: 7

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jul-03, Thu,20:59	Clear	SMV other	P.D. only	Dry	South	Going ahead	Other	Curb	
2015-Jan-23, Fri,17:10	Clear	Turning movement	P.D. only	Wet	South	Overtaking	Unknown	Other motor vehicle	
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2016-Jan-01, Fri,00:00	Snow	SMV unattended vehicle	P.D. only	Loose snow	Unknown	Unknown	Unknown	Unattended vehicle	
2016-Dec-17, Sat,21:46	Snow	SMV unattended vehicle	P.D. only	Loose snow	North	Reversing	Automobile, station wagon	Unattended vehicle	

2016-Dec-07, Wed,15:25	Clear	SMV unattended vehicle	P.D. only	Wet	South	Reversing	Delivery van	Unattended vehicle
2017-Dec-22, Fri,10:13	Clear	Rear end	P.D. only	Wet	South	Stopped	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Passenger van	Other motor vehicle
2013-Feb-13, Wed,13:45	Clear	Angle	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Delivery van	Other motor vehicle

Location: RUSSELL RD btwn SHELLEY AVE & THIRSK ST

Traffic Control: No control

Total Collisions: 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2017-Jul-13, Thu,18:38	Clear	Angle	Non-fatal injury	Dry	West	Turning left	Automobile, station wagon	Cyclist	
					North	Going ahead	Bicycle	Other motor vehicle	
2013-Mar-05, Tue,15:30	Clear	Rear end	P.D. only	Dry	South	Going ahead	Passenger van	Other motor vehicle	
					South	Stopped	Passenger van	Other motor vehicle	
2013-Dec-09, Mon,12:35	Snow	Rear end	P.D. only	Loose snow	South	Going ahead	Municipal transit bus	Other motor vehicle	
					South	Turning left	Automobile, station wagon	Other motor vehicle	

Location: RUSSELL RD btwn THIRSK ST & HAIG DR

Traffic Control: No control

Total Collisions: 6

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jun-23, Mon,16:00	Clear	SMV unattended vehicle	P.D. only	Dry	Unknown	Unknown	Unknown	Unattended vehicle	
2015-Jan-21, Wed,08:50	Clear	Rear end	P.D. only	Wet	North	Going ahead	Pick-up truck	Other motor vehicle	
					North	Stopped	School bus	Other motor vehicle	
2016-Feb-17, Wed,15:15	Snow	SMV unattended vehicle	P.D. only	Packed snow	Unknown	Unknown	Unknown	Unattended vehicle	
2016-Feb-24, Wed,08:12	Snow	SMV other	Non-fatal injury	Loose snow	North	Going ahead	Pick-up truck	Pedestrian	1
2017-Nov-27, Mon,16:06	Clear	Rear end	P.D. only	Dry	South	Overtaking	Unknown	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2013-Dec-28, Sat,18:34	Clear	SMV unattended vehicle	P.D. only	Wet	North	Reversing	Automobile, station wagon	Unattended vehicle	

Location: SHELLEY AVE @ RUSSELL RD

Traffic Control: Stop sign

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2013-Jan-29, Tue,09:54	Clear	Angle	P.D. only	Loose snow	East	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

Location: SMYTH RD/OTHELLO AVE @ RUSSELL RD W

Traffic Control: Traffic signal

Total Collisions: 22

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Feb-18, Tue,09:50	Clear	Rear end	P.D. only	Slush	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Slowing or stopping	Pick-up truck	Other motor vehicle	
2014-Apr-16, Wed,00:04	Clear	SMV other	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Skidding/sliding	
2014-Nov-11, Tue,09:00	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Jan-19, Mon,08:13	Clear	Angle	P.D. only	Slush	West	Turning left	Truck and trailer	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2015-May-25, Mon,17:00	Rain	Rear end	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Passenger van	Other motor vehicle	
2015-Aug-26, Wed,19:50	Clear	Angle	P.D. only	Dry	East	Turning right	Passenger van	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-May-15, Fri,17:44	Clear	Sideswipe	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	

					South	Stopped	Municipal transit bus	Other motor vehicle
2015-Sep-08, Tue,12:01	Clear	Rear end	Non-fatal injury	Dry	East	Slowing or stopping	Pick-up truck	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2015-Aug-24, Mon,14:15	Clear	Rear end	Non-fatal injury	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2016-Aug-08, Mon,16:11	Clear	Angle	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle
					South	Turning left	Municipal transit bus	Other motor vehicle
2016-Oct-14, Fri,16:10	Clear	Sideswipe	P.D. only	Dry	East	Unknown	Unknown	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Apr-22, Sat,19:05	Clear	Rear end	P.D. only	Dry	West	Going ahead	Pick-up truck	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2017-Oct-15, Sun,22:45	Clear	Approaching	P.D. only	Dry	North	Unknown	Pick-up truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2017-Nov-29, Wed,16:11	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Passenger van	Other motor vehicle

2013-Jan-28, Mon,11:39	Snow	Turning movement	P.D. only	Loose snow	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Passenger van	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2013-Apr-23, Tue,08:40	Clear	Sideswipe	Non-fatal injury	Dry	East	Overtaking	Truck - dump	Cyclist
					East	Going ahead	Bicycle	Other motor vehicle
2013-Apr-27, Sat,19:01	Clear	Sideswipe	P.D. only	Dry	West	Overtaking	Ambulance	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2013-Jun-28, Fri,17:13	Rain	Turning movement	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Passenger van	Other motor vehicle
2013-Jun-24, Mon,07:45	Clear	Turning movement	Non-fatal injury	Dry	East	Turning right	Passenger van	Cyclist
					East	Going ahead	Bicycle	Other motor vehicle
2013-Jun-02, Sun,08:15	Rain	Turning movement	P.D. only	Wet	West	Turning left	Pick-up truck	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle
2013-Aug-27, Tue,06:57	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle

2013-Oct-29, Tue, 12:30	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle

Appendix E

Traffic growth

DRAFT

St Laurent / Industrial / Innes
8 hrs

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2008	Fri, June 20	10749	8647	11642	14229	8191	7476	5191	5421	71546
2015	Wed, July 29	8311	8289	11179	11355	7808	7653	5652	5653	65900
2019	Wed, Jan 30	7976	8052	10920	11163	7938	7438	5272	5453	64212

North Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2008	8647	10749	19396	71546				
2015	8289	8311	16600	65900	-4.1%	-22.7%	-14.4%	-7.9%
2019	8052	7976	16028	64212	-2.9%	-4.0%	-3.4%	-2.6%

Regression Estimate 2008 8652 10590 19242
Regression Estimate 2019 8061 7697 15758
Average Annual Change -0.64 % -2.86 % -1.80 %

West Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2008	5191	5421	10612	71546				
2015	5652	5653	11305	65900	8.9%	4.3%	6.5%	-7.9%
2019	5272	5453	10725	64212	-6.7%	-3.5%	-5.1%	-2.6%

Regression Estimate 2008 5288 5471 10759
Regression Estimate 2019 5442 5541 10982
Average Annual Change 0.26 % 0.11 % 0.19 %

East Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2008	7476	8191	15667	71546				
2015	7653	7808	15461	65900	2.4%	-4.7%	-1.3%	-7.9%
2019	7438	7938	15376	64212	-2.8%	1.7%	-0.5%	-2.6%

Regression Estimate 2008 7524 8138 15662
Regression Estimate 2019 7521 7846 15367
Average Annual Change 0.00 % -0.33 % -0.17 %

South Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2008	11642	14229	25871	71546				
2015	11179	11355	22534	65900	-4.0%	-20.2%	-12.9%	-7.9%
2019	10920	11163	22083	64212	-2.3%	-1.7%	-2.0%	-2.6%

Regression Estimate 2008 11641 14011 25652
Regression Estimate 2019 10919 10781 21699
Average Annual Change -0.58 % -2.35 % -1.51 %

St Laurent / Industrial / Innes
AM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2008	Fri, June 20	1282	1065	1420	1896	1416	726	475	906	9186
2015	Wed, July 29	945	963	1374	1323	1170	727	418	894	7814
2019	Wed, Jan 30	1002	1291	1490	1473	1593	623	362	1060	8894

North Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2008	1065	1282	2347	9186				
2015	963	945	1908	7814	-9.6%	-26.3%	-18.7%	-14.9%
2019	1291	1002	2293	8894	34.1%	6.0%	20.2%	13.8%

Regression Estimate 2008 1007 1244 2251
Regression Estimate 2019 1189 936 2125
Average Annual Change 1.53 % -2.55 % -0.52 %

West Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2008	475	906	1381	9186				
2015	418	894	1312	7814	-12.0%	-1.3%	-5.0%	-14.9%
2019	362	1060	1422	8894	-13.4%	18.6%	8.4%	13.8%

Regression Estimate 2008 479 880 1359
Regression Estimate 2019 368 1014 1383
Average Annual Change -2.36 % 1.30 % 0.16 %

East Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2008	726	1416	2142	9186				
2015	727	1170	1897	7814	0.1%	-17.4%	-11.4%	-14.9%
2019	623	1593	2216	8894	-14.3%	36.2%	16.8%	13.8%

Regression Estimate 2008 742 1331 2073
Regression Estimate 2019 651 1445 2095
Average Annual Change -1.19 % 0.75 % 0.10 %

South Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2008	1420	1896	3316	9186				
2015	1374	1323	2697	7814	-3.2%	-30.2%	-18.7%	-14.9%
2019	1490	1473	2963	8894	8.4%	11.3%	9.9%	13.8%

Regression Estimate 2008 1399 1824 3223
Regression Estimate 2019 1453 1347 2800
Average Annual Change 0.34 % -2.72 % -1.27 %

St Laurent / Industrial / Innes
PM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2008	Fri, June 20	1559	1188	1781	1845	715	1495	1027	554	10164
2015	Wed, July 29	1185	1216	1621	1606	913	1292	1044	649	9526
2019	Wed, Jan 30	1069	1123	1533	1537	807	1187	1009	571	8836

North Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2008	1188	1559	2747	10164				
2015	1216	1185	2401	9526	2.4%	-24.0%	-12.6%	-6.3%
2019	1123	1069	2192	8836	-7.6%	-9.8%	-8.7%	-7.2%

Regression Estimate 2008 1204 1544 2749
Regression Estimate 2019 1152 1043 2195
Average Annual Change -0.41% -3.50% -2.02%

West Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2008	1027	554	1581	10164				
2015	1044	649	1693	9526	1.7%	17.1%	7.1%	-6.3%
2019	1009	571	1580	8836	-3.4%	-12.0%	-6.7%	-7.2%

Regression Estimate 2008 1034 574 1608
Regression Estimate 2019 1021 606 1627
Average Annual Change -0.11% 0.49% 0.11%

East Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2008	1495	715	2210	10164				
2015	1292	913	2205	9526	-13.6%	27.7%	-0.2%	-6.3%
2019	1187	807	1994	8836	-8.1%	-11.6%	-9.6%	-7.2%

Regression Estimate 2008 1493 748 2241
Regression Estimate 2019 1184 865 2049
Average Annual Change -2.09% 1.33% -0.81%

South Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2008	1781	1845	3626	10164				
2015	1621	1606	3227	9526	-9.0%	-13.0%	-11.0%	-6.3%
2019	1533	1537	3070	8836	-5.4%	-4.3%	-4.9%	-7.2%

Regression Estimate 2008 1780 1835 3615
Regression Estimate 2019 1532 1519 3051
Average Annual Change -1.36% -1.70% -1.53%

St Laurent /Smyth /Lancaster
8 hrs

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2012	Wed, Oct 24	14785	11934	9034	9895	12221	4961	3384	12634	78848
2014	Thu, May 29	9042	12396	11204	8999	2677	4871	6053	2710	57952
2016	Thu, Jan 28	10206	10237	7679	7956	2457	2378	5309	5080	51302

North Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2012	11934	14785	26719	78848				
2014	12396	9042	21438	57952	3.9%	-38.8%	-19.8%	-26.5%
2016	10237	10206	20443	51302	-17.4%	12.9%	-4.6%	-11.5%

Regression Estimate 2012 12371 13634 26005
Regression Estimate 2016 10674 9055 19729
Average Annual Change -3.62 % -9.73 % -6.67 %

West Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2012	3384	12634	16018	78848				
2014	6053	2710	8763	57952	78.9%	-78.5%	-45.3%	-26.5%
2016	5309	5080	10389	51302	-12.3%	87.5%	18.6%	-11.5%

Regression Estimate 2012 3953 10585 14538
Regression Estimate 2016 5878 3031 8909
Average Annual Change 10.43 % -26.85 % -11.52 %

East Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2012	4961	12221	17182	78848				
2014	4871	2677	7548	57952	-1.8%	-78.1%	-56.1%	-26.5%
2016	2378	2457	4835	51302	-51.2%	-8.2%	-35.9%	-11.5%

Regression Estimate 2012 5362 10667 16029
Regression Estimate 2016 2779 903 3682
Average Annual Change -15.15 % -46.06 % -30.77 %

South Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2012	9034	9895	18929	78848				
2014	11204	8999	20203	57952	24.0%	-9.1%	6.7%	-26.5%
2016	7679	7956	15635	51302	-31.5%	-11.6%	-22.6%	-11.5%

Regression Estimate 2012 9983 9920 19903
Regression Estimate 2016 8628 7981 16609
Average Annual Change -3.58 % -5.29 % -4.42 %

St Laurent/Smyth/Lancaster
AM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2012	Wed, Oct 24	1750	2003	1527	1043	1548	474	428	1733	10506
2014	Thu, May 29	1401	1294	1570	1293	403	814	561	534	7870
2016	Thu, Jan 28	1337	1345	1240	723	394	276	443	1070	6828

North Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2012	2003	1750	3753	10506				
2014	1294	1401	2695	7870	-35.4%	-19.9%	-28.2%	-25.1%
2016	1345	1337	2682	6828	3.9%	-4.6%	-0.5%	-13.2%

Regression Estimate 2012 1876 1703 3579
Regression Estimate 2016 1218 1290 2508
Average Annual Change -10.23% -6.71% -8.51%

West Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2012	428	1733	2161	10506				
2014	561	534	1095	7870	31.1%	-69.2%	-49.3%	-25.1%
2016	443	1070	1513	6828	-21.0%	100.4%	38.2%	-13.2%

Regression Estimate 2012 470 1444 1914
Regression Estimate 2016 485 781 1266
Average Annual Change 0.79% -14.24% -9.82%

East Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2012	474	1548	2022	10506				
2014	814	403	1217	7870	71.7%	-74.0%	-39.8%	-25.1%
2016	276	394	670	6828	-66.1%	-2.2%	-44.9%	-13.2%

Regression Estimate 2012 620 1359 1979
Regression Estimate 2016 422 205 627
Average Annual Change -9.16% -37.70% -24.98%

South Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2012	1527	1043	2570	10506				
2014	1570	1293	2863	7870	2.8%	24.0%	11.4%	-25.1%
2016	1240	723	1963	6828	-21.0%	-44.1%	-31.4%	-13.2%

Regression Estimate 2012 1589 1180 2769
Regression Estimate 2016 1302 860 2162
Average Annual Change -4.86% -7.61% -6.00%

St Laurent/Smyth/Lancaster
PM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2012	Wed, Oct 24	2157	1382	1094	1604	1748	914	651	1750	11300
2014	Thu, May 29	1154	2002	1573	1224	404	680	1121	346	8504
2016	Thu, Jan 28	1411	1453	962	1332	323	445	1016	482	7424

North Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2012	1382	2157	3539	11300				
2014	2002	1154	3156	8504	44.9%	-46.5%	-10.8%	-24.7%
2016	1453	1411	2864	7424	-27.4%	22.3%	-9.3%	-12.7%

Regression Estimate 2012 1577 1947 3524
Regression Estimate 2016 1648 1201 2849
Average Annual Change 1.11 % -11.38 % -5.18 %

West Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2012	651	1750	2401	11300				
2014	1121	346	1467	8504	72.2%	-80.2%	-38.9%	-24.7%
2016	1016	482	1498	7424	-9.4%	39.3%	2.1%	-12.7%

Regression Estimate 2012 747 1493 2240
Regression Estimate 2016 1112 225 1337
Average Annual Change 10.46 % -37.67 % -12.10 %

East Leg

Year	Counts				% Change			
	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
2012	914	1748	2662	11300				
2014	680	404	1084	8504	-25.6%	-76.9%	-59.3%	-24.7%
2016	445	323	768	7424	-34.6%	-20.0%	-29.2%	-12.7%

Regression Estimate 2012 914 1538 2452
Regression Estimate 2016 445 113 558
Average Annual Change -16.46 % -47.99 % -30.94 %

South Leg

Year	Counts				% Change			
	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
2012	1094	1604	2698	11300				
2014	1573	1224	2797	8504	43.8%	-23.7%	3.7%	-24.7%
2016	962	1332	2294	7424	-38.8%	8.8%	-18.0%	-12.7%

Regression Estimate 2012 1276 1523 2798
Regression Estimate 2016 1144 1251 2394
Average Annual Change -2.69 % -4.80 % -3.82 %

Appendix F

MMLOS Analysis for Road Segments

DRAFT

Multi-Modal Level of Service - Segments Form

Consultant
Scenario
Comments

Parsons

Existing and Future Conditions - Everest Priv

Project
Date

477122-01000

May 14th, 2019

SEGMENTS		Everest Priv	Existing	Future	Section	Section	Section	Section	Section	Section	Section
			1	2	3	4	5	6	7	8	9
Pedestrian	Sidewalk Width	-	no sidewalk	1.8 m							
	Boulevard Width		n/a	< 0.5 m							
	Avg Daily Curb Lane Traffic Volume		≤ 3000	≤ 3000							
	Operating Speed		> 30 to 50 km/h	> 30 to 50 km/h							
	On-Street Parking		no	yes							
	Exposure to Traffic PLoS		F	B	-	-	-	-	-	-	-
	Effective Sidewalk Width										
	Pedestrian Volume										
Bicycle		A									
	Type of Cycling Facility		Mixed Traffic	Mixed Traffic							
	Number of Travel Lanes		≤ 2 (no centreline)	≤ 2 (no centreline)							
	Operating Speed		≤ 40 km/h	≤ 40 km/h							
	# of Lanes & Operating Speed LoS		A	A	-	-	-	-	-	-	-
	Bike Lane (+ Parking Lane) Width										
	Bike Lane Width LoS		-	-	-	-	-	-	-	-	-
	Bike Lane Blockages										
	Blockage LoS		-	-	-	-	-	-	-	-	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge							
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes							
	Sidestreet Operating Speed		≤ 40 km/h	≤ 40 km/h							
	Unsignalized Crossing - Lowest LoS		A	A	-	-	-	-	-	-	-
	Level of Service		A	A	-	-	-	-	-	-	-
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic							
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8							
	Level of Service		D	D	-	-	-	-	-	-	-
Truck	Truck Lane Width	D	≤ 3.3 m	≤ 3.3 m							
	Travel Lanes per Direction		1	1							
	Level of Service		D	D	-	-	-	-	-	-	-

Multi-Modal Level of Service - Segments Form

Consultant
Scenario
Comments

Parsons

Existing Conditions - Russell Rd

Project
Date

477122-01000

May 14th, 2019

SEGMENTS		Russell Rd	Existing	Section	Section	Section	Section	Section	Section	Section	Section
			1	2	3	4	5	6	7	8	9
Pedestrian	Sidewalk Width	E	1.5 m								
	Boulevard Width		< 0.5 m								
	Avg Daily Curb Lane Traffic Volume		> 3000								
	Operating Speed		> 30 to 50 km/h								
	On-Street Parking		no								
	Exposure to Traffic PLoS		E	-	-	-	-	-	-	-	-
	Effective Sidewalk Width		1.5 m								
	Pedestrian Volume		250 ped/hr								
	Crowding PLoS		B	-	-	-	-	-	-	-	-
	Level of Service		E	-	-	-	-	-	-	-	-
Bicycle	Type of Cycling Facility	B	Mixed Traffic								
	Number of Travel Lanes		≤ 2 (no centreline)								
	Operating Speed		>40 to <50 km/h								
	# of Lanes & Operating Speed LoS		B	-	-	-	-	-	-	-	-
	Bike Lane (+ Parking Lane) Width										
	Bike Lane Width LoS		-	-	-	-	-	-	-	-	-
	Bike Lane Blockages										
	Blockage LoS		-	-	-	-	-	-	-	-	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge								
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes								
	Sidestreet Operating Speed		≤ 40 km/h								
	Unsignalized Crossing - Lowest LoS		A	-	-	-	-	-	-	-	-
	Level of Service		B	-	-	-	-	-	-	-	-
Transit	Facility Type	E	Mixed Traffic								
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≤ 0.6								
	Level of Service		E	-	-	-	-	-	-	-	-
Truck	Truck Lane Width	B	> 3.7 m								
	Travel Lanes per Direction		1								
	Level of Service		B	-	-	-	-	-	-	-	-

Multi-Modal Level of Service - Segments Form

Consultant
Scenario
Comments

Parsons

Existing Conditions - St Laurent Blvd

Project
Date

477122-01000

May 14th, 2019

SEGMENTS		St Laurent Blvd	Existing	Section	Section	Section	Section	Section	Section	Section	Section
			1	2	3	4	5	6	7	8	9
Pedestrian	Sidewalk Width	D	≥ 2 m								
	Boulevard Width		> 2 m								
	Avg Daily Curb Lane Traffic Volume		> 3000								
	Operating Speed		> 60 km/h								
	On-Street Parking		no								
	Exposure to Traffic PLoS		D	-	-	-	-	-	-	-	-
	Effective Sidewalk Width		2.0 m								
	Pedestrian Volume		250 ped/hr								
Bicycle	Crowding PLoS	A	B	-	-	-	-	-	-	-	-
	Level of Service		D	-	-	-	-	-	-	-	-
	Type of Cycling Facility		Physically Separated								
	Number of Travel Lanes										
	Operating Speed										
	# of Lanes & Operating Speed LoS		-	-	-	-	-	-	-	-	-
	Bike Lane (+ Parking Lane) Width										
	Bike Lane Width LoS		-	-	-	-	-	-	-	-	-
	Bike Lane Blockages										
	Blockage LoS		-	-	-	-	-	-	-	-	-
	Median Refuge Width (no median = < 1.8 m)										
	No. of Lanes at Unsignalized Crossing										
	Sidestreet Operating Speed										
Transit	Unsignalized Crossing - Lowest LoS	B	A	-	-	-	-	-	-	-	-
	Level of Service		A	-	-	-	-	-	-	-	-
	Facility Type		Bus lane								
Truck	Friction or Ratio Transit:Posted Speed	C	Cf ≤ 60								
	Level of Service		B	-	-	-	-	-	-	-	-
	Truck Lane Width		≤ 3.3 m								
Truck	Travel Lanes per Direction	C	> 1								
	Level of Service		C	-	-	-	-	-	-	-	-

