1740 – 1760 St. Laurent Boulevard

TIA Final Report

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10 October 2023

477563 - 01000

TIA Plan Reports

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

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

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

CERTIFICATION

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

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

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TIA FINAL REPORT

Parsons has been retained by Groupe Heafey to prepare a Transportation Impact Assessment (TIA) in support of a Zoning By-Law Amendment (ZBLA) and Site Plan Application (SPA) for a mixed-use development located at the 1740 and 1760 St. Laurent Boulevard. This document follows the current TIA process, as outlined by the City Transportation Impact Assessment (TIA) Guidelines (2017). The following report represents Step 5 – Final Report.

1. SCREENING FORM

The screening form confirmed the need for a TIA based on the trip generation trigger given that the development consists of approximately 701 apartment units, approximately 21,808 ft^2 of commercial retail uses and 9,383 ft^2 of St. Hubert Restaurant; location trigger given that the development is located within the St. Laurent Boulevard Arterial Mainstreet Design Priority Area (DPA) and safety trigger given that the proposed driveway is in the influence area of an adjacent intersection. The Screening Form and City comments throughout the TIA process have been provided in **Appendix A**.

2. SCOPING REPORT

2.1. Existing and Planned Conditions

2.1.1. Proposed Development

The proposed development is located at the municipal addresses of 1740 and 1760 St. Laurent Boulevard. The existing site is currently occupied by several commercial businesses including a hardware store, a private gym, two restaurants and a gas station.

The site is currently zoned as AM10 and AM10[1658]; the AM10 zoning (1760 St. Laurent Blvd) allows mid-rise buildings up to 9-storeys or 30m high, while the AM10[1658] (1740 St. Laurent Blvd) allows buildings up to 50m in height. The site's context is displayed in **Figure 1.**

The proponent is proposing two 13-storey and two 20-storey apartment buildings containing a total of 701 residential units, approximately 21,808 ft^2 of commercial retail on ground and second floor and 9,383 ft^2 of restaurant uses.

A single-phased development is proposed, with full build out of the site assumed by 2024.

The existing driveway access only permits right-in and right-out movements due to the existing median. The development proposes a full movement signalized intersection off St. Laurent Boulevard (replacing the existing access) and a new one-way inbound only access located on the northernmost limit of the site.

The proposed development includes 924 parking spaces of which 666 spaces are allotted to residents, 130 spaces to visitors, 76 spaces to retail, and 52 spaces to restaurant use. Of the spaces, 50 are located above ground including 3 delivery and 1 loading space and the remaining 874 spaces underground.

The Site Plan Concept is shown in **Figure 2** with a high-resolution image in **Appendix A**.

Figure 1: Local Context



Figure 2: Proposed Site Plan



Site Plan received August 2023

2.1.2. Existing Conditions

Area Road Network

St. Laurent Boulevard is classified as an arterial roadway which extends from Sandridge Road in the north to Don Reid Drive in the south. Within the study area, St. Laurent Boulevard has a six-lane cross section with the outer lane being a bus only dedicated lane. The posted speed limit is 70 km/h within the study area.

Industrial Avenue & Innes Road is an arterial roadway which extends from Riverside Drive in the west as Industrial Avenue to St. Laurent Boulevard, where it continues as Innes Road to Dunning Road in the east. Within the study area, Industrial Avenue and Innes Road have four-lane cross sections. The posted speed limit is 60 km/h within the study area.

Smyth Road & Lancaster Road is an arterial roadway west of St. Laurent Boulevard and a collector roadway east of St. Laurent Boulevard. Smyth Road extends from Riverside Drive in the west to St. Laurent Boulevard, where it continues as Lancaster Road to Walkley Road in the east. Within the study area, Industrial Avenue and Innes Road have a four-lane cross section. The posted speed limit is 60 km/h within the study area.

Russell Road is a northwest-southeast arterial roadway that has been cut into 4 parts over time due to ongoing major intersection modifications. Within the study area, Russell Road extends from St. Laurent Boulevard in the north to Hawthorne Road in the south, where it once again changes direction. Russell Road consists of a two-lane cross section and has a posted speed limit of 50km/h within the study area.

Belfast Road is classified as a collector roadway west of St. Laurent Boulevard and a local roadway east of St. Laurent Boulevard. Belfast Road extends from Coventry Road in the north-west to Michael Street in the east. Within the study area, Belfast Road has a two-lane cross section with a posted speed limit of 50km/h.

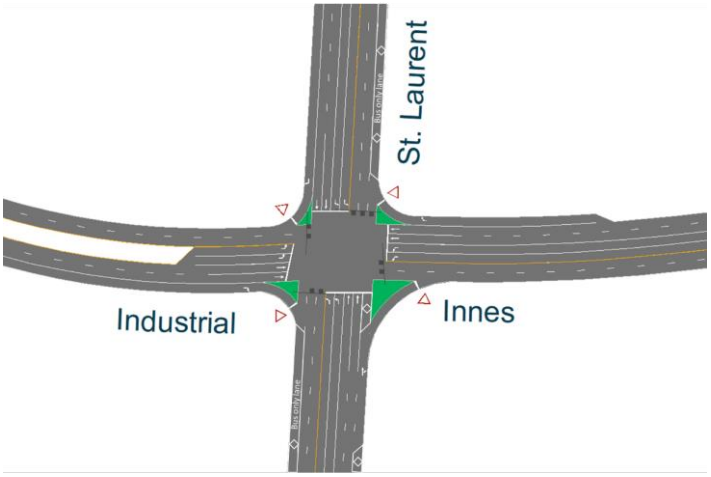
Bourassa Street is classified as a local roadway which extends a short distance from St. Laurent Boulevard in the west to Gladwin Crescent in the east. Within the study area, Bourassa Street has a two-lane cross section with an unposted speed limit assumed to be 50km/h.

Everest Private/Site Access is a local roadway with a two-lane cross section within the site. Approximately 110m from St. Laurent Boulevard, the roadway is barricaded to deter cut-through traffic between St. Laurent Boulevard and Russell Road. It is anticipated that the barricade will remain in place for the foreseeable future. Everest Private and the site access has an unposted speed limit assumed to be 50km/h.

Existing Study Area Intersections

Industrial/St. Laurent

The Industrial/St Laurent intersection is a signalized four-legged intersection. All approaches consist of a double left-turn lane, a channelized right-turn lane and two through lanes. The northbound approach has an additional third through lane which is part of a dedicated bus only lane. A receiving lane north of Industrial Road tapers off and merges on to mixed traffic approximately 150m north of the intersection. A southbound bus only lane begins just south of the intersection on St. Laurent Boulevard. All movements are permitted at this location.



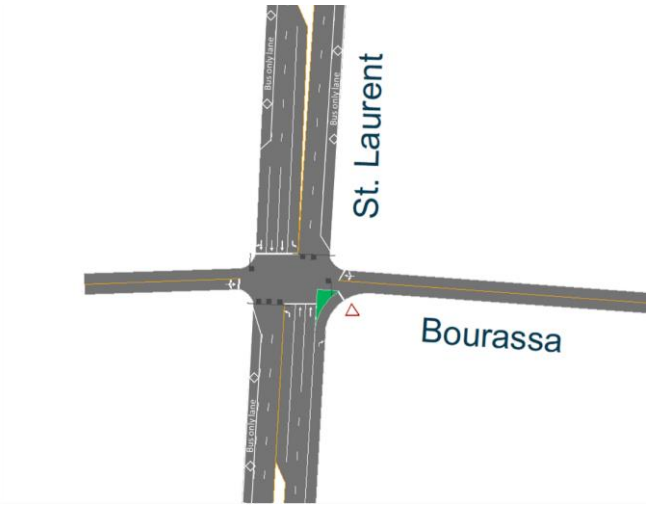
Site Access/St. Laurent

The Site Access/St. Laurent intersection is a three-legged intersection with a STOP control at the Site Access approach. The northbound consists of two through lanes and a transit lane. The southbound approach consists of two through lanes and a transit/right-turn lane. The eastbound approach has a right turn lane only. This intersection functions as a right-in right-out only due to the presence of a median along St. Laurent Boulevard.



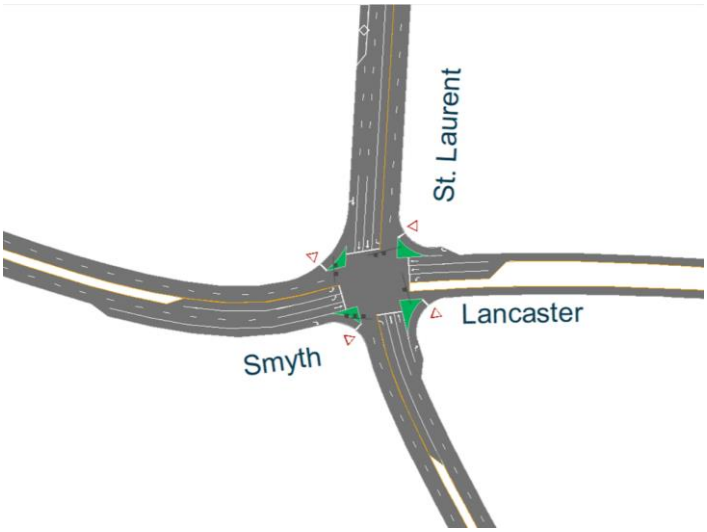
Bourassa/St. Laurent

The Bourassa/St. Laurent intersection is a four-legged signalized intersection. The northbound approach consists of a left-turn lane, a channelized right-turn lane and two through lanes. North of Bourassa intersection, a third northbound lane begins and functions as a bus only lane. The southbound approach consists of a left-turn lane, a right-turn lane/transit lane. The eastbound and westbound approaches have a single all-movement lane. All movements are permitted at this intersection.



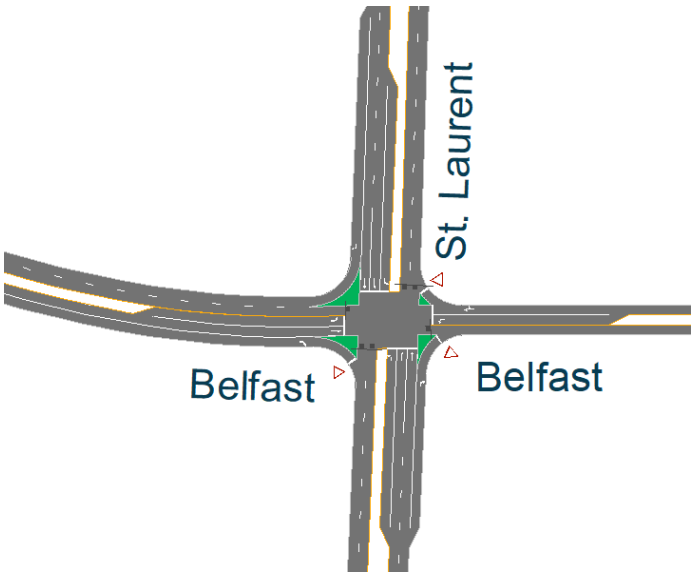
Smyth/St. Laurent

The Smyth/St. Laurent intersection is a four-legged signalized intersection. The northbound approach consists of a left-turn lane, a channelized right-turn lane and two through lanes. The southbound approach consists of a left-turn lane, a channelized right-turn lane and two through lanes. The eastbound approach consists of a double left-turn lane, a channelized right-turn lane and a single through lane. The westbound approach consists of a left-turn lane, a channelized right-turn lane and two through lanes. All movements are permitted at this intersection.



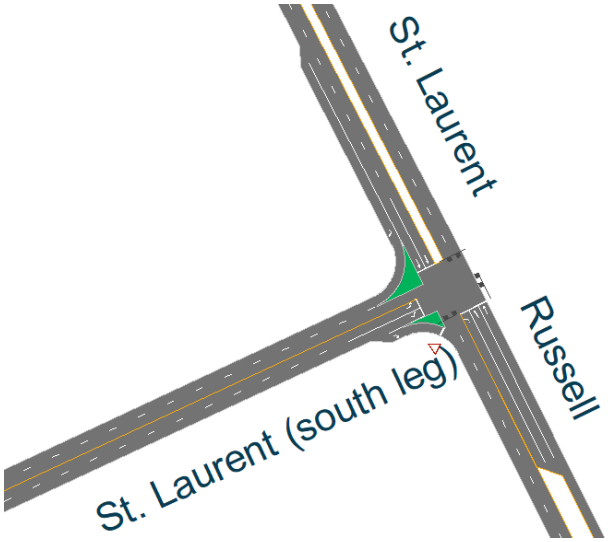
Belfast/St. Laurent

The Belfast/St. Laurent intersection is a four-legged signalized intersection. The northbound approach consists of a left-turn lane, a channelized right-turn lane and two through lanes. The southbound approach consists of a left-turn lane, a channelized right-turn lane and two through lanes. The eastbound approach consists of a left-turn lane, a channelized right-turn lane and a single through lane. The westbound approach consists of a left-turn lane and a channelized right-turn lane shared with a through lane. All movements are permitted at this intersection.



Russell/St. Laurent

The Russell/St. Laurent intersection is a three-legged signalized intersection. The northbound approach consists of a left-turn lane and two through lanes. The southbound approach consists of a channelized right-turn lane and two through lanes. The eastbound approach consists of a double left-turn lane and a channelized right-turn lane. All movements are permitted at this intersection.



Existing Driveways to Adjacent Developments

The existing driveways within 200m from each corner of the proposed site are shown in **Figure 3,** including:

- St. Laurent Boulevard West Side:
  - 1730 – There is a driveway to a surface parking lot for a commercial/office building that's approximately 8-storeys high, located approximately 20m north of the site boundary
  - 1740 – Accesses to Petro-Canada gas station, within site property
  - Everest Private – functions as a driveway to local businesses. Road connection to Russell Road is physically separated by a barricade (site property).
  - 1754 – Access to a restaurant, (site property).
  - 1760 – Two accesses on north and south ends of property parcel. Provides access to parking lot for a retail store, a recreational business, and a restaurant, (site property).
  - 1800 – Access to a small industrial building including warehousing, auto service and a recreational business, located approximately 15m south of the property boundaries
  - 1810 – Access to telecommunications maintenance buildings and an office, located approximately 175m south of the property boundaries

- St. Laurent Boulevard East Side:

- 1705 & 1755 – Major driveway functioning as right-in/right-out to St. Laurent Boulevard with access to multiple retail, commercial and light industrial uses. This driveway is located on the opposite side of St. Laurent Boulevard, adjacent to the proposed site.

Figure 3: Existing Driveways Adjacent to Development



Existing Area Traffic Management Measures

The following list highlights of some existing area traffic management measures within the study area:

- Tightened corner on St. Laurent/Bourassa;
- Raised median along St. Laurent Boulevard, with right in right out islands at various locations;
- Red light cameras at Belfast/St. Laurent and Russell/St. Laurent; and,
- Channelized right turn lanes with refuge island at some intersections.

Pedestrian/Cycling Network

Sidewalks are provided on both sides of Belfast Road, Smyth Road, and Lancaster Road. Industrial Avenue has sidewalks on the north side of the road only and a MUP on the south side of the road which connects to a MUP located on the south side of Innes Road. Innes Road does not have sidewalk facilities on the north side of the road. Bourassa Street has sidewalk facilities on the north side of the road only. Russell Road has a MUP on the west side of the road only.

St. Laurent Boulevard has sidewalks on both sides of the road from Belfast Road to Smyth Road. South of Smyth Road, sidewalk facilities are available on the west side of the road only, and a MUP is provided on the east side of the road. North of Smyth Road, the MUP on St. Laurent Boulevard becomes discontinued and cyclists are pushed on to the road as mixed-traffic. A physically separated cycle track is provided northbound from Bourassa Street to Industrial Avenue and a southbound physically separated cycle track is provided from Industrial Avenue to Smyth Road.

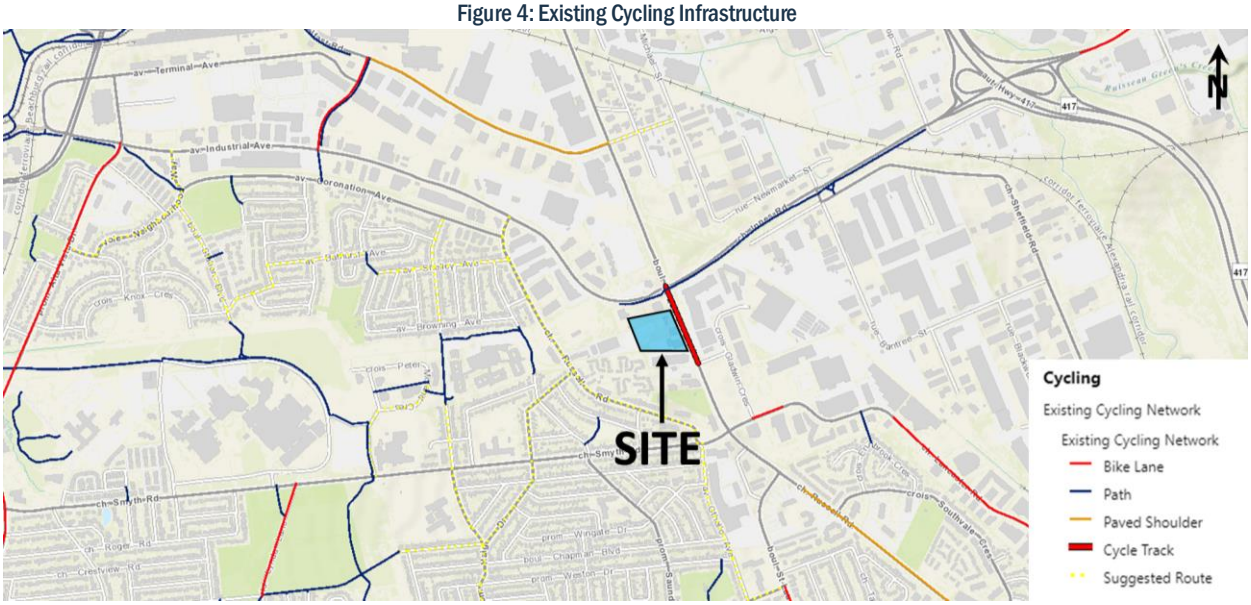
The connecting street (Everest Private) to the west of the subject site has a sidewalk on south side.

Cross-rides are provided at the Bourassa/St. Laurent intersection for north-south cyclists and at Industrial/St. Laurent intersection on the south side. Pocket lane treatments are provided at all the approaches on Smyth/St.

Laurent, the south approach at Bourrassa/St. Laurent, the east approach at Industrial/St. Laurent and north approach on Russell/St. Laurent. A curbside bike lane is provided on the north side of Innes Road which continues as a short segment of cycle track on the north side of Industrial Avenue continued by a MUP. Paved shoulders are also provided on Belfast Road and Russell Road.

Figure 4 illustrates the existing cycling infrastructure. St. Laurent Boulevard, Smyth Road, Industrial Avenue, Innes Road, and Russell Road are all classified as 'spine routes' within the TMP. **Section 2.1.3.** discusses the future Ultimate Cycling Network.

Figure 4: Existing Cycling Infrastructure



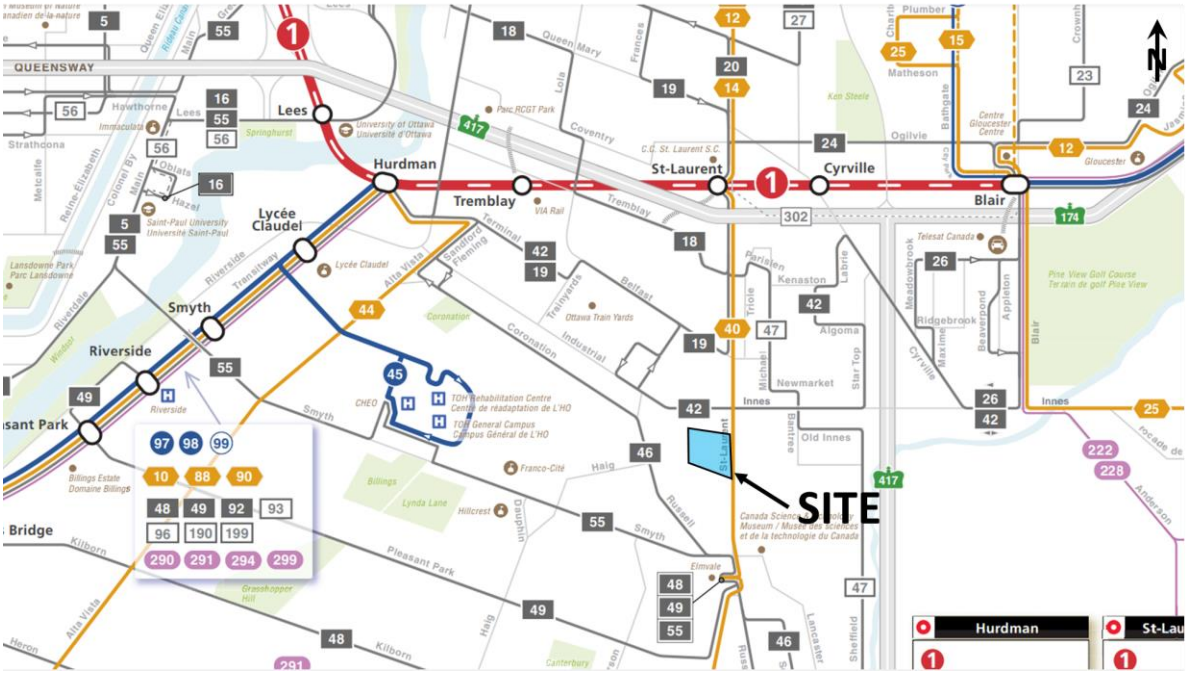
Transit Network

Currently, transit lanes have been implemented between Industrial/St. Laurent to Smyth/St. Laurent heading southbound and transit lanes between Bourassa/St. Laurent and Industrial/St. Laurent heading northbound.

The transit network for the study area is illustrated in **Figure 5**. The following OC Transpo routes currently operate within 600-meter radius of the site frontage:

- **Route #40 (St. Laurent <-> Greenboro/Hurdman)**: identified by OC Transpo as a "Frequent Route", this route operates at a frequency of every 15 minutes or less on weekdays and operates 7 days a week. Route #40 provides quick connection to the Confederation LRT Line at St. Laurent Station and provides connection to Elmvale Shopping Center. Bus stops for this route are available on both sides of St. Laurent Boulevard, approximately 100m to 230m from the site.
- **Route #42 (Blair <-> Hurdman)**: identified by OC Transpo as a "Local Route", this route operates on customized routing and schedules, to serve local destinations with connection to the Confederation LRT Line at Blair Station and Hurdman Station and provides connection to Trainyards Shopping. Route #42 operates at an average rate of every 15 minutes during weekdays. Bus stops for this route are available on both sides of Industrial Avenue and Innes Road, approximately 180 to 215m from the site.
- **Route #46 (Hurdman <-> Billings Bridge)**: identified by OC Transpo as a "Local Route", this route operates on customized routing and schedules, to serve local destinations with connection to the Confederation LRT Line at Hurdman and provides connection to the BRT Transitway at Billings Bridge. Route #46 operates at an average rate of every 30 minutes during weekdays. Bus stops for this route are available on both sides of Russell Road, approximately 450m from the site.

Figure 5: Area Transit Network



Source (Feb 6, 2023): https://www.octranspo.com/images/files/maps/systemmap.pdf

Peak Hour Travel Demands

The existing peak hour traffic volumes within the study area are illustrated in **Figure 6** and pedestrian/cyclist volumes are illustrated in **Figure 7**, based on data provided by the City of Ottawa and site in/out movements captured April 26, 2023. For simplicity, the existing in/outs from the site's four driveways were consolidated into a single access movement which reflects a worst-case scenario. The peak hour traffic volume data has been provided in **Appendix B**.

Upon inspection of the counts, there is a notable number of U-turns on the southbound approach at Bourassa/St. Laurent, predominantly in the mid-day time period (~40 veh/h).

Industrial/St. Laurent has very few northbound U-turns, suggesting northbound drivers alter their path prior this location or choose another destination.

Figure 6: Existing Peak Hour Traffic Volumes

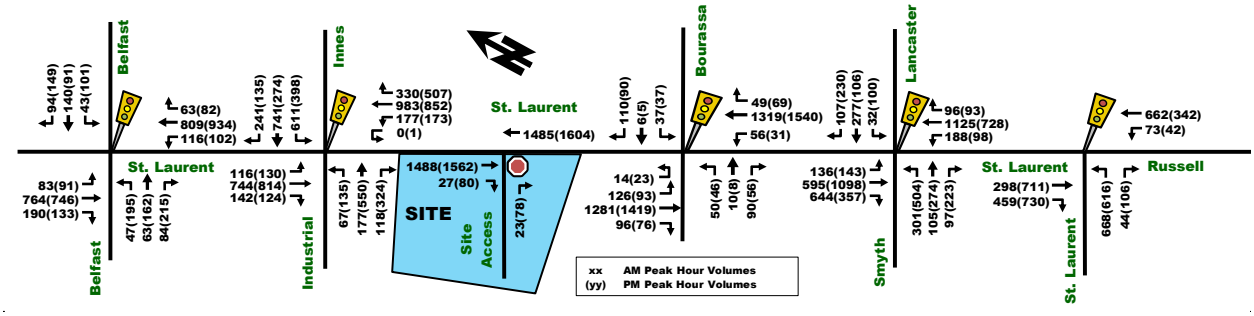
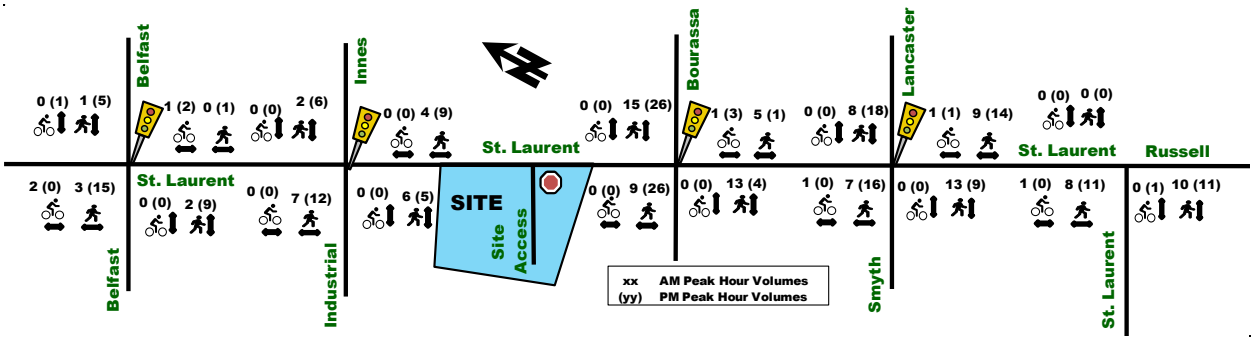


Figure 7: Existing Pedestrian/Cyclist Peak Hour Volumes



Existing Road Safety Conditions

A five-year collision history data (2017-2021, inclusive) was obtained from the City of Ottawa open data source. Upon analyzing the collision data, the total number of collisions observed within the broader study area was 442 collisions within the past five-years. The majority of the collisions 353 (80%) resulted in property damage only, and 89 (20%) resulted in non-fatal injury. There were no fatal collisions recorded. Overall, the majority of collisions, 214 (48%) were rear end type, 86 (19%) sideswipe, 67 (15%) turning movement, 41 (9%) angle and the rest less than 25 (<5%) collisions each type.

Within the study area, the quantity of collisions and collisions per million entering vehicles (MEV) at each location has occurred at a rate of:

- Belfast/St. Laurent: 97, MEV 1.47
- Industrial/St. Laurent: 121, MEV 1.13
- Bourassa/St. Laurent: 32, MEV 0.41
- Smyth/St. Laurent: 89, MEV 1.03
- Russell/St. Laurent: 39, MEV 0.80
- Mid-block Belfast to Industrial: 22 (620m)
- Mid-block Industrial to Smyth: 38 (630m)
- Mid-block Smyth to Russell: 4 (260m)
- Collisions with Pedestrians: 7 (2%)
- Collisions with Cyclists: 2 (<1%)

Belfast/St. Laurent showed to have a higher-than-average MEV or likeliness of collision than other intersections. The leading types of collisions at this intersection involved rear end and turning movements, consisting of 68 (70%) of collision types. There were also 2 collisions with pedestrians observed. It is possible that sight lines on St. Laurent Boulevard may be affected by the vertical deflection of the bridge north and south of the intersection, coupled with high vehicle traffic volumes and unencumbered travel lanes that are susceptible to speeding. The OC Transpo bus depot and industrial area trigger higher than average truck activity, when in the left-turn lane may block sightlines of oncoming left-turning vehicles.

The section of St. Laurent Blvd between Industrial Avenue and Smyth Road had a higher-than-average collision frequency, with relatively high non-fatal injury of 12 (32%), with recorded 1 collision with a cyclist. Common collisions within this road segment include rear end, sideswipe and angle type collisions, accounting for almost 89% of all collisions in this segment. The likely cause of these collisions is the frequency and inconsistent spacing of driveways; this segment has the highest density of driveways within the corridor. Consolidating accesses to improve access management along the corridor, such as what is proposed for the subject site, will help ease the long-term risks.

The Bourassa/St. Laurent intersection experienced collisions with 2 cyclists and 2 pedestrians. The recent introduction of the Protected Intersection Design measures with adjusted signal timings, such as pedestrian and cyclist advanced phases, is expected to help reduce collisions with more vulnerable active transportation users in the fullness of time.

Overall, the high quantity of collisions in this corridor are indicative of the high volumes of vehicles using St. Laurent Boulevard. It is important to reiterate the St. Laurent Transit Priority EA will reassess and apply more contemporary design standards to parts of the study area corridor (from Industrial Avenue northward) to address safety concerns for all road users.

The source collision data as provided by the City of Ottawa and related analysis is provided as **Appendix C**.

2.1.3. Planned Conditions

Planned Study Area Transportation Network Changes

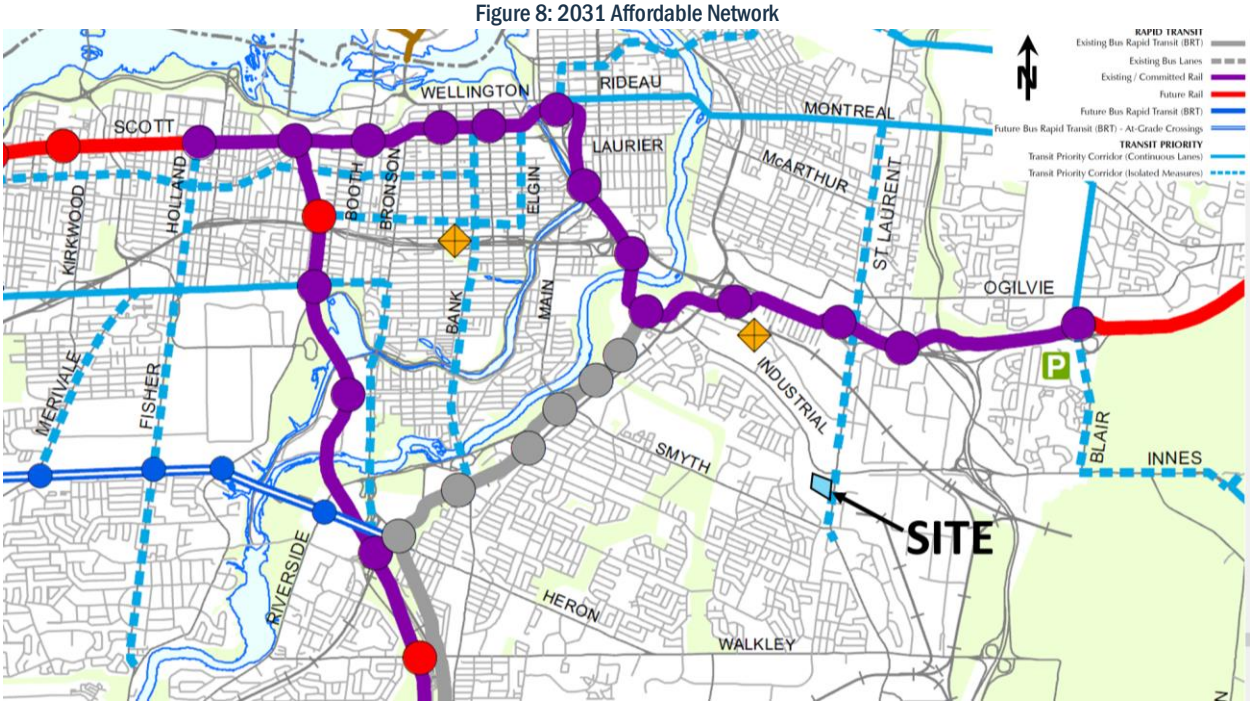
Transit Network

The 2031 Rapid Transit and Transit Priority Network – 2031 Affordable Network within the Transportation Master Plan 2013 designates St. Laurent Boulevard as a 'transit priority corridor' with isolated measures. This corridor extends from Montreal Road (planned continuous lane transit priority corridor) in the north to the Elmvale Shopping Center in the south. Within the New Official Plan, St. Laurent Avenue is proposed as an at grade transitway from Belfast Road to Walkley Road where it will continue on to the Heron – Baseline BRT corridor.

The City of Ottawa has recently initiated the St. Laurent Transit Priority Corridor Planning and Environmental Assessment Study between Hemlock Road and Industrial Avenue. The study aims at improving transit efficiency and reducing travel times, while also improving the travel environment for all other modes of transportation such as pedestrians and cyclists. Transit priority corridors complement the rapid transit network by providing improved transit access to major transit hubs such as the St. Laurent LRT Station, employment, commercial and residential land uses, reducing travel time and improving reliability. The study is expected to be completed by winter 2024. Further details and ongoing updates can be found in the link below[1].

The transit priority corridor is anticipated to improve transit travel times between the site and the Confederation Line, as displayed in **Figure 8** and New Official Plan in **Figure 9**.

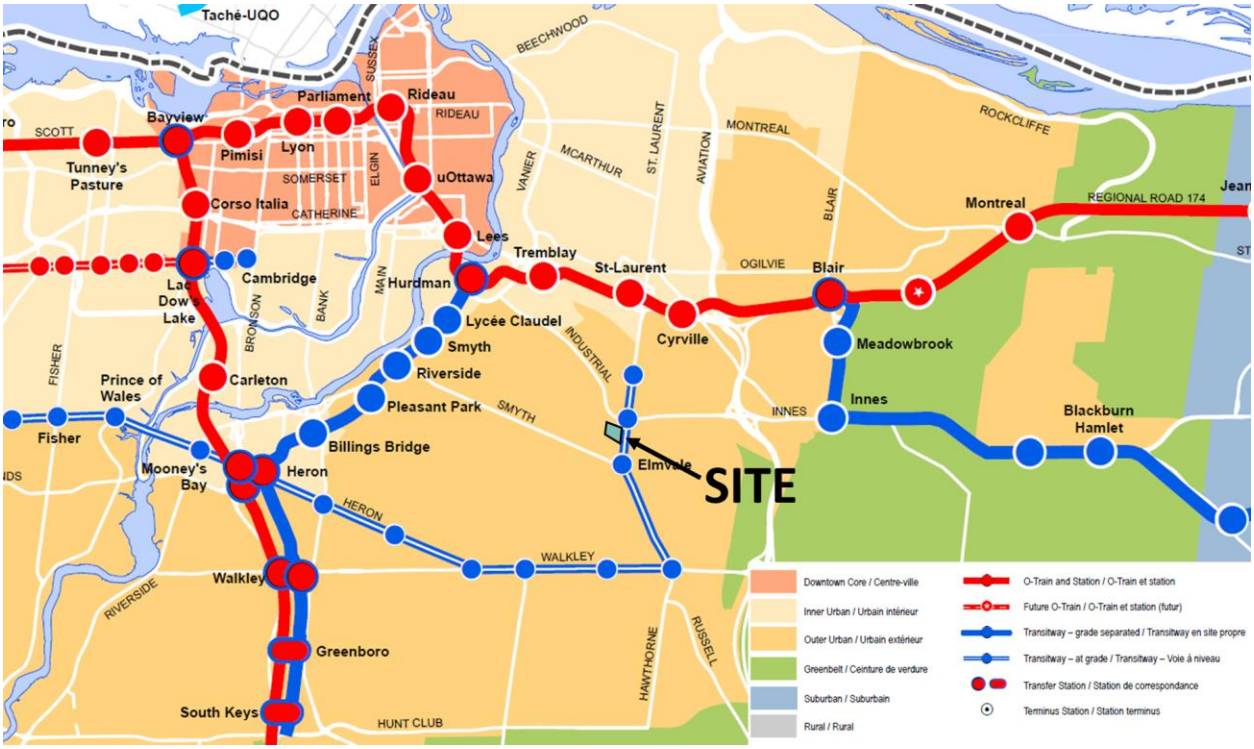
Figure 8: 2031 Affordable Network



Source: Transportation Master Plan 2013 – 2031 Affordable Network

1 https://ottawa.ca/en/city-hall/public-engagement/projects/st-laurent-boulevard-transit-priority-corridor-environmental-assessment-ea-study

Figure 9: New Official Plan – Transit Network



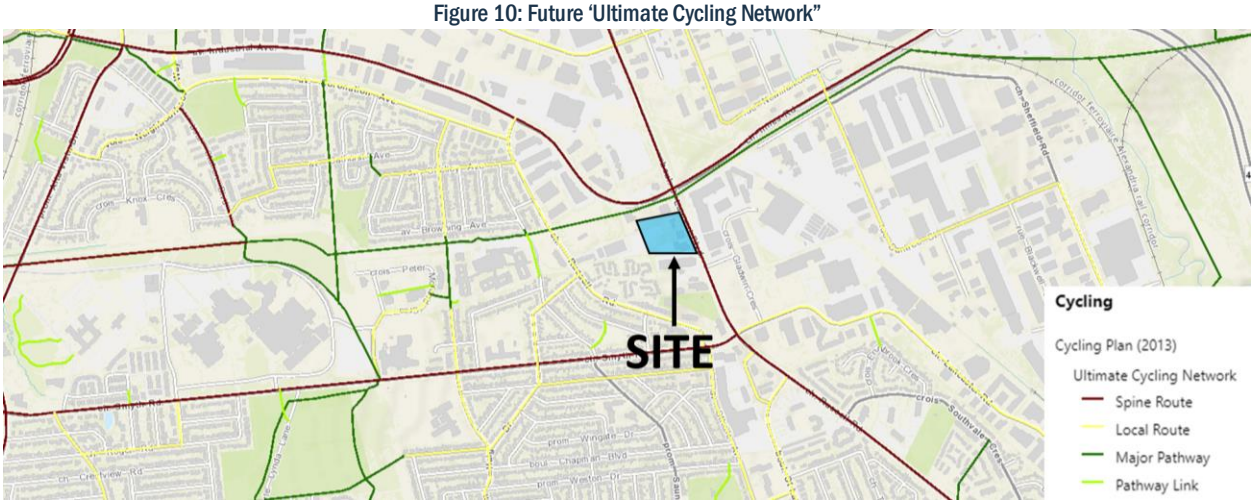
Cycling Network

Within the City of Ottawa Ultimate Cycling Plan, St. Laurent Boulevard, Smyth Road, Industrial Avenue, and Innes Road are all classified 'spine routes' within the TMP. The New TMP illustrates part of Industrial Avenue and St. Laurent Avenue south of Industrial Avenue as cross-town bikeways. A future major pathway is proposed along Innes Road, connecting to the Alexandria Rail Corridor (to be converted to a MUP) and along the hydro network corridor to the west.

The St. Laurent Transit Priority Corridor Planning and Environmental Assessment Study envisions improvements to cycling facilities along St. Laurent Boulevard along with improved intersection signal timing to include contemporary protected intersection designs.

Russell Road is classified as a local route and Lancaster Road is a local route that includes discontinuous bike lanes. **Figure 10** depicts the existing and future Ultimate Cycling Network.

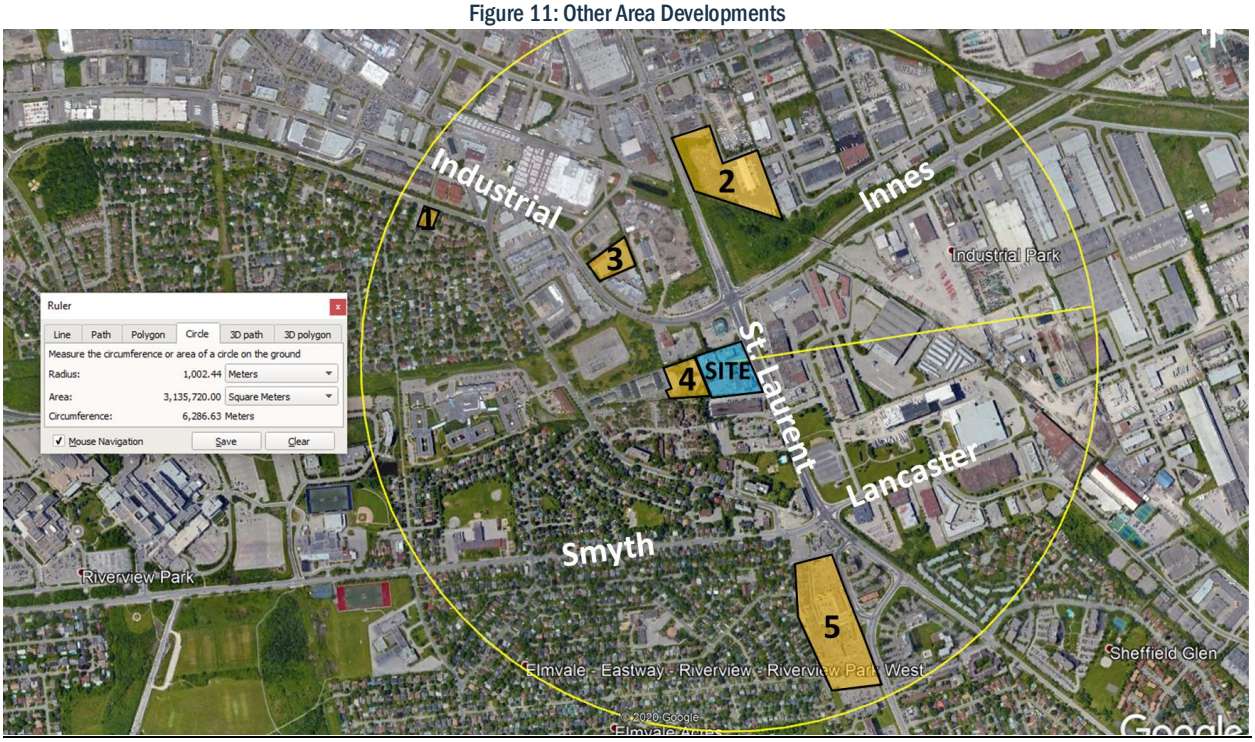
Figure 10: Future 'Ultimate Cycling Network"



Other Area Developments

The following section outlines adjacent developments in the general area that were considered in the TIA. The criteria for inclusion of other area developments are either approved developments or developments that have an active planning application in the City. **Figure 11** illustrates the location and relative size of relevant other area developments.

Figure 11: Other Area Developments



1 – 700 Coronation Avenue

The proposed development is a 4-storey residential building comprised of 35 units. No TIA report was found for this development.

2 – 1599 St. Laurent Boulevard

Reimer Properties is proposing the construction of a new truck transport terminal including a one-storey warehouse with 44 loading bays, 36 surface loading spaces and 28 employee surface parking spaces. The projected two-way vehicle trips according to a report written by IBI for this proposed development are approximately 175 total daily trips, with only about 15 veh/h during the AM and PM peak hours. Given the operating hours for the bulk of site generated trips and the limited trips during peak hours, it is not anticipated that this development will play a role in worsening traffic conditions.

3 – 851 Industrial Avenue

Dymon Storage has recently completed construction of a five-storey building consisting mainly of storage spaces and a small retail space. 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 is considered to have negligible effect on the road network within the study area.

4 – 355 / 374 Everest Private

Groupe Heafey is currently building two 8-storey buildings consisting of 293 residential units. The projected increase in two-way vehicle trips according to the 2020 TRANS Trip Generation Manual for this proposed residential development is approximately 45 to 50 veh/h during the AM and PM peak hours. It is understood that this development will use the Site/St. Laurent intersection and bollards to be placed west of this development will prohibit through traffic from Everest Private to our site and from our site to Russell Road. Future volumes from this development will be layered on to background volumes using the Site/St. Laurent intersection.

5 – 1910 St. Laurent Boulevard

RioCan is proposing the multi-phased construction of four apartment building towers ranging from 9 to 26-storeys high and totaling 815 units by full buildout. The TIA written by Parsons projects an ultimate build out two-way vehicle trips of approximately 120 to 245 veh/h during the AM and PM peak hours. Future volumes from this development will be layered on to background volumes.

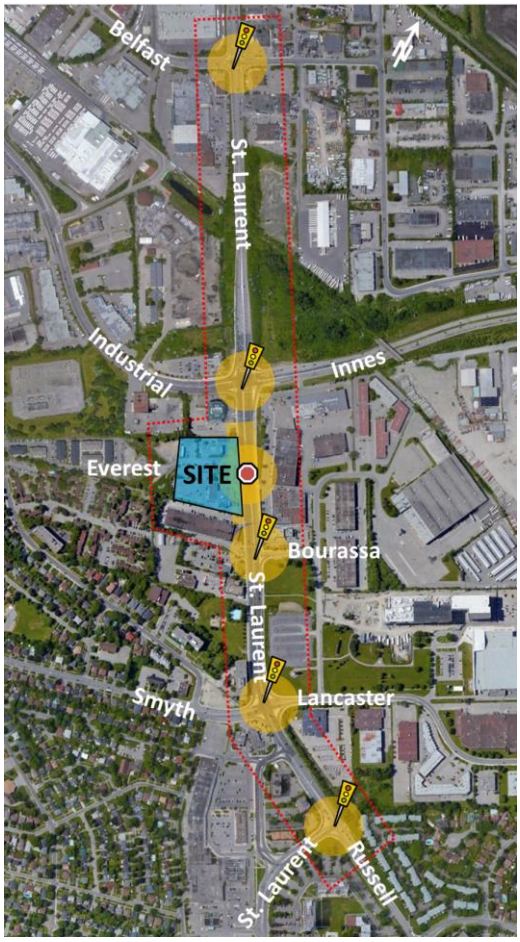
2.2. Study Area and Time Periods

Full buildout of the proposed mixed-use development is assumed to be 2024. A full movement signalized intersection is assumed and will be analyzed for 2024 full buildout and 2029 (five years after full buildout) horizon years, using the weekday morning and afternoon peak hour time periods.

