

1971 - 1975 St. Laurent Boulevard Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report (Rev #1)

Prepared for:

Starlight Development
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PN: 2020-23

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1 Screening

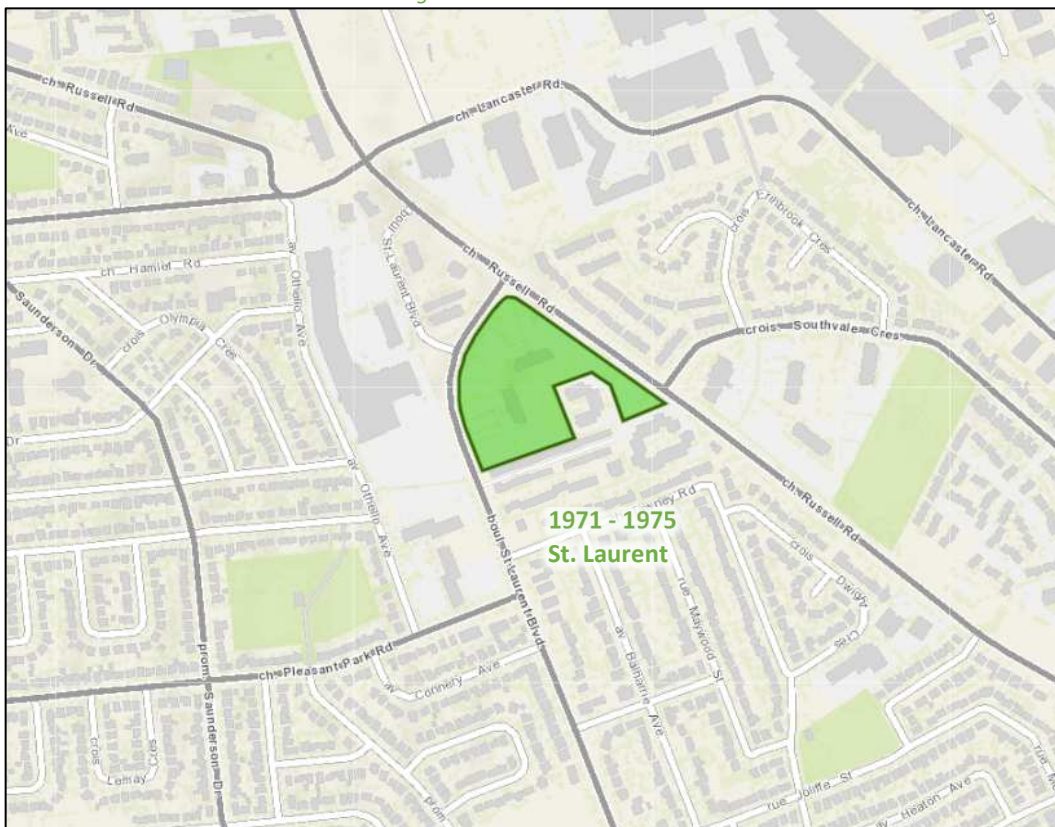
This study has been prepared according to the City of Ottawa’s 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for the TIA Study PM. As shown in the Screening Form, a TIA is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

2 Existing and Planned Conditions

2.1 Proposed Development

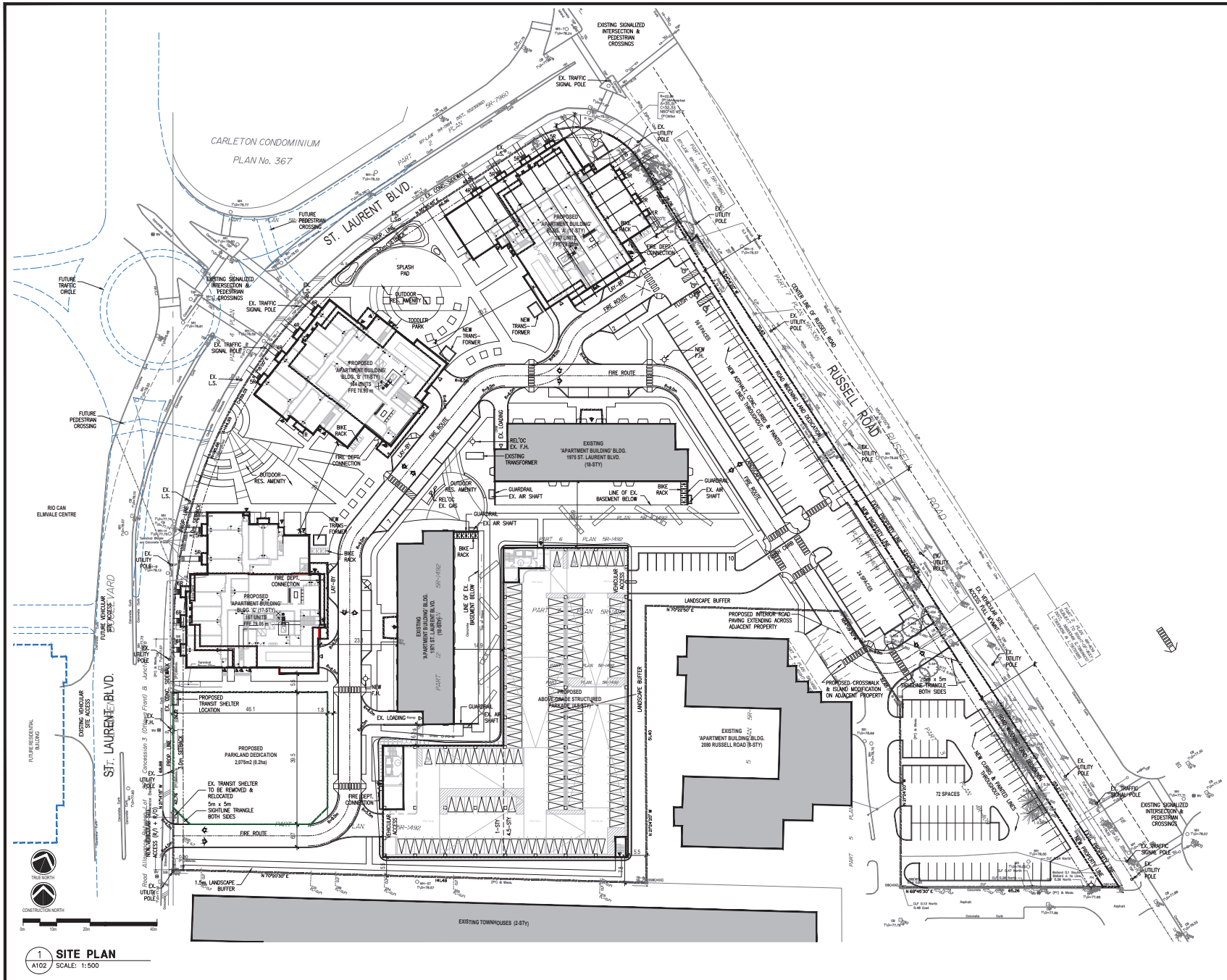
The existing site, located at 1971 and 1975 St. Laurent Boulevard, is zoned as Arterial Mainstreet (AM10 H(54)) & Residential Fifth Density Zone (R5B H(18)). The site currently includes two 18 storey apartment towers with a total of 500 units and approximately 494 surface parking spaces. The proposed redevelopment would replace the existing surface parking spaces with three 17 storey residential buildings with a total of 498 units, a parkland, and a 4.5-storey parking structure with 523 parking spaces. The remaining surface parking would be a total of 176 spaces. The anticipated full build-out and occupancy horizon is 2030 with construction occurring in sequence. The existing full-movements access onto Russell Road will be maintained and right-in/right-out access onto St. Laurent Boulevard is proposed, along with the internal site connected to the south. The site is located within the St. Laurent Arterial Mainstreet Design Priority Area. Figure 1 illustrates the Study Area Context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: November 24, 2022

Figure 2: Concept Plan



FILE NUMBER: D07-12-22-0044
 PLAN NUMBER #18715
LEGAL DESCRIPTION:
 PART OF LOT 27,
 CONVESSION 3 (STAIRS FRONT),
 SOUTH OF DUNDAS STREET
 (GEOGRAPHICAL TOWNSHIP OF GLOUCESTER)
 CITY OF OTTAWA

KEY PLAN

SITE PLAN LEGEND

	PROPOSED FPN. GRADE
	TOPOGRAPHICAL GRADE
	TOP OF CATCH BASIN
	DOOR LOCATIONS
	DRIVE AISLE VEHICULAR TRAFFIC
	LOADING/GARAGE DOOR LOCATION
	CATCH BASINS
	SANITARY MANHOLE
	STORM SEWER MANHOLE
	FIRE HYDRANT
	ROOF DRAIN
	NEW LIGHT STANDARDS
	HEAVY DUTY ASPHALT PAVING
	BARRIER-FREE DEPRESSED CURB

SITE SERVICES & GRADING: BASED ON INFORMATION PREPARED BY COASTPOINT ENGINEERING INC. DATED 2022-JAN-31
 LANDSCAPE: BASED ON INFORMATION PREPARED BY MIBC PLANNING, URBAN DESIGN & LANDSCAPE ARCHITECTURE, DATED 2022-FEB-03
 SURVEY & TOPOGRAPHICAL INFORMATION BASED ON DRAWING PREPARED BY: ANNE, TRILLIUM, VOLLEBERG LTD., ONTARIO LAND SURVEYORS, DRAWING DATED SEPTEMBER 27TH, 2021.

NO.	REVISIONS	DATE	BY
3	ISSUED FOR SITE PLAN APPROVAL #2	MAR.21.2023	OH
2	ISSUED FOR SITE PLAN APPROVAL #1	FEB.09.2021	OH
1	ISSUED FOR CLIENT REVIEW	FEB.04.2021	OH

SITE PLAN

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT
 171 & 175 ST. LAURENT BLVD.
 OTTAWA, ONTARIO
 FOR: STARLIGHT DEVELOPMENTS

PETROFF
 PETROFF PARTNERSHIP ARCHITECTS
 260 TOWN CENTRE BLVD. SUITE 300
 MARKHAM, ON L3R 9H8
 PH: 905-470-7000 www.petroff.com

CONVO ASSOCIATION
 CONVO ASSOCIATION OF ONTARIO
 1000 SHEPPARD AVENUE EAST
 SUITE 1000
 MARKHAM, ONTARIO L3R 9V4
 PH: 905-470-7000

DATE: 21740
 DRAWN BY: PETROFF
 CHECKED BY: PETROFF
 SCALE: A102

2.2 Existing Conditions

2.2.1 Area Road Network

St. Laurent Boulevard: St. Laurent Boulevard is a City of Ottawa arterial road north of Russell Road, with a discontinuous section south of Lancaster Road and a collector road to the west of Russell Road. North of Lancaster Road has a divided five-lane urban cross-section with a dedicated southbound bus lane. The cycletrack is provided on the west side of the road and sidewalks are provided on both sides. West of Russell Road has a divided four-lane urban cross-section with sidewalks on both sides. Seventy-five metres north of Lancaster Road, the posted speed limit is 70 km/h and the posted speed limit is 50 km/h to the south, the City-protected right-of-way is 44.5 metres north of Lancaster Road, and the existing right of way is 26.0 metres within the remainder of the study area. St. Laurent Boulevard is designated as a truck route north of Russell Road.

Russell Road: Russell Road is a City of Ottawa arterial road. Between Lancaster Road and the southern St. Laurent Boulevard intersection, the roadway consists of a divided four-lane semi-urban cross-section and includes a bike lane on the west side of the road. South of St. Laurent Boulevard, the roadway is a two-lane semi-urban cross-section, which changes to rural cross-section 95.0 metres south St. Laurent Boulevard. The sidewalks are provided along the west side of the roadway north St. Laurent Boulevard and transit to the asphalt pathway to the south. The posted speed limit is 50 km/h and the City-protected right-of-way is 37.5 metres. Russell Road is designated as a truck route.

Smyth Road: Smyth Road is a City of Ottawa arterial road with a four-lane urban cross-section with sidewalks on both sides of the road. The posted speed limit is 50 km/h and the City-protected right-of-way is 26.0 metres. Smyth Road is designated as a truck route.

Pleasant Park Road: Pleasant Park Road is a City of Ottawa collector road with a two-lane urban cross-section with a sidewalk on the north side of the road and with on-street parking permitted on the north side of the road. The unposted speed limit is assumed to be 50 km/h and the existing right of way is 20.0 metres.

Southvale Crescent: Southvale Crescent is a City of Ottawa collector road with a two-lane urban cross-section with sidewalks on both sides of the road. The posted speed limit is 50 km/h and the existing right of way is 20.0 metres.

Lancaster Road: Lancaster Road is a City of Ottawa collector road with a two-lane cross-section. Sidewalks and curbside bike lanes on both sides of the road within the study area. The unposted speed limit is assumed to be 50 km/h and the existing right of way is 24.0 metres within the study area. Lancaster Road is designated as a truck route.

St. Laurent Boulevard Service Road: St. Laurent Boulevard Service Road is a City of Ottawa local road. The roadway has a divided three-lane cross-section with one northbound lane and two southbound bus lanes. The unposted speed limit is assumed to be 50 km/h and the existing right of way is 25.5 metres within the study area.

2.2.2 Existing Intersections

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

St. Laurent Boulevard at Smyth Road / Lancaster Road The intersection of St. Laurent Boulevard at Smyth Road/ Lancaster Road is a signalized intersection. The northbound approach consists of an auxiliary left-turn, a through lane, a shared through/channelized right-turn lane, and a pocket bike lane and the southbound approach consists of an auxiliary left-turn lane, two through lanes, a bike pocket that transitions the cycletrack to an on-street bike lane through the right-turn channel, and an auxiliary channelized right-turn lane. The

eastbound approach consists of an auxiliary left-turn lane, a left-turn lane, a through lane, a bike pocket, and a channelized right-turn lane, and the westbound approach consists of an auxiliary left-turn lane, a through lane, an auxiliary shared through/channelized right-turn lane, and a bike lane. No turn restrictions were noted.

Russell Road at St. Laurent Boulevard

The intersection of Russell Road at St. Laurent Boulevard is a signalized intersection. The northbound approach of Russell Road consists of an auxiliary left-turn, a through lane, and an auxiliary through lane, and the southbound approach consists of two through lanes, a bike pocket, and an auxiliary channelized right-turn lane. The eastbound approach consists of a left-turn lane and a shared left-turn/channelized right-turn lane. No turn restrictions were noted.

Russell Road at Southvale Crescent N

The intersection of Russell Road at Southvale Crescent is a signalized intersection. The northbound approach consists of a shared through/right-turn lane, and the southbound approach consists of an auxiliary left-turn and a through lane. The westbound approach consists of an auxiliary left-turn lane and a right-turn lane. No turn restrictions were noted.

St. Laurent Boulevard at St. Laurent Boulevard Service Road

The intersection of St. Laurent Boulevard at St. Laurent Boulevard Service Road is a signalized intersection. The northbound approach consists of an auxiliary left-turn and two through lanes, and the southbound approach consists of a through lane and a shared through/channelized right-turn lane. The eastbound approach consists of a shared left-turn/ channelized right-turn lane. No turn restrictions were noted.

St. Laurent Boulevard at Pleasant Park Road

The intersection of St. Laurent Boulevard at Pleasant Park Road is a signalized intersection. The northbound approach consists of an auxiliary left-turn and a through lane and the southbound approach consists of a through lane and a right-turn lane. The eastbound approach consists of an auxiliary left-turn lane and a right-turn lane. No turn restrictions were noted.

Russell Road at Access #1

The intersection of Russell Road at Access #1 is a stop-controlled intersection on the minor approach of Access #1. Each approach consists of a shared all-movement lane. No turn restrictions were noted.

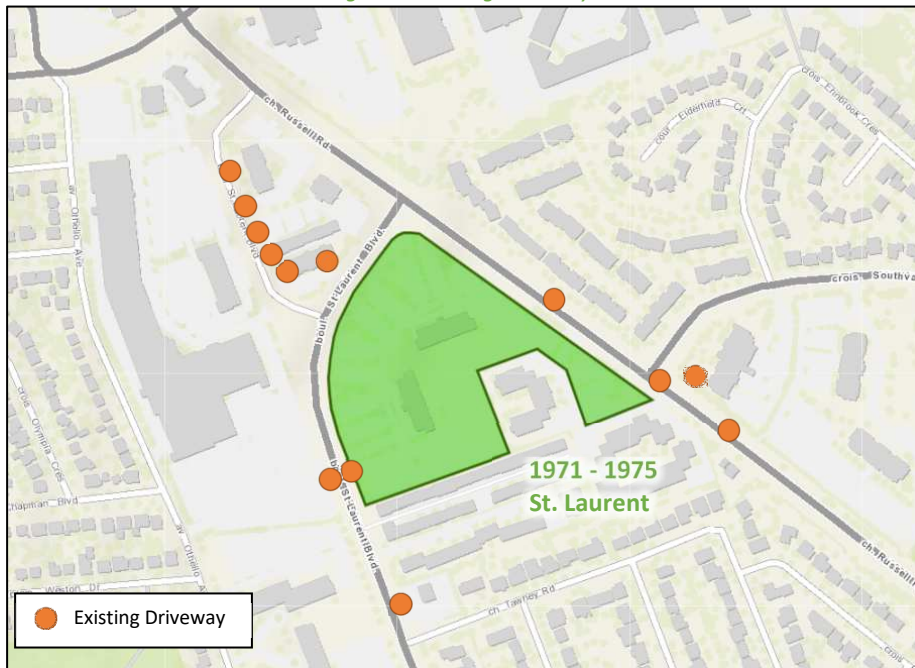
St. Laurent Boulevard at Access #2

The intersection of St. Laurent Boulevard at Access #2 is a stop-controlled intersection on the minor approach of Access #2. The northbound and southbound approaches each consists of an auxiliary left-turn, a through lane, and a shared through/right-turn lane. The eastbound and westbound approaches each consists of a shared all-movement lane. No turn restrictions were noted.

2.2.3 Existing Driveways

Within 200 metres of the site accesses, one driveway to Ottawa Community housing and one to a detached home are located on the west side of Russell Road. On the east side of Russell Road, a driveway to the mid-rise building is present. Opposite the existing site access on St. Laurent Boulevard, a driveway to a retail plaza is present, and a driveway to an automotive repair shop is present on the east side of St. Laurent Boulevard. Driveways are also present on the east sides of St. Laurent Boulevard Service Road to two mid-rise buildings, one detached dwelling, and three low-rise buildings. Figure 4 illustrates the existing driveways.

Figure 3: Existing Driveways



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: November 24, 2022

2.2.4 Cycling and Pedestrian Facilities

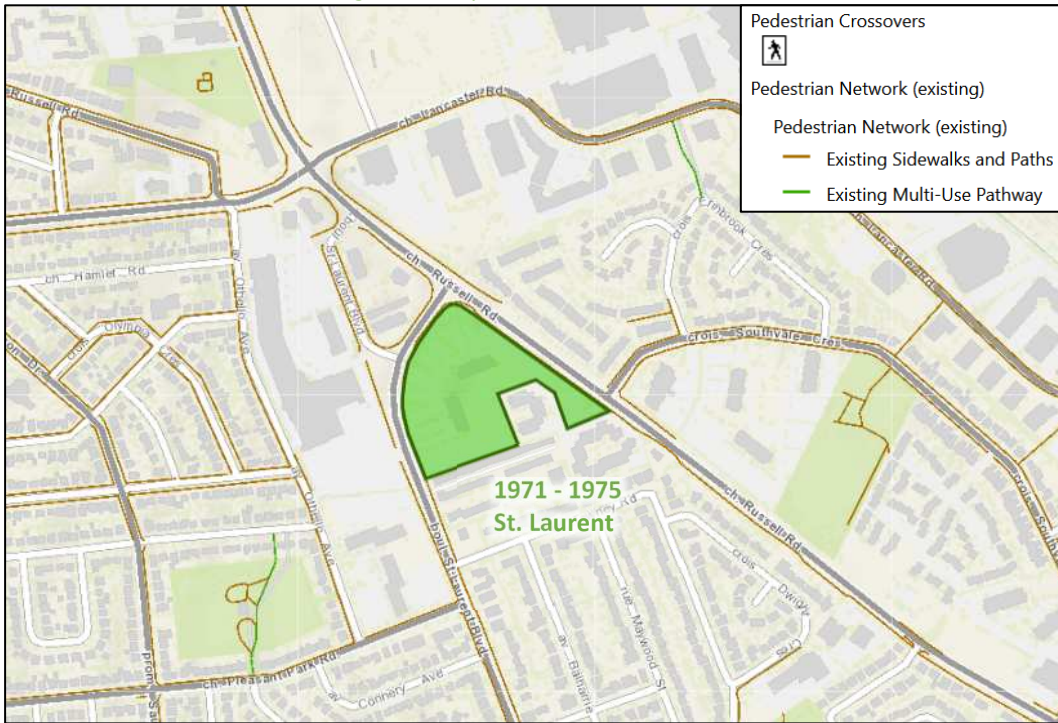
Figure 4 illustrates the pedestrian facilities in the study area and Figure 5 illustrates the cycling facilities.

Sidewalks are provided on both sides along Smyth Road, St. Laurent Boulevard, St. Laurent Boulevard Service, and Southvale Crescent. Sidewalks are also provided on the west side of Russell Road and the north side of Pleasant Park Road. Along Lancaster Road, sidewalks are present on both sides west of the Canada Science and Technology Museum and on the south side to the east.

Cycle tracks are provided on the west side of St. Laurent Boulevard north of Smyth Road within the study area. Curbside bike lanes are on both sides of Lancaster Road for 200 metres to the east of St. Laurent Boulevard and along St. Laurent Boulevard south of Pleasant Park Road. Paved shoulders are provided along Russell Road southeast of St. Laurent Boulevard.

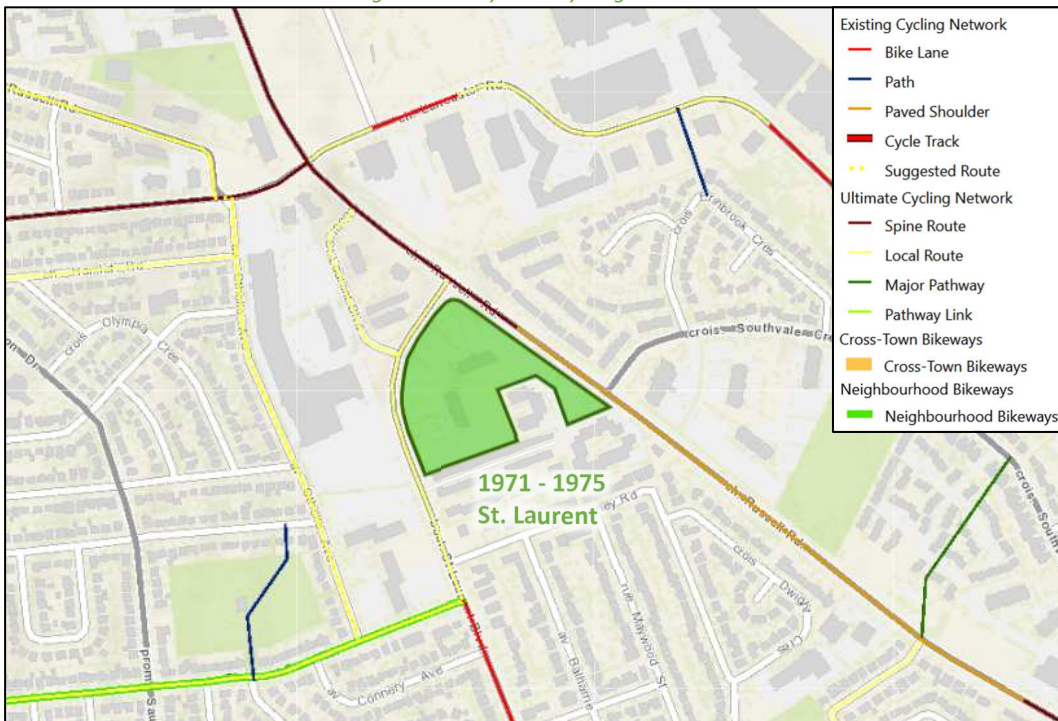
Russell Road south of Lancaster Road, Smyth Road, and St. Laurent Boulevard north of Lancaster Road are spine routes. St. Laurent Boulevard southeast of Russell Road, Russell Road north of Smyth Road, Othello Avenue, Pleasant Park Road, and St. Laurent Boulevard Service Road are local routes. Pleasant Park Road is a neighbourhood bikeway.

Figure 4: Study Area Pedestrian Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: November 24, 2022

Figure 5: Study Area Cycling Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: November 24, 2022

Pedestrian and cyclist volumes included in study area intersection counts, presented in Section 2.2.7, have been compiled and are illustrated in Figure 6 and Figure 7, respectively.

Figure 6: Existing Pedestrian Volumes

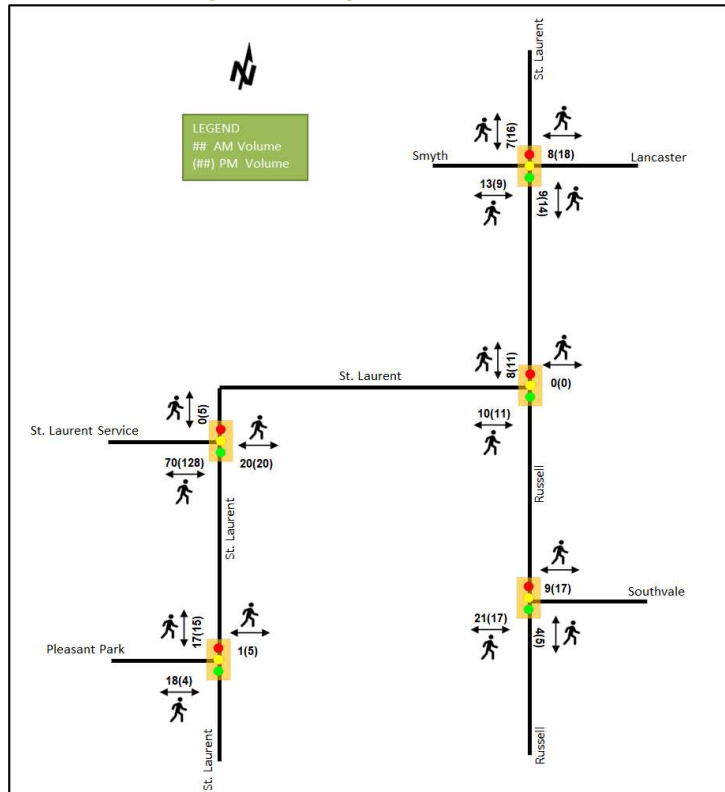
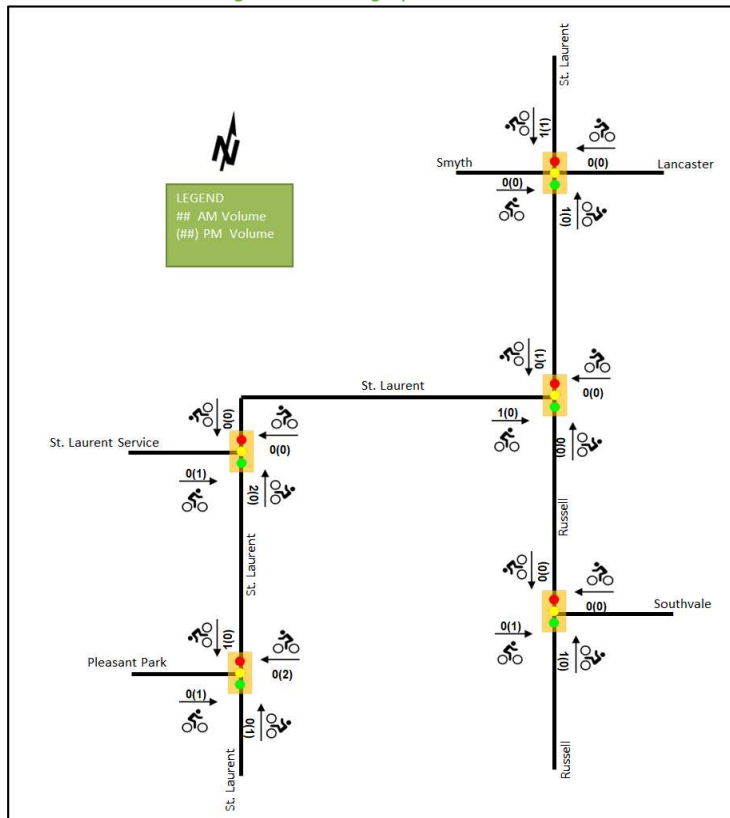


Figure 7: Existing Cyclist Volumes



2.2.5 Existing Transit

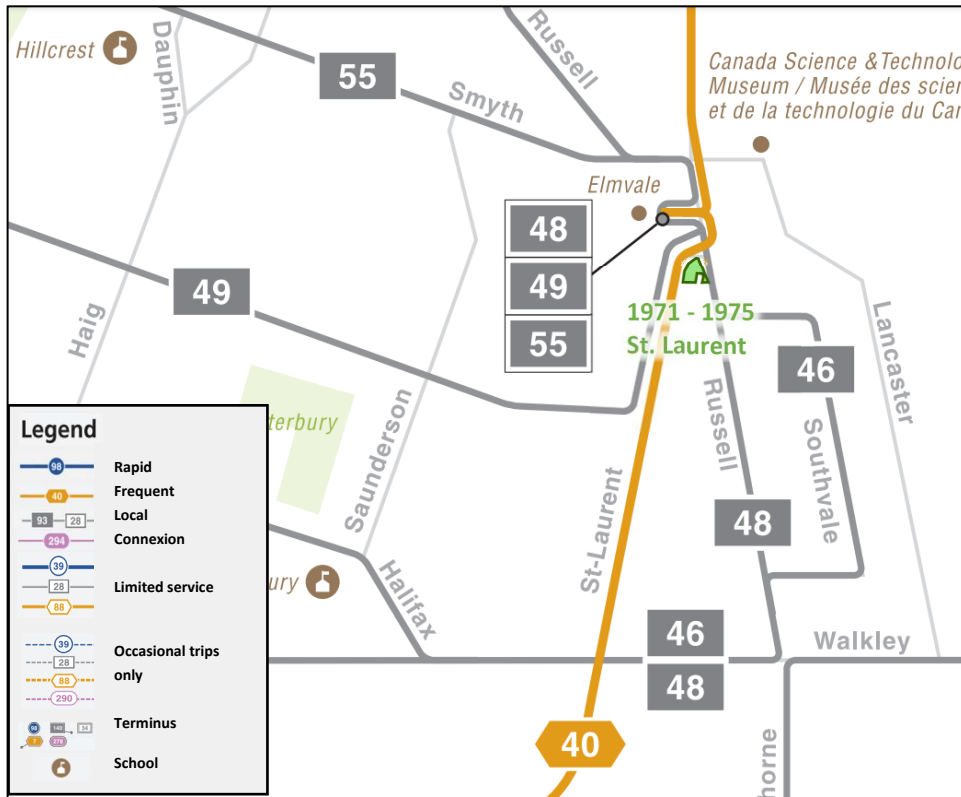
Figure 8 illustrates the transit system map in the study area and Figure 9 illustrates nearby transit stops. All transit information is from November 24, 2022 and is included for general information purposes and context to the surrounding area.

Within the study area, route #55 travels along Smyth Road, route #40 travels along St. Laurent Boulevard, route #46 travels along Russell Road, St. Laurent Boulevard, and Southvale Crescent, and route #48 travels along Russell Road.

Primary stops are located at the Elmvale Mall, Russell Road at Southvale Crescent, St. Laurent Boulevard at the site access, and St. Laurent Boulevard at Tawney Road. The frequency of these routes within proximity of the proposed site based on November 24, 2022 service levels are:

- Route #40 – 10-15-minute service in the peak period/direction, 15-minute daytime service, 30-minute service after 7:00 PM
- Route #46 – 15-minute service in peak periods, 30-minute service all-day
- Route #48 – 30-minute daytime service, one-hour service after 9:00 PM
- Route #49 – 30-minute service in peak periods, sporadic service outside of peaks
- Route #55 – 15-20-minute service all day, 30-minute service after 7:00 PM

Figure 8: Existing Study Area Transit Service



Source: <http://www.octranspo.com/> Accessed: November 24, 2022

Figure 9: Existing Study Area Transit Stops



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: November 24, 2022

2.2.6 Existing Area Traffic Management Measures

There are no existing area traffic management measures within the Study Area.

2.2.7 Existing Peak Hour Travel Demand

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

Table 1: Intersection Count Date

Intersection	Count Date	Source
St. Laurent Boulevard at Smyth Road/Lancaster Road	Thursday, March 05, 2020	City of Ottawa
Russell Road at St. Laurent Boulevard	Tuesday, April 11, 2017	City of Ottawa
Russell Road at Southvale Crescent N	Tuesday, January 07, 2020	City of Ottawa
St. Laurent Boulevard at St. Laurent Boulevard Service	Tuesday, December 06, 2016	City of Ottawa
St. Laurent Boulevard at Pleasant Park Road	Thursday, March 21, 2019	City of Ottawa
Russell Road at Access #1	Wednesday, September 2, 2015 Thursday, September 3, 2015	Elmvale Acres Shopping Centre Redevelopment - Phase 1 (Parsons, 2019)

Figure 10 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. The level of service for signalized intersections is based on the v/c calculation for individual lane movements and HCM 2000 v/c calculations for the overall intersection. Detailed turning movement count data is included in Appendix B and the Synchro worksheets are provided in Appendix C.