Appendix G

TDM Checklist

DRAFT

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

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

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

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

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

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

Appendix H

Existing Conditions SYNCHRO Analysis

DRAFT

Existing AM
1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	177	118	611	741	241	177	983	330	116	744	142
Future Volume (vph)	67	177	118	611	741	241	177	983	330	116	744	142
Lane Group Flow (vph)	71	186	124	643	780	254	186	1035	347	122	783	149
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	38.6	38.6	11.6	38.6	38.6	11.3	37.6	37.6	11.3	37.6	37.6
Total Split (s)	25.4	38.0	38.0	34.0	46.6	46.6	20.0	38.0	38.0	20.0	38.0	38.0
Total Split (%)	19.5%	29.2%	29.2%	26.2%	35.8%	35.8%	15.4%	29.2%	29.2%	15.4%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.1	2.4	2.4	2.1	2.4	2.4
Lost Time Adjust (s)	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.3	-2.6	-2.6	-2.3	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	11.1	15.7	15.7	33.9	41.0	41.0	15.0	52.1	52.1	12.4	49.4	49.4
Actuated g/C Ratio	0.09	0.12	0.12	0.26	0.32	0.32	0.12	0.40	0.40	0.10	0.38	0.38
v/c Ratio	0.26	0.48	0.36	0.71	0.73	0.43	0.50	0.76	0.46	0.38	0.59	0.24
Control Delay	57.2	57.3	3.2	48.0	44.1	11.5	58.2	39.8	11.8	58.2	36.4	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.2	57.3	3.2	48.0	44.1	11.5	58.2	39.8	11.8	58.2	36.4	2.6
LOS	E	E	A	D	D	B	E	D	B	E	D	A
Approach Delay		39.7			40.6			35.8			34.1	
Approach LOS		D			D			D			C	
Queue Length 50th (m)	8.9	23.7	0.0	75.7	93.8	11.2	23.4	122.2	17.2	15.3	85.7	0.0
Queue Length 95th (m)	16.1	34.8	0.9	93.9	113.9	33.1	34.3	#178.8	48.5	24.6	119.6	6.7
Internal Link Dist (m)		753.5			213.9			608.0			286.3	
Turn Bay Length (m)	30.0		60.0	110.0		50.0	65.0		70.0	100.0		70.0
Base Capacity (vph)	529	837	527	928	1117	604	415	1353	752	415	1321	618
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.22	0.24	0.69	0.70	0.42	0.45	0.76	0.46	0.29	0.59	0.24

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 37.5

Intersection LOS: D

Intersection Capacity Utilization 73.8%

ICU Level of Service D

Analysis Period (min) 15

Existing AM

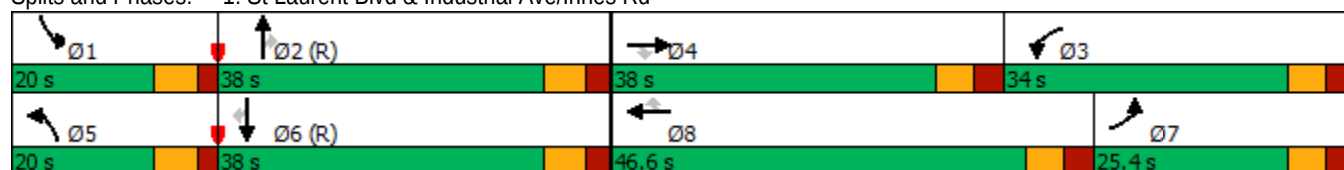
1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: St Laurent Blvd & Industrial Ave/Innes Rd



Existing AM
2: Russell Rd & Industrial Ave

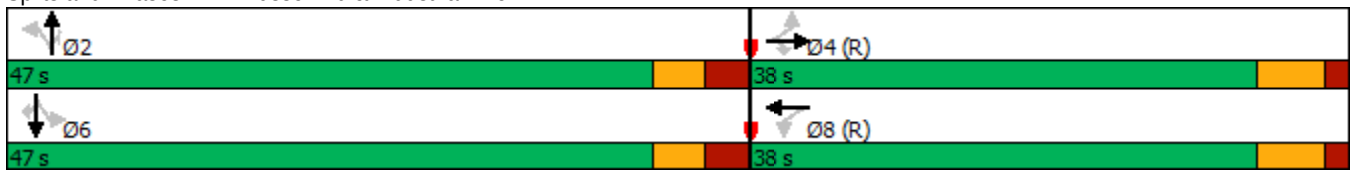
05/16/2019

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	2	372	152	158	748	261	3	129	15	1	10
Future Volume (vph)	2	372	152	158	748	261	3	129	15	1	10
Lane Group Flow (vph)	2	392	160	166	800	0	278	136	0	17	11
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		2			6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	4	4	4	8	8	2	2	2	6	6	6
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)	33.9	33.9	33.9	33.9	33.9	29.2	29.2	29.2	29.2	29.2	29.2
Total Split (s)	38.0	38.0	38.0	38.0	38.0	47.0	47.0	47.0	47.0	47.0	47.0
Total Split (%)	44.7%	44.7%	44.7%	44.7%	44.7%	55.3%	55.3%	55.3%	55.3%	55.3%	55.3%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	-1.9	-1.9	-1.9	-1.9	-1.9		-2.2	-2.2		-2.2	-2.2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	34.0	34.0	34.0	34.0	34.0		43.0	43.0		43.0	43.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.51	0.51		0.51	0.51
v/c Ratio	0.02	0.32	0.22	0.46	0.60		0.42	0.16		0.02	0.01
Control Delay	16.0	18.4	3.7	24.1	22.3		15.8	2.6		10.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	16.0	18.4	3.7	24.1	22.3		15.8	2.6		10.7	0.3
LOS	B	B	A	C	C		B	A		B	A
Approach Delay		14.2			22.6		11.4			6.6	
Approach LOS		B			C		B			A	
Queue Length 50th (m)	0.2	22.4	0.0	19.4	52.3		26.9	0.0		1.3	0.0
Queue Length 95th (m)	1.5	33.0	10.8	37.5	70.4		45.7	8.1		4.4	0.4
Internal Link Dist (m)		182.7			753.5		598.6			32.1	
Turn Bay Length (m)	25.0		55.0	85.0				20.0			
Base Capacity (vph)	117	1237	730	358	1339		655	851		710	831
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.02	0.32	0.22	0.46	0.60		0.42	0.16		0.02	0.01
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 85											
Offset: 81 (95%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green											
Natural Cycle: 65											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.60											
Intersection Signal Delay: 17.7						Intersection LOS: B					
Intersection Capacity Utilization 69.4%						ICU Level of Service C					
Analysis Period (min) 15											

Existing AM
2: Russell Rd & Industrial Ave

05/16/2019

Splits and Phases: 2: Russell Rd & Industrial Ave



Existing AM
3: Russell Rd & Everest Priv

05/16/2019

Intersection

Int Delay, s/veh 0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	21	426	5	9	280
Future Vol, veh/h	12	21	426	5	9	280
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	2	0	0	4
Mvmt Flow	13	22	448	5	9	295

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	767	454	0
Stage 1	454	-	-
Stage 2	313	-	-
Critical Hdwy	6.4	6.2	-
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	-
Pot Cap-1 Maneuver	373	610	-
Stage 1	644	-	-
Stage 2	746	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	369	608	-
Mov Cap-2 Maneuver	369	-	-
Stage 1	637	-	-
Stage 2	746	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.9	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	492	1112
HCM Lane V/C Ratio	-	-	0.071	0.009
HCM Control Delay (s)	-	-	12.9	8.3
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

Existing AM
4: Russell Rd & Haig Dr

05/16/2019

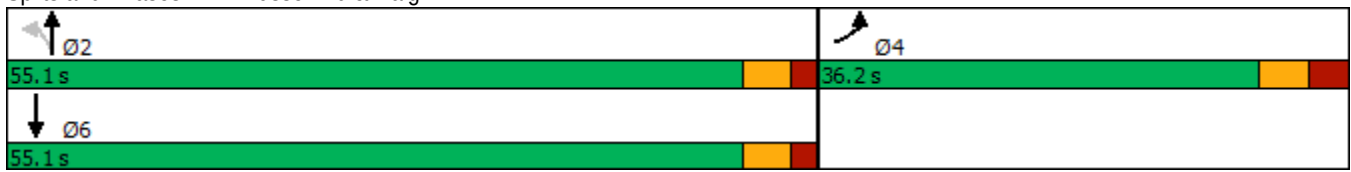


Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	314	27	178	203
Future Volume (vph)	314	27	178	203
Lane Group Flow (vph)	352	0	215	321
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		2		
Detector Phase	4	2	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	26.2	23.1	23.1	26.1
Total Split (s)	36.2	55.1	55.1	55.1
Total Split (%)	39.6%	60.4%	60.4%	60.4%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	1.8	1.8	1.8
Lost Time Adjust (s)	-2.2		-1.1	-1.1
Total Lost Time (s)	4.0		4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effct Green (s)	23.2		51.4	51.4
Actuated g/C Ratio	0.28		0.62	0.62
v/c Ratio	0.70		0.21	0.29
Control Delay	33.8		8.5	7.8
Queue Delay	0.0		0.0	0.0
Total Delay	33.8		8.5	7.8
LOS	C		A	A
Approach Delay	33.8		8.5	7.8
Approach LOS	C		A	A
Queue Length 50th (m)	48.5		13.1	17.3
Queue Length 95th (m)	75.1		29.6	39.1
Internal Link Dist (m)	130.4		522.1	50.1
Turn Bay Length (m)				
Base Capacity (vph)	704		1047	1115
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.50		0.21	0.29
Intersection Summary				
Cycle Length: 91.3				
Actuated Cycle Length: 82.6				
Natural Cycle: 55				
Control Type: Semi Act-Uncoord				
Maximum v/c Ratio: 0.70				
Intersection Signal Delay: 18.3			Intersection LOS: B	
Intersection Capacity Utilization 57.0%			ICU Level of Service B	
Analysis Period (min) 15				

Existing AM
4: Russell Rd & Haig Dr

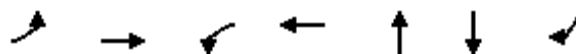
05/16/2019

Splits and Phases: 4: Russell Rd & Haig Dr



Existing AM
5: Othello Ave/Russell Rd & Smyth Rd

05/16/2019



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	20	320	38	771	154	62	26
Future Volume (vph)	20	320	38	771	154	62	26
Lane Group Flow (vph)	21	373	40	916	303	109	27
Turn Type	Perm	NA	Perm	NA	NA	NA	Perm
Protected Phases		4		8	2	6	
Permitted Phases	4		8				6
Detector Phase	4	4	8	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.8	34.8	34.8	34.8	31.0	29.2	29.2
Total Split (s)	59.0	59.0	59.0	59.0	31.0	30.0	30.0
Total Split (%)	49.2%	49.2%	49.2%	49.2%	25.8%	25.0%	25.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.5	3.5	3.5	3.5	3.7	3.9	3.9
Lost Time Adjust (s)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.5	6.7	6.7
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	52.7	52.7	52.7	52.7	24.5	23.3	23.3
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.20	0.19	0.19
v/c Ratio	0.12	0.25	0.10	0.61	0.82	0.33	0.07
Control Delay	22.4	21.7	17.8	22.5	62.3	44.8	0.3
Queue Delay	0.0	0.0	0.0	1.5	0.0	0.0	0.0
Total Delay	22.4	21.7	17.8	24.0	62.3	44.8	0.3
LOS	C	C	B	C	E	D	A
Approach Delay		21.8		23.8	62.3	36.0	
Approach LOS		C		C	E	D	
Queue Length 50th (m)	2.9	28.5	3.6	80.0	66.2	22.3	0.0
Queue Length 95th (m)	8.5	39.1	6.3	102.4	109.8	39.2	0.0
Internal Link Dist (m)		179.7		116.1	86.0	41.9	
Turn Bay Length (m)	50.0		15.0				30.0
Base Capacity (vph)	170	1505	411	1503	371	333	390
Starvation Cap Reductn	0	0	0	382	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.25	0.10	0.82	0.82	0.33	0.07

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 75 (63%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 30.8

Intersection LOS: C

Intersection Capacity Utilization 79.1%

ICU Level of Service D

Analysis Period (min) 15

Existing AM

5: Othello Ave/Russell Rd & Smyth Rd

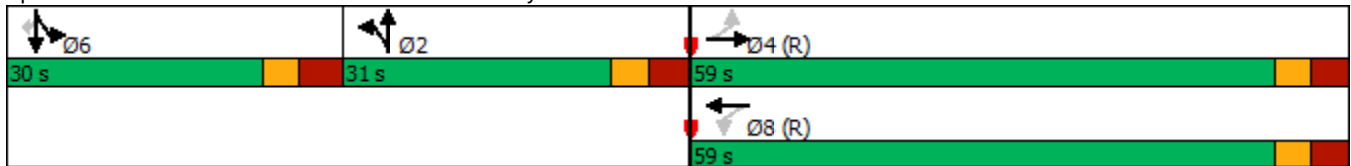
05/16/2019

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

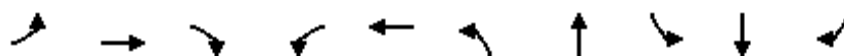
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Othello Ave/Russell Rd & Smyth Rd



Existing AM
6: St Laurent Blvd & Smyth Rd/Lancaster Rd

05/16/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	←←	↑	→	←	↑↑	←	↑↑	←	↑↑	→
Traffic Volume (vph)	273	76	93	31	280	159	989	108	599	630
Future Volume (vph)	273	76	93	31	280	159	989	108	599	630
Lane Group Flow (vph)	287	80	98	33	382	167	1138	114	631	663
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2	1	6	
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7	11.0	27.9	11.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0	20.0	52.0	20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%	16.7%	43.3%	16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0	1.8	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	-1.6	-1.7	-1.7	-1.6	-1.7	-2.0	-1.9	-2.0	-1.9	-1.9
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	15.2	30.0	30.0	9.5	19.6	17.1	54.9	14.3	52.1	52.1
Actuated g/C Ratio	0.13	0.25	0.25	0.08	0.16	0.14	0.46	0.12	0.43	0.43
v/c Ratio	0.66	0.17	0.22	0.25	0.67	0.72	0.74	0.55	0.43	0.71
Control Delay	72.5	60.2	21.3	55.9	49.3	66.7	31.3	59.5	25.8	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Total Delay	72.5	60.2	21.3	55.9	49.3	67.0	31.3	59.5	25.8	14.6
LOS	E	E	C	E	D	E	C	E	C	B
Approach Delay		59.6			49.9		35.9		23.3	
Approach LOS		E			D		D		C	
Queue Length 50th (m)	36.2	17.0	4.0	7.5	41.5	36.9	115.4	25.5	56.8	46.0
Queue Length 95th (m)	m49.4	m29.5	m12.6	17.4	55.5	#71.3	153.7	43.8	73.4	95.4
Internal Link Dist (m)		116.1			16.7		186.6		608.0	
Turn Bay Length (m)	55.0			35.0		150.0		105.0		35.0
Base Capacity (vph)	462	474	449	221	687	240	1545	237	1455	930
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	3	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.17	0.22	0.15	0.56	0.70	0.74	0.48	0.43	0.71

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 110 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 35.6

Intersection LOS: D

Intersection Capacity Utilization 70.5%

ICU Level of Service C

Analysis Period (min) 15

Existing AM

6: St Laurent Blvd & Smyth Rd/Lancaster Rd

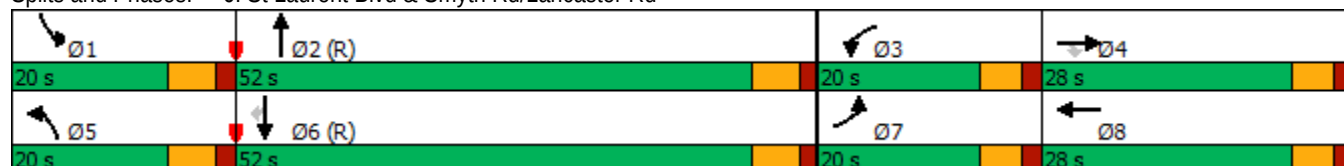
05/16/2019

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: 6: St Laurent Blvd & Smyth Rd/Lancaster Rd



Existing PM

1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←←	→→	→	←←	→→	→	←←	→→	→	←←	→→	→
Traffic Volume (vph)	135	550	324	398	274	135	174	852	507	130	814	124
Future Volume (vph)	135	550	324	398	274	135	174	852	507	130	814	124
Lane Group Flow (vph)	142	579	341	419	288	142	183	897	534	137	857	131
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	38.6	38.6	11.6	38.6	38.6	11.3	37.6	37.6	11.3	37.6	37.6
Total Split (s)	32.4	38.0	38.0	41.0	46.6	46.6	28.0	43.0	43.0	28.0	43.0	43.0
Total Split (%)	21.6%	25.3%	25.3%	27.3%	31.1%	31.1%	18.7%	28.7%	28.7%	18.7%	28.7%	28.7%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.1	2.4	2.4	2.1	2.4	2.4
Lost Time Adjust (s)	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.3	-2.6	-2.6	-2.3	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effect Green (s)	33.4	29.2	29.2	22.9	18.6	18.6	14.5	40.9	40.9	12.9	39.3	39.3
Actuated g/C Ratio	0.27	0.24	0.24	0.19	0.15	0.15	0.12	0.34	0.34	0.11	0.32	0.32
v/c Ratio	0.15	0.69	0.57	0.64	0.55	0.40	0.46	0.76	0.70	0.40	0.76	0.21
Control Delay	34.6	47.6	10.4	51.5	52.9	10.9	55.4	42.9	16.6	56.2	43.9	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.6	47.6	10.4	51.5	52.9	10.9	55.4	42.9	16.6	56.2	43.9	2.9
LOS	C	D	B	D	D	B	E	D	B	E	D	A
Approach Delay		33.9			45.2			35.6			40.6	
Approach LOS		C			D			D			D	
Queue Length 50th (m)	13.2	66.6	6.0	48.8	34.4	0.0	21.6	102.7	32.3	16.2	98.6	0.0
Queue Length 95th (m)	23.4	94.6	34.2	69.5	51.5	18.2	35.4	146.3	84.3	28.2	141.5	7.3
Internal Link Dist (m)		753.5			213.9			608.0			286.3	
Turn Bay Length (m)	30.0		60.0	110.0		50.0	65.0		70.0	100.0		70.0
Base Capacity (vph)	974	986	655	1061	1213	644	669	1176	767	650	1132	624
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.59	0.52	0.39	0.24	0.22	0.27	0.76	0.70	0.21	0.76	0.21

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 122

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 38.2

Intersection LOS: D

Intersection Capacity Utilization 72.4%

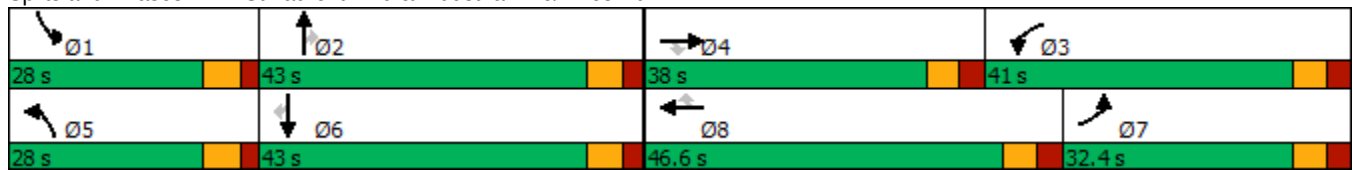
ICU Level of Service C

Analysis Period (min) 15

Existing PM
 1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

Splits and Phases: 1: St Laurent Blvd & Industrial Ave/Innes Rd



Existing PM
2: Russell Rd & Industrial Ave

05/16/2019

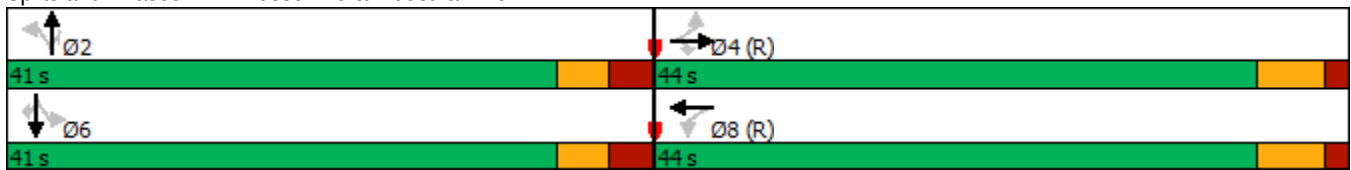
											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	3	806	354	132	520	300	4	166	11	6	5
Future Volume (vph)	3	806	354	132	520	300	4	166	11	6	5
Lane Group Flow (vph)	3	848	373	139	555	0	320	175	0	18	5
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		2			6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	4	4	4	8	8	2	2	2	6	6	6
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)	33.9	33.9	33.9	33.9	33.9	29.2	29.2	29.2	29.2	29.2	29.2
Total Split (s)	44.0	44.0	44.0	44.0	44.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	51.8%	51.8%	51.8%	51.8%	51.8%	48.2%	48.2%	48.2%	48.2%	48.2%	48.2%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	-1.9	-1.9	-1.9	-1.9	-1.9		-2.2	-2.2		-2.2	-2.2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	40.0	40.0	40.0	40.0	40.0		37.0	37.0		37.0	37.0
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47		0.44	0.44		0.44	0.44
v/c Ratio	0.01	0.52	0.40	0.65	0.34		0.55	0.23		0.03	0.01
Control Delay	12.0	17.2	2.9	34.3	14.9		22.1	7.8		13.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	12.0	17.2	2.9	34.3	14.9		22.1	7.8		13.9	0.0
LOS	B	B	A	C	B		C	A		B	A
Approach Delay		12.8			18.8		17.1			10.9	
Approach LOS		B			B		B			B	
Queue Length 50th (m)	0.3	48.6	0.0	16.5	28.6		37.2	7.1		1.6	0.0
Queue Length 95th (m)	1.7	64.7	13.6	#45.0	39.7		62.1	18.7		5.3	0.0
Internal Link Dist (m)		182.7			753.5		598.6			32.1	
Turn Bay Length (m)	25.0		55.0	85.0				20.0			
Base Capacity (vph)	354	1635	934	215	1619		586	745		686	722
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.01	0.52	0.40	0.65	0.34		0.55	0.23		0.03	0.01
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 85											
Offset: 12 (14%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green											
Natural Cycle: 65											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.65											
Intersection Signal Delay: 15.4						Intersection LOS: B					
Intersection Capacity Utilization 64.1%						ICU Level of Service C					
Analysis Period (min) 15											