Proposed study area intersections and boundary roads are outlined below and highlighted in **Figure 12**.

- Industrial/St. Laurent intersection;
- Site Access/St. Laurent intersection;
- Bourassa/St. Laurent intersection;
- Russell/St. Laurent intersection;
- Smyth/St. Laurent intersection;
- Belfast/St. Laurent intersection; and,
- Along St. Laurent Boulevard adjacent to the site.

Figure 12: Study Area Boundaries and Intersections



2.3. Exemption Review

The following modules/elements of the TIA process recommended to be exempt in the subsequent steps of the TIA process, based on the City's TIA guidelines and the subject site:

Table 1: Exemptions Review Summary

Module	Element	Exemption Consideration
4.1 Development Design	4.1.3 New Streets Networks	Only required for plans of subdivision
4.2 Parking	4.2.2 Spillover Parking	Development anticipated to provide sufficient parking. This will be verified in Section 4.2.
4.6 Neighborhood Traffic Management	4.6.1 Adjacent Neighborhoods	Only required when development relies on local or collector streets for access. Driveway will have direct access to St. Laurent Boulevard (arterial)

3. FORECASTING REPORT

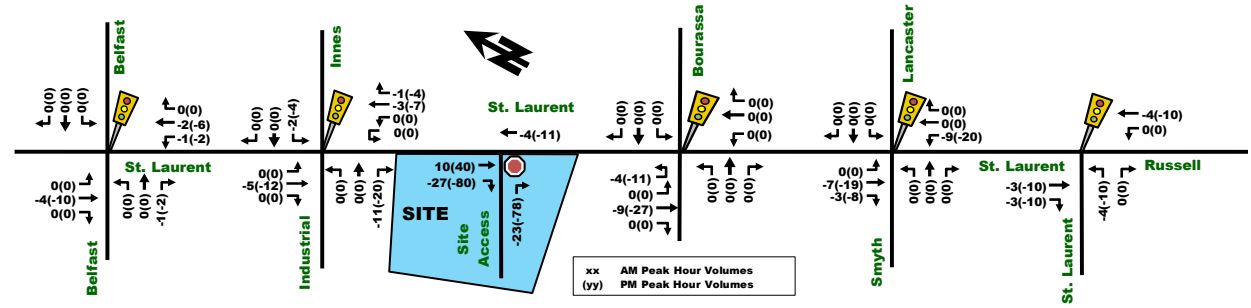
3.1. Development-Generated Travel Demand

3.1.1. Trip Generation and Mode Shares

The existing site frontage has four driveways all of which permit only right-in-right-out (RIRO) movements. A traffic count was completed at all four driveways during the AM and PM peak hour on April 26, 2023. It was estimated that approximately 50% of existing driveway trips counted were pass-by trips, and not "new" trips to the site. Pass-by trips are intermediate trips along the original route between the primary origin and destination. In this case, pass-by trips were not removed from the network, they were assumed to continue in their original direction of travel.

The remaining "new" trips were removed from the adjacent road network, to be replaced by trips forecasted for the proposed development. **Figure 13** illustrates the net number of vehicles that will be reduced from background conditions. For simplicity, the existing trips at the four driveways were consolidated to a single access.

Figure 13: Estimated Existing Site Traffic to be Removed



As mentioned in **Section 2.0**, the subject site is expected to be constructed in a single phase. Trip generation rates for proposed residential units, consisting of approximately 701 high-rise apartment units within four towers, were based on the city's 2020 TRANS Trip Generation Manual. The trip generation rates for proposed commercial uses were based on the ITE's Trip Generation Manual 10th Edition. These trip generation rates have been summarized in **Table 2**.

For the purpose of this assessment, the food land uses considered was high turnover (sit down) restaurants.

Table 2: 2020 TRANS Residential Trip Generation Rates & ITE Commercial Rates

Land Use	Data Source	Units or Size	Trip Rates	
			AM Peak	PM Peak
High Rise Apartments	TRANS 2020	701 units	T = 0.80(du)	T = 0.90(du)
Strip Retail Plaza	ITE 822	21,808 ft²	T = 0.66Ln(x) + 1.84	T = 0.71Ln(x) + 2.72
St. Hubert Restaurant	ITE 932	9,383 ft²	T = 9.94(x)	T = 9.77(x)
Note: T = Average Vehicle Trip Ends; du = dwelling units; x = GFA in 1,000 ft²				

Using the TRANS Trip Generation rates, the total amount of person trips generated by the proposed 701 residential units was calculated. The results are summarized in **Table 3**.

Table 3: Projected Residential Peak Period Person Trip Generation – TRANS Model 2020

Land Use	Dwelling Units	AM Peak Period Person Trips	PM Peak Period Person Trips
Four Residential Towers	701	561	631

The projected site peak period person trips were then divided based on the mode shares for Alta Vista according to TRANS 2020 table 5, as summarized in **Table 4**.

Table 4: Residential Peak Period Trips using TRANS 2020 Mode Shares

Travel Mode	AM Peak Period		PM Peak Period	
	Mode Share	Person Trip	Mode Share	Person Trips
Auto Driver	38%	212	45%	285
Auto Passenger	12%	67	16%	98
Transit	42%	234	28%	177
Cycling	2%	11	2%	12
Walking	7%	37	9%	59
Total Person Trips	100%	561	100%	631

Standard traffic analysis is usually conducted using the morning and afternoon peak hour trips as they represent a worst-case scenario. The 2020 TRANS Manual uses peak periods which can exceed the peak hours. Table 4 within the 2020 TRANS Manual includes factors for converting peak periods into peak hour traffic volumes as seen in **Table 5**. Note that conversion factors for passenger trips are assumed to be the same as auto driver.

Table 5: Peak Period to Peak Hour Conversion Factor (2020 TRANS Manual)

Travel Mode	Peak Period to Peak Hour Conversion Factors	
	AM	PM
Auto Driver	0.48	0.44
Passenger	0.48	0.44
Transit	0.55	0.47
Bike	0.58	0.48
Walk	0.58	0.52

Using the peak period to peak hour conversion rates from **Table 5**, the derived peak period trips by mode shares from **Table 4**, and the inbound and outbound splits from table 9 within the TRANS 2020 Manual, then the residential peak hour trips generated by the site for TRANS 2020 Alta Vista mode share can be calculated, as seen summarized in **Table 6**.

Table 6: Residential Peak Hour Trips Generated using TRANS 2020 Mode Shares

Travel Mode	Mode Share	AM Peak Hour (Trips/h)			Mode Share	PM Peak Hour (Trips/h)		
		In	Out	Total		In	Out	Total
Auto Driver	38%	32	70	102	45%	73	53	125
Auto Passenger	12%	10	22	32	16%	25	18	43
Transit	42%	40	89	129	28%	48	35	83
Cycling	2%	2	5	7	2%	3	3	6
Walking	7%	7	15	21	9%	18	13	31
Total Person Trips	100%	90	200	290	100%	167	121	288

The commercial elements of the proposed development are intended primarily to serve local residents and nearby high-density developments such as Everest to the west.

Given the mixture of land uses proposed onsite, an internal reduction rate was applied based on mixed-use parameters described in Section 6.5 of the ITE Trip Generation Manual 3rd Edition, to account for multi-purpose trips such as a local resident shopping or dining out prior to travelling to work as an example. These trips may be reduced to reflect double counted trips, which has been incorporated in the trip generation tables that follow. The base calculation for determining the quantity of internal reductions has been provided in **Appendix D.**

Pass-by trips were also considered for commercial uses. Pass-by trips are intermediate trips along the original route between the primary origin and destination, such as a trip to the St. Hubert Restaurant or retail between home and another destination. These are not considered 'new' trips, but existing trips already on the network. Appendix E of the ITE Trip Generation Manual 3rd edition was used to determine pass-by rates. Pass-by trips were calculated after the internal reduction factor was applied.

The trip generation rates for commercial land uses from **Table 2** were used along with the proposed sizes for each commercial land use. The mode shares for the non-residential aspect of the site were justified based on the site context, location and with guidance from the TRANS 2020 mode share projections for Alta Vista. The proposed non-residential mode shares are summarized in **Table 7**.

Table 7: TRANS 2020 Mode Shares for Alta Vista Commercial and Proposed Mode Shares

Travel Mode	TRANS Commercial Mode Shares		Proposed Mode Share (AM & PM)	Proposed Modal Share Rationale
	AM	PM		
Auto Driver	64%	60%	50%	A reduction in driver mode share from TRANS is justifiable given the close proximity to nearby frequent transit and nearby high-density residential uses, commercial and offices (promoting walking).
Auto Passenger	9%	20%	15%	
Transit	12%	8%	18%	Transit anticipated to be higher than the ward based on proximity to frequent transit and being located in a transit priority corridor.
Cycling	1%	1%	2%	The majority of trips are anticipated to be generated locally and will most likely attract nearby pedestrians, cyclists or even residents of the same development.
Walking	14%	11%	15%	

The new non-residential trips generated are shown in **Tables 8** to **10.**

Table 8: Strip Retail Plaza Peak Hour Trips Generated by Mode

Travel Mode	Mode Share	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	50%	16	10	26	29	21	50
Pre-Internal Reduction		*19*	*13*	*32*	*43*	*44*	*87*
Vehicles Reduced		*-3*	*-3*	*-6*	*-14*	*-23*	*-37*
Auto Passenger	15%	6	4	10	13	14	27
Transit	18%	6	4	10	16	15	31
Cycling	2%	1	0	1	2	2	3
Walking	15%	5	4	9	12	12	25
Total Person Trips	100%	34	22	56	72	64	136
Less Pass-by 0% AM (35% PM)		0	0	0	-9	-9	-18
Total 'New' Strip Retail Plaza Auto Trips		**16**	**10**	**26**	**20**	**12**	**32**

Table 9: St. Hubert Restaurant Peak Hour Trips Generated by Mode

Travel Mode	Mode Share	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	50%	27	27	54	22	10	32
Pre-Internal Reduction		*36*	*30*	*66*	*40*	*25*	*65*
Vehicles Reduced		*-9*	*-3*	*-12*	*-18*	*-15*	*-33*
Auto Passenger	15%	11	9	20	12	8	20
Transit	18%	13	11	24	15	9	24
Cycling	2%	1	1	3	2	1	2
Walking	15%	11	9	19	11	7	19
Total Person Trips	100%	63	57	120	62	35	97
Less Pass-by 40% AM (43% PM)		-11	-11	-22	-7	-7	-14
Total 'New' St. Hubert Auto Trips		**16**	**16**	**32**	**15**	**3**	**18**

Table 10: Combined Non-Residential Peak Hour Trips Generated by Mode

Travel Mode	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	43	37	80	51	31	82
Pre-Internal Reduction	*55*	*43*	*98*	*83*	*69*	*152*
Vehicles Reduced	*-12*	*-6*	*-18*	*-32*	*-38*	*-70*
Auto Passenger	17	13	30	25	22	47
Transit	19	15	34	31	24	55
Cycling	2	1	4	4	3	5
Walking	16	13	28	23	19	44
Total Person Trips	97	79	176	134	99	233
Less Pass-by AM (PM)	-11	-11	-22	-16	-16	-32
Total 'New' Non-Residential Auto Trips	**32**	**26**	**58**	**35**	**15**	**50**

Additionally, an internal reduction to residential trips is applicable, as shown in **Table 11**.

Table 11: Residential Peak Hour Trips using TRANS 2020 Mode Shares with Internal Reduction

Travel Mode	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	30	62	92	57	43	99
Pre-Internal Reduction	*32*	*70*	*102*	*73*	*53*	*125*
Vehicles Reduced	*-2*	*-8*	*-10*	*-16*	*-10*	*-26*
Auto Passenger, Transit, Cycling, Walking, Total Person Trips all remain the same (refer to Table 6)						
Total 'New' Residential Auto Trips	30	62	92	57	43	99

Using the total commercial trips generated from **Table 10** and the internally reduced residential trips generated from **Table 11**, the combined trips generated at full buildout using TRANS mode shares for residential and custom mode shares for non-residential can be found on **Table 12**.

Table 12: Combined Residential and Non-Residential Trips Generated - TRANS

Travel Mode	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	73	99	172	108	74	181
Pre-Internal Reduction	*87*	*113*	*200*	*156*	*122*	*277*
Vehicles Reduced	*-14*	*-14*	*-28*	*-48*	*-48*	*-96*
Auto Passenger	27	35	62	50	40	90
Transit	59	104	163	79	59	138
Cycling	4	6	11	7	6	11
Walking	23	28	49	41	32	75
Total Person Trips	185	271	456	285	210	495
Less Pass-by AM (PM)	-11	-11	-22	-16	-16	-32
Total 'New' Site Auto Trips	**62**	**88**	**150**	**92**	**58**	**149**

As shown in **Table 12**, based on the 2020 TRANS Trip Generation Manual, the proposed site is projected to generate approximately 150 new auto-trips per hour during the weekday commuter peak hours if the proposed four towers at 701 units total, plus commercial retail and restaurant uses was built.

The increase in two-way transit trips is estimated to be approximately 165 to 140 persons per hour, and the increase in walk/cycling trips is approximately 60 to 85 persons per hour during the peak hours.

3.1.2. TOD Mode Shares for Residential

The mode shares proposed by the TRANS 2020 Trip Generation Manual for Alta Vista were deemed appropriate and no further modifications to mode shares are proposed. It is forecasted that the majority of people will move to and from the site either by driving or taking transit as TRANS suggests, particularly given the sites location, near frequent bus route #40 and rapid transit corridor with isolated measures / at grade transitway in the future, close proximity via bus to major LRT Station at St. Laurent and close to southbound connecting Elmvale Station. Full TOD targets were not assumed as the site is not located within 600m walking distance to a major LRT Station.

3.1.3. Trip Distribution

Based on the OD Mode Share Survey, existing traffic volume counts and the location of adjacent arterial roadways and neighborhoods, the distribution of site-generated traffic volumes is as follows:

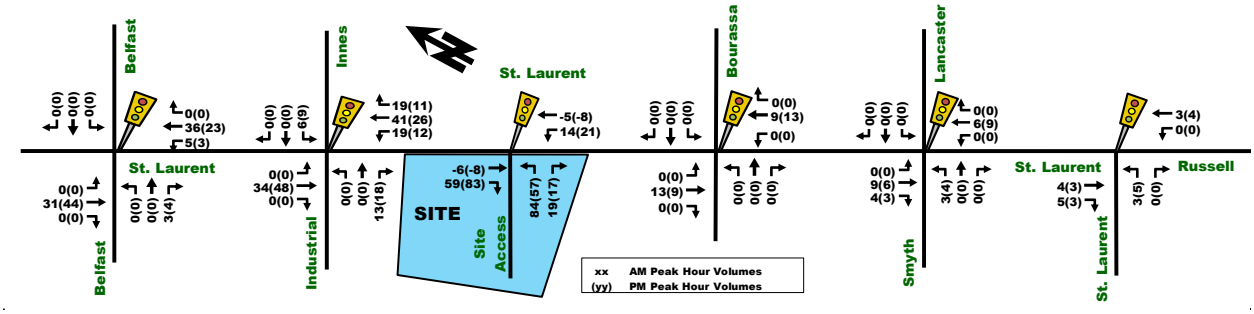
- 15% to/from the east;
- 15% to/from the south;
- 25% to/from the west; and
- 45% to/from the north.

3.1.4. Trip Assignment

The existing four access points will be replaced with a new signalized intersection at St. Laurent Boulevard/Site Access, with an inbound only access that is intended to serve trucks/loading vehicles exclusively. The new

signalized intersection will be located approximately 150m south of St. Laurent Boulevard. The 'new' site-generated vehicle trips provided in **Table 12,** were assigned to the study area network as shown in **Figure 14**. Note that negative numbers reflect pass-by trips.

Figure 14: 'New' Site-Generated Traffic



3.2. Background Network Travel Demands

3.2.1. Transportation Network Plans

As mentioned in **Section 2.1.3** Planned Conditions, St. Laurent Boulevard is designated as a 'transit priority corridor with isolated measures' from Montreal Road to Elmvale Shopping Center within the 2031 Affordable Network and an at grade transitway within the New Official Plan.

The St. Laurent Transit Priority Corridor Planning and Environmental Assessment Study between Hemlock Road and Industrial Avenue is currently ongoing. Though the design is still in its early stages, the study aims at improving transit efficiency and connectivity to LRT while also improving the travel environment for all other modes of transportation such as pedestrians and cyclists. The EA study is anticipated to be complete by winter 2024.

For further detail, refer to **Section 2.1.3**.

3.2.2. Background Growth

The emphasis in the City's recent Official Plan and Transportation Master Plan is to place priority on transit, encourage intensification around transit stations, encourage mixed-use developments and provide "complete streets" that better accommodate the active transportation needs of its residents and reduce the use of the private auto. Given the location of the site near frequent bus service within the St. Laurent transit priority corridor, close bus connectivity to the LRT Confederation Line and Elmvale Mall, the trips generated from this development as well as nearby developments will likely choose alternate modes of transportation over driving as transit infrastructure improves.

The following background traffic growth (summarized in **Table 13**) was calculated based on historical traffic count data (years 2001, 2009, 2014, 2016 and 2020) provided by the City of Ottawa at the Smyth/St. Laurent intersection near the site. Note that the year 2012 was omitted as counts were almost double any other year count and it was considered an anomaly year or miscount. Detailed background traffic growth analysis is included as **Appendix E**.

Table 13: Smyth/St. Laurent Historical Background Growth (2001-2020)

Time Period	Percent Annual Change				
	North Leg	South Leg	East Leg	West Leg	Overall
8 hrs	-0.17%	-0.13%	1.66%	0.47%	0.17%
AM Peak	-0.24%	0.00%	1.77%	0.52%	0.23%
PM Peak	-0.48%	-0.42%	1.53%	0.33%	-0.06%

As shown in **Table 13**, the Smyth/St. Laurent intersection, has experienced between 0.25% to 0% overall annual growth in traffic within recent years. A conservative growth rate of 1% annually will be added to background growth to account for future potential growth to the south and surrounding areas.

3.2.3. Other Developments

The volumes from the other area development as mentioned in **Section 2.1.3** were layered onto the existing traffic volumes for the future analysis volumes. **Figure 15** and **Figure 16** outlines the site generated volumes for 1910 St. Laurent development and 355-374 Everest development respectively.

Figure 15: 1910 St. Laurent Blvd Background Volumes

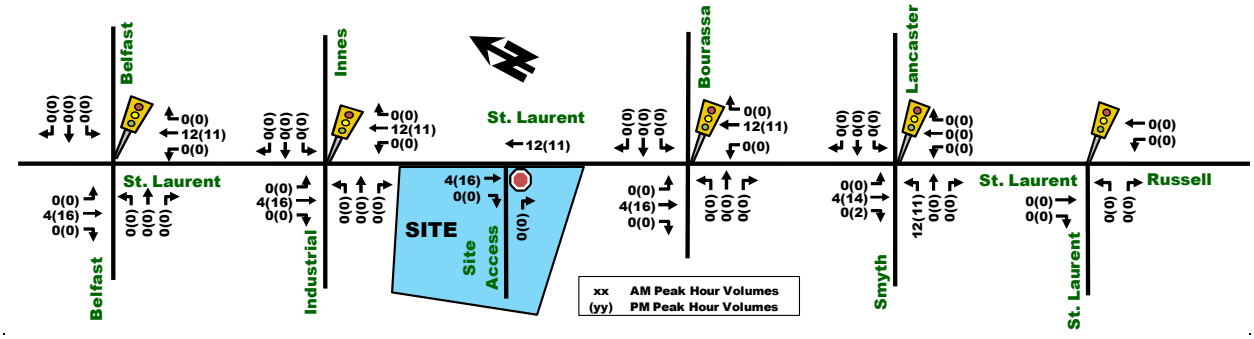
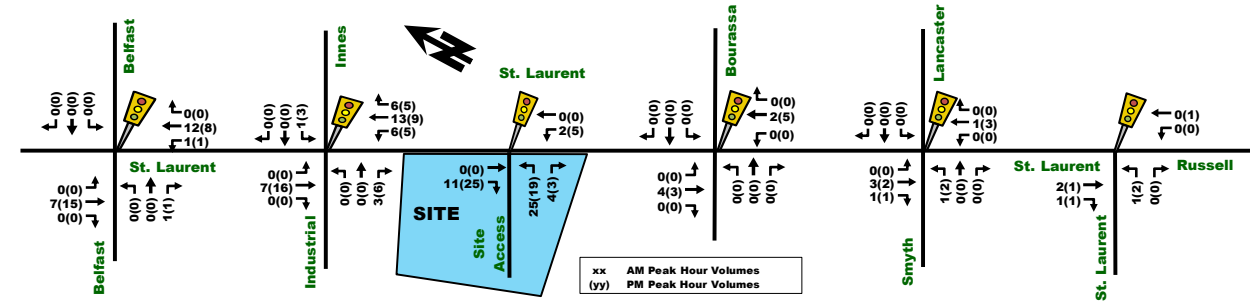


Figure 16: 355-374 Everest Background Volumes



3.3. Demand Rationalization

The following **Table 14** provides a summary of the existing traffic operations at the study area intersection based on the Synchro (V11) traffic analysis software. The subject intersections were assessed in terms of the volume-to-capacity (v/c) ratio and the corresponding Level of Service (LoS) for the critical movement(s). The Synchro model outputs of existing conditions are provided within **Appendix F** and the volumes used were obtained from **Figure 6**.

Table 14: Existing Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Industrial/St. Laurent	E(D)	0.98(0.83)	WBL(EBT)	46.4(46.2)	D(C)	0.82(0.78)
Bourassa/St. Laurent	D(D)	0.81(0.88)	EBT(NBT)	20.6(24.5)	C(D)	0.75(0.83)
Smyth/St. Laurent	D(E)	0.89(1.00)	SBR(EBL)	38.9(47.2)	D(D)	0.83(0.88)
Belfast/St. Laurent	C(D)	0.79(0.81)	WBT(WBT)	24.4(29.4)	A(B)	0.55(0.70)
Russell/St. Laurent	C(C)	0.76(0.73)	EBL(EBL)	15.5(15.3)	B(C)	0.68(0.73)
Site Access/St. Laurent (U)	C(C)	17(22)	EB(EB)	0(1)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 0.9 and a saturation flow rate of 1800 veh/h/lane. U = Unsignalized.						

As seen in **Table 14** all intersections operate overall at acceptable LoS 'D' or better with critical movements operating at LoS 'E' or better during the existing conditions.

The Synchro analysis confirms that the overall network is expected to operate well, with the exceptions of the Industrial/St. Laurent intersection and Smyth/St. Laurent intersection which are approaching capacity. The

convergence of commuter traffic on St. Laurent with Industrial Avenue which both provide access to Highway 417, creates significant congestion in the morning peak hour. The intersection as constructed is near its maximum buildout and to further increase capacity would require significant investment, but more importantly come at the expense of pedestrian and cyclist comfort if crossing distances were to increase further. This approach is not recommended. It is possible that optimizing the signal timings to prioritize critical movements may help ease the operational constraints.

Smyth Road experiences heavy vehicle demand on the eastbound left-turn during the PM peak hour, which likely coincides to The Ottawa Hospital General Campus staff departure times. A new roadway connection called the Hospital Link Road connects Riverside Drive to the hospital. The construction of this link is complete, but are not reflected in the traffic counts, but it is expected that it could offer relief to Smyth Road if congestion worsens over time.

The City's TMP does have a long-term plan to reduce auto-usage along the corridor, such as transit priority improvements on St. Laurent Boulevard from Montreal Road to Elmvale Shopping Center, with connectivity to LRT Line 1 at St. Laurent Shopping Center. More recently, the City initiated the St. Laurent Transit Priority Corridor Planning and Environmental Assessment Study between Hemlock Road and Industrial Avenue. The study aims at improving transit efficiency and reducing travel times, while also improving the travel environment for all other modes of transportation such as pedestrians and cyclists. Transit priority corridors complement the rapid transit network by providing improved transit access to major transit hubs such as the St. Laurent LRT Station, employment, commercial and residential land uses, reducing travel time and improving reliability.

These and other transit and active transportation initiatives City-wide (such as Stage 2 and eventually Stage 3 LRT), is expected to help gradually ease vehicle demand and improve long-term operational performance along the corridor.

The proposed development is expected to have minor impacts on study area intersections given the anticipated auto usage during the peak hours. The use of Transportation Demand Management (to be discussed in **Section 4.5**) can help mitigate possible worsening intersection performance by promoting the use of alternate modes of transportation.

4. STRATEGY REPORT

4.1. Development Design

4.1.1. Design for Sustainable Modes

Location of Transit Facilities

The subject site is located approximately 100m to 175m walking distance to the existing bus stops located on St. Laurent Boulevard for route #40. Additional bus stops include Innes Road for route #42 located approximate 180m to 215m away and Russell Road for route #46 approximately 450m away.

Within the City of Ottawa TMP Affordable Network, St. Laurent Boulevard is proposed to be upgraded to a transit priority corridor with isolated measures. The New Official Plan suggests a future at grade transitway fronting the site. The City of Ottawa has initiated an EA for St. Laurent Transit Priority Corridor Planning Study between Hemlock Road and Industrial Avenue which will improve travel times for bus routes such as route #40 and provide improved connectivity to the Confederation LRT Line at St. Laurent Shopping Center.

Pedestrian/Cycling Routes and Facilities

All proposed buildings will have direct pedestrian and cycling access to St. Laurent Boulevard via internal 2-meter-wide sidewalks and paths. The private driveway access to the buildings will bisect the site in two, with two towers per side of the road. All buildings have entrances that link directly to the central private road which will have sidewalks on both sides of the road. Pedestrian connectivity to Russell Road will also be available via Everest Private. Currently there are sidewalks on both side of St. Laurent Boulevard.

The St. Laurent Transit Priority Corridor Planning and Environmental Assessment Study will determine the feasibility of enhancing/expanding cycling infrastructure along St. Laurent Boulevard.

Bicycle Parking

A combined total of 377 bicycle parking is currently proposed underground within the parking structures, located in near each of the elevator blocks for each tower, stored indoors in well-lit areas. Residents will have easy access between the bike storage rooms and the elevator shafts which have access to the main entrances and ground floor. The main entrances for the Towers connect to the main full movement driveway which provides connectivity to Everest Private to the west and St. Laurent Boulevard cycle facilities to the east.

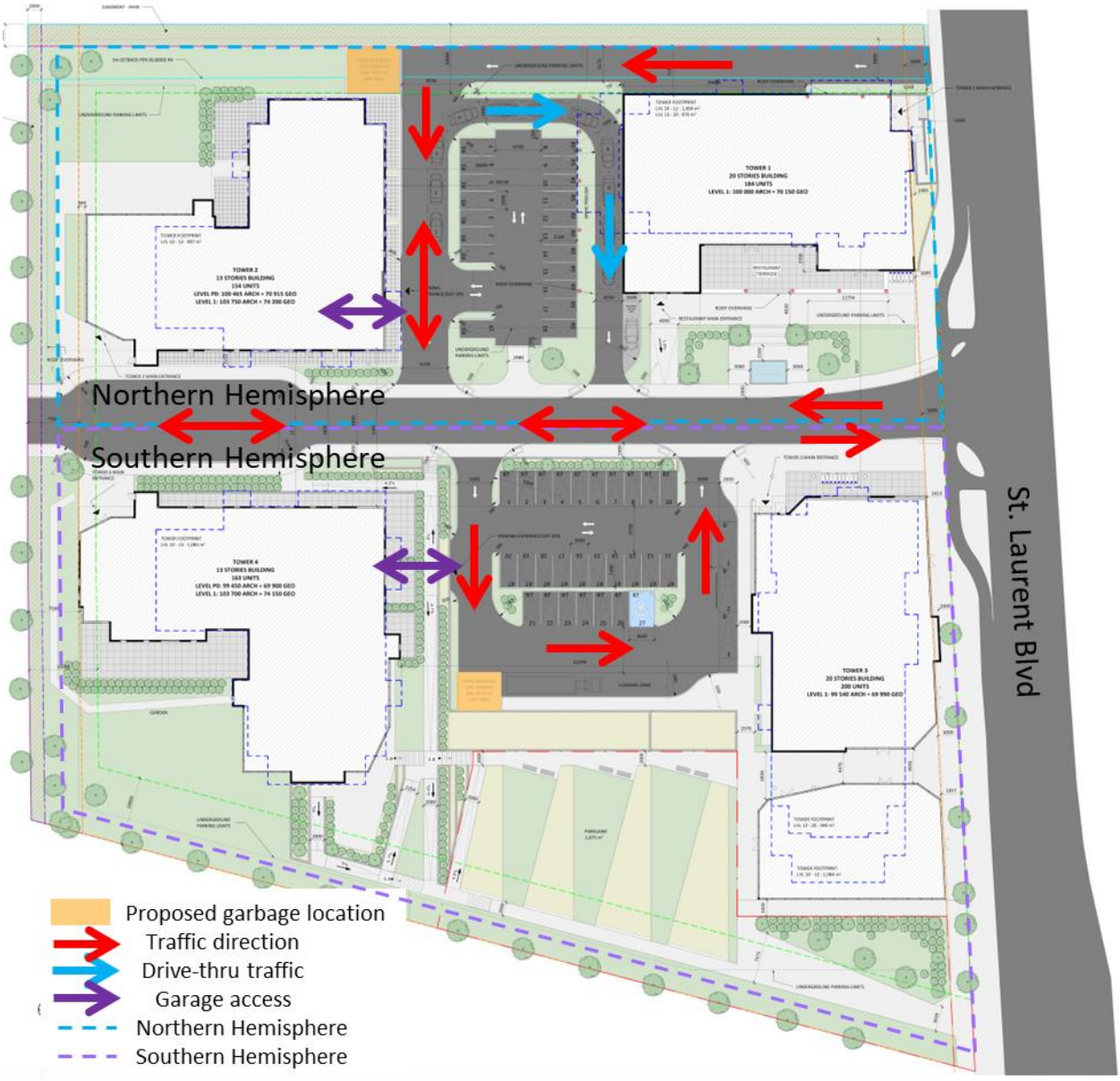
4.1.2. Circulation and Access

Figure 17 illustrates driveway circulation, proposed garbage pick-up locations and underground parking ramp locations. Access to the site is provided at a new signalized protected intersection at St. Laurent Boulevard and a secondary one-way inbound only access parallel to the north property line, which is meant to accommodate garbage and loading vehicles. The secondary driveway connects through the site to the main access thoroughfare. Appropriate signage will be provided to direct away from entering the driveway in the wrong direction.

The main access east-west thoroughfare bisects the site into two hemispheres, and will tie into Everest Private that connects to existing and future developments. Bollards restrict vehicular access to Everest Private and Russell Road. As a condition of approval of the adjacent property, this restriction will be relocated further west to allow the two Everest Buildings located at 355/374 Everest Private to access St. Laurent Boulevard, while vehicular through traffic from St. Laurent Boulevard to Russell Road will remain closed.

The northern hemisphere contains St. Hubert Restaurant with a drive-thru on Tower 1 fronting St. Laurent Boulevard. The drive-thru facility is proposed as a clockwise loop with a roof structure overhang in Tower 1. A short pickup stall has been proposed for drive-thru vehicles to reduce the risk of queues in the drive-thru. Surface parking is provided between Towers 1 and 2, catered to visitors and patrons to the St. Hubert Restaurant. Access to the underground parking garage for Towers 1 and 2 are provided via a two-way ramp on the eastern side of Tower 2.

Figure 17: Proposed Site Circulation and Garage Accesses



As mentioned, a secondary one-way inbound only access is proposed along the north property line, designed to accommodate HSU and WB40 trucks destined for garbage pickup adjacent to Tower 2 and deliver supplies to the St. Hubert Restaurant. The WB40 trucks are envisioned to drive in, pull up beside Tower 1 and off-load. Truck turning templates have confirmed that there is sufficient space to allow for truck off-loading and vehicles to circulate past. Proper signage will be required to prevent vehicles using the drive-thru or exiting the site from using this in-bound only northern loop.

The southern hemisphere contains retail opportunities within Tower 3, fronting St. Laurent Boulevard. Surface parking is proposed between Towers 3 and 4, mainly catered to visitors to the retail component of the site. Access to the underground parking garage for Towers 3 and 4 are provided via a two-way ramp on the east side of Tower 4.

These buildings are serviced by a southern loop, which is also envisioned as a one-way anti-clockwise route. Signage will be provided to properly direct vehicles. The circulation loop has been designed to accommodate WB40's and smaller MSU/HSU style trucks for deliveries to the retail portion on Tower 3 and garbage pick-up

adjacent to Tower 4. Delivery and loading trucks have dedicated space along the south and east sides of the loop, which have been afforded sufficient space to avoid blocking circulating vehicles.

Garbage pick-ups for the northern and southern hemispheres will be located on ground level and are expected to be front loading vehicles. The truck turning templates have been provided in **Appendix G.**

Both northern and southern hemisphere parking ramp grades are located indoors and are weather protected. Transitions from 8% to a maximum of 16% incline are proposed, which is considered acceptable. Sight lines internal to the site are expected to be adequate. Buildings are set back a notable distance from the main aisle which allows for adequate sight lines. Additionally, the main aisle is designed for low operating speeds and presents low risk for vehicle circulation.

4.1.3. New Streets Network

Exempt. See **Table 1**.

4.2. Parking

4.2.1. Parking Supply

According to Part 4 – Parking, Queueing and Loading Provisions for the City of Ottawa By-Laws, the site is located in Area B based on Schedule 1, Area B in Schedule 1A and is not within Rapid Transit Stations within Schedule 2B. **Table 15** summarizes the vehicle parking minimum allowed within the parking by-law. **Table 16** summarizes the bicycle parking requirements as per City of Ottawa Zoning By-Law-Part 4, sections 100-114.

Table 15: Proposed Vehicle Parking Space Supply

Land Use		Rate per Unit/Size		Required Vehicle Spaces			Proposed Spaces
		Base	Visitor	Base	Visitor	Min. Req.	
Residential	701 Units	0.5 per unit[1]	0.2 per unit[2]	345	120	465	924
Shopping Center	2,026 m²	-	3.4 per 100 m²	-	69	69	
High Turnover Restaurant	872 m²	-	See notes[3]	-	83	83	
			Totals	345	272	617	Meets mins.

1.) First 12 units are exempt
2.) no more than 60 visitor parking spaces per parking garage building structure
3.) 3 per first 50 m2 and 10 per each 100 m2 subsequent for fast food GFA

Table 16: Bicycle Parking Requirements

Land Use		Rate per Unit/Size	Required Bicycle Spaces	Proposed Spaces
Residential	701 Units	0.5 per unit	351	377
Commercial	2,898 m²	1 per 250 m²	12	
		Totals	363	Meets mins.

The Parking By-law requires a minimum of 617 vehicle parking spaces. The proposed development provides a total of 924 parking spaces, with 50 being located above ground and the remainder 874 indoors. The maximum parking permitted is 1,227 for residential uses and 104 for commercial uses, for a combined maximum of 1,331 spaces. The proposed development conforms to the vehicle parking requirements in the Parking By-law.

The ground floor parking proposes 27 spaces for retail uses, 19 spaces for restaurant use, 3 spaces for delivery and 1 space for loading. U0 floor proposes 49 retail spaces, 33 restaurant spaces and 7 visitor spaces, located at ground floor within Towers 2 and 4. Additional 123 visitor spaces are proposed in U1 for all towers. Residential parking spaces are located in U1 through U3, allowing for a separation of space between residential and commercial visitor parking uses. All required minimum parking rates are met.

The Parking By-law requires a minimum of 363 bike parking spaces. The proposed development proposes a total of 377 bike parking spaces: 146 located at ground level U0 within Towers 2 and 4, 170 located in U1 within all towers and 46 located in U2 for Tower 1. All underground bike parking will be located in secure and well-lit areas, located close to elevators for access. Additionally, the site proposes 15 outdoor bike parking spaces near the

commercial uses surrounding Towers 1 and 3. The proposed development abides with the bicycle parking requirements in the Parking By-law.

4.2.2. Spillover Parking

The proposed development is providing ample parking spaces, above the City By-Law minimums. The risk of parking spillover is considered minimal. The retail, restaurant and residential visitor parking occupancy is anticipated to happen at different times of the day, allowing for shared parking provisions between the land uses and reducing the overall requirement for general visitor parking of all land uses.

4.3. Boundary Street Design

4.3.1. Existing Conditions

The boundary street for the development is St. Laurent Boulevard. The existing roadway geometries consist of the following features:

- *St. Laurent Boulevard:*
  - 2 vehicle and 1 bus travel lanes in each direction;
  - 2m sidewalk with 2m bike lane buffer on both sides of roadway;
  - Additional boulevard style buffer on east side of roadway;
  - More than 3,000 vehicles per day;
  - Posted speed limit is 70km/h;
  - Classified as major arterial roadway and identified as a trucking route; and,
  - Identified as a spine route and major pathway for cycling.

The proposed site is located within St. Laurent Boulevard Arterial Mainstreet segment. Multi-modal Level of Service (MMLOS) analysis for the subject road segments adjacent to the site is summarized in **Table 17** with detail analysis provided in **Appendix H**.

Table 17: MMLOS – Boundary Street Segment Existing

Road Segment	Multi-Modal Level of Service							
	Pedestrian		Bicycle		Transit		Truck	
	PLoS	Target	BLoS	Target	TLoS	Target	TkLoS	Target
St. Laurent Blvd – west side between Industrial Ave. & Bourassa Street	D	C	A	C	B	D	A	D
St. Laurent Blvd – east side between Industrial Ave. & Bourassa Street	D	C	A	C	B	D	A	D

Pedestrian

- ***Both sides of St. Laurent Boulevard*** do not meet pedestrian PLoS due high vehicle operating speeds. Since providing a sidewalk of greater than 2m wide with a 2-meter boulevard is already in place, the only remaining mitigation would be reducing speeds from 70km/h to 50-60km/h or reducing daily curb volumes to below 3,000 vehicles a day, both which are very unlikely to occur due to the roadway's function and classification.

Bicycle

- ***Both sides of St. Laurent Boulevard*** meet cyclist BLoS.

Transit

- ***Both sides of St. Laurent Boulevard*** meet transit TLoS targets.

Truck

- ***Both sides of St. Laurent Boulevard*** meet trucking route TkLoS targets.

4.3.2. Future Conditions

Although the existing intersection will be modified from a right-in right-out only, the road segments adjacent to the site will continue to operate the same as existing.

4.4. Access Intersection Design

There have been ongoing discussions with City staff regarding a full movement signalized intersection for the site. Within one of the most recent briefings (February 2022), the City of Ottawa indicated that three conditions be met for a signalized intersection to be considered. These conditions include:

1. There must be a fully protected left-turn lane developed into the site (NBL)
2. The traffic signals must be installed as far south as possible, away from Industrial/St. Laurent
3. The accesses for this development must be consolidated (currently 4 RIRO accesses within the site)

The intent of the ensuing section is to demonstrate the extent to which these conditions have been satisfied.

4.4.1. Location and Design of Access

The main access thoroughfare will have smaller internal road connections leading to the drive-thru, surface parking, and the underground parking ramp accesses. The new main access signalized protected intersection at St. Laurent Boulevard is located approximately 135m south of Industrial/St. Laurent, and approximately 40m north of the RIRO on the east side of St. Laurent Boulevard.

The main site access driveway aligns with Everest Private to the west, which provides active transportation connectivity to Russell Road but vehicles are currently restricted by bollards. As a condition of approval of the adjacent property, this restriction will be relocated further west to allow the two Everest Buildings located at 355/374 Everest Private to access St. Laurent Boulevard, while vehicular through traffic from St. Laurent Boulevard to Russell Road will remain closed.

The one-way inbound only driveway is envisioned as a commercial truck delivery access and garbage truck access parallel to the north property line, as illustrated in **Figure 17**. This inbound only access is expected to be used infrequently, and no vehicles will be allowed to exit from this location, eliminating conflict outbound movements with St. Laurent Boulevard at this location.

4.4.2. Intersection Control

The current access to the site operates as an unsignalized STOP-control on the minor right-in right-out intersection. As part of this development, the intersection is proposed to be upgraded to a full movement access with traffic signal control.

A traffic signal warrant analysis was completed, and it did not trigger the need for a traffic signal, with 59% of the required 100% needed to trigger the warrant. The addition of approximately 60% more forecasted outbound left-turning vehicles from the site (approximately 125 more eastbound left-turning vehicles in the AM, PM, or a combination of both) would satisfy the signal warrant. It is understood that if a traffic signal is not warranted, that the developer is responsible for the traffic signal construction costs and future maintenance costs until a traffic signal warrant is 100% met. The warrant has been provided in **Appendix I**.

The new signalized access would be located approximately 150m south of the signalized Industrial/St. Laurent intersection and approximately 160m north of the signalized Bourassa/St. Laurent intersection. According to the City of Ottawa Private Approach By-Law Section 25, if a site has more than 300 parking spaces, a minimum distance between the private approach and signalized intersection is 75m. Given that both neighboring intersections are further than 75m away, this new signalized intersection would meet the minimum by-law requirements.

Based on Section 25 of the City Private Approach By-Law (PABL), since the development has between 46m and 150m of frontage, then the development can include a single two-way approach and two one-way approaches, or two two-way private approaches. The main access has a flared throat with a maximum throat width of approximately 10m wide. Although the access exceeds the maximum allowed approach width of 9m, the excess

width was designed to allow for larger delivery trucks to complete their turning radii without mounting sidewalks or blocking opposing traffic. Within 5m from the property line, the flared wide approach is reduced to less than 9m wide. The driveway then narrows to a width of 6.7m as per City By-law requirements.

The one-way inbound only private approach will be approximately 5.5m wide, which conforms with the PABL. The two site driveways are approximately 45m apart, and inbound only driveway is approximately 18m from the driveway to the north office towers at 1730 St. Laurent Boulevard, both of which meet the minimum separation of 9m from a two-way driveway.

4.4.3. Intersection Design

The proposed signalized protected intersection at the main access to St. Laurent Boulevard includes an auxiliary northbound left-turn lane to accommodate northbound left-turning vehicles, with a fully protected left-turn phase. The required storage length of the northbound left-turn lane was approximately 40m. A short southbound right-turn lane within the transit priority lane as well as no right turn on red phasing for eastbound right turns and southbound right turns were also recommended. Sight line requirements do not apply since right-turning vehicles are not permitted during red phase. The supporting analysis to the proposed design is provided in **Section 4.9.2**.

The design of the main site access intersection has evolved from early iterations. The location was considered optimal as it is evenly spaced between two existing signalized intersections, which met minimum separation distances based on City of Ottawa and TAC standards. A protected intersection design fits with contemporary standards, which prioritizes safety for the most vulnerable users at the expense of vehicle operations. However, corridor performance was still an important consideration to minimize queue spillback. The traffic signals within the study area can be optimized and coordinated to ensure traffic flows as efficiently as possible, and limit the risk of queue spillback. The draft functional design provided in **Appendix J** was vetted by the City Traffic Signals Branch, an RMA submission is in the process of being prepared for technical circulation at the city.

4.5. Transportation Demand Management

4.5.1. Context for TDM

Based on the type of development, it is assumed that most trips generated by the proposed site will be residents leaving the site in the AM peak to go to work and returning from work to the proposed site in the PM peak. Sections 3.1.1 and 3.1.2 describe how many trips are anticipated per travel mode and anticipates the likely locations that they will travel to and from based on the OD-Survey 2011 for Ottawa. The site is not located within 600m of rapid transit; however, it is located in a transit priority corridor with isolated measures.

4.5.2. Need and Opportunity

Since the development is located in a transit priority corridor with isolated measures and future at grade transitway, measures to provide sustainable active mode shares are encouraged. Such measures are described in more detail in Section 4.5.3 below, but can include reduced parking, more aggressive Multi-Modal Levels of Service (MMLOS) as described in Section 4.3 and 4.9 and safe and efficient connectivity to public transit as described in Section 4.7, to name a few.

4.5.3. TDM Program

The TDM infrastructure checklist and TDM Measures are attached as **Appendix K**.

Regarding the TDM Supportive Development Design and Infrastructure Checklist:

- All ten (10) Required measures related to Walking and Cycling (facilities and bicycle parking) and Vehicle Parking have been satisfied
- At least nine (9) of fourteen (14) Basic measures related to Walking and Cycling, Transit, Ridesharing and Parking have been satisfied or are not applicable
- Two (2) of the of the seven (7) candidate Better measures are also proposed or are non-applicable, namely:
  - Separate long-term and short-term parking areas

Regarding the TDM Measures Checklist, the developer has indicated there is a willingness to consider the following measures:

- Designate a TDM program coordinator
- Display walking and cycling information at major entrances
- Display transit information at major entrances
- Unbundle parking costs from monthly rent; and

4.6. Neighborhood Traffic Management

4.6.1. Adjacent Neighborhoods

This section is technically exempt as the access driveway will operate as a private approach driveway given that there will be no connectivity to the local roadway just west of the site, Everest Private.

4.7. Transit

4.7.1. Route Capacity

Table 18 below provides a summary of existing boarding and alighting transit data from OC Transpo for routes 40 and 42. Route 39 is not included in the table as it only passes through this area on a special early morning pattern and has no impact on peak periods. The data was collected in winter of 2020, between January 5th and March 16th.

Table 18: Boarding and Alighting Transit Data from OC Transpo Near Site Stops

Bus Stop ID and Direction (on St. Laurent)	AM (6:00 – 9:00)			PM (15:00 – 18:00)			24-hr		
	Boarding	Alighting	Avg. Load departure	Boarding	Alighting	Avg. Load departure	Boarding	Alighting	Avg. Load departure
#1507 Bourassa NB Route 40	14	6	23	55	14	22	142	40	17
#8541 Industrial WB Route 42	0	2	5	14	4	10	23	13	6
#8901 Innes EB Route 42	6	4	10	6	1	7	23	8	7
#8986 Industrial SB Route 40	4	35	16	11	24	33	21	102	18

Based on the data provided from OC Transpo, Route 42 has ample capacity near the site, normally operating with minimal average departure loads, and boarding and alighting trips. Route 40 exhibits more usage near the site compared to Route 42, predominantly riders alighting from the north in the AM and boardings heading northbound in the PM.

Since the proposed development is primarily a residential development, transit trips are expected to be the reverse of existing trends – riders boardings to leave the area in the AM and alighting when they return in the PM.