Figure 10: Existing Traffic Counts

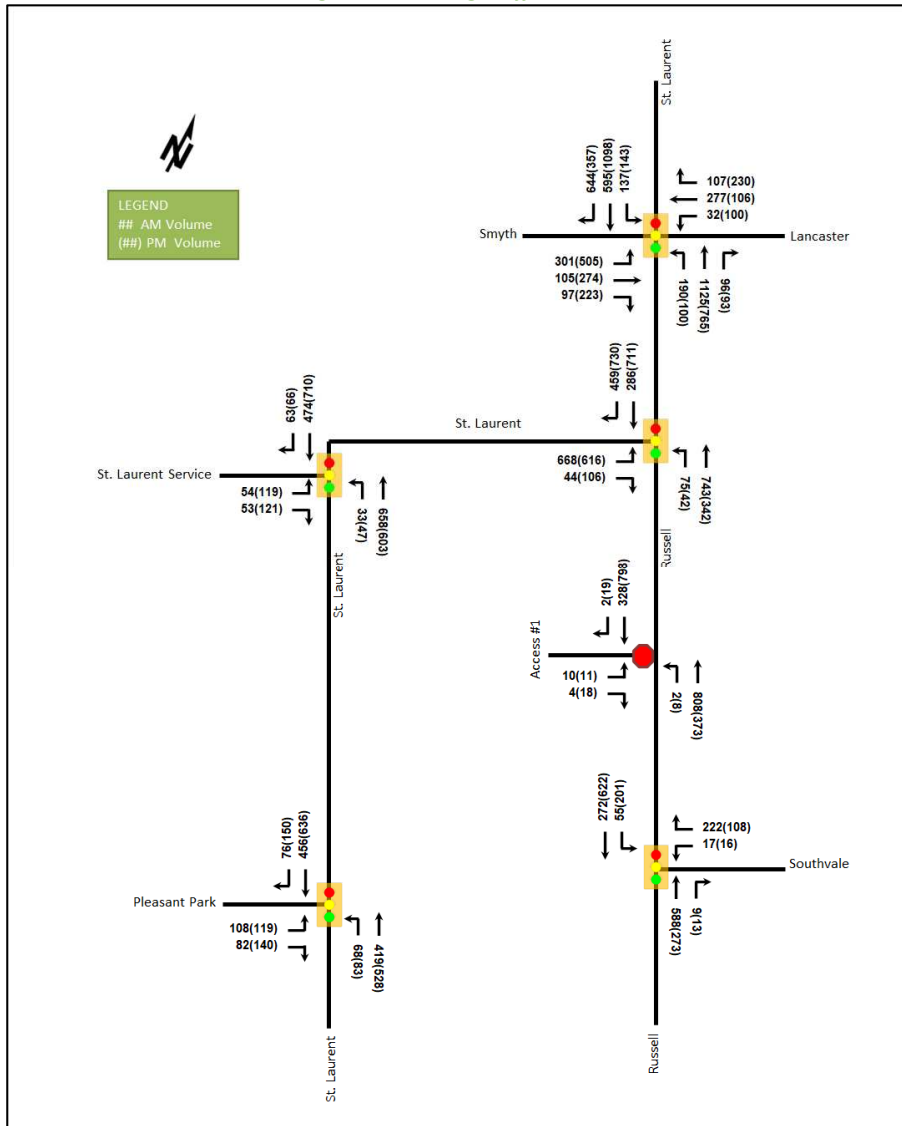


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
St. Laurent Boulevard & Smyth Road / Lancaster Road <i>Signalized</i>	EBL	D	0.87	75.4	#64.6	F	1.03	94.6	#107.0
	EBT	A	0.27	39.8	40.9	D	0.82	63.0	#117.9
	EBR	A	0.25	5.4	9.8	A	0.50	8.6	21.8
	WBL	A	0.36	62.1	18.5	B	0.61	64.1	41.9
	WBT/R	C	0.80	55.1	63.1	B	0.62	26.9	36.0
	NBL	F	1.02	119.3	#108.5	C	0.78	87.3	#56.1
	NBT/R	F	1.07	79.4	#237.4	D	0.81	40.6	132.1
	SBL	C	0.80	81.1	#69.7	D	0.84	87.2	#83.3
	SBT	A	0.54	30.7	81.0	E	0.95	52.3	#202.8
	SBR	D	0.90	32.1	#168.0	A	0.53	8.8	39.0
Overall	E	1.00	59.4	-	-	E	0.97	49.8	-
Russell Road & St. Laurent Boulevard <i>Signalized</i>	EBL/R	C	0.73	23.9	63.5	C	0.74	24.0	63.8
	NBL	A	0.16	11.5	12.3	A	0.16	12.9	8.0
	NBT	A	0.60	15.7	56.1	A	0.27	11.6	22.8
	SBT	A	0.33	19.4	26.8	B	0.67	23.8	#77.6
	SBR	B	0.62	6.0	20.7	C	0.77	8.2	#46.5
	Overall	C	0.72	16.6	-	-	C	0.71	17.6
Russell Road & Southvale Crescent N <i>Signalized</i>	WBL	A	0.07	21.5	6.0	A	0.06	18.8	5.3
	WBR	A	0.56	8.9	15.3	A	0.34	7.2	9.7
	NBT/R	B	0.65	11.2	92.7	A	0.27	6.0	31.5
	SBL	A	0.18	6.8	8.9	A	0.33	7.6	27.7
	SBT	A	0.30	6.2	30.5	A	0.58	10.2	#96.6
	Overall	A	0.55	9.6	-	-	A	0.51	8.7
St. Laurent Boulevard & St. Laurent Boulevard Service <i>Signalized</i>	SEL/R	B	0.47	18.3	18.3	C	0.70	23.0	32.9
	NEL	A	0.08	5.0	m5.0	A	0.13	7.2	m3.5
	NET	A	0.32	5.3	37.5	A	0.40	6.6	23.0
	SWT/R	A	0.26	4.9	23.0	A	0.47	9.8	50.8
	Overall	A	0.35	6.2	-	-	A	0.52	10.4
St. Laurent Boulevard & Pleasant Park Road <i>Signalized</i>	EBL	A	0.40	25.6	23.4	A	0.45	26.3	24.8
	EBR	A	0.28	7.9	9.4	A	0.39	7.2	11.7
	NBL	A	0.14	5.7	8.4	A	0.28	8.6	12.7
	NBT	A	0.38	6.5	42.3	A	0.55	9.3	63.2
	SBT	A	0.43	4.2	16.9	B	0.65	12.6	110.4
	SBR	A	0.09	0.4	0.2	A	0.18	2.0	1.0
	Overall	A	0.48	7.0	-	-	B	0.63	10.9
Russell Road & Access #1 <i>Unsignalized</i>	EB	C	0.07	21.5	1.5	C	0.13	22.0	3.0
	NBL	A	0.00	8.0	0.0	A	0.01	9.9	0.0
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	A	-	0.3	-	-	A	-	0.6

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 0.90

Delay = average vehicle delay in seconds
m = metered queue
= volume for the 95th %ile cycle exceeds capacity

During both the AM and PM peak hours, capacity issues are noted at the intersection of St. Laurent Boulevard & Smyth Road / Lancaster Road. The northbound left-turn and shared through/right-turn movements are over theoretical capacity and may be subject to high delays and extended queues during AM peak hour and eastbound left-turn movement will experience similar constraints during PM peak hour. Extended queues may be exhibited

on the eastbound left-turn, southbound left-turn and southbound right-turn movements during AM peak hour, and on the eastbound through, northbound left-turn and southbound left-turn and through movements during PM peak hour. High delays are anticipated on the southbound left-turn movement during AM peak hour and the northbound left-turn and southbound left-turn during PM peak hour.

The intersection of the Russell Road at St. Laurent Boulevard may be subject to extended queues on the southbound through and right-turn movements during PM peak hour.

The southbound through movement at the intersection of Russell Road and Southvale Crescent N may exhibit extended queues during PM peak hour.

2.2.8 Collision Analysis

Collision data have been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding study area road network. Table 3 summarizes the collisions types and conditions in the study area, Figure 11 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of these locations. Collision data are included in Appendix D.

Table 3: Study Area Collision Summary, 2016-2020

Total Collisions		Number	%
		75	100%
Classification	Fatality	2	3%
	Non-Fatal Injury	17	23%
	Property Damage Only	56	75%
Initial Impact Type	Approaching	1	1%
	Angle	18	24%
	Rear end	25	33%
	Sideswipe	8	11%
	Turning Movement	16	21%
	SMV Other	6	8%
	Other	1	1%
Road Surface Condition	Dry	56	75%
	Wet	10	13%
	Loose Snow	1	1%
	Slush	1	1%
	Packed Snow	2	3%
	Ice	5	7%
Pedestrian Involved		4	5%
Cyclists Involved		2	3%

Figure 11: Study Area Collision Records

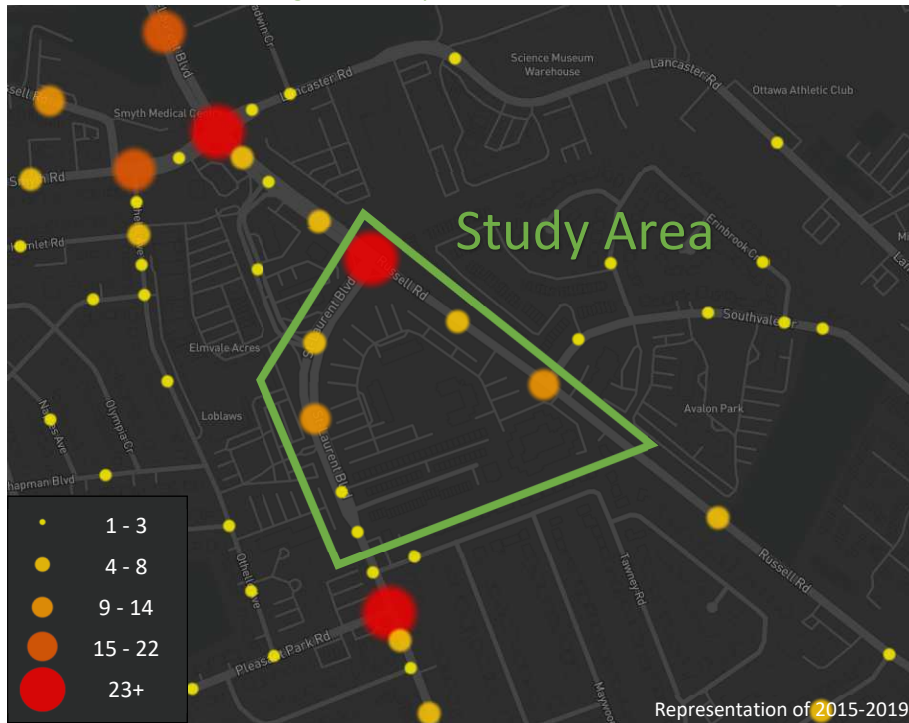


Table 4: Summary of Collision Locations, 2016-2020

Intersections / Segments	Number	%
	75	100%
Russell Rd @ St. Laurent Blvd	43	57%
Russell Rd @ Southvale Cres N	9	12%
St. Laurent Blvd btwn St. Laurent Blvd Service Rd & Dwellingham Priv	9	12%
St. Laurent Blvd @ St. Laurent Blvd Service	5	7%
Russell Rd btwn St. Laurent Blvd & Southvale Cres	5	7%
St. Laurent Blvd @ Dwellingham Priv	2	3%
St. Laurent Blvd btwn Dwellingham Priv & Tawney Rd	2	3%

Within the study area, the intersections of Russell Road at St. Laurent Boulevard is noted to have experienced higher collisions than other locations, and Russell Road at Southvale Crescent N is noted to have two fatal collisions. Table 5 and Table 6 summarize the collision types and conditions for each of these locations.

Table 5: Russell Road at St. Laurent Boulevard Collision Summary

		Number	%
Total Collisions		43	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	12	28%
	Property Damage Only	31	72%
Initial Impact Type	Angle	9	21%
	Rear end	18	42%
	Sideswipe	1	2%
	Turning Movement	12	28%
	SMV Other	2	5%
	Other	1	2%
Road Surface Condition	Dry	33	77%
	Wet	7	16%
	Loose Snow	0	0%
	Slush	1	2%
	Unknown	2	5%
Pedestrian Involved		1	2%
Cyclists Involved		1	2%

The Russell Road at St. Laurent Boulevard intersection had a total of 43 collisions during the 2016-2020 time period, with 31 involving property damage only and the remaining twelve having non-fatal injuries. The collision types are most represented by the rear end with 18 collisions, followed by turning movement with twelve collisions, angle with nine, SMV other with two, and with the remaining collision types represented by sideswipe and other. Weather conditions do not affect collisions at this location. The detailed collision records outline the rear end collisions are predominantly due to the congested conditions along St Laurent Boulevard.

From the detailed collision records (data received included 2015-2019), the turning volume movements are predominantly involve southbound through and northbound left-turn movements (11 of 15) and on dry conditions (10 of 12). The angled collisions predominantly involve southbound through and eastbound left-turn movements (8 of 14) and all occurred on dry conditions. The intersection is a typical 90-degree T-intersection with linear geometry on the approaches. The angled collisions suggest vehicles violate the signal control and the turning movement collisions may be several factors.

One possible condition related to both collision types would be offset placement of the second southbound signal head to the east side of the roadway, which leaves a solitary signal head to control two through lanes. The placement on the east side is more representative of a left-turn control and not for through movements. It is recommended that the City review and explore possible solutions for the intersection. No further review is required as part of this study.

Table 6: Russell Road at Southvale Crescent N Collision Summary

		Number	%
Total Collisions		9	100%
Classification	Fatality	2	22%
	Non-Fatal Injury	0	0%
	Property Damage Only	7	78%
Initial Impact Type	Angle	2	22%
	Rear end	3	33%
	Sideswipe	1	11%
	Turning Movement	1	11%
	SMV Other	2	22%
Road Surface Condition	Dry	7	78%
	Loose Snow	1	11%
	Ice	1	11%
Pedestrian Involved		1	11%
Cyclists Involved		0	0%

The Russell Road at Southvale Crescent N intersection had a total of nine collisions during the 2016-2020 time period, seven with property damage only and two fatal collisions, including one turning movement and one SMV other collision. The turning movement type fatality occurred during the afternoon at 4:26 PM in dry driving conditions in April of 2018, where a vehicle occupant was killed as a result of a two-vehicle collision. The SMV other type of fatality occurred during the morning at 7:54 am in dry driving conditions in September of 2019, where a pedestrian was struck and killed by an OC Transpo bus. The property damage collision types are most represented by the rear end with six (four northbound and 2 southbound), followed by two collisions each for angle (westbound) and SMV other. While two different types of collisions resulted in fatalities, no identifiable trends are present. Weather conditions do not affect collisions at this location. No further review is required as part of this study.

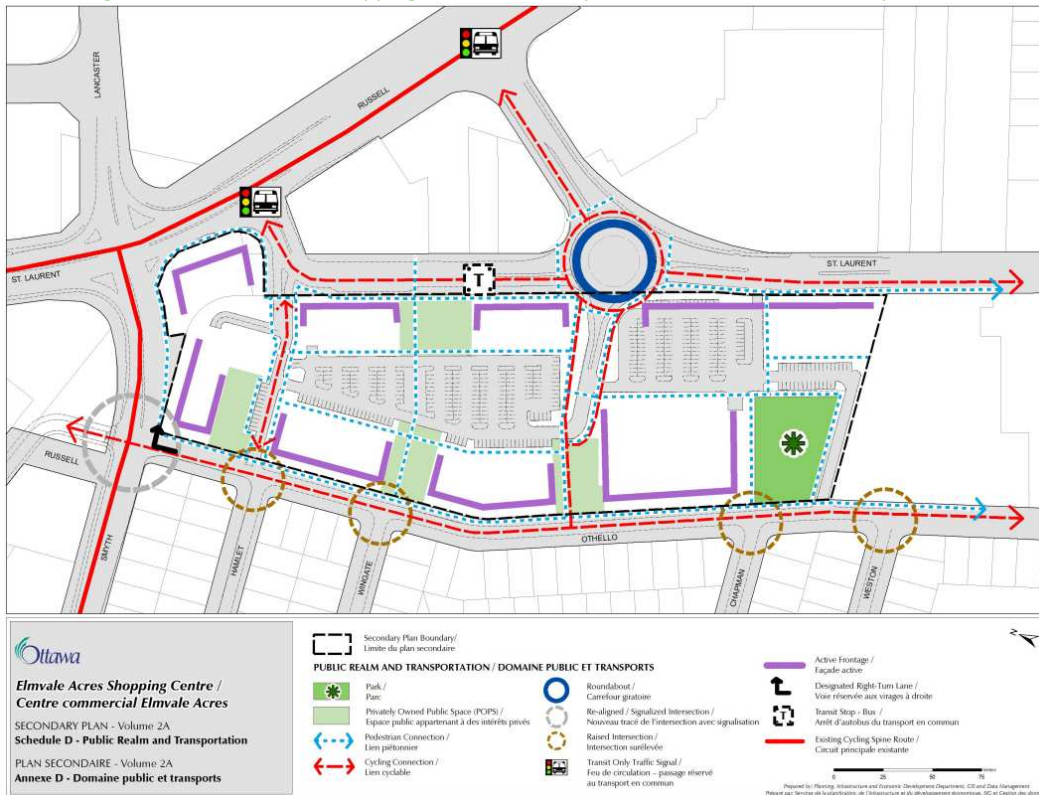
2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

Within the Transportation Master Plan (TMP), the Rapid Transit and Transit Priority (RTTP) Network’s Network Concept diagram shows an at-grade bus rapid transit (BRT) corridor along Russell Road continuing north along St. Laurent Boulevard and isolated transit priority measures along Smyth Road and St. Laurent Boulevard south of Smyth Road within the study area. Only the isolated transit priority measures along St Laurent Boulevard to the north of the Service Road are currently within the Affordable Network.

The Elmvale Acres Shopping Centre Secondary Plan identified a realignment of the intersection of Smyth Road with Russell Road and Othello Avenue and a new roundabout at the intersection of St. Laurent Boulevard at St. Laurent Boulevard Service Road. A transit-only left-turn signal will be provided at the intersection of St. Laurent Boulevard and Russell Road providing northbound access to Russell Road, and a transit-priority signal will be provided at the corner of St. Laurent Boulevard and Russell Road. Figure 12 illustrates the changes anticipated to the area intersection.

Figure 12: Elmvale Acres Shopping Centre Secondary Plan- Public Realm and Transportation



Source: https://documents.ottawa.ca/sites/documents/files/scheduled_elmvale_sp_en.pdf Accessed: November 24, 2022

Within the Ottawa Cycling Plan, shared use lanes constitute the phase one (2014-2019) project of the Pleasant Park Road Neighbourhood Bikeway, and bike lanes on St. Laurent Boulevard between Pleasant Park Road and Russell Road are planned for implementation as part of phase two (2020-2025) projects.

2.3.2 Other Study Area Developments

1910 St. Laurent Boulevard - Phase 1

The proposed development application includes a site plan for the expansion of the Elmvale Acres Shopping Centre to include 168 high-rise residential units and 1,100m² of retail space. The development is anticipated to be completed by 2021 and generate 40 new AM and 83 new PM peak hour two-way auto trips. (Parsons, 2019)

355 & 374 Everest Private

The proposed development includes a site plan proposing an eight-storey mid-rise apartment building with 101 units and a six to eight-storey mid-rise apartment building with 192 units. The development is predicted to generate 85 new AM two-way peak-hour auto trips and 92 new PM two-way peak-hour auto trips. The anticipated build-out horizon is 2020 or 2021. (Parsons, 2019)

2525 Lancaster Road

The proposed development includes a site plan proposing a parking lot. No TIA is available as part of this application.

1740 – 1760 St. Laurent Boulevard

The proposed development includes a site plan to develop four 12 to 15-storey apartment buildings with a total of 672 apartment units and 2900 m² commercial space. Phase one is predicted to be completed by 2022 and full

build out of the site is predicted by 2024. The development is predicted to generate 228 new AM two-way peak-hour auto trips and 263 new PM two-way peak-hour auto trips.

2571 Lancaster Road

The proposed development includes a site plan proposing 3,828 m² of office centre space, 710 m² of warehouse space, and 536 m² of shop space. The development is predicted to be completed in 2022 and full occupancy in mid 2023. Currently, only scoping report is available.

2025 Othello Avenue

The proposed development includes an Official Plan Amendment to develop 27-storey and 18-storey high-rise residential towers with 563 units. The development is anticipated to be buildout by 2023, and the development is predicted to generate 56 new AM two-way peak-hour auto trips and 63 new PM two-way peak-hour auto trips. (Parsons, 2021)

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of:

- St. Laurent Boulevard at:
 - Smyth Road/Lancaster Road
 - St. Laurent Boulevard Service Road
 - Pleasant Park Road
 - Access #2 (Future)
- Russell Road at:
 - St. Laurent Boulevard
 - Southvale Crescent N
 - Access #1

The boundary road will be Russell Road and St. Laurent Boulevard, and screenline SL54 is present north of the study area and will not be analyzed as part of this report.

3.2 Time Periods

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

3.3 Horizon Years

The anticipated build-out year is 2030. As a result, the full build-out plus five years horizon year is 2035.

4 Exemption Review

Table 7 summarizes the exemptions for this TIA.

Table 7: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Required
	4.2.3 New Street Networks	Only required for plans of subdivision	Exempt

Module	Element	Explanation	Exempt/Required
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Required
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Required
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt

5 Development-Generated Travel Demand

5.1 Mode Shares

Examining the mode shares recommended in the TRANS Trip Generation Manual (2020) for the subject district, derived from the most recent National Capital Region Origin-Destination survey (OD Survey), the existing average district mode shares by land use for Alta Vista have been summarized in Table 8.

Table 8: TRANS Trip Generation Manual Recommended Mode Shares – Alta Vista

Travel Mode	Multi-Unit (High-Rise)	
	AM	PM
Auto Driver	38%	45%
Auto Passenger	12%	16%
Transit	42%	28%
Cycling	2%	2%
Walking	7%	9%
Total	100%	100%

5.2 Trip Generation

This TIA has been prepared using the vehicle and person trip rates for the residential dwellings using the TRANS Trip Generation Manual (2020). Table 9 summarizes the person trip rates for the proposed residential land uses for each peak period.

Table 9: Trip Generation Person Trip Rates by Peak Period

Land Use	Land Use Code	Peak Period	Person Trip Rates
Multi-Unit High-Rise	221 & 222 (TRANS)	AM	0.80
		PM	0.90

Using the above person trip rates, the total person trip generation has been estimated. Table 10 summarizes the total person trip generation for the residential land uses.

Table 10: Total Residential Person Trip Generation by Peak Period

Land Use	Units	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Multi-Unit (High-Rise)	498	123	275	398	260	188	448

Using the above mode share targets for the person trip rates, the person trips by mode have been projected. Table 11 summarizes the trip generation by mode and peak hour using the residential peak hour adjustment factor.

Table 11: Residential Trip Generation by Mode

Travel Mode		AM Peak Hour				PM Peak Hour			
		Mode Share	In	Out	Total	Mode Share	In	Out	Total
Multi-Unit (High-Rise)	Auto Driver	38%	23	49	72	45%	51	37	88
	Auto Passenger	12%	7	16	23	16%	18	13	31
	Transit	42%	29	64	93	28%	34	25	59
	Cycling	2%	1	3	4	2%	2	2	4
	Walking	7%	5	11	16	9%	12	9	21
	Total	100%	65	143	208	100%	117	86	203

As shown above, a total of 72 AM new and 88 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

5.3 Trip Distribution

To understand the travel patterns of the subject development, the OD Survey has been reviewed to determine the travel for the residential component, and these patterns were applied based on the build-out of Alta Vista. Table 12 summarizes the distributions.

Table 12: OD Survey Distribution – Alta Vista

To/From	Residential % of Trips
North	25%
South	20%
East	5%
West	50%
Total	100%

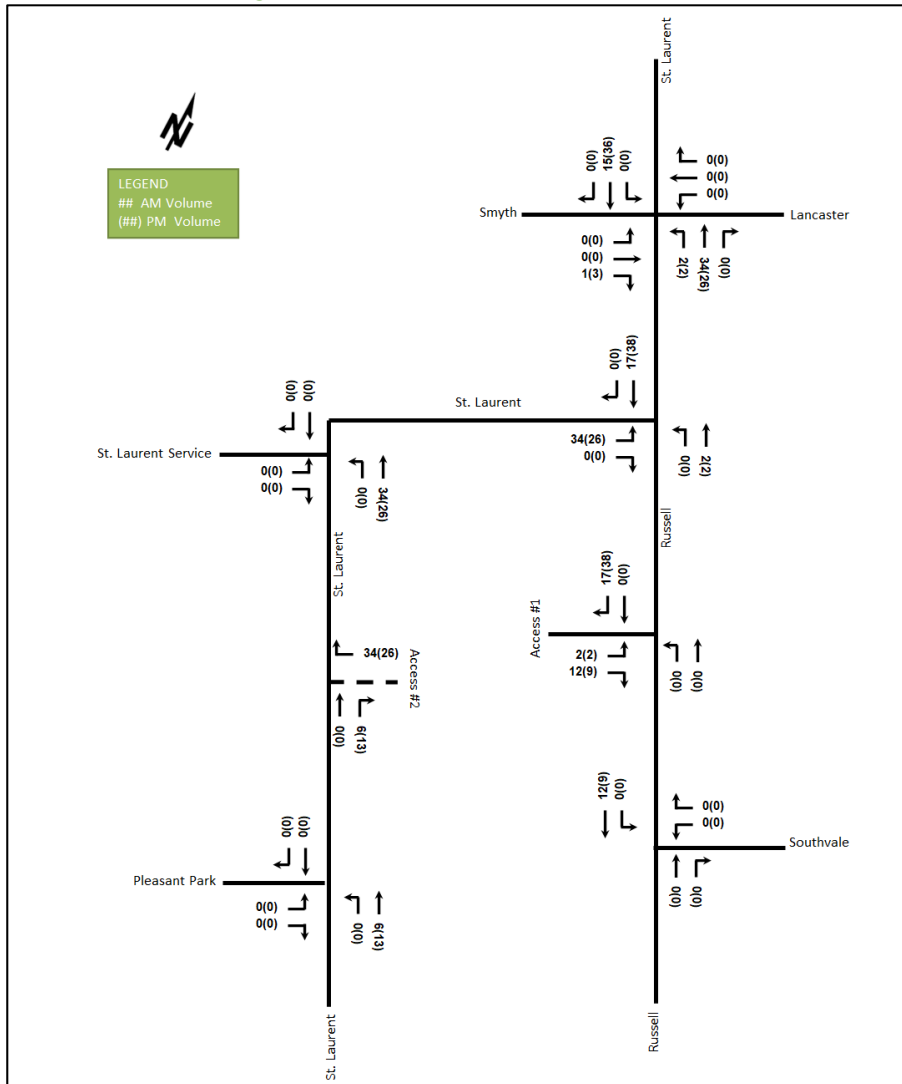
5.4 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the study area road network. Table 13 summarizes the proportional assignment to the study area roadways, and Figure 13 illustrates the new site generated volumes.

Table 13: Trip Assignment

To/From	Inbound Via	Outbound Via
North	25% St. Laurent Boulevard (N)	25% St. Laurent Boulevard (N)
South	20% St. Laurent Boulevard (S)	20% Russell Road (S)
East	5% Russell Road (N)	5% St. Laurent Boulevard (N)
West	40% St. Laurent Boulevard (N)	40% St. Laurent Boulevard (N)
	5% Smyth Road (via St. Laurent Boulevard)	5% Smyth Road (via St. Laurent Boulevard)
	5% St. Laurent Boulevard (S)	5% Russell Road (S)
Total	100%	100%

Figure 13: New Site Generation Auto Volumes



6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3. None of the proposed changes are considered to have any notable impact on the study area traffic volumes and travel patterns.

6.2 Background Growth

A review of the background projections from the City’s TRANS Regional Model for the 2011 and 2031 horizons was completed to determine the background growth for each of the study area roadways. The TRANS model plots and a summary of the results of the model interpolation are provided in Appendix E.

When comparing the existing volumes to 2031 horizons, the existing volumes northbound and southbound directions in the study area have exceeded the forecasted volumes. Resultantly, growth rates derived from the existing horizon to the 2031 model horizon rounded to the nearest 0.25% will be peak-directionally applied to the appropriate roadway’s mainline volumes and to the appropriate major turning movements at the intersections. Table 14 summarizes the growth rates applied within the study area.

Table 14: TRANS Regional Model Projections – Study Area Growth Rates

Street	AM Peak Hour		PM Peak Hour	
	Eastbound	Westbound	Eastbound	Westbound
Smyth Rd	2.00%	-	-	2.00%
Lancaster Rd	2.75%	-	-	2.75%
	Northbound	Southbound	Northbound	Southbound
St. Laurent Blvd	-	-	-	-

6.3 Other Developments

The background developments explicitly considered in the background conditions (Section 6.3) include:

- 1910 St. Laurent Boulevard
- 355 & 374 Everest Private
- 2025 Othello Avenue
- 1740 – 1760 St. Laurent Boulevard

The background development volumes within the study area have been provided in Appendix F.

7 Demand Rationalization

7.1 2030 Future Background Operations

Figure 14 illustrates the 2030 background volumes and Table 15 summarizes the 2030 background intersection operations. The level of service for signalized intersections is based on the v/c calculation for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2030 future background horizon are provided in Appendix G.