Existing PM
2: Russell Rd & Industrial Ave

05/16/2019

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

Splits and Phases: 2: Russell Rd & Industrial Ave



Existing PM
3: Russell Rd & Everest Priv

05/16/2019

Intersection

Int Delay, s/veh 0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	7	377	9	13	528
Future Vol, veh/h	5	7	377	9	13	528
Conflicting Peds, #/hr	0	0	0	14	14	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	3	0	0	2
Mvmt Flow	5	7	397	9	14	556

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1000	416	0
Stage 1	416	-	-
Stage 2	584	-	-
Critical Hdwy	6.4	6.2	-
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	-
Pot Cap-1 Maneuver	272	641	-
Stage 1	670	-	-
Stage 2	561	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	265	633	-
Mov Cap-2 Maneuver	265	-	-
Stage 1	653	-	-
Stage 2	561	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.3	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	401	1135
HCM Lane V/C Ratio	-	-	0.032	0.012
HCM Control Delay (s)	-	-	14.3	8.2
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Existing PM
4: Russell Rd & Haig Dr

05/16/2019

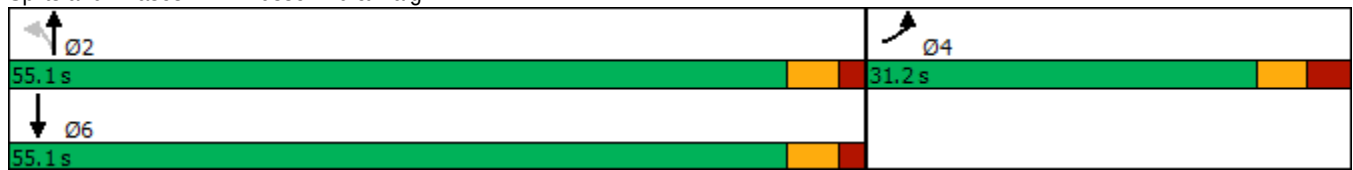


Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	226	4	167	233
Future Volume (vph)	226	4	167	233
Lane Group Flow (vph)	261	0	180	586
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		2		
Detector Phase	4	2	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	26.2	23.1	23.1	26.1
Total Split (s)	31.2	55.1	55.1	55.1
Total Split (%)	36.2%	63.8%	63.8%	63.8%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	1.8	1.8	1.8
Lost Time Adjust (s)	-2.2		-1.1	-1.1
Total Lost Time (s)	4.0		4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effect Green (s)	18.5		51.3	51.3
Actuated g/C Ratio	0.24		0.66	0.66
v/c Ratio	0.61		0.15	0.50
Control Delay	32.1		6.3	7.3
Queue Delay	0.0		0.0	0.0
Total Delay	32.1		6.3	7.3
LOS	C		A	A
Approach Delay	32.1		6.3	7.3
Approach LOS	C		A	A
Queue Length 50th (m)	33.4		8.7	26.4
Queue Length 95th (m)	55.2		20.4	62.0
Internal Link Dist (m)	130.4		522.1	50.1
Turn Bay Length (m)				
Base Capacity (vph)	628		1164	1173
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.42		0.15	0.50
Intersection Summary				
Cycle Length: 86.3				
Actuated Cycle Length: 77.8				
Natural Cycle: 55				
Control Type: Semi Act-Uncoord				
Maximum v/c Ratio: 0.61				
Intersection Signal Delay: 13.4			Intersection LOS: B	
Intersection Capacity Utilization 53.3%			ICU Level of Service A	
Analysis Period (min) 15				

Existing PM
4: Russell Rd & Haig Dr

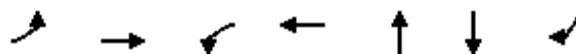
05/16/2019

Splits and Phases: 4: Russell Rd & Haig Dr



Existing PM
5: Othello Ave/Russell Rd & Smyth Rd

05/16/2019



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	14	921	85	359	91	148	19
Future Volume (vph)	14	921	85	359	91	148	19
Lane Group Flow (vph)	15	1036	89	442	268	303	20
Turn Type	Perm	NA	pm+pt	NA	NA	NA	Perm
Protected Phases		4	3	8	2	6	
Permitted Phases	4		8				6
Detector Phase	4	4	3	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.8	34.8	10.6	40.8	31.0	29.2	29.2
Total Split (s)	46.0	46.0	13.0	59.0	31.0	30.0	30.0
Total Split (%)	38.3%	38.3%	10.8%	49.2%	25.8%	25.0%	25.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.5	3.5	2.3	3.5	3.7	3.9	3.9
Lost Time Adjust (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.0
Total Lost Time (s)	7.3	7.3	6.1	7.3	7.5	7.7	7.2
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	Max
Act Effect Green (s)	38.9	38.9	52.9	51.7	23.5	22.3	22.8
Actuated g/C Ratio	0.32	0.32	0.44	0.43	0.20	0.19	0.19
v/c Ratio	0.05	0.90	0.54	0.31	0.76	0.90	0.05
Control Delay	28.9	50.8	37.1	29.2	56.4	77.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	50.8	37.1	29.2	56.4	77.9	0.2
LOS	C	D	D	C	E	E	A
Approach Delay		50.5		30.5	56.4	73.1	
Approach LOS		D		C	E	E	
Queue Length 50th (m)	2.4	122.6	16.8	46.8	54.6	70.5	0.0
Queue Length 95th (m)	7.5	#160.6	m31.2	64.7	#92.0	#120.3	0.0
Internal Link Dist (m)		179.7		116.1	86.0	41.9	
Turn Bay Length (m)	50.0		15.0				30.0
Base Capacity (vph)	283	1146	168	1431	351	336	421
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.90	0.53	0.31	0.76	0.90	0.05

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 82 (68%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 49.7

Intersection LOS: D

Intersection Capacity Utilization 94.4%

ICU Level of Service F

Analysis Period (min) 15

Existing PM

5: Othello Ave/Russell Rd & Smyth Rd

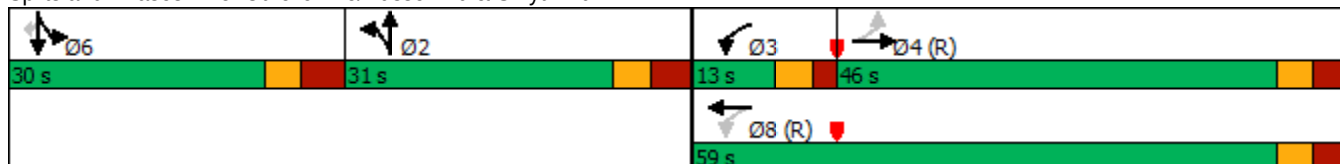
05/16/2019

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

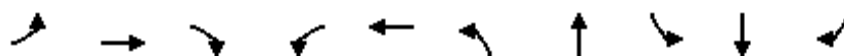
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Othello Ave/Russell Rd & Smyth Rd



Existing PM
6: St Laurent Blvd & Smyth Rd/Lancaster Rd

05/16/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	519	284	213	96	94	108	800	107	1023	280
Future Volume (vph)	519	284	213	96	94	108	800	107	1023	280
Lane Group Flow (vph)	546	299	224	101	239	114	899	113	1077	295
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2	1	6	
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7	11.0	27.9	11.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0	17.0	49.0	17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%	14.2%	40.8%	14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0	1.8	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	-1.6	-1.7	-1.7	-1.6	-1.7	-2.0	-1.9	-2.0	-1.9	-1.9
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	21.7	26.0	26.0	13.8	18.0	13.4	51.4	12.9	50.9	50.9
Actuated g/C Ratio	0.18	0.22	0.22	0.12	0.15	0.11	0.43	0.11	0.42	0.42
v/c Ratio	0.86	0.72	0.45	0.50	0.40	0.63	0.61	0.60	0.72	0.41
Control Delay	52.5	28.3	4.7	57.6	19.9	67.3	29.8	64.7	33.2	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.5	28.3	4.7	57.6	19.9	67.3	29.8	64.7	33.2	15.2
LOS	D	C	A	E	B	E	C	E	C	B
Approach Delay		35.7			31.1		34.0		32.0	
Approach LOS		D			C		C		C	
Queue Length 50th (m)	45.7	55.8	10.6	22.7	10.8	25.4	87.8	25.3	114.3	24.8
Queue Length 95th (m)	m59.8	m74.2	m16.7	38.7	21.3	#49.7	115.5	44.9	145.5	50.2
Internal Link Dist (m)		116.1			16.7		186.6		608.0	
Turn Bay Length (m)	55.0			35.0		150.0		105.0		35.0
Base Capacity (vph)	642	422	499	324	756	186	1473	198	1502	725
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.71	0.45	0.31	0.32	0.61	0.61	0.57	0.72	0.41

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 33.5

Intersection LOS: C

Intersection Capacity Utilization 73.3%

ICU Level of Service D

Analysis Period (min) 15

Existing PM

6: St Laurent Blvd & Smyth Rd/Lancaster Rd

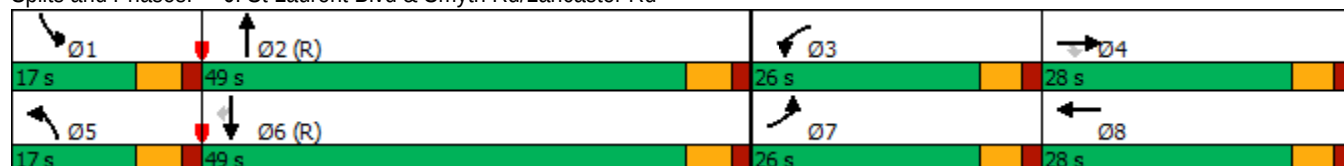
05/16/2019

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: 6: St Laurent Blvd & Smyth Rd/Lancaster Rd



Appendix I

Future Background 2020 SYNCHRO Analysis

DRAFT

Future Background 2020 AM
1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	179	119	617	748	243	179	993	333	117	751	143
Future Volume (vph)	68	179	119	617	748	243	179	993	333	117	751	143
Lane Group Flow (vph)	72	188	125	649	787	256	188	1045	351	123	791	151
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	38.6	38.6	11.6	38.6	38.6	11.3	37.6	37.6	11.3	37.6	37.6
Total Split (s)	25.4	38.0	38.0	34.0	46.6	46.6	20.0	38.0	38.0	20.0	38.0	38.0
Total Split (%)	19.5%	29.2%	29.2%	26.2%	35.8%	35.8%	15.4%	29.2%	29.2%	15.4%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.1	2.4	2.4	2.1	2.4	2.4
Lost Time Adjust (s)	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.3	-2.6	-2.6	-2.3	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	11.2	15.7	15.7	34.0	41.1	41.1	15.1	51.8	51.8	12.4	49.1	49.1
Actuated g/C Ratio	0.09	0.12	0.12	0.26	0.32	0.32	0.12	0.40	0.40	0.10	0.38	0.38
v/c Ratio	0.26	0.49	0.36	0.71	0.73	0.43	0.50	0.78	0.47	0.38	0.60	0.25
Control Delay	57.1	57.3	3.3	48.0	44.2	11.6	58.1	40.4	12.1	58.2	36.8	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.1	57.3	3.3	48.0	44.2	11.6	58.1	40.4	12.1	58.2	36.8	2.7
LOS	E	E	A	D	D	B	E	D	B	E	D	A
Approach Delay		39.7			40.7			36.2			34.5	
Approach LOS		D			D			D			C	
Queue Length 50th (m)	9.0	24.0	0.0	76.4	94.8	11.6	23.6	124.2	18.0	15.5	87.1	0.0
Queue Length 95th (m)	16.2	35.1	1.3	94.6	115.2	34.0	34.5	#183.0	50.3	24.7	121.5	6.9
Internal Link Dist (m)		753.5			213.9			608.0			286.3	
Turn Bay Length (m)	30.0		60.0	110.0		50.0	65.0		70.0	100.0		70.0
Base Capacity (vph)	529	837	527	930	1117	604	416	1348	750	415	1313	616
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.22	0.24	0.70	0.70	0.42	0.45	0.78	0.47	0.30	0.60	0.25

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 37.7

Intersection LOS: D

Intersection Capacity Utilization 74.2%

ICU Level of Service D

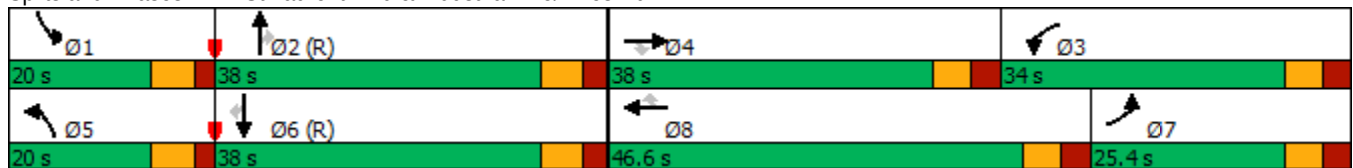
Analysis Period (min) 15

Future Background 2020 AM 1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

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

Splits and Phases: 1: St Laurent Blvd & Industrial Ave/Innes Rd

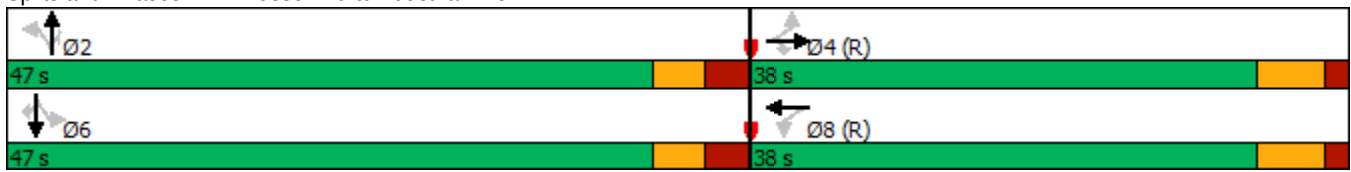


Future Background 2020 AM
2: Russell Rd & Industrial Ave

05/16/2019

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	2	376	154	160	755	264	3	130	15	1	10
Future Volume (vph)	2	376	154	160	755	264	3	130	15	1	10
Lane Group Flow (vph)	2	396	162	168	808	0	281	137	0	17	11
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		2			6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	4	4	4	8	8	2	2	2	6	6	6
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)	33.9	33.9	33.9	33.9	33.9	29.2	29.2	29.2	29.2	29.2	29.2
Total Split (s)	38.0	38.0	38.0	38.0	38.0	47.0	47.0	47.0	47.0	47.0	47.0
Total Split (%)	44.7%	44.7%	44.7%	44.7%	44.7%	55.3%	55.3%	55.3%	55.3%	55.3%	55.3%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	-1.9	-1.9	-1.9	-1.9	-1.9		-2.2	-2.2		-2.2	-2.2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	34.0	34.0	34.0	34.0	34.0		43.0	43.0		43.0	43.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.51	0.51		0.51	0.51
v/c Ratio	0.02	0.32	0.22	0.47	0.60		0.43	0.16		0.02	0.01
Control Delay	16.0	18.5	3.7	24.3	22.5		15.8	2.6		10.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	16.0	18.5	3.7	24.3	22.5		15.8	2.6		10.7	0.3
LOS	B	B	A	C	C		B	A		B	A
Approach Delay		14.2			22.8		11.5			6.6	
Approach LOS		B			C		B			A	
Queue Length 50th (m)	0.2	22.6	0.0	19.7	53.1		27.3	0.0		1.3	0.0
Queue Length 95th (m)	1.5	33.2	10.8	38.0	71.3		46.3	8.0		4.4	0.4
Internal Link Dist (m)		182.7			753.5		598.6			32.1	
Turn Bay Length (m)	25.0		55.0	85.0				20.0			
Base Capacity (vph)	116	1237	731	356	1339		655	851		709	831
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.02	0.32	0.22	0.47	0.60		0.43	0.16		0.02	0.01
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 85											
Offset: 81 (95%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green											
Natural Cycle: 65											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.60											
Intersection Signal Delay: 17.7						Intersection LOS: B					
Intersection Capacity Utilization 69.6%						ICU Level of Service C					
Analysis Period (min) 15											

Splits and Phases: 2: Russell Rd & Industrial Ave



Future Background 2020 AM
3: Russell Rd & Everest Priv

05/16/2019

Intersection

Int Delay, s/veh 0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	21	430	5	9	283
Future Vol, veh/h	12	21	430	5	9	283
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	2	0	0	4
Mvmt Flow	13	22	453	5	9	298

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	775	459	0
Stage 1	459	-	-
Stage 2	316	-	-
Critical Hdwy	6.4	6.2	-
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	-
Pot Cap-1 Maneuver	369	606	-
Stage 1	641	-	-
Stage 2	744	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	365	604	-
Mov Cap-2 Maneuver	365	-	-
Stage 1	634	-	-
Stage 2	744	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.9	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	488	1108
HCM Lane V/C Ratio	-	-	0.071	0.009
HCM Control Delay (s)	-	-	12.9	8.3
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0



Lane Group	EBL	NBL	NBT	SBT
Lane Configurations	LT	LT	RT	RT
Traffic Volume (vph)	317	27	180	205
Future Volume (vph)	317	27	180	205
Lane Group Flow (vph)	355	0	217	324
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		2		
Detector Phase	4	2	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	26.2	23.1	23.1	26.1
Total Split (s)	36.2	55.1	55.1	55.1
Total Split (%)	39.6%	60.4%	60.4%	60.4%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	1.8	1.8	1.8
Lost Time Adjust (s)	-2.2		-1.1	-1.1
Total Lost Time (s)	4.0		4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effect Green (s)	23.3		51.4	51.4
Actuated g/C Ratio	0.28		0.62	0.62
v/c Ratio	0.70		0.21	0.29
Control Delay	33.9		8.5	7.9
Queue Delay	0.0		0.0	0.0
Total Delay	33.9		8.5	7.9
LOS	C		A	A
Approach Delay	33.9		8.5	7.9
Approach LOS	C		A	A
Queue Length 50th (m)	49.0		13.3	17.6
Queue Length 95th (m)	75.9		29.9	39.6
Internal Link Dist (m)	130.4		522.1	50.1
Turn Bay Length (m)				
Base Capacity (vph)	703		1046	1113
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.50		0.21	0.29

Intersection Summary

Cycle Length: 91.3

Actuated Cycle Length: 82.7

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 18.4

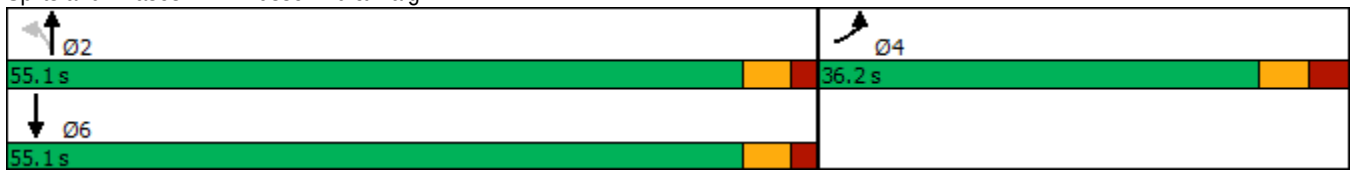
Intersection LOS: B

Intersection Capacity Utilization 57.3%

ICU Level of Service B

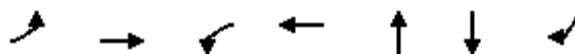
Analysis Period (min) 15

Splits and Phases: 4: Russell Rd & Haig Dr



Future Background 2020 AM
5: Othello Ave/Russell Rd & Smyth Rd

05/16/2019



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	20	323	38	779	156	63	26
Future Volume (vph)	20	323	38	779	156	63	26
Lane Group Flow (vph)	21	376	40	925	308	110	27
Turn Type	Perm	NA	Perm	NA	NA	NA	Perm
Protected Phases		4		8	2	6	
Permitted Phases	4		8				6
Detector Phase	4	4	8	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.8	34.8	34.8	34.8	31.0	29.2	29.2
Total Split (s)	59.0	59.0	59.0	59.0	31.0	30.0	30.0
Total Split (%)	49.2%	49.2%	49.2%	49.2%	25.8%	25.0%	25.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.5	3.5	3.5	3.5	3.7	3.9	3.9
Lost Time Adjust (s)	-1.8	-1.8	-1.8	-1.8	-2.0	-2.2	-2.2
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	54.0	54.0	54.0	54.0	26.0	25.0	25.0
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.22	0.21	0.21
v/c Ratio	0.12	0.24	0.10	0.60	0.78	0.31	0.07
Control Delay	21.7	20.9	17.0	21.5	57.8	43.0	0.3
Queue Delay	0.0	0.0	0.0	1.5	0.0	0.0	0.0
Total Delay	21.7	20.9	17.0	23.1	57.8	43.0	0.3
LOS	C	C	B	C	E	D	A
Approach Delay		21.0		22.8	57.8	34.6	
Approach LOS		C		C	E	C	
Queue Length 50th (m)	2.8	28.1	3.5	79.2	66.4	22.1	0.0
Queue Length 95th (m)	8.3	38.6	m6.1	101.5	#106.7	38.7	0.0
Internal Link Dist (m)		179.7		116.1	86.0	41.9	
Turn Bay Length (m)	50.0		15.0				30.0
Base Capacity (vph)	170	1542	411	1540	393	358	411
Starvation Cap Reductn	0	0	0	405	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.24	0.10	0.81	0.78	0.31	0.07

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 75 (63%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 29.3

Intersection LOS: C

Intersection Capacity Utilization 75.6%

ICU Level of Service D

Analysis Period (min) 15

Future Background 2020 AM 5: Othello Ave/Russell Rd & Smyth Rd

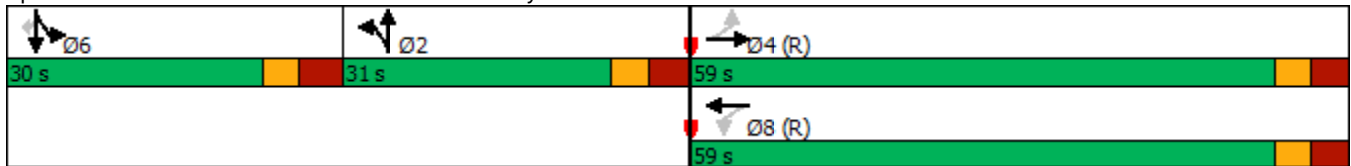
05/16/2019

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

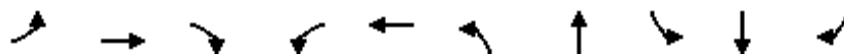
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Othello Ave/Russell Rd & Smyth Rd