Route 40 has average headways of 15 minutes or less during the peak hours, and with buses such as the New Flyer D60L with a total capacity of 110 passengers or Alexander Dennis Enviro 500 with approximately 100 passengers, is expected to have sufficient capacity to support roughly 165 to 140 'new' two-way transit passenger trips forecasted during the AM and PM peak hours respectively.

With isolated transit priority measures and at grade transitway planned for St. Laurent Boulevard, it is anticipated that the future transit network will have capacity to accommodate transit demand from the subject development. Additional capacity is also available on local bus routes on Russell Road and Industrial Avenue.

4.7.2. Transit Priority

Existing bus lanes on St. Laurent Boulevard provide high quality transit priority since vehicle queues in general purpose lanes will not affect bus travel times. However, the new signalized protected intersection at St. Laurent and the site access would increase the risk for delays. By coordinating the traffic signals between Industrial/St. Laurent, Site Access/St. Laurent and Bourassa/St. Laurent, the potential delay impact can be minimized particularly during the peak periods.

4.8. Review of Network Concept

The site is currently zoned as AM10 and AM10[1658] which allow for mixed land uses such as commercial and residential. The future commercial land uses will be similar in context and size to the existing permitted land uses and as such, the future commercial uses should be allowed within the existing zoning.

For the residential aspect, the AM10 zoning (1760 St. Laurent Blvd) allows mid-rise buildings up to 9-storeys or 30m high, while the AM10[1658] (1740 St. Laurent Blvd) allows buildings up to 50m in height or approximately 15-storeys high. Towers 1, and 2 are fully located within AM10[1658] while Towers 3 and 4 are partially located within both zones.

To achieve the most conservative analysis, the entirety of Towers 3 and 4 will be assumed to be within AM10 which allows for less height to be built. Towers 2 and 4 will assume that there are residential units in every floor, while Towers 1 and 3 will be assumed to have commercial on the entire ground floor, with no units on the first floor.

Lastly, it will be assumed that each floor has the same number of units, disregarding setbacks which would probably have a smaller GFA and fewer units on higher floors for a more conservative analysis. Using the above assumptions, a base calculation for how many projected units above existing zoning can be derived as seen in **Table 19**.

Table 19: Projected Number of Units Above Existing Zoning

Tower	Currently Zoned	Storeys Allowed	Storeys Proposed	Floors Above Existing Zoning	Units Proposed	Units / Storey Proposed[1]	Units Above Permitted Height
Tower 1	AM10[1658]	15	20	5	184	9.68	48
Tower 2	AM10[1658]	15	13	0	154	11.84	0
Tower 3	AM10	9	20	11	200	10.53	116
Tower 4	AM10[1658]	9	13	4	163	12.54	50
						Total	214

1. Assumed that the first floor does not have any residential units (Tower 1 & 3) and that each floor has the same number of units per storey.

Based on **Table 19**, approximately 214 units will be located above allowable zoning which would create approximate 90 more peak hour person trips than the equivalent volume permitted by established zoning (refer to **Appendix L** for calculations).

Since 200 peak hour person trips above the equivalent volume permitted by established zoning is the trigger according to the TIA Guidelines, this step can be exempt.

4.9. Intersection Design

4.9.1. Intersection Control

A new signalized intersection is proposed for the Site Access/St. Laurent intersection. A cycle of 120 seconds was initially assumed to match nearby intersections for coordination (with the exception of Industrial/St. Laurent which runs independently), whereas the minimum timing splits were determined using walking speeds, roadway speeds and clearing distances. Additional timing was allocated to the northbound left-turn which will require a fully protected phase.

4.9.2. Intersection Design

Multi-Modal Level of Service

As stated in the MMLOS Guidelines, only signalized intersections are considered for the intersection Level of Service measures. The MMLOS analysis is summarized in **Table 20**, with detailed analyses provided in **Appendix M**.

Table 20: MMLOS – Existing and Future Adjacent Signalized Intersections

Road Segment	Multi-Modal Level of Service							
	Pedestrian		Bicycle		Transit		Truck	
	PLoS	Target	BLoS	Target	TLoS	Target	TkLoS	Target
Site Access/St. Laurent[1]	F	C	D	C	C	D	C	D
Industrial/St. Laurent	F	C	F	C	F	D	A	D
Bourassa/St. Laurent	F	C	F	C	E	D	D	D
Belfast/St. Laurent	F	C	F	B	E	D	C	D
Smyth/St. Laurent	F	C	F	B	F	D	A	D
Russell/St. Laurent	F	C	F	B	D	D	A	D

1. Future Site Access/St. Laurent is based on the latest plans available – subject to change

Pedestrian

- For all intersections, pedestrians must cross at least 7 lanes of traffic due to the St. Laurent Boulevard cross-section. There are no options that can help improve the PLoS significantly enough to come anywhere near achieving the target PLoS 'C'.

Bicycle

- The bicycle BLoS target was not met at any intersection due to the quantity of lanes required to be crossed, the lack of cycling facilities on all approaches and the operating speeds.

Transit

- To achieve the TLoS targets, a maximum transit delay of 30 seconds or less for the bus movements must be met. Only the Site Access/St. Laurent and Russell/St. Laurent intersections had bus movement delays equal to or lesser than 30 seconds. It is important to note that within Synchro, the bus delays were modelled as general traffic without queue jumps. The addition of queue jumps and bus only lanes could reduce the bus movement delays and more TLoS targets could have been met.

Truck

- Truck target level of service was met for all intersections.

Background Conditions 2029

The future background 2029 conditions represent the impact of additional development including 355-374 Everest and forecasted growth in background volumes. Since 2029 background has the same intersection layouts as 2024 and is the more critical of the two scenarios, only 2029 will be analyzed. The future projected 2029 background volumes are illustrated in **Figure 18** with projected operation outputs in **Table 21**. This scenario assumes that the existing site access is kept, as unsignalized and right-in right-out (RIRO) conditions. The detailed Synchro results can be found in **Appendix N**.

Figure 18: 2029 Background Projected Volumes

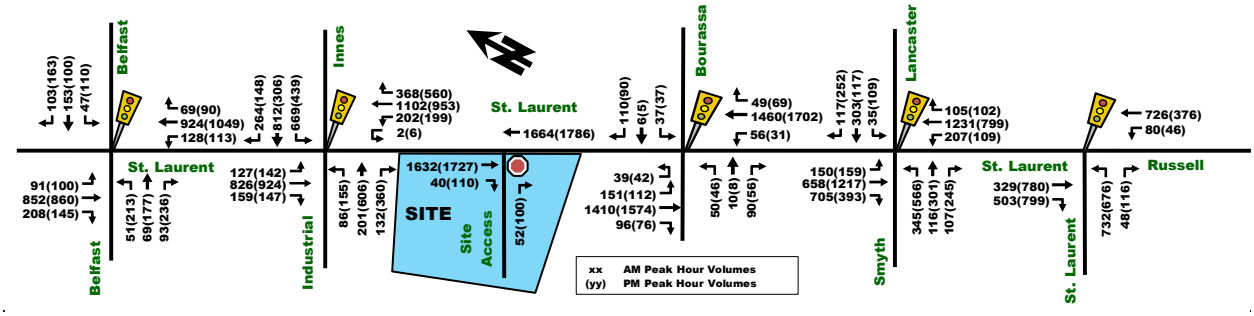


Table 21: 2029 Background Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Industrial/St. Laurent	E(D)	0.96(0.85)	WBL(EBT)	46.5(48.8)	D(C)	0.82(0.78)
Bourassa/St. Laurent	C(D)	0.74(0.82)	NBT(NBT)	19.4(26.5)	C(C)	0.72(0.78)
Smyth/St. Laurent	E(E)	0.92(0.95)	EBL(EBL)	39.8(40.1)	D(D)	0.86(0.87)
Belfast/St. Laurent	C(D)	0.78(0.83)	WBT(WBT)	24.5(30.0)	A(C)	0.56(0.71)
Russell/St. Laurent	C(C)	0.75(0.74)	EBL(EBL)	15.3(15.0)	B(C)	0.67(0.73)
Site Access/St. Laurent1 (U)	C(D)	20(26)	EB(EB)	0(1)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. U = Unsignalized.						

As seen in **Table 21**, all intersections operate overall at acceptable LoS 'D' or better with critical movements operating at LoS 'E' or better during the 2029 background volumes. Operations are similar with existing intersection performance.

Future Conditions 2024 – Full Buildout

The future full build-out 2024 volumes were derived by superimposing background 2024 volumes which include other area developments and background growth, with future site-generated volumes. The future projected 2024 volumes are illustrated in **Figure 19** with projected operation outputs in **Table 22**. The detailed Synchro results can be found in **Appendix O**. No right on red for eastbound right turns is proposed.

Figure 19: 2024 Total Projected Volumes

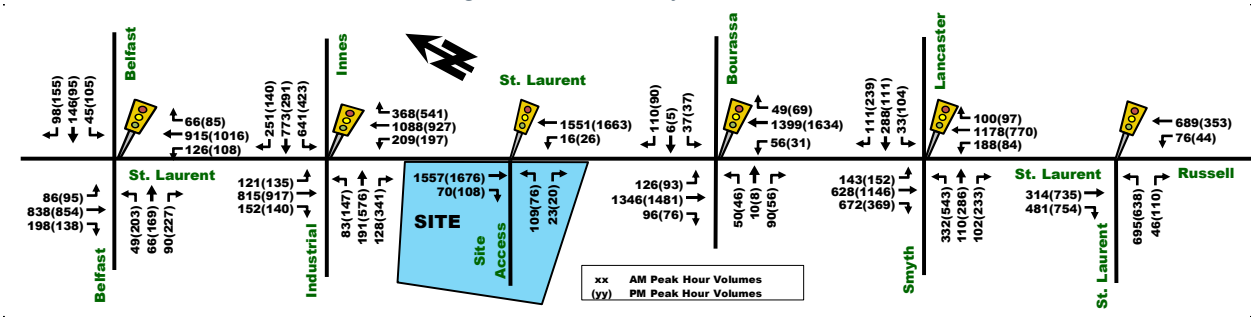


Table 22: 2024 Full Build-out Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Industrial/St. Laurent	E(D)	0.94(0.83)	WBL(EBT)	47.2(48.0)	C(C)	0.79(0.76)
Site Access/St. Laurent	B(B)	0.63(0.69)	SBT(SBT)	10.9(11.1)	B(B)	0.62(0.67)
Bourassa/St. Laurent	C(C)	0.75(0.78)	EBT(NBT)	15.3(21.8)	B(C)	0.68(0.74)
Smyth/St. Laurent	D(D)	0.85(0.90)	EBL(EBL)	36.9(37.3)	C(C)	0.80(0.80)
Belfast/St. Laurent	C(D)	0.77(0.81)	WBT(WBT)	23.8(29.0)	A(B)	0.53(0.68)
Russell/St. Laurent	C(C)	0.74(0.72)	EBL(EBL)	15.1(14.5)	B(B)	0.66(0.70)
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. Site access was modelled with no right on red for the eastbound right-turn.						

As seen in **Table 22**, all study area intersections are expected to operate similarly to existing conditions with acceptable delays.

Future Conditions 2029 – Full Buildout + 5 Years

The future full build-out 2029 volumes were derived by superimposing background 2029 volumes which include other area developments and background growth, with future site-generated volumes. The future projected 2029 volumes are illustrated in **Figure 20** with projected operation outputs in **Table 23.** The detailed Synchro results can be found in **Appendix O**.

Figure 20: 2029 Total Projected Volumes

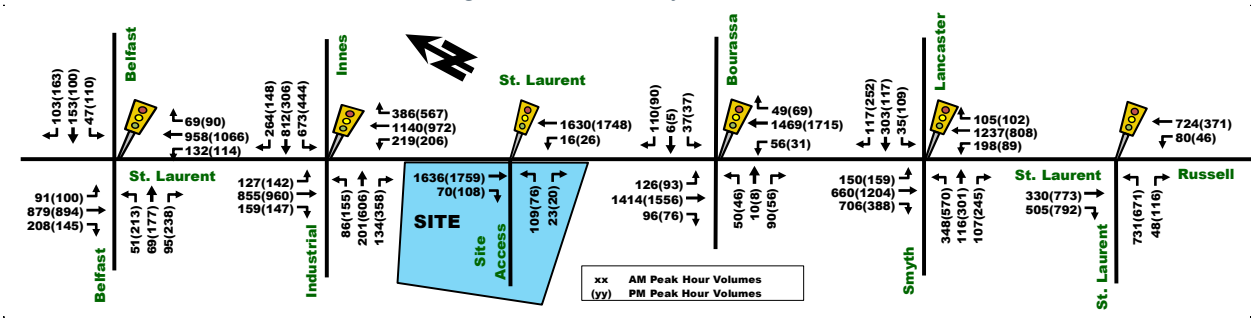


Table 23: 2029 Full Build-out Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Industrial/St. Laurent	E(D)	0.98(0.85)	WBL(EBT)	53.7(50.2)	D(C)	0.84(0.80)
Site Access/St. Laurent	B(C)	0.66(0.72)	SBT(SBT)	11.9(12.2)	B(B)	0.65(0.70)
Bourassa/St. Laurent	C(D)	0.75(0.81)	EBT(NBT)	15.5(22.4)	C(C)	0.71(0.77)
Smyth/St. Laurent	E(E)	0.92(0.95)	EBL(EBL)	39.9(39.7)	D(D)	0.86(0.84)
Belfast/St. Laurent	C(D)	0.78(0.83)	WBT(WBT)	24.4(30.2)	A(C)	0.57(0.72)
Russell/St. Laurent	C(C)	0.75(0.73)	EBL(EBL)	15.3(14.9)	B(C)	0.67(0.72)
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. Site access was modelled with no right on red for the eastbound right-turn.						

As seen in **Table 23**, all study area intersections are expected to operate similarly to existing conditions with acceptable delays.

Queuing Assessment

Analyses were completed to determine if the new signalized intersection will pose queueing concerns at adjacent intersections. **Table 24** summarizes the available storage capacity as well as the projected 95th percentile queue based on the findings of both Synchro and SimTraffic software.

Table 24: 95th Percentile Queue for Intersections Adjacent to Site/St. Laurent

Intersection - Movement	Available Storage (m)	Synchro Forecasted Queues AM (PM) (m)		SimTraffic Forecasted Queues AM (PM) (m)	
		50th Percentile	95th Percentile	50th Percentile	95th Percentile
Industrial/St. Laurent – NBL	100	30(31)	#52(#47)	69(53)	125(109)
Industrial/St. Laurent – NBT	135	153(137)	#217(162)	120(101)	150(143)
Site/St. Laurent – SBR	20	3(7)	12(19)	4(9)	18(28)
Site/St. Laurent – SBT	135	69(124)	184(217)	107(125)	171(179)
Site/St. Laurent – NBL	40	4(6)	m6(m8)	6(9)	23(26)
Site/St. Laurent – NBT	150	71(47)	18(34)	96(73)	180(142)
Site/St. Laurent – Internal (EBRL)	-	28(21)	43(32)	30(18)	65(39)
Bourassa/St. Laurent – SBT	150	103(9)	54(47)	92(87)	161(162)
Site Access was modelled with no right on red for the eastbound right turn; # - 95th percentile volume exceeds capacity; queue may be longer; m – volume for 95th percentile queue is metered by upstream signal					

As seen in **Table 24**, the through movements along St. Laurent Boulevard at the new main access signalized protected intersection resulted in queues that exceeded their available storage capacities based on the 95th percentile queue, creating queue spillback scenarios. However, according to the average or 50th percentile queue, the potential spillback is less prominent. When reviewing SimTraffic simulations, the average queues do not spill back and interfere with upstream intersections and most vehicles clear the new intersection and the downstream intersection once they are given a green light. Therefore, while congestion may occur occasionally during the critical peak periods, it would not be atypical compared to other major arterial corridors in the city that have been designed according to the protected intersection design guidelines.

The proposed northbound left-turn lane on the Site Access/St. Laurent intersection is expected to have sufficient capacity at a length of 40 meters. A short southbound right-turn lane (tapered lines within the bus only lanes) is proposed and was modelled as 20 meters. An additional 10m extension of the right-turn lane markings within the bus lane could be added to meet the queue demands forecasted by SimTraffic. The SimTraffic results have been included in **Appendix P**.

5. FINDINGS AND RECOMMENDATIONS

Based on the results summarized herein the following findings and recommendations are provided:

Existing Conditions

- The site is currently occupied by commercial uses and is zoned as AM10 and AM10[1658].
- The site is located in a transit priority corridor with isolated measures according to the TMP and a future at grade transitway according to the New Official Plan.
- Overall, there were 442 collisions recorded in five years within the study area, 38 of them occurred between Industrial Avenue and Bourassa Street on St. Laurent Boulevard. The high quantity and type of collisions is reflective of high vehicular volumes on St. Laurent Boulevard and the current design. The ongoing St. Laurent Transit Priority EA is expected to redesign parts of the study area corridor (from Industrial Avenue northward) to contemporary design standards that will prioritize safety for the most vulnerable road users.
- The site is currently accessed by four right-in right-out driveways to/from southbound St. Laurent Boulevard.
- Existing intersections operate at good overall LoS 'D' or better with some critical movements approaching capacity at LoS 'E' or better during the weekday peak hours.

Proposed Development

- The proposed development will comprise of approximately 701 residential units, 21,808 ft² of commercial/retail space, and 9,383 ft² St. Hubert Restaurant which will be replacing the existing restaurant in four 13 to 20-storey buildings.
- TDM measures include all required measures, some basic and better measures and provides additional policy measures like program coordinator, displaying active transportation routes and unbundling of parking costs to monthly rent.
- The proposed development is projected to generate approximately 165 to 140 'new' transit trips during the AM and PM peak hour periods, which can be accommodated by route 40 which operates on St. Laurent transit priority corridor. Additional capacity is available on local bus available within 450-meter walk or less.
- A total of 924 parking spaces are proposed which adheres to the city's minimum and maximum parking requirements for this location.

- The developer proposes 377 bike parking spaces, the majority located indoors in a well-lit secured area near elevators, with 15 outdoor bike parking spaces proposed near the commercial uses fronting Towers 1 and 3.
- The proposed development is projected to generate 'new' vehicle volumes of approximately 150 veh/h two-way total during the weekday morning and afternoon peak hours.
- The main access off St. Laurent Boulevard will be converted from the right-in right-out access into a new full movement signalized protected intersection. There will be more than 75m separation from the nearest signalized intersection, which meets City By-Law requirements. The proposed signalized protected intersection design has been initially vetted by the City Traffic Signals Branch, and the RMA is in progress.
- A secondary one-way inbound only driveway is proposed parallel to the north property line and is intended to be exclusively used by delivery and garbage trucks.

Future Conditions

- The City of Ottawa has recently initiated the St. Laurent Transit Priority Corridor Planning and Environmental Assessment Study between Hemlock Road and Industrial Avenue. The study aims at improving transit efficiency and reducing travel times, while also improving the travel environment for all other modes of transportation such as pedestrians and cyclists.
- Other nearby developments and a 1% growth rate were applied to existing volumes to estimate 2029 background conditions. The 2029 background overall intersection performance of all study area intersections was LoS 'D' or better and with critical movement of 'E' or better which is similar to existing.
- The MMLOS road segment analysis shows that existing and future conditions on boundary streets do not meet MMLOS area targets for pedestrians due to high vehicular volumes, however, all other targets are met.
- The MMLOS intersection analysis shows that truck target goals are met at all intersections. Given the higher-operating speeds and number of travel lanes, it is not possible to meet pedestrian target goals. The bicycle target goals were also not met given the lack of cycling facilities on all approaches, the quantity of lanes required to be crossed and the higher operating speeds. The transit TLoS was only met at the Site Access/St. Laurent and Russell/St. Laurent intersections as their bus movement delays were under 30 seconds.
- The new site vehicle access was modelled as a signalized 3-legged intersection with a new northbound left-turn lane to incorporate a protected NBL phase. An auxiliary NBL storage lane of approximately 40m is sufficient to service the site. No right on red for eastbound right turns is proposed.
- A short 20-meter segment of shared bus and southbound right-turn lane at Site Access/St. Laurent significantly reduces queue lengths for the southbound movement and is recommended.
- Future conditions with the addition of pedestrians, cyclists, transit patrons and site vehicle traffic performed at acceptable levels of service with respect to v/c and delay resulting in overall LoS 'D' or better and with critical movement of 'E' or better.
- Queueing implications were noted at the new signalized protected intersection at the main access and St. Laurent Boulevard in both north and southbound approaches. Spillback to the adjacent intersection is forecasted at times during the morning and afternoon peak hours based on the critical 95th percentile queue, however, it is anticipated that most vehicles would clear during each cycle. The average or 50th percentile queue showed minimal to no queue spillback is anticipated.

Based on the foregoing findings, the proposed development located at 1740 – 1760 St. Laurent Boulevard is recommended from a transportation perspective.

Prepared By:



Juan Lavin, P. Eng.
Transportation Engineer

Reviewed By:



Austin Shih, P.Eng.
Senior Transportation Engineer

APPENDIX A

SCREENING FORM & CITY CORRESPONDANCE

PARSONS

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City of Ottawa 2017 TIA Guidelines

TIA Screening Form

Date	06-Oct-23
Project	1740 -1760 St Laurent
Project Number	477563-01000

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

Module 1.1 - Description of Proposed Development	
Municipal Address	1740-1760 St. Laurent Boulevard, Ottawa, ON
Description of location	Approximately 150m south of St. Laurent Blvd on the west side
Land Use	Mixed-use (residential with ground commercial)
Development Size	701 units and approximately 2,900 sqm commercial
Number of Accesses and Locations	2. Full movement signalized to St. Laurent and a second inbound only at the north edge of the site.
Development Phasing	1 Phase
Buildout Year	2024
Sketch Plan / Site Plan	See attached

Module 1.2 - Trip Generation Trigger		
Land Use Type	Townhomes or Apartments	
Development Size	701	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)	Yes	St. Laurent currently has a cycle-track adjacent to the site and is considered a Spine Cycle route under the Ultimate Cycling Network
Development is in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone. (See Sheet 3)	Yes	St. Laurent Arterial Mainstreet DPA
Location Trigger Met?	Yes	

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;	Yes	Within 150 meters of St. Laurent/Industrial
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?	Yes	



1 SITE PLAN
1 : 200

SITE PLAN LEGEND

- LOT LINE
- SETBACKS
- TOWER FOOTPRINT
- 5m SETBACKS PER OLS0002 R4
- 10m TOWER SETBACKS
- EASEMENT - HHW
- EASEMENT EVEREST PROJECT
- HYDRO LINES
- 0000 GEO — GEODESIC ELEVATION
- EXISTING TREE
- EXISTING TREE TO BE CUT DOWN
- NEW TREE
- NEW PLANTATION
- LANDSCAPE AREAS
- WASHED AGGREGATE
- CONCRETE SIDE WALK
- ASPHALT ROADWAYS
- SNOWMELT SYSTEM ZONE
- PLATBAND
- TERRACE
- WATER

PROJECT
ST. LAURENT DEVELOPMENT
1740-1760 St. Laurent boulevard
Ontario,ON K1G 1A2

OWNER
Groupe Heafey Group
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ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 CONCOURSE GATE, SUITE 500,
NEPEAN, ON K2E 7S6

GENERAL CONTRACTOR

KEY PLAN

ARCHITECT SEAL

REVISIONS

NO	DESCRIPTION	DATE
1	FOR CITY REVIEW	2023-10-03

NOTE

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON THE SITE AND TO REPORT ALL ERRORS AND/OR OMISSIONS TO THE ARCHITECT. ALL CONTRACTORS MUST COMPLY WITH ALL PERTINENT CODES AND BY-LAWS. DO NOT SCALE DRAWINGS.

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DATE 2023-10-03
DESIGNED P.POMERLEAU
DRAWN A.DUFOUR
PROJECT No 20005
CHECKED P.MARTIN

SHEET TITLE
SITE PLAN

SHEET No
A101

BIM 360://DEV ST-LAURENT OTTAWA/20005_A-SITE_R21.rvt

000-21-0137 and 0-07-12-21-0177

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10 August 2020

City of Ottawa

Development Review Services

110 Laurier Avenue West

Ottawa, ON K1P 1J1

Attention: Josiane Gervais, P.Eng.

Dear Josian:

Re: 1740 – 1760 St. Laurent
Step 2 – Comment and Response Form

The following response form has been prepared to address City of Ottawa comments received on August 7th, 2020. City comments are noted in black with the corresponding responses from Parsons in Green.

Transportation Engineering Services

- Element 2.1.1 - Proposed Development
  - Please replace Figure 2, text showing aisle width dimensions is illegible. Figure updated
- Element 2.1.2 - Existing Conditions
  - include cycling and pedestrian volumes during the peak hour, as TIA guidelines require existing peak hour travel demands by mode. Noted, added as new figure 6
  - Revise description of St Laurent Blvd: "Don Reid Drive in the south." Noted, text updated
- Element 2.2.1 - Study Area
  - The St-Laurent Blvd/Belfast Rd and St-Laurent Blvd/Russell Rd intersections are also within the 1km radius and should be included within the study area for analysis of auto demand (cycling and pedestrian review of these intersections can be excluded as they are beyond 600m). Noted.
  - Typically, the TIA analysis must be completed for each development phase. Section 2.1.1 mentions that the potential for converting the access to a signal will be explored. Ensure the subsequent TIA steps outline when this is proposed to take place (i.e. 2022 or 2024) and how this affects warrants/operations. Assuming a single build-out time horizon for this site may be appropriate for this TIA (depending on assumptions), however it is possible that analysis for both phases be requested as part of future circulations. It is understood that the traffic signals will be constructed for the first phase of development
- Because this TIA is in support of a re-zoning application, the TIA must address the worst-case scenario for traffic generation based upon the zoning sought and compare this to the traffic generated under the current zoning. Noted, will be discussed in Step 4 for Network Concept
- Module 2.3 - Exemptions Review:
  - Should it be determined in Section 4.2 that parking supply is 15% below unconstrained demand, Module 4.2.2 will be required. Noted, will be discussed in Step 4.

- Will the barricade remain on Everest Private to prevent cut-through traffic between St-Laurent Blvd and Russell Road? If not, then Module 4.6 is required as Russell Road is a collector street. It is understood at this time that the barricade will remain on Everest Private

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16 July 2021

City of Ottawa

Development Review Services

110 Laurier Avenue West

Ottawa, ON K1P 1J1

Attention: Josiane Gervais, P.Eng.

Dear Josiane:

Re: 1740 – 1760 St. Laurent
Step 3 – Comment and Response Form

The following response form has been prepared to address City of Ottawa comments received on September 23rd, 2020. City comments are noted in black with the corresponding responses from Parsons in Green.

Transportation Engineering Services

Section 3.1.1 Trip Generation and Mode Shares:

1. Consider using the average rate Land Use Code 820 rather than the fitted curve equation. While it is generally preferred to use the fitted curve when the sample size is large enough, the size of the commercial development (31,127 ft2) versus the average size of the shopping centres surveyed (327,000 ft2) may lead to an overly conservative estimate. Noted, average rate used instead
2. Justify the pass-by rate of 35% for the AM Peak for the commercial development. The Trip Generation Handbook, 3rd Edition, only provides data for the PM Peak. Noted, pass-by for AM removed
3. Consider applying an internalization reduction as this is a mixed-use development. Noted
4. An estimate of the existing site-generated trips should be provided in the absence of counts in order to deduct the existing development trips from the new two-way vehicle trips. Noted, included in trip generation segment
5. The proposed reduction in auto mode share is supported but will require TOD strategies to encourage the shift to alternative modes. Consider the needs of transit users in the Strategy review. Noted, will be included in section 4.5
6. The site plan shows a drive-through included within Tower 1 (even though the screening form claims no drive-through facility is proposed). A drive-through should not be approximated as "Shopping Center". Screening form updated and drive-through trip generation included separate from shopping center

Section 3.1.2 Trip Distribution:

7. Justify the trip distribution. The location of this development within the context of the Alta Vista TAZ makes 20% to/from east and 25% to/from south seem high. Noted, distribution adjusted to reflect 'trips from area' closer than trips going to area to more closely resemble residents leaving for work and then returning home.

Section 3.2.2 Background Growth:

8. In the future, consult with Tim Wei (tim.wei@ottawa.ca) to obtain a snapshot of the Long-Range Transportation Model to inform the development of background growth rates. Noted

Site Plan considerations:

9. An RMA will be required for any proposed intersection modifications on the boundary roads. All road modification costs will be at the expense of the applicant. Any full-movement access will require a protected intersection on St-Laurent Blvd. Noted, RMA to be included and Synchro to be modelled as protected access
10. Annex 1 of the OP protects a 44.5m ROW for St. Laurent Boulevard adjacent to the site. Show the ROW measurement from the centreline of St. Laurent Boulevard, and indicate any additional property (ROW) that needs to be provided to the City. Noted
11. The site is disconnected from Everest Private to the west (see adjacent site plan on DevApps, D07-12-19-0135), with through access provided for pedestrians, cyclists, and emergency vehicles only. This site plan should include a space for vehicles to turnaround west of Tower 3 and Tower 4. Noted, will advice developers

Traffic Signal Operations

12. Collision analysis indicates that site access area is currently problematic and would be likely to remain so. Further collision analysis may be required. It is anticipated that once a traffic signal is added to the site intersection, collision patterns will significantly change, and existing collision data will no longer be valid. If no traffic signal is added at the site access, then further collision analysis will be conducted.
13. Analysis of impacts to auxiliary lanes on St. Laurent Blvd will be required in subsequent submissions. If the new proposed signal on St-Laurent Blvd is shown to impact adjacent signalized intersections, then alternatives to full-movement at Everest should be considered. Noted, will be included in section 4.9
14. Provide traffic signal warrant analysis. Noted, will be included in section 4.4.2

Transit Services

15. Agree that 30% transit mode share seems a reasonable target assuming transit supportive TDM measures are included. In addition, we support the reduction of parking to be in line with the targeted mode shares. Noted, will include TDM measures in Step 4, will advice developer of parking reduction suggestion
16. There are no direct impacts to bus stops from the proposed site plan. However, the proposed new signalized intersection would create additional delay for transit in both directions and would undermine previous transit priority efforts (signal timing, dedicated lanes). Noted
17. The signalized intersection would also create additional start-stop for buses, which erodes passenger comfort. For example: southbound buses would serve the stop at Innes, accelerate only slightly to then stop at the new signal, then accelerate slightly again towards Bourassa, and possibly stop again at the signal before serving the next stop on the far side of the intersection. This would be a big change from the current conditions which are almost free flow along this stretch. Noted
18. Finally, a new signalized intersection would also not provide any measurable benefit for pedestrian access to/from bus stops. Stops on the east side of St-Laurent Blvd are located at the Bourassa and Innes intersections, so pedestrians can use the west sidewalk to go north or south first before crossing at the existing intersections. Noted

Development Review – Transportation

- Should allowing access through Everest (at Russell Rd) be considered, perhaps as an alternative access scenario as mentioned above, then this additional intersection should be assessed. Noted, to be discussed with developer
- Please include comments/responses from Steps 2 and 3 within Appendix of the Strategy report. Noted, will include both

If the above comments can be incorporated within the next submission, please proceed to Step 4: Strategy.

Please submit the Strategy Report and digital files of ICA outputs (Synchro/Sidra/Rodel, if applicable) for circulation. To be included

Please note that I strongly encourage the submission of the draft Strategy and functional plan for staff review and comment prior to submission of the application. If you choose to omit this step, all documents required for Step 5 (TIA report, drawings, and/or monitoring plan, as required) need to be included to deem an application complete. All costs and delays resulting from the choice to omit Step 4 for staff review before proceeding to Step 5 are the responsibility of the applicant. Noted

1740, 1754, 1760 ST. LAURENT BLVD
ZONING BY-LAW AMENDMENT AND SITE PLAN CONTROL APPLICATION

Technical Circulation Comments – Round 1
Date received: February 9, 2022
Date of response: January 16th, 2023

The following, incomplete, comments are provided in response to the 1st submission received by the City on Oct. 25, 2021. Once the outstanding comments are received, this letter will be updated. These comments are based on the Applicant requesting that the proposal be kept confidential at this time, and as such, was only circulated to a limited group within the City.

The following reflects Transportation related comments only, answered by Parsons.

The site is being reviewed on the following bases:

#	COMMENT	CONSULTANT	RESPONSE
	All Plans:		
Transportation (Josiane Gervais)			
	Transportation Impact Assessment: 1740-1760 St-Laurent Boulevard TIA Strategy Report, prepared by Parsons, Consultant's report #477563-01000, dated 19 July 2021.		
Transportation Engineering Services			
1	In Figure 2, confirm that there is a vehicular entrance at the NW corner of Tower 3 from the private road.	Parsons	**The NW tower, now called Tower 2 no longer has a vehicular entrance at the north side of the tower. This building now has a single two-way garage access approximately 18m north of the private road.**
2	Table 5 does not properly calculate/display the in/out split for the PM peak numbers (i.e. 62% in, 38% out).	Parsons	**Noted, error fixed.**
3	Section 3.3 in the report provides two figures with no subsequent analysis or conclusions. Please elaborate more in this section on actual demand rationalization.	Parsons	**Noted, demand rationalization updated.**
4	Section 4.1.2 mentions that the drive-through loop runs counter-clockwise instead of the intuitive clockwise direction given the site plan layout. If that is indeed the case, there seems to be the possibility where long drive-through queues may block vehicles entering the site through the main access from proceeding towards their parking spaces. Consider showing the direction of travel on the Site Plan for clarity.	Parsons	**Drive-thru will operate in the intuitive clockwise direction, vehicles have been added to site plan for a visual representation.**
5	Figure 17 provides a sketch of garbage and delivery truck routes (ensure this is updated to the proposed site plan). However, actual automated truck turning templates are required.	Parsons	**Updated truck turning templates will be provided.**
6	Reduce the amount of proposed vehicular parking spaces to encourage the use of sustainable modes of transportation instead.	Parsons	**For client to consider.**
7	Ensure the provision and design of accessible parking is consistent with the AODA IASR.	Parsons	**For architect to confirm.**
8	With the proposed signalized intersection at the new full-movement access being so close to the shopping center RIRO access across the street (but the latter not being part of the signalized intersection), discuss the potential impacts on operations and safety.	Parsons	**The RIRO at the shopping center across the street is too close to the Bourassa Intersection. Moving our proposed signalized access to match this RIRO is not feasible. Given that the RIRO only allows for rights in and rights out, there are no adverse safety or operations concerns at this time.**
9	Section 4.4.2 mentions that the PABL requirement for distance between private approach and signalized intersections is met. However, note that the same distance is also required between approaches to the same development, which does not appear to be the case. The south access does not appear to be at a distance of 75m from the Bourassa St street line either.	Parsons	**The south access has been removed altogether and a new in-bound only access has been proposed at the north quadrant of the site, which has a distance greater than 75m from Industrial/St. Laurent.**
10	To encourage transit usage, providing a prepaid Presto pass to residents at move in is requested.	Parsons	**Not required, client to consider.**
11	In Section 4.7, please provide the total existing/future transit demand/capacities to better analyze the impact of the proposed development on the transit system. It is noted that this data is pending from OC Transpo, the data has likely been received now	Parsons	**Noted, transit Section 4.7 updated.**

	as the TIA was written in July 2021.		
12	Section 4.8 mentions an approximate 165 units above allowable zoning which creates 110 peak hour person trips above the equivalent volume permitted by the established zoning. Please demonstrate how these values were found/calculated.	Parsons	**Calculations provided in Appendix L.**
13	Please justify why the St. Laurent Blvd / Bourassa St intersection was not analyzed in Table 16.	Parsons	**St. Laurent/Bourassa added to MMLOS analysis.**
14	Appendix J mentions that all approaches of the St. Laurent Blvd / Industrial Ave intersection have 2-stage LT bike boxes, which is not the case. BLOS for that intersection is actually F due to the dual left-turn lane configuration at the west approach for instance.	Parsons	**Noted, MMLOS updated.**
15	Given that other intersections along this corridor are designed without cross rides across St. Laurent Blvd, confirm with Traffic Signal design if they will be required at the proposed signalized intersection. Consideration should also be given to providing median refuge for pedestrians within this long crosswalk.	Parsons	**Cross-rides are envisioned in RMA.**
16	The proposed full-movement access is in excess of the 9m mentioned in Section 25.1.c of the PABL. Review narrowing the access as much as possible.	Parsons	**The latest site plan and RMA shows a narrower full movement access, consistent with PABL.**
17	Ensure that the proposed full-movement access has a throat length of at least 40m to satisfy the TAC guidelines.	Parsons	**The latest site plan meets a minimum throat length of 40m. Note that the southern loop is proposed as a counter clockwise direction of operation, meaning that the eastern leg is an out only, and as such, vehicles entering from the Site Access should not encounter any traffic from a vehicle trying to enter this leg.**
18	Please provide access and ramp grades in future submission. Also ensure that there are no sight line issues for vehicles using the proposed accesses. Review sightlines for all accesses and show them on drawings	Parsons	**Noted, ramp grades discussed in Section 4.1. Sight lines internal to the site are expected to be adequate. Buildings are set back a notable distance from the main aisle which allows for adequate sight lines. Additionally, the main aisle is designed for low operating speeds and presents low risk for vehicle circulation.**
19	In Design Priority Areas, all public projects, private developments, and community partnerships within the public realm will be reviewed for their contribution to an enhanced pedestrian environment and their response to the distinct character and unique opportunities of the area. The public realm/domain refers to all those private and publicly owned spaces and places, which are freely available to the public to see and use.	Parsons	**Noted.**
20	Ensure paving materials used on City right of way are durable and appropriate to the harsh urban and climatic conditions of Ottawa. Use materials that can be sourced when needed to be replaced. Contact David Atkinson for additional information on paver selection. A maintenance and liability agreement may be required for these pavers placed in City ROW.	Parsons	**Noted.**
21	The proposed traffic signal installation does not meet OTM warrants and must be fully funded by the developer. The conditions for installation are considered to be met, however, the southern RIRO access must remain as a truck access only to meet the requirement of consolidation of accesses.	Parsons	**Noted. The southern RIRO has been replaced by an in-bound only drive aisle in the north quadrant of the site.**
22	Review the protected intersection design with the new recently completed protected intersection design guidance. Confirm the need for cross rides in all directions with Traffic Signal Design unit.	Parsons	**Noted, cross-rides will be provided.**
23	Provide a functional design illustrating the required pavement markings for a SB-RT use of the transit lane and confirm that this has been discussed with Transit Services (graham.rathwell@ottawa.ca).	Parsons	**Noted, new design has been provided.**
Traffic Signal Operation			
24	Queueing issues associated with the addition of a traffic signal to the corridor remain undesirable and will lead to intersection blocking at times during the peak periods.	Parsons	**Noted.**
25	Cycling connectivity/cross-ride should be included in proposed signalized intersection design.	Parsons	**Cross-rides will be provided.**
26	Queueing mitigation with SB-right turn at the site access should be examined further and included in the proposed signalized intersection design.	Parsons	**Given the forecasted number of right-turns and cycling facilities, a no-right-on-red is proposed. SBRL storage will be provided within the transit lane.**
Traffic Signal Design			
27	Queueing mitigation with SB-right turn at the site access should be examined further and included in the proposed signalized intersection design.	Parsons	***Same as Q26***

28	Due to proposed changes in the existing roadway geometry for the purpose of construction of a new TCS(s) or modifications to existing TCS(s) the City of Ottawa Traffic Signal Design and Specification Unit is required to complete a review for traffic signal plant re-design and provide the actual re-design to the proponent or their consultant.	Parsons	**Noted.**
29	If the proposed traffic signals are warranted/approved for installation or modifications to existing TCS are approved, and RMA approved, please forward an approved geometry detail design drawings (dwg digital format in NAD 83 coordinates) including following: base mapping, existing and new underground utilities/sewers, new/existing catch basins locations, AutoTurn-Radius Modeling for approved vehicles and approved pavement markings drawings in separate files , no Xref files attached in master file(s), for detail traffic plant design lay out.	Parsons	**Noted, RMA and turning templates will be provided.**
30	Please send all digital (CADD) design files to Peter.Grajcar@ottawa.ca 613-580-2424x23035. There will be an initial Design/Review/Drafting Fee [$5K, though the tax and 15% City's Develop. projects admin, is not included, it is extra] which will have to be forwarded prior to any Signal Design work commencing.	Parsons	**CADD files to be sent.**
31	If not sure as per above explanation and more detailed information is needed as per input files, (i.e., format, etc.) please ask for our Dispatch checklist document and it will be gladly provided.	Parsons	**Noted.**
Street Lights			
32	No comment with this TIA. Reserve the right to comment on future circulations	Parsons	**Noted.**
Transit Services			
33	Comments were not provided. Transit comments will be sent as soon as they are available.	Parsons	**Noted.**
Development Review – Transportation			
34	Update Figure 2 with most current Site Plan.	Parsons	**Latest Site Plan has been provided.**
35	The text in section 11.3.1, page 31, just above Table 24, describes changes to the PM peak hour operations with proposed signal phasing. This should refence AM peak hour operations	Parsons	**We believe this might have been an error. The report does not have a Table 24 nor section 11.3.1. however, we have included discussions about proposed signal phasing in 4.9.2.**
36	Please address the above comments and re-submit the TIA and digital files of ICA outputs after reviewing and adjusting for the above comments. If the result of Synchro analysis indicates that any road modifications are required at study intersections as a result of site generated traffic, submit RMA sketches and functional design.	Parsons	**Noted.**
37	Update Table 14 as per current proposal.	Parsons	**Parking numbers have been updated.**
38	Please address the above comments and re-submit the TIA and digital files of ICA outputs (Synchro/Sidra/Rodel, if applicable).	Parsons	**Noted.**
Plans:			
	Site Plan, sheet # P100, prepared by Pierre Martin & Associés | Architectes and LaPalme Rheault Architectes + Associés, Consultant's project # 20005, dated 2021-10-19, revision 1, dated 2021-10-19. Floor Plan, sheet # P201-P203, prepared by Pierre Martin & Associés | Architectes and LaPalme Rheault Architectes + Associés, Consultant's project # 20005, dated 2021-10-19, revision 1, dated 2021-10-19. Site Grading Plan, drawing # C200, prepared by exp. Services Inc., Consultant's project # OTT260579-B0, dated Oct 2020, revision 2, dated 16/08/21.		
1	Show all details of the roads abutting the site; include such items as pavement markings, accesses and/or sidewalks.	PMA	**Comment for architect.**
2	Show all curb radii dimensions; ensure that all curb radii are reduced as much as possible and follow TAC Figure 8.5.1.	PMA	**Comment for architect.**
3	As the proposed main site access is controlled, sidewalk is not to be depressed and continuous across the access, as per City Specification 7.4. [Reinstating to SC 7.1 is incorrectly referenced in the Grading Plan.	PMA	**Comment for architect.**
4	SC 7.1 applies for the south access.	PMA	**Comment for architect.**
5	Show dimensions for site elements (i.e. lane/aisle widths, access width and throat length, parking stalls, sidewalks, pedestrian pathways, etc.) throughout the site plan. It is noted that some dimensions are provided, but not throughout the plan.	PMA	**Comment for architect.**
6	.As the site is proposed as multi-use, AODA legislation applies. a. Ensure pedestrian pathway grades meet AODA requirements, show slopes for	PMA	**Comment for architect.**

	pedestrian pathways on grading plan. b. Ensure all crosswalks located internally on the site provide a TWSI at the depressed curb, per requirements of the Integrated Accessibility Standards Regulation under the AODA. c. Clearly define which parking stalls are for visitors and for commercial use. Note that accessible parking stalls that are for visitor/commercial use must meet AODA standards (include an access aisle next to the parking stall and a pedestrian curb ramp at the end of the access aisle). Accessible parking stalls must be clearly identified.		
7	Ensure continuity throughout the site, please provide either a continuous sidewalk along the south side of Everest Private as was done on the north side or make all the pedestrian crossings cross-walks with TWSIs.	PMA	**For client to decide.**
8	Consider providing a pedestrian connection from the parking area between Towers 1 and 2, to the sidewalk that runs along Everest private, to avoid pedestrians needing to either cut through landscaping or walk in the drive aisle to access the sidewalk.	PMA	**For client to decide.**
9	Consider providing only the required number of parking stalls to support the use of nonauto modal shares.	PMA	**For client to decide.**
10	The TIA indicates that no access is to be provided via Everest Private, however the Site Plan appears to provide access to the adjacent development and no barriers are shown. Please clarify if access is to be provided to/from the adjacent property, if so, then the TIA must accommodate the potential for the residents in the adjacent developments to use the proposed signal to access St-Laurent Blvd, instead of traveling via Russell Road.	PMA	**It has been confirmed that vehicular traffic from the two towers at 355 and 374 Everest Private will use our site access and St. Laurent Boulevard. These volumes have been added to our proposed site access. Bollards located west of these two Everest Towers will prohibit vehicle interaction from the remaining Everest Developments and Russell Road to/from/via our site.**
11	Floor Plans: a. Show slope of garage ramp on floor plans. Note that underground ramps should be limited to a 12% grade when possible. Ramp grades greater than 15% can be psychological barriers to some drivers. b. Parking stalls at the end of dead-end parking aisles require adequate turning around space. a. c. Show where bicycle stalls are provided. If the bike rooms are in the underground parking areas, ensure cyclists can access the bike rooms using an elevator, because the ramp provided for vehicles is too steep for cyclists.	PMA	**Architect to provide this information.**