Figure 14: 2030 Future Background Volumes

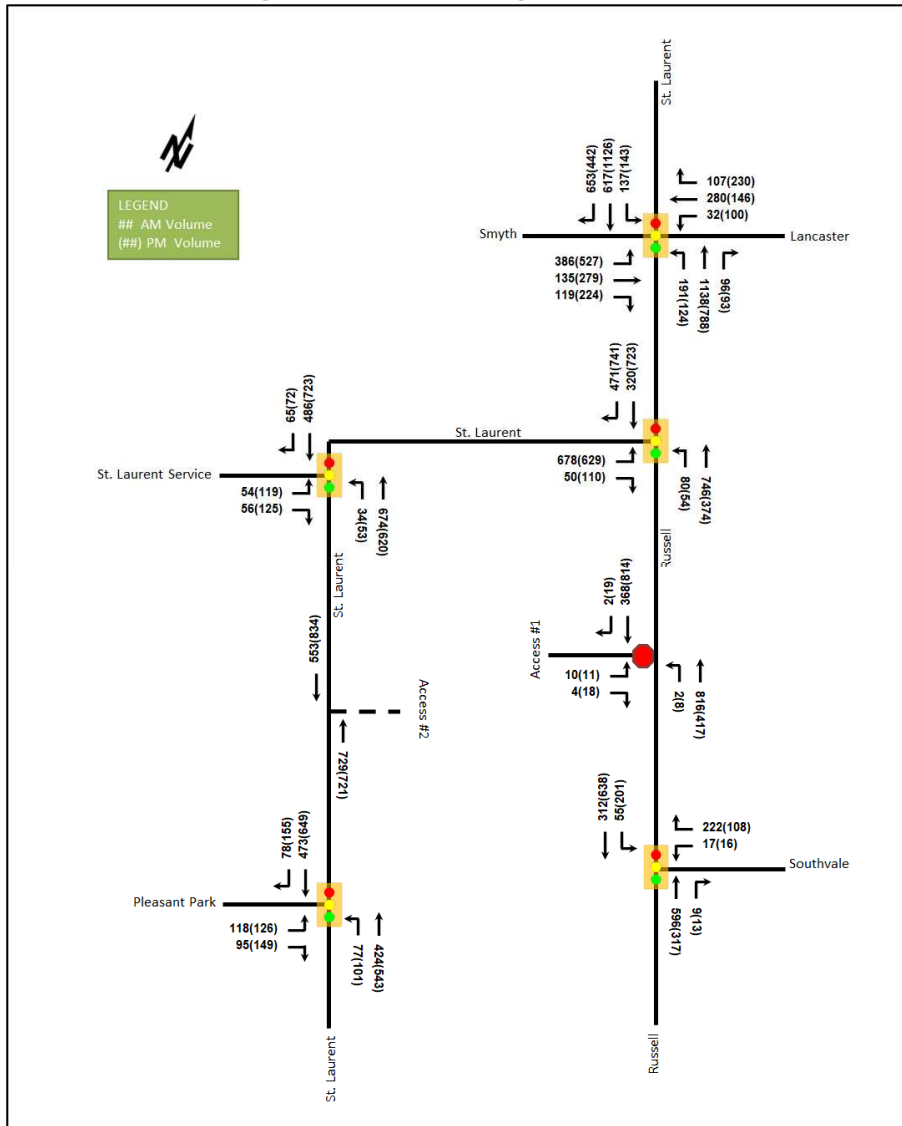


Table 15: 2030 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
St. Laurent Boulevard & Smyth Road / Lancaster Road Signalized	EBL	E	1.00	99.4	#79.3	E	0.97	80.5	#97.8
	EBT	A	0.32	41.1	46.3	C	0.77	60.1	#99.7
	EBR	A	0.29	7.1	12.4	A	0.47	8.6	20.3
	WBL	A	0.33	61.4	17.2	A	0.58	64.0	38.9
	WBT/R	C	0.76	53.5	56.6	B	0.64	27.5	35.3
	NBL	D	0.87	85.9	#96.8	C	0.76	81.2	#64.5
	NBT/R	E	0.94	49.0	#205.0	C	0.72	35.8	118.8
	SBL	C	0.74	74.8	#60.3	C	0.77	79.1	#73.5
	SBT	A	0.50	30.0	74.8	D	0.87	43.8	#177.8
	SBR	D	0.81	21.4	113.4	A	0.56	7.4	35.3
Overall	E	0.93	48.1	-	-	D	0.89	43.4	-
Russell Road & St. Laurent Boulevard Signalized	EBL/R	B	0.67	22.3	57.1	B	0.69	22.2	57.4
	NBL	A	0.15	11.5	11.9	A	0.17	12.8	8.9
	NBT	A	0.54	14.7	49.0	A	0.27	11.6	22.5
	SBT	A	0.33	19.4	27.1	B	0.61	22.1	63.1
	SBR	A	0.59	5.7	19.6	C	0.74	7.3	29.6
	Overall	B	0.66	15.8	-	-	B	0.66	16.3
Russell Road & Southvale Crescent N Signalized	WBL	A	0.06	21.4	5.6	A	0.05	18.7	4.9
	WBR	A	0.52	8.3	14.0	A	0.31	7.2	9.2
	NBT/R	A	0.59	9.9	78.4	A	0.28	6.1	32.9
	SBL	A	0.14	6.2	7.8	A	0.30	7.3	24.6
	SBT	A	0.31	6.3	31.6	A	0.54	9.0	81.3
	Overall	A	0.50	8.7	-	-	A	0.47	8.0
St. Laurent Boulevard & St. Laurent Boulevard Service Signalized	SEL/R	B	0.44	18.0	16.2	C	0.66	20.5	28.7
	NEL	A	0.07	4.8	4.8	A	0.16	6.5	m5.2
	NET	A	0.29	5.0	33.3	A	0.32	5.7	19.1
	SWT/R	A	0.24	4.7	20.4	A	0.41	8.3	42.3
	Overall	A	0.32	5.9	-	-	A	0.46	9.0
St. Laurent Boulevard & Pleasant Park Road Signalized	EBL	A	0.39	25.6	23.0	A	0.43	26.2	24.1
	EBR	A	0.29	7.9	9.5	A	0.39	7.4	11.6
	NBL	A	0.14	5.6	8.3	A	0.23	7.3	12.6
	NBT	A	0.35	6.2	37.1	A	0.45	7.5	55.0
	SBT	A	0.40	4.0	16.1	A	0.53	10.5	101.7
	SBR	A	0.08	0.4	0.2	A	0.15	2.6	4.5
	Overall	A	0.45	6.9	-	-	A	0.58	9.5
Russell Road & Access #1 Unsignalized	EB	C	0.05	19.8	1.5	C	0.11	19.9	3.0
	NBL	A	0.00	8.0	0.0	A	0.01	9.5	0.0
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	A	-	0.2	-	-	A	-	0.5

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

Delay = average vehicle delay in seconds
m = metered queue
= volume for the 95th %ile cycle exceeds capacity

Except for the intersection of St. Laurent Boulevard and Smyth Road / Lancaster Road, study area intersections operate well during both the AM and PM peak hours. The incremental improvement to the intersection operations is predominantly a result of the peak hour factor adjustment to 1.00 for forecasted conditions.

At the intersection of St. Laurent Boulevard and Smyth Road / Lancaster Road, the eastbound left-turn, northbound left-turn, northbound shared through/right-turn, and southbound left-turn movements during AM peak hour and eastbound left-turn, eastbound through, northbound left-turn, southbound left-turn, and southbound through movement during PM peak hour may subject to extended queues. High delays may be exhibited on the northbound left-turn movement during AM peak and on the eastbound left-turn and northbound left-turn movement during PM peak.

7.2 2035 Future Background Operations

Figure 15 illustrates the 2035 background volumes and Table 16 summarizes the 2035 background intersection operations. The level of service for signalized intersections is based on the v/c calculation for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2035 future background horizon are provided in Appendix H.

Figure 15: 2035 Future Background Volumes

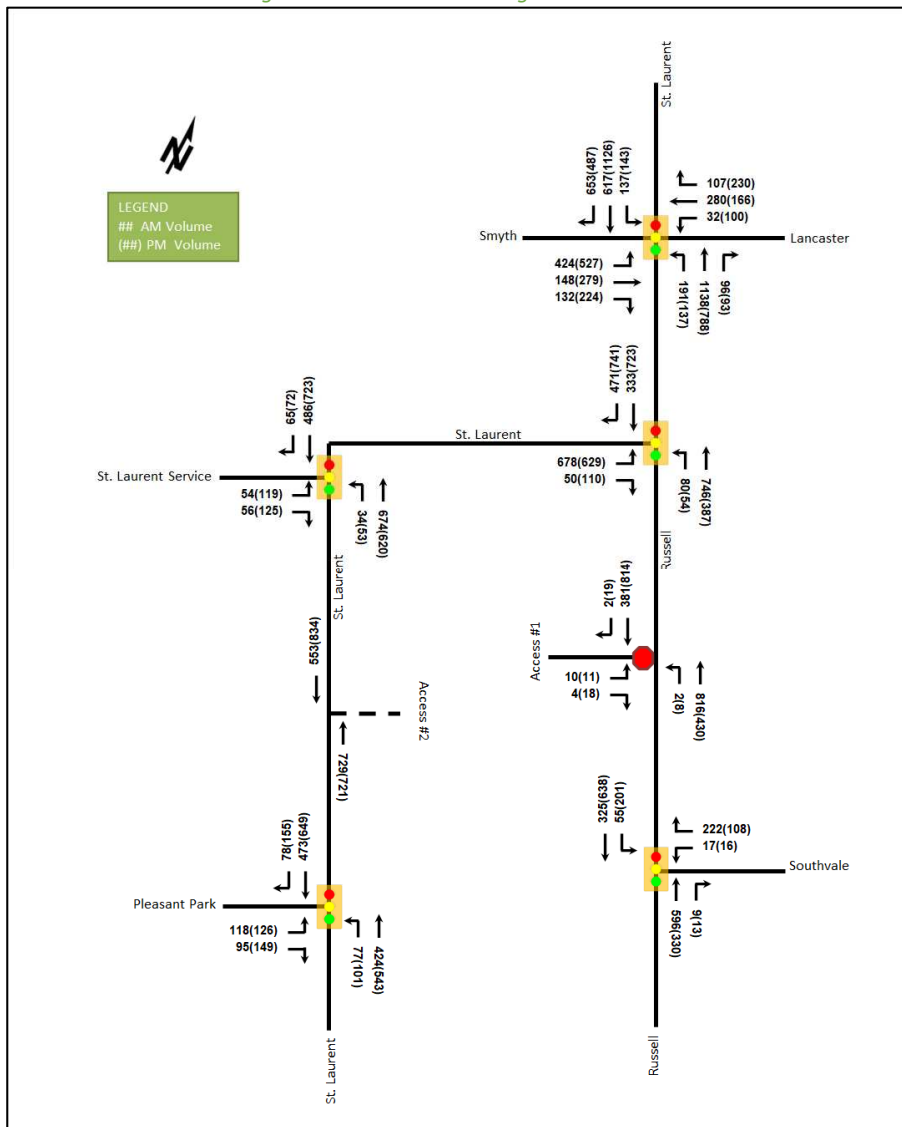


Table 16: 2035 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
St. Laurent Boulevard & Smyth Road / Lancaster Road <i>Signalized</i>	EBL	F	1.10	124.7	#89.9	E	0.97	80.5	#97.8
	EBT	A	0.35	41.7	50.2	C	0.77	60.1	#99.7
	EBR	A	0.32	8.8	16.0	A	0.47	8.6	20.3
	WBL	A	0.33	61.4	17.2	A	0.58	64.0	38.9
	WBT/R	C	0.76	53.5	56.6	B	0.67	29.7	38.3
	NBL	D	0.87	85.9	#96.8	C	0.77	79.4	#72.3
	NBT/R	E	0.94	49.0	#205.0	C	0.72	35.8	118.8
	SBL	C	0.74	74.8	#60.3	C	0.77	79.1	#73.5
	SBT	A	0.50	30.0	74.8	D	0.90	46.5	#177.8
	SBR	D	0.81	21.4	113.4	A	0.60	7.9	38.9
Overall	E	0.95	51.2	-	-	D	0.89	44.0	-
Russell Road & St. Laurent Boulevard <i>Signalized</i>	EBL/R	B	0.67	22.3	57.1	B	0.69	22.2	57.4
	NBL	A	0.15	11.5	11.9	A	0.17	12.8	8.9
	NBT	A	0.54	14.7	49.0	A	0.28	11.6	23.3
	SBT	A	0.34	19.5	28.1	B	0.61	22.1	63.1
	SBR	A	0.59	5.7	19.6	C	0.74	7.3	29.6
	Overall	B	0.66	15.8	-	-	B	0.66	16.3
Russell Road & Southvale Crescent N <i>Signalized</i>	WBL	A	0.06	21.4	5.6	A	0.05	18.7	4.9
	WBR	A	0.52	8.3	14.0	A	0.31	7.2	9.2
	NBT/R	A	0.59	9.9	78.4	A	0.29	6.2	34.4
	SBL	A	0.14	6.2	7.8	A	0.30	7.3	24.8
	SBT	A	0.32	6.4	33.2	A	0.54	9.0	81.3
	Overall	A	0.50	8.7	-	-	A	0.47	8.0
St. Laurent Boulevard & St. Laurent Boulevard Service <i>Signalized</i>	SEL/R	B	0.44	18.0	16.2	C	0.66	20.5	28.7
	NEL	A	0.07	4.8	4.8	A	0.16	6.5	m5.2
	NET	A	0.29	5.0	33.3	A	0.32	5.7	19.1
	SWT/R	A	0.24	4.7	20.4	A	0.41	8.3	42.3
	Overall	A	0.32	5.9	-	-	A	0.46	9.0
St. Laurent Boulevard & Pleasant Park Road <i>Signalized</i>	EBL	A	0.39	25.6	23.0	A	0.43	26.2	24.1
	EBR	A	0.29	7.9	9.5	A	0.39	7.4	11.6
	NBL	A	0.14	5.6	8.3	A	0.23	7.4	12.6
	NBT	A	0.35	6.2	37.1	A	0.45	7.5	55.0
	SBT	A	0.40	4.0	16.1	A	0.53	10.5	101.7
	SBR	A	0.08	0.4	0.2	A	0.15	2.6	4.5
	Overall	A	0.45	6.9	-	-	A	0.58	9.6
Russell Road & Access #1 <i>Unsignalized</i>	EB	C	0.06	20.1	1.5	C	0.11	20.1	3.0
	NBL	A	0.00	8.1	0.0	A	0.01	9.5	0.0
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	A	-	0.2	-	-	A	-	0.5

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

Delay = average vehicle delay in seconds
m = metered queue
= volume for the 95th %ile cycle exceeds capacity

The intersections at the 2035 future background condition are anticipated to operate similarly to the 2030 background conditions except for the eastbound left-turn movement at the intersection of St. Laurent Boulevard and Smyth Road / Lancaster Road. The eastbound left-turn movement at St. Laurent Boulevard and Smyth Road / Lancaster Road intersection is over theoretical capacity and may be subject to high delays and have extended

queues during AM peak hour due to the background growth and developments. Further optimized signal timings may address the constraint and reduce the v/c of all movements to be 1.00 or below.

7.2.1 2035 Future Background Elmvale Acres Roundabout Sensitivity

The Elmvale Acres Shopping Centre Secondary Plan identified a new roundabout at the intersection of St. Laurent Boulevard at St. Laurent Boulevard Service Road in the future. A sensitivity of this intersection is provided for the 2035 future background operations to assess the roundabout should the future redevelopment complete the construction of this intersection improvement. The volumes at the roundabout have been re-assigned from the background conditions to approximate the split of the volumes from the St. Laurent Boulevard Service Road to both the Service Road and the Elmvale Mall access.

Figure 16 and Table 17 illustrate 2035 background volumes and operations at the St. Laurent Boulevard at St. Laurent Boulevard Service Road intersection when the roundabout is constructed. Sidra 8 was used to model the roundabouts and the sidra worksheets at the roundabout for the 2035 future background horizon are provided in Appendix I.

Figure 16: 2035 Future Background Elmvale Acres Roundabout

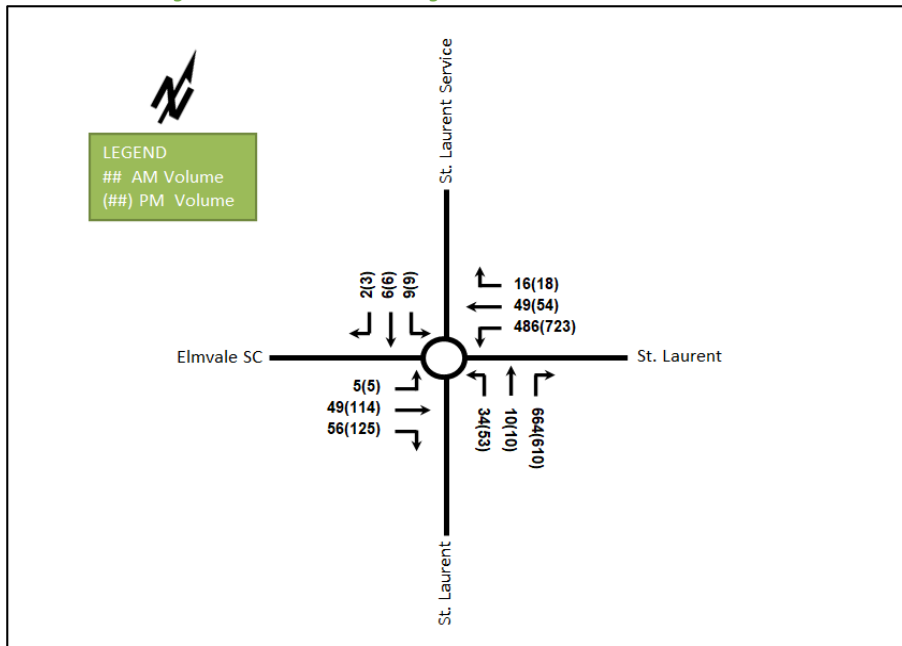


Table 17: Elmvale Acres Roundabout Operations - 2035 Future Background

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
St. Laurent Boulevard & St. Laurent Boulevard Service Roundabout	EB	A	0.11	1.7	3.1	A	0.28	2.6	8.4
	WB	A	0.20	7.2	6.1	A	0.29	7.4	10.2
	NB	A	0.26	3.0	9.0	A	0.28	3.4	9.8
	SB	A	0.02	7.7	0.8	A	0.03	8.5	1.0
	Overall	A	0.26	4.6	9.0	A	0.29	5.2	10.2

Notes: Saturation flow rate of 1800 veh/h/lane
 Queue is measured in metres
 Peak Hour Factor = 1.00

Delay = average vehicle delay in seconds
 m = metered queue
 # = volume for the 95th %ile cycle exceeds capacity

The St. Laurent Boulevard at St. Laurent Boulevard Service Road intersection operates well should the roundabout be realized by the 2035 horizon.

7.3 Modal Share Sensitivity and Demand Rationalization Conclusions

High delays and extended queues have been noted at the intersection of St. Laurent Boulevard and Smyth Road / Lancaster Road in the existing condition, and capacity constraint has been noted on the eastbound left-turn movement at the intersection of St. Laurent Boulevard and Smyth Road / Lancaster Road in the future background condition.

The site volumes are projected to be three vehicles on northbound left-turn movement (1.57% of existing volumes), 35 vehicles on northbound through movement (3.11% of existing volumes), 16 on southbound through movement (2.69% of existing volumes), and one vehicle on eastbound right-turn movement (1.03% of existing volumes) during AM peak hour.

During PM peak hour, site volumes are projected to be two vehicles on northbound left-turn movement (2.00% of existing volumes), 26 vehicles on northbound shared through movement (3.40% of existing volumes), 36 on southbound through movement (3.28% of existing volumes), and three vehicles on eastbound right-turn movement (1.35% of existing volumes).

The capacity constraint on the eastbound left-turn movement at St. Laurent Boulevard and Smyth Road / Lancaster Road intersection is due to the background growth and developments, and further optimized signal timings may address the constraint and reduce the v/c of all movements to be 1.00 or below. The site volumes are not anticipated to be a contributing factor to the network constraints. No further demand rationalization is required as part of this TIA.

8 Development Design

8.1 Design for Sustainable Modes

The existing surface parking lot will be reduced from 494 parking spaces to 176 spaces with the redevelopment of the site, and the new parking structure will include an additional 523 parking spaces. The new buildings will provide a total of 522 bike spaces including eight exterior bike racks provided by each building main entrances. Hard surface connections are provided between all building entrances and the surrounding pedestrian facilities on Russell Road and St. Laurent Boulevard. All exterior doors are located within a 300 metre walking distance to Elmvale Station or adjacent bus stops. It is noted that an existing bus stop is located at the proposed access on St. Laurent Boulevard, which is illustrated in Figure 17 and Figure 18, and the bus stop will need to be relocated approximately 35 metres north of the existing location.

Figure 17: Existing Bus Stop - St Laurent / Ad. 1971

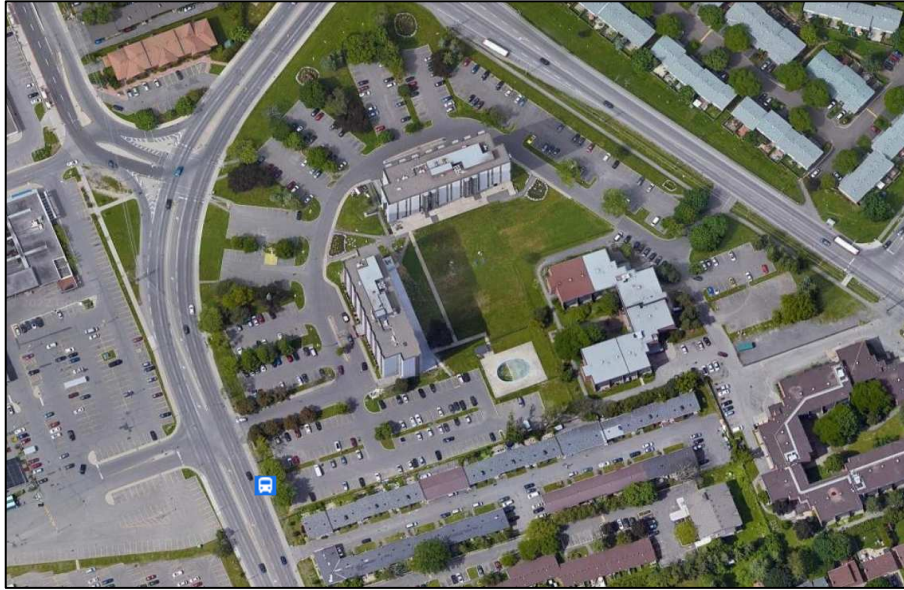
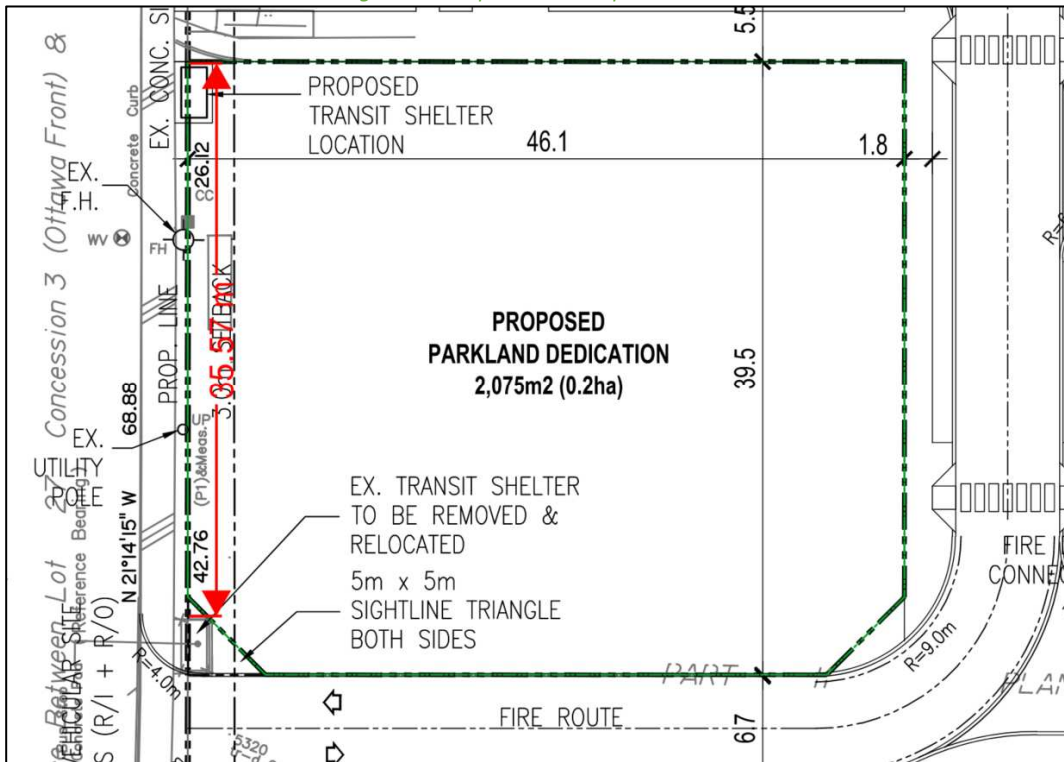


Figure 18: Proposed Bus Stop Relocation



8.2 Circulation and Access

Vehicle access is provided via two two-way accesses onto St. Laurent Boulevard and Russell Road. The two-way access onto St. Laurent Boulevard is 6.7m wide, the two-way access onto Russell Road is 8.5m wide, and a 6.7m internal aisle connects two accesses within the development. Lay-by parking and loading dock are provided in front of each building. The garbage truck, move-in truck, and fire truck turning movements can be accommodated on site. The turning templates are provided in Appendix J.

9 Parking

9.1 Parking Supply

The redevelopment will provide a total of 699 parking spaces, with 176 surface parking spaces and 523 parking structure spaces for the entire site. A total of 522 bicycle spaces will be provided, including 498 proposed bicycle spaces and 24 existing spaces. Each building will have a total of eight exterior bike racks by the main entrances, and the rest of bike parking spaces will be provided on the ground floor and underground. The reallocation of parking will provide a parking ratio of 0.7 spaces per unit, reducing the existing buildings from 0.99 to 0.7 spaces per unit. The minimum parking requirement is 0.7 spaces per unit, which is 699 spaces for the entire site, and the proposed parking spaces meet the parking requirements.

The redevelopment proposed 522 bike parking spaces, and it meets the minimum bicycle parking provision at a ratio of 0.5 spaces per unit. No change to the existing building bike parking is proposed.

10 Boundary Street Design

Table 18 summarizes the MMLOS analysis for the boundary streets of St. Laurent Boulevard and Russell Road. The existing and future conditions for both streets will be the same and are considered in one row. The St. Laurent Boulevard analysis is based on “Arterial Main Street” and “General Urban Area”, and Russell Road is based on “General Urban Area”. The MMLOS worksheets have been provided in Appendix K.

Table 18: Boundary Street MMLOS Analysis

Segment	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target
St. Laurent Boulevard	E	C	E	B	D	D	N/A	N/A
Russell Road	E	C	D	C	D	B	B	D

The pedestrian LOS will not be met along the segment of St. Laurent Boulevard and Russell Road. To meet the theoretical pedestrian LOS targets, the sidewalks would need to be at least 2 metres and boulevards widened to be larger than 2 metres.

The bicycle LOS will not be met along the segment of St. Laurent Boulevard and Russell Road. To meet the theoretical bicycle LOS targets, operating speeds would need to be decreased to less than 50 km/h. Physically separated facilities would also score a LOS of A and help meet the pedestrian LOS targets.

The transit LOS will not be met along the segment of Russell Road. To meet transit LOS, a bus lane or separated ROW would be required.

11 Access Intersections Design

11.1 Location and Design of Access

The development will maintain an existing full-movements access onto Russell Road and propose a right-in/right-out access onto St. Laurent Boulevard.

The throat length for the access on St. Laurent Boulevard is proposed to be approximately 40 metres, and it meets the minimums of 25.0 metres, from Table 8.9.3 of the TAC Geometric Design Guidelines. The throat length of the access on Russell Road is proposed to be approximately 34.5 metres, does not meet the suggested minimum 40.0 metres. The site plan aligns the parking garage entrance to the St. Laurent Boulevard frontage, reducing the likelihood of the Russell Road access requiring a longer queue storage/throat length. It is also noted that an existing building is located at the Russell Road access and would not permit the throat length being extended.

11.2 Intersection Control

Based upon the projected volumes, the site access will have stop-control on the minor approach.

11.3 Access Intersection Design

11.3.1 2030 Future Total Access Intersection Operations

The turning movement counts at the intersection of St. Laurent Boulevard at Access #2 was acquired from the Elmvale Acres Shopping Centre Redevelopment - Phase 1 report (Parsons, 2019), and volumes were re-distributed in future horizons. The 2030 future total intersection volumes are illustrated in Figure 19 and the access intersection operations are summarized below in Table 19. Synchro 11 has been used to model the unsignalized intersections and HCM 2010 methodology was used for unsignalized intersection operation. The Synchro worksheets have been provided in Appendix M.

Figure 19: 2030 Future Total Volumes

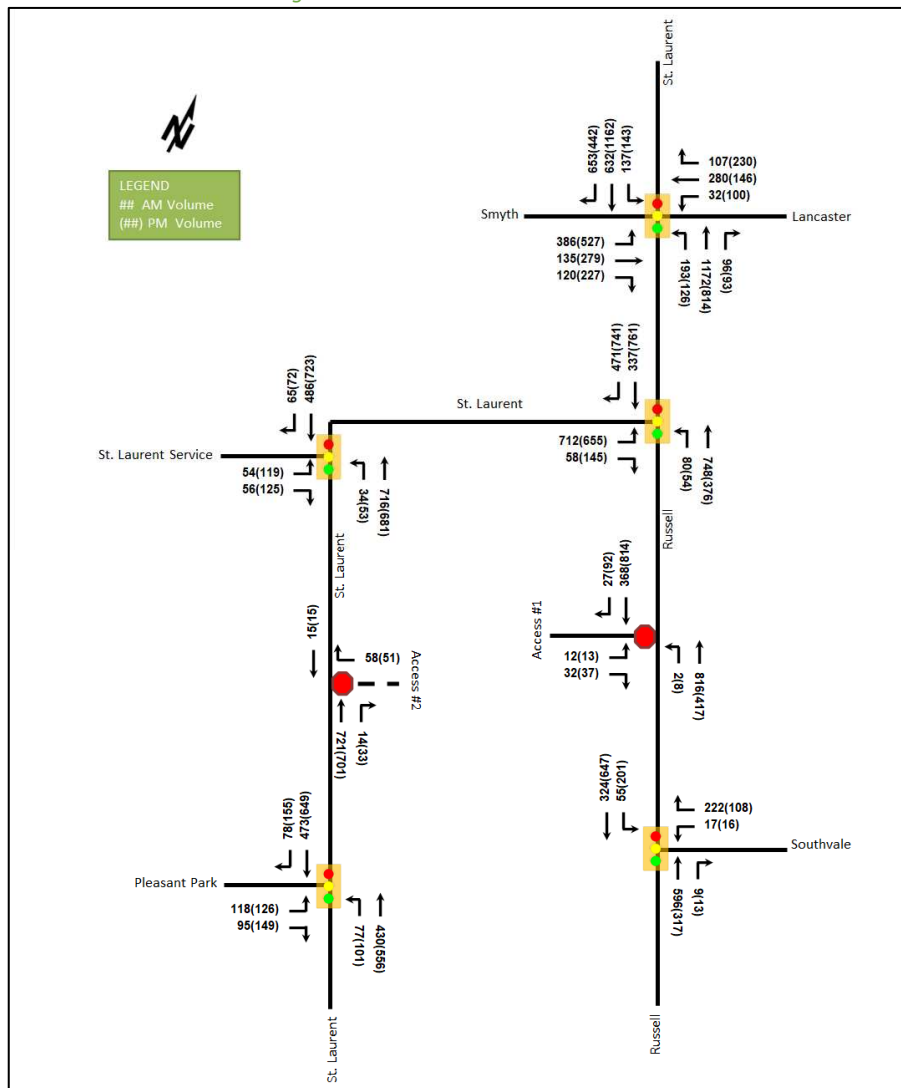


Table 19: 2030 Future Total Access Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
	EB	B	0.11	14.8	3.0	C	0.18	20.5	4.5

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Russell Road & Access #1 <i>Unsignalized</i>	NBL	A	0.00	8.1	0.0	A	0.01	9.8	0.0
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	A	-	0.5	-	A	-	0.8	-
St. Laurent Boulevard & Access #2 <i>Unsignalized</i>	WB	B	0.09	11.3	2.3	B	0.08	11.2	2.3
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	A	-	0.5	-	A	-	0.4	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

Delay = average vehicle delay in seconds
m = metered queue
= volume for the 95th %ile cycle exceeds capacity

The 2030 future total access intersections operate satisfactorily.

11.3.2 2035 Future Total Access Intersection Operations

The 2035 future total intersection volumes are illustrated in Figure 20 and the access intersection operations are summarized below in Table 20. Synchro 11 has been used to model the unsignalized intersections and HCM 2010 methodology was used for unsignalized intersection operation. The Synchro and Sidra worksheets have been provided in Appendix N.

Figure 20: 2035 Future Total Volumes

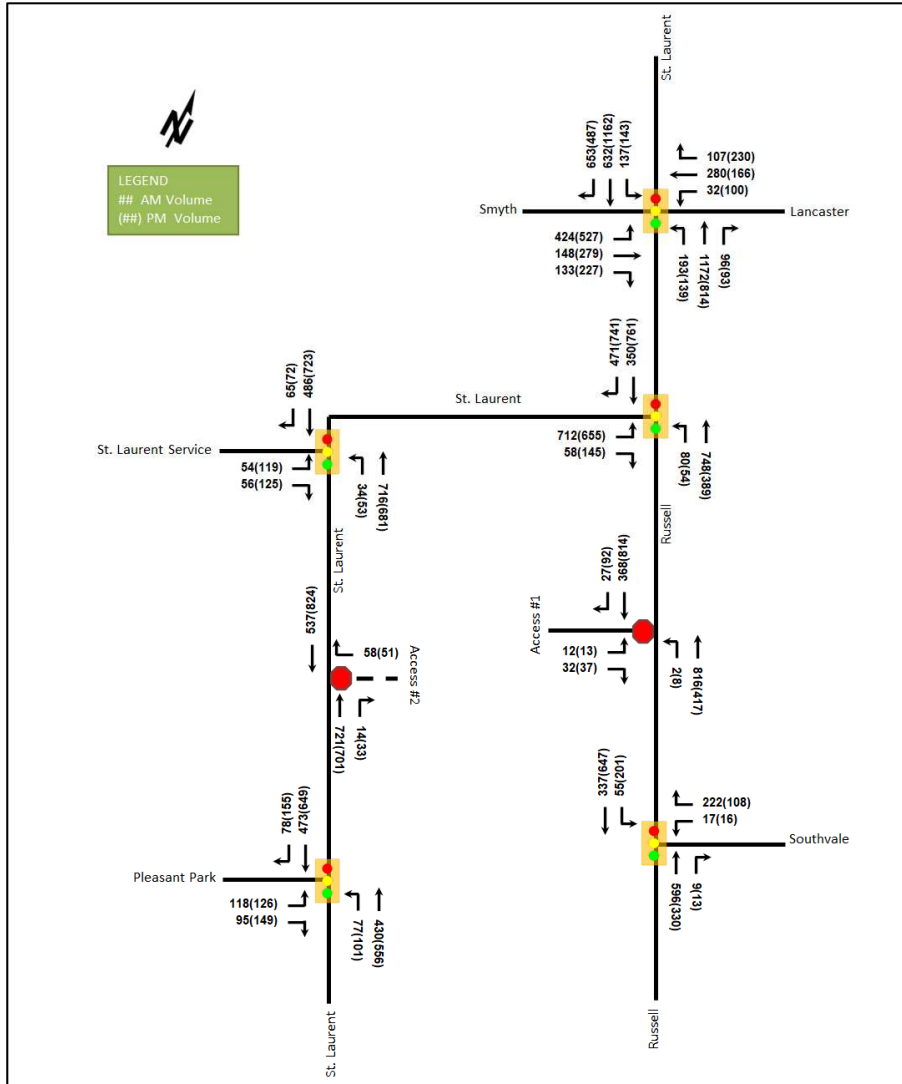


Table 20: 2035 Future Total Access Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Russell Road & Access #1 <i>Unsignalized</i>	EB	B	0.11	14.8	3.0	C	0.18	20.5	4.5
	NBL	A	0.00	8.1	0.0	A	0.01	9.8	0.0
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	A	-	0.5	-	A	-	0.8	-
St. Laurent Boulevard & Access #2 <i>Unsignalized</i>	WB	B	0.09	11.3	2.3	B	0.08	11.2	2.3
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	A	-	0.5	-	A	-	0.4	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

Delay = average vehicle delay in seconds
m = metered queue
= volume for the 95th %ile cycle exceeds capacity

The 2035 future total access intersections operate satisfactorily.