Future Background 2020 AM
6: St Laurent Blvd & Smyth Rd/Lancaster Rd

05/16/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	←←	↑	←	←	↑↑	←	↑↑	←	↑↑	←
Traffic Volume (vph)	276	77	94	31	283	161	999	109	605	636
Future Volume (vph)	276	77	94	31	283	161	999	109	605	636
Lane Group Flow (vph)	291	81	99	33	386	169	1150	115	637	669
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2	1	6	
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7	11.0	27.9	11.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0	20.0	52.0	20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%	16.7%	43.3%	16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0	1.8	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	-1.6	-1.7	-1.7	-1.6	-1.7	-2.0	-1.9	-2.0	-1.9	-1.9
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	15.2	30.1	30.1	9.5	19.7	17.1	54.8	14.3	51.9	51.9
Actuated g/C Ratio	0.13	0.25	0.25	0.08	0.16	0.14	0.46	0.12	0.43	0.43
v/c Ratio	0.66	0.17	0.22	0.25	0.68	0.72	0.75	0.55	0.44	0.72
Control Delay	72.3	59.5	21.2	55.9	49.4	67.1	31.8	59.7	26.0	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	72.3	59.5	21.2	55.9	49.4	67.2	31.8	59.7	26.0	15.2
LOS	E	E	C	E	D	E	C	E	C	B
Approach Delay		59.4			49.9		36.3		23.6	
Approach LOS		E			D		D		C	
Queue Length 50th (m)	36.8	17.2	3.7	7.5	42.0	37.3	117.2	25.7	57.7	48.6
Queue Length 95th (m)	m50.5	m29.6	m12.5	17.4	56.2	#72.2	156.0	44.4	74.3	98.8
Internal Link Dist (m)		116.1			16.7		186.6		608.0	
Turn Bay Length (m)	55.0			35.0		150.0		105.0		35.0
Base Capacity (vph)	462	477	451	221	687	240	1540	237	1449	927
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	1	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.17	0.22	0.15	0.56	0.71	0.75	0.49	0.44	0.72

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 110 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 35.9

Intersection LOS: D

Intersection Capacity Utilization 71.1%

ICU Level of Service C

Analysis Period (min) 15

Future Background 2020 AM 6: St Laurent Blvd & Smyth Rd/Lancaster Rd

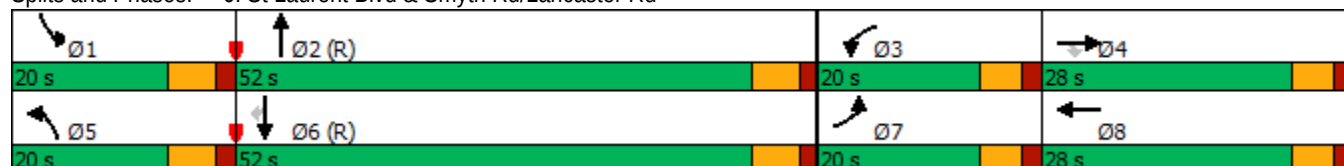
05/16/2019

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: 6: St Laurent Blvd & Smyth Rd/Lancaster Rd



Future Background 2020 PM
1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	556	327	402	277	136	176	861	512	131	822	125
Future Volume (vph)	136	556	327	402	277	136	176	861	512	131	822	125
Lane Group Flow (vph)	143	585	344	423	292	143	185	906	539	138	865	132
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	38.6	38.6	11.6	38.6	38.6	11.3	37.6	37.6	11.3	37.6	37.6
Total Split (s)	32.4	38.0	38.0	41.0	46.6	46.6	28.0	43.0	43.0	28.0	43.0	43.0
Total Split (%)	21.6%	25.3%	25.3%	27.3%	31.1%	31.1%	18.7%	28.7%	28.7%	18.7%	28.7%	28.7%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.1	2.4	2.4	2.1	2.4	2.4
Lost Time Adjust (s)	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.3	-2.6	-2.6	-2.3	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effect Green (s)	33.6	29.3	29.3	23.0	18.8	18.8	14.6	40.9	40.9	13.0	39.3	39.3
Actuated g/C Ratio	0.27	0.24	0.24	0.19	0.15	0.15	0.12	0.33	0.33	0.11	0.32	0.32
v/c Ratio	0.15	0.70	0.57	0.65	0.55	0.40	0.46	0.77	0.70	0.40	0.77	0.21
Control Delay	34.7	47.9	10.7	51.7	53.1	10.9	55.6	43.5	17.2	56.3	44.5	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	47.9	10.7	51.7	53.1	10.9	55.6	43.5	17.2	56.3	44.5	3.0
LOS	C	D	B	D	D	B	E	D	B	E	D	A
Approach Delay		34.2			45.4			36.2			41.1	
Approach LOS		C			D			D			D	
Queue Length 50th (m)	13.3	67.6	6.8	49.5	35.1	0.0	22.0	104.7	34.0	16.4	100.5	0.0
Queue Length 95th (m)	23.6	96.0	35.6	70.1	52.3	18.2	35.9	148.6	87.4	28.4	#144.3	7.6
Internal Link Dist (m)		753.5			213.9			608.0			286.3	
Turn Bay Length (m)	30.0		60.0	110.0		50.0	65.0		70.0	100.0		70.0
Base Capacity (vph)	975	983	653	1058	1209	643	666	1172	765	648	1127	623
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.60	0.53	0.40	0.24	0.22	0.28	0.77	0.70	0.21	0.77	0.21

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 122.4

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 38.6

Intersection LOS: D

Intersection Capacity Utilization 72.8%

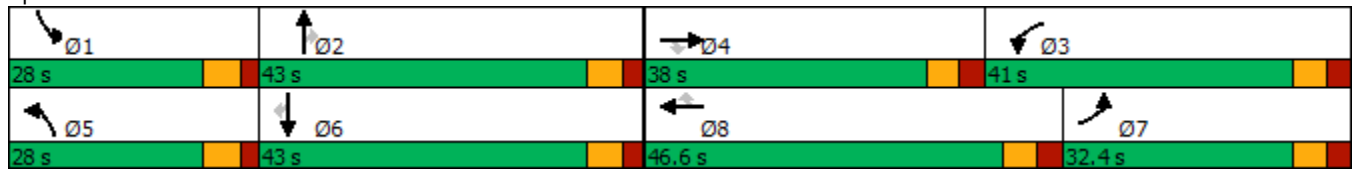
ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: St Laurent Blvd & Industrial Ave/Innes Rd



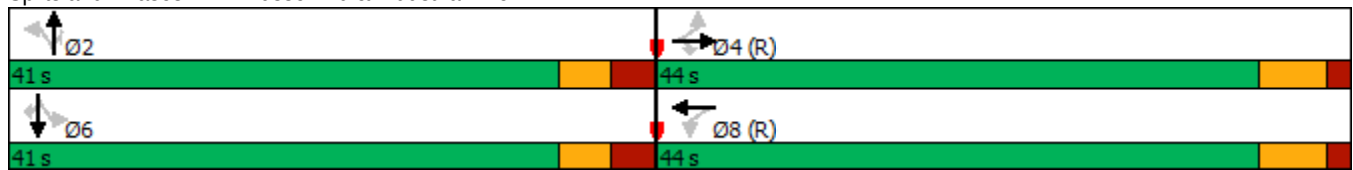
Future Background 2020 PM
2: Russell Rd & Industrial Ave

05/16/2019

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	3	814	358	133	525	303	4	168	11	6	5
Future Volume (vph)	3	814	358	133	525	303	4	168	11	6	5
Lane Group Flow (vph)	3	857	377	140	561	0	323	177	0	18	5
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		2			6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	4	4	4	8	8	2	2	2	6	6	6
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)	33.9	33.9	33.9	33.9	33.9	29.2	29.2	29.2	29.2	29.2	29.2
Total Split (s)	44.0	44.0	44.0	44.0	44.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	51.8%	51.8%	51.8%	51.8%	51.8%	48.2%	48.2%	48.2%	48.2%	48.2%	48.2%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	-1.9	-1.9	-1.9	-1.9	-1.9		-2.2	-2.2		-2.2	-2.2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	40.0	40.0	40.0	40.0	40.0		37.0	37.0		37.0	37.0
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47		0.44	0.44		0.44	0.44
v/c Ratio	0.01	0.52	0.40	0.66	0.35		0.55	0.24		0.03	0.01
Control Delay	12.0	17.3	2.9	36.0	14.9		22.3	8.0		13.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	12.0	17.3	2.9	36.0	14.9		22.3	8.0		13.9	0.0
LOS	B	B	A	D	B		C	A		B	A
Approach Delay		12.9			19.1		17.2			10.9	
Approach LOS		B			B		B			B	
Queue Length 50th (m)	0.3	49.2	0.0	16.7	28.8		37.7	7.5		1.6	0.0
Queue Length 95th (m)	1.7	65.4	13.7	#45.9	40.3		62.9	19.2		5.3	0.0
Internal Link Dist (m)		182.7			753.5		598.6			32.1	
Turn Bay Length (m)	25.0		55.0	85.0				20.0			
Base Capacity (vph)	350	1635	936	211	1619		586	744		685	722
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.01	0.52	0.40	0.66	0.35		0.55	0.24		0.03	0.01
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 85											
Offset: 12 (14%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green											
Natural Cycle: 65											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.66											
Intersection Signal Delay: 15.5						Intersection LOS: B					
Intersection Capacity Utilization 64.5%						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.

Splits and Phases: 2: Russell Rd & Industrial Ave



Future Background 2020 PM
3: Russell Rd & Everest Priv

05/16/2019

Intersection

Int Delay, s/veh 0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	7	381	9	13	533
Future Vol, veh/h	5	7	381	9	13	533
Conflicting Peds, #/hr	0	0	0	14	14	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	3	0	0	2
Mvmt Flow	5	7	401	9	14	561

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1009	420	0
Stage 1	420	-	-
Stage 2	589	-	-
Critical Hdwy	6.4	6.2	-
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	-
Pot Cap-1 Maneuver	269	638	-
Stage 1	667	-	-
Stage 2	558	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	262	630	-
Mov Cap-2 Maneuver	262	-	-
Stage 1	650	-	-
Stage 2	558	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.4	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	397	1131
HCM Lane V/C Ratio	-	-	0.032	0.012
HCM Control Delay (s)	-	-	14.4	8.2
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0



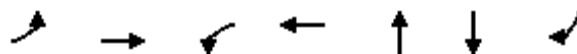
Lane Group	EBL	NBL	NBT	SBT
Lane Configurations	LT	LT	RT	RT
Traffic Volume (vph)	228	4	169	235
Future Volume (vph)	228	4	169	235
Lane Group Flow (vph)	263	0	182	591
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		2		
Detector Phase	4	2	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	26.2	23.1	23.1	26.1
Total Split (s)	31.2	55.1	55.1	55.1
Total Split (%)	36.2%	63.8%	63.8%	63.8%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	1.8	1.8	1.8
Lost Time Adjust (s)	-2.2		-1.1	-1.1
Total Lost Time (s)	4.0		4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effct Green (s)	18.5		51.2	51.2
Actuated g/C Ratio	0.24		0.66	0.66
v/c Ratio	0.61		0.16	0.50
Control Delay	32.2		6.3	7.4
Queue Delay	0.0		0.0	0.0
Total Delay	32.2		6.3	7.4
LOS	C		A	A
Approach Delay	32.2		6.3	7.4
Approach LOS	C		A	A
Queue Length 50th (m)	33.8		8.8	26.9
Queue Length 95th (m)	55.6		20.6	63.3
Internal Link Dist (m)	130.4		522.1	50.1
Turn Bay Length (m)				
Base Capacity (vph)	628		1163	1172
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.42		0.16	0.50
Intersection Summary				
Cycle Length: 86.3				
Actuated Cycle Length: 77.8				
Natural Cycle: 60				
Control Type: Semi Act-Uncoord				
Maximum v/c Ratio: 0.61				
Intersection Signal Delay: 13.5			Intersection LOS: B	
Intersection Capacity Utilization 53.7%			ICU Level of Service A	
Analysis Period (min) 15				

Splits and Phases: 4: Russell Rd & Haig Dr



Future Background 2020 PM
5: Othello Ave/Russell Rd & Smyth Rd

05/16/2019



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	14	930	86	363	92	149	19
Future Volume (vph)	14	930	86	363	92	149	19
Lane Group Flow (vph)	15	1047	91	447	271	305	20
Turn Type	Perm	NA	pm+pt	NA	NA	NA	Perm
Protected Phases		4	3	8	2	6	
Permitted Phases	4		8				6
Detector Phase	4	4	3	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.8	34.8	10.6	34.8	31.0	29.2	29.2
Total Split (s)	46.0	46.0	13.0	59.0	31.0	30.0	30.0
Total Split (%)	38.3%	38.3%	10.8%	49.2%	25.8%	25.0%	25.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.5	3.5	2.3	3.5	3.7	3.9	3.9
Lost Time Adjust (s)	-1.8	-1.8	-0.6	-1.8	-2.0	-2.2	-2.7
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	Max
Act Effect Green (s)	41.2	41.2	54.0	54.0	26.0	25.0	25.5
Actuated g/C Ratio	0.34	0.34	0.45	0.45	0.22	0.21	0.21
v/c Ratio	0.05	0.86	0.50	0.30	0.70	0.81	0.04
Control Delay	27.3	45.5	33.5	28.4	49.8	62.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	45.5	33.5	28.4	49.8	62.9	0.2
LOS	C	D	C	C	D	E	A
Approach Delay		45.2		29.3	49.8	59.0	
Approach LOS		D		C	D	E	
Queue Length 50th (m)	2.4	120.6	17.0	46.9	53.6	68.9	0.0
Queue Length 95th (m)	7.3	148.2	m31.5	64.6	83.3	#111.3	0.0
Internal Link Dist (m)		179.7		116.1	86.0	41.9	
Turn Bay Length (m)	50.0		15.0				30.0
Base Capacity (vph)	298	1214	185	1494	387	377	453
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.86	0.49	0.30	0.70	0.81	0.04

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 82 (68%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 43.9

Intersection LOS: D

Intersection Capacity Utilization 87.6%

ICU Level of Service E

Analysis Period (min) 15

Future Background 2020 PM
 5: Othello Ave/Russell Rd & Smyth Rd

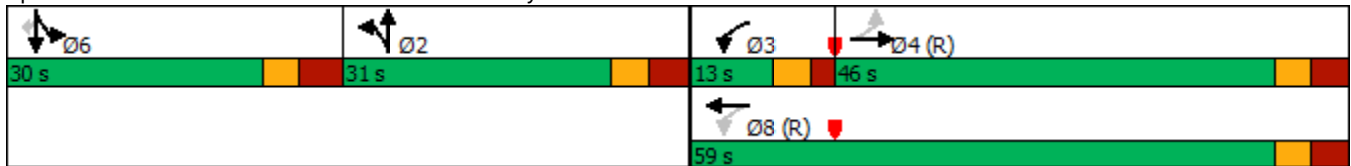
05/16/2019

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

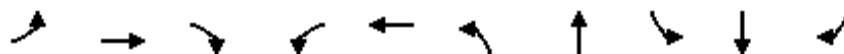
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Othello Ave/Russell Rd & Smyth Rd



Future Background 2020 PM
6: St Laurent Blvd & Smyth Rd/Lancaster Rd

05/16/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	←←	→	→	←	→	←	→	←	→	→
Traffic Volume (vph)	524	287	215	97	95	109	808	108	1033	283
Future Volume (vph)	524	287	215	97	95	109	808	108	1033	283
Lane Group Flow (vph)	552	302	226	102	241	115	909	114	1087	298
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2	1	6	
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7	11.0	27.9	11.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0	17.0	49.0	17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%	14.2%	40.8%	14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0	1.8	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	-1.6	-1.7	-1.7	-1.6	-1.7	-2.0	-1.9	-2.0	-1.9	-1.9
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	21.7	26.1	26.1	13.8	18.2	13.4	51.2	12.9	50.7	50.7
Actuated g/C Ratio	0.18	0.22	0.22	0.12	0.15	0.11	0.43	0.11	0.42	0.42
v/c Ratio	0.87	0.72	0.45	0.50	0.40	0.64	0.62	0.61	0.73	0.41
Control Delay	54.7	29.2	4.7	57.7	19.8	67.8	30.1	65.1	33.6	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.7	29.2	4.7	57.7	19.8	67.8	30.1	65.1	33.6	15.5
LOS	D	C	A	E	B	E	C	E	C	B
Approach Delay		37.1			31.1		34.4		32.4	
Approach LOS		D			C		C		C	
Queue Length 50th (m)	46.9	56.1	10.6	22.9	10.9	25.6	89.4	25.5	116.3	25.6
Queue Length 95th (m)	m#70.2	m76.7	m16.6	38.9	21.5	#50.7	117.3	45.2	147.3	51.2
Internal Link Dist (m)		116.1			16.7		186.6		608.0	
Turn Bay Length (m)	55.0			35.0		150.0		105.0		35.0
Base Capacity (vph)	642	423	501	324	757	186	1467	197	1497	722
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.71	0.45	0.31	0.32	0.62	0.62	0.58	0.73	0.41

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 34.1

Intersection LOS: C

Intersection Capacity Utilization 73.8%

ICU Level of Service D

Analysis Period (min) 15

Future Background 2020 PM
6: St Laurent Blvd & Smyth Rd/Lancaster Rd

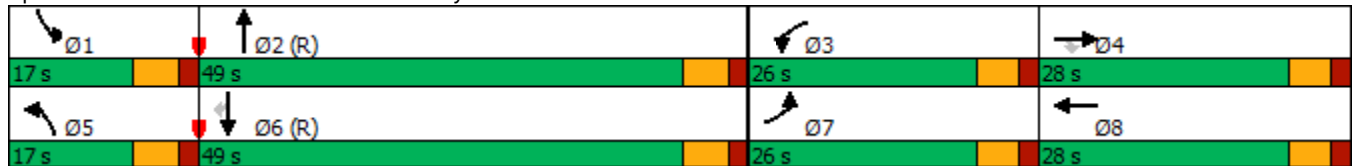
05/16/2019

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: 6: St Laurent Blvd & Smyth Rd/Lancaster Rd



Appendix J

Total Future Background 2025 SYNCHRO Analysis

DRAFT

Total Future Background 2025 AM
1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	188	125	649	787	256	188	1055	350	123	794	151
Future Volume (vph)	71	188	125	649	787	256	188	1055	350	123	794	151
Lane Group Flow (vph)	75	198	132	683	828	269	198	1111	368	129	836	159
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	38.6	38.6	11.6	38.6	38.6	11.3	37.6	37.6	11.3	37.6	37.6
Total Split (s)	25.4	38.0	38.0	34.0	46.6	46.6	20.0	38.0	38.0	20.0	38.0	38.0
Total Split (%)	19.5%	29.2%	29.2%	26.2%	35.8%	35.8%	15.4%	29.2%	29.2%	15.4%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.1	2.4	2.4	2.1	2.4	2.4
Lost Time Adjust (s)	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.3	-2.6	-2.6	-2.3	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	11.6	16.1	16.1	34.9	41.9	41.9	15.5	50.4	50.4	12.6	47.5	47.5
Actuated g/C Ratio	0.09	0.12	0.12	0.27	0.32	0.32	0.12	0.39	0.39	0.10	0.37	0.37
v/c Ratio	0.26	0.50	0.38	0.73	0.75	0.45	0.51	0.85	0.50	0.40	0.66	0.26
Control Delay	56.6	57.3	4.2	48.1	44.6	12.7	58.0	44.8	13.9	58.3	39.3	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.6	57.3	4.2	48.1	44.6	12.7	58.0	44.8	13.9	58.3	39.3	3.3
LOS	E	E	A	D	D	B	E	D	B	E	D	A
Approach Delay		39.8			41.1			39.6			36.4	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	9.4	25.3	0.0	80.4	99.6	13.9	24.8	139.0	22.8	16.2	96.0	0.0
Queue Length 95th (m)	16.4	36.6	3.1	98.9	122.4	37.6	35.9	#208.7	58.3	25.6	#139.6	9.1
Internal Link Dist (m)		753.5			213.9			608.0			286.3	
Turn Bay Length (m)	30.0		60.0	110.0		50.0	65.0		70.0	100.0		70.0
Base Capacity (vph)	529	837	527	946	1123	606	421	1311	734	415	1270	602
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.24	0.25	0.72	0.74	0.44	0.47	0.85	0.50	0.31	0.66	0.26