APPENDIX B

TRAFFIC COUNT DATA

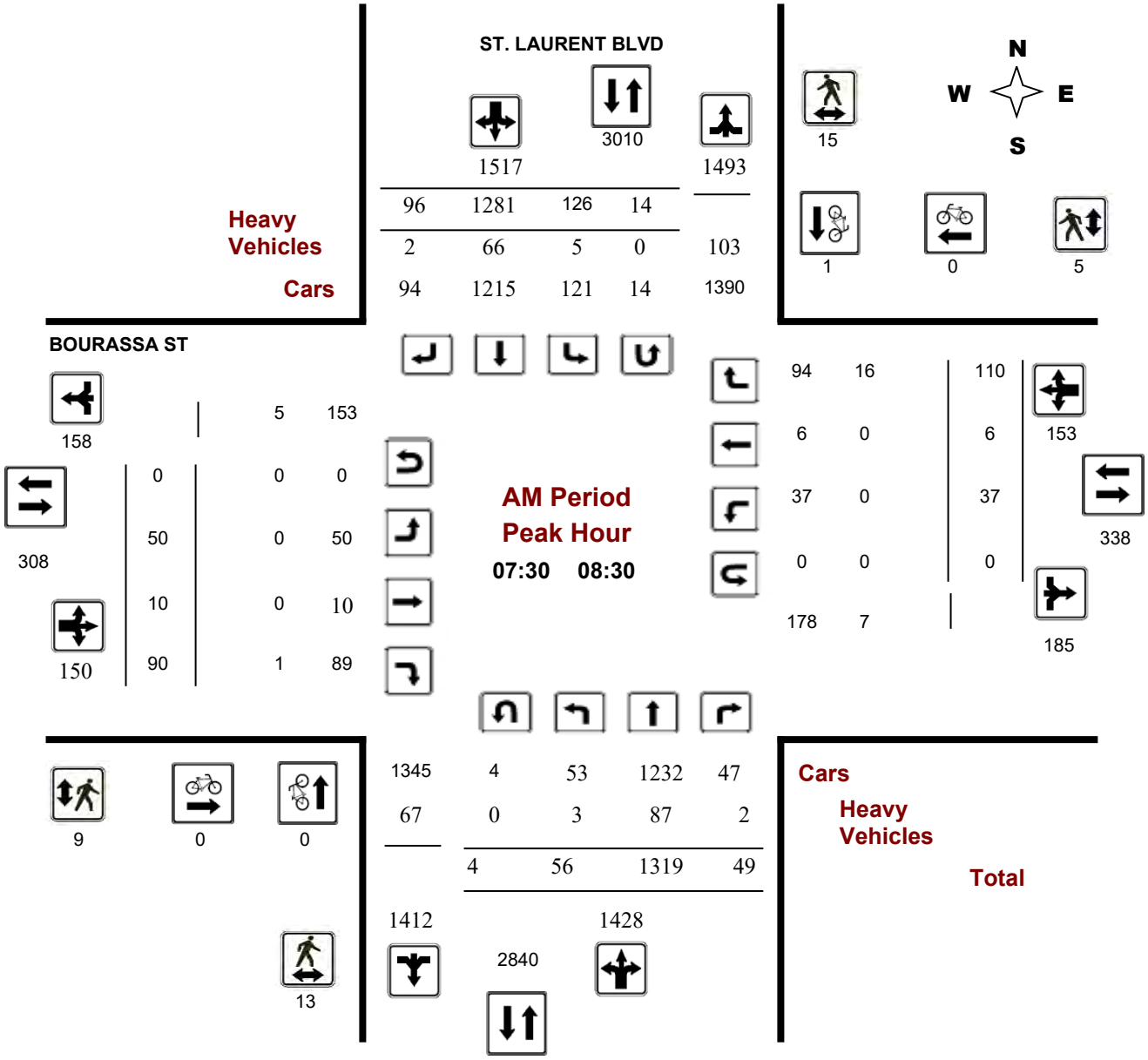
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOURASSA ST @ ST. LAURENT BLVD

Survey Date: Thursday, January 09, 2020 **WO No:** 39291

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



Comments 5469233 - THU JAN 09, 2020 - 8HRS - LORETTA

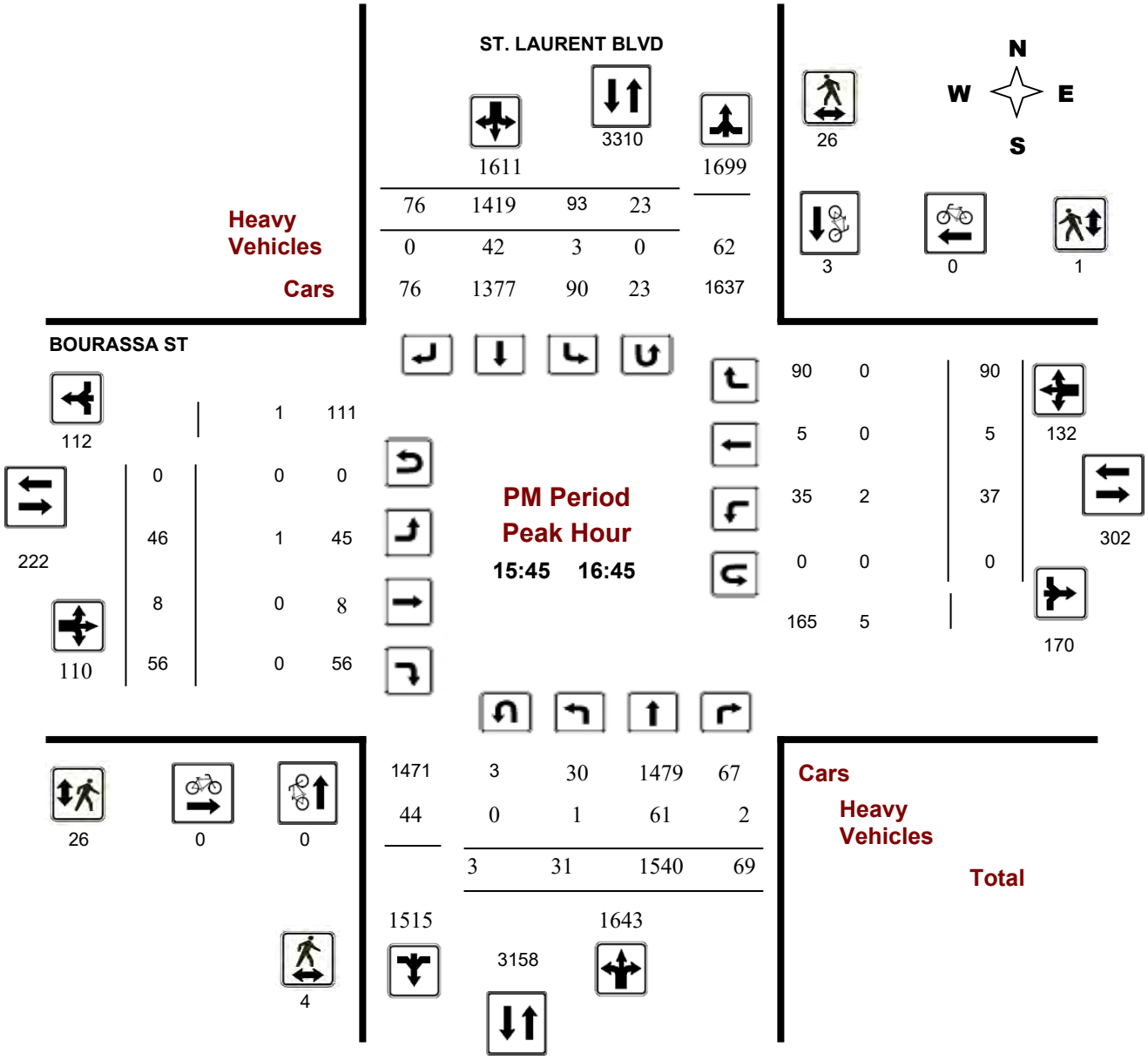
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOURASSA ST @ ST. LAURENT BLVD

Survey Date: Thursday, January 09, 2020 **WO No:** 39291

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



Comments 5469233 - THU JAN 09, 2020 - 8HRS - LORETTA

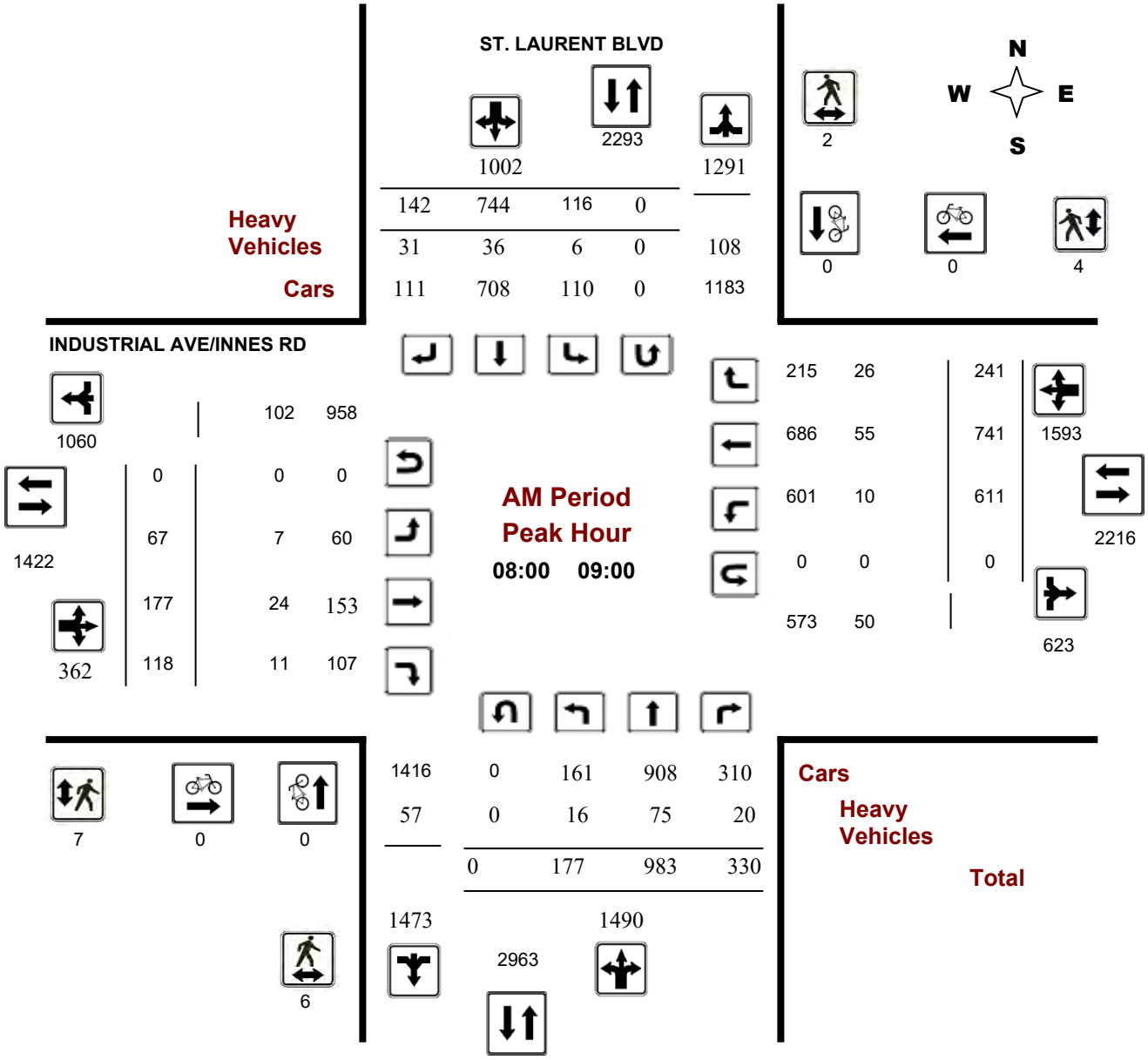
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

INDUSTRIAL AVE/INNES RD @ ST. LAURENT BLVD

Survey Date: Wednesday, January 30, 2019 **WO No:** 38336

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



Comments

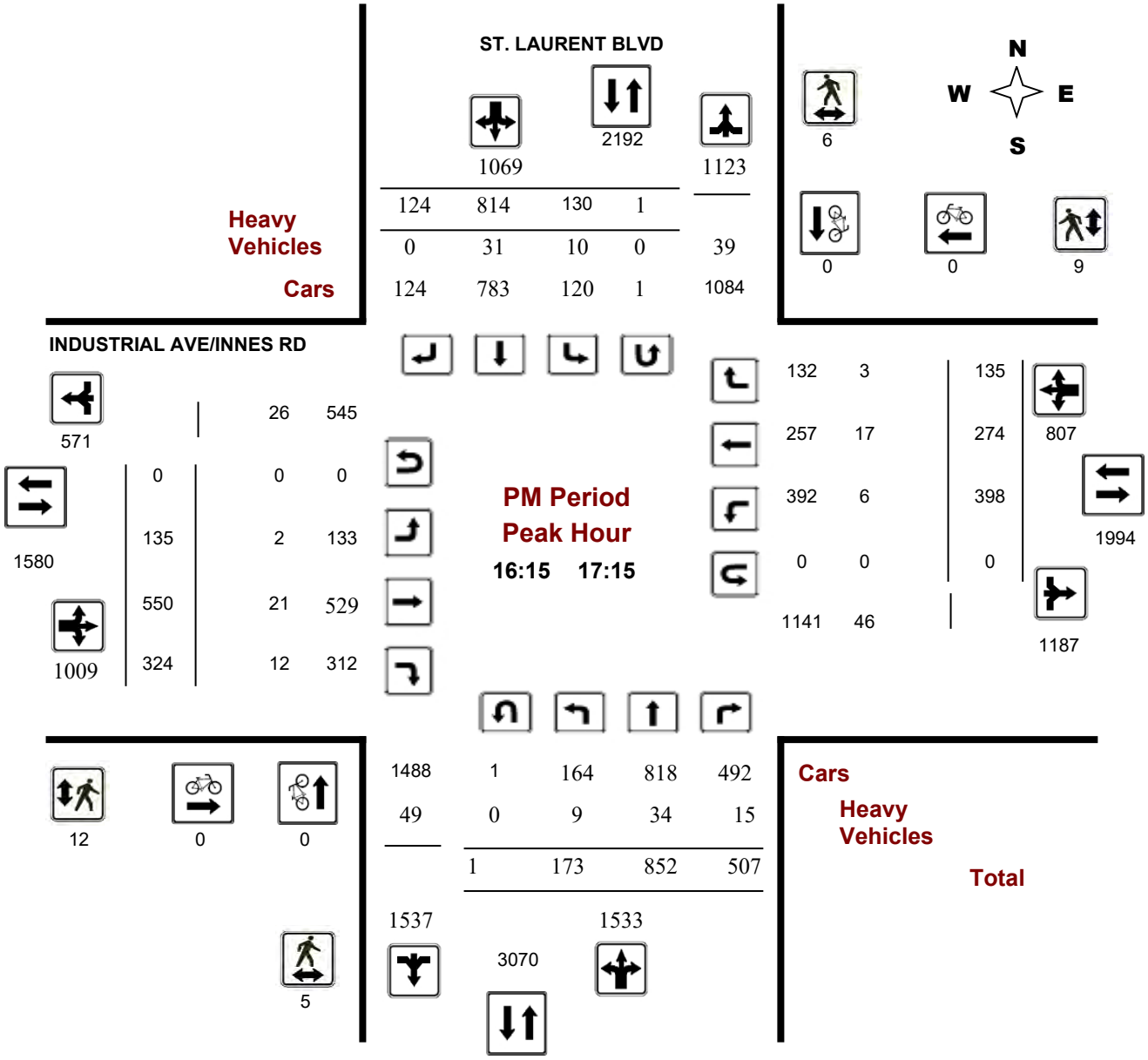
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

INDUSTRIAL AVE/INNES RD @ ST. LAURENT BLVD

Survey Date: Wednesday, January 30, 2019 **WO No:** 38336

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



Comments

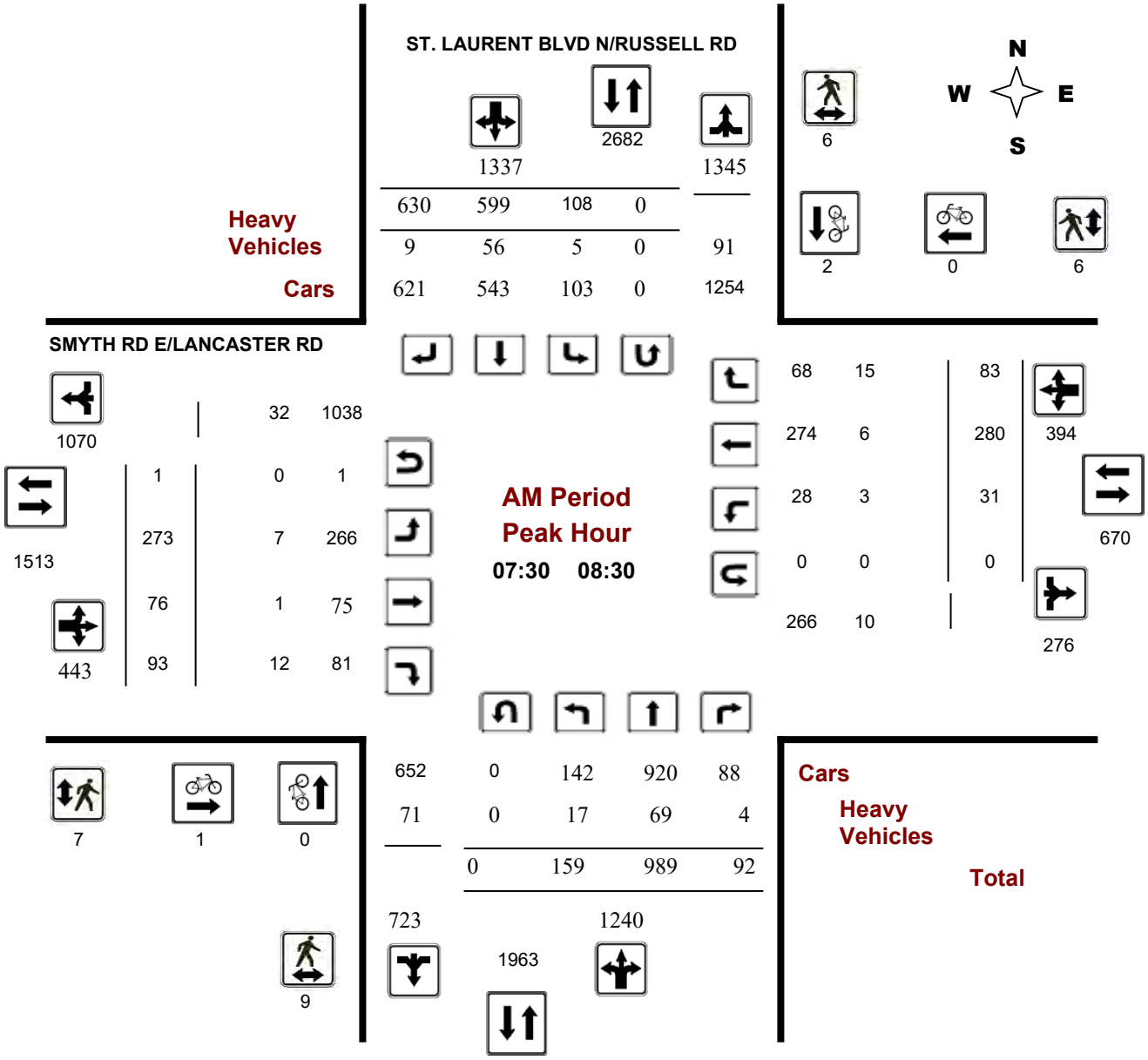
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

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

Survey Date: Thursday, January 28, 2016 **WO No:** 37985

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



Comments

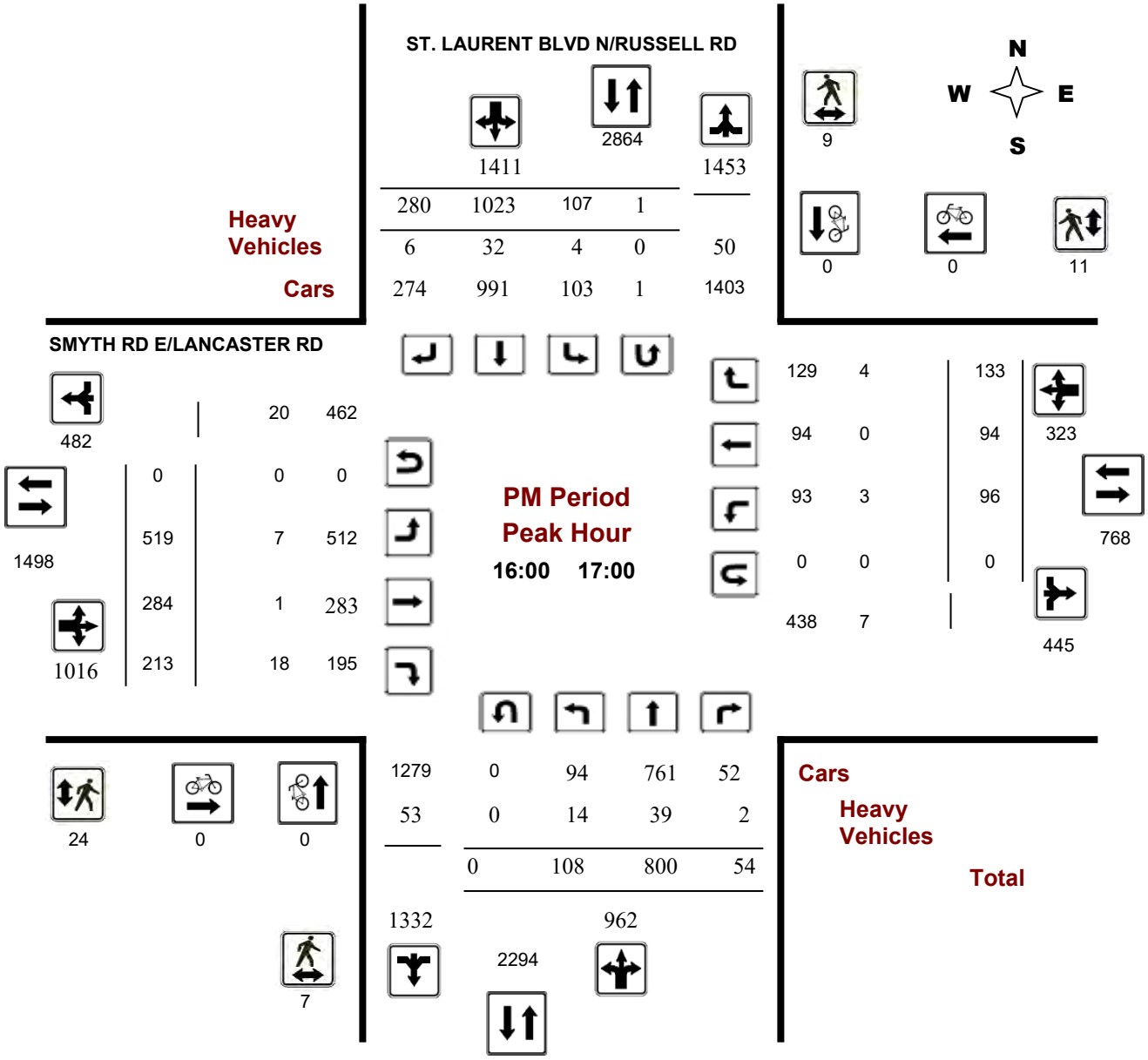
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

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

Survey Date: Thursday, January 28, 2016 **WO No:** 37985

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



Comments

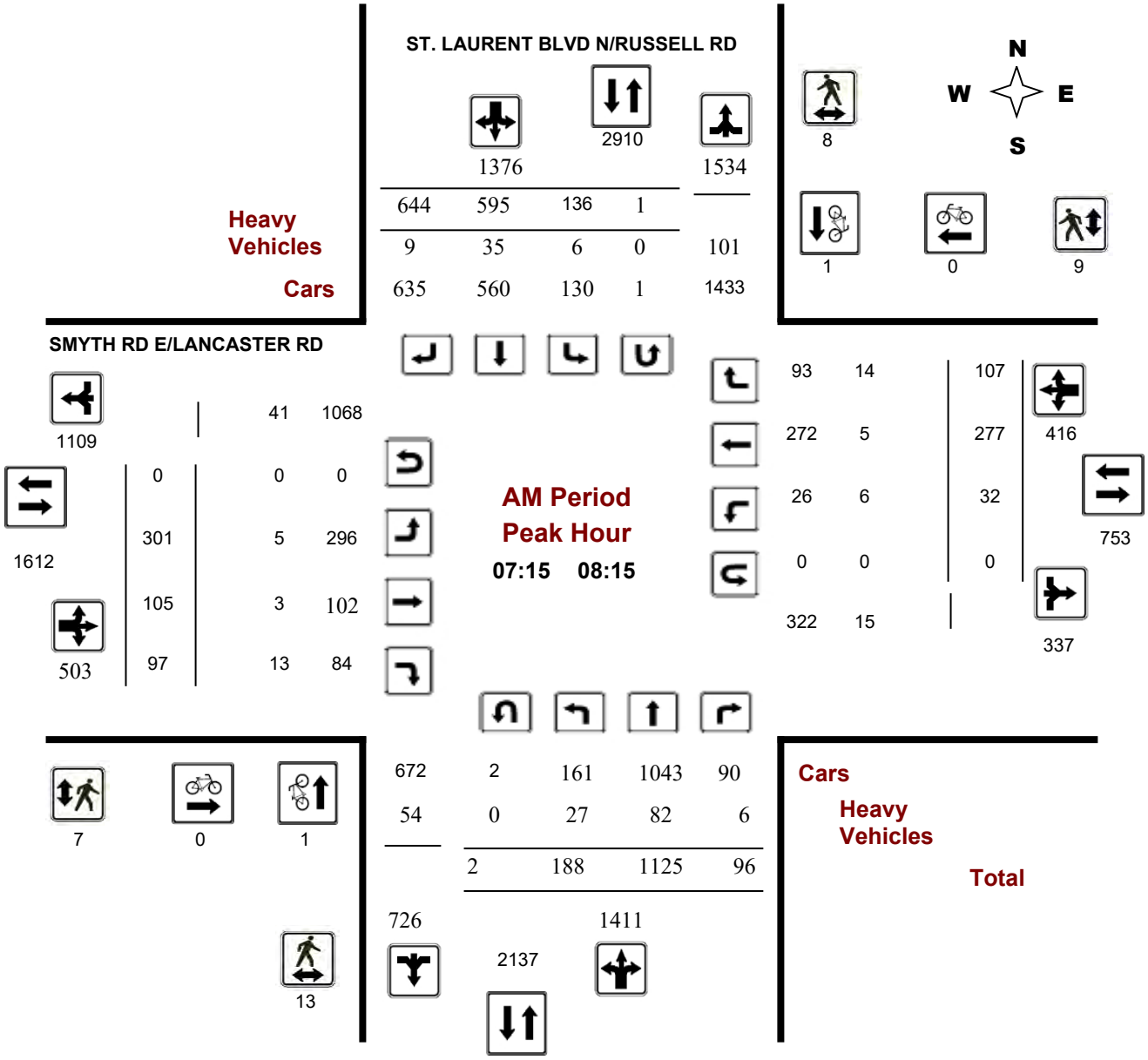
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

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

Survey Date: Thursday, March 05, 2020 **WO No:** 39290

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



Comments 5469232 - MAR 5, 2020 - 8HRS - LORETTA

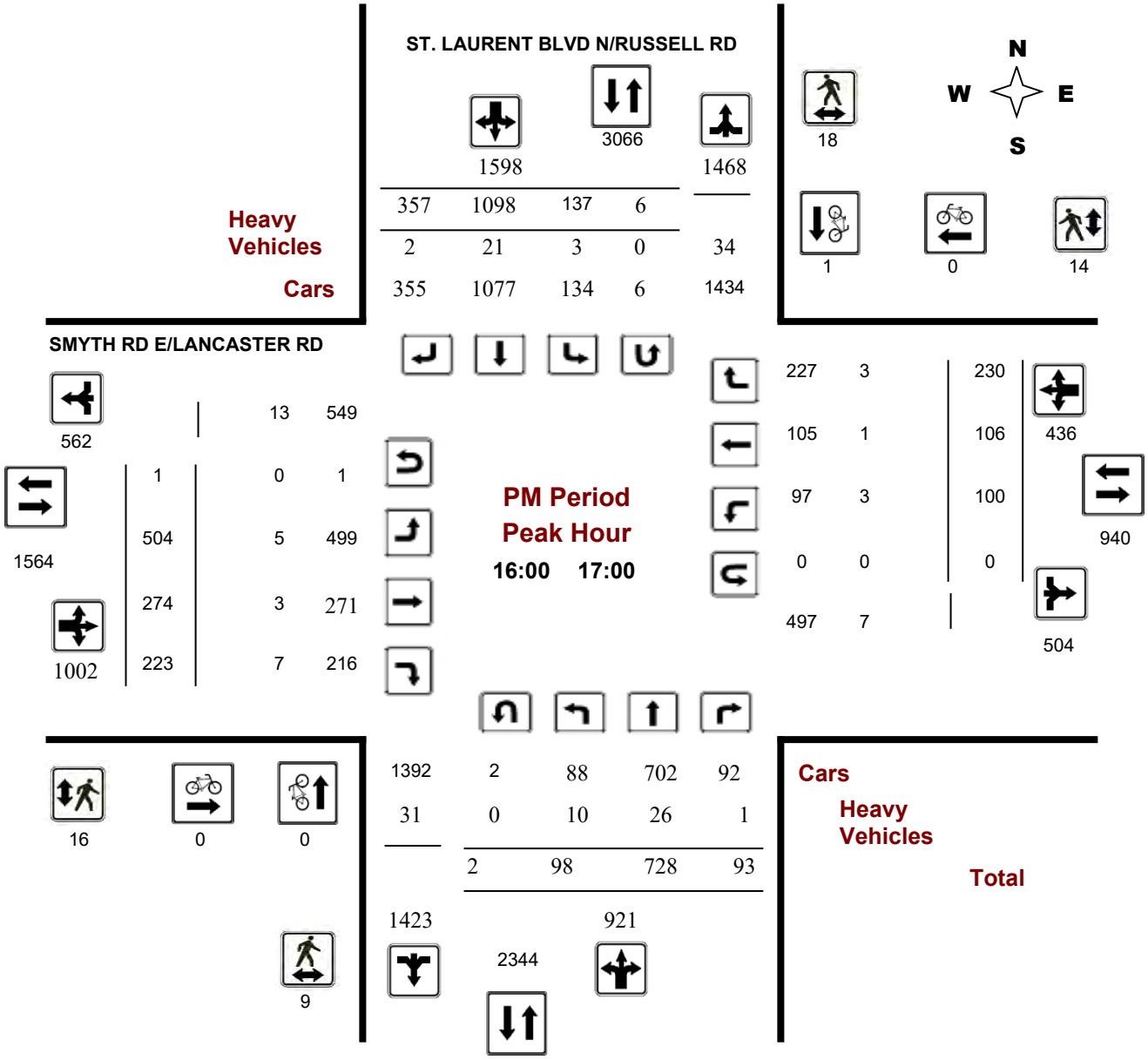
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

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

Survey Date: Thursday, March 05, 2020 **WO No:** 39290

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



Comments 5469232 - MAR 5, 2020 - 8HRS - LORETTA

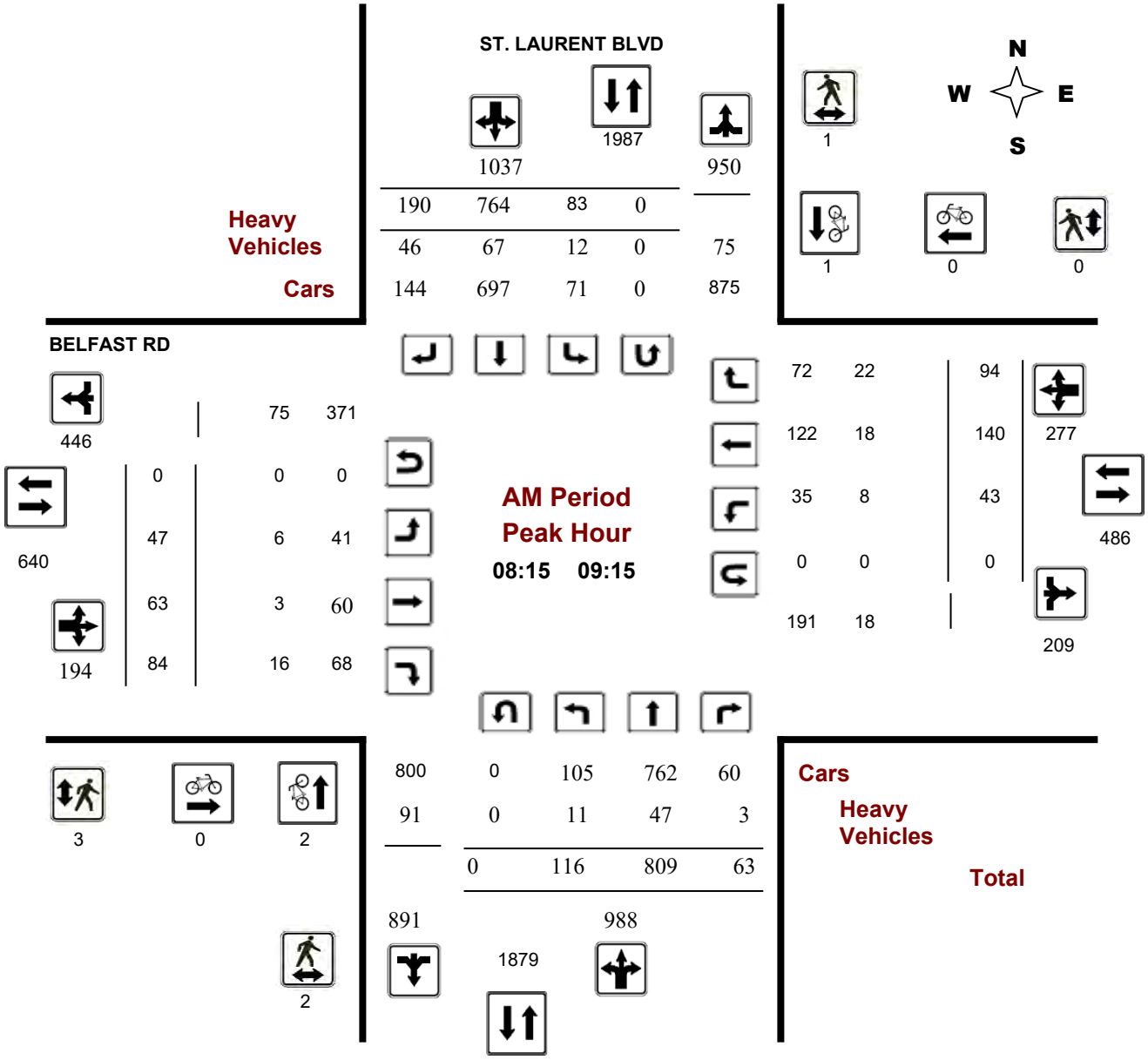
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BELFAST RD @ ST. LAURENT BLVD

Survey Date: Tuesday, February 06, 2018 **WO No:** 37494

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



Comments

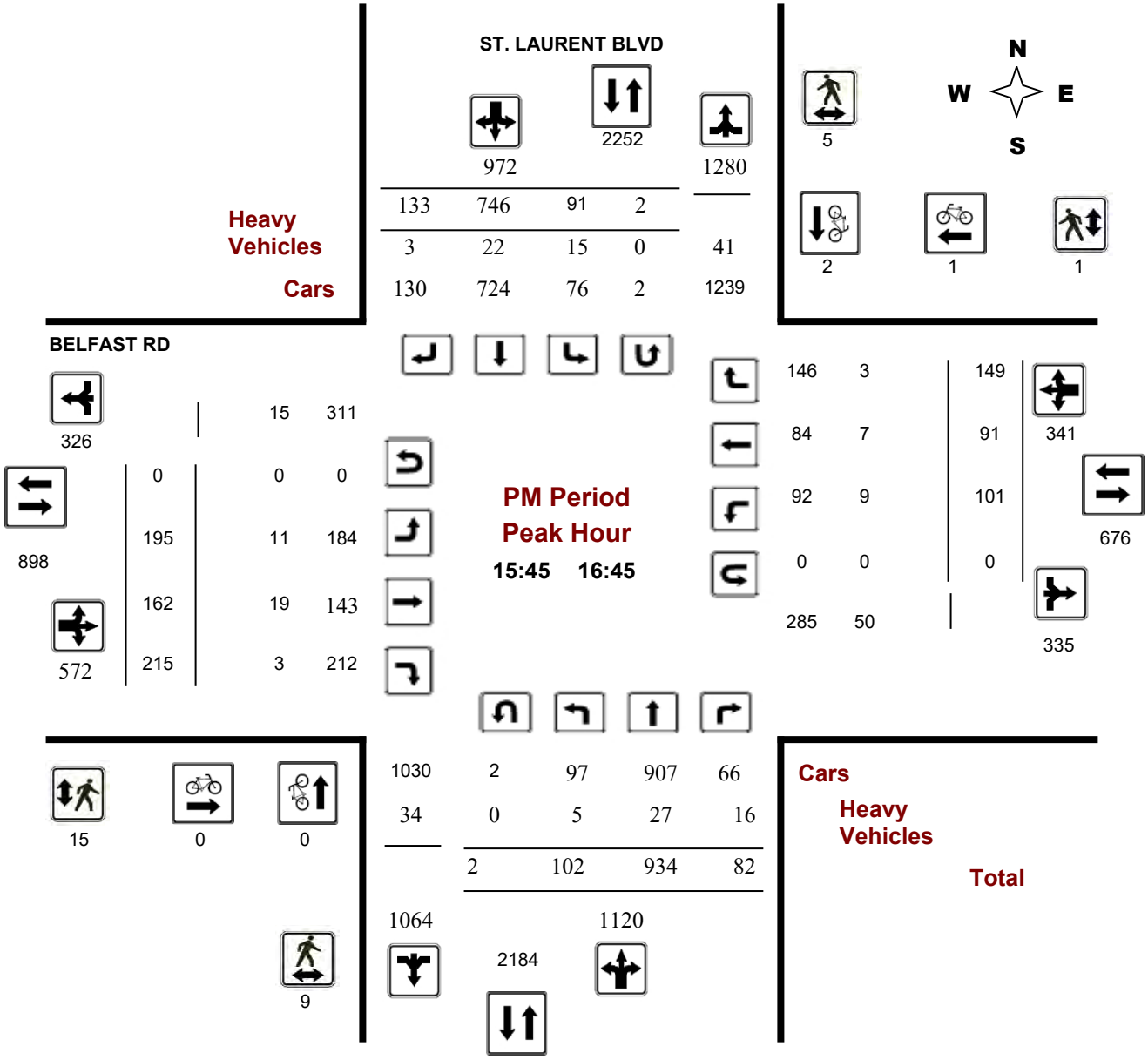
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BELFAST RD @ ST. LAURENT BLVD

Survey Date: Tuesday, February 06, 2018 **WO No:** 37494

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



Comments

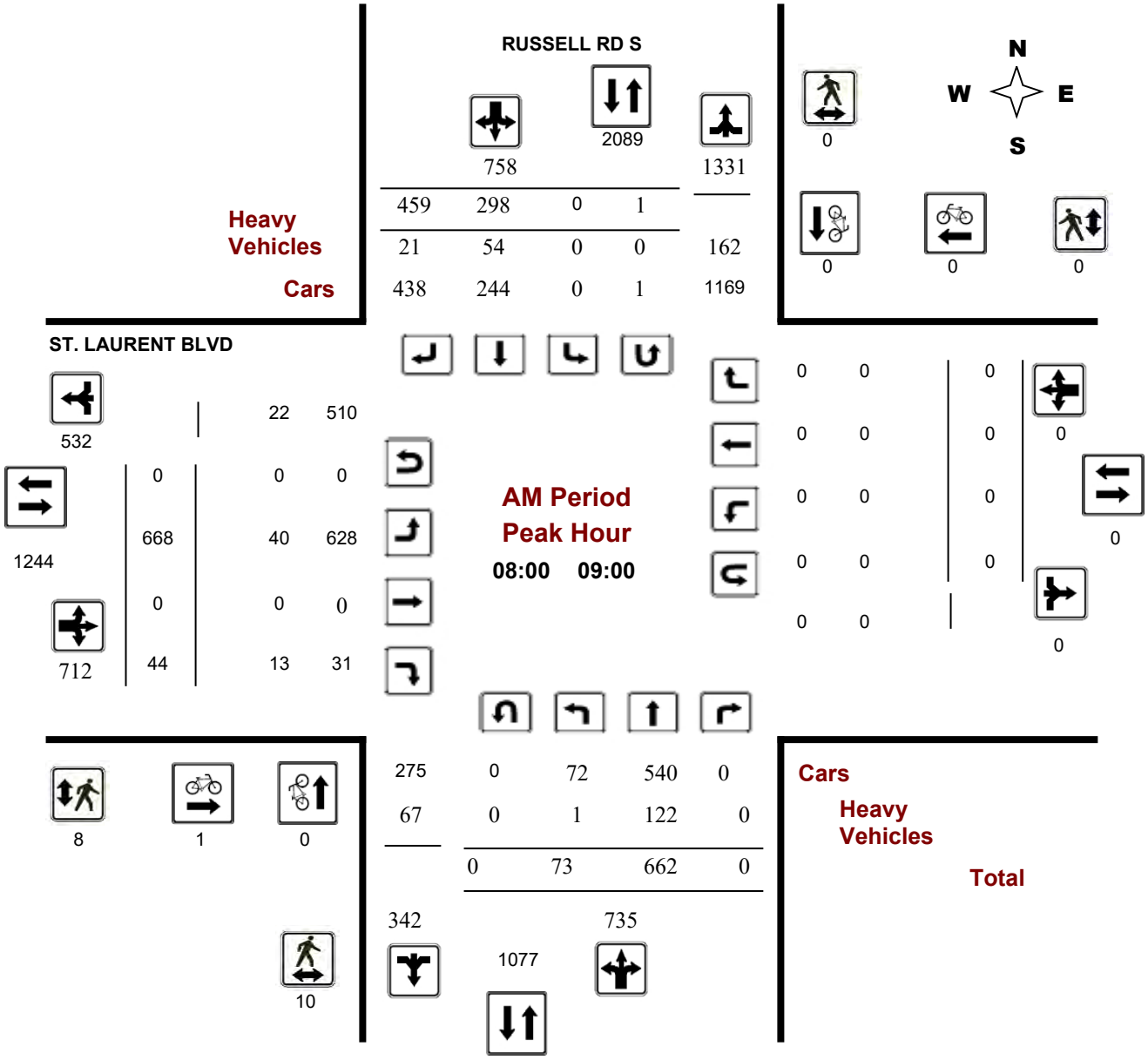
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017
Start Time: 07:00

WO No: 36886
Device: Miovision



Comments

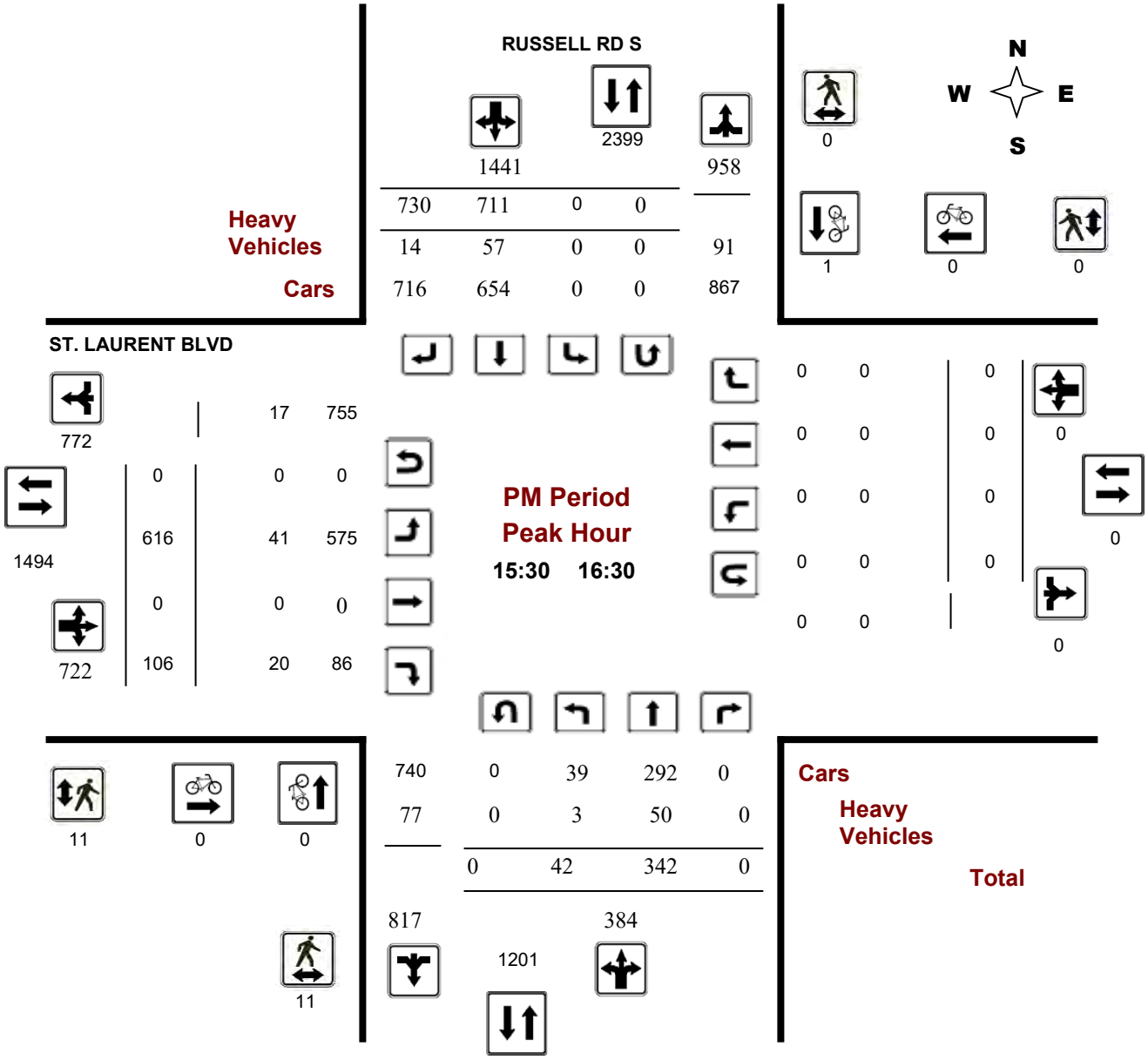
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017
Start Time: 07:00

WO No: 36886
Device: Miovision



Comments

APPENDIX C

COLLISION DATA

Total Area

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	169	51	79	31	2	13	2	6	353	80%
Non-fatal injury	45	16	7	10	0	10	0	1	89	20%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**214**	**67**	**86**	**41**	**2**	**23**	**2**	**7**	**442**	100%
	#1 or 48%	#3 or 15%	#2 or 19%	#4 or 9%	#7 or 0%	#5 or 5%	#7 or 0%	#6 or 2%		