11.3.3 Access Intersection MMLoS

The access intersection is unsignalized, and therefore no access intersection MMLoS analysis has been conducted.

11.3.4 Recommended Design Elements

No changes to the site accesses are proposed.

12 Transportation Demand Management

12.1 Context for TDM

The mode shares used within the TIA represent the recommended shares for the Alta Vista, and the subject site lies within proximity to the planned transit at Elmvale Station. Overall, the modal shares are likely to be achieved and supporting TDM measures should be provided to encourage shifts towards sustainable modes.

The subject site is within the St. Laurent Arterial Mainstreet Design Priority Area, and the total proposed bedroom count within the new buildings is estimated to be 777 bedrooms.

12.2 Need and Opportunity

The subject site has been assumed to rely predominantly on auto travel and transit based upon the proximity to the planned transit at Elmvale Station, and those assumptions have been carried through the analysis. The unmodified district mode shares have been applied, risks to other network users from failing to meet mode share targets are low.

12.3 TDM Program

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

- Display local area maps with walking and cycling routes, and transit route information and schedules at major entrances
- Provide a multimodal travel option information package to new residents
- Contract with providers to install on-site bikeshare (or other micromobility alternatives) and carshare spaces
- Inclusion of a 1-year Presto card for first time apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
- Unbundle parking cost from rental costs

13 Neighbourhood Traffic Management

Site traffic is proposed to access the arterial network via St. Laurent Boulevard (a collector road). The TIA Guidelines propose a threshold of 300 vehicles per peak hour for the classification of collector roads, equivalent to five cars per minute, which per City guidance is to be interpreted as two-way volumes. The City Staff have further noted that these thresholds are too low for analysis and are under review for future update.

The existing volumes on St. Laurent Boulevard are 1,218 two-way vehicles in the AM peak hour and 1,481 two-way vehicles in the PM peak hour. Overall, the site is anticipated to generate approximately 34 and 26 two-way vehicle trips during the AM and PM peak hours, respectively, all of which will access St. Laurent Boulevard travelling northbound from the south or north of the access to Russell Road. While over the prescribed theoretical local road capacity, this volume increase is not considered a significant impact on St. Laurent Boulevard and does not require redesignation of the road classification.

14 Transit

14.1 Route Capacity

In Section 5.1 the trip generation by mode was estimated, including an estimate of the number of transit trips that will be generated by the proposed development. Table 21 summarizes the transit trip generation.

Table 21: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Transit	42% (28%)	29	64	93	34	25	59

The proposed development is anticipated to generate an additional 91 AM peak hour transit trips and 58 PM peak hour transit trips. From the trip distribution found in section 5.3, these values can be further broken down. Table 22 summarizes forecasted site-generated transit ridership trips by direction and the equivalent bus loads.

Table 22: Forecasted Site-Generated Transit Ridership

Direction	AM Peak Hour		PM Peak Hour		Service Type	Approximate Equivalent Peak Hour/Direction Bus Loads
	In	Out	In	Out		
North	7	16	8	6	Buses	One third of a standard bus
South	6	13	7	5	Buses	One quarter of a standard bus
East	1	3	2	1	Buses	Negligible
West	15	32	17	13	Buses	Half of a standard bus

14.2 Transit Priority

Examining the study area intersection delays, negligible impacts are noted on the transit movements at the study area intersections as a result of the development site traffic.

15 Network Intersection Design

15.1 Network Intersection Control

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

15.2 Network Intersection Design

15.2.1 2030 Future Total Network Intersection Operations

The 2030 future total network intersection operations are summarized below in Table 23. The level of service for signalized intersections is based on the v/c calculation for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The Synchro worksheets have been provided in Appendix M.

Table 23: 2030 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
St. Laurent Boulevard & Smyth Road / Lancaster Road Signalized	EBL	E	1.00	99.4	#79.3	E	0.97	80.5	#97.8
	EBT	A	0.32	41.1	46.3	C	0.77	60.1	#99.7
	EBR	A	0.29	7.2	12.8	A	0.48	8.6	20.6
	WBL	A	0.33	61.4	17.2	A	0.58	64.0	38.9
	WBT/R	C	0.76	53.5	56.6	B	0.65	28.0	35.7
	NBL	D	0.88	87.3	#97.8	C	0.77	81.5	#65.5
	NBT/R	E	0.97	53.2	#213.8	C	0.74	36.6	123.6
	SBL	C	0.74	74.8	#60.3	C	0.77	79.1	#73.5
	SBT	A	0.52	30.2	77.0	E	0.91	46.6	#187.3
	SBR	D	0.81	21.5	113.8	A	0.56	8.1	38.6
Overall	E	0.95	49.5	-	-	D	0.90	44.4	-
Russell Road & St. Laurent Boulevard Signalized	EBL/R	C	0.71	23.3	61.2	C	0.74	23.7	63.2
	NBL	A	0.15	11.5	11.9	A	0.17	13.2	8.9
	NBT	A	0.55	14.8	49.2	A	0.27	11.6	22.6
	SBT	A	0.34	19.6	28.5	B	0.65	23.0	#68.7
	SBR	A	0.59	5.7	19.6	C	0.74	7.3	29.6
	Overall	B	0.68	16.3	-	-	B	0.70	17.2
Russell Road & Southvale Crescent N Signalized	WBL	A	0.06	21.4	5.6	A	0.05	18.7	4.9
	WBR	A	0.52	8.3	14.0	A	0.31	7.2	9.2
	NBT/R	A	0.59	9.9	78.4	A	0.28	6.1	32.9
	SBL	A	0.14	6.2	7.8	A	0.30	7.3	24.6
	SBT	A	0.32	6.4	33.1	A	0.55	9.2	83.1
	Overall	A	0.50	8.7	-	-	A	0.48	8.1
St. Laurent Boulevard & St. Laurent Boulevard Service Signalized	SEL/R	B	0.44	18.0	16.2	C	0.66	20.5	28.7
	NEL	A	0.07	4.8	m4.7	A	0.16	6.5	m5.1
	NET	A	0.31	5.2	35.4	A	0.36	5.8	20.5
	SWT/R	A	0.24	4.7	20.4	A	0.41	8.3	42.3
	Overall	A	0.33	6.0	-	-	A	0.46	9.0
St. Laurent Boulevard & Pleasant Park Road Signalized	EBL	A	0.39	25.6	23.0	A	0.43	26.2	24.1
	EBR	A	0.29	7.9	9.5	A	0.39	7.4	11.6
	NBL	A	0.14	5.6	8.3	A	0.23	7.4	12.6
	NBT	A	0.35	6.2	37.9	A	0.46	7.7	56.8
	SBT	A	0.40	4.0	15.2	A	0.53	10.7	102.6
	SBR	A	0.08	0.3	0.1	A	0.15	2.8	4.9
	Overall	A	0.45	6.9	-	-	A	0.58	9.6

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

Delay = average vehicle delay in seconds
m = metered queue
= volume for the 95th %ile cycle exceeds capacity

The network intersection operations for the 2030 future total horizon operate similarly to the 2030 future background conditions.

The intersection of the Russell Road at St. Laurent Boulevard may be subject to extended queues on the southbound through movement during PM peak hour.

15.2.2 2035 Future Total Network Intersection Operations

The 2035 future total network intersection operations are summarized below in Table 24. The level of service for signalized intersections is based on the v/c calculation for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The Synchro worksheets have been provided in Appendix N.

Table 24: 2035 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
St. Laurent Boulevard & Smyth Road / Lancaster Road <i>Signalized</i>	EBL	F	1.10	124.7	#89.9	E	0.97	80.5	#97.8
	EBT	A	0.35	41.7	50.2	C	0.77	60.1	#99.7
	EBR	A	0.32	8.8	16.0	A	0.48	8.6	20.6
	WBL	A	0.33	61.4	17.2	A	0.58	64.0	38.9
	WBT/R	C	0.76	53.5	56.6	B	0.68	30.1	38.6
	NBL	D	0.88	87.3	#97.8	C	0.76	78.6	#73.8
	NBT/R	E	0.97	53.2	#213.8	C	0.74	36.6	123.6
	SBL	C	0.74	74.8	#60.3	C	0.77	79.1	#73.5
	SBT	A	0.52	30.2	77.0	E	0.93	50.7	#187.3
	SBR	D	0.81	21.5	113.8	B	0.61	8.6	42.7
Overall	E	0.96	52.6	-	E	0.91	45.3	-	
Russell Road & St. Laurent Boulevard <i>Signalized</i>	EBL/R	C	0.71	23.3	61.2	C	0.74	23.7	63.2
	NBL	A	0.16	11.5	11.9	A	0.17	13.2	8.9
	NBT	A	0.55	14.8	49.2	A	0.28	11.6	23.4
	SBT	A	0.36	19.7	29.5	B	0.65	23.0	#68.7
	SBR	A	0.59	5.7	19.6	C	0.74	7.3	29.6
	Overall	B	0.68	16.3	-	B	0.70	17.2	-
Russell Road & Southvale Crescent N <i>Signalized</i>	WBL	A	0.06	21.4	5.6	A	0.05	18.7	4.9
	WBR	A	0.52	8.3	14.0	A	0.31	7.2	9.2
	NBT/R	A	0.59	9.9	78.4	A	0.29	6.2	34.4
	SBL	A	0.14	6.2	7.8	A	0.30	7.3	24.8
	SBT	A	0.33	6.5	34.6	A	0.55	9.2	83.1
	Overall	A	0.50	8.7	-	A	0.48	8.1	-
St. Laurent Boulevard & St. Laurent Boulevard Service <i>Signalized</i>	SEL/R	B	0.44	18.0	16.2	C	0.66	20.5	28.7
	NEL	A	0.07	4.8	m4.7	A	0.16	6.5	m5.0
	NET	A	0.31	5.2	35.4	A	0.36	5.8	20.4
	SWT/R	A	0.24	4.7	20.4	A	0.41	8.3	42.3
	Overall	A	0.33	6.0	-	A	0.46	8.9	-
St. Laurent Boulevard & Pleasant Park Road <i>Signalized</i>	EBL	A	0.39	25.6	23.0	A	0.43	26.2	24.1
	EBR	A	0.29	7.9	9.5	A	0.39	7.4	11.6
	NBL	A	0.14	5.6	8.3	A	0.23	7.4	12.6
	NBT	A	0.35	6.2	37.9	A	0.46	7.7	56.8
	SBT	A	0.40	4.0	15.1	A	0.53	10.7	102.5
	SBR	A	0.08	0.3	0.2	A	0.15	2.9	5.2
	Overall	A	0.45	6.9	-	A	0.58	9.7	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

Delay = average vehicle delay in seconds
m = metered queue
= volume for the 95th %ile cycle exceeds capacity

The network intersection operations for the 2035 future total horizon operate similarly to the 2035 future background conditions. The constraint on the eastbound left-turn movement at St. Laurent Boulevard & Smyth Road / Lancaster Road will remain due to the background growth and developments, and further optimized signal timings may address the constraint and reduce the v/c of all movements to be 1.00 or below. The southbound through movement at the intersection of Russell Road & St. Laurent Boulevard during PM peak hour may start to be subject to extended queues.

15.2.2.1 2035 Future Total Elmvale Acres Roundabout Sensitivity

Figure 21 and Table 25 illustrate 2035 future total volumes and operations at the St. Laurent Boulevard at St. Laurent Boulevard Service Road intersection when the roundabout is constructed. The volumes at the St. Laurent Boulevard at St. Laurent Boulevard Service Road roundabout were re-assigned. Sidra 8 was used to model the roundabouts and the sidra worksheets at the roundabout for the 2035 future total horizon are provided in Appendix O.

Figure 21: 2035 Future Total Elmvale Acres Roundabout

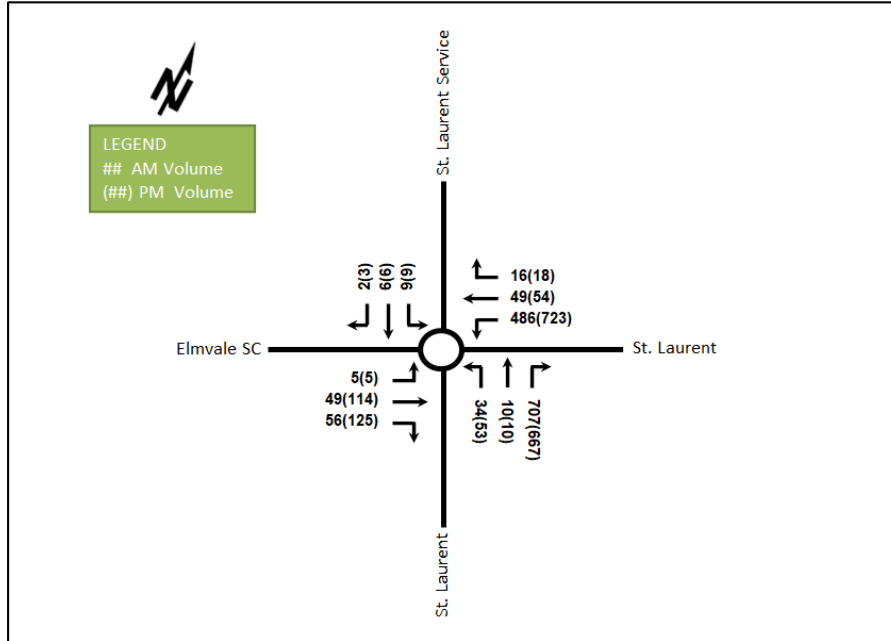


Table 25: Elmvale Acres Roundabout Operations - 2035 Future Total

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
St. Laurent Boulevard & St. Laurent Boulevard Service Roundabout	EB	A	0.12	1.7	3.1	A	0.29	2.6	8.4
	WB	A	0.20	7.2	6.0	A	0.29	7.4	10.2
	NB	A	0.28	3.0	9.7	A	0.30	3.4	10.8
	SB	A	0.02	7.7	0.8	A	0.03	8.5	1.0
	Overall	A	0.27	4.6	9.7	A	0.30	5.1	10.8

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

Delay = average vehicle delay in seconds
m = metered queue
= volume for the 95th %ile cycle exceeds capacity

The St. Laurent Boulevard at St. Laurent Boulevard Service Road intersection operates well should the roundabout be realized by the 2035 horizon.

15.2.3 Network Intersection MMLOS

Table 26 summarizes the MMLOS analysis for the network intersections within the study area. The existing and future conditions for both intersections will be the same and are considered in one row. The intersection of Russell Road at Southvale Crescent is based on “General Urban Area”, and other intersections are based on “Arterial Main Street” and “General Urban Area”. The MMLOS worksheets have been provided in Appendix K.

Table 26: Study Area Intersection MMLoS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
St. Laurent Blvd at Smyth Rd/ Lancaster Rd	F	C	F	B	F	B	A	D	E	D
Russell Rd at St. Laurent Blvd	F	C	F	B	D	B	N/A	N/A	B	D
Russell Road at Southvale Cres	E	C	D	B	B	B	N/A	N/A	A	D
St. Laurent Blvd at St. Laurent Blvd Service Rd (Existing)	F	C	F	B	D	D	N/A	N/A	A	D
St. Laurent Blvd at Pleasant Park Rd	D	C	F	B	B	D	N/A	N/A	A	D

The pedestrian LOS targets will not be met at the existing or future intersections within the study area. As typical for arterial roads, the crossing distance does not permit the targets to be met. To meet pedestrian LOS targets, the maximum crossing distance on all pedestrian crossings would need to be reduced to three lane-widths.

The bicycle LOS targets will not be met at the existing or future intersections within the study area. To meet bicycle LOS targets, the left-turn configurations would need to be two-stage or include turn boxes or protected facilities would be required at the intersections.

The transit LOS targets will not be met in the existing or future condition at the intersections of St. Laurent Boulevard at Smyth Road/ Lancaster Road and Russell Road at St. Laurent Boulevard. To meet transit LOS, the delay at the intersections of St. Laurent Boulevard at Smyth Road/ Lancaster Road would need to be reduced to below 10 seconds on all transit movements, and the delay at the intersections of Russell Road at St. Laurent Boulevard would need to be reduced to below 30 seconds.

15.2.4 Recommended Design Elements

No study area intersection design elements are proposed as part of this study.

16 Summary of Improvements Indicated and Modifications Options

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

Proposed Site and Screening

- The proposed site includes three 17 storey residential buildings with a total of 498 units, parkland, and a 4.5-storey parking structure with 523 parking spaces
- The remaining surface parking would be a total of 176 spaces
- The existing full-movements access onto Russell Road will maintain and right-in/right-out access onto St. Laurent Boulevard is proposed, along with the internal site connected to the south
- The anticipated full build-out and occupancy horizon is 2030 with the individual buildings being constructed in sequence
- The trip generation, location, and safety triggers were met for the TIA Screening

Existing Conditions

- St. Laurent Boulevard, Russell Road, and Smyth Road are arterial roads, and Pleasant Park Road, Southvale Crescent, and Lancaster Road are collector roads within the study area

- Cycle tracks are on the west side of St. Laurent Boulevard north of Smyth Road, and curbside bike lanes are on both sides of Lancaster Road for 200 metres to the east of St. Laurent Boulevard and along St. Laurent Boulevard south of Pleasant Park Road
- Paved shoulders are provided along Russell Road southeast of St. Laurent Boulevard
- Sidewalks are provided on both sides along Smyth Road, St. Laurent Boulevard, St. Laurent Boulevard Service, Southvale Crescent and along Lancaster Road west of the Canada Science and Technology Museum, on the west side of Russell Road and the north side of Pleasant Park Road, and the south side of Lancaster Road east of Lancaster Road
- Russell Road south of Lancaster Road, Smyth Road, and St. Laurent Boulevard north of Lancaster Road are spine routes. St. Laurent Boulevard southeast of Russell Road, Russell Road north of Smyth Road, Othello Avenue, Pleasant Park Road, and St. Laurent Boulevard Service Road are local routes. Pleasant Park Road is a neighbourhood bikeway
- The high volumes roadways have produced a high number of collisions at the study area intersections, primarily at the Russell Road at St. Laurent Boulevard intersection (57% or 43 collisions), predominantly represented by the rear end and turning movement
- Two fatal collisions have occurred at the Russell Road at Southvale Crescent N intersection in 2018 and 2019, and involved one turning movement and one single motor vehicle other type collisions.
- Queuing issues and capacity issues are noted on various movements at the intersection of St. Laurent Boulevard at Smyth Road / Lancaster Road, and queuing issues are noted on a few movements at the intersection of Russell Road at St. Laurent Boulevard and Russell Road at Southvale Crescent N

Development Generated Travel Demand

- The proposed development is forecasted to produce 208 two-way people trips during the AM peak hour and 203 two-way people trips during the PM peak hour
- Of the forecasted people trips, 72 two-way trips will be vehicle trips during the AM peak hour and 88 two-way trips will be vehicle trips during the PM peak hour based on a 38% AM and 45% PM modal share target
- Of the forecasted trips, 25% are anticipated to travel north, 20% to the south, 5% to the east, and 50% to the west

Background Conditions

- The background developments were explicitly included in the background conditions, along with a total background growth of 2.00% per annum along Smyth Road and 2.75% per annum along Lancaster Road
- The study area intersections in 2030 future condition will operate similar to the existing conditions with incremental improvement due to peak hour factor adjustment to 1.00 for forecasted conditions
- The St. Laurent Boulevard at St. Laurent Boulevard Service Road intersection operates well should the roundabout be realized by the 2035 horizon

Development Design

- The existing surface parking lot will be reduced from 494 parking spaces to 176 spaces with the redevelopment of the site, and the new parking structure will include an additional 523 parking spaces
- Hard surface connections are provided between all building entrances and the surrounding pedestrian facilities on Russell Road and St. Laurent Boulevard

- All exterior doors are located within a 300 metre walking distance to Elmvale Station or adjacent bus stops
- An existing bus stop is located at the proposed access on St. Laurent Boulevard, and it needs to be relocated approximately 35 metres north of the existing location
- The garbage truck, move-in truck and fire truck turning movements can be accommodated on site
- Lay-by parking and loading dock are provided in front of each building

Parking

- The redevelopment proposes a parking ratio for the new buildings and existing buildings of 0.7 spaces per unit, with a total of 699 parking spaces
- The parking will be provided through 176 surface spaces and 523 parking structure spaces
- A total of 522 bicycle spaces will be provided, including 498 proposed bicycle spaces and 24 existing spaces
- The minimum parking and bicycle parking requirements are satisfied

Boundary Street Design

- The pedestrian LOS will not be met along the boundary streets, which requires an increase to the sidewalks to be at least 2 metres and boulevards widened to be larger than 2 metres
- The bicycle LOS will not be met along the boundary streets, which needs the operating speed to be decreased to less than 50 km/h or physically separated to be created
- The transit LOS will not be met along the segment of Russell Road, which requires a bus lane or separated ROW to be created

Access Intersections Design

- The development will maintain two existing full-movements accesses, one onto St. Laurent Boulevard and one onto Russell Road, along with the internal site connected to the south
- The site accesses will be stop-controlled on the minor approach
- The access on St. Laurent Boulevard provides approximately 40 metres of the TAC recommended 25 metre throat length, and the Russell Road access provides approximately 34.5 metres of the TAC recommended 40 metre throat length
- The existing building does not permit the throat length to be extended and the site has been oriented towards St. Laurent Boulevard to reduce queue storage requirements along Russell Road
- No changes to the site accesses are proposed
- The 2030 and 2035 future total access intersection operate satisfactorily

TDM

- Supportive TDM measures to be included within the proposed development should include:
 - Display local area maps with walking and cycling routes, and transit route information and schedules at major entrances
 - Provide a multimodal travel option information package to new residents
 - Contract with providers to install on-site bikeshare (or other micromobility alternatives) and carshare spaces
 - Inclusion of a 1-year Presto card for first time apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
 - Unbundle parking cost from rental costs

NTM

- The site is anticipated to generate approximately 34 to 26 two-way vehicle trips during the peak hours on St. Laurent Boulevard
- The additional traffic is not considered a significant impact compared to the existing two-way vehicles during the peak hours and no mitigation is required from a network perspective

Transit

- The forecasted transit trips will include 93 two-way trips during the AM peak and 59 two-way trips during the PM peak
- Peak hour increases in transit ridership resulting from the site equate to one third of a standard bus load northerly of the site, one quarter of a standard bus load southerly of the site, negligible increase in traffic east of the site and half of a standard bus load westerly of the site
- Negligible impacts are noted on the transit movements at the study area intersections as a result of the development site traffic

Network Intersection Design

- Generally, the network intersections operate at the future total horizons will operate similarly to the future background conditions
- The St. Laurent Boulevard at St. Laurent Boulevard Service Road intersection operates well should the roundabout be realized by the 2035 horizon
- The pedestrian LOS targets will not be met at the existing or future intersections within the study area, which require crossing distances need to be reduced to equal or less than three lane widths
- The bicycle LOS targets will not be met at the existing or future intersections within the study area, and it is limited by the lack of dedicated facilities and improved left-turn configurations
- The transit LOS targets will not be met at the intersections of St. Laurent Boulevard at Smyth Road/Lancaster Road and Russell Road at St. Laurent Boulevard, which requires the delay to be below 10 seconds and 30 seconds respectively

17 Conclusion

It is recommended that, from a transportation perspective, the proposed development applications proceed.

Prepared By:



Yu-Chu Chen, EIT
Transportation Engineering-Intern

Reviewed By:



Andrew Harte, P.Eng.
Senior Transportation Engineer

Appendix A

TIA Screening Form and PM Certification Form

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: November 22, 2021
Project Number: 2020-23
Project Reference: 1971 & 1975 St. Laurent Blvd

1.1 Description of Proposed Development	
Municipal Address	1971 & 1975 St. Laurent Boulevard
Description of Location	South of the intersection of St. Laurent Blvd & Russell Rd. Existing residential parking lot and two residential towers.
Land Use Classification	Arterial Mainstreet (AM10 H(54)) & Residential Fifth Density Zone (R5B H(18))
Development Size	Three residential buildings with a total of 495 new residential units.
Accesses	One existing on St. Laurent Blvd, one existing on Russell Rd
Phase of Development	All phases
Buildout Year	2025
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger	
Land Use Type	Townhomes or apartments
Development Size	495 Units
Trip Generation Trigger	Yes

1.3 Location Triggers	
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	Yes
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	Yes
Location Trigger	Yes

1.4. Safety Triggers	
Are posted speed limits on a boundary street 80 km/hr or greater?	No
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	Yes No newly proposed driveway
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	Yes No newly proposed driveway
Is the proposed driveway within auxiliary lanes of an intersection?	Yes No newly proposed driveway
Does the proposed driveway make use of an existing median break that serves an existing site?	Yes Existing access on Russell Road in taper of Southvale Crescent intersection SBL
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	Yes Two fatalities in past five years at Russell Road at Southvale Crescent N intersection
Does the development include a drive-thru facility?	No
Safety Trigger	Yes



TIA Plan Reports

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

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

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

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed¹ or registered² professional in good standing, whose field of expertise [check appropriate field(s)] is either transportation engineering or transportation planning .

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

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

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

Dated at Ottawa this 20 day of September, 2018.
(City)

Name: Andrew Harte
(Please Print)

Professional Title: Professional Engineer



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

Office Contact Information (Please Print)
Address: 6 Plaza Court
City / Postal Code: Ottawa / K2H 7W1
Telephone / Extension: (613) 697-3797
E-Mail Address: Andrew.Harte@CGHTransportation.com



Appendix B

Turning Movement Count Data



Transportation Services - Traffic Services

Turning Movement Count - Study Results

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

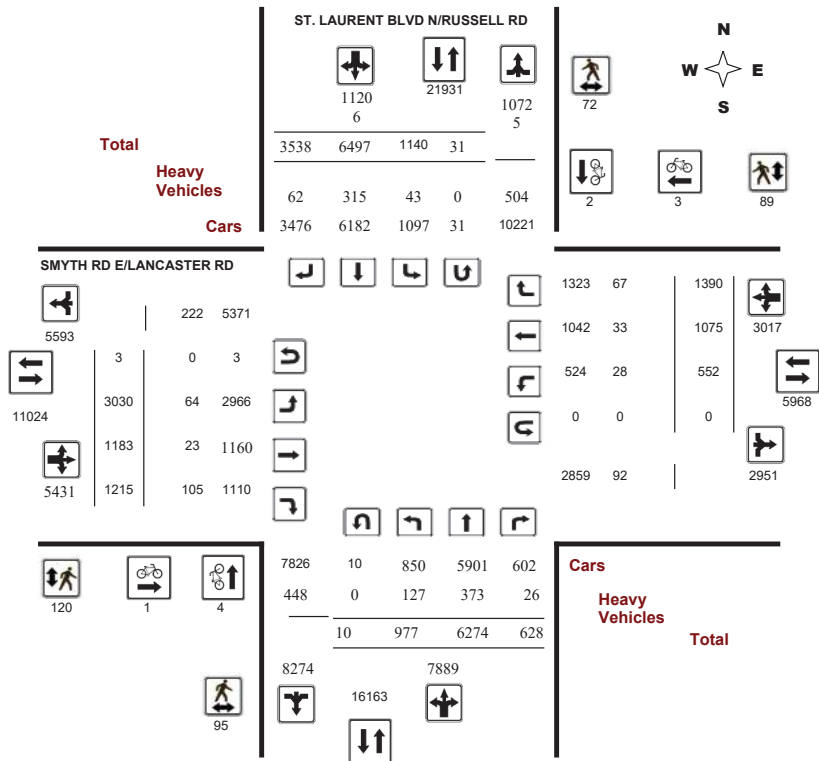
Survey Date: Thursday, March 05, 2020

WO No: 39290

Start Time: 07:00

Device: Miovision

Full Study Diagram



5469232 - MAR 5, 2020 - 8HRS - LORETTA



Transportation Services - Traffic Services

Turning Movement Count - Study Results

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

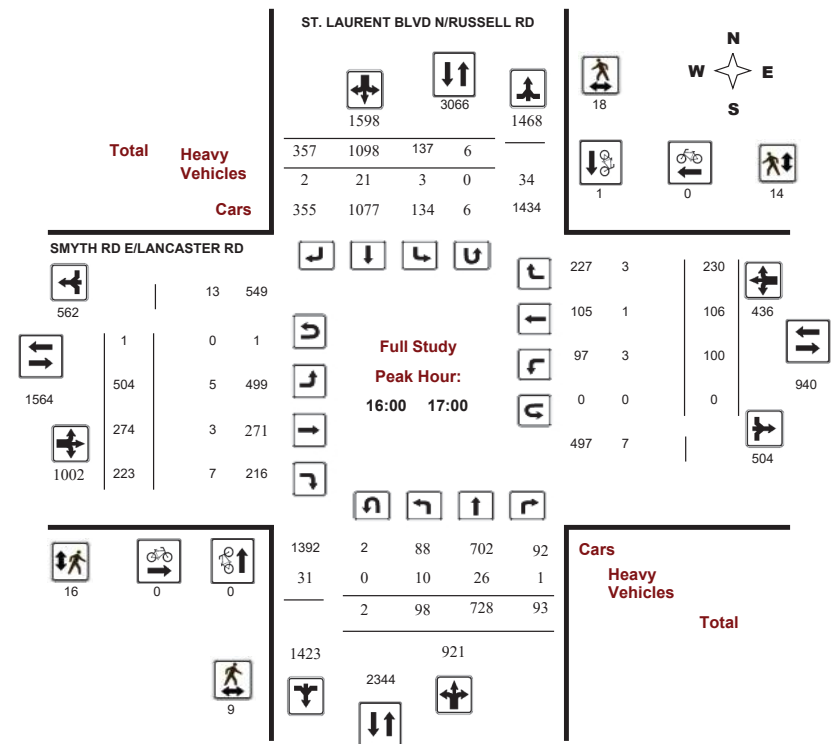
Survey Date: Thursday, March 05, 2020

WO No: 39290

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram



5469232 - MAR 5, 2020 - 8HRS - LORETTA



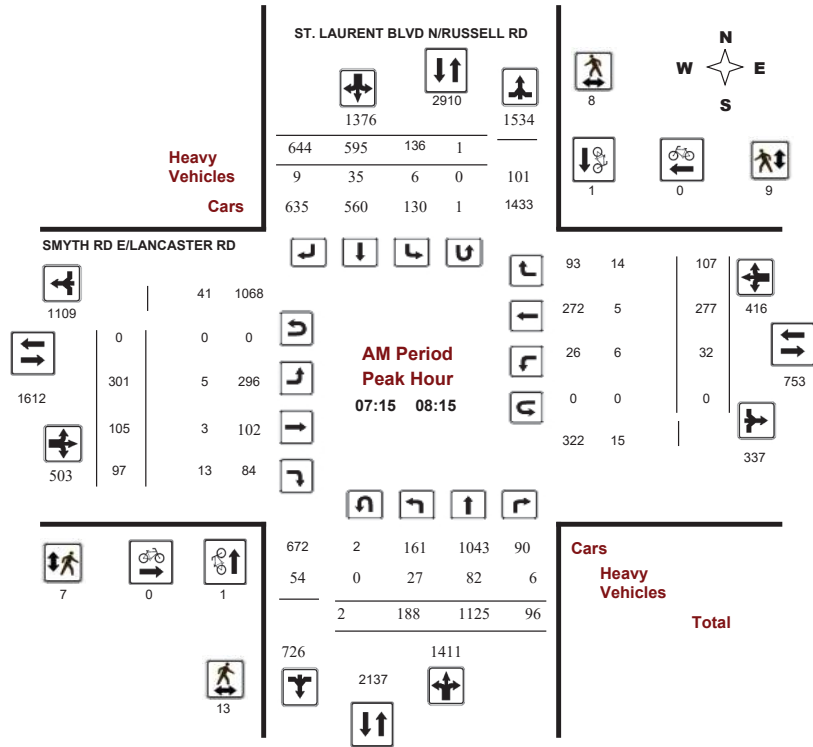
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