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 39.4

Intersection LOS: D

Intersection Capacity Utilization 76.8%

ICU Level of Service D

Analysis Period (min) 15

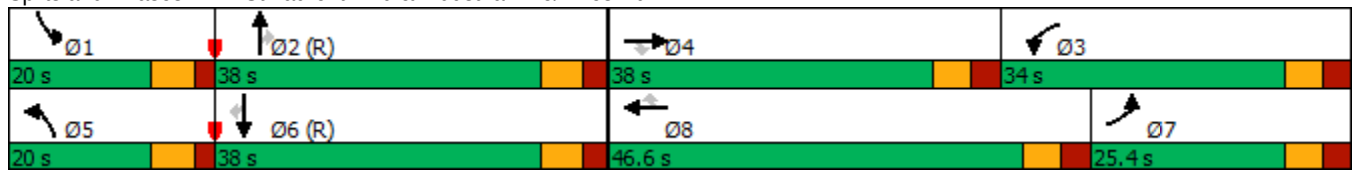
Total Future Background 2025 AM

1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

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

Splits and Phases: 1: St Laurent Blvd & Industrial Ave/Innes Rd



Total Future Background 2025 AM
2: Russell Rd & Industrial Ave

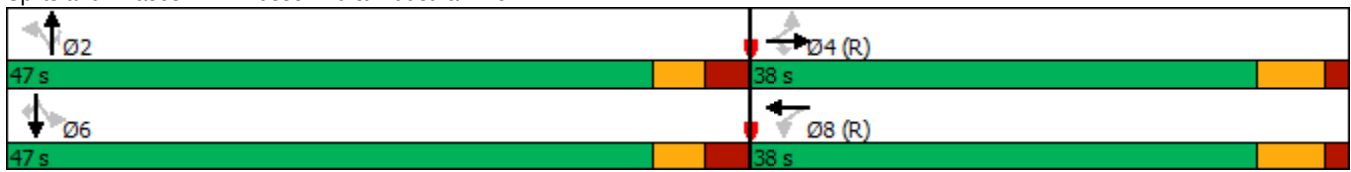
05/16/2019

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	2	395	161	168	794	279	3	137	15	1	10
Future Volume (vph)	2	395	161	168	794	279	3	137	15	1	10
Lane Group Flow (vph)	2	416	169	177	849	0	297	144	0	17	11
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		2			6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	4	4	4	8	8	2	2	2	6	6	6
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)	33.9	33.9	33.9	33.9	33.9	29.2	29.2	29.2	29.2	29.2	29.2
Total Split (s)	38.0	38.0	38.0	38.0	38.0	47.0	47.0	47.0	47.0	47.0	47.0
Total Split (%)	44.7%	44.7%	44.7%	44.7%	44.7%	55.3%	55.3%	55.3%	55.3%	55.3%	55.3%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	-1.9	-1.9	-1.9	-1.9	-1.9		-2.2	-2.2		-2.2	-2.2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Efect Green (s)	34.0	34.0	34.0	34.0	34.0		43.0	43.0		43.0	43.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.51	0.51		0.51	0.51
v/c Ratio	0.02	0.34	0.23	0.51	0.63		0.45	0.17		0.02	0.01
Control Delay	16.5	18.7	3.7	25.8	23.1		16.3	2.6		10.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	16.5	18.7	3.7	25.8	23.1		16.3	2.6		10.7	0.3
LOS	B	B	A	C	C		B	A		B	A
Approach Delay		14.3			23.5		11.8			6.6	
Approach LOS		B			C		B			A	
Queue Length 50th (m)	0.2	24.0	0.0	21.2	56.8		29.3	0.0		1.3	0.0
Queue Length 95th (m)	1.5	35.0	11.0	40.9	75.8		49.4	8.2		4.4	0.4
Internal Link Dist (m)		182.7			753.5		598.6			32.1	
Turn Bay Length (m)	25.0		55.0	85.0				20.0			
Base Capacity (vph)	106	1237	735	345	1339		655	855		706	831
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.02	0.34	0.23	0.51	0.63		0.45	0.17		0.02	0.01
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 85											
Offset: 81 (95%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green											
Natural Cycle: 65											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.63											
Intersection Signal Delay: 18.2						Intersection LOS: B					
Intersection Capacity Utilization 70.7%						ICU Level of Service C					
Analysis Period (min) 15											

Total Future Background 2025 AM
2: Russell Rd & Industrial Ave

05/16/2019

Splits and Phases: 2: Russell Rd & Industrial Ave



Total Future Background 2025 AM
3: Russell Rd & Everest Priv

05/16/2019

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	21	454	5	9	297
Future Vol, veh/h	12	21	454	5	9	297
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	2	0	0	4
Mvmt Flow	13	22	478	5	9	313

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	815	484	0	0	486
Stage 1	484	-	-	-	-
Stage 2	331	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	350	587	-	-	1087
Stage 1	624	-	-	-	-
Stage 2	732	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	346	585	-	-	1084
Mov Cap-2 Maneuver	346	-	-	-	-
Stage 1	617	-	-	-	-
Stage 2	732	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.3	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	468	1084
HCM Lane V/C Ratio	-	-	0.074	0.009
HCM Control Delay (s)	-	-	13.3	8.3
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

Total Future Background 2025 AM

4: Russell Rd & Haig Dr

05/16/2019



Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	333	29	191	215
Future Volume (vph)	333	29	191	215
Lane Group Flow (vph)	373	0	232	340
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		2		
Detector Phase	4	2	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	26.2	23.1	23.1	26.1
Total Split (s)	36.2	55.1	55.1	55.1
Total Split (%)	39.6%	60.4%	60.4%	60.4%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	1.8	1.8	1.8
Lost Time Adjust (s)	-2.2		-1.1	-1.1
Total Lost Time (s)	4.0		4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effect Green (s)	24.1		51.3	51.3
Actuated g/C Ratio	0.29		0.62	0.62
v/c Ratio	0.72		0.23	0.31
Control Delay	34.5		8.9	8.3
Queue Delay	0.0		0.0	0.0
Total Delay	34.5		8.9	8.3
LOS	C		A	A
Approach Delay	34.5		8.9	8.3
Approach LOS	C		A	A
Queue Length 50th (m)	52.2		15.0	19.7
Queue Length 95th (m)	80.3		32.0	42.0
Internal Link Dist (m)	130.4		522.1	50.1
Turn Bay Length (m)				
Base Capacity (vph)	696		1029	1103
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.54		0.23	0.31

Intersection Summary

Cycle Length: 91.3

Actuated Cycle Length: 83.4

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 18.8

Intersection LOS: B

Intersection Capacity Utilization 59.5%

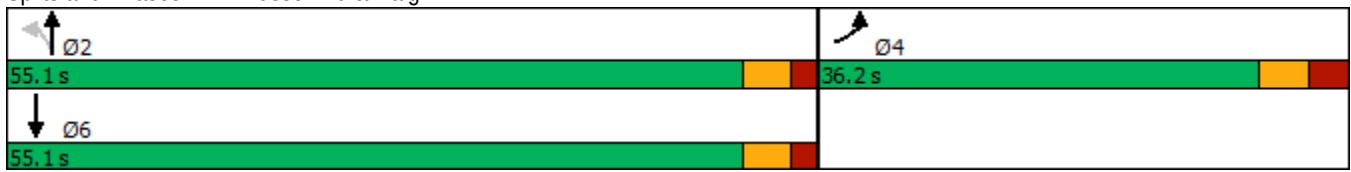
ICU Level of Service B

Analysis Period (min) 15

Total Future Background 2025 AM
4: Russell Rd & Haig Dr

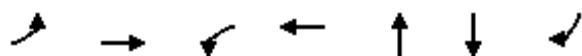
05/16/2019

Splits and Phases: 4: Russell Rd & Haig Dr



Total Future Background 2025 AM
5: Othello Ave/Russell Rd & Smyth Rd

05/16/2019



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	21	340	40	818	165	66	28
Future Volume (vph)	21	340	40	818	165	66	28
Lane Group Flow (vph)	22	398	42	972	342	116	29
Turn Type	Perm	NA	Perm	NA	NA	NA	Perm
Protected Phases		4		8	2	6	
Permitted Phases	4		8				6
Detector Phase	4	4	8	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.8	34.8	34.8	34.8	31.0	29.2	29.2
Total Split (s)	59.0	59.0	59.0	59.0	31.0	30.0	30.0
Total Split (%)	49.2%	49.2%	49.2%	49.2%	25.8%	25.0%	25.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.5	3.5	3.5	3.5	3.7	3.9	3.9
Lost Time Adjust (s)	-1.8	-1.8	-1.8	-1.8	-2.0	-2.2	-2.2
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	54.0	54.0	54.0	54.0	26.0	25.0	25.0
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.22	0.21	0.21
v/c Ratio	0.14	0.26	0.11	0.63	0.87	0.32	0.07
Control Delay	22.5	21.1	17.8	22.7	66.9	43.3	0.3
Queue Delay	0.0	0.0	0.0	2.1	0.0	0.0	0.0
Total Delay	22.5	21.1	17.8	24.8	66.9	43.3	0.3
LOS	C	C	B	C	E	D	A
Approach Delay		21.2		24.5	66.9	34.7	
Approach LOS		C		C	E	C	
Queue Length 50th (m)	3.0	30.0	3.9	85.8	75.7	23.4	0.0
Queue Length 95th (m)	8.9	40.8	m6.1	107.7	#126.3	40.6	0.0
Internal Link Dist (m)		179.7		116.1	86.0	41.9	
Turn Bay Length (m)	50.0		15.0				30.0
Base Capacity (vph)	154	1540	398	1540	392	358	411
Starvation Cap Reductn	0	0	0	406	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.26	0.11	0.86	0.87	0.32	0.07

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 75 (63%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 32.1

Intersection LOS: C

Intersection Capacity Utilization 76.8%

ICU Level of Service D

Analysis Period (min) 15

Total Future Background 2025 AM
5: Othello Ave/Russell Rd & Smyth Rd

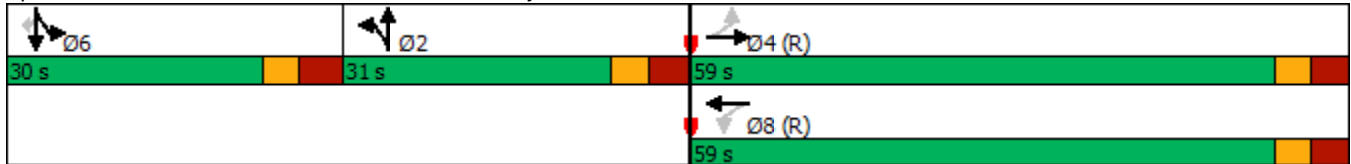
05/16/2019

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

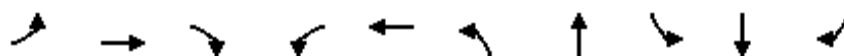
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Othello Ave/Russell Rd & Smyth Rd



Total Future Background 2025 AM
6: St Laurent Blvd & Smyth Rd/Lancaster Rd

05/16/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	302	81	99	33	297	169	1050	115	640	669
Future Volume (vph)	302	81	99	33	297	169	1050	115	640	669
Lane Group Flow (vph)	318	85	104	35	406	178	1208	121	674	704
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2	1	6	
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7	11.0	27.9	11.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0	20.0	52.0	20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%	16.7%	43.3%	16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0	1.8	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	-1.6	-1.7	-1.7	-1.6	-1.7	-2.0	-1.9	-2.0	-1.9	-1.9
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	15.5	30.9	30.9	9.6	20.3	17.2	53.7	14.5	51.0	51.0
Actuated g/C Ratio	0.13	0.26	0.26	0.08	0.17	0.14	0.45	0.12	0.42	0.42
v/c Ratio	0.71	0.17	0.23	0.27	0.69	0.76	0.80	0.57	0.47	0.77
Control Delay	74.2	58.3	21.3	56.0	49.8	70.2	34.5	60.3	26.9	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0
Total Delay	74.2	58.3	21.3	56.0	49.8	72.7	34.5	60.3	26.9	18.7
LOS	E	E	C	E	D	E	C	E	C	B
Approach Delay		60.7			50.3		39.4		25.8	
Approach LOS		E			D		D		C	
Queue Length 50th (m)	40.2	17.8	4.4	7.9	44.3	39.9	128.9	27.1	61.8	62.6
Queue Length 95th (m)	m53.2	m29.9	m12.8	17.8	59.2	#77.6	#171.9	46.2	79.3	118.7
Internal Link Dist (m)		116.1			16.7		186.6		608.0	
Turn Bay Length (m)	55.0			35.0		150.0		105.0		35.0
Base Capacity (vph)	462	489	459	221	687	239	1509	238	1423	911
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	16	0	0	0	4
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.17	0.23	0.16	0.59	0.80	0.80	0.51	0.47	0.78

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 110 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 38.2

Intersection LOS: D

Intersection Capacity Utilization 74.0%

ICU Level of Service D

Analysis Period (min) 15

Total Future Background 2025 AM 6: St Laurent Blvd & Smyth Rd/Lancaster Rd

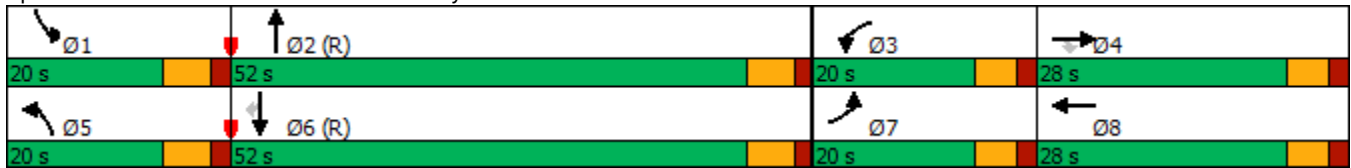
05/16/2019

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: 6: St Laurent Blvd & Smyth Rd/Lancaster Rd



Total Future Background 2025 PM
1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	584	344	422	291	143	185	915	538	138	880	132
Future Volume (vph)	143	584	344	422	291	143	185	915	538	138	880	132
Lane Group Flow (vph)	151	615	362	444	306	151	195	963	566	145	926	139
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	38.6	38.6	11.6	38.6	38.6	11.3	37.6	37.6	11.3	37.6	37.6
Total Split (s)	32.4	38.0	38.0	41.0	46.6	46.6	28.0	43.0	43.0	28.0	43.0	43.0
Total Split (%)	21.6%	25.3%	25.3%	27.3%	31.1%	31.1%	18.7%	28.7%	28.7%	18.7%	28.7%	28.7%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.1	2.4	2.4	2.1	2.4	2.4
Lost Time Adjust (s)	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.3	-2.6	-2.6	-2.3	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effect Green (s)	34.8	30.4	30.4	24.0	19.6	19.6	15.0	41.0	41.0	13.4	39.3	39.3
Actuated g/C Ratio	0.28	0.24	0.24	0.19	0.16	0.16	0.12	0.33	0.33	0.11	0.31	0.31
v/c Ratio	0.16	0.72	0.60	0.67	0.57	0.40	0.48	0.84	0.75	0.41	0.84	0.23
Control Delay	35.3	49.4	12.3	52.6	53.8	10.7	56.7	47.8	20.5	57.4	49.2	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.3	49.4	12.3	52.6	53.8	10.7	56.7	47.8	20.5	57.4	49.2	3.6
LOS	D	D	B	D	D	B	E	D	C	E	D	A
Approach Delay		35.6			46.0			39.9			45.0	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	14.3	73.1	10.4	53.5	37.8	0.0	23.8	118.3	45.1	17.7	114.4	0.0
Queue Length 95th (m)	25.0	103.2	42.8	73.9	55.0	18.6	37.9	#174.0	103.0	29.8	#171.0	9.4
Internal Link Dist (m)		753.5			213.9			608.0			286.3	
Turn Bay Length (m)	30.0		60.0	110.0		50.0	65.0		70.0	100.0		70.0
Base Capacity (vph)	979	963	646	1036	1183	637	652	1151	755	634	1104	613
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.64	0.56	0.43	0.26	0.24	0.30	0.84	0.75	0.23	0.84	0.23

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 124.9

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 41.3

Intersection LOS: D

Intersection Capacity Utilization 74.2%

ICU Level of Service D

Analysis Period (min) 15

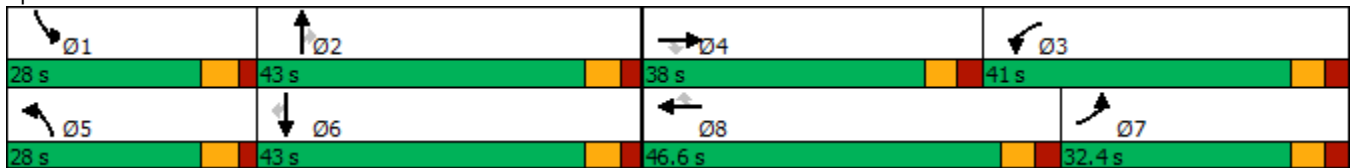
95th percentile volume exceeds capacity, queue may be longer.

Total Future Background 2025 PM
1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

Queue shown is maximum after two cycles.

Splits and Phases: 1: St Laurent Blvd & Industrial Ave/Innes Rd



Total Future Background 2025 PM
2: Russell Rd & Industrial Ave

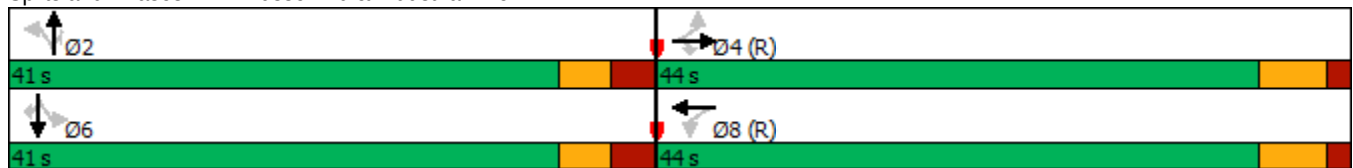
05/16/2019

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	3	856	379	140	552	320	4	176	11	6	5
Future Volume (vph)	3	856	379	140	552	320	4	176	11	6	5
Lane Group Flow (vph)	3	901	399	147	589	0	341	185	0	18	5
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		2			6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	4	4	4	8	8	2	2	2	6	6	6
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)	33.9	33.9	33.9	33.9	33.9	29.2	29.2	29.2	29.2	29.2	29.2
Total Split (s)	44.0	44.0	44.0	44.0	44.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	51.8%	51.8%	51.8%	51.8%	51.8%	48.2%	48.2%	48.2%	48.2%	48.2%	48.2%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	-1.9	-1.9	-1.9	-1.9	-1.9		-2.2	-2.2		-2.2	-2.2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	40.0	40.0	40.0	40.0	40.0		37.0	37.0		37.0	37.0
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47		0.44	0.44		0.44	0.44
v/c Ratio	0.01	0.55	0.42	0.75	0.36		0.58	0.25		0.03	0.01
Control Delay	12.0	17.7	3.0	46.0	15.1		23.1	9.2		13.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	12.0	17.7	3.0	46.0	15.1		23.1	9.2		13.9	0.0
LOS	B	B	A	D	B		C	A		B	A
Approach Delay		13.2			21.3		18.2			10.9	
Approach LOS		B			C		B			B	
Queue Length 50th (m)	0.3	52.7	0.0	18.7	30.6		40.5	9.5		1.6	0.0
Queue Length 95th (m)	1.7	69.7	14.0	#51.7	42.4		67.3	21.9		5.3	0.0
Internal Link Dist (m)		182.7			753.5		598.6			32.1	
Turn Bay Length (m)	25.0		55.0	85.0				20.0			
Base Capacity (vph)	336	1635	948	195	1619		586	737		682	722
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.01	0.55	0.42	0.75	0.36		0.58	0.25		0.03	0.01
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 85											
Offset: 12 (14%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green											
Natural Cycle: 65											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.75											
Intersection Signal Delay: 16.5						Intersection LOS: B					
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.

Splits and Phases: 2: Russell Rd & Industrial Ave



Total Future Background 2025 PM
3: Russell Rd & Everest Priv

05/16/2019

Intersection

Int Delay, s/veh 0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	7	402	9	13	563
Future Vol, veh/h	5	7	402	9	13	563
Conflicting Peds, #/hr	0	0	0	14	14	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	3	0	0	2
Mvmt Flow	5	7	423	9	14	593

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1063	442	0
Stage 1	442	-	-
Stage 2	621	-	-
Critical Hdwy	6.4	6.2	-
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	-
Pot Cap-1 Maneuver	249	620	-
Stage 1	652	-	-
Stage 2	540	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	243	612	-
Mov Cap-2 Maneuver	243	-	-
Stage 1	635	-	-
Stage 2	540	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.9	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	375	1110
HCM Lane V/C Ratio	-	-	0.034	0.012
HCM Control Delay (s)	-	-	14.9	8.3
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Total Future Background 2025 PM

4: Russell Rd & Haig Dr

05/16/2019

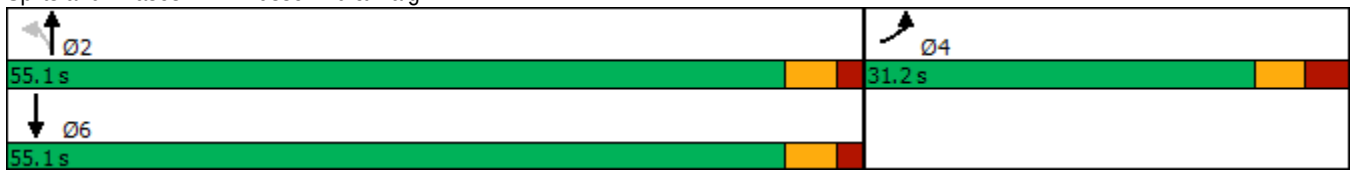


Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	240	4	179	250
Future Volume (vph)	240	4	179	250
Lane Group Flow (vph)	277	0	192	625
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		2		
Detector Phase	4	2	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	26.2	23.1	23.1	26.1
Total Split (s)	31.2	55.1	55.1	55.1
Total Split (%)	36.2%	63.8%	63.8%	63.8%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	1.8	1.8	1.8
Lost Time Adjust (s)	-2.2		-1.1	-1.1
Total Lost Time (s)	4.0		4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effct Green (s)	19.2		51.3	51.3
Actuated g/C Ratio	0.24		0.65	0.65
v/c Ratio	0.63		0.17	0.54
Control Delay	32.4		6.6	8.2
Queue Delay	0.0		0.0	0.0
Total Delay	32.4		6.6	8.2
LOS	C		A	A
Approach Delay	32.4		6.6	8.2
Approach LOS	C		A	A
Queue Length 50th (m)	35.9		9.6	31.3
Queue Length 95th (m)	58.5		22.5	72.4
Internal Link Dist (m)	130.4		522.1	50.1
Turn Bay Length (m)				
Base Capacity (vph)	623		1152	1164
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.44		0.17	0.54
Intersection Summary				
Cycle Length: 86.3				
Actuated Cycle Length: 78.5				
Natural Cycle: 60				
Control Type: Semi Act-Uncoord				
Maximum v/c Ratio: 0.63				
Intersection Signal Delay: 14.1			Intersection LOS: B	
Intersection Capacity Utilization 56.2%			ICU Level of Service B	
Analysis Period (min) 15				

Total Future Background 2025 PM
4: Russell Rd & Haig Dr

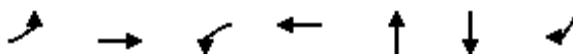
05/16/2019

Splits and Phases: 4: Russell Rd & Haig Dr



Total Future Background 2025 PM
5: Othello Ave/Russell Rd & Smyth Rd

05/16/2019



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	15	978	92	381	99	160	20
Future Volume (vph)	15	978	92	381	99	160	20
Lane Group Flow (vph)	16	1107	97	469	305	325	21
Turn Type	Perm	NA	pm+pt	NA	NA	NA	Perm
Protected Phases		4	3	8	2	6	
Permitted Phases	4		8				6
Detector Phase	4	4	3	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.8	34.8	10.6	34.8	31.0	29.2	29.2
Total Split (s)	46.0	46.0	13.0	59.0	31.0	30.0	30.0
Total Split (%)	38.3%	38.3%	10.8%	49.2%	25.8%	25.0%	25.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.5	3.5	2.3	3.5	3.7	3.9	3.9
Lost Time Adjust (s)	-1.8	-1.8	-0.6	-1.8	-2.0	-2.2	-2.7
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	Max
Act Effect Green (s)	41.2	41.2	54.0	54.0	26.0	25.0	25.5
Actuated g/C Ratio	0.34	0.34	0.45	0.45	0.22	0.21	0.21
v/c Ratio	0.05	0.91	0.53	0.31	0.79	0.86	0.05
Control Delay	27.4	50.2	34.3	28.2	55.9	68.6	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	50.2	34.3	28.2	55.9	68.6	0.2
LOS	C	D	C	C	E	E	A
Approach Delay		49.9		29.2	55.9	64.4	
Approach LOS		D		C	E	E	
Queue Length 50th (m)	2.5	130.8	18.3	49.7	62.4	74.4	0.0
Queue Length 95th (m)	7.7	#171.0	m32.7	68.0	#103.7	#122.0	0.0
Internal Link Dist (m)		179.7		116.1	86.0	41.9	
Turn Bay Length (m)	50.0		15.0				30.0
Base Capacity (vph)	291	1211	185	1494	387	377	453
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.91	0.52	0.31	0.79	0.86	0.05