BELFAST RD/ST. LAURENT BLVD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2017-2021	97	36,162	1825	**1.47**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	26	25	9	9	0	3	1	1	74	76%
Non-fatal injury	6	11	1	2	0	3	0	0	23	24%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**32**	**36**	**10**	**11**	**0**	**6**	**1**	**1**	**97**	100%
	33%	37%	10%	11%	0%	6%	1%	1%		

INDUSTRIAL AVE/INNES RD/ST. LAURENT BLVD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2017-2021	121	58,461	1825	**1.13**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	53	10	22	8	1	2	0	2	98	81%
Non-fatal injury	17	1	2	1	0	2	0	0	23	19%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**70**	**11**	**24**	**9**	**1**	**4**	**0**	**2**	**121**	100%
	58%	9%	20%	7%	1%	3%	0%	2%		

BOURASSA ST/ST. LAURENT BLVD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2017-2021	32	42,442	1825	**0.41**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	13	4	6	0	0	0	0	2	25	78%
Non-fatal injury	1	0	1	2	0	3	0	0	7	22%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**14**	**4**	**7**	**2**	**0**	**3**	**0**	**2**	**32**	100%
	44%	13%	22%	6%	0%	9%	0%	6%		

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

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2017-2021	89	47,266	1825	**1.03**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	45	4	19	5	1	4	0	0	78	88%
Non-fatal injury	8	1	2	0	0	0	0	0	11	12%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**53**	**5**	**21**	**5**	**1**	**4**	**0**	**0**	**89**	100%
	60%	6%	24%	6%	1%	5%	0%	0%		

RUSSELL RD S/ST. LAURENT BLVD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2017-2021	39	26,673	1825	**0.80**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	14	7	1	4	0	2	0	1	29	74%
Non-fatal injury	4	2	0	3	0	1	0	0	10	26%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**18**	**9**	**1**	**7**	**0**	**3**	**0**	**1**	**39**	100%
	46%	23%	3%	18%	0%	8%	0%	3%		

ROAD SEGMENTS

ST. LAURENT BLVD, BELFAST RD to INDUSTRIAL AVE

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2017-2021	22	n/a	1825	**n/a**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	8	0	9	0	0	1	1	0	19	86%
Non-fatal injury	2	0	0	0	0	0	0	1	3	14%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**10**	**0**	**9**	**0**	**0**	**1**	**1**	**1**	**22**	100%
	45%	0%	41%	0%	0%	5%	5%	5%		

ST. LAURENT BLVD, BOURASSA ST to INDUSTRIAL AVE

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2017-2021	24	n/a	1825	**n/a**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	5	1	6	4	0	1	0	0	17	71%
Non-fatal injury	2	1	1	2	0	1	0	0	7	29%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**7**	**2**	**7**	**6**	**0**	**2**	**0**	**0**	**24**	100%
	29%	8%	29%	25%	0%	8%	0%	0%		

ST. LAURENT BLVD, BOURASSA ST to SMYTH RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2017-2021	14	n/a	1825	**n/a**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	4	0	5	0	0	0	0	0	9	64%
Non-fatal injury	5	0	0	0	0	0	0	0	5	36%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**9**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**14**	100%
	64%	0%	36%	0%	0%	0%	0%	0%		

RUSSELL RD, ST. LAURENT BLVD to ST. LAURENT BLVD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2017-2021	4	n/a	1825	**n/a**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	1	0	2	1	0	0	0	0	4	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**	**1**	**0**	**0**	**0**	**0**	**4**	100%
	25%	0%	50%	25%	0%	0%	0%	0%		

APPENDIX D

TRIP GENERATION: INTERNAL REDUCTIONS

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	1740 - 1760 St. Laurent	**Organization:**	Parsons
Project Location:		**Performed By:**	
Scenario Description:	AM Internal Reduction	**Date:**	4/28/2023
Analysis Year:		**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				32	19	13
Restaurant				66	36	30
Cinema/Entertainment				0		
Residential				102	32	70
Hotel				0		
All Other Land Uses[2]				0		
				200	87	113

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		2	0	1	0
Restaurant	0	2		0	1	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	7	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	200	87	113
Internal Capture Percentage	14%	16%	12%
External Vehicle-Trips[5]	172	73	99
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	16%	23%
Restaurant	25%	10%
Cinema/Entertainment	N/A	N/A
Residential	6%	11%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	1740 - 1760 St. Laurent
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	19	19	1.00	13	13
Restaurant	1.00	36	36	1.00	30	30
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	32	32	1.00	70	70
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	4		2	0	2	0
Restaurant	9	4		0	1	1
Cinema/Entertainment	0	0	0		0	0
Residential	1	1	14	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		6	8	0	0	0
Retail	0		18	0	1	0
Restaurant	0	2		0	2	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	3	7	0		0
Hotel	0	1	2	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	3	16	19	16	0	0
Restaurant	9	27	36	27	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	2	30	32	30	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	3	10	13	10	0	0
Restaurant	3	27	30	27	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	8	62	70	62	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	1740 - 1760 St. Laurent	**Organization:**	Parsons
Project Location:		**Performed By:**	
Scenario Description:	PM Internal Reduction	**Date:**	4/28/2023
Analysis Year:		**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				87	43	44
Restaurant				65	40	25
Cinema/Entertainment				0		
Residential				126	73	53
Hotel				0		
All Other Land Uses[2]				0		
				278	156	122

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail					150	
Restaurant					150	
Cinema/Entertainment						
Residential		150	150			
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		12	0	11	0
Restaurant	0	10		0	5	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	4	6	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	278	156	122
Internal Capture Percentage	35%	31%	39%
External Vehicle-Trips[5]	182	108	74
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	33%	52%
Restaurant	45%	60%
Cinema/Entertainment	N/A	N/A
Residential	22%	19%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	1740 - 1760 St. Laurent
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	43	43	1.00	44	44
Restaurant	1.00	40	40	1.00	25	25
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	73	73	1.00	53	53
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	1		13	2	11	2
Restaurant	1	10		2	5	2
Cinema/Entertainment	0	0	0		0	0
Residential	2	22	11	0		2
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	1	0	3	0
Retail	0		12	0	34	0
Restaurant	0	22		0	12	0
Cinema/Entertainment	0	2	1		3	0
Residential	0	4	6	0		0
Hotel	0	1	2	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	14	29	43	29	0	0
Restaurant	18	22	40	22	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	16	57	73	57	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	23	21	44	21	0	0
Restaurant	15	10	25	10	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	10	43	53	43	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

APPENDIX E

TRAFFIC GROWTH DATA

Road/Road

8 hrs

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2001	Tues June 12	11373	10796	8185	8810	2382	2072	4757	5019	53394
2009	Friday June 5	11865	9457	7059	9682	2592	2206	4754	4925	52540
2014	29-May	9042	12396	11204	8999	2677	4871	6053	2710	57952
2016	Thurs Jan 28	10206	10237	7679	7956	2457	2378	5309	5080	51302
2020	Thurs March 5	11206	10725	7889	8274	3017	2951	5331	5593	54986

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2001	10796	11373	22169	53394				
2009	9457	11865	21322	52540	-12.4%	4.3%	-3.8%	-1.6%
2014	12396	9042	21438	57952	31.1%	-23.8%	0.5%	10.3%
2016	10237	10206	20443	51302	-17.4%	12.9%	-4.6%	-11.5%
2020	10725	11206	21931	54986	4.8%	9.8%	7.3%	7.2%

Regression Estimate	2001	10495	11363	21858
Regression Estimate	2020	10887	10284	21172
Average Annual Change		0.19%	-0.52%	-0.17%

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2001	4757	5019	9776	53394				
2009	4754	4925	9679	52540	-0.1%	-1.9%	-1.0%	-1.6%
2014	6053	2710	8763	57952	27.3%	-45.0%	-9.5%	10.3%
2016	5309	5080	10389	51302	-12.3%	87.5%	18.6%	-11.5%
2020	5331	5593	10924	54986	0.4%	10.1%	5.1%	7.2%

Regression Estimate	2001	4758	4640	9397
Regression Estimate	2020	5592	4684	10276
Average Annual Change		0.85%	0.05%	0.47%

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2001	2072	2382	4454	53394				
2009	2206	2592	4798	52540	6.5%	8.8%	7.7%	-1.6%
2014	4871	2677	7548	57952	120.8%	3.3%	57.3%	10.3%
2016	2378	2457	4835	51302	-51.2%	-8.2%	-35.9%	-11.5%
2020	2951	3017	5968	54986	24.1%	22.8%	23.4%	7.2%

Regression Estimate	2001	2204	2351	4555
Regression Estimate	2020	3398	2825	6223
Average Annual Change		2.31%	0.97%	1.66%

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2001	8185	8810	16995	53394				
2009	7059	9682	16741	52540	-13.8%	9.9%	-1.5%	-1.6%
2014	11204	8999	20203	57952	58.7%	-7.1%	20.7%	10.3%
2016	7679	7956	15635	51302	-31.5%	-11.6%	-22.6%	-11.5%
2020	7889	8274	16163	54986	2.7%	4.0%	3.4%	7.2%

Regression Estimate	2001	8145	9255	17400
Regression Estimate	2020	8591	8373	16964
Average Annual Change		0.28%	-0.53%	-0.13%

Road/Road

AM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2001	Tues June 12	1636	1319	1177	1064	285	285	489	918	7173
2009	Friday June 5	1633	1149	1082	1045	344	338	422	949	6962
2014	43980	1401	1294	1750	1293	403	814	561	534	8050
2016	Thurs Jan 28	1337	1345	1240	723	394	276	443	1070	6828
2020	Thurs March 5	1376	1534	1411	726	416	337	503	1109	7412

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2001	1319	1636	2955	7173				
2009	1149	1633	2782	6962	-12.9%	-0.2%	-5.9%	-2.9%
2014	1294	1401	2695	8050	12.6%	-14.2%	-3.1%	15.6%
2016	1345	1337	2682	6828	3.9%	-4.6%	-0.5%	-15.2%
2020	1534	1376	2910	7412	14.1%	2.9%	8.5%	8.6%
Regression Estimate	2001	1211	1669	2879				
Regression Estimate	2020	1414	1337	2750				
Average Annual Change		0.82%	-1.16%	-0.24%				

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2001	489	918	1407	7173				
2009	422	949	1371	6962	-13.7%	3.4%	-2.6%	-2.9%
2014	561	534	1095	8050	32.9%	-43.7%	-20.1%	15.6%
2016	443	1070	1513	6828	-21.0%	100.4%	38.2%	-15.2%
2020	503	1109	1612	7412	13.5%	3.6%	6.5%	8.6%
Regression Estimate	2001	470	850	1320				
Regression Estimate	2020	494	964	1457				
Average Annual Change		0.27%	0.66%	0.52%				

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2001	285	285	570	7173				
2009	338	344	682	6962	18.6%	20.7%	19.6%	-2.9%
2014	814	403	1217	8050	140.8%	17.2%	78.4%	15.6%
2016	276	394	670	6828	-66.1%	-2.2%	-44.9%	-15.2%
2020	337	416	753	7412	22.1%	5.6%	12.4%	8.6%
Regression Estimate	2001	344	289	633				
Regression Estimate	2020	458	426	884				
Average Annual Change		1.51%	2.06%	1.77%				

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2001	1177	1064	2241	7173				
2009	1082	1045	2127	6962	-8.1%	-1.8%	-5.1%	-2.9%
2014	1750	1293	3043	8050	61.7%	23.7%	43.1%	15.6%
2016	1240	723	1963	6828	-29.1%	-44.1%	-35.5%	-15.2%
2020	1411	726	2137	7412	13.8%	0.4%	8.9%	8.6%
Regression Estimate	2001	1149	1153	2302				
Regression Estimate	2020	1465	837	2302				
Average Annual Change		1.29%	-1.67%	0.00%				

Road/Road
PM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2001	Tues June 12	1555	1674	1105	1415	381	318	904	538	7890
2009	Friday June 5	1751	1589	1058	1642	450	338	912	600	8340
2014	43980	1154	2002	1573	1224	404	680	1121	346	8504
2016	Thurs Jan 28	1411	1453	962	1332	323	445	1016	482	7424
2020	Thurs March 5	1598	1468	921	1423	436	504	1002	562	7914

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2001	1674	1555	3229	7890				
2009	1589	1751	3340	8340	-5.1%	12.6%	3.4%	5.7%
2014	2002	1154	3156	8504	26.0%	-34.1%	-5.5%	2.0%
2016	1453	1411	2864	7424	-27.4%	22.3%	-9.3%	-12.7%
2020	1468	1598	3066	7914	1.0%	13.3%	7.1%	6.6%

Regression Estimate	2001	1721	1577	3298
Regression Estimate	2020	1577	1433	3010
Average Annual Change		-0.46%	-0.50%	-0.48%

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2001	904	538	1442	7890				
2009	912	600	1512	8340	0.9%	11.5%	4.9%	5.7%
2014	1121	346	1467	8504	22.9%	-42.3%	-3.0%	2.0%
2016	1016	482	1498	7424	-9.4%	39.3%	2.1%	-12.7%
2020	1002	562	1564	7914	-1.4%	16.6%	4.4%	6.6%

Regression Estimate	2001	907	537	1443
Regression Estimate	2020	1052	483	1535
Average Annual Change		0.79%	-0.55%	0.33%

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2001	318	381	699	7890				
2009	338	450	788	8340	6.3%	18.1%	12.7%	5.7%
2014	680	404	1084	8504	101.2%	-10.2%	37.6%	2.0%
2016	445	323	768	7424	-34.6%	-20.0%	-29.2%	-12.7%
2020	504	436	940	7914	13.3%	35.0%	22.4%	6.6%

Regression Estimate	2001	320	396	717
Regression Estimate	2020	556	401	957
Average Annual Change		2.95%	0.06%	1.53%

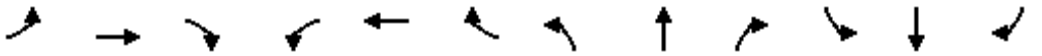
South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2001	1105	1415	2520	7890				
2009	1058	1642	2700	8340	-4.3%	16.0%	7.1%	5.7%
2014	1573	1224	2797	8504	48.7%	-25.5%	3.6%	2.0%
2016	962	1332	2294	7424	-38.8%	8.8%	-18.0%	-12.7%
2020	921	1423	2344	7914	-4.3%	6.8%	2.2%	6.6%

Regression Estimate	2001	1174	1476	2649
Regression Estimate	2020	1088	1357	2445
Average Annual Change		-0.40%	-0.44%	-0.42%

APPENDIX F

SYNCHRO ANALYSIS: EXISTING INTERSECTION PERFORMANCE



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
Satd. Flow (prot)	3288	3390	1517	3288	3390	1517	3288	3390	1517	3288	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3284	3390	1487	3256	3390	1495	3272	3390	1490	3282	3390	1484
Satd. Flow (RTOR)			180			268			343			180
Lane Group Flow (vph)	74	197	131	679	823	268	197	1092	367	129	827	158
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)	25.0	38.0	38.0	36.0	49.0	49.0	23.0	43.0	43.0	23.0	43.0	43.0
Total Split (%)	17.9%	27.1%	27.1%	25.7%	35.0%	35.0%	16.4%	30.7%	30.7%	16.4%	30.7%	30.7%
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)	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 Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.3	6.6	6.6	6.3	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	8.5	20.1	20.1	29.4	43.6	43.6	13.5	53.5	53.5	10.8	50.8	50.8
Actuated g/C Ratio	0.06	0.14	0.14	0.21	0.31	0.31	0.10	0.38	0.38	0.08	0.36	0.36
v/c Ratio	0.37	0.40	0.36	0.98	0.78	0.41	0.62	0.84	0.47	0.51	0.67	0.24
Control Delay	67.9	55.3	4.3	85.3	49.8	5.6	69.3	47.4	7.1	68.7	42.5	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.9	55.3	4.3	85.3	49.8	5.6	69.3	47.4	7.1	68.7	42.5	4.4
LOS	E	E	A	F	D	A	E	D	A	E	D	A
Approach Delay		41.0			56.7			41.1			40.1	
Approach LOS		D			E			D			D	
Queue Length 50th (m)	10.3	26.5	0.0	97.4	113.0	0.0	27.4	143.1	4.1	17.9	100.6	0.0
Queue Length 95th (m)	18.2	35.2	5.1	#136.4	124.4	18.4	39.5	#228.6	32.1	28.1	#157.0	12.2
Internal Link Dist (m)		460.3			515.4			130.1			572.9	
Turn Bay Length (m)	35.0		120.0	160.0		85.0	90.0		110.0	135.0		155.0
Base Capacity (vph)	432	760	473	690	1087	661	392	1296	781	392	1231	653
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	0.26	0.28	0.98	0.76	0.41	0.50	0.84	0.47	0.33	0.67	0.24

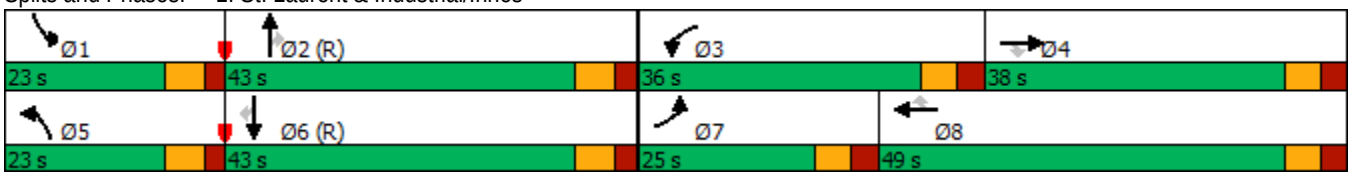
Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated

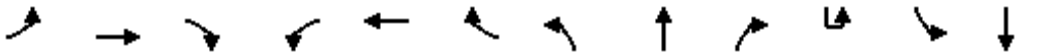
Maximum v/c Ratio: 0.98

Intersection Signal Delay: 46.4	Intersection LOS: D
Intersection Capacity Utilization 84.7%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: St. Laurent & Industrial/Innes





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	50	10	90	37	6	110	56	1319	49	14	126	1281
Future Volume (vph)	50	10	90	37	6	110	56	1319	49	14	126	1281
Satd. Flow (prot)	0	1586	0	0	1559	0	1695	3390	1517	0	1695	3390
Flt Permitted		0.696			0.792		0.950				0.950	
Satd. Flow (perm)	0	1116	0	0	1245	0	1689	3390	1464	0	1692	3390
Satd. Flow (RTOR)		58			99				86			
Lane Group Flow (vph)	0	167	0	0	170	0	62	1466	54	0	156	1423
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	Prot	NA
Protected Phases		4			8		5	2		1	1	6
Permitted Phases	4			8					2			
Detector Phase	4	4		8	8		5	2	2	1	1	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	5.0	10.0
Minimum Split (s)	33.3	33.3		33.3	33.3		11.2	27.2	27.2	11.2	11.2	33.0
Total Split (s)	34.0	34.0		34.0	34.0		18.0	68.0	68.0	18.0	18.0	68.0
Total Split (%)	28.3%	28.3%		28.3%	28.3%		15.0%	56.7%	56.7%	15.0%	15.0%	56.7%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	1.7	1.7	2.0	2.0	1.7
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		6.3			6.3		6.2	5.9	5.9		6.2	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	None	C-Min
Act Effct Green (s)		17.0			17.0		9.5	68.3	68.3		16.3	77.5
Actuated g/C Ratio		0.14			0.14		0.08	0.57	0.57		0.14	0.65
v/c Ratio		0.80			0.65		0.46	0.76	0.06		0.68	0.65
Control Delay		58.5			31.9		58.5	13.7	1.1		65.0	17.3
Queue Delay		0.0			0.0		0.0	0.0	0.0		0.0	0.0
Total Delay		58.5			31.9		58.5	13.7	1.1		65.0	17.3
LOS		E			C		E	B	A		E	B
Approach Delay		58.5			31.9			15.0				20.9
Approach LOS		E			C			B				C
Queue Length 50th (m)		25.7			15.6		15.6	53.5	0.3		34.6	103.9
Queue Length 95th (m)		45.9			35.3		m19.0	53.2	m0.5		#75.3	172.2
Internal Link Dist (m)		48.8			101.3			271.9				163.4
Turn Bay Length (m)							55.0		105.0		80.0	
Base Capacity (vph)		302			363		168	1929	870		230	2190
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		0.55			0.47		0.37	0.76	0.06		0.68	0.65

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 113 (94%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	96
Future Volume (vph)	96
Satd. Flow (prot)	1517
Flt Permitted	
Satd. Flow (perm)	1448
Satd. Flow (RTOR)	86
Lane Group Flow (vph)	107
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	33.0
Total Split (s)	68.0
Total Split (%)	56.7%
Yellow Time (s)	4.2
All-Red Time (s)	1.7
Lost Time Adjust (s)	0.0
Total Lost Time (s)	5.9
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Min
Act Effct Green (s)	77.5
Actuated g/C Ratio	0.65
v/c Ratio	0.11
Control Delay	4.2
Queue Delay	0.0
Total Delay	4.2
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (m)	1.7
Queue Length 95th (m)	11.0
Internal Link Dist (m)	
Turn Bay Length (m)	60.0
Base Capacity (vph)	965
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.11

Intersection Summary

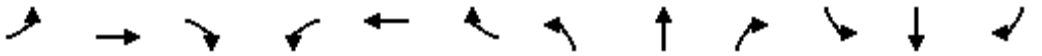
Maximum v/c Ratio: 0.80

Intersection Signal Delay: 20.6	Intersection LOS: C
Intersection Capacity Utilization 79.6%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: St. Laurent & Bourassa





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	301	105	97	32	277	107	188	1125	96	136	595	644
Future Volume (vph)	301	105	97	32	277	107	188	1125	96	136	595	644
Satd. Flow (prot)	3288	1784	1517	1695	3390	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3242	1784	1467	1664	3390	1479	1687	3390	1448	1688	3390	1481
Satd. Flow (RTOR)			132			132			130			385
Lane Group Flow (vph)	334	117	108	36	308	119	209	1250	107	151	661	716
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)	11.0	28.0	28.0	11.0	28.0	28.0	11.2	28.2	28.2	11.2	28.2	28.2
Total Split (s)	20.0	28.0	28.0	20.0	28.0	28.0	20.0	52.0	52.0	20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%	23.3%	16.7%	43.3%	43.3%	16.7%	43.3%	43.3%
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)	1.9	2.0	2.0	1.9	2.0	2.0	1.8	1.7	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.7	5.7	5.6	5.7	5.7	6.0	5.9	5.9	6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	14.2	27.4	27.4	8.0	16.5	16.5	19.6	51.3	51.3	14.8	46.5	46.5
Actuated g/C Ratio	0.12	0.23	0.23	0.07	0.14	0.14	0.16	0.43	0.43	0.12	0.39	0.39
v/c Ratio	0.86	0.29	0.25	0.32	0.66	0.38	0.75	0.86	0.15	0.72	0.50	0.89
Control Delay	73.3	41.8	5.3	60.1	55.9	9.2	66.7	39.7	3.0	76.2	25.0	24.9
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	73.3	41.8	5.3	60.1	55.9	9.2	66.7	39.7	3.0	76.2	25.0	24.9
LOS	E	D	A	E	E	A	E	D	A	E	C	C
Approach Delay		53.6			44.2			40.8			30.0	
Approach LOS		D			D			D			C	
Queue Length 50th (m)	40.3	24.2	0.0	8.3	36.8	0.0	47.2	141.4	0.0	38.0	40.0	103.5
Queue Length 95th (m)	#63.6	40.4	9.7	18.5	48.8	12.8	#100.0	#196.2	7.4	m#66.0	60.8	#108.8
Internal Link Dist (m)		678.5			293.4			245.7			271.9	
Turn Bay Length (m)	70.0		100.0	35.0		15.0	65.0		25.0	110.0		90.0
Base Capacity (vph)	394	406	436	203	629	382	277	1448	693	218	1313	809
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	0.85	0.29	0.25	0.18	0.49	0.31	0.75	0.86	0.15	0.69	0.50	0.89

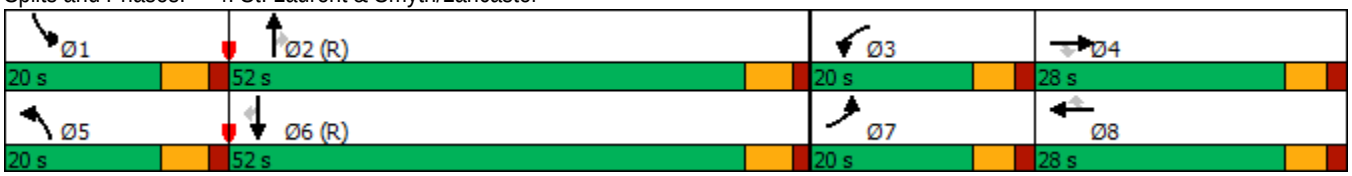
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 110 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

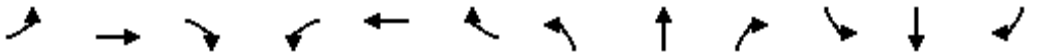
Maximum v/c Ratio: 0.89

Intersection Signal Delay: 38.9	Intersection LOS: D
Intersection Capacity Utilization 79.9%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: St. Laurent & Smyth/Lancaster





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	63	84	43	140	94	116	809	63	83	764	190
Future Volume (vph)	47	63	84	43	140	94	116	809	63	83	764	190
Satd. Flow (prot)	1695	1784	1517	1695	1668	0	1695	3390	1517	1695	3390	1517
Flt Permitted	0.246			0.711			0.245			0.234		
Satd. Flow (perm)	439	1784	1494	1265	1668	0	437	3390	1485	418	3390	1492
Satd. Flow (RTOR)			93		26				130			211
Lane Group Flow (vph)	52	70	93	48	260	0	129	899	70	92	849	211
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	27.8	27.8	27.8	27.8		11.2	41.6	41.6	11.2	41.6	41.6
Total Split (s)	16.0	48.0	48.0	32.0	32.0		15.0	57.0	57.0	15.0	57.0	57.0
Total Split (%)	13.3%	40.0%	40.0%	26.7%	26.7%		12.5%	47.5%	47.5%	12.5%	47.5%	47.5%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		1.5	1.4	1.4	1.5	1.4	1.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8		5.7	5.6	5.6	5.7	5.6	5.6
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	34.5	34.5	34.5	22.2	22.2		69.1	60.4	60.4	67.5	59.5	59.5
Actuated g/C Ratio	0.29	0.29	0.29	0.18	0.18		0.58	0.50	0.50	0.56	0.50	0.50
v/c Ratio	0.24	0.14	0.19	0.21	0.79		0.38	0.53	0.09	0.29	0.51	0.25
Control Delay	29.3	28.3	5.8	41.1	58.6		15.5	24.2	0.2	14.7	24.2	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	28.3	5.8	41.1	58.6		15.5	24.2	0.2	14.7	24.2	3.9
LOS	C	C	A	D	E		B	C	A	B	C	A
Approach Delay		18.8			55.9			21.7			19.8	
Approach LOS		B			E			C			B	
Queue Length 50th (m)	8.8	11.9	0.0	9.7	53.3		12.5	76.4	0.0	8.7	72.2	0.0
Queue Length 95th (m)	15.7	19.9	10.2	19.1	76.6		26.6	115.3	0.2	19.8	107.3	14.9
Internal Link Dist (m)		480.6			437.7			572.9			582.7	
Turn Bay Length (m)	70.0		200.0	65.0			65.0		65.0	75.0		100.0
Base Capacity (vph)	236	643	597	284	394		356	1735	823	339	1719	860
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.11	0.16	0.17	0.66		0.36	0.52	0.09	0.27	0.49	0.25

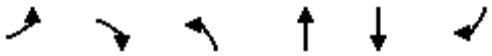
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 100 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 24.4	Intersection LOS: C
Intersection Capacity Utilization 69.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Belfast





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	668	44	73	662	298	459
Future Volume (vph)	668	44	73	662	298	459
Satd. Flow (prot)	3288	1517	1695	3390	3390	1517
Flt Permitted	0.950		0.457			
Satd. Flow (perm)	3288	1485	812	3390	3390	1485
Satd. Flow (RTOR)		31				510
Lane Group Flow (vph)	742	49	81	736	331	510
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	30.0	30.0	11.0	24.0	26.5	26.5
Total Split (s)	31.0	31.0	12.0	39.0	27.0	27.0
Total Split (%)	44.3%	44.3%	17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	20.9	20.9	37.6	37.6	27.7	27.7
Actuated g/C Ratio	0.30	0.30	0.54	0.54	0.40	0.40
v/c Ratio	0.76	0.11	0.16	0.40	0.25	0.57
Control Delay	27.4	9.2	9.9	11.1	16.9	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	9.2	9.9	11.1	16.9	5.0
LOS	C	A	A	B	B	A
Approach Delay	26.3			10.9	9.7	
Approach LOS	C			B	A	
Queue Length 50th (m)	44.8	1.7	4.8	27.6	15.9	0.0
Queue Length 95th (m)	57.3	7.7	12.0	44.8	27.1	19.8
Internal Link Dist (m)	174.1			99.9	245.7	
Turn Bay Length (m)		15.0	65.0			90.0
Base Capacity (vph)	1174	550	523	1822	1340	895
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.09	0.15	0.40	0.25	0.57

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 15.5	Intersection LOS: B
Intersection Capacity Utilization 55.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Russell/St. Laurent & St. Laurent (south leg)



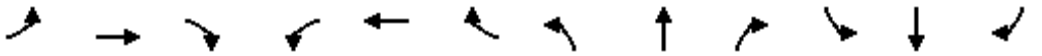
Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	23	0	1485	1488	27
Future Vol, veh/h	0	23	0	1485	1488	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	15
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	26	0	1650	1653	30

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	827	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	315	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	315	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	315	-	-
HCM Lane V/C Ratio	-	0.081	-	-
HCM Control Delay (s)	-	17.4	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.3	-	-



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	173	852	507	130	814	124
Future Volume (vph)	135	550	324	398	274	135	173	852	507	130	814	124
Satd. Flow (prot)	3288	3390	1517	3288	3390	1517	3288	3390	1517	3288	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3258	3390	1488	3272	3390	1486	3261	3390	1479	3269	3390	1473
Satd. Flow (RTOR)			305			150			462			168
Lane Group Flow (vph)	150	611	360	442	304	150	192	947	563	144	904	138
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)	19.0	38.0	38.0	41.0	60.0	60.0	28.0	43.0	43.0	28.0	43.0	43.0
Total Split (%)	12.7%	25.3%	25.3%	27.3%	40.0%	40.0%	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)	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 Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.3	6.6	6.6	6.3	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	11.3	32.5	32.5	25.4	46.7	46.7	14.1	54.0	54.0	11.9	51.9	51.9
Actuated g/C Ratio	0.08	0.22	0.22	0.17	0.31	0.31	0.09	0.36	0.36	0.08	0.35	0.35
v/c Ratio	0.61	0.83	0.64	0.79	0.29	0.27	0.62	0.78	0.68	0.55	0.77	0.22
Control Delay	77.8	66.6	14.9	70.5	39.0	5.9	74.1	49.1	13.1	74.3	50.4	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.8	66.6	14.9	70.5	39.0	5.9	74.1	49.1	13.1	74.3	50.4	3.5
LOS	E	E	B	E	D	A	E	D	B	E	D	A
Approach Delay		51.5			49.0			40.0			47.8	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	22.5	91.0	13.3	65.9	35.8	0.0	28.8	133.5	22.2	21.6	128.3	0.0
Queue Length 95th (m)	34.4	113.0	47.0	81.0	45.7	14.9	41.0	#192.2	75.0	32.5	#187.5	9.5
Internal Link Dist (m)		460.3			515.4			130.1			572.9	
Turn Bay Length (m)	35.0		120.0	160.0		85.0	90.0		110.0	135.0		155.0
Base Capacity (vph)	271	759	569	754	1206	625	475	1221	828	475	1172	619
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	0.55	0.81	0.63	0.59	0.25	0.24	0.40	0.78	0.68	0.30	0.77	0.22

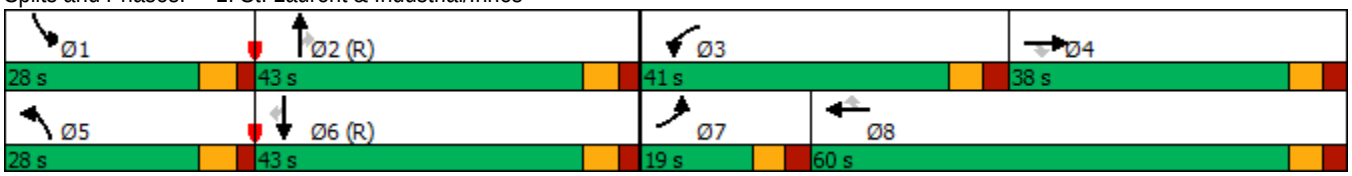
Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 46.2	Intersection LOS: D
Intersection Capacity Utilization 82.5%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: St. Laurent & Industrial/Innes



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	46	8	56	37	5	90	31	1540	69	23	93	1419
Future Volume (vph)	46	8	56	37	5	90	31	1540	69	23	93	1419
Satd. Flow (prot)	0	1614	0	0	1548	0	1695	3390	1517	0	1695	3390
Flt Permitted		0.711			0.842		0.950				0.950	
Satd. Flow (perm)	0	1159	0	0	1320	0	1681	3390	1479	0	1695	3390
Satd. Flow (RTOR)		40			68				86			
Lane Group Flow (vph)	0	122	0	0	147	0	34	1711	77	0	129	1577
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	Prot	NA
Protected Phases		4			8		5	2		1	1	6
Permitted Phases	4			8					2			
Detector Phase	4	4		8	8		5	2	2	1	1	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	5.0	10.0
Minimum Split (s)	33.3	33.3		33.3	33.3		11.2	27.2	27.2	11.2	11.2	27.2
Total Split (s)	34.0	34.0		34.0	34.0		13.0	73.0	73.0	13.0	13.0	73.0
Total Split (%)	28.3%	28.3%		28.3%	28.3%		10.8%	60.8%	60.8%	10.8%	10.8%	60.8%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	1.7	1.7	2.0	2.0	1.7
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		6.3			6.3		6.2	5.9	5.9		6.2	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	None	C-Min
Act Effct Green (s)		17.4			17.4		7.0	68.8	68.8		15.4	82.1
Actuated g/C Ratio		0.14			0.14		0.06	0.57	0.57		0.13	0.68
v/c Ratio		0.60			0.59		0.35	0.88	0.09		0.60	0.68
Control Delay		42.8			33.8		60.3	28.3	4.8		63.8	16.3
Queue Delay		0.0			0.0		0.0	0.0	0.0		0.0	0.0
Total Delay		42.8			33.8		60.3	28.3	4.8		63.8	16.3
LOS		D			C		E	C	A		E	B
Approach Delay		42.8			33.8			27.9				19.1
Approach LOS		D			C			C				B
Queue Length 50th (m)		19.0			18.0		8.3	193.6	1.7		28.1	109.2
Queue Length 95th (m)		34.9			35.0		m12.1	m220.6	m3.3		#76.0	186.8
Internal Link Dist (m)		48.8			101.3			271.9				163.4
Turn Bay Length (m)							55.0		105.0		80.0	
Base Capacity (vph)		298			357		102	1944	884		216	2319
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		0.41			0.41		0.33	0.88	0.09		0.60	0.68

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 42 (35%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	76
Future Volume (vph)	76
Satd. Flow (prot)	1517
Flt Permitted	
Satd. Flow (perm)	1376
Satd. Flow (RTOR)	86
Lane Group Flow (vph)	84
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	27.2
Total Split (s)	73.0
Total Split (%)	60.8%
Yellow Time (s)	4.2
All-Red Time (s)	1.7
Lost Time Adjust (s)	0.0
Total Lost Time (s)	5.9
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Min
Act Effct Green (s)	82.1
Actuated g/C Ratio	0.68
v/c Ratio	0.09
Control Delay	2.7
Queue Delay	0.0
Total Delay	2.7
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (m)	0.0
Queue Length 95th (m)	6.6
Internal Link Dist (m)	
Turn Bay Length (m)	60.0
Base Capacity (vph)	968
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.09

Intersection Summary

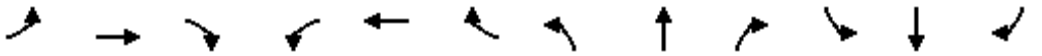
Maximum v/c Ratio: 0.88

Intersection Signal Delay: 24.5	Intersection LOS: C
Intersection Capacity Utilization 84.8%	ICU Level of Service E
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: St. Laurent & Bourassa





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	504	274	223	100	106	230	98	728	93	143	1098	357
Future Volume (vph)	504	274	223	100	106	230	98	728	93	143	1098	357
Satd. Flow (prot)	3288	1784	1517	1695	3390	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3151	1784	1477	1679	3390	1455	1687	3390	1428	1674	3390	1460
Satd. Flow (RTOR)			248			192			130			372
Lane Group Flow (vph)	560	304	248	111	118	256	109	809	103	159	1220	397
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)	11.0	28.0	28.0	11.0	28.0	28.0	11.2	28.2	28.2	11.2	28.2	28.2
Total Split (s)	26.0	28.0	28.0	26.0	28.0	28.0	17.0	49.0	49.0	17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%	23.3%	14.2%	40.8%	40.8%	14.2%	40.8%	40.8%
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)	1.9	2.0	2.0	1.9	2.0	2.0	1.8	1.7	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.7	5.7	5.6	5.7	5.7	6.0	5.9	5.9	6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	20.4	25.4	25.4	13.2	18.2	18.2	10.9	44.2	44.2	14.0	47.3	47.3
Actuated g/C Ratio	0.17	0.21	0.21	0.11	0.15	0.15	0.09	0.37	0.37	0.12	0.39	0.39
v/c Ratio	1.00	0.80	0.49	0.60	0.23	0.67	0.71	0.65	0.17	0.81	0.91	0.50
Control Delay	88.8	61.9	8.4	63.6	44.4	21.8	77.6	34.7	2.9	80.4	43.2	9.3
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	88.8	61.9	8.4	63.6	44.4	21.8	77.6	34.7	2.9	80.4	43.2	9.3
LOS	F	E	A	E	D	C	E	C	A	F	D	A
Approach Delay		63.5			36.9			36.1			39.0	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	~68.9	66.7	0.0	25.3	12.6	13.2	24.9	83.7	0.0	40.3	~141.8	0.8
Queue Length 95th (m)	#105.2	#114.5	21.4	42.0	20.9	40.0	#51.6	105.3	7.0	m#80.5	#196.1	41.6
Internal Link Dist (m)		678.5			293.4			245.7			271.9	
Turn Bay Length (m)	70.0		100.0	35.0		15.0	65.0		25.0	110.0		90.0
Base Capacity (vph)	558	378	508	288	629	426	161	1249	608	197	1336	800
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	1.00	0.80	0.49	0.39	0.19	0.60	0.68	0.65	0.17	0.81	0.91	0.50

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: 110
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

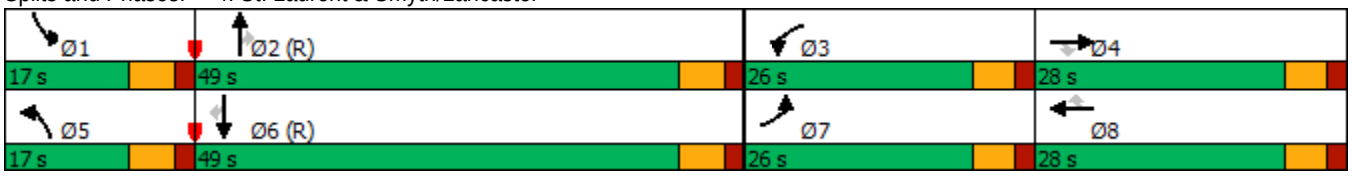
Intersection Signal Delay: 44.3	Intersection LOS: D
Intersection Capacity Utilization 85.1%	ICU Level of Service E
Analysis Period (min) 15	

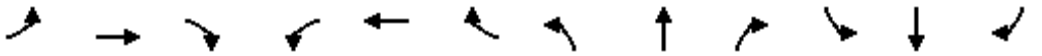
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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: 4: St. Laurent & Smyth/Lancaster





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	162	215	101	91	149	102	934	82	91	746	133
Future Volume (vph)	195	162	215	101	91	149	102	934	82	91	746	133
Satd. Flow (prot)	1695	1784	1517	1695	1597	0	1695	3390	1517	1695	3390	1517
Flt Permitted	0.208			0.644			0.233			0.152		
Satd. Flow (perm)	370	1784	1477	1136	1597	0	414	3390	1481	271	3390	1473
Satd. Flow (RTOR)			217		64				130			148
Lane Group Flow (vph)	217	180	239	112	267	0	113	1038	91	101	829	148
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	27.8	27.8	27.8	27.8		11.2	41.6	41.6	11.2	41.6	41.6
Total Split (s)	15.0	49.0	49.0	34.0	34.0		14.0	57.0	57.0	14.0	57.0	57.0
Total Split (%)	12.5%	40.8%	40.8%	28.3%	28.3%		11.7%	47.5%	47.5%	11.7%	47.5%	47.5%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		1.5	1.4	1.4	1.5	1.4	1.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8		5.7	5.6	5.6	5.7	5.6	5.6
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	42.1	42.1	42.1	20.7	20.7		61.1	52.5	52.5	60.4	52.2	52.2
Actuated g/C Ratio	0.35	0.35	0.35	0.17	0.17		0.51	0.44	0.44	0.50	0.44	0.44
v/c Ratio	0.72	0.29	0.36	0.57	0.81		0.37	0.70	0.13	0.43	0.56	0.20
Control Delay	45.1	28.8	6.3	55.9	54.6		17.6	31.5	1.6	19.8	28.1	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.1	28.8	6.3	55.9	54.6		17.6	31.5	1.6	19.8	28.1	4.1
LOS	D	C	A	E	D		B	C	A	B	C	A
Approach Delay		25.9			55.0			28.0			24.0	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	34.4	27.7	3.1	24.4	46.8		13.8	114.5	0.0	12.3	84.5	0.0
Queue Length 95th (m)	#80.9	47.7	20.3	40.3	72.0		21.8	128.4	3.9	19.8	95.7	11.8
Internal Link Dist (m)		480.6			437.7			572.9			582.7	
Turn Bay Length (m)	70.0		200.0	65.0			65.0		65.0	75.0		100.0
Base Capacity (vph)	301	663	685	266	424		309	1538	743	242	1535	748
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.27	0.35	0.42	0.63		0.37	0.67	0.12	0.42	0.54	0.20

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

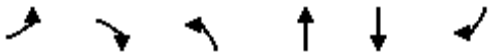
Maximum v/c Ratio: 0.81

Intersection Signal Delay: 29.4	Intersection LOS: C
Intersection Capacity Utilization 78.6%	ICU Level of Service D
Analysis Period (min) 15	

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

Splits and Phases: 5: St. Laurent & Belfast





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	616	106	42	342	711	730
Future Volume (vph)	616	106	42	342	711	730
Satd. Flow (prot)	3288	1517	1695	3390	3390	1517
Flt Permitted	0.950		0.226			
Satd. Flow (perm)	3288	1483	402	3390	3390	1481
Satd. Flow (RTOR)		80				811
Lane Group Flow (vph)	684	118	47	380	790	811
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	30.0	30.0	11.0	24.0	26.5	26.5
Total Split (s)	31.0	31.0	12.0	39.0	27.0	27.0
Total Split (%)	44.3%	44.3%	17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	20.1	20.1	38.4	38.4	31.1	31.1
Actuated g/C Ratio	0.29	0.29	0.55	0.55	0.44	0.44
v/c Ratio	0.73	0.24	0.14	0.20	0.52	0.73
Control Delay	26.9	8.4	9.7	9.1	18.2	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.9	8.4	9.7	9.1	18.2	6.8
LOS	C	A	A	A	B	A
Approach Delay	24.2			9.2	12.5	
Approach LOS	C			A	B	
Queue Length 50th (m)	40.9	3.6	2.7	12.4	43.4	0.0
Queue Length 95th (m)	52.2	12.9	8.0	22.2	67.9	#39.2
Internal Link Dist (m)	174.1			99.9	245.7	
Turn Bay Length (m)		15.0	65.0			90.0
Base Capacity (vph)	1174	581	342	1860	1507	1108
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.20	0.14	0.20	0.52	0.73

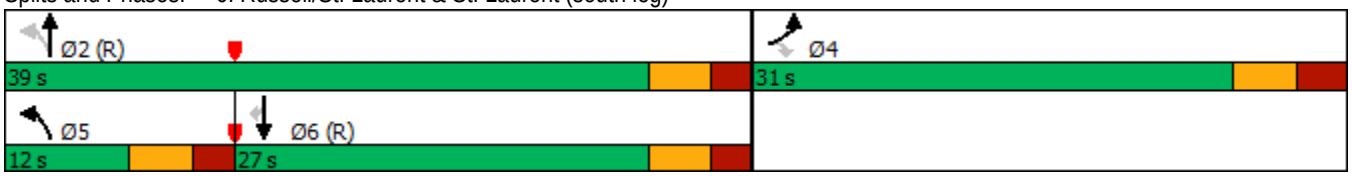
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 6: Russell/St. Laurent & St. Laurent (south leg)



Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	78	0	1604	1562	80
Future Vol, veh/h	0	78	0	1604	1562	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	15
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	87	0	1782	1736	89

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	868	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	296	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	296	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	296	-	-
HCM Lane V/C Ratio	-	0.293	-	-
HCM Control Delay (s)	-	22.1	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	1.2	-	-