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

Survey Date: Thursday, March 05, 2020
Start Time: 07:00

WO No: 39290
Device: Miovision



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



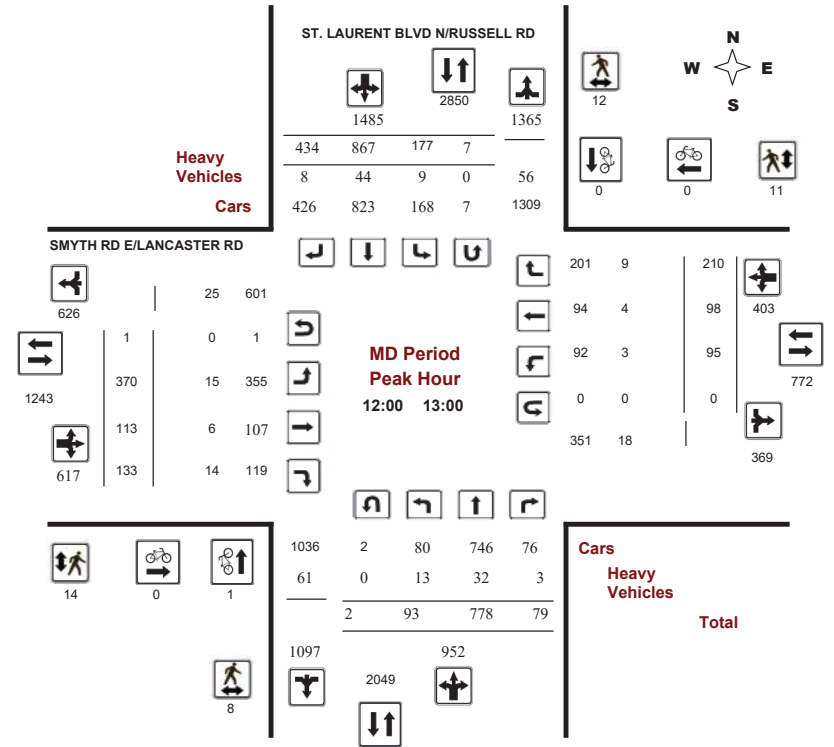
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

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

Survey Date: Thursday, March 05, 2020
Start Time: 07:00

WO No: 39290
Device: Miovision



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



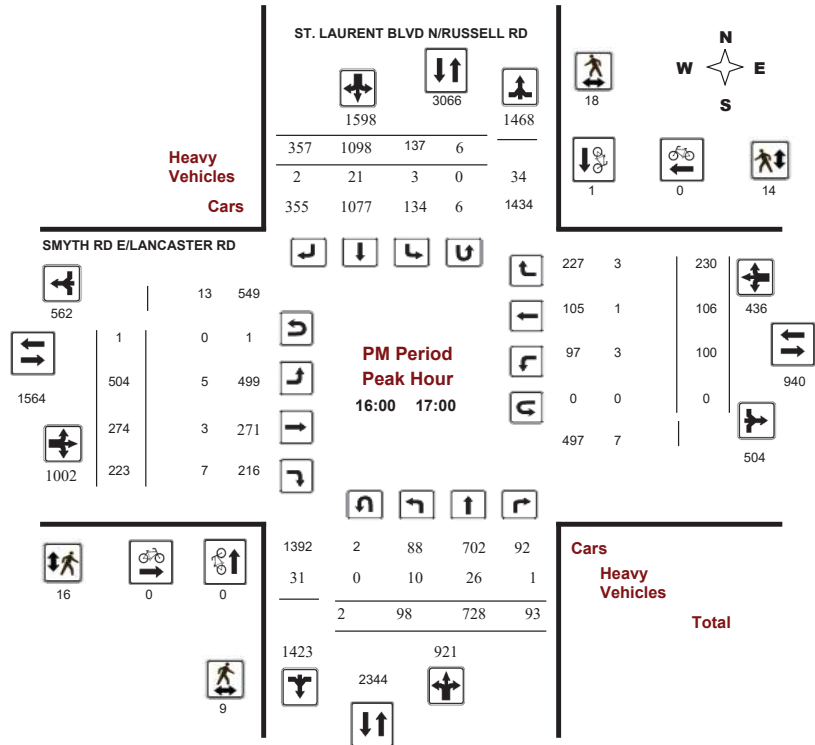
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

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

Survey Date: Thursday, March 05, 2020
Start Time: 07:00

WO No: 39290
Device: Miovision



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



Transportation Services - Traffic Services

Turning Movement Count - Study Results

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

Survey Date: Thursday, March 05, 2020
Start Time: 07:00

WO No: 39290
Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, March 05, 2020

Total Observed U-Turns
Northbound: 10 Southbound: 31
Eastbound: 3 Westbound: 0

AADT Factor
1.00

Period	ST. LAURENT BLVD N/RUSSELL RD				SMYTH RD E/LANCASTER RD								WB TOT	STR TOT	Grand Total				
	Northbound		Southbound		Eastbound				Westbound										
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	179	1061	79	1319	118	569	641	1328	2647	267	92	94	453	32	292	94	418	871	3518
08:00 09:00	180	971	89	1240	135	658	619	1412	2652	301	122	102	525	25	201	123	349	874	3526
09:00 10:00	145	700	73	918	176	593	423	1192	2110	250	95	96	441	53	116	141	310	751	2861
11:30 12:30	88	768	79	935	166	816	399	1381	2316	386	95	146	627	86	86	212	384	1011	3327
12:30 13:30	92	767	79	938	173	807	410	1390	2328	371	98	134	603	95	95	197	387	990	3318
15:00 16:00	108	598	70	776	128	1008	354	1490	2266	561	260	257	1078	65	88	186	339	1417	3683
16:00 17:00	98	728	93	919	137	1098	357	1592	2511	504	274	223	1001	100	106	230	436	1437	3948
17:00 18:00	87	681	66	834	107	948	335	1390	2224	390	147	163	700	96	91	207	394	1094	3318
Sub Total	977	6274	628	7879	1140	6497	3538	11175	19054	3030	1183	1215	5428	552	1075	1390	3017	8445	27499
U Turns				10				31	41				3				0	3	44
Total	977	6274	628	7889	1140	6497	3538	11206	19095	3030	1183	1215	5431	552	1075	1390	3017	8448	27543
EQ 12Hr	1358	8721	873	10966	1585	9031	4918	15576	26542	4212	1644	1689	7549	767	1494	1932	4194	11743	38285
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																			
AVG 12Hr	1280	8219	823	10335	1493	8511	4635	14680	26542	3969	1550	1592	7115	723	1408	1821	3952	11743	38285
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																			
AVG 24Hr	1677	10767	1078	13538	1956	11150	6072	19231	32769	5200	2030	2085	9320	947	1845	2385	5177	14497	47266
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																			
Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.																			



Transportation Services - Traffic Services

Turning Movement Count - Study Results

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

Full Study 15 Minute Increments

Table with columns for Time Period, Northbound, Southbound, Eastbound, Westbound, and Grand Total. Rows represent 15-minute intervals from 07:00 to 18:00.

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

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

Full Study Cyclist Volume

Table with columns for Time Period, Northbound, Southbound, Street Total, Eastbound, Westbound, Street Total, and Grand Total. Rows represent 15-minute intervals from 07:00 to 18:00.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

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

Full Study Pedestrian Volume

Table with columns: Time Period, NB Approach, SB Approach, Total, EB Approach, WB Approach, Grand Total. Rows show pedestrian counts for various time intervals from 07:00 to 18:00.

5469232 - MAR 5, 2020 - 8HRS - LORETTA



Transportation Services - Traffic Services

Turning Movement Count - Study Results

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

Full Study Heavy Vehicles

Table with columns: Time Period, Northbound (LT, ST, RT, N TOT, STR TOT), Southbound (LT, ST, RT, S TOT, STR TOT), Eastbound (LT, ST, RT, E TOT), Westbound (LT, ST, RT, W TOT, STR TOT), Grand Total. Rows show heavy vehicle counts for various time intervals from 07:00 to 18:00.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

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

Full Study 15 Minute U-Turn Total

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

Time Period	Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00 - 07:15	0	0	0	0	0
07:15 - 07:30	0	0	0	0	0
07:30 - 07:45	2	1	0	0	3
07:45 - 08:00	0	0	0	0	0
08:00 - 08:15	0	0	0	0	0
08:15 - 08:30	0	1	0	0	1
08:30 - 08:45	0	0	0	0	0
08:45 - 09:00	0	1	0	0	1
09:00 - 09:15	0	0	0	0	0
09:15 - 09:30	0	2	0	0	2
09:30 - 09:45	0	1	0	0	1
09:45 - 10:00	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0
11:45 - 12:00	1	0	0	0	1
12:00 - 12:15	1	1	0	0	2
12:15 - 12:30	1	2	0	0	3
12:30 - 12:45	0	2	1	0	3
12:45 - 13:00	0	2	0	0	2
13:00 - 13:15	1	1	0	0	2
13:15 - 13:30	0	1	0	0	1
15:00 - 15:15	2	1	0	0	3
15:15 - 15:30	0	0	1	0	1
15:30 - 15:45	0	2	0	0	2
15:45 - 16:00	0	2	0	0	2
16:00 - 16:15	1	1	0	0	2
16:15 - 16:30	1	2	1	0	4
16:30 - 16:45	0	0	0	0	0
16:45 - 17:00	0	3	0	0	3
17:00 - 17:15	0	2	0	0	2
17:15 - 17:30	0	1	0	0	1
17:30 - 17:45	0	2	0	0	2
17:45 - 18:00	0	0	0	0	0
Total	10	31	3	0	44



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

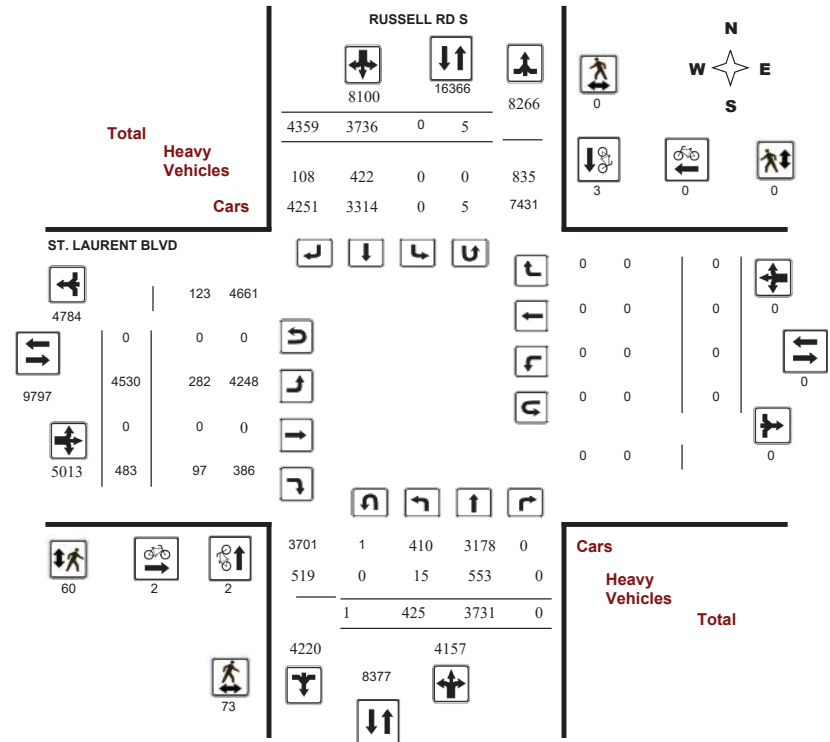
Survey Date: Tuesday, April 11, 2017

WO No: 36886

Start Time: 07:00

Device: Miovision

Full Study Diagram





Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

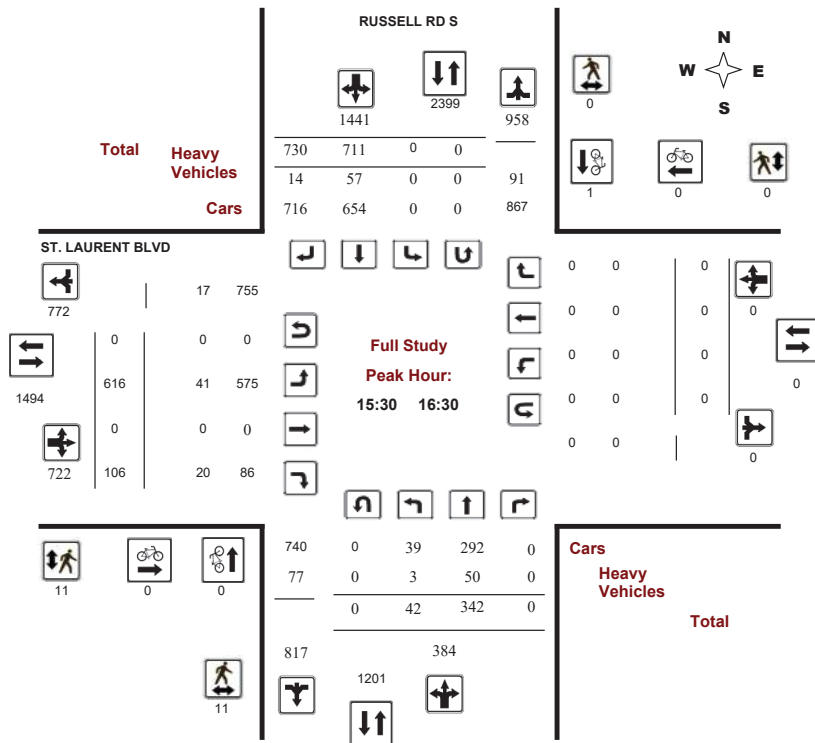
Survey Date: Tuesday, April 11, 2017

WO No: 36886

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

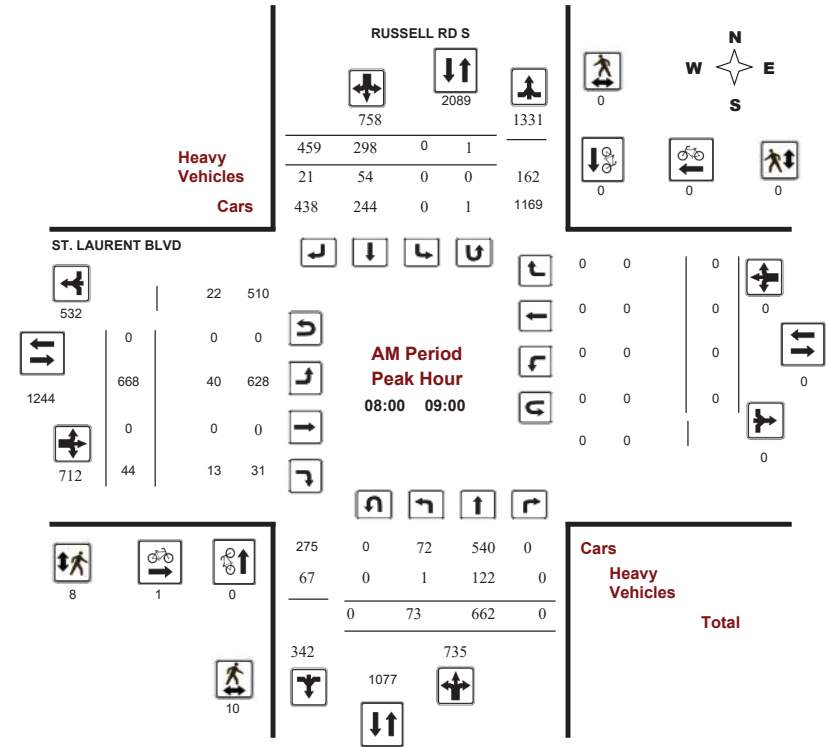
RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017

WO No: 36886

Start Time: 07:00

Device: Miovision



Comments



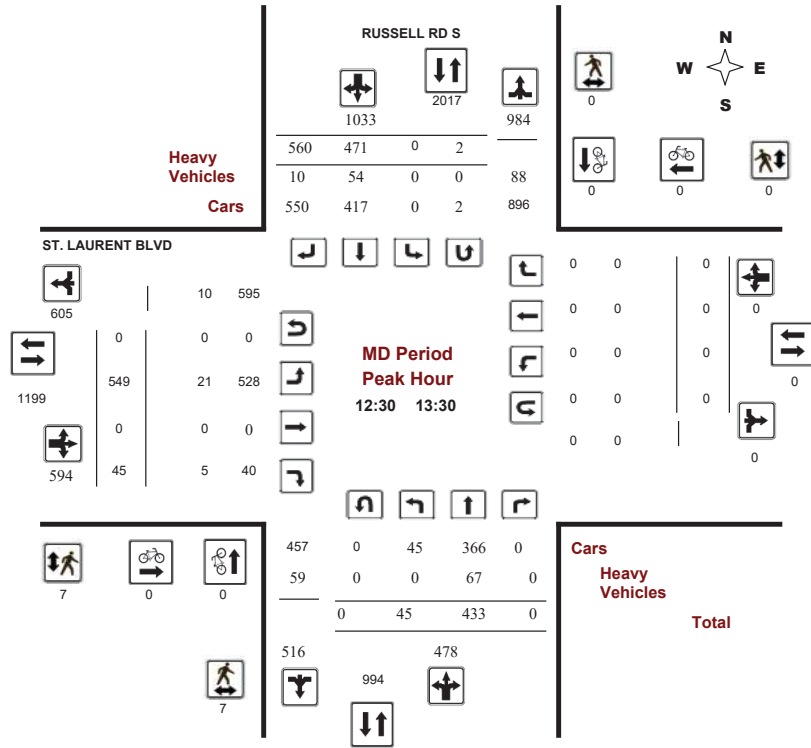
Transportation Services - Traffic Services

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



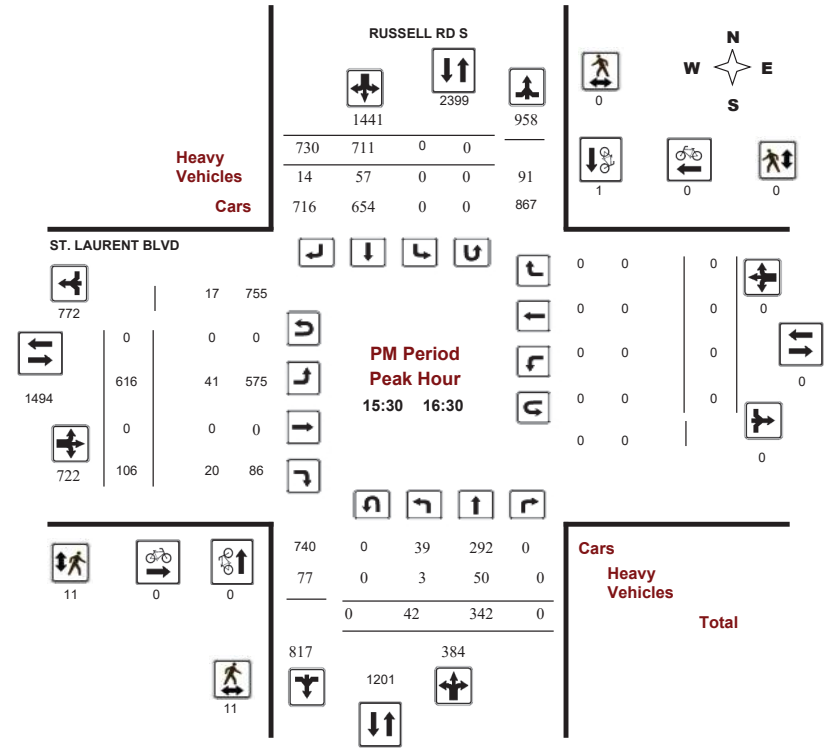
Transportation Services - Traffic Services

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



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017

WO No: 36886

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, April 11, 2017

Total Observed U-Turns AADT Factor
Northbound: 1 Southbound: 5 Eastbound: 0 Westbound: 0 .90

Table with columns for Period, Northbound, Southbound, Eastbound, Westbound, and Grand Total. Includes sub-totals for U Turns, EQ 12Hr, and AVG 24Hr.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017

WO No: 36886

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

Table with columns for Time Period, Northbound, Southbound, Eastbound, Westbound, and Grand Total. Includes sub-totals for U Turns, EQ 12Hr, and AVG 24Hr.

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017

WO No: 36886

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

RUSSELL RD S			ST. LAURENT BLVD			Grand Total
Time Period	Northbound	Southbound	Street Total	Eastbound	Westbound	
07:00 07:15	0	0	0	0	0	0
07:15 07:30	0	0	0	0	0	0
07:30 07:45	0	0	0	0	0	0
07:45 08:00	0	0	0	0	0	0
08:00 08:15	0	0	0	0	0	0
08:15 08:30	0	0	0	1	0	1
08:30 08:45	0	0	0	0	0	0
08:45 09:00	0	0	0	0	0	0
09:00 09:15	0	0	0	0	0	0
09:15 09:30	0	0	0	0	0	0
09:30 09:45	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0
12:15 12:30	1	0	1	0	0	1
12:30 12:45	0	0	0	0	0	0
12:45 13:00	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0
15:30 15:45	0	0	0	0	0	0
15:45 16:00	0	0	0	0	0	0
16:00 16:15	0	0	0	0	0	0
16:15 16:30	0	1	1	0	0	1
16:30 16:45	0	0	0	0	0	0
16:45 17:00	0	0	0	0	0	0
17:00 17:15	0	0	0	0	0	0
17:15 17:30	0	2	2	0	0	2
17:30 17:45	1	0	1	0	0	1
17:45 18:00	0	0	0	1	0	1
Total	2	3	5	2	0	7



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017

WO No: 36886

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

RUSSELL RD S			ST. LAURENT BLVD			Grand Total
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	
07:00 07:15	3	0	3	1	0	4
07:15 07:30	2	0	2	2	0	4
07:30 07:45	2	0	2	2	0	4
07:45 08:00	5	0	5	5	0	10
08:00 08:15	2	0	2	3	0	5
08:15 08:30	1	0	1	0	0	1
08:30 08:45	3	0	3	2	0	5
08:45 09:00	4	0	4	3	0	7
09:00 09:15	1	0	1	0	0	1
09:15 09:30	1	0	1	0	0	1
09:30 09:45	1	0	1	2	0	3
09:45 10:00	0	0	0	3	0	3
11:30 11:45	1	0	1	1	0	2
11:45 12:00	3	0	3	3	0	6
12:00 12:15	1	0	1	3	0	4
12:15 12:30	0	0	0	0	0	0
12:30 12:45	1	0	1	1	0	2
12:45 13:00	1	0	1	0	0	1
13:00 13:15	3	0	3	0	0	3
13:15 13:30	2	0	2	6	0	8
15:00 15:15	2	0	2	3	0	5
15:15 15:30	2	0	2	1	0	3
15:30 15:45	4	0	4	5	0	9
15:45 16:00	1	0	1	3	0	4
16:00 16:15	5	0	5	2	0	7
16:15 16:30	1	0	1	1	0	2
16:30 16:45	7	0	7	2	0	9
16:45 17:00	5	0	5	1	0	6
17:00 17:15	2	0	2	2	0	4
17:15 17:30	3	0	3	1	0	4
17:30 17:45	4	0	4	1	0	5
17:45 18:00	0	0	0	1	0	1
Total	73	0	73	60	0	133



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017

WO No: 36886

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

RUSSELL RD S ST. LAURENT BLVD

Table with columns for Time Period, Northbound (LT, ST, RT, N TOT, STR TOT), Southbound (LT, ST, RT, S TOT, STR TOT), Eastbound (LT, ST, RT, E TOT), Westbound (LT, ST, RT, W TOT, STR TOT), and Grand Total. Rows represent 15-minute intervals from 07:00 to 18:00.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017

WO No: 36886

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

RUSSELL RD S ST. LAURENT BLVD

Table with columns for Time Period, Northbound U-Turn Total, Southbound U-Turn Total, Eastbound U-Turn Total, Westbound U-Turn Total, and Total. Rows represent 15-minute intervals from 07:00 to 18:00.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

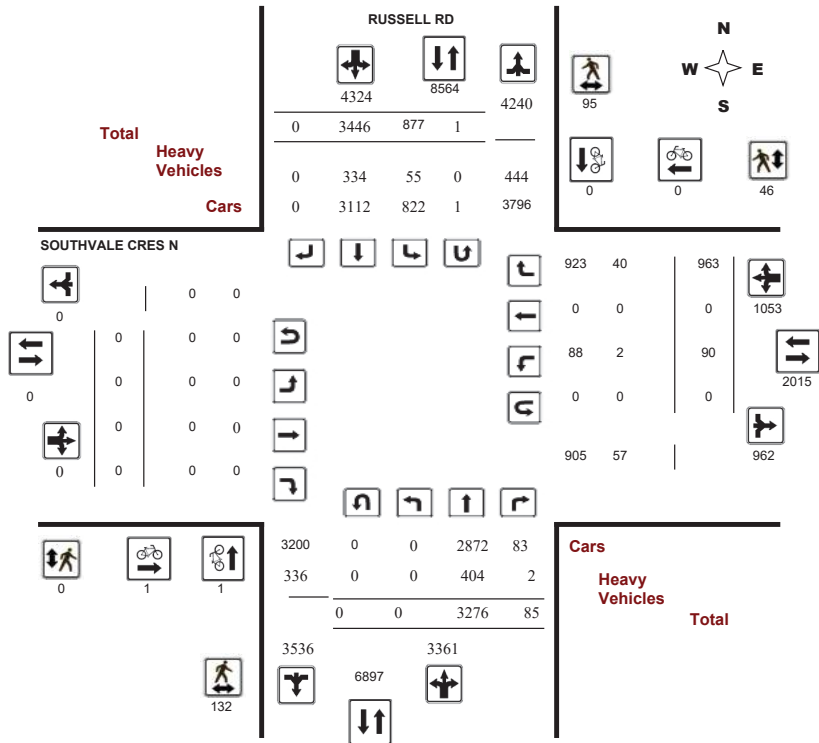
Survey Date: Tuesday, January 07, 2020

WO No: 39257

Start Time: 07:00

Device: Miovision

Full Study Diagram



5469198 - TUE JAN 07, 2020 - 8HRS - LORETTA



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

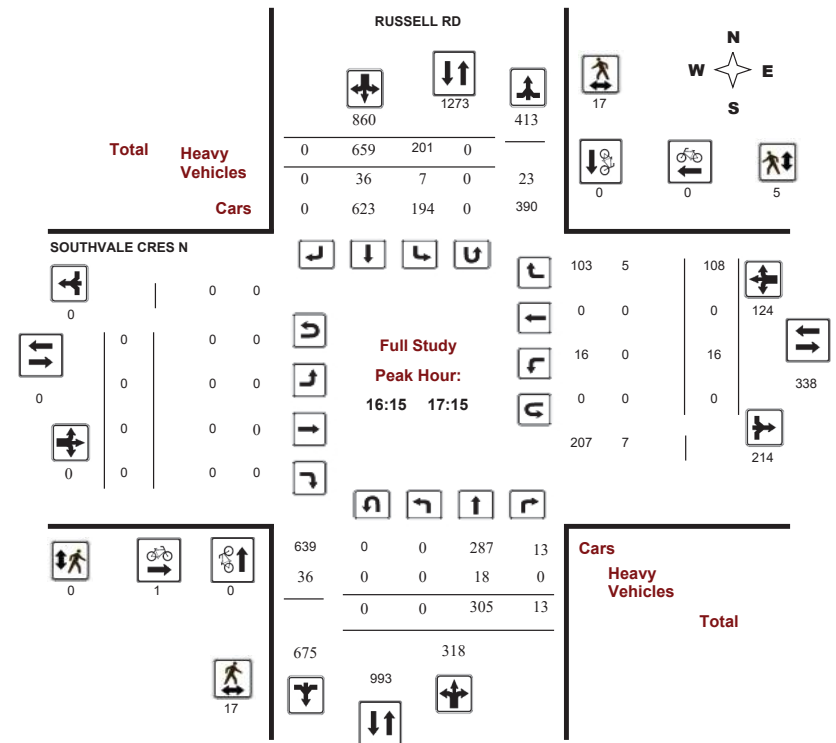
Survey Date: Tuesday, January 07, 2020

WO No: 39257

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram



5469198 - TUE JAN 07, 2020 - 8HRS - LORETTA



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

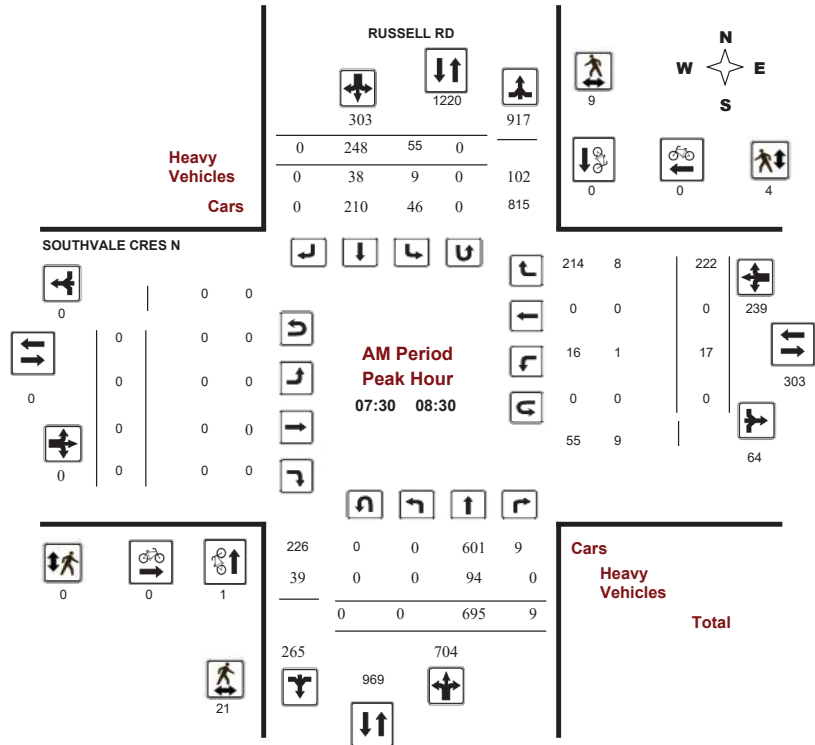
RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020

Start Time: 07:00

WO No: 39257

Device: Miovision



Comments 5469198 - TUE JAN 07, 2020 - 8HRS - LORETTA



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

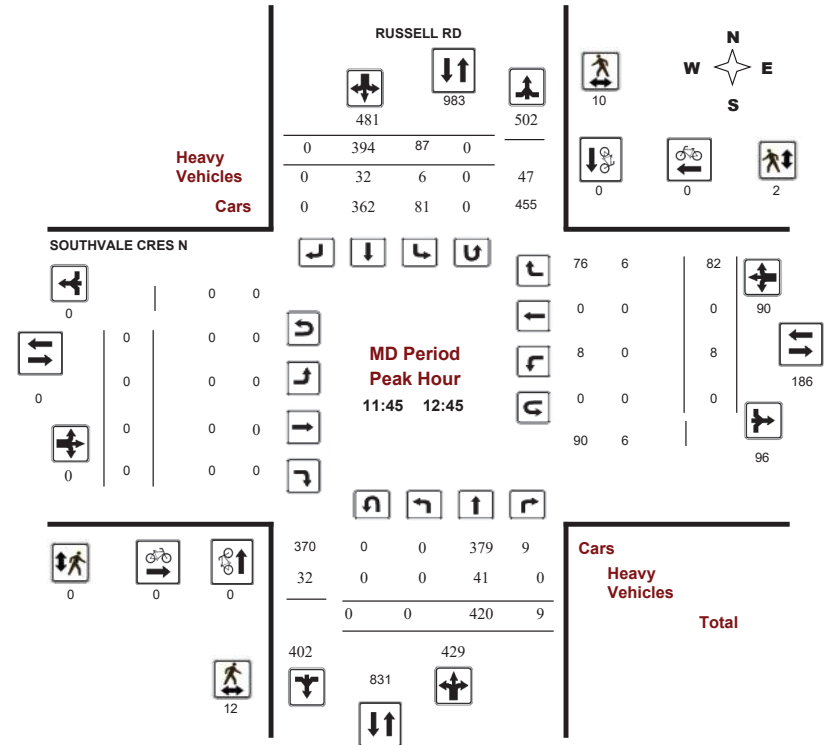
RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020

Start Time: 07:00

WO No: 39257

Device: Miovision



Comments 5469198 - TUE JAN 07, 2020 - 8HRS - LORETTA



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

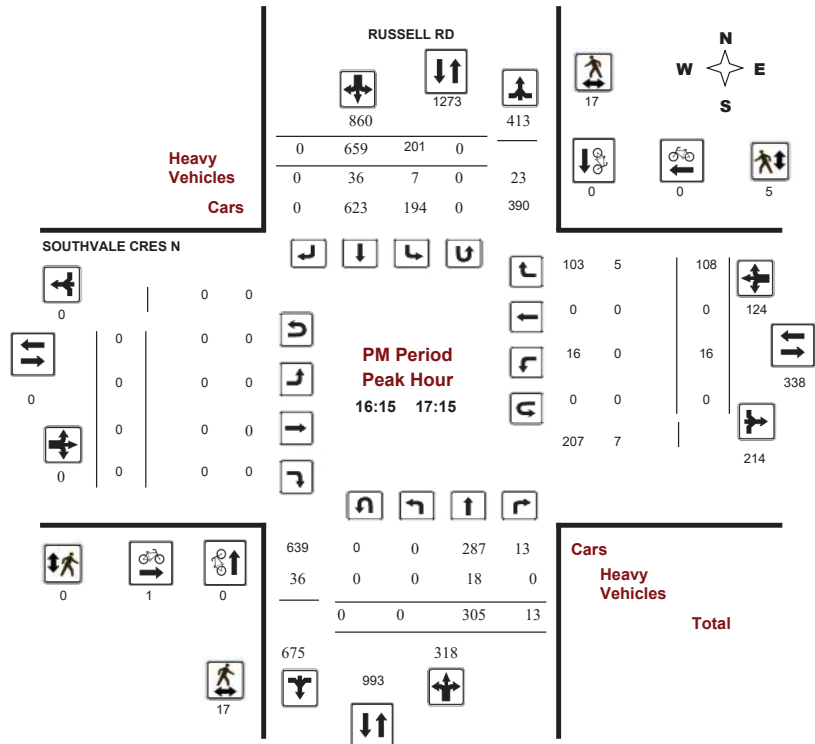
RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020

Start Time: 07:00

WO No: 39257

Device: Miovision



Comments 5469198 - TUE JAN 07, 2020 - 8HRS - LORETTA



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020

Start Time: 07:00

WO No: 39257

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, January 07, 2020

Total Observed U-Turns

AADT Factor

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

1.10

Period	RUSSELL RD				SOUTHVALE CRES N				Grand Total										
	Northbound		Southbound		Eastbound		Westbound												
	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	STR	WB	STR	Grand Total			
07:00-08:00	0	628	5	633	52	247	0	299	932	0	0	0	0	18	0	201	219	219	1151
08:00-09:00	0	599	9	608	57	270	0	327	935	0	0	0	0	12	0	178	190	190	1125
09:00-10:00	0	376	5	381	52	252	0	304	685	0	0	0	0	10	0	102	112	112	797
11:30-12:30	0	403	9	412	87	404	0	491	903	0	0	0	0	7	0	86	93	93	996
12:30-13:30	0	380	11	391	79	405	0	484	875	0	0	0	0	6	0	84	90	90	965
15:00-16:00	0	314	13	327	158	666	0	824	1151	0	0	0	0	6	0	99	105	105	1256
16:00-17:00	0	287	15	302	188	676	0	864	1166	0	0	0	0	13	0	104	117	117	1283
17:00-18:00	0	289	18	307	204	526	0	730	1037	0	0	0	0	18	0	109	127	127	1164
Sub Total	0	3276	85	3361	877	3446	0	4323	7684	0	0	0	0	90	0	963	1053	1053	8737
U Turns	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	1
Total	0	3276	85	3361	878	3446	0	4324	7685	0	0	0	0	90	0	963	1053	1053	8738
EQ 12Hr	0	4554	118	4672	1220	4790	0	6010	10682	0	0	0	0	125	0	1339	1464	1464	12146
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																			
																			1.39
AVG 12Hr	0	5009	130	5139	1342	5269	0	6611	11750	0	0	0	0	138	0	1473	1611	1611	13361
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																			
																			1.10
AVG 24Hr	0	6562	170	6732	1758	6902	0	8660	15392	0	0	0	0	181	0	1930	2111	2111	17503
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																			
																			1.31
Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.																			