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 82 (68%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 47.8

Intersection LOS: D

Intersection Capacity Utilization 89.5%

ICU Level of Service E

Analysis Period (min) 15

Total Future Background 2025 PM 5: Othello Ave/Russell Rd & Smyth Rd

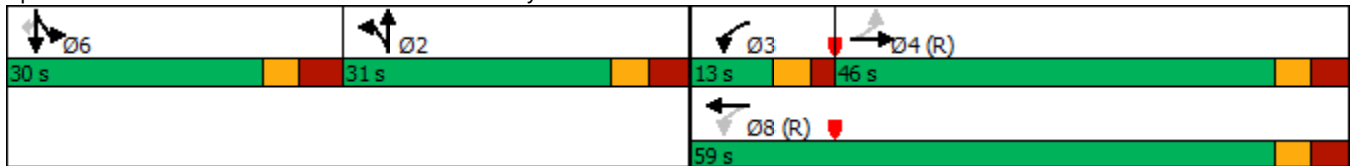
05/16/2019

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

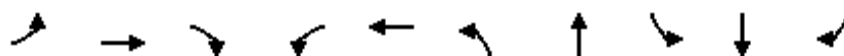
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Othello Ave/Russell Rd & Smyth Rd



Total Future Background 2025 PM
6: St Laurent Blvd & Smyth Rd/Lancaster Rd

05/16/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	562	301	226	102	100	115	849	114	1100	299
Future Volume (vph)	562	301	226	102	100	115	849	114	1100	299
Lane Group Flow (vph)	592	317	238	107	253	121	954	120	1158	315
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2	1	6	
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7	11.0	27.9	11.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0	17.0	49.0	17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%	14.2%	40.8%	14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0	1.8	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	-1.6	-1.7	-1.7	-1.6	-1.7	-2.0	-1.9	-2.0	-1.9	-1.9
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	22.0	26.7	26.7	14.2	18.9	13.6	50.0	13.1	49.5	49.5
Actuated g/C Ratio	0.18	0.22	0.22	0.12	0.16	0.11	0.42	0.11	0.41	0.41
v/c Ratio	0.92	0.74	0.46	0.51	0.40	0.66	0.66	0.63	0.79	0.44
Control Delay	58.4	28.9	4.4	57.6	19.6	69.0	31.9	66.1	36.8	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	28.9	4.4	57.6	19.6	69.0	31.9	66.1	36.8	16.9
LOS	E	C	A	E	B	E	C	E	D	B
Approach Delay		39.0			30.9		36.1		35.0	
Approach LOS		D			C		D		D	
Queue Length 50th (m)	55.7	58.5	10.1	24.0	11.3	26.9	98.6	26.8	131.6	30.1
Queue Length 95th (m)	m#74.7	m77.0	m15.9	40.2	22.3	#54.2	124.6	#50.0	161.1	56.2
Internal Link Dist (m)		116.1			16.7		186.6		608.0	
Turn Bay Length (m)	55.0			35.0		150.0		105.0		35.0
Base Capacity (vph)	642	427	513	324	762	188	1436	199	1462	708
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.74	0.46	0.33	0.33	0.64	0.66	0.60	0.79	0.44

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 36.0

Intersection LOS: D

Intersection Capacity Utilization 77.1%

ICU Level of Service D

Analysis Period (min) 15

Total Future Background 2025 PM
 6: St Laurent Blvd & Smyth Rd/Lancaster Rd

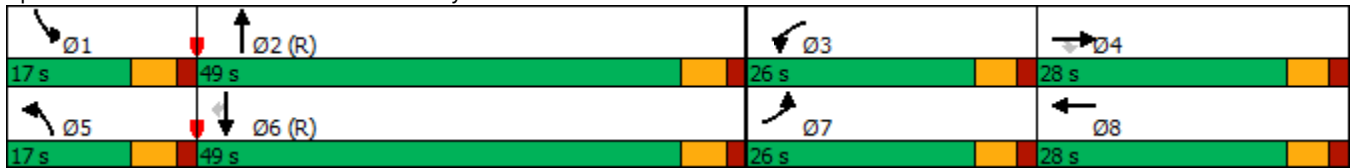
05/16/2019

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: 6: St Laurent Blvd & Smyth Rd/Lancaster Rd



Appendix K

Total Projected 2020 SYNCHRO Analysis

DRAFT

Total Projected 2020 AM
1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	187	119	617	750	243	179	995	335	117	752	148
Future Volume (vph)	84	187	119	617	750	243	179	995	335	117	752	148
Lane Group Flow (vph)	88	197	125	649	789	256	188	1047	353	123	792	156
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	38.6	38.6	11.6	38.6	38.6	11.3	37.6	37.6	11.3	37.6	37.6
Total Split (s)	25.4	38.0	38.0	34.0	46.6	46.6	20.0	38.0	38.0	20.0	38.0	38.0
Total Split (%)	19.5%	29.2%	29.2%	26.2%	35.8%	35.8%	15.4%	29.2%	29.2%	15.4%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.1	2.4	2.4	2.1	2.4	2.4
Lost Time Adjust (s)	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.3	-2.6	-2.6	-2.3	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	11.8	16.0	16.0	34.9	39.1	39.1	15.1	50.7	50.7	12.4	48.0	48.0
Actuated g/C Ratio	0.09	0.12	0.12	0.27	0.30	0.30	0.12	0.39	0.39	0.10	0.37	0.37
v/c Ratio	0.30	0.50	0.36	0.70	0.77	0.45	0.50	0.79	0.48	0.38	0.62	0.26
Control Delay	57.4	57.3	3.3	47.0	46.6	11.8	58.1	41.8	12.4	58.2	37.8	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.4	57.3	3.3	47.0	46.6	11.8	58.1	41.8	12.4	58.2	37.8	3.0
LOS	E	E	A	D	D	B	E	D	B	E	D	A
Approach Delay		40.8			41.5			37.2			35.1	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	11.0	25.2	0.0	76.1	95.0	11.6	23.6	125.6	18.3	15.5	88.0	0.0
Queue Length 95th (m)	18.8	36.5	1.3	94.6	115.5	34.0	34.5	#185.1	50.9	24.7	122.3	8.3
Internal Link Dist (m)		753.5			213.9			608.0			286.3	
Turn Bay Length (m)	30.0		60.0	110.0		50.0	65.0		70.0	100.0		70.0
Base Capacity (vph)	529	837	527	936	1117	604	416	1318	740	415	1283	606
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.24	0.24	0.69	0.71	0.42	0.45	0.79	0.48	0.30	0.62	0.26

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 38.6

Intersection LOS: D

Intersection Capacity Utilization 74.3%

ICU Level of Service D

Analysis Period (min) 15

Total Projected 2020 AM

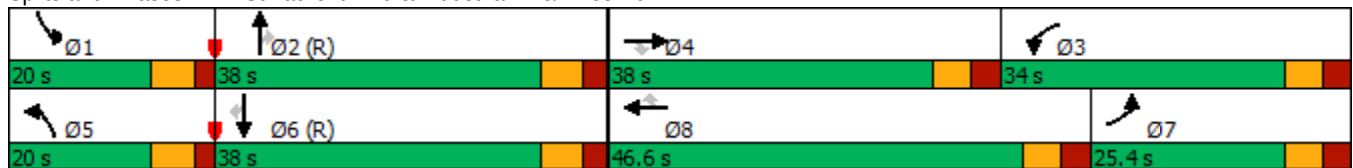
1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: St Laurent Blvd & Industrial Ave/Innes Rd



Total Projected 2020 AM
2: Russell Rd & Industrial Ave

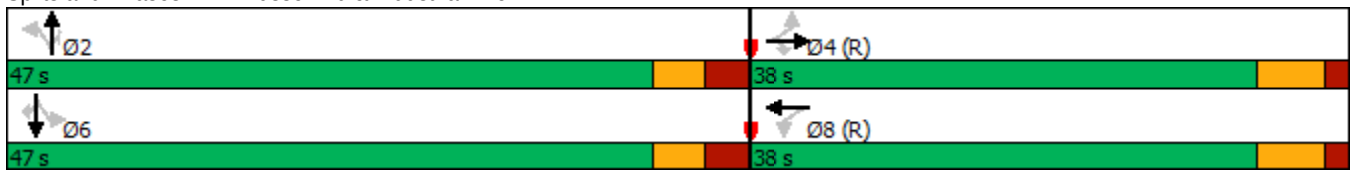
05/16/2019

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	2	376	161	167	755	288	3	154	15	1	10
Future Volume (vph)	2	376	161	167	755	288	3	154	15	1	10
Lane Group Flow (vph)	2	396	169	176	808	0	306	162	0	17	11
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		2			6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	4	4	4	8	8	2	2	2	6	6	6
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)	33.9	33.9	33.9	33.9	33.9	29.2	29.2	29.2	29.2	29.2	29.2
Total Split (s)	38.0	38.0	38.0	38.0	38.0	47.0	47.0	47.0	47.0	47.0	47.0
Total Split (%)	44.7%	44.7%	44.7%	44.7%	44.7%	55.3%	55.3%	55.3%	55.3%	55.3%	55.3%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	-1.9	-1.9	-1.9	-1.9	-1.9		-2.2	-2.2		-2.2	-2.2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Efect Green (s)	34.0	34.0	34.0	34.0	34.0		43.0	43.0		43.0	43.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.51	0.51		0.51	0.51
v/c Ratio	0.02	0.32	0.23	0.49	0.60		0.47	0.19		0.02	0.01
Control Delay	16.0	18.5	3.7	25.0	22.5		16.5	2.5		10.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	16.0	18.5	3.7	25.0	22.5		16.5	2.5		10.7	0.3
LOS	B	B	A	C	C		B	A		B	A
Approach Delay		14.0			22.9		11.7			6.6	
Approach LOS		B			C		B			A	
Queue Length 50th (m)	0.2	22.6	0.0	20.8	53.1		30.5	0.0		1.3	0.0
Queue Length 95th (m)	1.5	33.2	11.0	40.0	71.3		51.3	8.7		4.4	0.4
Internal Link Dist (m)		182.7			753.5		598.6			32.1	
Turn Bay Length (m)	25.0		55.0	85.0				20.0			
Base Capacity (vph)	116	1237	735	356	1339		655	864		704	831
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.02	0.32	0.23	0.49	0.60		0.47	0.19		0.02	0.01
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 85											
Offset: 81 (95%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green											
Natural Cycle: 65											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.60											
Intersection Signal Delay: 17.7						Intersection LOS: B					
Intersection Capacity Utilization 69.6%						ICU Level of Service C					
Analysis Period (min) 15											

Total Projected 2020 AM
2: Russell Rd & Industrial Ave

05/16/2019

Splits and Phases: 2: Russell Rd & Industrial Ave



Total Projected 2020 AM
3: Russell Rd & Everest Priv

05/16/2019

Intersection						
Int Delay, s/veh	2.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	69	430	15	23	283
Future Vol, veh/h	44	69	430	15	23	283
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	2	0	0	4
Mvmt Flow	46	73	453	16	24	298
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	810	464	0	0	472	0
Stage 1	464	-	-	-	-	-
Stage 2	346	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	352	602	-	-	1100	-
Stage 1	637	-	-	-	-	-
Stage 2	721	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	343	600	-	-	1097	-
Mov Cap-2 Maneuver	343	-	-	-	-	-
Stage 1	621	-	-	-	-	-
Stage 2	721	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	15.4	0		0.6		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	464	1097	-	
HCM Lane V/C Ratio	-	-	0.256	0.022	-	
HCM Control Delay (s)	-	-	15.4	8.4	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	1	0.1	-	

Total Projected 2020 AM
4: Russell Rd & Haig Dr

05/16/2019

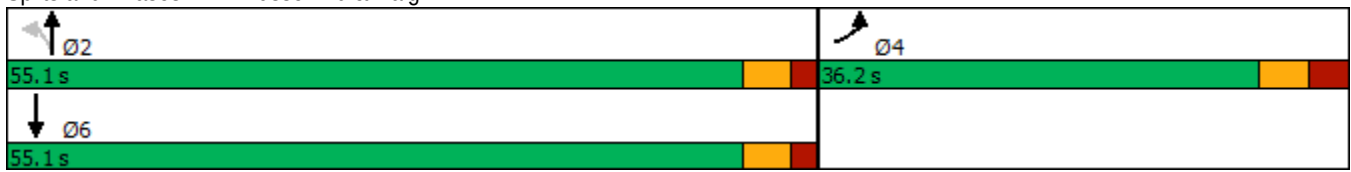


Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	323	27	184	217
Future Volume (vph)	323	27	184	217
Lane Group Flow (vph)	361	0	222	357
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		2		
Detector Phase	4	2	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	26.2	23.1	23.1	26.1
Total Split (s)	36.2	55.1	55.1	55.1
Total Split (%)	39.6%	60.4%	60.4%	60.4%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	1.8	1.8	1.8
Lost Time Adjust (s)	-2.2		-1.1	-1.1
Total Lost Time (s)	4.0		4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effct Green (s)	23.6		51.3	51.3
Actuated g/C Ratio	0.28		0.62	0.62
v/c Ratio	0.71		0.21	0.32
Control Delay	34.1		8.7	8.2
Queue Delay	0.0		0.0	0.0
Total Delay	34.1		8.7	8.2
LOS	C		A	A
Approach Delay	34.1		8.7	8.2
Approach LOS	C		A	A
Queue Length 50th (m)	50.1		13.8	20.0
Queue Length 95th (m)	77.3		30.6	44.1
Internal Link Dist (m)	130.4		522.1	50.1
Turn Bay Length (m)				
Base Capacity (vph)	700		1040	1108
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.52		0.21	0.32
Intersection Summary				
Cycle Length: 91.3				
Actuated Cycle Length: 82.9				
Natural Cycle: 55				
Control Type: Semi Act-Uncoord				
Maximum v/c Ratio: 0.71				
Intersection Signal Delay: 18.3			Intersection LOS: B	
Intersection Capacity Utilization 58.3%			ICU Level of Service B	
Analysis Period (min) 15				

Total Projected 2020 AM
4: Russell Rd & Haig Dr

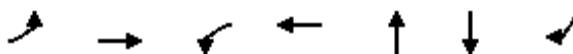
05/16/2019

Splits and Phases: 4: Russell Rd & Haig Dr



Total Projected 2020 AM
5: Othello Ave/Russell Rd & Smyth Rd

05/16/2019



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	21	323	38	779	157	65	28
Future Volume (vph)	21	323	38	779	157	65	28
Lane Group Flow (vph)	22	376	40	927	309	121	29
Turn Type	Perm	NA	Perm	NA	NA	NA	Perm
Protected Phases		4		8	2	6	
Permitted Phases	4		8				6
Detector Phase	4	4	8	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.8	34.8	34.8	34.8	31.0	29.2	29.2
Total Split (s)	59.0	59.0	59.0	59.0	31.0	30.0	30.0
Total Split (%)	49.2%	49.2%	49.2%	49.2%	25.8%	25.0%	25.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.5	3.5	3.5	3.5	3.7	3.9	3.9
Lost Time Adjust (s)	-1.8	-1.8	-1.8	-1.8	-2.0	-2.2	-2.2
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	54.0	54.0	54.0	54.0	26.0	25.0	25.0
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.22	0.21	0.21
v/c Ratio	0.13	0.24	0.10	0.60	0.79	0.34	0.07
Control Delay	21.9	20.9	16.9	21.6	58.0	43.7	0.3
Queue Delay	0.0	0.0	0.0	1.5	0.0	0.0	0.0
Total Delay	21.9	20.9	16.9	23.1	58.0	43.7	0.3
LOS	C	C	B	C	E	D	A
Approach Delay		21.0		22.8	58.0	35.3	
Approach LOS		C		C	E	D	
Queue Length 50th (m)	3.0	28.1	3.5	79.4	66.7	24.5	0.0
Queue Length 95th (m)	8.7	38.6	m5.9	101.6	#107.2	42.1	0.0
Internal Link Dist (m)		179.7		116.1	86.0	41.9	
Turn Bay Length (m)	50.0		15.0				30.0
Base Capacity (vph)	170	1542	411	1540	393	356	411
Starvation Cap Reductn	0	0	0	403	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.24	0.10	0.82	0.79	0.34	0.07

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 75 (63%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 29.4

Intersection LOS: C

Intersection Capacity Utilization 75.7%

ICU Level of Service D

Analysis Period (min) 15

Total Projected 2020 AM
 5: Othello Ave/Russell Rd & Smyth Rd

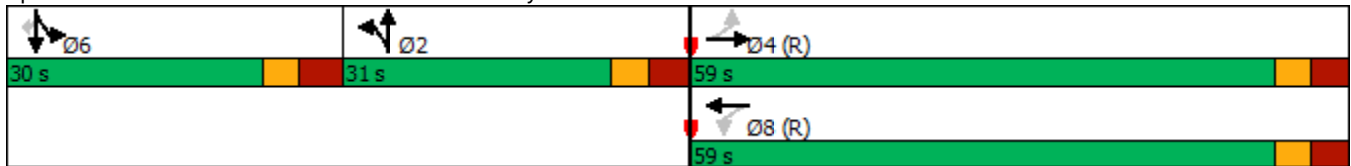
05/16/2019

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

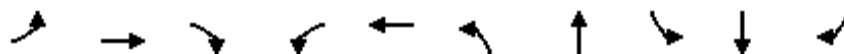
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Othello Ave/Russell Rd & Smyth Rd



Total Projected 2020 AM
6: St Laurent Blvd & Smyth Rd/Lancaster Rd

05/16/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	←←	↑	→	←	↑↑	←	↑↑	←	↑↑	→
Traffic Volume (vph)	280	79	96	31	283	162	999	109	605	637
Future Volume (vph)	280	79	96	31	283	162	999	109	605	637
Lane Group Flow (vph)	295	83	101	33	386	171	1150	115	637	671
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2	1	6	
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7	11.0	27.9	11.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0	20.0	52.0	20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%	16.7%	43.3%	16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0	1.8	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	-1.6	-1.7	-1.7	-1.6	-1.7	-2.0	-1.9	-2.0	-1.9	-1.9
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	15.2	30.1	30.1	9.5	19.7	17.2	54.7	14.3	51.9	51.9
Actuated g/C Ratio	0.13	0.25	0.25	0.08	0.16	0.14	0.46	0.12	0.43	0.43
v/c Ratio	0.67	0.17	0.22	0.25	0.68	0.73	0.75	0.55	0.44	0.73
Control Delay	71.6	59.0	21.2	55.9	49.4	67.7	31.8	59.7	26.0	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Total Delay	71.6	59.0	21.2	55.9	49.4	67.9	31.8	59.7	26.0	15.4
LOS	E	E	C	E	D	E	C	E	C	B
Approach Delay		58.8			49.9		36.5		23.7	
Approach LOS		E			D		D		C	
Queue Length 50th (m)	37.2	17.6	3.8	7.5	42.0	37.8	117.2	25.7	57.7	49.5
Queue Length 95th (m)	m51.1	m30.4	m12.6	17.4	56.2	#73.7	156.0	44.4	74.3	100.0
Internal Link Dist (m)		116.1			16.7		186.6		608.0	
Turn Bay Length (m)	55.0			35.0		150.0		105.0		35.0
Base Capacity (vph)	462	477	451	221	687	240	1539	237	1447	925
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	2	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.17	0.22	0.15	0.56	0.72	0.75	0.49	0.44	0.73

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 110 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 36.0

Intersection LOS: D

Intersection Capacity Utilization 71.2%

ICU Level of Service C

Analysis Period (min) 15

Total Projected 2020 AM
 6: St Laurent Blvd & Smyth Rd/Lancaster Rd

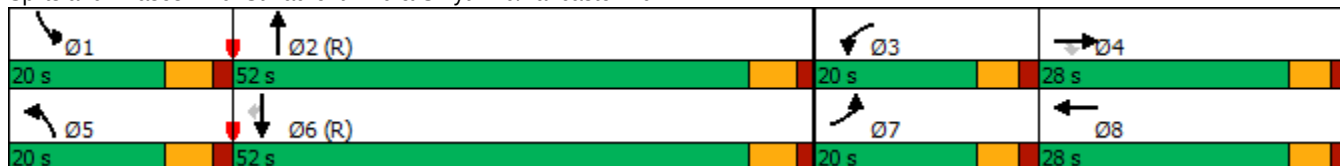
05/16/2019

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: 6: St Laurent Blvd & Smyth Rd/Lancaster Rd



Total Projected 2020 PM
1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	560	327	404	284	136	176	862	513	131	824	139
Future Volume (vph)	145	560	327	404	284	136	176	862	513	131	824	139
Lane Group Flow (vph)	153	589	344	425	299	143	185	907	540	138	867	146
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	38.6	38.6	11.6	38.6	38.6	11.3	37.6	37.6	11.3	37.6	37.6
Total Split (s)	32.4	38.0	38.0	41.0	46.6	46.6	28.0	43.0	43.0	28.0	43.0	43.0
Total Split (%)	21.6%	25.3%	25.3%	27.3%	31.1%	31.1%	18.7%	28.7%	28.7%	18.7%	28.7%	28.7%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.1	2.4	2.4	2.1	2.4	2.4
Lost Time Adjust (s)	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.3	-2.6	-2.6	-2.3	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effect Green (s)	33.5	29.5	29.5	23.1	19.0	19.0	14.6	40.9	40.9	13.0	39.3	39.3
Actuated g/C Ratio	0.27	0.24	0.24	0.19	0.15	0.15	0.12	0.33	0.33	0.11	0.32	0.32
v/c Ratio	0.16	0.70	0.57	0.65	0.56	0.39	0.46	0.78	0.71	0.40	0.77	0.23
Control Delay	35.0	48.0	10.9	51.7	53.1	10.8	55.7	43.7	17.2	56.4	44.7	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	48.0	10.9	51.7	53.1	10.8	55.7	43.7	17.2	56.4	44.7	4.3
LOS	C	D	B	D	D	B	E	D	B	E	D	A
Approach Delay		34.4			45.4			36.3			40.9	
Approach LOS		C			D			D			D	
Queue Length 50th (m)	14.3	68.3	7.2	50.0	36.0	0.0	22.0	105.2	34.2	16.4	101.2	0.0
Queue Length 95th (m)	25.0	96.8	36.2	70.5	53.4	18.1	35.9	148.7	87.0	28.4	#145.1	11.1
Internal Link Dist (m)		753.5			213.9			608.0			286.3	
Turn Bay Length (m)	30.0		60.0	110.0		50.0	65.0		70.0	100.0		70.0
Base Capacity (vph)	971	981	651	1056	1207	642	665	1170	765	646	1126	622
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.60	0.53	0.40	0.25	0.22	0.28	0.78	0.71	0.21	0.77	0.23

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 122.6

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 38.7

Intersection LOS: D

Intersection Capacity Utilization 72.9%

ICU Level of Service C

Analysis Period (min) 15

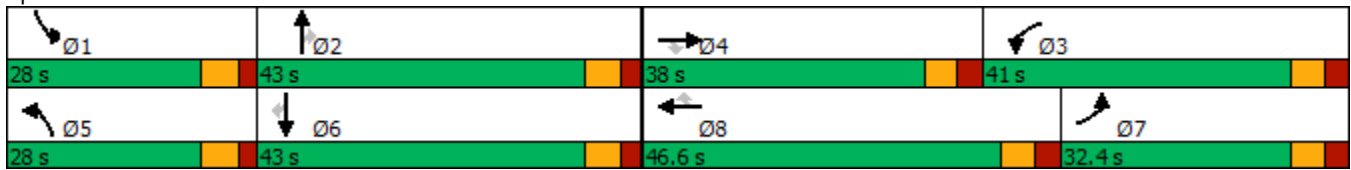
95th percentile volume exceeds capacity, queue may be longer.