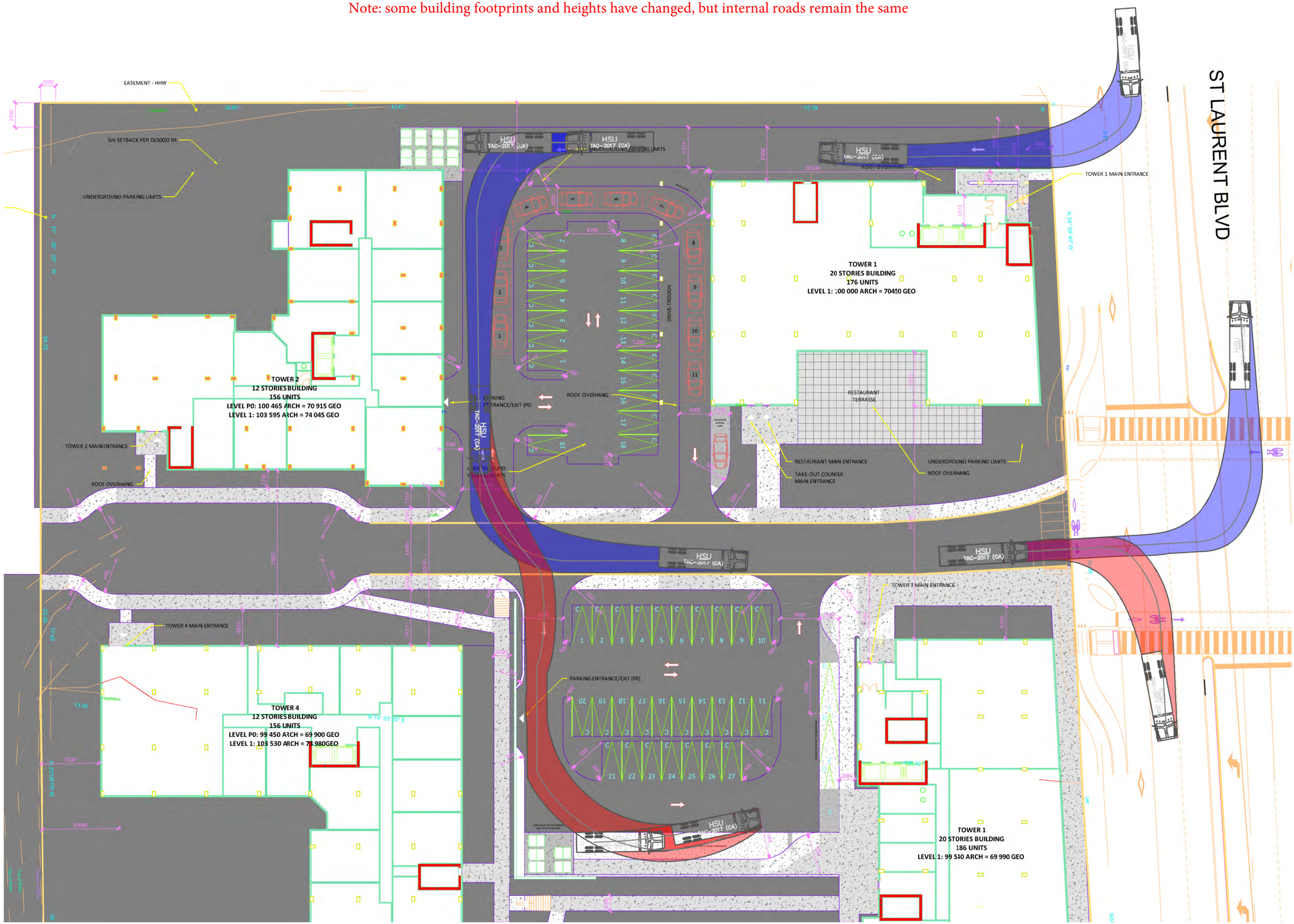
APPENDIX G

TRUCK TURNING TEMPLATES

Note: some building footprints and heights have changed, but internal roads remain the same



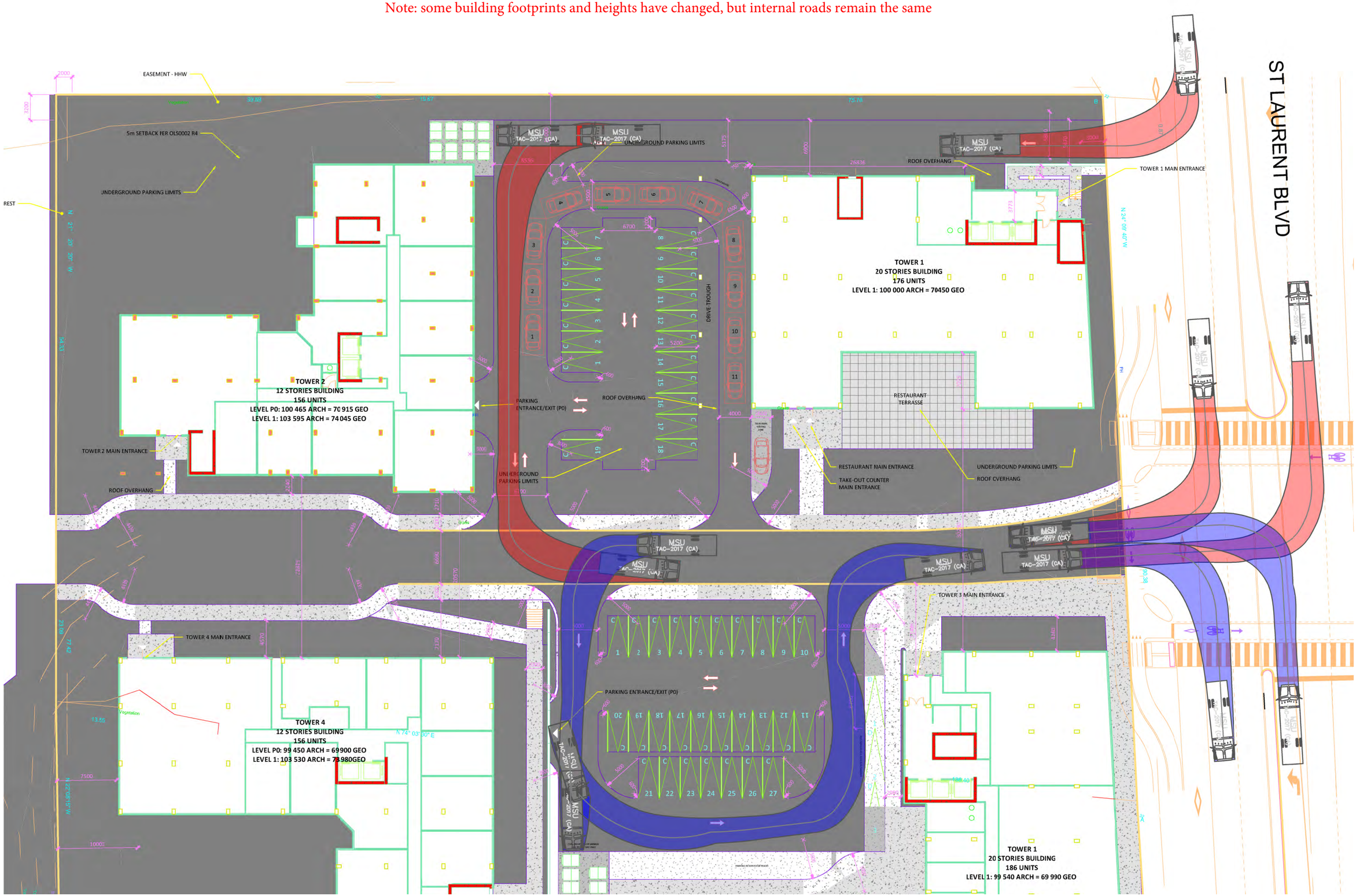
Note: some building footprints and heights have changed, but internal roads remain the same



Note: some building footprints and heights have changed, but internal roads remain the same



Note: some building footprints and heights have changed, but internal roads remain the same



APPENDIX H

MMLOS ANALYSIS: ROAD SEGMENTS

Multi-Modal Level of Service - Segments Form

Consultant	Parsons	**Project**	477563
Scenario	1740 St. Laurent	**Date**	Oct. 23, 2020
Comments			

SEGMENTS		Street A	St. Laurent West Side	St. Laurent East Side	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	Section 9
Pedestrian	Sidewalk Width Boulevard Width	D	≥ 2 m > 2 m	≥ 2 m > 2 m							
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000							
	Operating Speed On-Street Parking		> 50 to 60 km/h no	> 60 km/h no							
	Exposure to Traffic PLoS		**C**	**D**	-	-	-	-	-	-	-
	Effective Sidewalk Width		2.0 m	2.0 m							
	Pedestrian Volume		500 ped /hr	500 ped /hr							
	Crowding PLoS		**B**	**B**	-	-	-	-	-	-	-
	Level of Service		**C**	**D**	-	-	-	-	-	-	-
Bicycle	Type of Cycling Facility	A	Physically Separated	Physically Separated							
	Number of Travel Lanes				sweet						
	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										
	Unsignalized Crossing - Lowest LoS		**A**	**A**	-	-	-	-	-	-	-
	Level of Service		**A**	**A**	-	-	-	-	-	-	-
Transit	Facility Type	B	Bus lane	Bus lane							
	Friction or Ratio Transit:Posted Speed		Cf ≤ 60	Cf ≤ 60							
	Level of Service		**B**	**B**	-	-	-	-	-	-	-
Truck	Truck Lane Width	A	≤ 3.5 m	≤ 3.5 m							
	Travel Lanes per Direction		> 1	> 1							
	Level of Service		**A**	**A**	-	-	-	-	-	-	-

APPENDIX I

TRAFFIC SIGNAL WARRANT

St. Laurent/Site - (peak hour signal warrant)

Signal Warrant		Description		Minimum Requirement for Two Lane Roadways	Compliance		
				Restricted Flow - Operating Speed Less Than 70 km/h	Sectional %	Entire %	Warrant
Intersection	1. Minimum Vehicular Volume	(1) A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and	900	201%	22%	**60% No**
		(4) B	Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours	255	22%		
	2. Delay to Cross Traffic	(1) A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	900	194%	60%	
		(2) B	Combined Vehicle and Pedestrian Volume Crossing the Major Street for Each of the Same 8 Hours	75	60%		

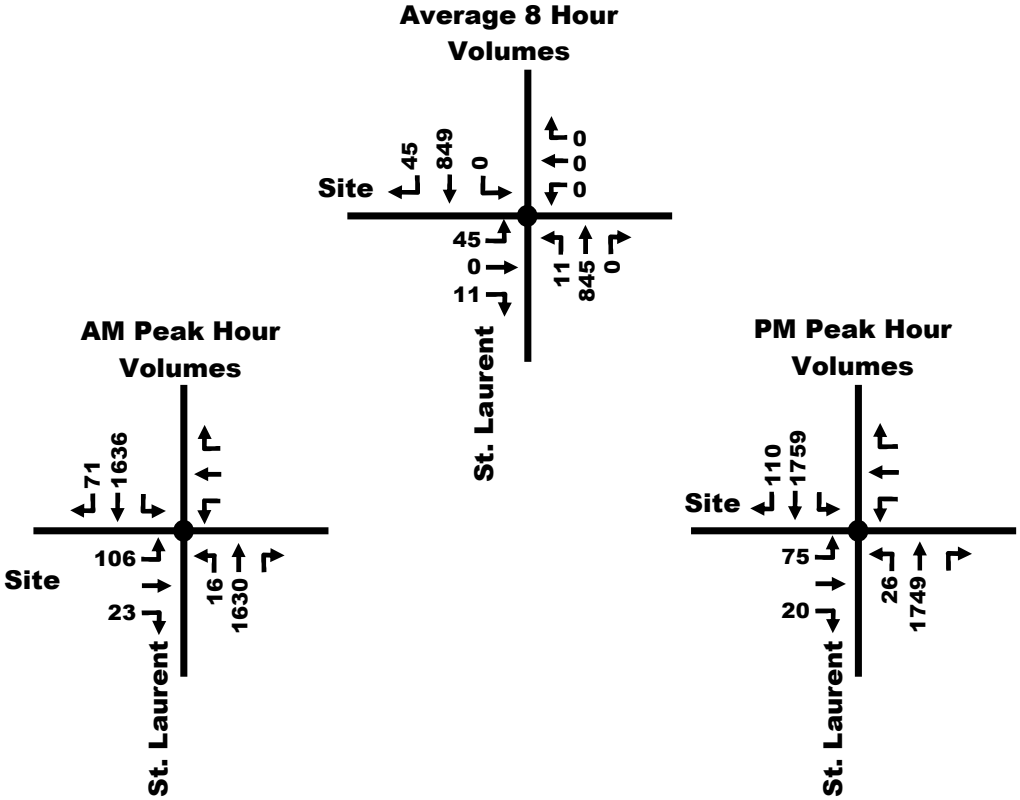
Notes

1 *Vehicle Volume Warrants (1A), (2A) and (5B) for Roadways Having Two or More Moving Lanes in one Direction Should Be 25% Higher Than Values Given Above* **Yes**

2 *For Definition of Crossing Volume Refer to Note 4 on the Signal Warrant Analysis Form B2.03.08*

3 *The Lowest Sectional Percentage Governs the Entire Warrant*

4 *For "T" Intersections the Warrant Values for Minor Street Should be Increased by 50% (Warrant 1B only)* **Yes**



APPENDIX J

DRAFT DESIGN: NEW SIGNALIZED INTERSECTION



CONCRETE BOULEVARD (TYP.)
CYCLE TRACK
SIDEWALK
MATCH EXISTING
TWSI (TYP.)
MATCH EXISTING
PROPOSED AUXILIARY LEFT-TURN LANE AND MODIFIED MEDIAN
PROPOSED WIDENED MEDIAN
PROPOSED 21m TAPER
MATCH EXISTING
MATCH EXISTING
ST LAURENT BLVD
2.00
1.80
2.70
3.50
3.50
3.50
3.50
1.50
39.05
21.00
MATCH EXISTING
3.50
3.50
3.50
R 7.00
R 8.00
4.05
1.85
3.64
2.00
MATCH EXISTING
CYCLE TRACK
SIDEWALK
1.8m WIDE CROSS RIDE (TYP.)
PROPOSED 3.0m CROSSWALK (TYP.)
4.33
3.50
CYCLE TRACK
SIDEWALK
HALF-HEIGHT CURB (TYP.)
SITE ACCESS

No.	DATE	DESCRIPTION	BY
C	02-02-23	UPDATE TO ENTRANCE GEOMETRY	M.H.
B	01-04-23	UPDATE TO CURRENT STANDARDS	M.H.
A	07-16-21	STEP 4 TIA	M.B.

REVISIONS

5m 0 5 10m
SCALE: 1:250

PARSONS
1223 Michael Street, Suite 100, Ottawa, Ontario, Canada K1J 7T2
Tel: (613) 738-4160 Fax: (613) 739-7105

CLIENT
HEAFEY GROUP

PROJECT
1740-1760 ST LAURENT BOULEVARD - SITE PLAN APPLICATION

TITLE
FUNCTIONAL PLAN

DESIGNED BY	M.H.
DRAWN BY	A.M.
CHECKED BY	M.K.
DATE	February 2, 2023
SCALE	1:250
PROJECT NO.	477563
DRAWING NO.	1
DRAWING	

APPENDIX K

TDM MEASURES

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

Legend

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

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

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

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑ Majority of bike parking proposed underground
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑ Developer suggests that at least the minimum required will be met
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑ bicycle parking to meet by-law standards
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☑ Majority of bike parking proposed in underground parking structure
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	☐ no 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	☐ no on-site transit stops
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐ no on-site transit stops

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☑ Lay-by proposed adjacent to Tower 1, 2 and 4.
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☑ current parking proposed meets min/max allowed
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	☑ surface parking for visitors separate from underground
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☑ surface parking to be shared by commercial and residential visitors
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	☑ residential underground parking separate from surface visitor parking

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

Legend

BASIC — The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER — The measure could maximize support for users of sustainable modes, and optimize development performance

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

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

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

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

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

Legend

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

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

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

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

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

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

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

Legend

BASIC — The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER — The measure could maximize support for users of sustainable modes, and optimize development performance

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

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

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

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

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

APPENDIX L

REVIEW OF NETWORK CONCEPT CALCULATIONS

Time	Number of Units	Type of Unit	District
Peak Hour	214	High-Rise	Alta Vista

	AM peak			PM peak			AM peak	PM peak
	In	Out	Total	In	Out	Total	Mode Share	Mode Share
Auto Driver	10	21	31	22	16	38	38%	45%
Auto Passenger	3	7	10	8	6	13	12%	16%
Transit	12	27	39	15	11	25	42%	28%
Cycling	1	1	2	1	1	2	2%	2%
Pedestrian	2	4	6	5	4	9	7%	9%
Total	27	61	89	51	37	88	100%	100%

APPENDIX M

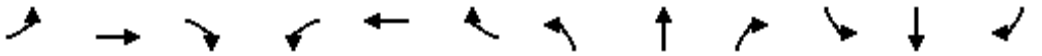
MMLOS ANALYSIS: INTERSECTIONS

INTERSECTIONS		Belfast/St. Laurent				Smyth/St. Laurent				Russell/St. Laurent			
Crossing Side		**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	8	8	5	6	8	8	8	8	7	7		7
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m
	Conflicting Left Turns	Protected/ Permissive	Protected/ Permissive	Permissive	Protected/ Permissive	Protected	Protected	Protected	Protected	No left turn / Prohib.	Protected/ Permissive		Permissive
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn		Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited		RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No	No	No		No
	Right Turn Channel	Conventional with Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conventional with Receiving Lane	No Right Turn		Conv'tl without Receiving Lane
	Corner Radius	15-25m	15-25m	15-25m	15-25m	>25m	>25m	>25m	>25m	>25m	No Right Turn		>25m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings		Std transverse markings
	PETSI Score	**-13**	**-10**	**39**	**22**	**-3**	**-3**	**-3**	**-3**		**22**		**5**
	Ped. Exposure to Traffic LoS	**F**	**F**	**E**	**F**	**F**	**F**	**F**	**F**	**-**	**F**	**-**	**F**
	Cycle Length	120	120	120	120	120	120	120	120	70	70		70
	Effective Walk Time	22	22	31	31	22	22	22	22	20	20		24
	Average Pedestrian Delay	**40**	**40**	**33**	**33**	**40**	**40**	**40**	**40**	**18**	**18**		**15**
	Pedestrian Delay LoS	**E**	**E**	**D**	**D**	**E**	**E**	**E**	**E**	**B**	**B**	**-**	**B**
	Level of Service	**F**	**F**	**E**	**F**	**F**	**F**	**F**	**F**	**B**	**F**	**-**	**F**
		F				**F**				**F**			
Approach From		**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Pocket Bike Lane	Pocket Bike Lane	Pocket Bike Lane	Pocket Bike Lane	Pocket Bike Lane	Mixed Traffic		Mixed Traffic
	Right Turn Lane Configuration	> 50 m	> 50 m	> 50 m	> 50 m	≤ 50 m Introduced right turn lane	≤ 50 m Introduced right turn lane	≤ 50 m Introduced right turn lane	> 50 m Introduced right turn lane	> 50 m Introduced right turn lane	≤ 50 m		≤ 50 m
	Right Turning Speed	>25 km/h	>25 km/h	>25 km/h	>25 km/h	>25 to 30 km/h	>25 to 30 km/h	>25 to 30 km/h	>25 to 30 km/h	>25 to 30 km/h	≤ 25 km/h		≤ 25 km/h
	Cyclist relative to RT motorists	**F**	**F**	**F**	**F**	**C**	**C**	**C**	**D**	**D**	**D**	**-**	**D**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	**Separated**	**Separated**	**Separated**	**Mixed Traffic**	**-**	**Mixed Traffic**
	Left Turn Approach	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed		≥ 2 lanes crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		≥ 60 km/h
	Left Turning Cyclist	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**-**	**F**
	Level of Service	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**-**	**F**
		F				**F**				**F**			
Transit	Average Signal Delay	≤ 30 sec	≤ 40 sec		≤ 40 sec	> 40 sec	> 40 sec		≤ 20 sec	≤ 20 sec	≤ 20 sec		≤ 30 sec
	Level of Service	**D**	**E**	**-**	**E**	**F**	**F**	**-**	**C**	**C**	**C**	**-**	**D**
		E				**F**				**D**			
Truck	Effective Corner Radius	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	> 15 m			> 15 m
	Number of Receiving Lanes on Departure from Intersection	≥ 2	1	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2			≥ 2
	Level of Service	**A**	**C**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**-**	**-**	**A**
		C				**A**				**A**			
Auto	Volume to Capacity Ratio												
	Level of Service	**-**				**-**				**-**			

Site Access/St. Laurent				Industrial/St. Laurent				Bourassa/St. Laurent			
NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
7	6		3	10+	10+	8	8	8	8	5	5
No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
No left turn / Prohib.	Protected		Permissive	Protected	Protected	Protected	Protected	Protected	Protected	Permissive	Permissive
Permissive or yield control	No right turn		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
RTOR allowed	RTOR prohibited		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
No	No		No	No	No	No	No	No	No	No	No
No Channel	No Channel		No Channel	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	No Channel	Conv'tl without Receiving Lane	No Channel	No Channel
15-25m	15-25m		15-25m	15-25m	15-25m	15-25m	15-25m	5-10m	15-25m	5-10m	5-10m
Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
10	**34**		**68**	**-35**	**-35**	**-2**	**-2**	**-3**	**-2**	**38**	**38**
F	**E**	**-**	**C**	**#N/A**	**#N/A**	**F**	**F**	**F**	**F**	**E**	**E**
140	140		140	140	140	140	140	120	120	120	120
31	31		31	31	31	32	32	27	27	21	21
42	**42**		**42**	**42**	**42**	**42**	**42**	**36**	**36**	**41**	**41**
E	**E**	**-**	**E**	**E**	**E**	**E**	**E**	**D**	**D**	**E**	**E**
F	**E**	**-**	**E**	**#N/A**	**#N/A**	**F**	**F**	**F**	**F**	**E**	**E**
F				**#N/A**				**F**			
NORTH	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP		Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Pocket Bike Lane	Mixed Traffic	Mixed Traffic
Not Applicable	Not Applicable		≤ 50 m	> 50 m	Not Applicable	Not Applicable	Not Applicable	Not Applicable	> 50 m Introduced right turn lane	≤ 50 m	≤ 50 m
Not Applicable	Not Applicable		≤ 25 km/h	≤ 25 km/h	Not Applicable	Not Applicable	Not Applicable	Not Applicable	>25 to 30 km/h	≤ 25 km/h	≤ 25 km/h
Not Applicable	**Not Applicable**	**-**	**D**	**F**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**D**	**D**	**D**
Separated	**Separated**	**-**	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	**Separated**	**Separated**	**Separated**	**Mixed Traffic**	**Mixed Traffic**
No lane crossed	No lane crossed		No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	One lane crossed	One lane crossed
≥ 60 km/h	≥ 60 km/h		≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
C	**C**	**-**	**C**	**F**	**F**	**F**	**F**	**F**	**F**	**E**	**E**
C	**C**	**-**	**D**	**F**	**F**	**F**	**F**	**F**	**F**	**E**	**E**
D				**F**				**F**			
≤ 20 sec	≤ 20 sec			> 40 sec	> 40 sec	> 40 sec	> 40 sec	≤ 20 sec	≤ 40 sec		
C	**C**	**-**	**-**	**F**	**F**	**F**	**F**	**C**	**E**	**-**	**-**
C				**F**				**E**			
> 15 m	> 15 m		> 15 m	> 15 m	> 15 m	> 15 m	> 15 m	< 10 m	> 15 m	< 10 m	< 10 m
1	1		≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2	≥ 2
C	**C**	**-**	**A**	**A**	**A**	**A**	**A**	**D**	**A**	**D**	**D**
C				**A**				**D**			
-				**-**				**-**			

APPENDIX N

SYNCHRO ANALYSIS: BACKGROUND INTERSECTION PERFORMANCE



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	201	132	669	812	264	202	1102	368	127	826	159
Future Volume (vph)	86	201	132	669	812	264	202	1102	368	127	826	159
Satd. Flow (prot)	3288	3390	1517	3288	3390	1517	3288	3390	1517	3288	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3239	3390	1479	3234	3390	1479	3229	3390	1473	3272	3390	1473
Satd. Flow (RTOR)			180			152			368			180
Lane Group Flow (vph)	86	201	132	669	812	264	202	1102	368	127	826	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)	14.2	38.6	38.6	36.0	60.4	60.4	17.4	52.7	52.7	12.7	48.0	48.0
Total Split (%)	10.1%	27.6%	27.6%	25.7%	43.1%	43.1%	12.4%	37.6%	37.6%	9.1%	34.3%	34.3%
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)	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 Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.3	6.6	6.6	6.3	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	7.4	20.1	20.1	29.6	42.3	42.3	12.8	54.4	54.4	9.8	51.4	51.4
Actuated g/C Ratio	0.05	0.14	0.14	0.21	0.30	0.30	0.09	0.39	0.39	0.07	0.37	0.37
v/c Ratio	0.50	0.41	0.36	0.96	0.79	0.48	0.67	0.84	0.46	0.55	0.66	0.24
Control Delay	74.6	55.5	4.5	80.9	50.5	17.9	72.8	46.5	5.2	71.8	41.8	4.2
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	74.6	55.5	4.5	80.9	50.5	17.9	72.8	46.5	5.2	71.8	41.8	4.2
LOS	E	E	A	F	D	B	E	D	A	E	D	A
Approach Delay		43.4			57.3			40.6			39.8	
Approach LOS		D			E			D			D	
Queue Length 50th (m)	12.1	27.2	0.0	95.6	110.1	24.4	28.0	146.0	0.0	17.6	100.8	0.0
Queue Length 95th (m)	21.1	35.5	5.5	#133.7	116.8	44.1	#46.9	#206.4	22.5	#36.7	137.5	11.8
Internal Link Dist (m)		460.3			515.4			130.1			572.9	
Turn Bay Length (m)	35.0		120.0	160.0		85.0	90.0		110.0	135.0		155.0
Base Capacity (vph)	178	774	476	694	1302	661	304	1316	797	231	1244	654
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	0.48	0.26	0.28	0.96	0.62	0.40	0.66	0.84	0.46	0.55	0.66	0.24

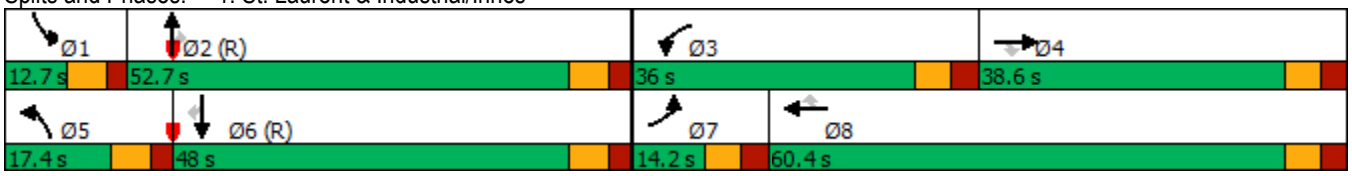
Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated

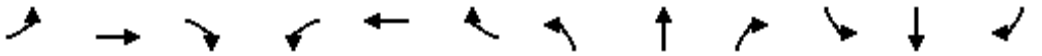
Maximum v/c Ratio: 0.96

Intersection Signal Delay: 46.5	Intersection LOS: D
Intersection Capacity Utilization 91.7%	ICU Level of Service F
Analysis Period (min) 15	

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

Splits and Phases: 1: St. Laurent & Industrial/Innes





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	90	37	6	110	56	1460	49	151	1410	96
Future Volume (vph)	50	10	90	37	6	110	56	1460	49	151	1410	96
Satd. Flow (prot)	0	1583	0	0	1548	0	1695	3390	1517	1695	3390	1517
Flt Permitted		0.727			0.811		0.950			0.950		
Satd. Flow (perm)	0	1164	0	0	1267	0	1632	3390	1438	1689	3390	1418
Satd. Flow (RTOR)		58			99				143			86
Lane Group Flow (vph)	0	150	0	0	153	0	56	1460	49	151	1410	96
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	33.3	33.3		33.3	33.3		11.2	27.2	27.2	11.2	27.2	27.2
Total Split (s)	33.3	33.3		33.3	33.3		13.0	63.7	63.7	23.0	73.7	73.7
Total Split (%)	27.8%	27.8%		27.8%	27.8%		10.8%	53.1%	53.1%	19.2%	61.4%	61.4%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	1.7	1.7	2.0	1.7	1.7
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.2	5.9	5.9	6.2	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		16.8			16.8		8.3	69.9	69.9	14.9	78.9	78.9
Actuated g/C Ratio		0.14			0.14		0.07	0.58	0.58	0.12	0.66	0.66
v/c Ratio		0.71			0.58		0.48	0.74	0.05	0.72	0.63	0.10
Control Delay		46.5			26.6		64.6	14.3	0.2	69.5	15.7	3.2
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		46.5			26.6		64.6	14.3	0.2	69.5	15.7	3.2
LOS		D			C		E	B	A	E	B	A
Approach Delay		46.5			26.6			15.7			19.8	
Approach LOS		D			C			B			B	
Queue Length 50th (m)		21.1			11.7		14.1	46.7	0.0	34.3	100.9	0.8
Queue Length 95th (m)		39.6			29.9		m17.1	m194.5	m0.0	56.2	150.7	8.3
Internal Link Dist (m)		48.8			101.3			271.9			163.4	
Turn Bay Length (m)							55.0		105.0	80.0		60.0
Base Capacity (vph)		306			361		119	1974	897	241	2229	962
Starvation Cap Reductn		0			0		0	0	0	0	0	0
Spillback Cap Reductn		0			0		0	0	0	0	0	0
Storage Cap Reductn		0			0		0	0	0	0	0	0
Reduced v/c Ratio		0.49			0.42		0.47	0.74	0.05	0.63	0.63	0.10

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

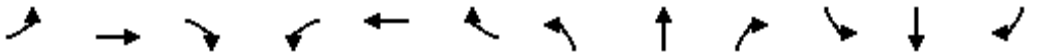
Maximum v/c Ratio: 0.74

Intersection Signal Delay: 19.4	Intersection LOS: B
Intersection Capacity Utilization 84.8%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 3: St. Laurent & Bourassa





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	345	116	107	35	303	117	207	1231	105	150	658	705
Future Volume (vph)	345	116	107	35	303	117	207	1231	105	150	658	705
Satd. Flow (prot)	3288	1784	1517	1695	3390	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3228	1784	1467	1664	3390	1479	1685	3390	1443	1688	3390	1470
Satd. Flow (RTOR)			132			183			181			302
Lane Group Flow (vph)	345	116	107	35	303	117	207	1231	105	150	658	705
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)	11.0	28.0	28.0	11.0	28.0	28.0	11.2	28.2	28.2	11.2	28.2	28.2
Total Split (s)	19.0	35.0	35.0	12.0	28.0	28.0	22.0	55.0	55.0	18.0	51.0	51.0
Total Split (%)	15.8%	29.2%	29.2%	10.0%	23.3%	23.3%	18.3%	45.8%	45.8%	15.0%	42.5%	42.5%
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)	1.9	2.0	2.0	1.9	2.0	2.0	1.8	1.7	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.7	5.7	5.6	5.7	5.7	6.0	5.9	5.9	6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	13.8	28.5	28.5	6.2	16.3	16.3	18.9	51.9	51.9	14.9	47.8	47.8
Actuated g/C Ratio	0.12	0.24	0.24	0.05	0.14	0.14	0.16	0.43	0.43	0.12	0.40	0.40
v/c Ratio	0.92	0.27	0.24	0.40	0.66	0.33	0.78	0.84	0.14	0.72	0.49	0.92
Control Delay	82.2	40.3	4.8	68.7	55.8	3.1	68.5	37.4	0.4	75.0	24.3	30.6
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	82.2	40.3	4.8	68.7	55.8	3.1	68.5	37.4	0.4	75.0	24.3	30.6
LOS	F	D	A	E	E	A	E	D	A	E	C	C
Approach Delay		59.1			43.2			39.1			32.2	
Approach LOS		E			D			D			C	
Queue Length 50th (m)	42.1	23.9	0.0	8.1	36.2	0.0	45.8	138.1	0.0	37.7	32.4	23.5
Queue Length 95th (m)	#70.0	38.6	8.9	18.8	48.2	2.0	#92.1	#171.4	0.0	#74.7	56.5	#116.8
Internal Link Dist (m)		678.5			293.4			245.7			271.9	
Turn Bay Length (m)	70.0		100.0	35.0		15.0	65.0		25.0	110.0		90.0
Base Capacity (vph)	377	456	473	90	629	423	268	1465	726	209	1349	766
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	0.92	0.25	0.23	0.39	0.48	0.28	0.77	0.84	0.14	0.72	0.49	0.92

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: 110
Control Type: Actuated-Coordinated

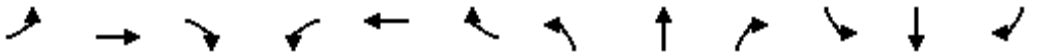
Maximum v/c Ratio: 0.92

Intersection Signal Delay: 39.8	Intersection LOS: D
Intersection Capacity Utilization 85.5%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 4: St. Laurent & Smyth/Lancaster





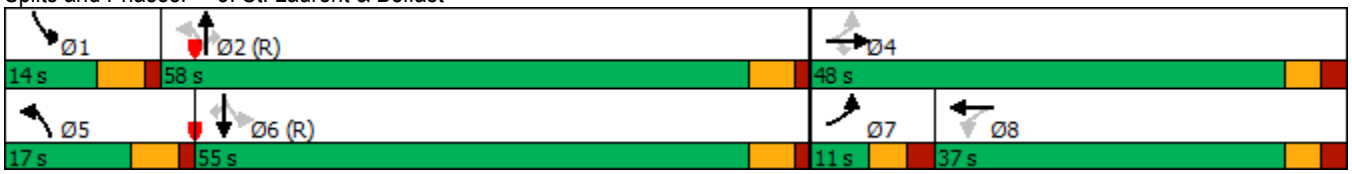
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	69	93	47	153	103	128	924	69	91	852	208
Future Volume (vph)	51	69	93	47	153	103	128	924	69	91	852	208
Satd. Flow (prot)	1695	1784	1517	1695	1668	0	1695	3390	1517	1695	3390	1517
Flt Permitted	0.250			0.712			0.241			0.227		
Satd. Flow (perm)	446	1784	1494	1267	1668	0	429	3390	1480	405	3390	1489
Satd. Flow (RTOR)			93		27				130			208
Lane Group Flow (vph)	51	69	93	47	256	0	128	924	69	91	852	208
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	27.8	27.8	27.8	27.8		11.2	41.6	41.6	11.2	41.6	41.6
Total Split (s)	11.0	48.0	48.0	37.0	37.0		17.0	58.0	58.0	14.0	55.0	55.0
Total Split (%)	9.2%	40.0%	40.0%	30.8%	30.8%		14.2%	48.3%	48.3%	11.7%	45.8%	45.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		1.5	1.4	1.4	1.5	1.4	1.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8		5.7	5.6	5.6	5.7	5.6	5.6
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	34.2	34.2	34.2	22.0	22.0		70.0	60.7	60.7	67.2	59.3	59.3
Actuated g/C Ratio	0.28	0.28	0.28	0.18	0.18		0.58	0.51	0.51	0.56	0.49	0.49
v/c Ratio	0.24	0.14	0.19	0.20	0.78		0.37	0.54	0.08	0.29	0.51	0.25
Control Delay	29.5	28.5	5.9	41.1	57.8		15.1	24.2	0.2	14.7	24.7	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	28.5	5.9	41.1	57.8		15.1	24.2	0.2	14.7	24.7	4.1
LOS	C	C	A	D	E		B	C	A	B	C	A
Approach Delay		18.9			55.2			21.7			20.2	
Approach LOS		B			E			C			C	
Queue Length 50th (m)	8.6	11.7	0.0	9.5	52.1		12.3	79.1	0.0	8.6	72.3	0.0
Queue Length 95th (m)	15.7	19.9	10.3	18.9	75.0		26.1	118.7	0.0	19.4	111.9	15.3
Internal Link Dist (m)		480.6			437.7			572.9			582.7	
Turn Bay Length (m)	70.0		200.0	65.0			65.0		65.0	75.0		100.0
Base Capacity (vph)	217	641	596	329	453		379	1750	827	323	1709	853
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.11	0.16	0.14	0.57		0.34	0.53	0.08	0.28	0.50	0.24

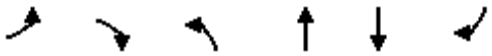
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 100 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 24.5	Intersection LOS: C
Intersection Capacity Utilization 71.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Belfast





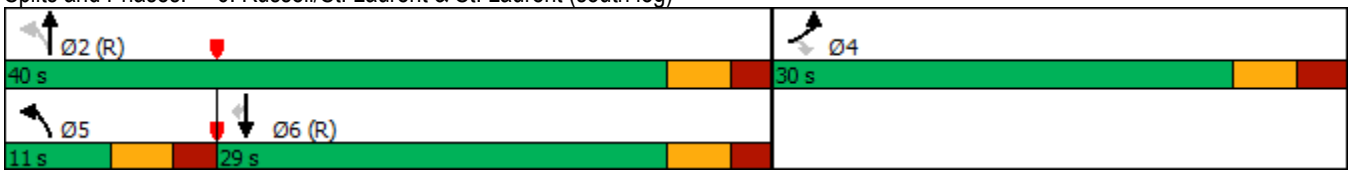
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	732	48	80	726	329	503
Future Volume (vph)	732	48	80	726	329	503
Satd. Flow (prot)	3288	1517	1695	3390	3390	1517
Flt Permitted	0.950		0.459			
Satd. Flow (perm)	3288	1485	816	3390	3390	1485
Satd. Flow (RTOR)		30				503
Lane Group Flow (vph)	732	48	80	726	329	503
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	30.0	30.0	11.0	24.0	26.5	26.5
Total Split (s)	30.0	30.0	11.0	40.0	29.0	29.0
Total Split (%)	42.9%	42.9%	15.7%	57.1%	41.4%	41.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	20.8	20.8	37.7	37.7	27.9	27.9
Actuated g/C Ratio	0.30	0.30	0.54	0.54	0.40	0.40
v/c Ratio	0.75	0.10	0.15	0.40	0.24	0.56
Control Delay	27.1	9.2	10.0	11.0	16.8	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	9.2	10.0	11.0	16.8	4.9
LOS	C	A	A	B	B	A
Approach Delay	26.0			10.9	9.6	
Approach LOS	C			B	A	
Queue Length 50th (m)	44.4	1.7	4.6	26.8	15.6	0.0
Queue Length 95th (m)	55.2	7.5	12.3	45.2	27.1	20.0
Internal Link Dist (m)	174.1			99.9	245.7	
Turn Bay Length (m)		15.0	65.0			90.0
Base Capacity (vph)	1144	536	521	1843	1388	904
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.09	0.15	0.39	0.24	0.56

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 57.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Russell/St. Laurent & St. Laurent (south leg)



Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	52	0	1664	1632	40
Future Vol, veh/h	0	52	0	1664	1632	40
Conflicting Peds, #/hr	20	20	20	0	0	20
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	15
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	52	0	1664	1632	40

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	856	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	301	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	291	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	291	-	-
HCM Lane V/C Ratio	-	0.179	-	-
HCM Control Delay (s)	-	20	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.6	-	-

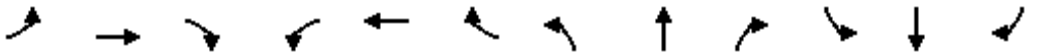
Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	195	0	1699	1656	99
Future Vol, veh/h	0	195	0	1699	1656	99
Conflicting Peds, #/hr	20	20	20	0	0	20
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	15
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	195	0	1699	1656	99

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	868	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	296	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	286	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	40.8	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	286	-	-
HCM Lane V/C Ratio	-	0.682	-	-
HCM Control Delay (s)	-	40.8	-	-
HCM Lane LOS	-	E	-	-
HCM 95th %tile Q(veh)	-	4.6	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	606	360	439	306	148	199	953	560	142	924	147
Future Volume (vph)	155	606	360	439	306	148	199	953	560	142	924	147
Satd. Flow (prot)	3288	3390	1517	3288	3390	1517	3288	3390	1517	3288	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3226	3390	1478	3255	3390	1478	3191	3390	1462	3257	3390	1461
Satd. Flow (RTOR)			168			148			350			168
Lane Group Flow (vph)	155	606	360	439	306	148	199	953	560	142	924	147
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)	18.9	41.0	41.0	32.0	54.1	54.1	19.0	61.0	61.0	16.0	58.0	58.0
Total Split (%)	12.6%	27.3%	27.3%	21.3%	36.1%	36.1%	12.7%	40.7%	40.7%	10.7%	38.7%	38.7%
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)	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 Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.3	6.6	6.6	6.3	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	11.5	31.7	31.7	23.8	44.0	44.0	12.7	58.4	58.4	10.1	55.8	55.8
Actuated g/C Ratio	0.08	0.21	0.21	0.16	0.29	0.29	0.08	0.39	0.39	0.07	0.37	0.37
v/c Ratio	0.62	0.85	0.81	0.84	0.31	0.28	0.72	0.72	0.72	0.65	0.73	0.23
Control Delay	77.9	68.6	44.2	76.4	41.5	6.6	81.8	43.8	20.3	82.1	46.0	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	77.9	68.6	44.2	76.4	41.5	6.6	81.8	43.8	20.3	82.1	46.0	3.8
LOS	E	E	D	E	D	A	F	D	C	F	D	A
Approach Delay		62.1			52.9			40.5			45.1	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	23.2	90.6	56.5	65.4	36.5	0.0	29.8	133.6	58.1	21.3	131.7	0.0
Queue Length 95th (m)	35.4	112.1	95.9	84.6	48.8	15.7	#44.6	158.2	106.6	#33.7	156.9	10.8
Internal Link Dist (m)		460.3			515.4			130.1			572.9	
Turn Bay Length (m)	35.0		120.0	160.0		85.0	90.0		110.0	135.0		155.0
Base Capacity (vph)	272	777	468	559	1073	569	287	1327	785	225	1266	651
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	0.57	0.78	0.77	0.79	0.29	0.26	0.69	0.72	0.71	0.63	0.73	0.23

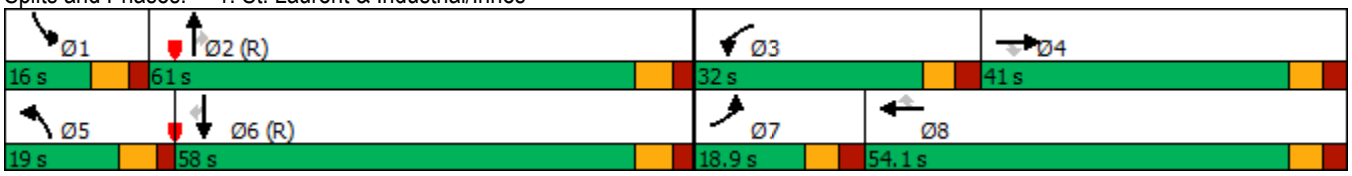
Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 48.8	Intersection LOS: D
Intersection Capacity Utilization 88.2%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: St. Laurent & Industrial/Innes



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	8	56	37	5	90	31	1702	69	112	1574	76
Future Volume (vph)	46	8	56	37	5	90	31	1702	69	112	1574	76
Satd. Flow (prot)	0	1613	0	0	1542	0	1695	3390	1517	1695	3390	1517
Flt Permitted		0.739			0.858		0.950			0.950		
Satd. Flow (perm)	0	1203	0	0	1340	0	1543	3390	1460	1693	3390	1333
Satd. Flow (RTOR)		40			83				86			86
Lane Group Flow (vph)	0	110	0	0	132	0	31	1702	69	112	1574	76
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	33.3	33.3		33.3	33.3		11.2	27.2	27.2	11.2	27.2	27.2
Total Split (s)	33.3	33.3		33.3	33.3		11.2	69.7	69.7	17.0	75.5	75.5
Total Split (%)	27.8%	27.8%		27.8%	27.8%		9.3%	58.1%	58.1%	14.2%	62.9%	62.9%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	1.7	1.7	2.0	1.7	1.7
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.2	5.9	5.9	6.2	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		17.3			17.3		5.9	73.1	73.1	11.2	83.3	83.3
Actuated g/C Ratio		0.14			0.14		0.05	0.61	0.61	0.09	0.69	0.69
v/c Ratio		0.53			0.50		0.37	0.82	0.07	0.71	0.67	0.08
Control Delay		37.7			24.3		62.4	34.3	7.3	77.4	15.1	2.1
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		37.7			24.3		62.4	34.3	7.3	77.4	15.1	2.1
LOS		D			C		E	C	A	E	B	A
Approach Delay		37.7			24.3			33.8			18.5	
Approach LOS		D			C			C			B	
Queue Length 50th (m)		15.9			10.9		7.3	168.1	0.6	25.4	106.2	0.0
Queue Length 95th (m)		30.6			26.9		m10.4	m#223.7	m7.0	#53.8	176.0	5.3
Internal Link Dist (m)		48.8			101.3			271.9			163.4	
Turn Bay Length (m)							55.0		105.0	80.0		60.0
Base Capacity (vph)		301			365		83	2066	923	163	2352	951
Starvation Cap Reductn		0			0		0	0	0	0	0	0
Spillback Cap Reductn		0			0		0	0	0	0	0	0
Storage Cap Reductn		0			0		0	0	0	0	0	0
Reduced v/c Ratio		0.37			0.36		0.37	0.82	0.07	0.69	0.67	0.08

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

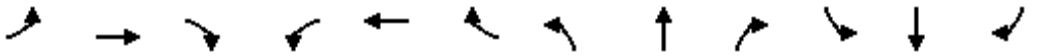
Maximum v/c Ratio: 0.82

Intersection Signal Delay: 26.5	Intersection LOS: C
Intersection Capacity Utilization 89.9%	ICU Level of Service E
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: St. Laurent & Bourassa





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	566	301	245	109	117	252	109	799	102	159	1217	393
Future Volume (vph)	566	301	245	109	117	252	109	799	102	159	1217	393
Satd. Flow (prot)	3288	1784	1517	1695	3390	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3175	1784	1477	1679	3390	1455	1655	3390	1421	1674	3390	1433
Satd. Flow (RTOR)			209			237			235			375
Lane Group Flow (vph)	566	301	245	109	117	252	109	799	102	159	1217	393
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)	11.0	28.0	28.0	11.0	28.0	28.0	11.2	28.2	28.2	11.2	28.2	28.2
Total Split (s)	27.0	39.0	39.0	16.0	28.0	28.0	14.7	43.9	43.9	21.1	50.3	50.3
Total Split (%)	22.5%	32.5%	32.5%	13.3%	23.3%	23.3%	12.3%	36.6%	36.6%	17.6%	41.9%	41.9%
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)	1.9	2.0	2.0	1.9	2.0	2.0	1.8	1.7	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.7	5.7	5.6	5.7	5.7	6.0	5.9	5.9	6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	21.7	27.7	27.7	10.0	16.0	16.0	11.2	44.5	44.5	14.6	47.9	47.9
Actuated g/C Ratio	0.18	0.23	0.23	0.08	0.13	0.13	0.09	0.37	0.37	0.12	0.40	0.40
v/c Ratio	0.95	0.73	0.49	0.77	0.26	0.63	0.69	0.64	0.15	0.77	0.90	0.49
Control Delay	75.7	53.4	11.0	87.2	46.5	14.4	75.9	35.1	0.5	70.8	36.6	7.2
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	75.7	53.4	11.0	87.2	46.5	14.4	75.9	35.1	0.5	70.8	36.6	7.2
LOS	E	D	B	F	D	B	E	D	A	E	D	A
Approach Delay		55.4			38.9			36.0			33.1	
Approach LOS		E			D			D			C	
Queue Length 50th (m)	68.9	67.6	6.9	25.5	13.4	3.2	24.4	81.4	0.0	30.6	145.2	32.9
Queue Length 95th (m)	#103.2	91.0	27.3	#53.7	20.8	26.5	#59.6	111.3	0.0	m#63.6	#194.9	40.5
Internal Link Dist (m)		678.5			293.4			245.7			271.9	
Turn Bay Length (m)	70.0		100.0	35.0		15.0	65.0		25.0	110.0		90.0
Base Capacity (vph)	595	495	560	146	629	463	158	1257	674	219	1353	797
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	0.95	0.61	0.44	0.75	0.19	0.54	0.69	0.64	0.15	0.73	0.90	0.49