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020

WO No: 39257

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

Table with columns for Time Period, Northbound (LT, ST, RT, N TOT, STR TOT), Southbound (LT, ST, RT, S TOT, STR TOT), Eastbound (LT, ST, RT, E TOT), Westbound (LT, ST, RT, W TOT, STR TOT), and Grand Total. Rows represent 15-minute intervals from 07:00 to 18:00.

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020

WO No: 39257

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

Table with columns for Time Period, Northbound, Southbound, Street Total, Eastbound, Westbound, Street Total, and Grand Total. Rows represent 15-minute intervals from 07:00 to 18:00.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020

WO No: 39257

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

RUSSELL RD

SOUTHVALE CRES N

Table with columns: Time Period, NB Approach (E or W Crossing), SB Approach (E or W Crossing), Total, EB Approach (N or S Crossing), WB Approach (N or S Crossing), Total, Grand Total. Rows show pedestrian counts for various time intervals from 07:00 to 17:45.

5469198 - TUE JAN 07, 2020 - 8HRS - LORETTA



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020

WO No: 39257

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

RUSSELL RD

SOUTHVALE CRES N

Table with columns: Time Period, Northbound (LT, ST, RT, N TOT, STR TOT), Southbound (LT, ST, RT, S TOT, STR TOT), Eastbound (LT, ST, RT, E TOT, W TOT), Westbound (LT, ST, RT, W TOT, STR TOT), Grand Total. Rows show heavy vehicle counts for various time intervals from 07:00 to 17:45.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020

WO No: 39257

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

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



Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

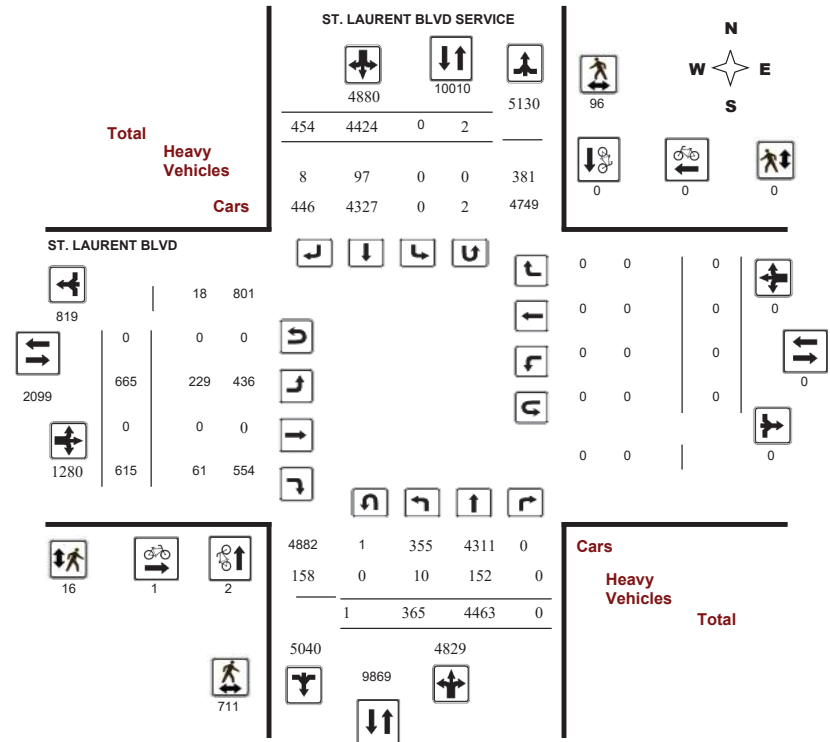
Survey Date: Tuesday, December 06, 2016

WO No: 36585

Start Time: 07:00

Device: Miovision

Full Study Diagram





Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

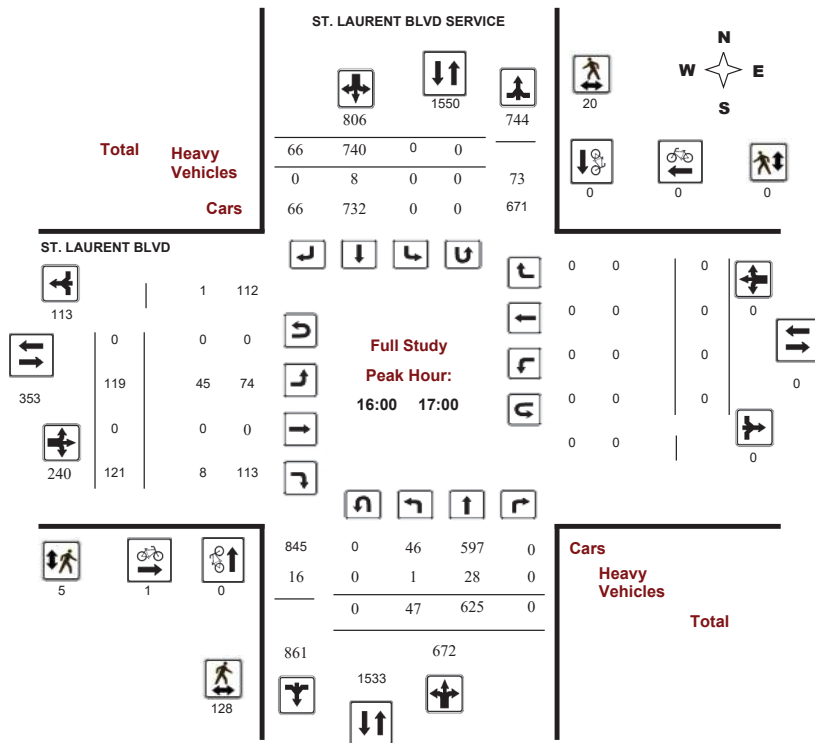
Survey Date: Tuesday, December 06, 2016

WO No: 36585

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

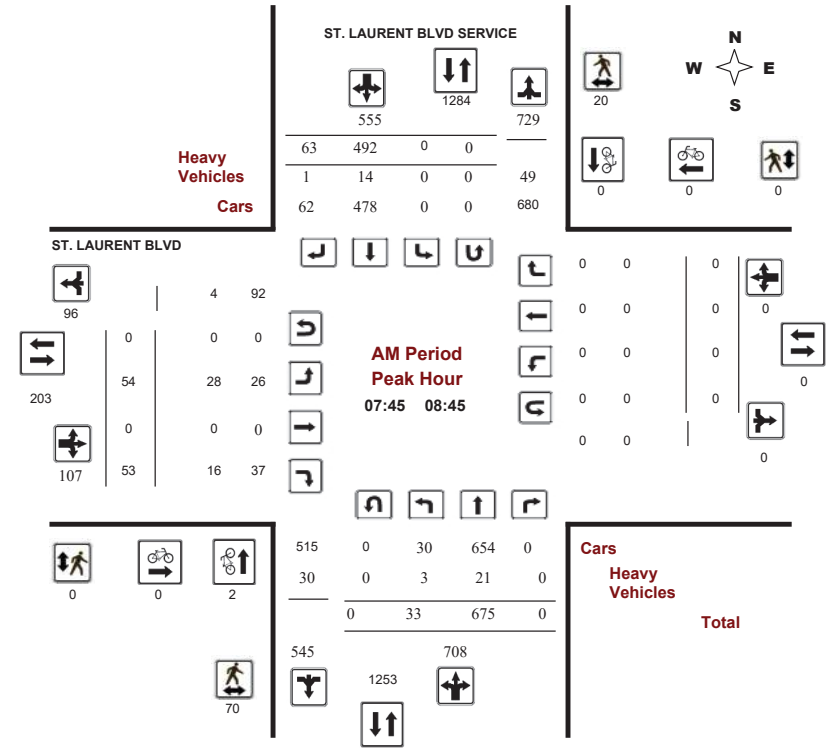
ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016

WO No: 36585

Start Time: 07:00

Device: Miovision



Comments



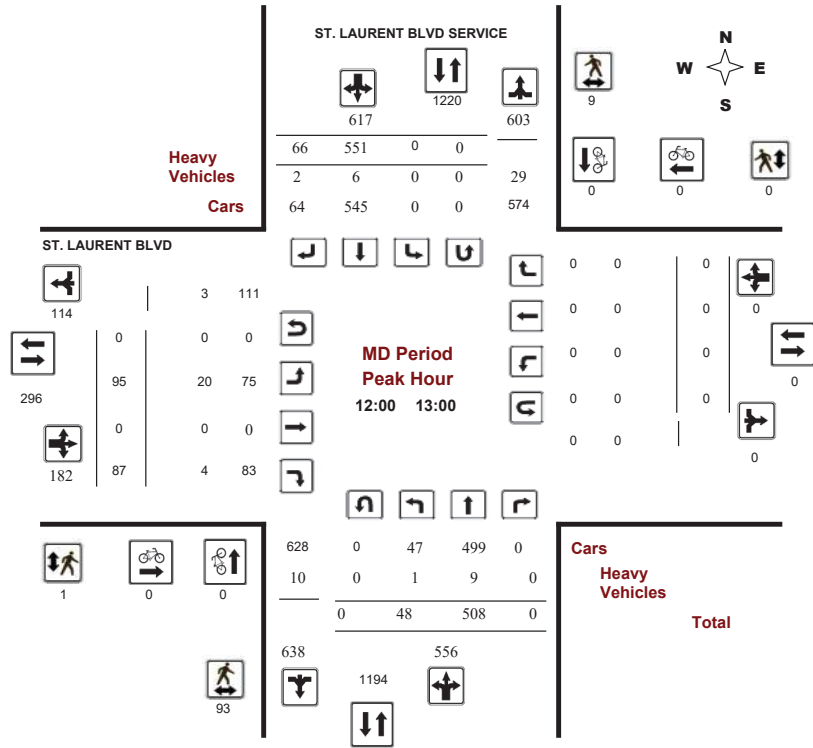
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016
Start Time: 07:00

WO No: 36585
Device: Miovision



Comments



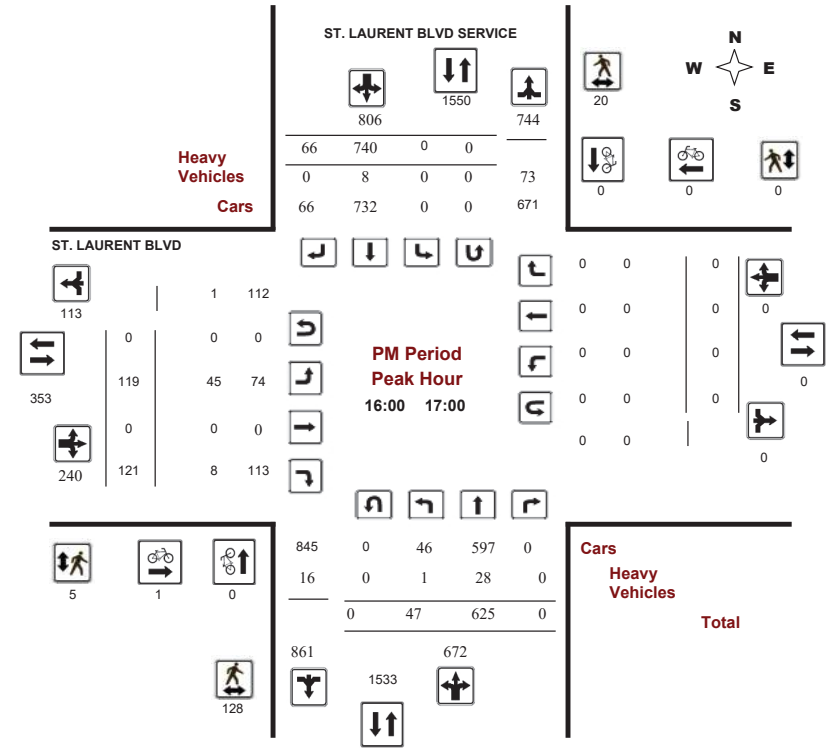
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016
Start Time: 07:00

WO No: 36585
Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016

WO No: 36585

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, December 06, 2016

Total Observed U-Turns **AADT Factor**

Northbound: 1 Southbound: 2 1.30
 Eastbound: 0 Westbound: 0

Period	ST. LAURENT BLVD SERVICE										ST. LAURENT BLVD										WB TOT	STR TOT	Grand Total
	Northbound					Southbound					Eastbound					Westbound							
	LT	ST	RT	NB TOT	SB TOT	LT	ST	RT	STR TOT	STB TOT	LT	ST	RT	EB TOT	WB TOT	LT	ST	RT	W TOT	STR TOT			
07:00-08:00	32	569	0	601	0	463	31	494	1095	48	0	51	99	0	0	0	0	99	1194				
08:00-09:00	31	660	0	691	0	474	60	534	1225	52	0	43	95	0	0	0	0	95	1320				
09:00-10:00	39	516	0	555	0	341	32	373	928	55	0	51	106	0	0	0	0	106	1034				
11:30-12:30	49	534	0	583	0	514	67	581	1164	83	0	57	140	0	0	0	0	140	1304				
12:30-13:30	61	487	0	548	0	549	65	614	1162	83	0	100	183	0	0	0	0	183	1345				
15:00-16:00	60	539	0	599	0	652	69	721	1320	112	0	94	206	0	0	0	0	206	1526				
16:00-17:00	47	625	0	672	0	740	66	806	1478	119	0	121	240	0	0	0	0	240	1718				
17:00-18:00	46	533	0	579	0	691	64	755	1334	113	0	98	211	0	0	0	0	211	1545				
Sub Total	365	4463	0	4828	0	4424	454	4878	9706	665	0	615	1280	0	0	0	0	1280	10986				
U Turns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Total	365	4463	0	4828	0	4424	454	4878	9706	665	0	615	1280	0	0	0	0	1280	10986				
EQ 12Hr	509	6204	0	6713	3	6149	631	6783	13496	924	0	855	1779	0	0	0	0	1779	15275				
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.											1.39												
AVG 12Hr	662	8065	0	8727	4	7994	820	8818	17545	1201	0	1112	2313	0	0	0	0	2313	19858				
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.											1.30												
AVG 24Hr	867	10565	0	11432	5	10472	1074	11551	22983	1573	0	1457	3030	0	0	0	0	3030	26013				
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.											1.31												
Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.																							



Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016

WO No: 36585

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

Time Period	ST. LAURENT BLVD SERVICE										ST. LAURENT BLVD										W TOT	STR TOT	Grand Total
	Northbound					Southbound					Eastbound					Westbound							
	LT	ST	RT	N TOT	S TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT				
07:00-07:15	3	107	0	110	0	98	5	103	213	9	0	7	16	0	0	0	0	16	229				
07:15-07:30	8	143	0	151	0	100	6	106	257	15	0	11	26	0	0	0	0	26	283				
07:30-07:45	9	149	0	158	0	130	8	138	296	9	0	13	22	0	0	0	0	22	318				
07:45-08:00	12	170	0	182	0	135	12	147	329	15	0	20	35	0	0	0	0	35	364				
08:00-08:15	7	168	0	175	0	120	21	141	316	10	0	12	22	0	0	0	0	22	338				
08:15-08:30	8	161	0	169	0	112	21	133	302	13	0	6	19	0	0	0	0	19	321				
08:30-08:45	6	176	0	182	0	125	9	134	316	16	0	15	31	0	0	0	0	31	347				
08:45-09:00	10	155	0	165	0	117	9	126	291	13	0	10	23	0	0	0	0	23	314				
09:00-09:15	14	128	0	142	0	106	7	113	255	15	0	18	33	0	0	0	0	33	288				
09:15-09:30	1	141	0	142	0	91	10	101	243	15	0	9	24	0	0	0	0	24	267				
09:30-09:45	6	124	0	130	1	63	7	71	201	12	0	14	26	0	0	0	0	26	227				
09:45-10:00	18	123	0	141	0	81	8	89	230	13	0	10	23	0	0	0	0	23	253				
11:30-11:45	15	128	0	143	0	135	19	154	297	18	0	16	34	0	0	0	0	34	331				
11:45-12:00	11	133	0	144	0	117	12	129	273	16	0	7	23	0	0	0	0	23	296				
12:00-12:15	14	162	0	176	0	126	19	145	321	27	0	12	39	0	0	0	0	39	360				
12:15-12:30	9	111	0	120	0	136	17	153	273	22	0	22	44	0	0	0	0	44	317				
12:30-12:45	10	115	0	125	0	146	16	162	287	18	0	30	48	0	0	0	0	48	335				
12:45-13:00	15	120	0	135	0	143	14	157	292	28	0	23	51	0	0	0	0	51	343				
13:00-13:15	15	134	0	149	0	136	18	154	303	17	0	20	37	0	0	0	0	37	340				
13:15-13:30	21	118	0	139	0	124	17	141	280	20	0	27	47	0	0	0	0	47	327				
15:00-15:15	10	139	0	149	0	147	14	161	310	25	0	19	44	0	0	0	0	44	354				
15:15-15:30	13	127	0	140	0	163	18	181	321	24	0	17	41	0	0	0	0	41	362				
15:30-15:45	20	143	0	163	0	163	24	187	350	32	0	27	59	0	0	0	0	59	409				
15:45-16:00	17	130	0	147	0	179	13	192	339	31	0	31	62	0	0	0	0	62	401				
16:00-16:15	20	178	0	198	0	165	20	185	383	33	0	27	60	0	0	0	0	60	443				
16:15-16:30	10	152	0	162	0	189	12	201	363	23	0	44	67	0	0	0	0	67	430				
16:30-16:45	11	155	0	166	0	200	11	211	377	30	0	22	52	0	0	0	0	52	429				
16:45-17:00	6	140	0	146	0	186	23	209	355	33	0	28	61	0	0	0	0	61	416				
17:00-17:15	12	146	0	158	0	206	20	226	384	29	0	17	46	0	0	0	0	46	430				
17:15-17:30	12	142	0	154	0	180	18	198	352	27	0	27	54	0	0	0	0	54	406				
17:30-17:45	13	121	0	134	0	174	16	190	324	29	0	34	63	0	0	0	0	63	387				
17:45-18:00	10	124	0	134	1	131	10	142	276	28	0	20	48	0	0	0	0	48	324				
Total	366	4463	0	4829	2	4424	454	4880	9709	665	0	615	1280	0	0	0	0	1280	10,989				

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016

WO No: 36585

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

Table with 8 columns: Time Period, Northbound, Southbound, Street Total, Eastbound, Westbound, Street Total, Grand Total. Rows show cyclist counts from 07:00 to 17:45.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016

WO No: 36585

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

Table with 8 columns: Time Period, NB Approach, SB Approach, Total, EB Approach, WB Approach, Total, Grand Total. Rows show pedestrian counts from 07:00 to 17:45.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016

WO No: 36585

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

Table with columns for Time Period, Northbound (LT, ST, RT, N TOT, STR TOT), Southbound (LT, ST, RT, S TOT, STR TOT), Eastbound (LT, ST, RT, E TOT), Westbound (LT, ST, RT, W TOT, STR TOT), and Grand Total. Rows represent 15-minute intervals from 07:00 to 18:00.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016

WO No: 36585

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

Table with columns for Time Period, Northbound U-Turn Total, Southbound U-Turn Total, Eastbound U-Turn Total, Westbound U-Turn Total, and Total. Rows represent 15-minute intervals from 07:00 to 18:00.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

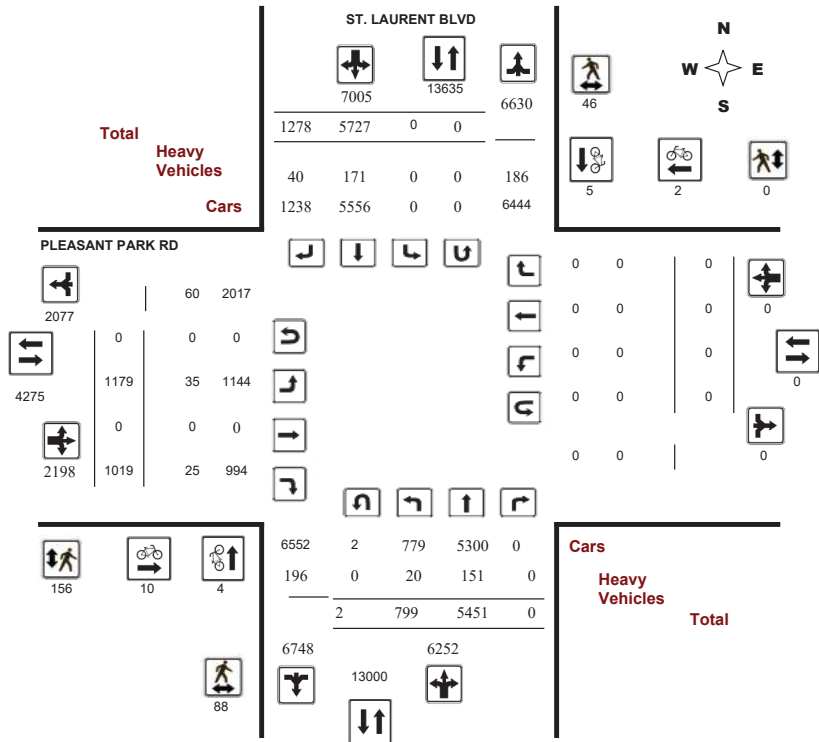
Survey Date: Thursday, March 21, 2019

WO No: 38459

Start Time: 07:00

Device: Miovision

Full Study Diagram



Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

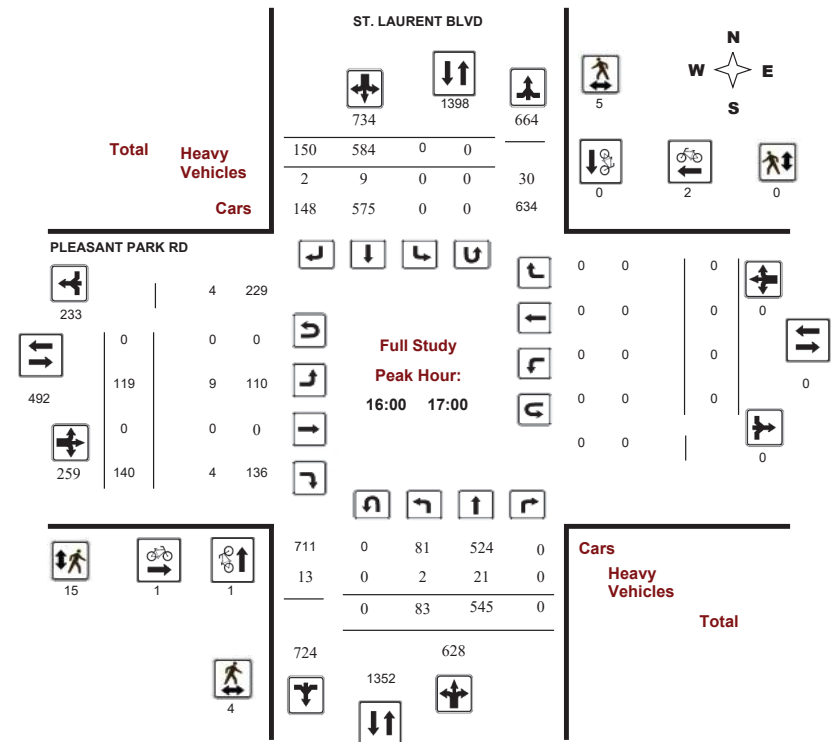
Survey Date: Thursday, March 21, 2019

WO No: 38459

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram





Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019

WO No: 38459

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

ST. LAURENT BLVD PLEASANT PARK RD

Table with columns for Time Period, Northbound (LT, ST, RT, N TOT, STR TOT), Eastbound (LT, ST, RT, E TOT), Westbound (LT, ST, RT, W TOT, STR TOT), and Grand Total. Rows represent 15-minute intervals from 07:00 to 17:15.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019

WO No: 38459

Start Time: 07:00

Device: Miovision

Summary table with columns for 15-minute intervals (17:30 to 18:45) and Grand Total. Rows show counts for various directions and a final total row.

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019

WO No: 38459

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

Time Period	ST. LAURENT BLVD			PLEASANT PARK RD			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 07:15	0	1	1	0	0	0	1
07:15 07:30	0	0	0	0	0	0	0
07:30 07:45	0	0	0	0	0	0	0
07:45 08:00	0	0	0	0	0	0	0
08:00 08:15	0	0	0	1	0	1	1
08:15 08:30	0	0	0	1	0	1	1
08:30 08:45	0	0	0	2	0	2	2
08:45 09:00	0	0	0	4	0	4	4
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0
10:00 10:15	0	0	0	0	0	0	0
10:15 10:30	0	0	0	0	0	0	0
10:30 10:45	0	0	0	0	0	0	0
10:45 11:00	0	0	0	0	0	0	0
11:00 11:15	0	0	0	0	0	0	0
11:15 11:30	0	0	0	0	0	0	0
11:30 11:45	1	0	1	0	0	0	1
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	1	1	0	0	0	1
13:30 13:45	0	0	0	0	0	0	0
13:45 14:00	0	0	0	0	0	0	0
14:00 14:15	0	0	0	0	0	0	0
14:15 14:30	0	0	0	0	0	0	0
14:30 14:45	0	0	0	0	0	0	0
14:45 15:00	1	0	1	0	0	0	1
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0	0
15:30 15:45	0	1	1	0	0	0	1
15:45 16:00	0	1	1	1	0	1	2
16:00 16:15	1	0	1	0	0	0	1
16:15 16:30	0	0	0	0	2	2	2
16:30 16:45	0	0	0	1	0	1	1
16:45 17:00	0	0	0	0	0	0	0
17:00 17:15	0	0	0	0	0	0	0
17:15 17:30	1	0	1	0	0	0	1
17:30 17:45	0	1	1	0	0	0	1
17:45 18:00	0	0	0	0	0	0	0
18:00 18:15	0	0	0	0	0	0	0



Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019

WO No: 38459

Start Time: 07:00

Device: Miovision

18:15 18:30	0	0	0	0	0	0	0
18:30 18:45	0	0	0	0	0	0	0
18:45 19:00	0	0	0	0	0	0	0
Total	4	5	9	10	2	12	21



Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019

WO No: 38459

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

ST. LAURENT BLVD

PLEASANT PARK RD

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	1	0	1	1	0	1	2
07:15 07:30	0	0	0	1	0	1	1
07:30 07:45	8	0	8	4	0	4	12
07:45 08:00	9	1	10	11	0	11	21
08:00 08:15	4	0	4	0	0	0	4
08:15 08:30	3	0	3	6	0	6	9
08:30 08:45	2	0	2	5	0	5	7
08:45 09:00	2	0	2	3	0	3	5
09:00 09:15	0	1	1	0	0	0	1
09:15 09:30	0	0	0	1	0	1	1
09:30 09:45	0	2	2	2	0	2	4
09:45 10:00	0	1	1	3	0	3	4
10:00 10:15	1	2	3	0	0	0	3
10:15 10:30	2	0	2	0	0	0	2
10:30 10:45	3	0	3	3	0	3	6
10:45 11:00	3	0	3	2	0	2	5
11:00 11:15	2	1	3	2	0	2	5
11:15 11:30	2	0	2	1	0	1	3
11:30 11:45	1	0	1	3	0	3	4
11:45 12:00	2	0	2	1	0	1	3
12:00 12:15	2	2	4	1	0	1	5
12:15 12:30	2	0	2	2	0	2	4
12:30 12:45	2	0	2	3	0	3	5
12:45 13:00	2	3	5	3	0	3	8
13:00 13:15	0	0	0	4	0	4	4
13:15 13:30	0	0	0	6	0	6	6
13:30 13:45	4	0	4	7	0	7	11
13:45 14:00	3	0	3	4	0	4	7
14:00 14:15	3	3	6	6	0	6	12
14:15 14:30	3	0	3	3	0	3	6
14:30 14:45	5	5	10	11	0	11	21
14:45 15:00	2	4	6	14	0	14	20
15:00 15:15	1	1	2	3	0	3	5
15:15 15:30	4	3	7	3	0	3	10
15:30 15:45	1	3	4	4	0	4	8
15:45 16:00	1	1	2	4	0	4	6
16:00 16:15	0	1	1	4	0	4	5
16:15 16:30	1	1	2	4	0	4	6
16:30 16:45	2	2	4	2	0	2	6
16:45 17:00	1	1	2	5	0	5	7
17:00 17:15	0	0	0	0	0	0	0
17:15 17:30	0	2	2	2	0	2	4
17:30 17:45	2	0	2	4	0	4	6



Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019

WO No: 38459

Start Time: 07:00

Device: Miovision

17:45 18:00	1	2	3	3	0	3	6
18:00 18:15	0	3	3	2	0	2	5
18:15 18:30	0	1	1	0	0	0	1
18:30 18:45	0	0	0	2	0	2	2
18:45 19:00	1	0	1	1	0	1	2
Total	88	46	134	156	0	156	290



Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019

WO No: 38459

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

Table with columns for Time Period, Northbound (LT, ST, RT, N TOT), Southbound (LT, ST, RT, S TOT), Eastbound (LT, ST, RT, E TOT), Westbound (LT, ST, RT, W TOT), STR TOT, and Grand Total. Rows represent 15-minute intervals from 07:00 to 17:15.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019

WO No: 38459

Start Time: 07:00

Device: Miovision

Summary table with columns for 15-minute intervals (17:30-18:45) and Grand Total. Rows show counts for various directions and a total of 442.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019

WO No: 38459

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

ST. LAURENT BLVD PLEASANT PARK RD

Time Period	Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00 07:15	0	0	0	0	0
07:15 07:30	0	0	0	0	0
07:30 07:45	1	0	0	0	1
07:45 08:00	0	0	0	0	0
08:00 08:15	0	0	0	0	0
08:15 08:30	0	0	0	0	0
08:30 08:45	0	0	0	0	0
08:45 09:00	0	0	0	0	0
09:00 09:15	0	0	0	0	0
09:15 09:30	0	0	0	0	0
09:30 09:45	0	0	0	0	0
09:45 10:00	0	0	0	0	0
10:00 10:15	0	0	0	0	0
10:15 10:30	0	0	0	0	0
10:30 10:45	0	0	0	0	0
10:45 11:00	0	0	0	0	0
11:00 11:15	0	0	0	0	0
11:15 11:30	0	0	0	0	0
11:30 11:45	0	0	0	0	0
11:45 12:00	0	0	0	0	0
12:00 12:15	0	0	0	0	0
12:15 12:30	0	0	0	0	0
12:30 12:45	0	0	0	0	0
12:45 13:00	0	0	0	0	0
13:00 13:15	0	0	0	0	0
13:15 13:30	0	0	0	0	0
13:30 13:45	0	0	0	0	0
13:45 14:00	0	0	0	0	0
14:00 14:15	0	0	0	0	0
14:15 14:30	0	0	0	0	0
14:30 14:45	0	0	0	0	0
14:45 15:00	0	0	0	0	0
15:00 15:15	0	0	0	0	0
15:15 15:30	0	0	0	0	0
15:30 15:45	0	0	0	0	0
15:45 16:00	0	0	0	0	0
16:00 16:15	0	0	0	0	0
16:15 16:30	0	0	0	0	0
16:30 16:45	0	0	0	0	0
16:45 17:00	0	0	0	0	0
17:00 17:15	0	0	0	0	0
17:15 17:30	0	0	0	0	0



Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019

WO No: 38459

Start Time: 07:00

Device: Miovision

17:30 17:45	0	0	0	0	0
17:45 18:00	0	0	0	0	0
18:00 18:15	0	0	0	0	0
18:15 18:30	0	0	0	0	0
18:30 18:45	0	0	0	0	0
18:45 19:00	1	0	0	0	1
Total	2	0	0	0	2



Transportation Services - Traffic Services

Work Order
38459

Turning Movement Count - Full Study Summary Report

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019

Total Observed U-Turns **AADT Factor**
 Northbound: 2 Southbound: 0 1.00
 Eastbound: 0 Westbound: 0

Full Study

Period	ST. LAURENT BLVD								PLEASANT PARK RD								Grand Total		
	Northbound				Southbound				Eastbound				Westbound						
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT		WB TOT	STR TOT
07:00 08:00	68	447	0	515	0	456	76	532	1047	108	0	82	190	0	0	0	0	190	1237
08:00 09:00	83	511	0	594	0	425	96	521	1115	125	0	80	205	0	0	0	0	205	1320
09:00 10:00	58	398	0	456	0	371	76	447	903	86	0	65	151	0	0	0	0	151	1054
10:00 11:00	47	392	0	439	0	370	73	443	882	89	0	49	138	0	0	0	0	138	1020
11:00 12:00	66	471	0	537	0	431	84	515	1052	90	0	72	162	0	0	0	0	162	1214
12:00 13:00	53	495	0	548	0	477	111	588	1136	99	0	74	173	0	0	0	0	173	1309
13:00 14:00	56	418	0	474	0	513	90	603	1077	76	0	72	148	0	0	0	0	148	1225
14:00 15:00	65	473	0	538	0	484	108	592	1130	101	0	78	179	0	0	0	0	179	1309
15:00 16:00	79	480	0	559	0	590	151	741	1300	95	0	131	226	0	0	0	0	226	1526
16:00 17:00	83	545	0	628	0	584	150	734	1362	119	0	140	259	0	0	0	0	259	1621
17:00 18:00	77	449	0	526	0	574	140	714	1240	117	0	106	223	0	0	0	0	223	1463
18:00 19:00	64	372	0	436	0	452	123	575	1011	74	0	70	144	0	0	0	0	144	1155
Sub Total	799	5451	0	6250	0	5727	1278	7005	13255	1179	0	1019	2198	0	0	0	0	2198	15453
U Turns	2			2	0			0	2	0			0	0			0	0	2
Total	799	5451	0	6252	0	5727	1278	7005	13257	1179	0	1019	2198	0	0	0	0	2198	15455
AVG 12Hr	799	5451	0	6252	0	5727	1278	7005	13257	1179	0	1019	2198	0	0	0	0	2198	15455
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													1.00						
AVG 24Hr	1047	7141	0	8190	0	7502	1674	9177	17367	1544	0	1335	2879	0	0	0	0	2879	20246
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													1.31						

Comments:

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

Appendix C

Synchro Intersection Worksheets – Existing Conditions

Lanes, Volumes, Timings

1: Russell/St. Laurent & Smyth/Lancaster

AM Peak Hour

Existing

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	190	1125	96	137	595	644
Future Volume (vph)	301	105	97	32	277	107	190	1125	96	137	595	644
Satd. Flow (prot)	3216	1728	1339	1421	3062	0	1483	3118	0	1626	3191	1483
Fit Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3177	1728	1295	1395	3062	0	1477	3118	0	1622	3191	1448
Satd. Flow (RTOR)			132		41			9				385
Lane Group Flow (vph)	334	117	108	36	427	0	211	1357	0	152	661	716
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				4								6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0		20.0	52.0		20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%		16.7%	43.3%		16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
Lost Time Adjust (s)	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		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	14.3	30.1	30.1	8.5	19.6		16.8	48.9		14.0	46.1	46.1
Actuated g/C Ratio	0.12	0.25	0.25	0.07	0.16		0.14	0.41		0.12	0.38	0.38
v/c Ratio	0.87	0.27	0.25	0.36	0.80		1.02	1.07		0.80	0.54	0.90
Control Delay	75.4	39.8	5.4	62.1	55.1		119.3	79.4		81.1	30.7	32.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	75.4	39.8	5.4	62.1	55.1		119.3	79.4		81.1	30.7	32.1
LOS	E	D	A	E	E		F	E		F	C	C
Approach Delay		54.4			55.7			84.8			36.4	
Approach LOS		D			E			F			D	
Queue Length 50th (m)	40.4	23.2	0.0	8.2	46.2		~55.6	~194.7		34.8	62.8	84.4
Queue Length 95th (m)	#64.6	40.9	9.8	18.5	63.1		#108.5	#237.4		#69.7	81.0	#168.0
Internal Link Dist (m)		111.9			87.8			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	385	434	424	170	602		207	1274		197	1225	793
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.87	0.27	0.25	0.21	0.71		1.02	1.07		0.77	0.54	0.90

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: 125

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

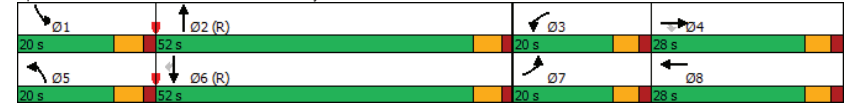
1: Russell/St. Laurent & Smyth/Lancaster

AM Peak Hour

Existing

Maximum v/c Ratio: 1.07	Intersection LOS: E
Intersection Signal Delay: 59.4	ICU Level of Service E
Intersection Capacity Utilization 86.0%	
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.	

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster



Lanes, Volumes, Timings
2: Russell & St. Laurent

AM Peak Hour
Existing

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔		↔	↕↕	↕↕	↕
Traffic Volume (vph)	668	44	75	743	286	459
Future Volume (vph)	668	44	75	743	286	459
Satd. Flow (prot)	3034	0	1658	2866	2866	1441
Fit Permitted	0.955		0.559			
Satd. Flow (perm)	3034	0	970	2866	2866	1412
Satd. Flow (RTOR)	11					510
Lane Group Flow (vph)	791	0	83	826	318	510
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			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)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	23.9	23.9
Actuated g/C Ratio	0.36		0.48	0.48	0.34	0.34
v/c Ratio	0.73		0.16	0.60	0.33	0.62
Control Delay	23.9		11.5	15.7	19.4	6.0
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.9		11.5	15.7	19.4	6.0
LOS	C		B	B	B	A
Approach Delay	23.9			15.3	11.1	
Approach LOS	C			B	B	
Queue Length 50th (m)	44.6		5.6	39.3	16.8	0.0
Queue Length 95th (m)	63.5		12.3	56.1	26.8	20.7
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1090		528	1371	978	818
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.73		0.16	0.60	0.33	0.62

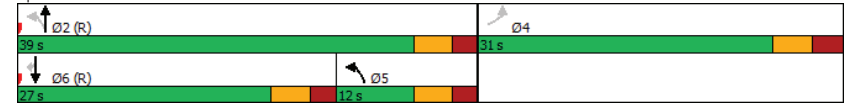
Intersection Summary	
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle:	70
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
2: Russell & St. Laurent

AM Peak Hour
Existing

Maximum v/c Ratio: 0.73	Intersection LOS: B
Intersection Signal Delay: 16.6	ICU Level of Service B
Intersection Capacity Utilization 56.9%	
Analysis Period (min) 15	

Splits and Phases: 2: Russell & St. Laurent



Lanes, Volumes, Timings
3: Southvale & Russell

AM Peak Hour
Existing

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	17	222	588	9	55	272
Future Volume (vph)	17	222	588	9	55	272
Satd. Flow (prot)	1595	1455	1560	0	1458	1548
Fit Permitted	0.950				0.341	
Satd. Flow (perm)	1531	1401	1560	0	523	1548
Satd. Flow (RTOR)		242	2			
Lane Group Flow (vph)	19	247	663	0	61	302
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		23.5	23.5
Total Split (s)	22.3	22.3	42.7		42.7	42.7
Total Split (%)	34.3%	34.3%	65.7%		65.7%	65.7%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.8		42.8	42.8
Actuated g/C Ratio	0.18	0.18	0.66		0.66	0.66
v/c Ratio	0.07	0.56	0.65		0.18	0.30
Control Delay	21.5	8.9	11.2		6.8	6.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	21.5	8.9	11.2		6.8	6.2
LOS	C	A	B		A	A
Approach Delay	9.8		11.2			6.3
Approach LOS	A		B			A
Queue Length 50th (m)	2.0	0.5	36.0		2.2	11.8
Queue Length 95th (m)	6.0	15.3	92.7		8.9	30.5
Internal Link Dist (m)	422.1		18.0			54.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	400	545	1027		344	1019
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.05	0.45	0.65		0.18	0.30

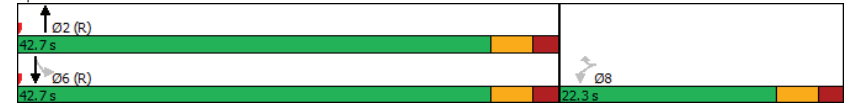
Intersection Summary	
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	10 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
3: Southvale & Russell

AM Peak Hour
Existing

Maximum v/c Ratio: 0.65	Intersection LOS: A
Intersection Signal Delay: 9.6	ICU Level of Service C
Intersection Capacity Utilization 65.0%	
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

AM Peak Hour
Existing

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	54	53	33	658	474	63
Future Volume (vph)	54	53	33	658	474	63
Satd. Flow (prot)	1112	0	1551	3283	3228	0
Fit Permitted	0.975		0.426			
Satd. Flow (perm)	1103	0	696	3283	3228	0
Satd. Flow (RTOR)	59			29		
Lane Group Flow (vph)	119	0	37	731	597	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	11.3		42.1	42.1	42.1	
Actuated g/C Ratio	0.19		0.70	0.70	0.70	
v/c Ratio	0.47		0.08	0.32	0.26	
Control Delay	18.3		5.0	5.3	4.9	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	18.3		5.0	5.3	4.9	
LOS	B		A	A	A	
Approach Delay	18.3			5.3	4.9	
Approach LOS	B			A	A	
Queue Length 50th (m)	5.9		1.3	19.4	11.3	
Queue Length 95th (m)	17.1		m5.0	37.5	23.0	
Internal Link Dist (m)	18.7			103.8	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	487		488	2303	2273	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.24		0.08	0.32	0.26	

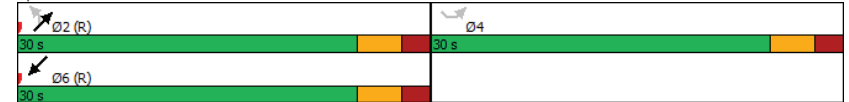
Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

AM Peak Hour
Existing

Maximum v/c Ratio: 0.47	Intersection LOS: A
Intersection Signal Delay: 6.2	ICU Level of Service B
Intersection Capacity Utilization 56.7%	
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



Lanes, Volumes, Timings
5: St. Laurent & Pleasant

AM Peak Hour
Existing

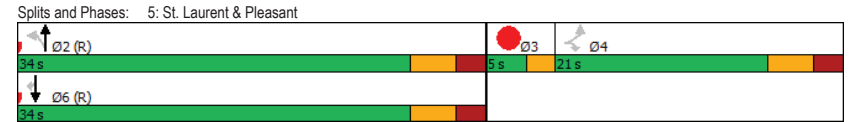
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations	↖	↗	↖	↗	↗	↖	
Traffic Volume (vph)	108	82	68	419	456	76	
Future Volume (vph)	108	82	68	419	456	76	
Satd. Flow (prot)	1658	1483	1642	1728	1679	1401	
Fit Permitted	0.950		0.450				
Satd. Flow (perm)	1654	1393	770	1728	1679	1337	
Satd. Flow (RTOR)		91				84	
Lane Group Flow (vph)	120	91	76	466	507	84	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	10.9	10.9	42.3	42.3	42.3	42.3	
Actuated g/C Ratio	0.18	0.18	0.70	0.70	0.70	0.70	
v/c Ratio	0.40	0.28	0.14	0.38	0.43	0.09	
Control Delay	25.6	7.9	5.7	6.5	4.2	0.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.6	7.9	5.7	6.5	4.2	0.4	
LOS	C	A	A	A	A	A	
Approach Delay	17.9			6.4	3.7		
Approach LOS	B			A	A		
Queue Length 50th (m)	12.0	0.0	2.7	20.2	10.5	0.0	
Queue Length 95th (m)	23.4	9.4	8.4	42.3	16.9	0.2	
Internal Link Dist (m)	450.4			257.0	226.8		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	427	427	542	1217	1183	967	
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	0.28	0.21	0.14	0.38	0.43	0.09	

Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	3 (5%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle:	50
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
5: St. Laurent & Pleasant

AM Peak Hour
Existing

Maximum v/c Ratio: 0.43	Intersection LOS: A
Intersection Signal Delay: 7.0	ICU Level of Service B
Intersection Capacity Utilization 56.9%	
Analysis Period (min) 15	



HCM 2010 TWSC
6: Russell & Access #1

AM Peak Hour
Existing

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↕		↕	
Traffic Vol, veh/h	10	4	2	808	328	2
Future Vol, veh/h	10	4	2	808	328	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	4	2	898	364	2

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1267	365	366
Stage 1	365	-	-
Stage 2	902	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	186	680	1193
Stage 1	702	-	-
Stage 2	396	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	185	680	1193
Mov Cap-2 Maneuver	185	-	-
Stage 1	700	-	-
Stage 2	396	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.5	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1193	-	234	-	-
HCM Lane V/C Ratio	0.002	-	0.066	-	-
HCM Control Delay (s)	8	0	21.5	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

HCM 2010 TWSC
7: St. Laurent & Access #2

AM Peak Hour
Existing

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↕		↕		↕	
Traffic Vol, veh/h	16	0	20	16	2	22	51	653	8	8	502	17
Future Vol, veh/h	16	0	20	16	2	22	51	653	8	8	502	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	35	-	108	21	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	0	22	18	2	24	57	726	9	9	558	19

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	1064	1435	289	1142
Stage 1	586	586	-	845
Stage 2	478	849	-	297
Critical Hdwy	7.54	6.54	6.94	7.54
Critical Hdwy Stg 1	6.54	5.54	-	6.54
Critical Hdwy Stg 2	6.54	5.54	-	6.54
Follow-up Hdwy	3.52	4.02	3.32	3.52
Pot Cap-1 Maneuver	177	133	708	155
Stage 1	463	495	-	324
Stage 2	537	375	-	687
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	159	124	708	142
Mov Cap-2 Maneuver	159	124	-	142
Stage 1	437	490	-	306
Stage 2	483	354	-	659

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.1	23	0.6	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	993	-	-	279	244	866	-	-
HCM Lane V/C Ratio	0.057	-	-	0.143	0.182	0.01	-	-
HCM Control Delay (s)	8.8	-	-	20.1	23	9.2	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.5	0.7	0	-	-

Lanes, Volumes, Timings

1: Russell/St. Laurent & Smyth/Lancaster

PM Peak Hour

Existing

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	505	274	223	100	106	230	100	765	93	143	1098	357
Future Volume (vph)	505	274	223	100	106	230	100	765	93	143	1098	357
Satd. Flow (prot)	3216	1745	1469	1642	2891	0	1537	3195	0	1658	3316	1483
Fit Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3122	1745	1430	1626	2891	0	1530	3195	0	1648	3316	1427
Satd. Flow (RTOR)			248		188			12				326
Lane Group Flow (vph)	561	304	248	111	374	0	111	953	0	159	1220	397
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				4								6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0		17.0	49.0		17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%		14.2%	40.8%		14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
Lost Time Adjust (s)	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		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	20.4	25.7	25.7	13.4	18.7		11.2	43.9		13.8	46.5	46.5
Actuated g/C Ratio	0.17	0.21	0.21	0.11	0.16		0.09	0.37		0.12	0.39	0.39
v/c Ratio	1.03	0.82	0.50	0.61	0.62		0.78	0.81		0.84	0.95	0.53
Control Delay	94.6	63.0	8.6	64.1	26.9		87.3	40.6		87.2	52.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	94.6	63.0	8.6	64.1	26.9		87.3	40.6		87.2	52.3	8.8
LOS	F	E	A	E	C		F	D		F	D	A
Approach Delay		66.8			35.4			45.5			45.7	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	-72.6	66.3	0.0	25.3	20.4		25.9	105.5		38.0	-161.0	11.2
Queue Length 95th (m)	#107.0	#117.9	21.8	41.9	36.0		#56.1	132.1		#83.3	#202.8	39.0
Internal Link Dist (m)		111.7			91.7			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	546	373	500	279	690		146	1177		190	1285	753
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	1.03	0.82	0.50	0.40	0.54		0.76	0.81		0.84	0.95	0.53

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: 115

Control Type: Actuated-Coordinated

Scenario 1 1971 & 1975 St. Laurent Boulevard 11:59 pm 10/21/2021 Existing

Synchro 11 Report
Page 1

Lanes, Volumes, Timings

1: Russell/St. Laurent & Smyth/Lancaster

PM Peak Hour

Existing

Maximum v/c Ratio: 1.03	Intersection LOS: D
Intersection Signal Delay: 49.8	ICU Level of Service E
Intersection Capacity Utilization 87.4%	
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.	

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster



Scenario 1 1971 & 1975 St. Laurent Boulevard 11:59 pm 10/21/2021 Existing

Synchro 11 Report
Page 2

Lanes, Volumes, Timings
2: Russell & St. Laurent

PM Peak Hour
Existing

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)	2962	0	1580	2941	3131	1483
Fit Permitted	0.959		0.254			
Satd. Flow (perm)	2962	0	421	2941	3131	1448
Satd. Flow (RTOR)	32					811
Lane Group Flow (vph)	802	0	47	380	790	811
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases	5		2		6	
Permitted Phases	4		2			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)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	26.3	26.3
Actuated g/C Ratio	0.36		0.48	0.48	0.38	0.38
v/c Ratio	0.74		0.16	0.27	0.67	0.77
Control Delay	24.0		12.9	11.6	23.8	8.2
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	24.0		12.9	11.6	23.8	8.2
LOS	C		B	B	C	A
Approach Delay	24.0			11.7	15.9	
Approach LOS	C			B	B	
Queue Length 50th (m)	44.5		3.1	14.7	49.8	0.0
Queue Length 95th (m)	63.8		8.0	22.8	#77.6	#46.5
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1078		309	1407	1176	1050
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.74		0.15	0.27	0.67	0.77

Intersection Summary

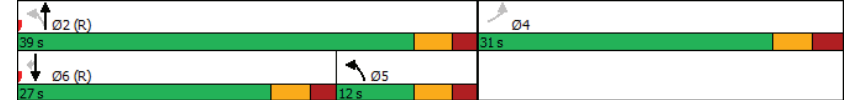
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
2: Russell & St. Laurent

PM Peak Hour
Existing

Maximum v/c Ratio: 0.77	Intersection LOS: B
Intersection Signal Delay: 17.6	ICU Level of Service B
Intersection Capacity Utilization 62.2%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: Russell & St. Laurent



Lanes, Volumes, Timings
3: Southvale & Russell

PM Peak Hour
Existing

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖		↖	↗
Traffic Volume (vph)	16	108	273	13	201	622
Future Volume (vph)	16	108	273	13	201	622
Satd. Flow (prot)	1658	1441	1670	0	1642	1695
Fit Permitted	0.950				0.568	
Satd. Flow (perm)	1608	1370	1670	0	978	1695
Satd. Flow (RTOR)		120	6			
Lane Group Flow (vph)	18	120	317	0	223	691
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		15.5	15.5
Total Split (s)	22.3	22.3	37.7		37.7	37.7
Total Split (%)	37.2%	37.2%	62.8%		62.8%	62.8%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.0		42.0	42.0
Actuated g/C Ratio	0.19	0.19	0.70		0.70	0.70
v/c Ratio	0.06	0.34	0.27		0.33	0.58
Control Delay	18.8	7.2	6.0		7.6	10.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	18.8	7.2	6.0		7.6	10.2
LOS	B	A	A		A	B
Approach Delay	8.7		6.0			9.6
Approach LOS	A		A			A
Queue Length 50th (m)	1.7	0.0	11.9		9.1	36.5
Queue Length 95th (m)	5.3	9.7	31.5		27.7	#96.6
Internal Link Dist (m)	422.1		26.8			60.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	455	474	1170		683	1185
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.25	0.27		0.33	0.58

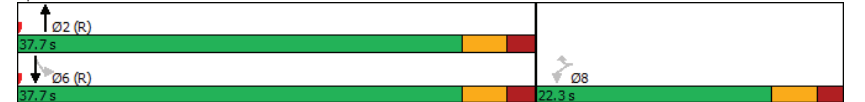
Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	53 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
3: Southvale & Russell

PM Peak Hour
Existing

Maximum v/c Ratio: 0.58	Intersection Signal Delay: 8.7	Intersection LOS: A
Intersection Capacity Utilization 61.2%	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: 3: Southvale & Russell



Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

PM Peak Hour
Existing

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations	↖		↗	↖↗	↖↗	
Traffic Volume (vph)	119	121	33	658	710	66
Future Volume (vph)	119	121	33	658	710	66
Satd. Flow (prot)	1252	0	1658	3252	3265	0
Fit Permitted	0.976		0.295			
Satd. Flow (perm)	1243	0	514	3252	3265	0
Satd. Flow (RTOR)	82				19	
Lane Group Flow (vph)	266	0	37	731	862	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	15.5		33.7	33.7	33.7	
Actuated g/C Ratio	0.26		0.56	0.56	0.56	
v/c Ratio	0.70		0.13	0.40	0.47	
Control Delay	23.0		7.2	6.6	9.8	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	23.0		7.2	6.6	9.8	
LOS	C		A	A	A	
Approach Delay	23.0			6.7	9.8	
Approach LOS	C			A	A	
Queue Length 50th (m)	18.1		1.5	15.7	24.7	
Queue Length 95th (m)	32.9		m3.5	23.0	50.8	
Internal Link Dist (m)	15.1			104.0	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	558		288	1828	1844	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.48		0.13	0.40	0.47	

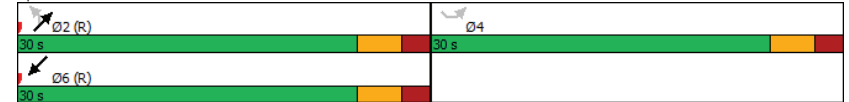
Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

PM Peak Hour
Existing

Maximum v/c Ratio: 0.70	Intersection LOS: B
Intersection Signal Delay: 10.4	ICU Level of Service B
Intersection Capacity Utilization 57.9%	
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



Lanes, Volumes, Timings
5: St. Laurent & Pleasant

PM Peak Hour
Existing

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations	↖	↗	↖	↗	↗	↖	
Traffic Volume (vph)	119	140	83	528	636	150	
Future Volume (vph)	119	140	83	528	636	150	
Satd. Flow (prot)	1566	1469	1658	1712	1745	1483	
Fit Permitted	0.950		0.302				
Satd. Flow (perm)	1548	1424	524	1712	1745	1421	
Satd. Flow (RTOR)		156				167	
Lane Group Flow (vph)	132	156	92	587	707	167	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	11.4	11.4	37.6	37.6	37.6	37.6	
Actuated g/C Ratio	0.19	0.19	0.63	0.63	0.63	0.63	
v/c Ratio	0.45	0.39	0.28	0.55	0.65	0.18	
Control Delay	26.3	7.2	8.6	9.3	12.6	2.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.3	7.2	8.6	9.3	12.6	2.0	
LOS	C	A	A	A	B	A	
Approach Delay	16.0			9.2	10.6		
Approach LOS	B			A	B		
Queue Length 50th (m)	13.3	0.0	3.6	28.9	60.9	3.0	
Queue Length 95th (m)	24.8	11.7	12.7	63.2	110.4	1.0	
Internal Link Dist (m)	450.4			257.0	226.8		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	399	483	328	1072	1093	952	
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	0.33	0.32	0.28	0.55	0.65	0.18	

Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	23 (38%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
5: St. Laurent & Pleasant

PM Peak Hour
Existing

Maximum v/c Ratio: 0.65	Intersection LOS: B
Intersection Signal Delay: 10.9	ICU Level of Service C
Intersection Capacity Utilization 66.1%	
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



HCM 2010 TWSC
6: Russell & Access #1

PM Peak Hour
Existing

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↕		↕	
Traffic Vol, veh/h	11	18	8	373	798	19
Future Vol, veh/h	11	18	8	373	798	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	20	9	414	887	21

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1330	898	908
Stage 1	898	-	-
Stage 2	432	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	171	338	750
Stage 1	398	-	-
Stage 2	655	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	168	338	750
Mov Cap-2 Maneuver	168	-	-
Stage 1	392	-	-
Stage 2	655	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	750	-	244	-	-
HCM Lane V/C Ratio	0.012	-	0.132	-	-
HCM Control Delay (s)	9.9	0	22	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

HCM 2010 TWSC
7: St. Laurent & Access #2

PM Peak Hour
Existing

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↕		↕		↕	
Traffic Vol, veh/h	20	6	41	10	3	22	70	608	20	29	768	34
Future Vol, veh/h	20	6	41	10	3	22	70	608	20	29	768	34
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	35	-	108	21	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	7	46	11	3	24	78	676	22	32	853	38

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	1432	1790	446	1337
Stage 1	936	936	-	843
Stage 2	496	854	-	494
Critical Hdwy	7.54	6.54	6.94	7.54
Critical Hdwy Stg 1	6.54	5.54	-	6.54
Critical Hdwy Stg 2	6.54	5.54	-	6.54
Follow-up Hdwy	3.52	4.02	3.32	3.52
Pot Cap-1 Maneuver	95	80	560	111
Stage 1	285	342	-	325
Stage 2	524	373	-	526
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	79	69	560	85
Mov Cap-2 Maneuver	79	69	-	85
Stage 1	256	330	-	292
Stage 2	448	335	-	457

Approach	EB	WB	NB	SB
HCM Control Delay, s	44.8	30.6	1	0.3
HCM LOS	E	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	757	-	-	162	179	894	-	-
HCM Lane V/C Ratio	0.103	-	-	0.46	0.217	0.036	-	-
HCM Control Delay (s)	10.3	-	-	44.8	30.6	9.2	-	-
HCM Lane LOS	B	-	-	E	D	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	2.1	0.8	0.1	-	-

Appendix D

Collision Data

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Traffic Control Condition	Classification Of Accident	Initial Impact Type	Road Surface Condition	# Vehicles	# Motorcycles	# Bicycles	# Pedestrians
10/1/2016	2016	18:06	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P-D only	02 - Angle	01 - Dry	2	0	0	0
1/21/2016	2016	8:21	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Clear	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
10/25/2016	2016	11:05	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	3	0	0	0
4/15/2016	2016	21:20	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P-D only	05 - Turning movement	01 - Dry	2	0	0	0
8/16/2016	2016	6:11	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	03 - Dawn	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	1	0
8/22/2016	2016	18:22	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
9/9/2016	2016	14:57	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	05 - Turning movement	01 - Dry	2	0	0	0
9/13/2016	2016	17:23	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	01 - Traffic signal	01 - Dry	2	0	0	0
4/6/2017	2017	14:00	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	04 - Sideswipe	02 - Wet	2	0	0	0
4/7/2017	2017	16:16	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
9/13/2017	2017	17:00	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
9/21/2017	2017	9:51	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	02 - Angle	01 - Dry	2	0	0	0
10/7/2018	2018	13:05	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
11/22/2018	2018	8:35	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	06 - Ice	2	0	0	0
12/16/2018	2018	17:03	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	07 - SMV other	02 - Wet	1	0	0	1
2/14/2018	2018	9:59	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	02 - Wet	2	0	0	0
2/23/2018	2018	12:36	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	05 - Turning movement	02 - Wet	2	0	0	0
5/3/2018	2018	13:00	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	05 - Turning movement	02 - Wet	2	0	0	0
6/12/2018	2018	16:36	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	01 - Dry	3	0	0	0
8/4/2018	2018	17:20	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
1/14/2018	2018	8:21	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	02 - Angle	04 - Slush	2	0	0	0
9/7/2018	2018	16:40	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	07 - SMV other	01 - Dry	1	0	0	0
9/23/2018	2018	19:30	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P-D only	05 - Turning movement	01 - Dry	2	0	0	0
9/21/2018	2018	16:50	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	06 - Strong wind	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	05 - Turning movement	01 - Dry	2	0	0	0
8/22/2019	2019	16:50	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	05 - Turning movement	01 - Dry	2	0	0	0
8/23/2019	2019	12:30	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
12/26/2019	2019	17:15	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	04 - Freezing Rain	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P-D only	02 - Angle	06 - Ice	2	0	0	0
12/19/2019	2019	6:35	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P-D only	05 - Turning movement	01 - Dry	2	0	0	0
2/1/2019	2019	15:40	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	02 - Wet	2	0	0	0
2/11/2019	2019	8:15	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
3/19/2019	2019	16:45	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	02 - Wet	2	0	0	0
4/24/2019	2019	21:21	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	05 - Turning movement	01 - Dry	2	0	0	0
4/18/2019	2019	10:25	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
5/10/2019	2019	20:54	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
8/10/2019	2019	12:45	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
8/12/2019	2019	13:58	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
2/20/2020	2020	17:53	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
3/25/2020	2020	18:30	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
7/31/2020	2020	13:03	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
8/19/2020	2020	9:42	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	0	0
9/10/2020	2020	22:12	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
12/21/2020	2020	10:25	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	99 - Other	01 - Dry	2	0	0	0
12/21/2020	2020	14:10	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	02 - Angle	01 - Dry	2	0	0	0
3/24/2016	2016	17:56	RUSSELL RD @ SOUTHWALE CRES N (0002650)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	07 - SMV other	06 - Ice	1	0	0	0
11/8/2018	2018	12:15	RUSSELL RD @ SOUTHWALE CRES N (0002650)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
12/3/2018	2018	19:56	RUSSELL RD @ SOUTHWALE CRES N (0002650)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P-D only	02 - Angle	01 - Dry	2	0	0	0
3/27/2018	2018	8:36	RUSSELL RD @ SOUTHWALE CRES N (0002650)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	02 - Angle	01 - Dry	2	0	0	0
4/29/2018	2018	16:26	RUSSELL RD @ SOUTHWALE CRES N (0002650)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	01 - Fatal injury	05 - Turning movement	01 - Dry	2	0	0	0
5/17/2018	2018	12:45	RUSSELL RD @ SOUTHWALE CRES N (0002650)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
1/10/2018	2018	18:04	RUSSELL RD @ SOUTHWALE CRES N (0002650)	04 - Freezing Rain	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	03 - Loose snow	2	0	0	0
7/13/2018	2018	15:32	RUSSELL RD @ SOUTHWALE CRES N (0002650)	01 - Clear	01 - Daylight	01 - Traffic signal	00 - Unknown	03 - P-D only	04 - Sideswipe	01 - Dry	2	0	0	0
9/24/2019	2019	7:54	RUSSELL RD @ SOUTHWALE CRES N (0002650)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	01 - Fatal injury	07 - SMV other	01 - Dry	1	0	0	1
11/3/2016	2016	13:30	ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE (0008760)	99 - Other	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	03 - Rear end	02 - Wet	2	0	0	0
2/3/2017	2017	13:08	ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE (0008760)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P-D only	02 - Angle	01 - Dry	2	0	0	0
2/12/2018	2018	3:30	ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE (0008760)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P-D only	05 - Packed snow	02 - Angle	2	0	0	0
2/2/2018	2018	20:37	ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE (0008760)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P-D only	05 - Turning movement	01 - Dry	2	0	0	0
1/29/2019	2019	8:21	ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE (0008760)	05 - Drifting Snow	01 - Daylight	01 - Traffic signal	00 - Unknown	03 - P-D only	04 - Sideswipe	05 - Packed snow	2	0	0	0
2/22/2018	2018	8:20	DWELLINGHAM PRIV @ ST. LAURENT BLVD (0006421)	01 - Clear	01 - Daylight	10 - No control	0	03 - P-D only	05 - Turning movement	02 - Wet	2	0	0	0
12/14/2020	2020	8:32	DWELLINGHAM PRIV @ ST. LAURENT BLVD (0006421)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	1	0
2/21/2016	2016	16:57	RUSSELL RD btwn ST. LAURENT BLVD & SOUTHWALE CRES (_3ZA3RV)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	04 - Sideswipe	01 - Dry	2	0	0	0
10/27/2017	2017	15:02	RUSSELL RD btwn ST. LAURENT BLVD & SOUTHWALE CRES (_3ZA3RV)	01 - Clear	01 - Daylight	10 - No control	0	03 - P-D only	04 - Sideswipe	01 - Dry	2	0	0	0
10/17/2018	2018	10:23	RUSSELL RD btwn ST. LAURENT BLVD & SOUTHWALE CRES (_3ZA3RV)	01 - Clear	01 - Daylight	10 - No control	0	03 - P-D only	02 - Angle	01 - Dry	2	0	0	0
11/28/2018	2018	17:57	RUSSELL RD btwn ST. LAURENT BLVD & SOUTHWALE CRES (_3ZA3RV)	01 - Clear	07 - Dark	10 - No control	0	03 - P-D only	04 - Sideswipe	02 - Wet	2	0	0	0
9/1/2019	2019	10:17	RUSSELL RD btwn ST. LAURENT BLVD & SOUTHWALE CRES (_3ZA3RV)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	1	0	0
2/25/2016	2016	18:00	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (_3ZA1L3)	04 - Freezing Rain	07 - Dark	10 - No control	0	03 - P-D only	01 - Approaching	06 - Ice	2	0	0	0
1/29/2018	2018	12:32	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (_3ZA1L3)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	07 - SMV other	01 - Dry	1	0	0	1
3/29/2018	2018	10:28	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (_3ZA1L3)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	07 - SMV other	01 - Dry	1	0	0	1
4/16/2018	2018	10:07	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (_3ZA1L3)	04 - Freezing Rain	01 - Daylight	10 - No control	0	03 - P-D only	04 - Sideswipe	06 - Ice	2	0	0	0
11/10/2019	2019	17:14	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (_3ZA1L3)	01 - Clear	07 - Dark	10 - No control	0	03 - P-D only	03 - Rear end	01 - Dry	2	0	0	0
11/26/2019	2019	19:15	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (_3ZA1L3)	01 - Clear	07 - Dark	10 - No control	0	03 - P-D only	02 - Angle	01 - Dry	2	0	0	0
12/19/2019	2019	19:00	ST. LAURENT BLVD btwn											