Total Projected 2020 PM
 1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

Queue shown is maximum after two cycles.

Splits and Phases: 1: St Laurent Blvd & Industrial Ave/Innes Rd



Total Projected 2020 PM
2: Russell Rd & Industrial Ave

05/16/2019

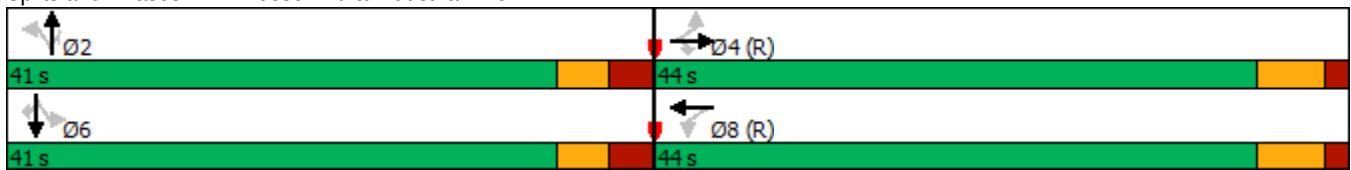
											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	3	814	378	154	525	316	4	181	11	6	5
Future Volume (vph)	3	814	378	154	525	316	4	181	11	6	5
Lane Group Flow (vph)	3	857	398	162	561	0	337	191	0	18	5
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		2			6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	4	4	4	8	8	2	2	2	6	6	6
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)	33.9	33.9	33.9	33.9	33.9	29.2	29.2	29.2	29.2	29.2	29.2
Total Split (s)	44.0	44.0	44.0	44.0	44.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	51.8%	51.8%	51.8%	51.8%	51.8%	48.2%	48.2%	48.2%	48.2%	48.2%	48.2%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	-1.9	-1.9	-1.9	-1.9	-1.9		-2.2	-2.2		-2.2	-2.2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Efect Green (s)	40.0	40.0	40.0	40.0	40.0		37.0	37.0		37.0	37.0
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47		0.44	0.44		0.44	0.44
v/c Ratio	0.01	0.52	0.42	0.77	0.35		0.58	0.26		0.03	0.01
Control Delay	12.0	17.3	3.0	45.7	14.9		22.9	8.6		13.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	12.0	17.3	3.0	45.7	14.9		22.9	8.6		13.9	0.0
LOS	B	B	A	D	B		C	A		B	A
Approach Delay		12.7			21.8		17.7			10.9	
Approach LOS		B			C		B			B	
Queue Length 50th (m)	0.3	49.2	0.0	20.9	28.8		39.9	8.9		1.6	0.0
Queue Length 95th (m)	1.7	65.4	14.0	#55.5	40.3		66.4	21.4		5.3	0.0
Internal Link Dist (m)		182.7			753.5		598.6			32.1	
Turn Bay Length (m)	25.0		55.0	85.0				20.0			
Base Capacity (vph)	350	1635	947	211	1619		586	744		683	722
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.01	0.52	0.42	0.77	0.35		0.58	0.26		0.03	0.01
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 85											
Offset: 12 (14%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green											
Natural Cycle: 65											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.77											
Intersection Signal Delay: 16.4						Intersection LOS: B					
Intersection Capacity Utilization 65.4%						ICU Level of Service C					
Analysis Period (min) 15											

Total Projected 2020 PM
2: Russell Rd & Industrial Ave

05/16/2019

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

Splits and Phases: 2: Russell Rd & Industrial Ave



Total Projected 2020 PM
3: Russell Rd & Everest Priv

05/16/2019

Intersection

Int Delay, s/veh 1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	33	381	37	54	533
Future Vol, veh/h	22	33	381	37	54	533
Conflicting Peds, #/hr	0	0	0	14	14	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	3	0	0	2
Mvmt Flow	23	35	401	39	57	561

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1110	435	0
Stage 1	435	-	-
Stage 2	675	-	-
Critical Hdwy	6.4	6.2	-
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	-
Pot Cap-1 Maneuver	234	625	-
Stage 1	657	-	-
Stage 2	510	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	219	617	-
Mov Cap-2 Maneuver	219	-	-
Stage 1	615	-	-
Stage 2	510	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17	0	0.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	357	1103
HCM Lane V/C Ratio	-	-	0.162	0.052
HCM Control Delay (s)	-	-	17	8.4
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.6	0.2

Total Projected 2020 PM
4: Russell Rd & Haig Dr

05/16/2019



Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	246	4	179	241
Future Volume (vph)	246	4	179	241
Lane Group Flow (vph)	282	0	192	610
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		2		
Detector Phase	4	2	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	26.2	23.1	23.1	26.1
Total Split (s)	31.2	55.1	55.1	55.1
Total Split (%)	36.2%	63.8%	63.8%	63.8%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	1.8	1.8	1.8
Lost Time Adjust (s)	-2.2		-1.1	-1.1
Total Lost Time (s)	4.0		4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effct Green (s)	19.5		51.3	51.3
Actuated g/C Ratio	0.25		0.65	0.65
v/c Ratio	0.64		0.17	0.53
Control Delay	32.6		6.7	8.1
Queue Delay	0.0		0.0	0.0
Total Delay	32.6		6.7	8.1
LOS	C		A	A
Approach Delay	32.6		6.7	8.1
Approach LOS	C		A	A
Queue Length 50th (m)	36.9		9.8	30.0
Queue Length 95th (m)	59.9		22.7	70.0
Internal Link Dist (m)	130.4		522.1	50.1
Turn Bay Length (m)				
Base Capacity (vph)	621		1149	1159
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.45		0.17	0.53
Intersection Summary				
Cycle Length: 86.3				
Actuated Cycle Length: 78.8				
Natural Cycle: 60				
Control Type: Semi Act-Uncoord				
Maximum v/c Ratio: 0.64				
Intersection Signal Delay: 14.2			Intersection LOS: B	
Intersection Capacity Utilization 55.6%			ICU Level of Service B	
Analysis Period (min) 15				

Total Projected 2020 PM
4: Russell Rd & Haig Dr

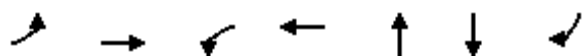
05/16/2019

Splits and Phases: 4: Russell Rd & Haig Dr



Total Projected 2020 PM
5: Othello Ave/Russell Rd & Smyth Rd

05/16/2019



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	15	930	86	363	94	150	20
Future Volume (vph)	15	930	86	363	94	150	20
Lane Group Flow (vph)	16	1047	91	455	273	311	21
Turn Type	Perm	NA	pm+pt	NA	NA	NA	Perm
Protected Phases		4	3	8	2	6	
Permitted Phases	4		8				6
Detector Phase	4	4	3	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.8	34.8	10.6	34.8	31.0	29.2	29.2
Total Split (s)	46.0	46.0	13.0	59.0	31.0	30.0	30.0
Total Split (%)	38.3%	38.3%	10.8%	49.2%	25.8%	25.0%	25.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.5	3.5	2.3	3.5	3.7	3.9	3.9
Lost Time Adjust (s)	-1.8	-1.8	-0.6	-1.8	-2.0	-2.2	-2.2
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	Max
Act Effect Green (s)	41.2	41.2	54.0	54.0	26.0	25.0	25.0
Actuated g/C Ratio	0.34	0.34	0.45	0.45	0.22	0.21	0.21
v/c Ratio	0.05	0.86	0.50	0.31	0.71	0.82	0.05
Control Delay	27.3	45.5	33.4	28.5	50.1	64.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	45.5	33.4	28.5	50.1	64.4	0.2
LOS	C	D	C	C	D	E	A
Approach Delay		45.2		29.3	50.1	60.3	
Approach LOS		D		C	D	E	
Queue Length 50th (m)	2.5	120.6	17.1	48.0	54.1	70.6	0.0
Queue Length 95th (m)	7.7	148.2	m31.3	65.8	84.1	#114.7	0.0
Internal Link Dist (m)		179.7		116.1	86.0	41.9	
Turn Bay Length (m)	50.0		15.0				30.0
Base Capacity (vph)	296	1214	185	1488	387	377	447
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.86	0.49	0.31	0.71	0.82	0.05

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 82 (68%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 44.2

Intersection LOS: D

Intersection Capacity Utilization 87.6%

ICU Level of Service E

Analysis Period (min) 15

Total Projected 2020 PM
 5: Othello Ave/Russell Rd & Smyth Rd

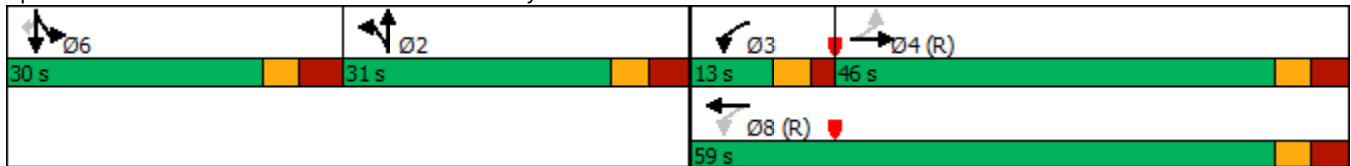
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95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

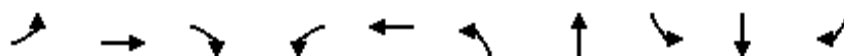
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Othello Ave/Russell Rd & Smyth Rd



Total Projected 2020 PM
6: St Laurent Blvd & Smyth Rd/Lancaster Rd

05/16/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	526	288	216	97	96	111	808	108	1033	287
Future Volume (vph)	526	288	216	97	96	111	808	108	1033	287
Lane Group Flow (vph)	554	303	227	102	242	117	909	114	1087	302
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2	1	6	
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7	11.0	27.9	11.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0	17.0	49.0	17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%	14.2%	40.8%	14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0	1.8	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	-1.6	-1.7	-1.7	-1.6	-1.7	-2.0	-1.9	-2.0	-1.9	-1.9
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	21.7	26.2	26.2	13.8	18.3	13.5	51.1	12.9	50.5	50.5
Actuated g/C Ratio	0.18	0.22	0.22	0.12	0.15	0.11	0.43	0.11	0.42	0.42
v/c Ratio	0.87	0.72	0.45	0.50	0.40	0.65	0.62	0.61	0.73	0.42
Control Delay	54.8	29.4	4.6	57.7	19.9	68.1	30.2	65.2	33.8	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.8	29.4	4.6	57.7	19.9	68.1	30.2	65.2	33.8	15.6
LOS	D	C	A	E	B	E	C	E	C	B
Approach Delay		37.2			31.1		34.5		32.5	
Approach LOS		D			C		C		C	
Queue Length 50th (m)	47.3	56.5	10.5	22.9	11.0	26.0	89.5	25.5	116.8	26.1
Queue Length 95th (m)	m#70.9	m76.3	m16.6	38.9	21.6	#51.7	117.3	45.2	147.3	51.8
Internal Link Dist (m)		116.1			16.7		186.6		608.0	
Turn Bay Length (m)	55.0			35.0		150.0		105.0		35.0
Base Capacity (vph)	642	424	503	324	757	187	1466	197	1492	722
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.71	0.45	0.31	0.32	0.63	0.62	0.58	0.73	0.42

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 34.2

Intersection LOS: C

Intersection Capacity Utilization 74.0%

ICU Level of Service D

Analysis Period (min) 15

Total Projected 2020 PM
 6: St Laurent Blvd & Smyth Rd/Lancaster Rd

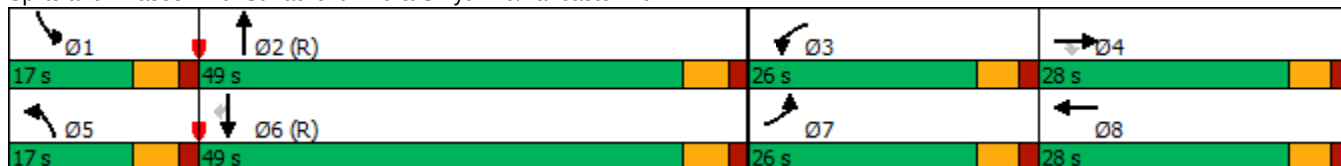
05/16/2019

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: 6: St Laurent Blvd & Smyth Rd/Lancaster Rd



Appendix L

Total Projected 2025 SYNCHRO Analysis

DRAFT

Total Projected 2025 AM
1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	196	125	649	789	256	188	1057	352	123	795	156
Future Volume (vph)	87	196	125	649	789	256	188	1057	352	123	795	156
Lane Group Flow (vph)	92	206	132	683	831	269	198	1113	371	129	837	164
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	38.6	38.6	11.6	38.6	38.6	11.3	37.6	37.6	11.3	37.6	37.6
Total Split (s)	25.4	38.0	38.0	34.0	46.6	46.6	20.0	38.0	38.0	20.0	38.0	38.0
Total Split (%)	19.5%	29.2%	29.2%	26.2%	35.8%	35.8%	15.4%	29.2%	29.2%	15.4%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.1	2.4	2.4	2.1	2.4	2.4
Lost Time Adjust (s)	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.3	-2.6	-2.6	-2.3	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	12.2	16.3	16.3	35.8	40.0	40.0	15.5	49.2	49.2	12.6	46.3	46.3
Actuated g/C Ratio	0.09	0.13	0.13	0.28	0.31	0.31	0.12	0.38	0.38	0.10	0.36	0.36
v/c Ratio	0.31	0.51	0.37	0.71	0.79	0.46	0.51	0.87	0.51	0.40	0.68	0.28
Control Delay	56.8	57.3	4.1	46.9	47.3	13.0	58.0	47.0	14.3	58.3	40.4	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	57.3	4.1	46.9	47.3	13.0	58.0	47.0	14.3	58.3	40.4	3.8
LOS	E	E	A	D	D	B	E	D	B	E	D	A
Approach Delay		40.9			42.0			41.1			37.2	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	11.5	26.3	0.0	80.0	100.0	14.1	24.8	140.8	23.5	16.2	97.1	0.0
Queue Length 95th (m)	19.4	37.7	3.1	98.9	123.1	37.9	35.9	#210.7	59.2	25.6	#141.7	10.6
Internal Link Dist (m)		753.5			213.9			608.0			286.3	
Turn Bay Length (m)	30.0		60.0	110.0		50.0	65.0		70.0	100.0		70.0
Base Capacity (vph)	529	837	527	956	1117	604	421	1280	723	415	1237	591
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.25	0.25	0.71	0.74	0.45	0.47	0.87	0.51	0.31	0.68	0.28

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 40.5

Intersection LOS: D

Intersection Capacity Utilization 76.9%

ICU Level of Service D

Analysis Period (min) 15

Total Projected 2025 AM

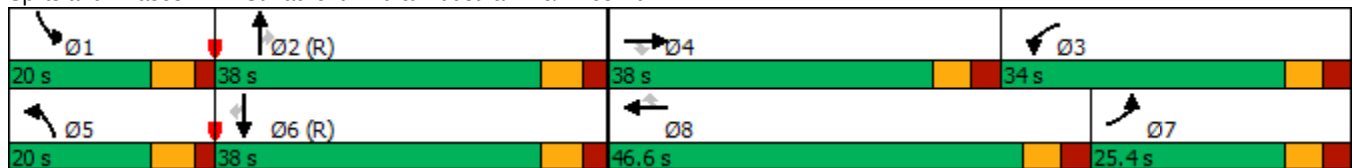
1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: St Laurent Blvd & Industrial Ave/Innes Rd

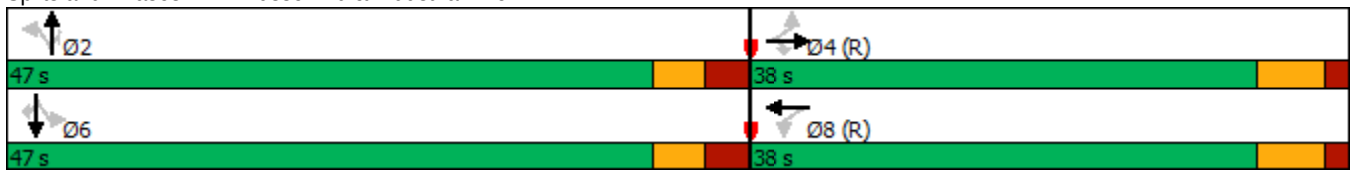


Total Projected 2025 AM
2: Russell Rd & Industrial Ave

05/16/2019

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	2	395	168	175	794	303	3	161	15	1	10
Future Volume (vph)	2	395	168	175	794	303	3	161	15	1	10
Lane Group Flow (vph)	2	416	177	184	849	0	322	169	0	17	11
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		2			6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	4	4	4	8	8	2	2	2	6	6	6
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)	33.9	33.9	33.9	33.9	33.9	29.2	29.2	29.2	29.2	29.2	29.2
Total Split (s)	38.0	38.0	38.0	38.0	38.0	47.0	47.0	47.0	47.0	47.0	47.0
Total Split (%)	44.7%	44.7%	44.7%	44.7%	44.7%	55.3%	55.3%	55.3%	55.3%	55.3%	55.3%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	-1.9	-1.9	-1.9	-1.9	-1.9		-2.2	-2.2		-2.2	-2.2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	34.0	34.0	34.0	34.0	34.0		43.0	43.0		43.0	43.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.51	0.51		0.51	0.51
v/c Ratio	0.02	0.34	0.24	0.53	0.63		0.49	0.20		0.02	0.01
Control Delay	16.5	18.7	3.6	26.4	23.1		17.0	2.7		10.8	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	16.5	18.7	3.6	26.4	23.1		17.0	2.7		10.8	0.3
LOS	B	B	A	C	C		B	A		B	A
Approach Delay		14.2			23.7		12.1			6.6	
Approach LOS		B			C		B			A	
Queue Length 50th (m)	0.2	24.0	0.0	22.3	56.8		32.5	0.5		1.3	0.0
Queue Length 95th (m)	1.5	35.0	11.2	42.8	75.8		54.8	9.4		4.4	0.4
Internal Link Dist (m)		182.7			753.5		598.6			32.1	
Turn Bay Length (m)	25.0		55.0	85.0				20.0			
Base Capacity (vph)	106	1237	740	345	1339		655	864		699	831
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.02	0.34	0.24	0.53	0.63		0.49	0.20		0.02	0.01
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 85											
Offset: 81 (95%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green											
Natural Cycle: 65											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.63											
Intersection Signal Delay: 18.2						Intersection LOS: B					
Intersection Capacity Utilization 70.7%						ICU Level of Service C					
Analysis Period (min) 15											

Splits and Phases: 2: Russell Rd & Industrial Ave



Total Projected 2025 AM
3: Russell Rd & Everest Priv

05/16/2019

Intersection

Int Delay, s/veh 2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	69	454	15	23	297
Future Vol, veh/h	44	69	454	15	23	297
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	2	0	0	4
Mvmt Flow	46	73	478	16	24	313

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	850	489	0
Stage 1	489	-	-
Stage 2	361	-	-
Critical Hdwy	6.4	6.2	-
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	-
Pot Cap-1 Maneuver	334	583	-
Stage 1	621	-	-
Stage 2	710	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	326	581	-
Mov Cap-2 Maneuver	326	-	-
Stage 1	605	-	-
Stage 2	710	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16	0	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	445	1074
HCM Lane V/C Ratio	-	-	0.267	0.023
HCM Control Delay (s)	-	-	16	8.4
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	1.1	0.1

Total Projected 2025 AM
4: Russell Rd & Haig Dr

05/16/2019

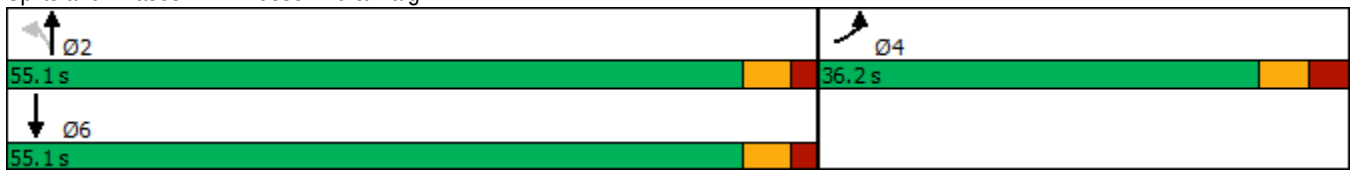


Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	339	29	195	227
Future Volume (vph)	339	29	195	227
Lane Group Flow (vph)	379	0	236	374
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		2		
Detector Phase	4	2	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	26.2	23.1	23.1	26.1
Total Split (s)	36.2	55.1	55.1	55.1
Total Split (%)	39.6%	60.4%	60.4%	60.4%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	1.8	1.8	1.8
Lost Time Adjust (s)	-2.2		-1.1	-1.1
Total Lost Time (s)	4.0		4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effct Green (s)	24.3		51.3	51.3
Actuated g/C Ratio	0.29		0.61	0.61
v/c Ratio	0.72		0.23	0.34
Control Delay	34.8		9.0	8.6
Queue Delay	0.0		0.0	0.0
Total Delay	34.8		9.0	8.6
LOS	C		A	A
Approach Delay	34.8		9.0	8.6
Approach LOS	C		A	A
Queue Length 50th (m)	53.2		15.4	22.3
Queue Length 95th (m)	81.9		32.7	46.7
Internal Link Dist (m)	130.4		522.1	50.1
Turn Bay Length (m)				
Base Capacity (vph)	694		1023	1098
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.55		0.23	0.34
Intersection Summary				
Cycle Length: 91.3				
Actuated Cycle Length: 83.7				
Natural Cycle: 55				
Control Type: Semi Act-Uncoord				
Maximum v/c Ratio: 0.72				
Intersection Signal Delay: 18.8			Intersection LOS: B	
Intersection Capacity Utilization 61.5%			ICU Level of Service B	
Analysis Period (min) 15				