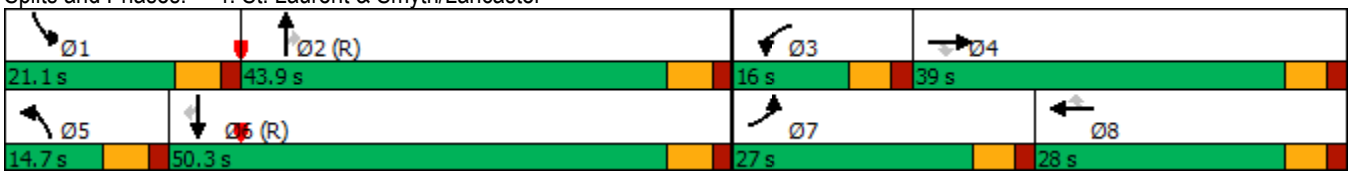
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

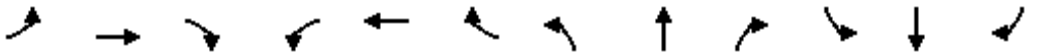
Maximum v/c Ratio: 0.95

Intersection Signal Delay: 40.1	Intersection LOS: D
Intersection Capacity Utilization 91.1%	ICU Level of Service F
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: St. Laurent & Smyth/Lancaster





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	213	177	236	110	100	163	113	1049	90	100	860	145
Future Volume (vph)	213	177	236	110	100	163	113	1049	90	100	860	145
Satd. Flow (prot)	1695	1784	1517	1695	1597	0	1695	3390	1517	1695	3390	1517
Flt Permitted	0.201			0.646			0.215			0.147		
Satd. Flow (perm)	358	1784	1477	1139	1597	0	378	3390	1477	262	3390	1468
Satd. Flow (RTOR)			208		62				130			145
Lane Group Flow (vph)	213	177	236	110	263	0	113	1049	90	100	860	145
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	27.8	27.8	27.8	27.8		11.2	41.6	41.6	11.2	41.6	41.6
Total Split (s)	21.0	52.0	52.0	31.0	31.0		15.2	54.0	54.0	14.0	52.8	52.8
Total Split (%)	17.5%	43.3%	43.3%	25.8%	25.8%		12.7%	45.0%	45.0%	11.7%	44.0%	44.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		1.5	1.4	1.4	1.5	1.4	1.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8		5.7	5.6	5.6	5.7	5.6	5.6
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	42.5	42.5	42.5	20.0	20.0		61.0	52.3	52.3	59.6	51.6	51.6
Actuated g/C Ratio	0.35	0.35	0.35	0.17	0.17		0.51	0.44	0.44	0.50	0.43	0.43
v/c Ratio	0.68	0.28	0.36	0.58	0.83		0.39	0.71	0.13	0.44	0.59	0.20
Control Delay	39.5	28.0	6.4	57.6	57.7		18.6	32.2	1.7	20.9	29.5	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.5	28.0	6.4	57.6	57.7		18.6	32.2	1.7	20.9	29.5	4.5
LOS	D	C	A	E	E		B	C	A	C	C	A
Approach Delay		23.8			57.6			28.8			25.4	
Approach LOS		C			E			C			C	
Queue Length 50th (m)	34.1	27.5	4.0	23.9	46.4		13.6	114.7	0.0	11.9	87.7	0.0
Queue Length 95th (m)	#55.1	45.0	20.5	41.2	73.6		23.1	136.5	4.0	20.8	107.1	12.4
Internal Link Dist (m)		480.6			437.7			572.9			582.7	
Turn Bay Length (m)	70.0		200.0	65.0			65.0		65.0	75.0		100.0
Base Capacity (vph)	317	692	700	239	384		301	1496	724	234	1472	719
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.26	0.34	0.46	0.68		0.38	0.70	0.12	0.43	0.58	0.20

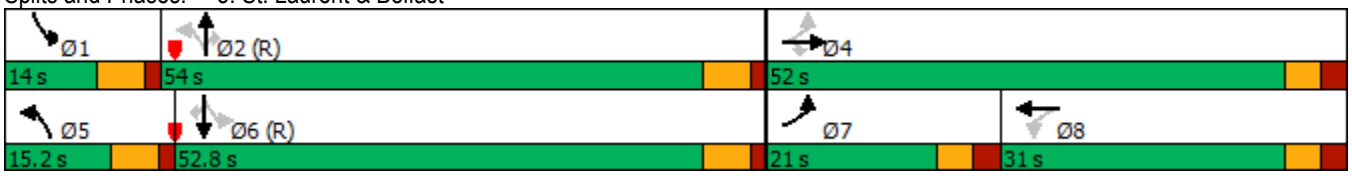
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

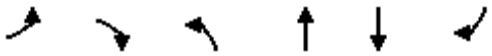
Maximum v/c Ratio: 0.83

Intersection Signal Delay: 30.0	Intersection LOS: C
Intersection Capacity Utilization 84.7%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 5: St. Laurent & Belfast





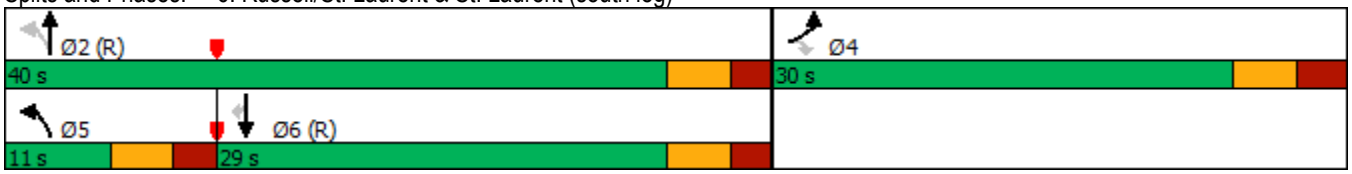
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	676	116	46	376	780	799
Future Volume (vph)	676	116	46	376	780	799
Satd. Flow (prot)	3288	1517	1695	3390	3390	1517
Flt Permitted	0.950		0.236			
Satd. Flow (perm)	3288	1483	420	3390	3390	1481
Satd. Flow (RTOR)		78				799
Lane Group Flow (vph)	676	116	46	376	780	799
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	30.0	30.0	11.0	24.0	26.5	26.5
Total Split (s)	30.0	30.0	11.0	40.0	29.0	29.0
Total Split (%)	42.9%	42.9%	15.7%	57.1%	41.4%	41.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	19.6	19.6	38.9	38.9	31.9	31.9
Actuated g/C Ratio	0.28	0.28	0.56	0.56	0.46	0.46
v/c Ratio	0.74	0.25	0.13	0.20	0.51	0.72
Control Delay	27.7	8.8	9.3	8.8	17.2	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	8.8	9.3	8.8	17.2	6.3
LOS	C	A	A	A	B	A
Approach Delay	24.9			8.9	11.7	
Approach LOS	C			A	B	
Queue Length 50th (m)	41.1	3.7	2.5	11.7	41.5	0.0
Queue Length 95th (m)	52.7	13.2	7.6	21.3	63.6	28.2
Internal Link Dist (m)	174.1			99.9	245.7	
Turn Bay Length (m)		15.0	65.0			90.0
Base Capacity (vph)	1127	559	342	1884	1544	1109
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.21	0.13	0.20	0.51	0.72

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 15.0	Intersection LOS: B
Intersection Capacity Utilization 66.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Russell/St. Laurent & St. Laurent (south leg)



Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	100	0	1786	1727	110
Future Vol, veh/h	0	100	0	1786	1727	110
Conflicting Peds, #/hr	20	20	20	0	0	20
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	15
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	100	0	1786	1727	110

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	904	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	280	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	271	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.9	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	271	-	-
HCM Lane V/C Ratio	-	0.369	-	-
HCM Control Delay (s)	-	25.9	-	-
HCM Lane LOS	-	D	-	-
HCM 95th %tile Q(veh)	-	1.6	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	131	0	1791	1744	244
Future Vol, veh/h	0	131	0	1791	1744	244
Conflicting Peds, #/hr	20	20	20	0	0	20
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	15
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	131	0	1791	1744	244

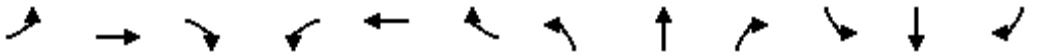
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	912	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	276	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	267	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	30.8	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	267	-	-
HCM Lane V/C Ratio	-	0.491	-	-
HCM Control Delay (s)	-	30.8	-	-
HCM Lane LOS	-	D	-	-
HCM 95th %tile Q(veh)	-	2.5	-	-

APPENDIX O

SYNCHRO ANALYSIS: FUTURE PROJECTED INTERSECTION PERFORMANCE



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	191	126	641	773	251	207	1088	366	121	812	152
Future Volume (vph)	83	191	126	641	773	251	207	1088	366	121	812	152
Satd. Flow (prot)	3288	3390	1517	3288	3390	1517	3288	3390	1517	3288	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3264	3390	1479	3233	3390	1479	3264	3390	1473	3272	3390	1473
Satd. Flow (RTOR)			180			154			366			180
Lane Group Flow (vph)	83	191	126	641	773	251	207	1088	366	121	812	152
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)	14.2	38.6	38.6	36.0	60.4	60.4	17.4	52.7	52.7	12.7	48.0	48.0
Total Split (%)	10.1%	27.6%	27.6%	25.7%	43.1%	43.1%	12.4%	37.6%	37.6%	9.1%	34.3%	34.3%
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)	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 Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.3	6.6	6.6	6.3	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	7.4	18.8	18.8	29.0	40.4	40.4	13.0	56.6	56.6	9.5	53.1	53.1
Actuated g/C Ratio	0.05	0.13	0.13	0.21	0.29	0.29	0.09	0.40	0.40	0.07	0.38	0.38
v/c Ratio	0.48	0.42	0.36	0.94	0.79	0.47	0.68	0.79	0.45	0.54	0.63	0.23
Control Delay	73.9	56.8	4.1	77.4	51.7	16.9	72.7	42.9	5.0	72.0	39.9	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	0.2	0.0	0.0	0.0
Total Delay	73.9	56.8	4.1	77.4	51.7	16.9	72.7	52.6	5.2	72.0	39.9	3.5
LOS	E	E	A	E	D	B	E	D	A	E	D	A
Approach Delay		43.7			56.4			44.6			38.4	
Approach LOS		D			E			D			D	
Queue Length 50th (m)	11.7	26.1	0.0	90.6	105.0	21.0	28.7	139.5	0.0	16.8	97.0	0.0
Queue Length 95th (m)	20.5	33.9	3.9	#124.8	110.0	39.7	#48.4	#202.2	22.5	#34.5	134.8	10.1
Internal Link Dist (m)		460.3			515.4			130.1			572.9	
Turn Bay Length (m)	35.0		120.0	160.0		85.0	90.0		110.0	135.0		155.0
Base Capacity (vph)	178	774	476	690	1302	663	308	1371	813	223	1286	670
Starvation Cap Reductn	0	0	0	0	0	0	0	263	84	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	0.47	0.25	0.26	0.93	0.59	0.38	0.67	0.98	0.50	0.54	0.63	0.23

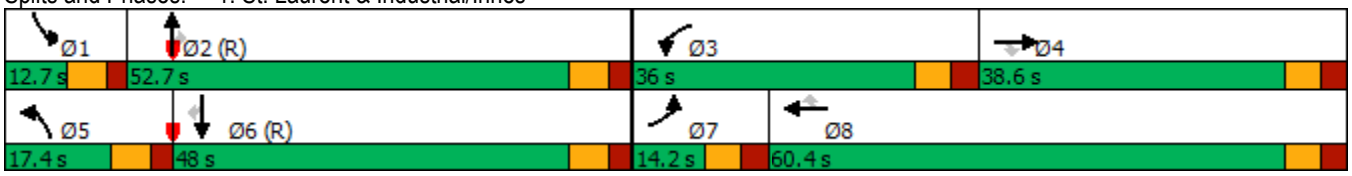
Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated

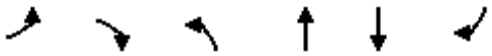
Maximum v/c Ratio: 0.94

Intersection Signal Delay: 47.2	Intersection LOS: D
Intersection Capacity Utilization 90.5%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: St. Laurent & Industrial/Innes





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	103	22	16	1551	1557	65
Future Volume (vph)	103	22	16	1551	1557	65
Satd. Flow (prot)	1659	0	1695	3390	3390	1517
Flt Permitted	0.960		0.950			
Satd. Flow (perm)	1623	0	1685	3390	3390	1407
Satd. Flow (RTOR)						
Lane Group Flow (vph)	125	0	16	1551	1557	65
Turn Type	Perm		Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4					6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	32.0		11.3	29.9	29.9	29.9
Total Split (s)	32.0		11.3	88.0	76.7	76.7
Total Split (%)	26.7%		9.4%	73.3%	63.9%	63.9%
Yellow Time (s)	3.0		4.2	4.2	4.2	4.2
All-Red Time (s)	2.0		2.1	1.7	1.7	1.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		6.3	5.9	5.9	5.9
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None		None	C-Min	C-Min	C-Min
Act Effct Green (s)	16.1		6.0	93.0	88.0	88.0
Actuated g/C Ratio	0.13		0.05	0.78	0.73	0.73
v/c Ratio	0.57		0.19	0.59	0.63	0.06
Control Delay	57.8		62.2	4.0	11.6	7.2
Queue Delay	0.0		0.0	0.0	2.1	0.0
Total Delay	57.8		62.2	4.0	13.8	7.2
LOS	E		E	A	B	A
Approach Delay	57.8			4.6	13.5	
Approach LOS	E			A	B	
Queue Length 50th (m)	28.4		3.9	62.4	62.3	2.8
Queue Length 95th (m)	42.6		m6.4	17.9	168.1	12.4
Internal Link Dist (m)	152.0			163.4	130.1	
Turn Bay Length (m)			40.0			20.0
Base Capacity (vph)	365		85	2626	2484	1031
Starvation Cap Reductn	0		0	3	744	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.34		0.19	0.59	0.89	0.06

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

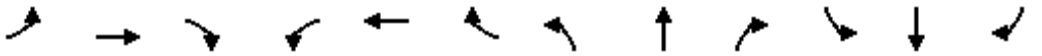
Maximum v/c Ratio: 0.63

Intersection Signal Delay: 10.9	Intersection LOS: B
Intersection Capacity Utilization 69.7%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 2: St. Laurent & Site Access





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	90	37	6	110	56	1399	49	126	1345	96
Future Volume (vph)	50	10	90	37	6	110	56	1399	49	126	1345	96
Satd. Flow (prot)	0	1583	0	0	1548	0	1695	3390	1517	1695	3390	1517
Flt Permitted		0.717			0.804		0.950			0.950		
Satd. Flow (perm)	0	1146	0	0	1256	0	1684	3390	1438	1688	3390	1418
Satd. Flow (RTOR)		58			99				86			86
Lane Group Flow (vph)	0	150	0	0	153	0	56	1399	49	126	1345	96
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	33.3	33.3		33.3	33.3		11.2	27.2	27.2	11.2	27.2	27.2
Total Split (s)	33.3	33.3		33.3	33.3		15.9	66.7	66.7	20.0	70.8	70.8
Total Split (%)	27.8%	27.8%		27.8%	27.8%		13.3%	55.6%	55.6%	16.7%	59.0%	59.0%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	1.7	1.7	2.0	1.7	1.7
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.2	5.9	5.9	6.2	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		15.8			15.8		8.7	72.6	72.6	13.1	79.5	79.5
Actuated g/C Ratio		0.13			0.13		0.07	0.60	0.60	0.11	0.66	0.66
v/c Ratio		0.75			0.61		0.46	0.68	0.05	0.68	0.60	0.10
Control Delay		51.4			28.3		63.6	11.7	0.7	77.1	7.2	1.8
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.1	0.0
Total Delay		51.4			28.3		63.6	11.7	0.7	77.1	7.3	1.8
LOS		D			C		E	B	A	E	A	A
Approach Delay		51.4			28.3			13.2			12.6	
Approach LOS		D			C			B			B	
Queue Length 50th (m)		21.5			11.9		13.9	51.9	0.2	24.2	92.0	3.0
Queue Length 95th (m)		39.7			29.9		m18.2	82.4	m0.2	m#52.5	44.6	m3.9
Internal Link Dist (m)		48.8			101.3			271.9			163.4	
Turn Bay Length (m)							55.0		105.0	80.0		60.0
Base Capacity (vph)		302			359		140	2052	904	203	2245	968
Starvation Cap Reductn		0			0		0	0	0	0	128	0
Spillback Cap Reductn		0			0		0	0	0	0	0	0
Storage Cap Reductn		0			0		0	0	0	0	0	0
Reduced v/c Ratio		0.50			0.43		0.40	0.68	0.05	0.62	0.64	0.10

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

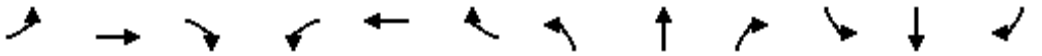
Maximum v/c Ratio: 0.75

Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 81.5%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: St. Laurent & Bourassa





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	332	110	102	33	288	111	188	1178	100	143	627	672
Future Volume (vph)	332	110	102	33	288	111	188	1178	100	143	627	672
Satd. Flow (prot)	3288	1784	1517	1695	3390	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3240	1784	1467	1664	3390	1479	1683	3390	1443	1687	3390	1470
Satd. Flow (RTOR)			132			183			181			317
Lane Group Flow (vph)	332	110	102	33	288	111	188	1178	100	143	627	672
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)	11.0	28.0	28.0	11.0	28.0	28.0	11.2	28.2	28.2	11.2	28.2	28.2
Total Split (s)	19.0	35.0	35.0	12.0	28.0	28.0	22.0	55.0	55.0	18.0	51.0	51.0
Total Split (%)	15.8%	29.2%	29.2%	10.0%	23.3%	23.3%	18.3%	45.8%	45.8%	15.0%	42.5%	42.5%
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)	1.9	2.0	2.0	1.9	2.0	2.0	1.8	1.7	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.7	5.7	5.6	5.7	5.7	6.0	5.9	5.9	6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	14.2	28.5	28.5	6.3	15.9	15.9	17.5	52.3	52.3	14.4	49.2	49.2
Actuated g/C Ratio	0.12	0.24	0.24	0.05	0.13	0.13	0.15	0.44	0.44	0.12	0.41	0.41
v/c Ratio	0.85	0.26	0.23	0.38	0.64	0.31	0.76	0.80	0.14	0.71	0.45	0.85
Control Delay	72.8	40.0	4.0	67.3	55.6	2.4	69.2	35.0	0.4	77.3	24.0	22.9
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	72.8	40.0	4.0	67.3	55.6	2.4	69.2	35.0	0.4	77.3	24.0	22.9
LOS	E	D	A	E	E	A	E	D	A	E	C	C
Approach Delay		53.3			42.8			37.0			28.8	
Approach LOS		D			D			D			C	
Queue Length 50th (m)	40.4	22.7	0.0	7.7	34.5	0.0	42.0	126.0	0.0	36.0	37.3	92.3
Queue Length 95th (m)	#66.2	36.8	7.8	18.3	45.9	0.4	#81.3	159.5	0.0	#69.6	66.4	#122.1
Internal Link Dist (m)		678.5			293.4			245.7			271.9	
Turn Bay Length (m)	70.0		100.0	35.0		15.0	65.0		25.0	110.0		90.0
Base Capacity (vph)	389	460	476	91	629	423	255	1477	731	205	1388	789
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	0.85	0.24	0.21	0.36	0.46	0.26	0.74	0.80	0.14	0.70	0.45	0.85

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: 100
Control Type: Actuated-Coordinated

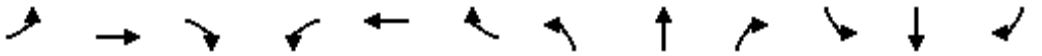
Maximum v/c Ratio: 0.85

Intersection Signal Delay: 36.9	Intersection LOS: D
Intersection Capacity Utilization 82.8%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 4: St. Laurent & Smyth/Lancaster





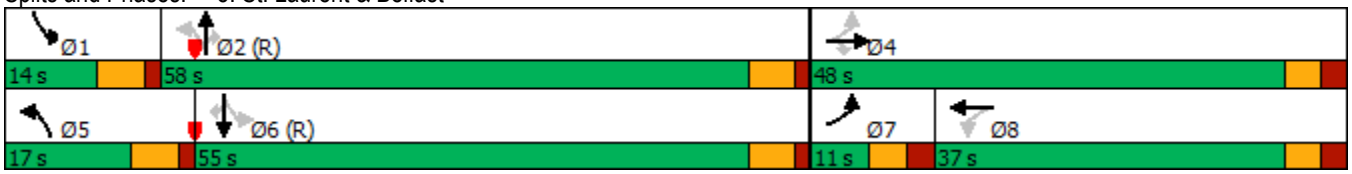
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	66	89	45	146	98	126	913	66	86	836	198
Future Volume (vph)	49	66	89	45	146	98	126	913	66	86	836	198
Satd. Flow (prot)	1695	1784	1517	1695	1668	0	1695	3390	1517	1695	3390	1517
Flt Permitted	0.257			0.714			0.246			0.242		
Satd. Flow (perm)	458	1784	1494	1270	1668	0	439	3390	1480	432	3390	1489
Satd. Flow (RTOR)			89		27				130			198
Lane Group Flow (vph)	49	66	89	45	244	0	126	913	66	86	836	198
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	27.8	27.8	27.8	27.8		11.2	41.6	41.6	11.2	41.6	41.6
Total Split (s)	11.0	48.0	48.0	37.0	37.0		17.0	58.0	58.0	14.0	55.0	55.0
Total Split (%)	9.2%	40.0%	40.0%	30.8%	30.8%		14.2%	48.3%	48.3%	11.7%	45.8%	45.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		1.5	1.4	1.4	1.5	1.4	1.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8		5.7	5.6	5.6	5.7	5.6	5.6
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	33.3	33.3	33.3	21.1	21.1		71.9	63.7	63.7	68.2	60.1	60.1
Actuated g/C Ratio	0.28	0.28	0.28	0.18	0.18		0.60	0.53	0.53	0.57	0.50	0.50
v/c Ratio	0.23	0.13	0.19	0.20	0.77		0.35	0.51	0.08	0.26	0.49	0.23
Control Delay	29.9	29.0	6.0	41.9	57.7		14.3	23.0	0.2	13.8	24.0	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	29.0	6.0	41.9	57.7		14.3	23.0	0.2	13.8	24.0	4.1
LOS	C	C	A	D	E		B	C	A	B	C	A
Approach Delay		19.2			55.2			20.7			19.7	
Approach LOS		B			E			C			B	
Queue Length 50th (m)	8.3	11.3	0.0	9.2	49.4		11.8	76.1	0.0	7.9	69.0	0.0
Queue Length 95th (m)	15.4	19.3	10.2	18.4	72.1		25.3	118.3	0.0	18.4	109.5	15.2
Internal Link Dist (m)		480.6			437.7			572.9			582.7	
Turn Bay Length (m)	70.0		200.0	65.0			65.0		65.0	75.0		100.0
Base Capacity (vph)	215	639	592	330	453		389	1837	861	343	1731	857
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.10	0.15	0.14	0.54		0.32	0.50	0.08	0.25	0.48	0.23

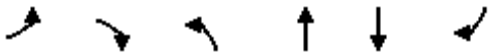
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 100 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 23.8	Intersection LOS: C
Intersection Capacity Utilization 71.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Belfast





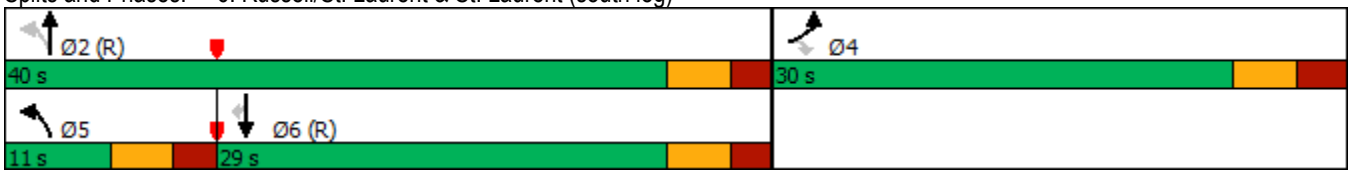
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	695	46	76	689	314	480
Future Volume (vph)	695	46	76	689	314	480
Satd. Flow (prot)	3288	1517	1695	3390	3390	1517
Flt Permitted	0.950		0.467			
Satd. Flow (perm)	3288	1485	829	3390	3390	1485
Satd. Flow (RTOR)		30				480
Lane Group Flow (vph)	695	46	76	689	314	480
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	30.0	30.0	11.0	24.0	26.5	26.5
Total Split (s)	30.0	30.0	11.0	40.0	29.0	29.0
Total Split (%)	42.9%	42.9%	15.7%	57.1%	41.4%	41.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	20.1	20.1	38.4	38.4	28.4	28.4
Actuated g/C Ratio	0.29	0.29	0.55	0.55	0.41	0.41
v/c Ratio	0.74	0.10	0.14	0.37	0.23	0.54
Control Delay	27.2	9.3	9.5	10.4	16.5	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.2	9.3	9.5	10.4	16.5	4.8
LOS	C	A	A	B	B	A
Approach Delay	26.1			10.3	9.4	
Approach LOS	C			B	A	
Queue Length 50th (m)	42.2	1.5	4.3	24.5	14.5	0.0
Queue Length 95th (m)	52.9	7.2	11.5	41.6	26.3	19.5
Internal Link Dist (m)	174.1			99.9	245.7	
Turn Bay Length (m)		15.0	65.0			90.0
Base Capacity (vph)	1137	533	537	1870	1410	897
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.09	0.14	0.37	0.22	0.54

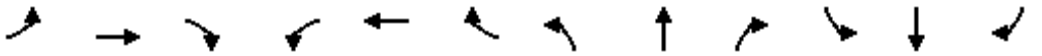
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 15.1	Intersection LOS: B
Intersection Capacity Utilization 56.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Russell/St. Laurent & St. Laurent (south leg)





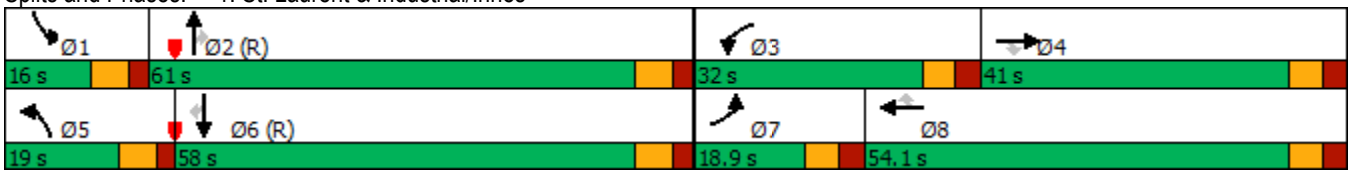
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	576	340	423	291	140	196	926	541	135	917	140
Future Volume (vph)	147	576	340	423	291	140	196	926	541	135	917	140
Satd. Flow (prot)	3288	3390	1517	3288	3390	1517	3288	3390	1517	3288	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3237	3390	1478	3254	3390	1478	3255	3390	1462	3256	3390	1461
Satd. Flow (RTOR)			168			140			354			168
Lane Group Flow (vph)	147	576	340	423	291	140	196	926	541	135	917	140
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)	18.9	41.0	41.0	32.0	54.1	54.1	19.0	61.0	61.0	16.0	58.0	58.0
Total Split (%)	12.6%	27.3%	27.3%	21.3%	36.1%	36.1%	12.7%	40.7%	40.7%	10.7%	38.7%	38.7%
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)	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 Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.3	6.6	6.6	6.3	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	11.4	30.6	30.6	23.4	42.7	42.7	12.6	60.0	60.0	9.8	57.3	57.3
Actuated g/C Ratio	0.08	0.20	0.20	0.16	0.28	0.28	0.08	0.40	0.40	0.07	0.38	0.38
v/c Ratio	0.59	0.83	0.78	0.82	0.30	0.27	0.71	0.68	0.68	0.63	0.71	0.21
Control Delay	76.8	68.2	40.9	75.2	42.1	6.7	81.7	41.6	17.7	81.6	44.3	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.9	0.0	0.0	0.0
Total Delay	76.8	68.2	40.9	75.2	42.1	6.7	81.7	44.5	18.6	81.6	44.3	3.0
LOS	E	E	D	E	D	A	F	D	B	F	D	A
Approach Delay		60.7			52.7			40.4			43.7	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	22.1	86.8	50.4	63.1	35.4	0.0	29.4	123.8	47.7	20.3	126.0	0.0
Queue Length 95th (m)	33.9	105.8	86.6	81.5	46.5	15.4	43.4	152.3	95.1	32.1	155.4	8.9
Internal Link Dist (m)		460.3			515.4			130.1			572.9	
Turn Bay Length (m)	35.0		120.0	160.0		85.0	90.0		110.0	135.0		155.0
Base Capacity (vph)	274	777	468	561	1073	563	285	1361	799	222	1300	664
Starvation Cap Reductn	0	0	0	0	0	0	0	317	81	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	0.54	0.74	0.73	0.75	0.27	0.25	0.69	0.89	0.75	0.61	0.71	0.21

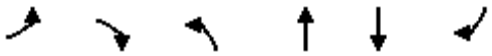
Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 48.0	Intersection LOS: D
Intersection Capacity Utilization 86.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: St. Laurent & Industrial/Innes





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	73	18	25	1664	1677	106
Future Volume (vph)	73	18	25	1664	1677	106
Satd. Flow (prot)	1654	0	1695	3390	3390	1517
Flt Permitted	0.961		0.950			
Satd. Flow (perm)	1619	0	1687	3390	3390	1407
Satd. Flow (RTOR)						
Lane Group Flow (vph)	91	0	25	1664	1677	106
Turn Type	Perm		Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4					6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	32.0		11.3	29.9	29.9	29.9
Total Split (s)	32.0		12.0	88.0	76.0	76.0
Total Split (%)	26.7%		10.0%	73.3%	63.3%	63.3%
Yellow Time (s)	3.0		4.2	4.2	4.2	4.2
All-Red Time (s)	2.0		2.1	1.7	1.7	1.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		6.3	5.9	5.9	5.9
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None		None	C-Min	C-Min	C-Min
Act Effct Green (s)	14.7		6.5	94.4	86.5	86.5
Actuated g/C Ratio	0.12		0.05	0.79	0.72	0.72
v/c Ratio	0.46		0.27	0.62	0.69	0.10
Control Delay	54.8		61.0	3.4	13.7	7.6
Queue Delay	0.0		0.0	0.0	2.1	0.0
Total Delay	54.8		61.0	3.5	15.8	7.6
LOS	D		E	A	B	A
Approach Delay	54.8			4.3	15.3	
Approach LOS	D			A	B	
Queue Length 50th (m)	20.8		6.1	27.5	112.6	7.4
Queue Length 95th (m)	32.4		m8.9	32.7	196.6	19.0
Internal Link Dist (m)	152.0			163.4	130.1	
Turn Bay Length (m)			40.0			20.0
Base Capacity (vph)	364		92	2667	2442	1013
Starvation Cap Reductn	0		0	57	586	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.25		0.27	0.64	0.90	0.10

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 11.1	Intersection LOS: B
Intersection Capacity Utilization 73.2%	ICU Level of Service D
Analysis Period (min) 15	

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

Splits and Phases: 2: St. Laurent & Site Access



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	8	56	37	5	90	31	1634	69	93	1480	76
Future Volume (vph)	46	8	56	37	5	90	31	1634	69	93	1480	76
Satd. Flow (prot)	0	1613	0	0	1542	0	1695	3390	1517	1695	3390	1517
Flt Permitted		0.738			0.857		0.950			0.950		
Satd. Flow (perm)	0	1199	0	0	1338	0	1673	3390	1460	1693	3390	1333
Satd. Flow (RTOR)		40			83				86			86
Lane Group Flow (vph)	0	110	0	0	132	0	31	1634	69	93	1480	76
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	33.3	33.3		33.3	33.3		11.2	27.2	27.2	11.2	27.2	27.2
Total Split (s)	33.3	33.3		33.3	33.3		11.2	71.7	71.7	15.0	75.5	75.5
Total Split (%)	27.8%	27.8%		27.8%	27.8%		9.3%	59.8%	59.8%	12.5%	62.9%	62.9%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	1.7	1.7	2.0	1.7	1.7
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.2	5.9	5.9	6.2	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		17.2			17.2		5.9	74.6	74.6	9.8	83.4	83.4
Actuated g/C Ratio		0.14			0.14		0.05	0.62	0.62	0.08	0.70	0.70
v/c Ratio		0.54			0.50		0.37	0.78	0.07	0.67	0.63	0.08
Control Delay		38.0			24.5		60.6	32.1	7.1	82.9	6.0	1.1
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.1	0.0
Total Delay		38.0			24.5		60.6	32.1	7.1	82.9	6.0	1.1
LOS		D			C		E	C	A	F	A	A
Approach Delay		38.0			24.5			31.7			10.2	
Approach LOS		D			C			C			B	
Queue Length 50th (m)		16.1			11.0		7.2	189.0	1.6	23.6	10.5	0.0
Queue Length 95th (m)		30.6			26.9		m11.0	202.7	m7.5	m#37.3	44.0	m1.9
Internal Link Dist (m)		48.8			101.3			271.9			163.4	
Turn Bay Length (m)							55.0		105.0	80.0		60.0
Base Capacity (vph)		300			365		83	2108	940	140	2356	952
Starvation Cap Reductn		0			0		0	0	0	0	118	0
Spillback Cap Reductn		0			0		0	0	0	0	0	0
Storage Cap Reductn		0			0		0	0	0	0	0	0
Reduced v/c Ratio		0.37			0.36		0.37	0.78	0.07	0.66	0.66	0.08

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

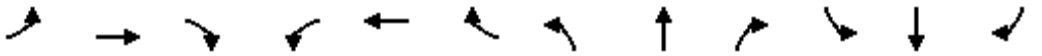
Maximum v/c Ratio: 0.78

Intersection Signal Delay: 21.8	Intersection LOS: C
Intersection Capacity Utilization 86.8%	ICU Level of Service E
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: St. Laurent & Bourassa





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	544	286	233	104	111	239	84	769	97	152	1146	368
Future Volume (vph)	544	286	233	104	111	239	84	769	97	152	1146	368
Satd. Flow (prot)	3288	1784	1517	1695	3390	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3150	1784	1477	1678	3390	1455	1681	3390	1421	1673	3390	1433
Satd. Flow (RTOR)			215			237			235			368
Lane Group Flow (vph)	544	286	233	104	111	239	84	769	97	152	1146	368
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)	11.0	28.0	28.0	11.0	28.0	28.0	11.2	28.2	28.2	11.2	28.2	28.2
Total Split (s)	27.0	39.0	39.0	16.0	28.0	28.0	14.7	43.9	43.9	21.1	50.3	50.3
Total Split (%)	22.5%	32.5%	32.5%	13.3%	23.3%	23.3%	12.3%	36.6%	36.6%	17.6%	41.9%	41.9%
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)	1.9	2.0	2.0	1.9	2.0	2.0	1.8	1.7	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.7	5.7	5.6	5.7	5.7	6.0	5.9	5.9	6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	22.0	27.4	27.4	10.1	15.5	15.5	9.4	45.0	45.0	14.3	49.9	49.9
Actuated g/C Ratio	0.18	0.23	0.23	0.08	0.13	0.13	0.08	0.38	0.38	0.12	0.42	0.42
v/c Ratio	0.90	0.70	0.46	0.73	0.25	0.61	0.64	0.61	0.14	0.75	0.81	0.45
Control Delay	67.8	52.0	9.2	82.1	46.8	12.6	75.2	34.1	0.4	70.2	32.9	6.8
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	67.8	52.0	9.2	82.1	46.8	12.6	75.2	34.1	0.4	70.2	32.9	6.8
LOS	E	D	A	F	D	B	E	C	A	E	C	A
Approach Delay		50.7			36.9			34.3			30.5	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	65.6	64.4	3.4	24.2	12.8	0.4	19.1	75.7	0.0	30.7	137.4	28.1
Queue Length 95th (m)	#97.4	86.5	22.8	#50.2	20.0	22.2	#42.4	106.2	0.0	#61.9	#172.0	24.3
Internal Link Dist (m)		678.5			293.4			245.7			271.9	
Turn Bay Length (m)	70.0		100.0	35.0		15.0	65.0		25.0	110.0		90.0
Base Capacity (vph)	605	495	565	148	629	463	136	1271	679	218	1410	811
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	0.90	0.58	0.41	0.70	0.18	0.52	0.62	0.61	0.14	0.70	0.81	0.45

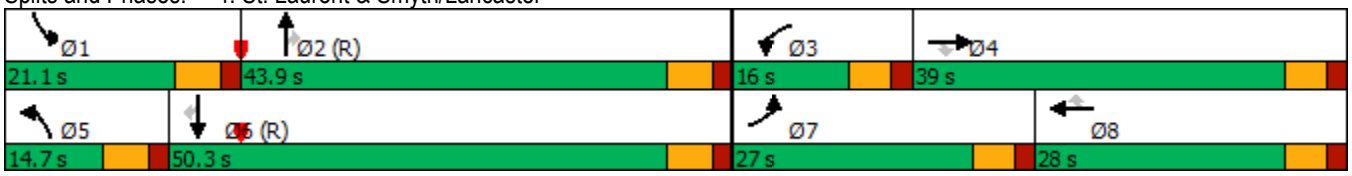
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

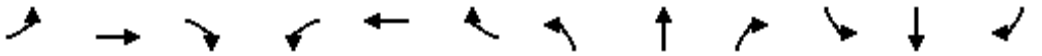
Maximum v/c Ratio: 0.90

Intersection Signal Delay: 37.3	Intersection LOS: D
Intersection Capacity Utilization 86.9%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 4: St. Laurent & Smyth/Lancaster





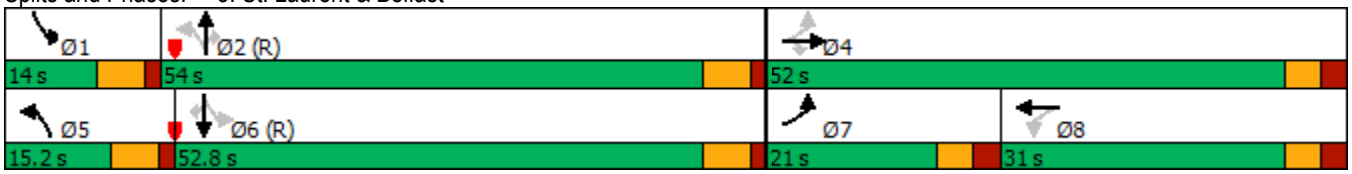
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	169	227	105	95	155	108	1015	85	95	854	138
Future Volume (vph)	203	169	227	105	95	155	108	1015	85	95	854	138
Satd. Flow (prot)	1695	1784	1517	1695	1597	0	1695	3390	1517	1695	3390	1517
Flt Permitted	0.213			0.650			0.223			0.163		
Satd. Flow (perm)	379	1784	1477	1146	1597	0	396	3390	1477	291	3390	1468
Satd. Flow (RTOR)			209		62				130			138
Lane Group Flow (vph)	203	169	227	105	250	0	108	1015	85	95	854	138
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	27.8	27.8	27.8	27.8		11.2	41.6	41.6	11.2	41.6	41.6
Total Split (s)	21.0	52.0	52.0	31.0	31.0		15.2	54.0	54.0	14.0	52.8	52.8
Total Split (%)	17.5%	43.3%	43.3%	25.8%	25.8%		12.7%	45.0%	45.0%	11.7%	44.0%	44.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		1.5	1.4	1.4	1.5	1.4	1.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8		5.7	5.6	5.6	5.7	5.6	5.6
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	41.7	41.7	41.7	19.3	19.3		61.7	53.1	53.1	60.5	52.5	52.5
Actuated g/C Ratio	0.35	0.35	0.35	0.16	0.16		0.51	0.44	0.44	0.50	0.44	0.44
v/c Ratio	0.65	0.27	0.35	0.57	0.81		0.36	0.68	0.12	0.39	0.58	0.19
Control Delay	38.1	28.2	5.8	57.8	56.0		17.8	30.9	1.4	19.2	28.8	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.1	28.2	5.8	57.8	56.0		17.8	30.9	1.4	19.2	28.8	4.6
LOS	D	C	A	E	E		B	C	A	B	C	A
Approach Delay		23.1			56.5			27.7			24.9	
Approach LOS		C			E			C			C	
Queue Length 50th (m)	33.4	27.0	2.7	23.0	43.3		12.4	105.4	0.0	10.8	83.6	0.0
Queue Length 95th (m)	51.8	43.0	18.4	39.3	69.0		22.3	130.6	3.0	20.0	106.0	12.3
Internal Link Dist (m)		480.6			437.7			572.9			582.7	
Turn Bay Length (m)	70.0		200.0	65.0			65.0		65.0	75.0		100.0
Base Capacity (vph)	319	691	700	240	384		312	1518	733	250	1498	726
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.24	0.32	0.44	0.65		0.35	0.67	0.12	0.38	0.57	0.19

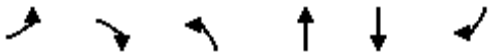
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 29.0	Intersection LOS: C
Intersection Capacity Utilization 82.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Belfast





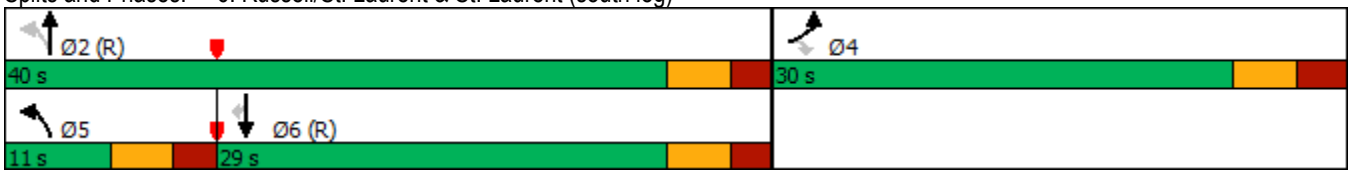
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	637	110	44	353	735	754
Future Volume (vph)	637	110	44	353	735	754
Satd. Flow (prot)	3288	1517	1695	3390	3390	1517
Flt Permitted	0.950		0.259			
Satd. Flow (perm)	3288	1483	461	3390	3390	1481
Satd. Flow (RTOR)		78				754
Lane Group Flow (vph)	637	110	44	353	735	754
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	30.0	30.0	11.0	24.0	26.5	26.5
Total Split (s)	30.0	30.0	11.0	40.0	29.0	29.0
Total Split (%)	42.9%	42.9%	15.7%	57.1%	41.4%	41.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	19.0	19.0	39.5	39.5	32.5	32.5
Actuated g/C Ratio	0.27	0.27	0.56	0.56	0.46	0.46
v/c Ratio	0.72	0.24	0.12	0.18	0.47	0.69
Control Delay	27.5	8.5	9.0	8.4	16.4	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	8.5	9.0	8.4	16.4	5.7
LOS	C	A	A	A	B	A
Approach Delay	24.7			8.5	11.0	
Approach LOS	C			A	B	
Queue Length 50th (m)	38.9	3.1	2.3	10.6	37.6	0.0
Queue Length 95th (m)	49.4	12.4	7.3	19.9	59.4	26.2
Internal Link Dist (m)	174.1			99.9	245.7	
Turn Bay Length (m)		15.0	65.0			90.0
Base Capacity (vph)	1127	559	366	1914	1574	1091
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.20	0.12	0.18	0.47	0.69

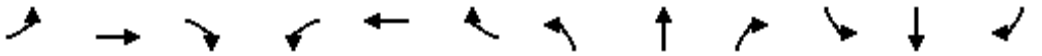
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 14.5	Intersection LOS: B
Intersection Capacity Utilization 63.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Russell/St. Laurent & St. Laurent (south leg)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	201	132	673	812	264	217	1138	384	127	852	159
Future Volume (vph)	86	201	132	673	812	264	217	1138	384	127	852	159
Satd. Flow (prot)	3288	3390	1517	3288	3390	1517	3288	3390	1517	3288	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3265	3390	1479	3234	3390	1479	3266	3390	1473	3273	3390	1473
Satd. Flow (RTOR)			180			151			380			180
Lane Group Flow (vph)	86	201	132	673	812	264	217	1138	384	127	852	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)	14.2	38.6	38.6	36.0	60.4	60.4	17.4	52.7	52.7	12.7	48.0	48.0
Total Split (%)	10.1%	27.6%	27.6%	25.7%	43.1%	43.1%	12.4%	37.6%	37.6%	9.1%	34.3%	34.3%
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)	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 Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.3	6.6	6.6	6.3	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	7.4	20.1	20.1	29.4	42.1	42.1	13.5	54.5	54.5	9.8	50.8	50.8
Actuated g/C Ratio	0.05	0.14	0.14	0.21	0.30	0.30	0.10	0.39	0.39	0.07	0.36	0.36
v/c Ratio	0.50	0.41	0.36	0.98	0.80	0.48	0.68	0.86	0.48	0.55	0.69	0.24
Control Delay	74.6	55.5	4.5	83.4	50.8	18.1	72.3	48.0	5.4	71.8	43.0	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.7	0.2	0.0	0.0	0.0
Total Delay	74.6	55.5	4.5	83.4	50.8	18.1	72.3	75.8	5.6	71.8	43.0	4.2
LOS	E	E	A	F	D	B	E	E	A	E	D	A
Approach Delay		43.4			58.4			59.8			40.8	
Approach LOS		D			E			E			D	
Queue Length 50th (m)	12.1	27.2	0.0	96.3	110.1	24.6	30.0	153.0	0.7	17.6	106.3	0.0
Queue Length 95th (m)	21.1	35.5	5.5	#134.6	116.8	44.2	#52.0	#217.3	24.0	#36.7	143.1	11.8
Internal Link Dist (m)		460.3			515.4			130.1			572.9	
Turn Bay Length (m)	35.0		120.0	160.0		85.0	90.0		110.0	135.0		155.0
Base Capacity (vph)	178	774	476	690	1302	661	317	1320	805	231	1230	649
Starvation Cap Reductn	0	0	0	0	0	0	0	236	73	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	0.48	0.26	0.28	0.98	0.62	0.40	0.68	1.05	0.52	0.55	0.69	0.24