Total Projected 2025 AM
4: Russell Rd & Haig Dr

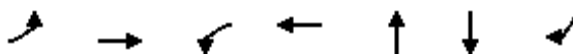
05/16/2019

Splits and Phases: 4: Russell Rd & Haig Dr



Total Projected 2025 AM
5: Othello Ave/Russell Rd & Smyth Rd

05/16/2019



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	22	340	40	818	166	68	30
Future Volume (vph)	22	340	40	818	166	68	30
Lane Group Flow (vph)	23	398	42	974	343	128	32
Turn Type	Perm	NA	Perm	NA	NA	NA	Perm
Protected Phases		4		8	2	6	
Permitted Phases	4		8				6
Detector Phase	4	4	8	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.8	34.8	34.8	34.8	31.0	29.2	29.2
Total Split (s)	59.0	59.0	59.0	59.0	31.0	30.0	30.0
Total Split (%)	49.2%	49.2%	49.2%	49.2%	25.8%	25.0%	25.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.5	3.5	3.5	3.5	3.7	3.9	3.9
Lost Time Adjust (s)	-1.8	-1.8	-1.8	-1.8	-2.0	-2.2	-2.2
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	54.0	54.0	54.0	54.0	26.0	25.0	25.0
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.22	0.21	0.21
v/c Ratio	0.15	0.26	0.11	0.63	0.88	0.36	0.08
Control Delay	22.8	21.1	17.8	22.8	67.2	44.1	0.4
Queue Delay	0.0	0.0	0.0	2.1	0.0	0.0	0.0
Total Delay	22.8	21.1	17.8	24.9	67.2	44.1	0.4
LOS	C	C	B	C	E	D	A
Approach Delay		21.2		24.6	67.2	35.3	
Approach LOS		C		C	E	D	
Queue Length 50th (m)	3.1	30.0	3.9	86.1	76.0	26.0	0.0
Queue Length 95th (m)	9.1	40.8	m6.1	107.9	#126.8	44.3	0.0
Internal Link Dist (m)		179.7		116.1	86.0	41.9	
Turn Bay Length (m)	50.0		15.0				30.0
Base Capacity (vph)	153	1540	398	1540	392	356	411
Starvation Cap Reductn	0	0	0	404	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.26	0.11	0.86	0.88	0.36	0.08

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 75 (63%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 32.3

Intersection LOS: C

Intersection Capacity Utilization 76.9%

ICU Level of Service D

Analysis Period (min) 15

Total Projected 2025 AM
 5: Othello Ave/Russell Rd & Smyth Rd

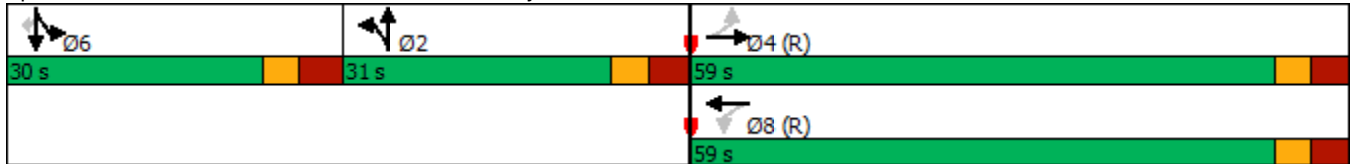
05/16/2019

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

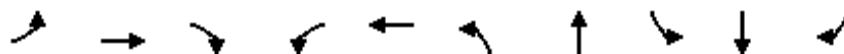
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Othello Ave/Russell Rd & Smyth Rd



Total Projected 2025 AM
6: St Laurent Blvd & Smyth Rd/Lancaster Rd

05/16/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	←←←	→	→	←←←	→	←←←	→	←←←	→	→
Traffic Volume (vph)	306	83	101	33	297	170	1050	115	640	670
Future Volume (vph)	306	83	101	33	297	170	1050	115	640	670
Lane Group Flow (vph)	322	87	106	35	406	179	1208	121	674	705
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2	1	6	
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7	11.0	27.9	11.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0	20.0	52.0	20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%	16.7%	43.3%	16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0	1.8	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	-1.6	-1.7	-1.7	-1.6	-1.7	-2.0	-1.9	-2.0	-1.9	-1.9
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	15.5	30.9	30.9	9.6	20.3	17.2	53.6	14.5	50.9	50.9
Actuated g/C Ratio	0.13	0.26	0.26	0.08	0.17	0.14	0.45	0.12	0.42	0.42
v/c Ratio	0.72	0.18	0.23	0.27	0.69	0.76	0.80	0.57	0.47	0.78
Control Delay	73.7	57.8	21.2	56.0	49.8	70.3	34.5	60.3	27.0	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0
Total Delay	73.7	57.8	21.2	56.0	49.8	73.1	34.5	60.3	27.0	18.9
LOS	E	E	C	E	D	E	C	E	C	B
Approach Delay		60.2			50.3		39.5		25.9	
Approach LOS		E			D		D		C	
Queue Length 50th (m)	40.7	18.4	4.5	7.9	44.3	40.1	128.9	27.1	61.8	63.1
Queue Length 95th (m)	m53.9	m30.8	m12.8	17.8	59.2	#78.6	#171.9	46.2	79.3	119.2
Internal Link Dist (m)		116.1			16.7		186.6		608.0	
Turn Bay Length (m)	55.0			35.0		150.0		105.0		35.0
Base Capacity (vph)	462	489	459	221	687	239	1509	238	1420	909
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	17	0	0	0	4
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.18	0.23	0.16	0.59	0.81	0.80	0.51	0.47	0.78

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 110 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 38.2

Intersection LOS: D

Intersection Capacity Utilization 74.1%

ICU Level of Service D

Analysis Period (min) 15

Total Projected 2025 AM
 6: St Laurent Blvd & Smyth Rd/Lancaster Rd

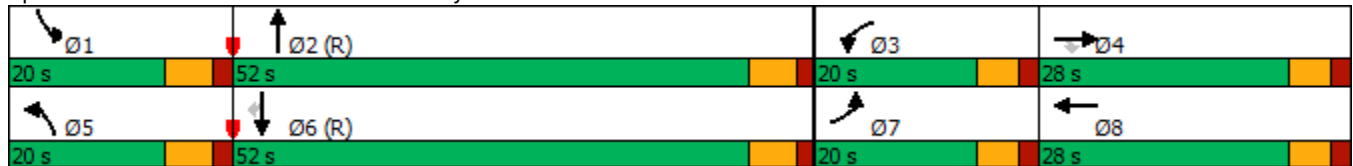
05/16/2019

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: 6: St Laurent Blvd & Smyth Rd/Lancaster Rd



Total Projected 2025 PM
1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	588	344	424	298	143	185	916	539	138	882	146
Future Volume (vph)	152	588	344	424	298	143	185	916	539	138	882	146
Lane Group Flow (vph)	160	619	362	446	314	151	195	964	567	145	928	154
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.6	38.6	38.6	11.6	38.6	38.6	11.3	37.6	37.6	11.3	37.6	37.6
Total Split (s)	32.4	38.0	38.0	41.0	46.6	46.6	28.0	43.0	43.0	28.0	43.0	43.0
Total Split (%)	21.6%	25.3%	25.3%	27.3%	31.1%	31.1%	18.7%	28.7%	28.7%	18.7%	28.7%	28.7%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.9	2.9	2.9	2.9	2.9	2.9	2.1	2.4	2.4	2.1	2.4	2.4
Lost Time Adjust (s)	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.3	-2.6	-2.6	-2.3	-2.6	-2.6
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effect Green (s)	34.9	30.7	30.7	24.1	19.9	19.9	15.0	41.0	41.0	13.4	39.3	39.3
Actuated g/C Ratio	0.28	0.25	0.25	0.19	0.16	0.16	0.12	0.33	0.33	0.11	0.31	0.31
v/c Ratio	0.17	0.72	0.59	0.67	0.57	0.40	0.48	0.84	0.75	0.42	0.84	0.25
Control Delay	35.5	49.4	12.4	52.7	53.8	10.5	56.9	48.2	20.7	57.6	49.7	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.5	49.4	12.4	52.7	53.8	10.5	56.9	48.2	20.7	57.6	49.7	5.2
LOS	D	D	B	D	D	B	E	D	C	E	D	A
Approach Delay		35.7			46.1			40.2			45.1	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	15.3	73.8	10.7	53.9	38.9	0.0	23.8	118.9	45.5	17.7	115.2	0.0
Queue Length 95th (m)	26.3	103.8	43.1	74.4	56.2	18.5	37.9	#174.6	103.2	29.9	#171.8	13.2
Internal Link Dist (m)		753.5			213.9			608.0			286.3	
Turn Bay Length (m)	30.0		60.0	110.0		50.0	65.0		70.0	100.0		70.0
Base Capacity (vph)	974	959	644	1032	1179	636	650	1147	754	632	1100	612
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.65	0.56	0.43	0.27	0.24	0.30	0.84	0.75	0.23	0.84	0.25

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 125.3

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 41.4

Intersection LOS: D

Intersection Capacity Utilization 74.4%

ICU Level of Service D

Analysis Period (min) 15

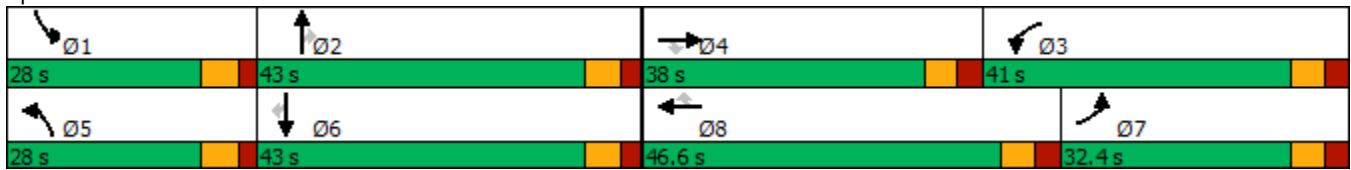
95th percentile volume exceeds capacity, queue may be longer.

Total Projected 2025 PM
 1: St Laurent Blvd & Industrial Ave/Innes Rd

05/16/2019

Queue shown is maximum after two cycles.

Splits and Phases: 1: St Laurent Blvd & Industrial Ave/Innes Rd



Total Projected 2025 PM
2: Russell Rd & Industrial Ave

05/16/2019

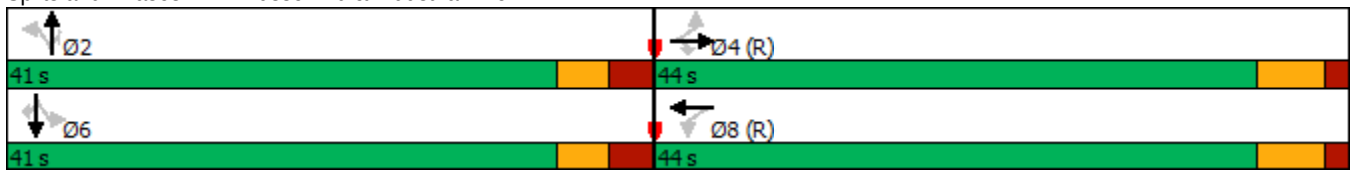
											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	3	856	399	161	552	333	4	189	11	6	5
Future Volume (vph)	3	856	399	161	552	333	4	189	11	6	5
Lane Group Flow (vph)	3	901	420	169	589	0	355	199	0	18	5
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		2			6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	4	4	4	8	8	2	2	2	6	6	6
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)	33.9	33.9	33.9	33.9	33.9	29.2	29.2	29.2	29.2	29.2	29.2
Total Split (s)	44.0	44.0	44.0	44.0	44.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	51.8%	51.8%	51.8%	51.8%	51.8%	48.2%	48.2%	48.2%	48.2%	48.2%	48.2%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	-1.9	-1.9	-1.9	-1.9	-1.9		-2.2	-2.2		-2.2	-2.2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	40.0	40.0	40.0	40.0	40.0		37.0	37.0		37.0	37.0
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47		0.44	0.44		0.44	0.44
v/c Ratio	0.01	0.55	0.44	0.87	0.36		0.61	0.27		0.03	0.01
Control Delay	12.0	17.7	3.0	62.1	15.1		23.8	9.7		13.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	12.0	17.7	3.0	62.1	15.1		23.8	9.7		13.9	0.0
LOS	B	B	A	E	B		C	A		B	A
Approach Delay		13.0			25.6		18.8			10.9	
Approach LOS		B			C		B			B	
Queue Length 50th (m)	0.3	52.7	0.0	23.4	30.6		42.8	10.9		1.6	0.0
Queue Length 95th (m)	1.7	69.7	14.2	#61.3	42.4		70.8	24.1		5.3	0.0
Internal Link Dist (m)		182.7			753.5		598.6			32.1	
Turn Bay Length (m)	25.0		55.0	85.0				20.0			
Base Capacity (vph)	336	1635	959	195	1619		586	737		679	722
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.01	0.55	0.44	0.87	0.36		0.61	0.27		0.03	0.01
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 85											
Offset: 12 (14%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green											
Natural Cycle: 65											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.87											
Intersection Signal Delay: 17.8						Intersection LOS: B					
Intersection Capacity Utilization 67.9%						ICU Level of Service C					
Analysis Period (min) 15											

Total Projected 2025 PM
2: Russell Rd & Industrial Ave

05/16/2019

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

Splits and Phases: 2: Russell Rd & Industrial Ave



Total Projected 2025 PM
3: Russell Rd & Everest Priv

05/16/2019

Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	33	402	37	54	563
Future Vol, veh/h	22	33	402	37	54	563
Conflicting Peds, #/hr	0	0	0	14	14	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	3	0	0	2
Mvmt Flow	23	35	423	39	57	593
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1164	457	0	0	476	0
Stage 1	457	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	217	608	-	-	1097	-
Stage 1	642	-	-	-	-	-
Stage 2	493	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	203	600	-	-	1083	-
Mov Cap-2 Maneuver	203	-	-	-	-	-
Stage 1	600	-	-	-	-	-
Stage 2	493	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	17.9	0		0.7		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	337	1083	-	
HCM Lane V/C Ratio	-	-	0.172	0.052	-	
HCM Control Delay (s)	-	-	17.9	8.5	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.6	0.2	-	

Total Projected 2025 PM
4: Russell Rd & Haig Dr

05/16/2019



Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	258	4	189	256
Future Volume (vph)	258	4	189	256
Lane Group Flow (vph)	296	0	203	643
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		2		
Detector Phase	4	2	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	26.2	23.1	23.1	26.1
Total Split (s)	31.2	55.1	55.1	55.1
Total Split (%)	36.2%	63.8%	63.8%	63.8%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.9	1.8	1.8	1.8
Lost Time Adjust (s)	-2.2		-1.1	-1.1
Total Lost Time (s)	4.0		4.0	4.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effct Green (s)	20.1		51.3	51.3
Actuated g/C Ratio	0.25		0.65	0.65
v/c Ratio	0.65		0.18	0.56
Control Delay	33.1		7.0	8.8
Queue Delay	0.0		0.0	0.0
Total Delay	33.1		7.0	8.8
LOS	C		A	A
Approach Delay	33.1		7.0	8.8
Approach LOS	C		A	A
Queue Length 50th (m)	39.0		10.7	34.7
Queue Length 95th (m)	62.9		24.0	77.4
Internal Link Dist (m)	130.4		522.1	50.1
Turn Bay Length (m)				
Base Capacity (vph)	616		1141	1152
Starvation Cap Reductn	0		0	0
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.48		0.18	0.56
Intersection Summary				
Cycle Length: 86.3				
Actuated Cycle Length: 79.4				
Natural Cycle: 60				
Control Type: Semi Act-Uncoord				
Maximum v/c Ratio: 0.65				
Intersection Signal Delay: 14.8			Intersection LOS: B	
Intersection Capacity Utilization 58.1%			ICU Level of Service B	
Analysis Period (min) 15				

Total Projected 2025 PM
4: Russell Rd & Haig Dr

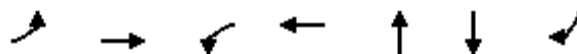
05/16/2019

Splits and Phases: 4: Russell Rd & Haig Dr



Total Projected 2025 PM
5: Othello Ave/Russell Rd & Smyth Rd

05/16/2019



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	16	978	92	381	101	161	21
Future Volume (vph)	16	978	92	381	101	161	21
Lane Group Flow (vph)	17	1107	97	477	307	330	22
Turn Type	Perm	NA	pm+pt	NA	NA	NA	Perm
Protected Phases		4	3	8	2	6	
Permitted Phases	4		8				6
Detector Phase	4	4	3	8	2	6	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.8	34.8	10.6	34.8	31.0	29.2	29.2
Total Split (s)	46.0	46.0	13.0	59.0	31.0	30.0	30.0
Total Split (%)	38.3%	38.3%	10.8%	49.2%	25.8%	25.0%	25.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.5	3.5	2.3	3.5	3.7	3.9	3.9
Lost Time Adjust (s)	-1.8	-1.8	-0.6	-1.8	-2.0	-2.2	-2.2
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	Max
Act Effect Green (s)	41.2	41.2	54.0	54.0	26.0	25.0	25.0
Actuated g/C Ratio	0.34	0.34	0.45	0.45	0.22	0.21	0.21
v/c Ratio	0.06	0.91	0.53	0.32	0.80	0.88	0.05
Control Delay	27.5	50.2	34.3	28.3	56.7	70.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	50.2	34.3	28.3	56.7	70.3	0.2
LOS	C	D	C	C	E	E	A
Approach Delay		49.9		29.3	56.7	65.9	
Approach LOS		D		C	E	E	
Queue Length 50th (m)	2.7	130.8	18.3	50.9	63.2	75.8	0.0
Queue Length 95th (m)	8.0	#171.0	m32.8	69.0	#105.4	#125.5	0.0
Internal Link Dist (m)		179.7		116.1	86.0	41.9	
Turn Bay Length (m)	50.0		15.0				30.0
Base Capacity (vph)	289	1211	185	1488	386	377	447
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.91	0.52	0.32	0.80	0.88	0.05

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 82 (68%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 48.2

Intersection LOS: D

Intersection Capacity Utilization 89.5%

ICU Level of Service E

Analysis Period (min) 15

Total Projected 2025 PM
 5: Othello Ave/Russell Rd & Smyth Rd

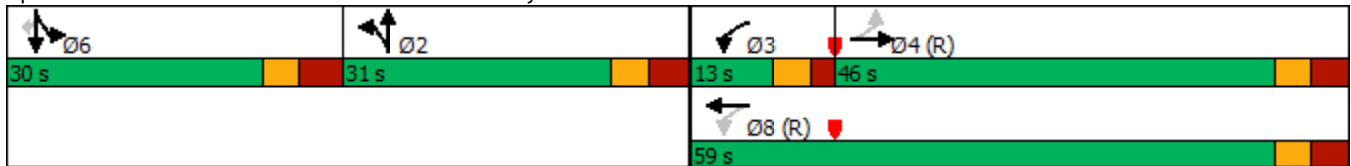
05/16/2019

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

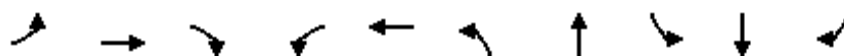
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Othello Ave/Russell Rd & Smyth Rd



Total Projected 2025 PM
6: St Laurent Blvd & Smyth Rd/Lancaster Rd

05/16/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	←←	↑	→	←	↑↑	←	↑↑	←	↑↑	→
Traffic Volume (vph)	564	302	227	102	101	117	849	114	1100	303
Future Volume (vph)	564	302	227	102	101	117	849	114	1100	303
Lane Group Flow (vph)	594	318	239	107	254	123	954	120	1158	319
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2	1	6	
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7	11.0	27.9	11.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0	17.0	49.0	17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%	14.2%	40.8%	14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0	1.8	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	-1.6	-1.7	-1.7	-1.6	-1.7	-2.0	-1.9	-2.0	-1.9	-1.9
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	22.0	26.7	26.7	14.2	18.9	13.7	50.0	13.1	49.4	49.4
Actuated g/C Ratio	0.18	0.22	0.22	0.12	0.16	0.11	0.42	0.11	0.41	0.41
v/c Ratio	0.93	0.74	0.46	0.51	0.40	0.67	0.66	0.63	0.79	0.45
Control Delay	58.7	29.1	4.3	57.6	19.6	69.5	31.9	66.1	36.8	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.7	29.1	4.3	57.6	19.6	69.5	31.9	66.1	36.8	17.0
LOS	E	C	A	E	B	E	C	E	D	B
Approach Delay		39.2			30.9		36.2		35.1	
Approach LOS		D			C		D		D	
Queue Length 50th (m)	56.2	58.9	10.1	24.0	11.4	27.4	98.7	26.8	131.8	30.6
Queue Length 95th (m)	m#75.0	m77.4	m15.7	40.2	22.5	#55.6	124.6	#50.0	161.1	56.7
Internal Link Dist (m)		116.1			16.7		186.6		608.0	
Turn Bay Length (m)	55.0			35.0		150.0		105.0		35.0
Base Capacity (vph)	642	428	514	324	763	188	1435	199	1459	709
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.74	0.46	0.33	0.33	0.65	0.66	0.60	0.79	0.45

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 36.2

Intersection LOS: D

Intersection Capacity Utilization 77.2%

ICU Level of Service D

Analysis Period (min) 15

Total Projected 2025 PM
 6: St Laurent Blvd & Smyth Rd/Lancaster Rd

05/16/2019

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: 6: St Laurent Blvd & Smyth Rd/Lancaster Rd