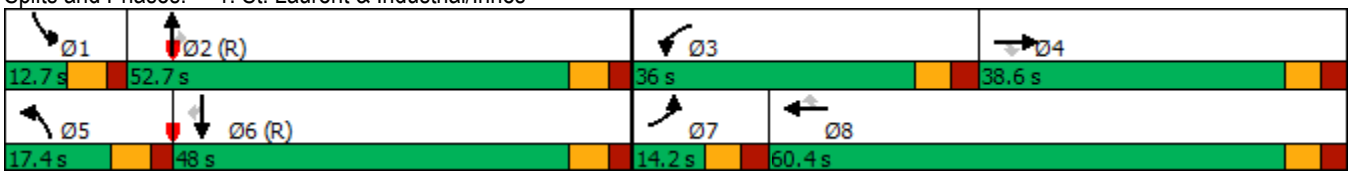
Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated

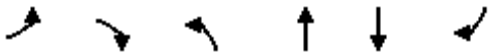
Maximum v/c Ratio: 0.98

Intersection Signal Delay: 53.7	Intersection LOS: D
Intersection Capacity Utilization 92.9%	ICU Level of Service F
Analysis Period (min) 15	

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

Splits and Phases: 1: St. Laurent & Industrial/Innes





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	103	22	16	1630	1636	65
Future Volume (vph)	103	22	16	1630	1636	65
Satd. Flow (prot)	1659	0	1695	3390	3390	1517
Flt Permitted	0.960		0.950			
Satd. Flow (perm)	1623	0	1686	3390	3390	1407
Satd. Flow (RTOR)						
Lane Group Flow (vph)	125	0	16	1630	1636	65
Turn Type	Perm		Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4					6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	32.0		11.3	29.9	29.9	29.9
Total Split (s)	32.0		11.3	88.0	76.7	76.7
Total Split (%)	26.7%		9.4%	73.3%	63.9%	63.9%
Yellow Time (s)	3.0		4.2	4.2	4.2	4.2
All-Red Time (s)	2.0		2.1	1.7	1.7	1.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		6.3	5.9	5.9	5.9
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None		None	C-Min	C-Min	C-Min
Act Effct Green (s)	16.1		6.0	93.0	88.0	88.0
Actuated g/C Ratio	0.13		0.05	0.78	0.73	0.73
v/c Ratio	0.57		0.19	0.62	0.66	0.06
Control Delay	57.8		62.6	4.7	12.3	7.2
Queue Delay	0.0		0.0	0.0	2.9	0.0
Total Delay	57.8		62.6	4.7	15.2	7.2
LOS	E		E	A	B	A
Approach Delay	57.8			5.3	14.9	
Approach LOS	E			A	B	
Queue Length 50th (m)	28.4		3.8	71.2	68.6	2.8
Queue Length 95th (m)	42.6		m6.0	18.2	184.3	12.4
Internal Link Dist (m)	152.0			163.4	130.1	
Turn Bay Length (m)			40.0			20.0
Base Capacity (vph)	365		85	2626	2484	1031
Starvation Cap Reductn	0		0	3	710	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.34		0.19	0.62	0.92	0.06

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 11.9	Intersection LOS: B
Intersection Capacity Utilization 72.0%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 2: St. Laurent & Site Access



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	90	37	6	110	56	1469	49	126	1413	96
Future Volume (vph)	50	10	90	37	6	110	56	1469	49	126	1413	96
Satd. Flow (prot)	0	1583	0	0	1548	0	1695	3390	1517	1695	3390	1517
Flt Permitted		0.717			0.804		0.950			0.950		
Satd. Flow (perm)	0	1146	0	0	1256	0	1685	3390	1438	1689	3390	1418
Satd. Flow (RTOR)		58			99				86			86
Lane Group Flow (vph)	0	150	0	0	153	0	56	1469	49	126	1413	96
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	33.3	33.3		33.3	33.3		11.2	27.2	27.2	11.2	27.2	27.2
Total Split (s)	33.3	33.3		33.3	33.3		15.9	66.7	66.7	20.0	70.8	70.8
Total Split (%)	27.8%	27.8%		27.8%	27.8%		13.3%	55.6%	55.6%	16.7%	59.0%	59.0%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	1.7	1.7	2.0	1.7	1.7
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.2	5.9	5.9	6.2	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		15.8			15.8		8.7	72.6	72.6	13.1	79.5	79.5
Actuated g/C Ratio		0.13			0.13		0.07	0.60	0.60	0.11	0.66	0.66
v/c Ratio		0.75			0.61		0.46	0.72	0.05	0.68	0.63	0.10
Control Delay		51.4			28.3		63.2	12.0	0.6	76.1	8.0	2.3
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.1	0.0
Total Delay		51.4			28.3		63.2	12.0	0.6	76.1	8.1	2.3
LOS		D			C		E	B	A	E	A	A
Approach Delay		51.4			28.3			13.5			13.0	
Approach LOS		D			C			B			B	
Queue Length 50th (m)		21.5			11.9		14.2	50.6	0.2	24.6	102.8	3.0
Queue Length 95th (m)		39.7			29.9		m17.1	m112.7	m0.2	m48.7	53.9	m4.9
Internal Link Dist (m)		48.8			101.3			271.9			163.4	
Turn Bay Length (m)							55.0		105.0	80.0		60.0
Base Capacity (vph)		302			359		140	2052	904	203	2245	968
Starvation Cap Reductn		0			0		0	0	0	0	145	0
Spillback Cap Reductn		0			0		0	0	0	0	0	0
Storage Cap Reductn		0			0		0	0	0	0	0	0
Reduced v/c Ratio		0.50			0.43		0.40	0.72	0.05	0.62	0.67	0.10

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

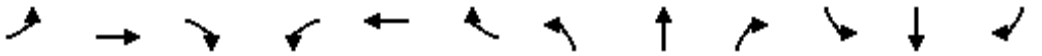
Maximum v/c Ratio: 0.75

Intersection Signal Delay: 15.5	Intersection LOS: B
Intersection Capacity Utilization 83.6%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 3: St. Laurent & Bourassa





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	348	116	107	35	303	117	198	1237	105	150	659	706
Future Volume (vph)	348	116	107	35	303	117	198	1237	105	150	659	706
Satd. Flow (prot)	3288	1784	1517	1695	3390	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3241	1784	1467	1664	3390	1479	1684	3390	1443	1688	3390	1470
Satd. Flow (RTOR)			132			183			181			306
Lane Group Flow (vph)	348	116	107	35	303	117	198	1237	105	150	659	706
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)	11.0	28.0	28.0	11.0	28.0	28.0	11.2	28.2	28.2	11.2	28.2	28.2
Total Split (s)	19.0	35.0	35.0	12.0	28.0	28.0	22.0	55.0	55.0	18.0	51.0	51.0
Total Split (%)	15.8%	29.2%	29.2%	10.0%	23.3%	23.3%	18.3%	45.8%	45.8%	15.0%	42.5%	42.5%
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)	1.9	2.0	2.0	1.9	2.0	2.0	1.8	1.7	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.7	5.7	5.6	5.7	5.7	6.0	5.9	5.9	6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	13.8	28.5	28.5	6.2	16.3	16.3	18.1	51.8	51.8	14.9	48.6	48.6
Actuated g/C Ratio	0.12	0.24	0.24	0.05	0.14	0.14	0.15	0.43	0.43	0.12	0.40	0.40
v/c Ratio	0.92	0.27	0.24	0.40	0.66	0.33	0.78	0.85	0.14	0.72	0.48	0.91
Control Delay	82.8	40.3	4.8	68.7	55.8	3.1	69.8	37.8	0.4	74.1	25.1	29.8
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	82.8	40.3	4.8	68.7	55.8	3.1	69.8	37.8	0.4	74.1	25.1	29.8
LOS	F	D	A	E	E	A	E	D	A	E	C	C
Approach Delay		59.6			43.2			39.3			32.2	
Approach LOS		E			D			D			C	
Queue Length 50th (m)	42.6	23.9	0.0	8.1	36.2	0.0	44.0	139.1	0.0	37.7	37.3	105.5
Queue Length 95th (m)	#70.8	38.6	8.9	18.8	48.2	2.0	#87.2	#174.4	0.0	#74.3	66.5	#134.6
Internal Link Dist (m)		678.5			293.4			245.7			271.9	
Turn Bay Length (m)	70.0		100.0	35.0		15.0	65.0		25.0	110.0		90.0
Base Capacity (vph)	378	457	474	90	629	423	260	1463	725	209	1371	777
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	0.92	0.25	0.23	0.39	0.48	0.28	0.76	0.85	0.14	0.72	0.48	0.91

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: 110
Control Type: Actuated-Coordinated

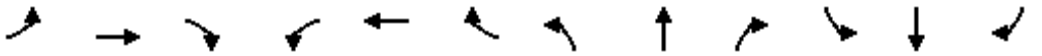
Maximum v/c Ratio: 0.92

Intersection Signal Delay: 39.9	Intersection LOS: D
Intersection Capacity Utilization 85.7%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 4: St. Laurent & Smyth/Lancaster





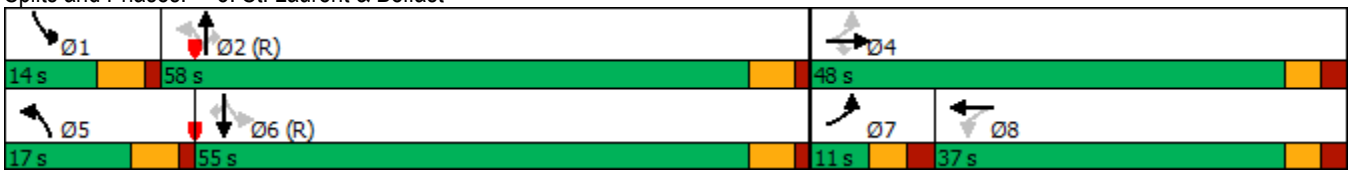
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	69	94	47	153	103	132	956	69	91	877	208
Future Volume (vph)	51	69	94	47	153	103	132	956	69	91	877	208
Satd. Flow (prot)	1695	1784	1517	1695	1668	0	1695	3390	1517	1695	3390	1517
Flt Permitted	0.250			0.712			0.231			0.216		
Satd. Flow (perm)	446	1784	1494	1267	1668	0	412	3390	1480	385	3390	1489
Satd. Flow (RTOR)			94		27				130			208
Lane Group Flow (vph)	51	69	94	47	256	0	132	956	69	91	877	208
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	27.8	27.8	27.8	27.8		11.2	41.6	41.6	11.2	41.6	41.6
Total Split (s)	11.0	48.0	48.0	37.0	37.0		17.0	58.0	58.0	14.0	55.0	55.0
Total Split (%)	9.2%	40.0%	40.0%	30.8%	30.8%		14.2%	48.3%	48.3%	11.7%	45.8%	45.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		1.5	1.4	1.4	1.5	1.4	1.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8		5.7	5.6	5.6	5.7	5.6	5.6
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	33.8	33.8	33.8	22.0	22.0		70.5	61.1	61.1	67.5	59.6	59.6
Actuated g/C Ratio	0.28	0.28	0.28	0.18	0.18		0.59	0.51	0.51	0.56	0.50	0.50
v/c Ratio	0.24	0.14	0.19	0.20	0.78		0.38	0.55	0.08	0.30	0.52	0.25
Control Delay	30.2	29.0	6.0	41.1	57.8		15.0	24.2	0.2	14.5	24.6	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	29.0	6.0	41.1	57.8		15.0	24.2	0.2	14.5	24.6	4.0
LOS	C	C	A	D	E		B	C	A	B	C	A
Approach Delay		19.2			55.2			21.7			20.2	
Approach LOS		B			E			C			C	
Queue Length 50th (m)	8.6	11.7	0.0	9.5	52.1		12.8	82.8	0.0	8.6	75.2	0.0
Queue Length 95th (m)	16.1	20.4	10.5	18.9	75.0		25.8	120.8	0.0	18.7	113.0	14.9
Internal Link Dist (m)		480.6			437.7			572.9			582.7	
Turn Bay Length (m)	70.0		200.0	65.0			65.0		65.0	75.0		100.0
Base Capacity (vph)	211	635	593	329	453		372	1750	827	314	1706	852
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.11	0.16	0.14	0.57		0.35	0.55	0.08	0.29	0.51	0.24

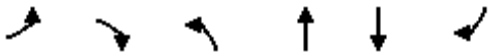
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 100 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 24.4	Intersection LOS: C
Intersection Capacity Utilization 72.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Belfast





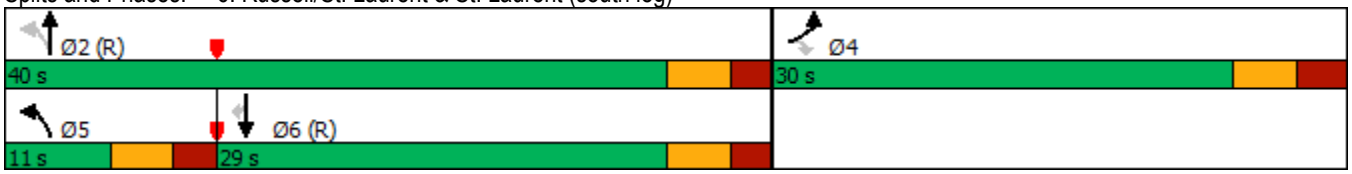
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	731	48	80	724	330	504
Future Volume (vph)	731	48	80	724	330	504
Satd. Flow (prot)	3288	1517	1695	3390	3390	1517
Flt Permitted	0.950		0.458			
Satd. Flow (perm)	3288	1485	813	3390	3390	1485
Satd. Flow (RTOR)		30				504
Lane Group Flow (vph)	731	48	80	724	330	504
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	30.0	30.0	11.0	24.0	26.5	26.5
Total Split (s)	30.0	30.0	11.0	40.0	29.0	29.0
Total Split (%)	42.9%	42.9%	15.7%	57.1%	41.4%	41.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	20.8	20.8	37.7	37.7	27.9	27.9
Actuated g/C Ratio	0.30	0.30	0.54	0.54	0.40	0.40
v/c Ratio	0.75	0.10	0.15	0.40	0.24	0.56
Control Delay	27.1	9.2	10.0	11.0	16.8	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	9.2	10.0	11.0	16.8	4.9
LOS	C	A	A	B	B	A
Approach Delay	26.0			10.9	9.6	
Approach LOS	C			B	A	
Queue Length 50th (m)	44.2	1.7	4.6	26.8	15.7	0.0
Queue Length 95th (m)	55.1	7.5	12.3	45.0	27.2	20.0
Internal Link Dist (m)	174.1			99.9	245.7	
Turn Bay Length (m)		15.0	65.0			90.0
Base Capacity (vph)	1144	536	520	1844	1389	905
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.09	0.15	0.39	0.24	0.56

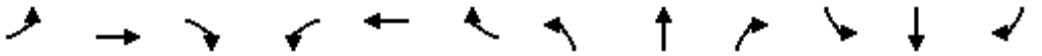
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 57.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Russell/St. Laurent & St. Laurent (south leg)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	606	357	444	306	148	205	971	567	142	960	147
Future Volume (vph)	155	606	357	444	306	148	205	971	567	142	960	147
Satd. Flow (prot)	3288	3390	1517	3288	3390	1517	3288	3390	1517	3288	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3238	3390	1478	3255	3390	1478	3257	3390	1462	3258	3390	1461
Satd. Flow (RTOR)			168			148			350			168
Lane Group Flow (vph)	155	606	357	444	306	148	205	971	567	142	960	147
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)	18.9	41.0	41.0	32.0	54.1	54.1	19.0	61.0	61.0	16.0	58.0	58.0
Total Split (%)	12.6%	27.3%	27.3%	21.3%	36.1%	36.1%	12.7%	40.7%	40.7%	10.7%	38.7%	38.7%
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)	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 Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.3	6.6	6.6	6.3	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	11.4	31.5	31.5	23.8	43.9	43.9	12.8	58.5	58.5	10.1	55.7	55.7
Actuated g/C Ratio	0.08	0.21	0.21	0.16	0.29	0.29	0.09	0.39	0.39	0.07	0.37	0.37
v/c Ratio	0.62	0.85	0.81	0.85	0.31	0.28	0.73	0.73	0.72	0.65	0.76	0.23
Control Delay	78.4	69.2	43.7	77.1	41.5	6.6	82.2	44.2	20.8	82.1	47.3	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	0.9	0.0	0.0	0.0
Total Delay	78.4	69.2	43.7	77.1	41.5	6.6	82.2	48.3	21.8	82.1	47.3	3.8
LOS	E	E	D	E	D	A	F	D	C	F	D	A
Approach Delay		62.3			53.4			43.6			46.1	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	23.2	90.6	55.4	66.2	36.4	0.0	30.7	137.4	60.7	21.3	139.5	0.0
Queue Length 95th (m)	35.4	112.1	94.1	85.7	48.8	15.7	#47.3	162.2	110.0	#33.7	165.1	10.8
Internal Link Dist (m)		460.3			515.4			130.1			572.9	
Turn Bay Length (m)	35.0		120.0	160.0		85.0	90.0		110.0	135.0		155.0
Base Capacity (vph)	269	777	468	556	1073	569	289	1328	785	225	1265	650
Starvation Cap Reductn	0	0	0	0	0	0	0	273	65	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	0.58	0.78	0.76	0.80	0.29	0.26	0.71	0.92	0.79	0.63	0.76	0.23

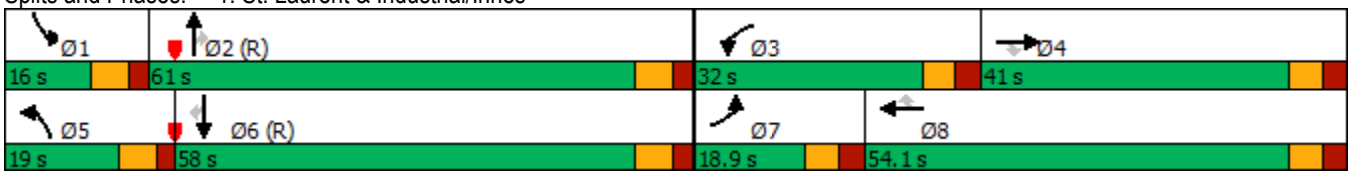
Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

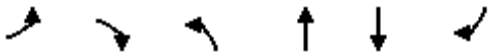
Maximum v/c Ratio: 0.85

Intersection Signal Delay: 50.2	Intersection LOS: D
Intersection Capacity Utilization 89.5%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: St. Laurent & Industrial/Innes





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	73	18	25	1749	1760	106
Future Volume (vph)	73	18	25	1749	1760	106
Satd. Flow (prot)	1654	0	1695	3390	3390	1517
Flt Permitted	0.961		0.950			
Satd. Flow (perm)	1619	0	1688	3390	3390	1407
Satd. Flow (RTOR)						
Lane Group Flow (vph)	91	0	25	1749	1760	106
Turn Type	Perm		Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4					6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	32.0		11.3	29.9	29.9	29.9
Total Split (s)	32.0		12.0	88.0	76.0	76.0
Total Split (%)	26.7%		10.0%	73.3%	63.3%	63.3%
Yellow Time (s)	3.0		4.2	4.2	4.2	4.2
All-Red Time (s)	2.0		2.1	1.7	1.7	1.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		6.3	5.9	5.9	5.9
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None		None	C-Min	C-Min	C-Min
Act Effct Green (s)	14.7		6.5	94.4	86.5	86.5
Actuated g/C Ratio	0.12		0.05	0.79	0.72	0.72
v/c Ratio	0.46		0.27	0.66	0.72	0.10
Control Delay	54.8		61.4	4.2	14.6	7.6
Queue Delay	0.0		0.0	0.0	3.0	0.0
Total Delay	54.8		61.4	4.2	17.6	7.6
LOS	D		E	A	B	A
Approach Delay	54.8			5.0	17.0	
Approach LOS	D			A	B	
Queue Length 50th (m)	20.8		6.1	47.3	124.2	7.4
Queue Length 95th (m)	32.4		m8.4	33.6	217.1	19.0
Internal Link Dist (m)	152.0			163.4	130.1	
Turn Bay Length (m)			40.0			20.0
Base Capacity (vph)	364		92	2667	2442	1013
Starvation Cap Reductn	0		0	51	555	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.25		0.27	0.67	0.93	0.10

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 12.2	Intersection LOS: B
Intersection Capacity Utilization 75.7%	ICU Level of Service D
Analysis Period (min) 15	

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

Splits and Phases: 2: St. Laurent & Site Access



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	8	56	37	5	90	31	1715	69	93	1555	76
Future Volume (vph)	46	8	56	37	5	90	31	1715	69	93	1555	76
Satd. Flow (prot)	0	1613	0	0	1542	0	1695	3390	1517	1695	3390	1517
Flt Permitted		0.738			0.857		0.950			0.950		
Satd. Flow (perm)	0	1199	0	0	1338	0	1675	3390	1460	1693	3390	1333
Satd. Flow (RTOR)		40			83				86			86
Lane Group Flow (vph)	0	110	0	0	132	0	31	1715	69	93	1555	76
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	33.3	33.3		33.3	33.3		11.2	27.2	27.2	11.2	27.2	27.2
Total Split (s)	33.3	33.3		33.3	33.3		11.2	71.7	71.7	15.0	75.5	75.5
Total Split (%)	27.8%	27.8%		27.8%	27.8%		9.3%	59.8%	59.8%	12.5%	62.9%	62.9%
Yellow Time (s)	3.3	3.3		3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	1.7	1.7	2.0	1.7	1.7
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.2	5.9	5.9	6.2	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		17.2			17.2		5.9	74.6	74.6	9.8	83.4	83.4
Actuated g/C Ratio		0.14			0.14		0.05	0.62	0.62	0.08	0.70	0.70
v/c Ratio		0.54			0.50		0.37	0.81	0.07	0.67	0.66	0.08
Control Delay		38.0			24.5		60.2	33.2	6.8	82.7	6.5	1.0
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.1	0.0
Total Delay		38.0			24.5		60.2	33.2	6.8	82.7	6.6	1.0
LOS		D			C		E	C	A	F	A	A
Approach Delay		38.0			24.5			32.7			10.5	
Approach LOS		D			C			C			B	
Queue Length 50th (m)		16.1			11.0		7.3	180.3	1.0	23.5	9.4	0.0
Queue Length 95th (m)		30.6			26.9		m10.1	m211.4	m6.8	m#34.2	47.2	m1.7
Internal Link Dist (m)		48.8			101.3			271.9			163.4	
Turn Bay Length (m)							55.0		105.0	80.0		60.0
Base Capacity (vph)		300			365		83	2108	940	140	2356	952
Starvation Cap Reductn		0			0		0	0	0	0	116	0
Spillback Cap Reductn		0			0		0	0	0	0	0	0
Storage Cap Reductn		0			0		0	0	0	0	0	0
Reduced v/c Ratio		0.37			0.36		0.37	0.81	0.07	0.66	0.69	0.08

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

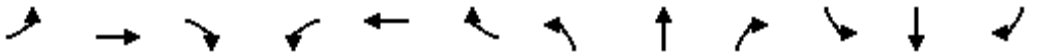
Maximum v/c Ratio: 0.81

Intersection Signal Delay: 22.4	Intersection LOS: C
Intersection Capacity Utilization 89.2%	ICU Level of Service E
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: St. Laurent & Bourassa





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	571	301	245	109	117	252	89	807	102	159	1204	387
Future Volume (vph)	571	301	245	109	117	252	89	807	102	159	1204	387
Satd. Flow (prot)	3288	1784	1517	1695	3390	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3151	1784	1477	1679	3390	1455	1682	3390	1421	1674	3390	1433
Satd. Flow (RTOR)			210			237			235			373
Lane Group Flow (vph)	571	301	245	109	117	252	89	807	102	159	1204	387
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)	11.0	28.0	28.0	11.0	28.0	28.0	11.2	28.2	28.2	11.2	28.2	28.2
Total Split (s)	27.0	39.0	39.0	16.0	28.0	28.0	14.7	43.9	43.9	21.1	50.3	50.3
Total Split (%)	22.5%	32.5%	32.5%	13.3%	23.3%	23.3%	12.3%	36.6%	36.6%	17.6%	41.9%	41.9%
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)	1.9	2.0	2.0	1.9	2.0	2.0	1.8	1.7	1.7	1.8	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.7	5.7	5.6	5.7	5.7	6.0	5.9	5.9	6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	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-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	21.9	27.8	27.8	10.0	16.0	16.0	9.6	44.3	44.3	14.6	49.3	49.3
Actuated g/C Ratio	0.18	0.23	0.23	0.08	0.13	0.13	0.08	0.37	0.37	0.12	0.41	0.41
v/c Ratio	0.95	0.73	0.49	0.77	0.26	0.63	0.66	0.64	0.15	0.77	0.86	0.48
Control Delay	75.7	53.0	10.8	87.2	46.5	14.4	76.8	35.4	0.5	71.7	35.4	7.0
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	75.7	53.0	10.8	87.2	46.5	14.4	76.8	35.4	0.5	71.7	35.4	7.0
LOS	E	D	B	F	D	B	E	D	A	E	D	A
Approach Delay		55.3			38.9			35.5			32.4	
Approach LOS		E			D			D			C	
Queue Length 50th (m)	69.6	67.6	6.7	25.5	13.4	3.2	20.2	82.4	0.0	31.8	143.3	30.6
Queue Length 95th (m)	#104.5	91.0	27.1	#53.7	20.8	26.5	#46.8	112.6	0.0	m#65.0	#187.7	11.9
Internal Link Dist (m)		678.5			293.4			245.7			271.9	
Turn Bay Length (m)	70.0		100.0	35.0		15.0	65.0		25.0	110.0		90.0
Base Capacity (vph)	600	495	561	146	629	463	138	1252	672	219	1393	808
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	0.95	0.61	0.44	0.75	0.19	0.54	0.64	0.64	0.15	0.73	0.86	0.48

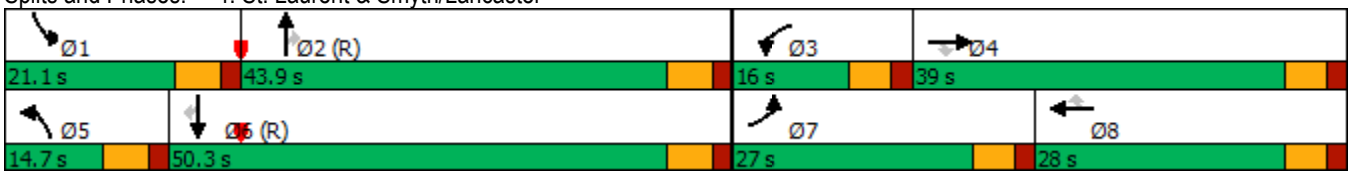
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

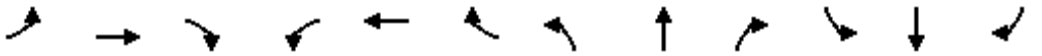
Maximum v/c Ratio: 0.95

Intersection Signal Delay: 39.7	Intersection LOS: D
Intersection Capacity Utilization 89.7%	ICU Level of Service E
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: St. Laurent & Smyth/Lancaster





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	213	177	238	110	100	163	114	1065	90	100	894	145
Future Volume (vph)	213	177	238	110	100	163	114	1065	90	100	894	145
Satd. Flow (prot)	1695	1784	1517	1695	1597	0	1695	3390	1517	1695	3390	1517
Flt Permitted	0.201			0.646			0.202			0.143		
Satd. Flow (perm)	357	1784	1477	1139	1597	0	359	3390	1477	255	3390	1468
Satd. Flow (RTOR)			203		62				130			145
Lane Group Flow (vph)	213	177	238	110	263	0	114	1065	90	100	894	145
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	27.8	27.8	27.8	27.8		11.2	41.6	41.6	11.2	41.6	41.6
Total Split (s)	21.0	52.0	52.0	31.0	31.0		15.2	54.0	54.0	14.0	52.8	52.8
Total Split (%)	17.5%	43.3%	43.3%	25.8%	25.8%		12.7%	45.0%	45.0%	11.7%	44.0%	44.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5		1.5	1.4	1.4	1.5	1.4	1.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8		5.7	5.6	5.6	5.7	5.6	5.6
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	42.2	42.2	42.2	20.0	20.0		61.3	52.6	52.6	59.8	51.8	51.8
Actuated g/C Ratio	0.35	0.35	0.35	0.17	0.17		0.51	0.44	0.44	0.50	0.43	0.43
v/c Ratio	0.69	0.28	0.37	0.58	0.83		0.41	0.72	0.12	0.45	0.61	0.20
Control Delay	40.4	28.2	6.9	57.6	57.7		18.8	32.3	1.7	21.0	29.8	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.4	28.2	6.9	57.6	57.7		18.8	32.3	1.7	21.0	29.8	4.5
LOS	D	C	A	E	E		B	C	A	C	C	A
Approach Delay		24.3			57.6			28.9			25.8	
Approach LOS		C			E			C			C	
Queue Length 50th (m)	34.3	27.7	5.1	23.9	46.4		13.6	116.5	0.0	11.8	91.9	0.0
Queue Length 95th (m)	#55.2	45.0	22.0	41.2	73.6		23.3	139.4	4.0	20.8	112.4	12.4
Internal Link Dist (m)		480.6			437.7			572.9			582.7	
Turn Bay Length (m)	70.0		200.0	65.0			65.0		65.0	75.0		100.0
Base Capacity (vph)	313	689	695	239	384		293	1500	726	231	1475	721
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.26	0.34	0.46	0.68		0.39	0.71	0.12	0.43	0.61	0.20

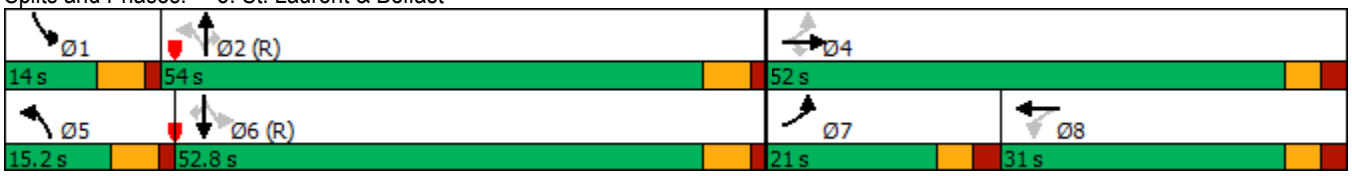
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

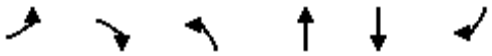
Maximum v/c Ratio: 0.83

Intersection Signal Delay: 30.2	Intersection LOS: C
Intersection Capacity Utilization 85.2%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 5: St. Laurent & Belfast





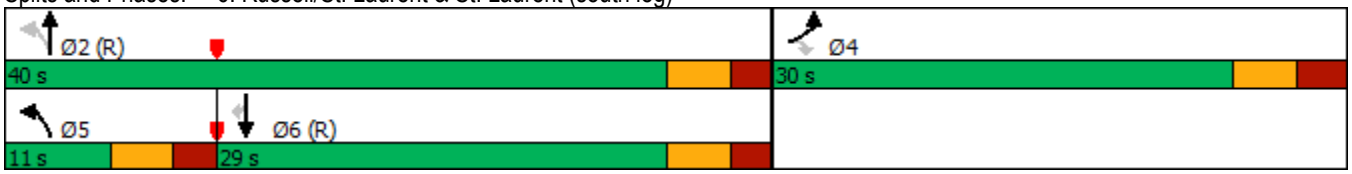
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	670	116	46	371	773	792
Future Volume (vph)	670	116	46	371	773	792
Satd. Flow (prot)	3288	1517	1695	3390	3390	1517
Flt Permitted	0.950		0.239			
Satd. Flow (perm)	3288	1483	425	3390	3390	1481
Satd. Flow (RTOR)		78				792
Lane Group Flow (vph)	670	116	46	371	773	792
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	30.0	30.0	11.0	24.0	26.5	26.5
Total Split (s)	30.0	30.0	11.0	40.0	29.0	29.0
Total Split (%)	42.9%	42.9%	15.7%	57.1%	41.4%	41.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.7	2.7	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	19.5	19.5	39.0	39.0	32.0	32.0
Actuated g/C Ratio	0.28	0.28	0.56	0.56	0.46	0.46
v/c Ratio	0.73	0.25	0.13	0.20	0.50	0.72
Control Delay	27.7	8.8	9.3	8.7	17.1	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	8.8	9.3	8.7	17.1	6.2
LOS	C	A	A	A	B	A
Approach Delay	24.9			8.8	11.6	
Approach LOS	C			A	B	
Queue Length 50th (m)	40.8	3.7	2.5	11.5	40.8	0.0
Queue Length 95th (m)	52.1	13.2	7.6	20.9	63.1	28.1
Internal Link Dist (m)	174.1			99.9	245.7	
Turn Bay Length (m)		15.0	65.0			90.0
Base Capacity (vph)	1127	559	345	1889	1548	1106
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.21	0.13	0.20	0.50	0.72

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 14.9	Intersection LOS: B
Intersection Capacity Utilization 66.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Russell/St. Laurent & St. Laurent (south leg)



APPENDIX P

SIM TRAFFIC RESULTS

Intersection: 1: St. Laurent & Industrial/Innes

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (m)	37.7	41.6	58.1	51.1	45.2	163.7	167.5	538.1	534.6	92.5	54.4	97.4
Average Queue (m)	8.1	23.0	29.3	20.3	6.0	160.6	166.3	491.7	482.8	33.3	29.4	68.8
95th Queue (m)	27.8	40.8	48.3	41.1	29.4	180.9	176.5	649.2	651.9	87.8	48.4	124.6
Link Distance (m)			467.1	467.1				523.3	523.3			
Upstream Blk Time (%)								59	22			
Queuing Penalty (veh)								0	0			
Storage Bay Dist (m)	35.0	35.0			120.0	160.0	160.0			85.0	90.0	90.0
Storage Blk Time (%)	0	3	9			12	68	1	5	0		0
Queuing Penalty (veh)	0	3	8			50	277	8	13	0		0

Intersection: 1: St. Laurent & Industrial/Innes

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	R
Maximum Queue (m)	131.7	137.5	117.5	37.8	83.0	233.2	361.1	123.0
Average Queue (m)	119.4	119.5	71.8	16.5	23.6	102.3	128.6	20.4
95th Queue (m)	148.6	149.9	162.3	32.7	62.3	191.6	253.2	98.1
Link Distance (m)	126.1	126.1				569.7	569.7	
Upstream Blk Time (%)	14	13					0	
Queuing Penalty (veh)	117	112					1	
Storage Bay Dist (m)			110.0	135.0	135.0			155.0
Storage Blk Time (%)	31	22	0		0	2	5	0
Queuing Penalty (veh)	68	86	1		0	2	8	0

Intersection: 2: St. Laurent & Site Access

Movement	EB	NB	NB	NB	SB	SB	SB
Directions Served	LR	L	T	T	T	T	R
Maximum Queue (m)	80.6	34.0	157.5	162.2	134.5	146.2	27.4
Average Queue (m)	30.3	6.0	88.7	96.3	72.4	106.5	4.3
95th Queue (m)	65.0	22.8	172.4	179.6	142.2	170.5	18.2
Link Distance (m)	155.5		172.7	172.7	126.1	126.1	
Upstream Blk Time (%)			1	2	1	10	
Queuing Penalty (veh)			10	14	7	80	
Storage Bay Dist (m)		40.0					20.0
Storage Blk Time (%)			30			25	0
Queuing Penalty (veh)			5			16	2

Intersection: 3: St. Laurent & Bourassa

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	R	L	T	T	R
Maximum Queue (m)	57.1	69.9	48.0	139.7	194.4	33.7	63.2	133.4	172.6	67.5
Average Queue (m)	26.0	29.1	15.8	61.3	72.1	3.7	25.5	37.7	91.7	18.4
95th Queue (m)	48.2	55.0	38.8	140.8	167.0	36.8	48.4	97.1	161.3	60.9
Link Distance (m)	55.0	111.2		269.0	269.0			172.7	172.7	
Upstream Blk Time (%)	1	0		0	1			0	1	
Queuing Penalty (veh)	0	0		1	5			0	5	
Storage Bay Dist (m)			55.0			105.0	80.0			60.0
Storage Blk Time (%)				10	5	0		0	23	0
Queuing Penalty (veh)				6	2	0		0	22	0

Intersection: 4: St. Laurent & Smyth/Lancaster

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	71.7	87.2	50.2	26.2	31.5	42.4	120.6	22.5	72.4	212.0	214.6	32.5
Average Queue (m)	41.0	46.2	22.0	3.4	11.1	35.7	63.5	20.5	55.8	137.8	143.3	11.6
95th Queue (m)	66.4	77.0	40.8	15.7	25.4	55.4	105.5	26.0	88.3	223.0	224.8	36.3
Link Distance (m)		689.8	689.8				299.1			239.7	239.7	
Upstream Blk Time (%)										1	1	
Queuing Penalty (veh)										8	9	
Storage Bay Dist (m)	70.0			100.0	35.0	35.0		15.0	65.0			25.0
Storage Blk Time (%)	1	3			0	5	57	2	6	29	48	0
Queuing Penalty (veh)	2	5			1	13	173	7	39	58	51	1

Intersection: 4: St. Laurent & Smyth/Lancaster

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (m)	72.8	58.1	111.3	96.6
Average Queue (m)	33.1	24.5	64.3	50.6
95th Queue (m)	62.8	48.4	102.2	104.0
Link Distance (m)		269.0	269.0	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	110.0			90.0
Storage Blk Time (%)	0		1	1
Queuing Penalty (veh)	0		10	3

Intersection: 5: St. Laurent & Belfast

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	T	R	L	T	T
Maximum Queue (m)	31.1	35.9	19.5	72.4	184.4	60.6	109.6	448.7	65.2	40.2	130.0	83.8
Average Queue (m)	12.9	16.5	1.3	28.6	96.9	21.7	35.7	64.5	6.1	12.9	40.0	42.1
95th Queue (m)	26.8	31.5	9.2	74.2	191.3	49.4	85.1	267.9	38.8	28.7	100.9	72.1
Link Distance (m)		488.3			445.6		569.7	569.7			596.0	596.0
Upstream Blk Time (%)								0			0	
Queuing Penalty (veh)								3			0	
Storage Bay Dist (m)	70.0		200.0	65.0		65.0			65.0	75.0		
Storage Blk Time (%)				0	38	0	3	3	0		0	0
Queuing Penalty (veh)				0	18	0	4	2	0		0	0

Intersection: 6: Russell/St. Laurent & St. Laurent (south leg)

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	L	R	L	T	T	T	T
Maximum Queue (m)	91.8	83.9	22.5	28.6	67.8	92.4	38.8	61.0
Average Queue (m)	52.8	42.5	13.8	10.8	25.7	44.2	16.7	16.5
95th Queue (m)	84.1	77.0	26.6	22.5	57.4	78.5	32.1	44.6
Link Distance (m)	183.7	183.7				115.6	239.7	239.7
Upstream Blk Time (%)						1		
Queuing Penalty (veh)						0		
Storage Bay Dist (m)			15.0	65.0	65.0			
Storage Blk Time (%)		33	1	0	0	2		
Queuing Penalty (veh)		16	2	0	1	9		

Network Summary

Network wide Queuing Penalty: 1363

Intersection: 1: St. Laurent & Industrial/Innes

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (m)	38.5	42.5	129.5	126.9	113.7	157.7	162.2	309.6	256.4	39.5	54.8	97.4
Average Queue (m)	21.8	36.2	88.3	79.4	54.5	121.4	128.8	129.9	109.7	6.9	27.8	53.2
95th Queue (m)	44.6	52.2	124.0	117.8	107.9	190.7	191.9	378.2	342.8	25.9	46.2	106.8
Link Distance (m)			467.1	467.1				523.3	523.3			
Upstream Blk Time (%)								2	0			
Queuing Penalty (veh)								0	0			
Storage Bay Dist (m)	35.0	35.0			120.0	160.0	160.0			85.0	90.0	90.0
Storage Blk Time (%)	2	17	52	0	1	5	22	0				0
Queuing Penalty (veh)	7	52	79	1	2	7	34	2				0

Intersection: 1: St. Laurent & Industrial/Innes

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	R
Maximum Queue (m)	130.5	137.0	117.5	46.0	142.4	299.2	473.6	147.9
Average Queue (m)	99.7	100.5	63.8	22.7	46.7	151.4	182.0	47.2
95th Queue (m)	140.5	142.8	136.0	38.6	128.9	282.3	359.4	167.3
Link Distance (m)	126.1	126.1				569.7	569.7	
Upstream Blk Time (%)	3	4					0	
Queuing Penalty (veh)	29	33					1	
Storage Bay Dist (m)			110.0	135.0	135.0			155.0
Storage Blk Time (%)	15	7	1		0	14	17	0
Queuing Penalty (veh)	30	39	4		0	20	25	0

Intersection: 2: St. Laurent & Site Access

Movement	EB	NB	NB	NB	SB	SB	SB
Directions Served	LR	L	T	T	T	T	R
Maximum Queue (m)	50.7	39.5	147.8	156.6	132.8	149.1	27.5
Average Queue (m)	18.3	8.7	63.8	73.0	98.9	125.2	9.1
95th Queue (m)	39.2	26.0	132.5	141.9	157.0	178.9	27.6
Link Distance (m)	155.5		172.7	172.7	126.1	126.1	
Upstream Blk Time (%)			0	0	2	20	
Queuing Penalty (veh)			1	1	20	179	
Storage Bay Dist (m)		40.0					20.0
Storage Blk Time (%)			17			28	0
Queuing Penalty (veh)			4			30	4

Intersection: 3: St. Laurent & Bourassa

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	T	R	L	T	T	R
Maximum Queue (m)	45.8	55.4	62.3	229.5	284.4	112.5	71.2	160.4	167.0	67.4
Average Queue (m)	18.5	23.5	13.6	151.3	171.2	34.1	24.6	63.3	87.3	13.2
95th Queue (m)	37.0	43.7	43.3	220.4	256.6	119.0	52.0	139.8	161.7	51.2
Link Distance (m)	55.0	111.2		269.0	269.0			172.7	172.7	
Upstream Blk Time (%)	0				1			1	1	
Queuing Penalty (veh)	0				8			4	11	
Storage Bay Dist (m)			55.0			105.0	80.0			60.0
Storage Blk Time (%)			0	30	25	0		2	20	0
Queuing Penalty (veh)			0	9	17	0		2	15	0

Intersection: 4: St. Laurent & Smyth/Lancaster

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	77.4	217.5	144.9	91.9	37.6	42.4	117.6	23.0	72.3	120.9	121.0	32.5
Average Queue (m)	66.9	110.4	57.8	24.4	23.0	18.8	44.8	20.4	28.0	64.4	73.1	14.3
95th Queue (m)	90.1	228.0	116.0	61.3	38.0	49.1	99.7	24.5	60.3	101.2	110.6	39.7
Link Distance (m)		689.8	689.8				299.1			239.7	239.7	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0			100.0	35.0	35.0		15.0	65.0			25.0
Storage Blk Time (%)	10	28	0	0	5	3	18	9	0	7	37	0
Queuing Penalty (veh)	29	80	1	0	16	10	75	19	1	6	38	1

Intersection: 4: St. Laurent & Smyth/Lancaster

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (m)	113.0	231.1	261.4	97.5
Average Queue (m)	42.8	93.6	148.5	57.8
95th Queue (m)	82.3	210.0	271.6	136.4
Link Distance (m)		269.0	269.0	
Upstream Blk Time (%)		0	1	
Queuing Penalty (veh)		2	12	
Storage Bay Dist (m)	110.0			90.0
Storage Blk Time (%)	0	1	18	0
Queuing Penalty (veh)	0	2	71	1

Intersection: 5: St. Laurent & Belfast

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	T	R	L	T	T
Maximum Queue (m)	74.2	73.0	44.9	72.4	221.2	72.4	155.0	542.1	72.5	57.1	93.3	92.9
Average Queue (m)	35.3	27.7	9.8	45.6	126.1	30.4	72.9	107.5	15.7	17.9	54.1	54.8
95th Queue (m)	62.1	54.6	32.1	86.9	307.6	69.0	140.6	326.9	63.4	40.3	83.7	84.6
Link Distance (m)		488.3			445.6		569.7	569.7			596.0	596.0
Upstream Blk Time (%)					4			1				
Queuing Penalty (veh)					0			5				
Storage Bay Dist (m)	70.0		200.0	65.0		65.0			65.0	75.0		
Storage Blk Time (%)	1	0		1	38	0	12	12	0	0	2	0
Queuing Penalty (veh)	3	1		3	42	0	13	11	0	0	2	0

Intersection: 5: St. Laurent & Belfast

Movement	SB
Directions Served	R
Maximum Queue (m)	10.7
Average Queue (m)	0.4
95th Queue (m)	10.6
Link Distance (m)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	100.0
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Russell/St. Laurent & St. Laurent (south leg)

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	L	R	L	T	T	T	T
Maximum Queue (m)	77.0	81.2	22.5	19.6	33.5	49.7	71.0	167.2
Average Queue (m)	46.0	45.8	18.7	8.7	7.5	22.0	34.0	35.2
95th Queue (m)	68.4	72.5	25.0	17.9	20.9	39.4	61.3	90.7
Link Distance (m)	183.7	183.7				115.6	239.7	239.7
Upstream Blk Time (%)								0
Queuing Penalty (veh)								0
Storage Bay Dist (m)			15.0	65.0	65.0			
Storage Blk Time (%)		38	1			0		
Queuing Penalty (veh)		44	4			0		

Network Summary

Network wide Queuing Penalty: 1166