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: RUSSELL RD @ SOUTHVALE CRES N

Traffic Control: Traffic signal

Total Collisions: 12

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jan-14, Wed,08:24	Clear	Rear end	P.D. only	Wet	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	
2015-Feb-18, Wed,08:40	Clear	Rear end	P.D. only	Wet	South	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: RUSSELL RD @ SOUTHVALE CRES N

Traffic Control: Traffic signal

Total Collisions: 12

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-Jul-07, Tue,12:57	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Mar-24, Thu,17:56	Snow	SMV other	P.D. only	Ice	North	Slowing or stopping	Automobile, station wagon	Pole (utility, power)	0
2018-Jan-10, Wed,18:04	Freezing Rain	Rear end	P.D. only	Loose snow	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Mar-27, Tue,08:36	Clear	Angle	P.D. only	Dry	West	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Apr-29, Sun,16:26	Clear	Turning movement	Fatal injury	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-May-27, Sun,12:45	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jul-13, Fri,15:32	Clear	Sideswipe	P.D. only	Dry	South	Unknown	Unknown	Other motor vehicle	0
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Nov-08, Thu,12:15	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Dec-03, Mon,19:56	Clear	Angle	P.D. only	Dry	West	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Sep-24, Tue,07:54	Clear	SMV other	Fatal injury	Dry	West	Turning left	Municipal transit bus	Pedestrian	1

Location: RUSSELL RD S @ ST. LAURENT BLVD

Traffic Control: Traffic signal

Total Collisions: 52

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-Jan-30, Fri,18:32	Clear	SMV other	Non-fatal injury	Slush	East	Turning left	Pick-up truck	Pedestrian	1



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: RUSSELL RD S @ ST. LAURENT BLVD

Traffic Control: Traffic signal

Total Collisions: 52

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-Feb-02, Mon,13:23	Snow	Rear end	P.D. only	Loose snow	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Feb-03, Tue,21:27	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2015-Feb-18, Wed,18:41	Snow	Rear end	P.D. only	Loose snow	South	Going ahead	Pick-up truck	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Jun-12, Fri,14:30	Rain	Turning movement	P.D. only	Wet	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Unknown	Other motor vehicle	
2015-Jun-17, Wed,07:31	Clear	SMV other	Non-fatal injury	Dry	North	Going ahead	Truck - closed	Pedestrian	1
2015-Jun-20, Sat,19:59	Clear	Angle	Non-fatal injury	Dry	East	Turning left	Motorcycle	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jul-17, Fri,18:02	Clear	SMV other	P.D. only	Dry	North	Turning left	Automobile, station wagon	Curb	0
2015-Aug-19, Wed,14:50	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Pick-up truck	Other motor vehicle	
2015-Oct-01, Thu,13:12	Clear	Angle	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Passenger van	Other motor vehicle	
2015-Oct-20, Tue,23:00	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Nov-03, Tue,18:34	Clear	Angle	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2015-Nov-17, Tue,17:22	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Nov-25, Wed,16:53	Clear	Turning movement	Non-fatal injury	Dry	North	Turning left	Passenger van	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: RUSSELL RD S @ ST. LAURENT BLVD

Traffic Control: Traffic signal

Total Collisions: 52

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-Nov-28, Sat,08:19	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Delivery van	Other motor vehicle	
2015-Dec-24, Thu,20:17	Clear	Turning movement	Non-fatal injury	Dry	South	Making "U" turn	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Pick-up truck	Other motor vehicle	
2016-Jan-21, Thu,08:21	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Passenger van	Other motor vehicle	
2016-Apr-15, Fri,21:20	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Aug-02, Tue,18:22	Clear	Rear end	P.D. only	Dry	South	Turning right	Truck - closed	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2016-Aug-16, Tue,06:11	Clear	Angle	Non-fatal injury	Dry	East	Turning right	Bicycle	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Cyclist	
2016-Sep-09, Fri,14:57	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Delivery van	Other motor vehicle	
2016-Sep-13, Tue,17:23	Clear	Turning movement	Non-fatal injury	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Oct-01, Sat,18:06	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Pick-up truck	Other motor vehicle	
2016-Oct-25, Tue,11:05	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Apr-06, Thu,14:00	Rain	Sideswipe	P.D. only	Wet	East	Turning left	Delivery van	Other motor vehicle	0
					East	Turning left	Pick-up truck	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: RUSSELL RD S @ ST. LAURENT BLVD

Traffic Control: Traffic signal

Total Collisions: 52

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2017-Apr-27, Thu,16:16	Clear	Rear end	P.D. only	Dry	East	Going ahead	Pick-up truck	Other motor vehicle	0
					East	Stopped	Pick-up truck	Other motor vehicle	
2017-Sep-13, Wed,17:00	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	
2017-Sep-21, Thu,09:51	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Tow truck	Other motor vehicle	
2018-Jan-14, Sun,08:21	Clear	Angle	P.D. only	Slush	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Passenger van	Other motor vehicle	
2018-Feb-14, Wed,09:59	Clear	Angle	Non-fatal injury	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Feb-23, Fri,12:36	Rain	Turning movement	P.D. only	Wet	South	Making "U" turn	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-May-03, Thu,13:00	Rain	Turning movement	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Passenger van	Other motor vehicle	
2018-Jun-11, Mon,16:36	Clear	Turning movement	Non-fatal injury	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Turning left	Municipal transit bus	Other motor vehicle	
2018-Aug-04, Sat,17:20	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2018-Sep-07, Fri,16:40	Clear	SMV other	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Curb	0
2018-Sep-21, Fri,16:50	Strong wind	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Sep-23, Sun,19:30	Clear	Turning movement	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Turning left	Unknown	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: RUSSELL RD S @ ST. LAURENT BLVD

Traffic Control: Traffic signal

Total Collisions: 52

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2018-Oct-07, Sun,13:05	Clear	Rear end	Non-fatal injury	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	0
					East	Turning right	Pick-up truck	Other motor vehicle	
2018-Nov-22, Thu,08:35	Clear	Rear end	Non-fatal injury	Ice	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Dec-16, Sun,17:03	Clear	SMV other	Non-fatal injury	Wet	East	Going ahead	Passenger van	Pedestrian	1
2019-Feb-01, Fri,15:40	Clear	Rear end	P.D. only	Wet	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Unknown	Other motor vehicle	
2019-Feb-11, Mon,08:15	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Passenger van	Other motor vehicle	
2019-Mar-19, Tue,16:45	Clear	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Apr-18, Thu,10:25	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Passenger van	Other motor vehicle	
2019-Apr-24, Wed,21:21	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-May-10, Fri,20:54	Clear	Angle	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Aug-10, Sat,12:45	Clear	Rear end	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Pick-up truck	Other motor vehicle	
2019-Aug-12, Mon,13:58	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2019-Aug-22, Thu,16:50	Clear	Turning movement	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: RUSSELL RD S @ ST. LAURENT BLVD

Traffic Control: Traffic signal

Total Collisions: 52

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2019-Aug-23, Fri,12:30	Clear	Rear end	P.D. only	Dry	South	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2019-Dec-19, Thu,06:35	Clear	Turning movement	P.D. only	Dry	North	Turning left	Pick-up truck	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Dec-26, Thu,17:15	Freezing Rain	Angle	P.D. only	Ice	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	

Location: ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV

Traffic Control: No control

Total Collisions: 12

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jan-04, Sun,15:10	Snow	Sideswipe	P.D. only	Slush	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Passenger van	Other motor vehicle	
2015-Feb-02, Mon,13:12	Snow	Angle	P.D. only	Loose snow	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Delivery van	Other motor vehicle	
2015-Mar-15, Sun,07:58	Snow	Angle	Non-fatal injury	Slush	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Feb-25, Thu,18:00	Freezing Rain	Approaching	P.D. only	Ice	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Jan-29, Mon,12:32	Clear	SMV other	Non-fatal injury	Dry	South	Going ahead	Municipal transit bus	Pedestrian	1
2018-Mar-20, Tue,10:28	Clear	SMV other	Non-fatal injury	Dry	East	Turning right	Automobile, station wagon	Pedestrian	1
2018-Apr-16, Mon,10:07	Freezing Rain	Sideswipe	P.D. only	Ice	South	Going ahead	Truck - closed	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Jan-17, Thu,13:10	Clear	Angle	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV

Traffic Control: No control

Total Collisions: 12

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2019-Mar-27, Wed,07:37	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Nov-10, Sun,17:14	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Turning right	Pick-up truck	Other motor vehicle	
2019-Nov-26, Tue,19:15	Clear	Angle	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Dec-19, Thu,19:00	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

Appendix E

City TRANS Forecasts – Background Growth

TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

1802 St Laurent

2011 Model - Basecase

N/A

User Initials: TIMW

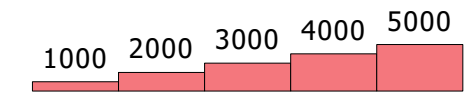
Plot Prepared: April 30, 2021

EMME Scenario: 21711

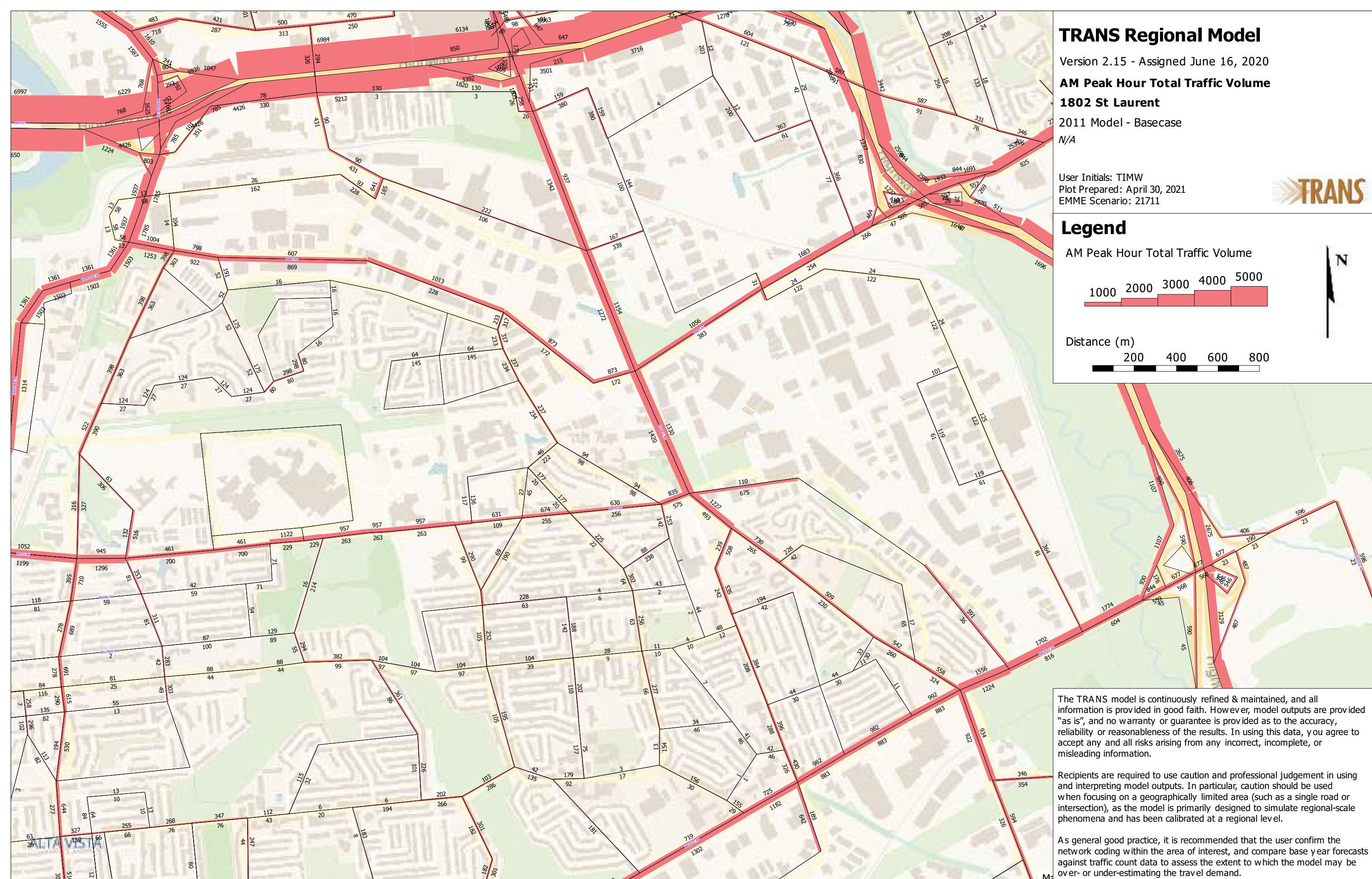
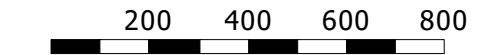


Legend

AM Peak Hour Total Traffic Volume



Distance (m)



The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As a general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

1802 St Laurent

2031 Model - Basecase

N/A

User Initials: TIMW

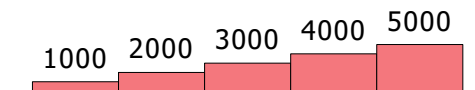
Plot Prepared: April 30, 2021

EMME Scenario: 21711

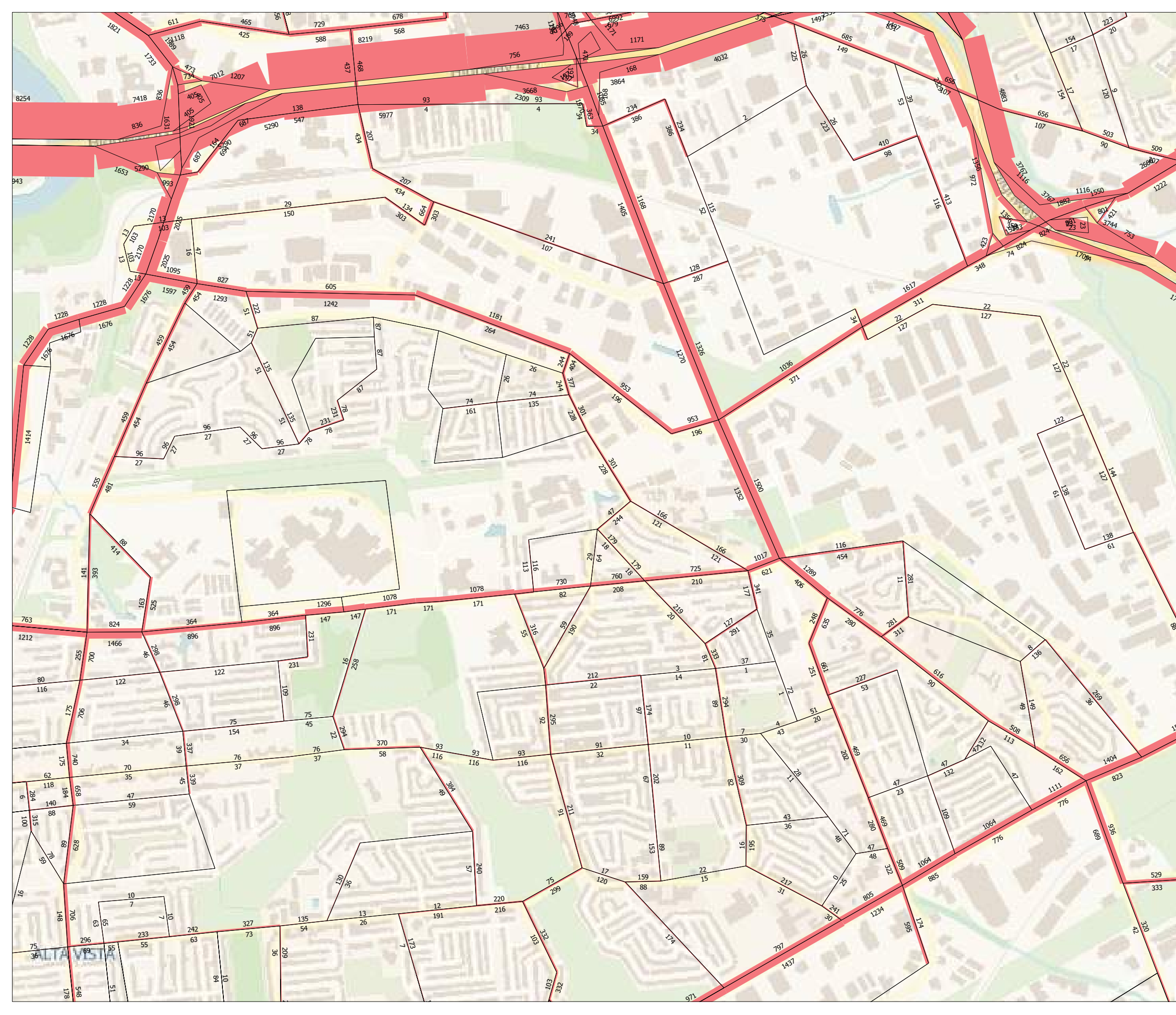


Legend

AM Peak Hour Total Traffic Volume



Distance (m)



The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As a general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

Appendix F

Background Development Volumes

Figure 10: 'New' Site-Generated Traffic

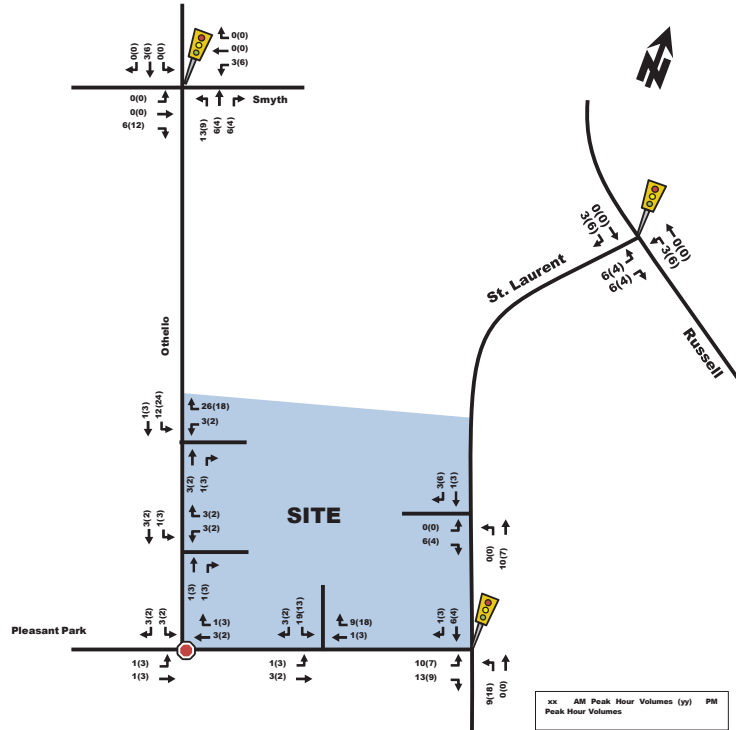


Figure 11: 'Existing' Site-Generated Traffic

Figure 12: 'New' Site-Generated Traffic

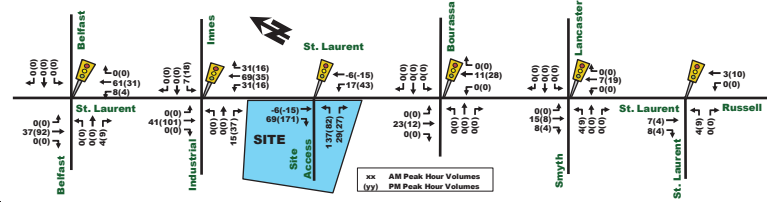
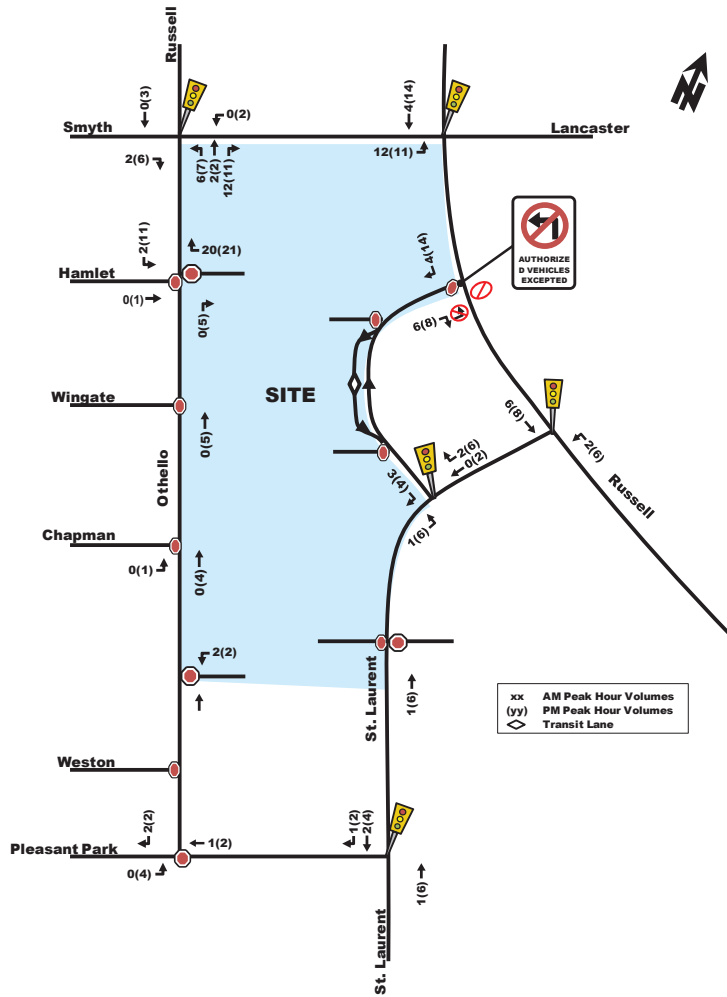
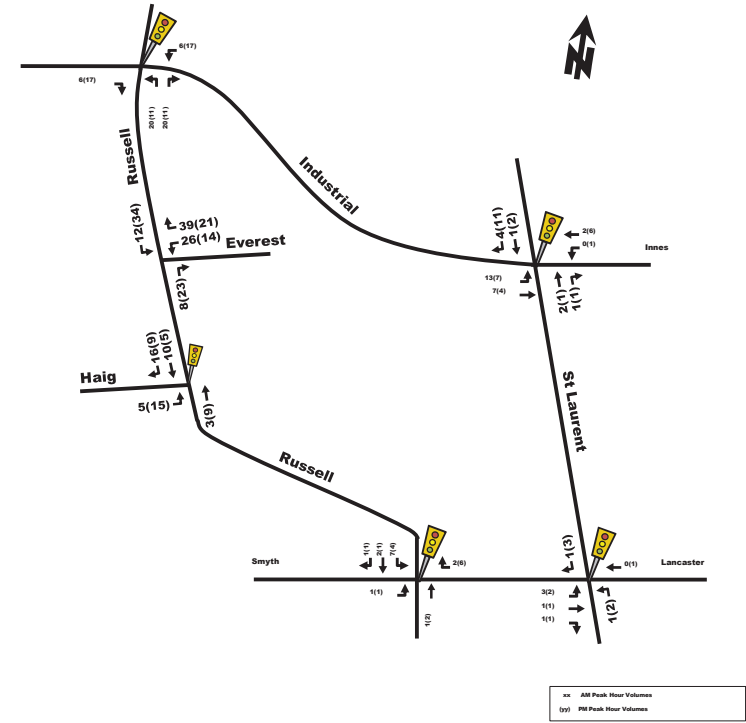


Figure 8: Phase 1-Generated Traffic (year 2021)



PARSONS

Figure 8: Residential Development Site-Generated Traffic



Appendix G

Synchro Intersection Worksheets – 2030 Future Background Conditions

Lanes, Volumes, Timings
1: Russell/St. Laurent & Smyth/Lancaster

AM Peak Hour
2030 Future Background

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	386	135	119	32	280	107	191	1138	96	137	617	653
Future Volume (vph)	386	135	119	32	280	107	191	1138	96	137	617	653
Satd. Flow (prot)	3216	1728	1339	1421	3066	0	1483	3119	0	1626	3191	1483
Fit Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3178	1728	1295	1396	3066	0	1477	3119	0	1622	3191	1448
Satd. Flow (RTOR)			132		41			8				403
Lane Group Flow (vph)	386	135	119	32	387	0	191	1234	0	137	617	653
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0		20.0	52.0		20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%		16.7%	43.3%		16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
Lost Time Adjust (s)	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		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	14.4	29.4	29.4	8.2	18.5		17.8	50.2		13.7	46.1	46.1
Actuated g/C Ratio	0.12	0.24	0.24	0.07	0.15		0.15	0.42		0.11	0.38	0.38
v/c Ratio	1.00	0.32	0.29	0.33	0.76		0.87	0.94		0.74	0.50	0.81
Control Delay	99.4	41.1	7.1	61.4	53.5		85.9	49.0		74.8	30.0	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	99.4	41.1	7.1	61.4	53.5		85.9	49.0		74.8	30.0	21.4
LOS	F	D	A	E	D		F	D		E	C	C
Approach Delay		69.9			54.1			53.9			30.4	
Approach LOS		E			D			D			C	
Queue Length 50th (m)	-47.5	27.5	0.0	7.3	41.5		44.7	149.5		31.0	57.7	56.0
Queue Length 95th (m)	#79.3	46.3	12.4	17.2	56.6		#96.8	#205.0		#60.3	74.8	113.4
Internal Link Dist (m)		111.9			87.8			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	385	422	416	170	603		220	1309		197	1225	804
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	1.00	0.32	0.29	0.19	0.64		0.87	0.94		0.70	0.50	0.81

Intersection Summary

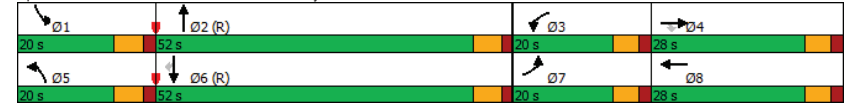
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
1: Russell/St. Laurent & Smyth/Lancaster

AM Peak Hour
2030 Future Background

Maximum v/c Ratio: 1.00	Intersection LOS: D
Intersection Signal Delay: 48.1	ICU Level of Service E
Intersection Capacity Utilization 89.0%	
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.	

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster



Lanes, Volumes, Timings
2: Russell & St. Laurent

AM Peak Hour
2030 Future Background

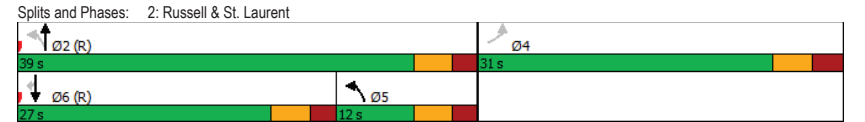
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔		↔	↑↑	↑↑	↔
Traffic Volume (vph)	678	50	80	746	320	471
Future Volume (vph)	678	50	80	746	320	471
Satd. Flow (prot)	3029	0	1658	2866	2866	1441
Fit Permitted	0.956		0.558			
Satd. Flow (perm)	3029	0	969	2866	2866	1412
Satd. Flow (RTOR)	12					471
Lane Group Flow (vph)	728	0	80	746	320	471
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			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)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	23.9	23.9
Actuated g/C Ratio	0.36		0.48	0.48	0.34	0.34
v/c Ratio	0.67		0.15	0.54	0.33	0.59
Control Delay	22.3		11.5	14.7	19.4	5.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	22.3		11.5	14.7	19.4	5.7
LOS	C		B	B	B	A
Approach Delay	22.3			14.4	11.2	
Approach LOS	C			B	B	
Queue Length 50th (m)	39.9		5.4	34.2	17.0	0.0
Queue Length 95th (m)	57.1		11.9	49.0	27.1	19.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1089		527	1371	978	792
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.67		0.15	0.54	0.33	0.59

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

Lanes, Volumes, Timings
2: Russell & St. Laurent

AM Peak Hour
2030 Future Background

Maximum v/c Ratio: 0.67	Intersection LOS: B
Intersection Signal Delay: 15.8	ICU Level of Service B
Intersection Capacity Utilization 57.7%	
Analysis Period (min) 15	



Lanes, Volumes, Timings
3: Southvale & Russell

AM Peak Hour
2030 Future Background

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Traffic Volume (vph)	17	222	596	9	55	312
Future Volume (vph)	17	222	596	9	55	312
Satd. Flow (prot)	1595	1455	1560	0	1458	1548
Fit Permitted	0.950				0.377	
Satd. Flow (perm)	1531	1401	1560	0	578	1548
Satd. Flow (RTOR)		222	2			
Lane Group Flow (vph)	17	222	605	0	55	312
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		23.5	23.5
Total Split (s)	22.3	22.3	42.7		42.7	42.7
Total Split (%)	34.3%	34.3%	65.7%		65.7%	65.7%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.8		42.8	42.8
Actuated g/C Ratio	0.18	0.18	0.66		0.66	0.66
v/c Ratio	0.06	0.52	0.59		0.14	0.31
Control Delay	21.4	8.3	9.9		6.2	6.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	21.4	8.3	9.9		6.2	6.3
LOS	C	A	A		A	A
Approach Delay	9.2		9.9			6.3
Approach LOS	A		A			A
Queue Length 50th (m)	1.8	0.0	30.9		1.9	12.2
Queue Length 95th (m)	5.6	14.0	78.4		7.8	31.6
Internal Link Dist (m)	422.1		18.0			54.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	400	530	1027		380	1019
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.42	0.59		0.14	0.31

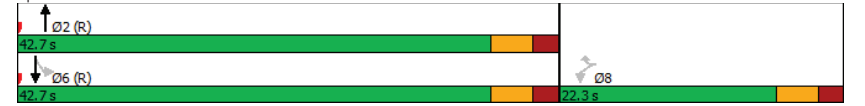
Intersection Summary	
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	10 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
3: Southvale & Russell

AM Peak Hour
2030 Future Background

Maximum v/c Ratio: 0.59	Intersection LOS: A
Intersection Signal Delay: 8.7	ICU Level of Service C
Intersection Capacity Utilization 65.5%	
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

AM Peak Hour
2030 Future Background

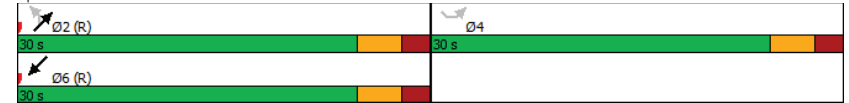
Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	54	56	34	674	486	65
Future Volume (vph)	54	56	34	674	486	65
Satd. Flow (prot)	1112	0	1551	3283	3228	0
Fit Permitted	0.976		0.446			
Satd. Flow (perm)	1103	0	728	3283	3228	0
Satd. Flow (RTOR)	56			29		
Lane Group Flow (vph)	110	0	34	674	551	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	11.0		42.3	42.3	42.3	
Actuated g/C Ratio	0.18		0.70	0.70	0.70	
v/c Ratio	0.44		0.07	0.29	0.24	
Control Delay	18.0		4.8	5.0	4.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	18.0		4.8	5.0	4.7	
LOS	B		A	A	A	
Approach Delay	18.0			5.0	4.7	
Approach LOS	B			A	A	
Queue Length 50th (m)	5.3		1.3	17.4	10.2	
Queue Length 95th (m)	16.2		4.8	33.3	20.4	
Internal Link Dist (m)	18.7			103.8	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	485		513	2315	2285	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.23		0.07	0.29	0.24	
Intersection Summary						
Cycle Length: 60						
Actuated Cycle Length: 60						
Offset: 45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green						
Natural Cycle: 60						
Control Type: Actuated-Coordinated						

Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

AM Peak Hour
2030 Future Background

Maximum v/c Ratio: 0.44	Intersection LOS: A
Intersection Signal Delay: 5.9	ICU Level of Service B
Intersection Capacity Utilization 57.2%	
Analysis Period (min) 15	

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



Lanes, Volumes, Timings
5: St. Laurent & Pleasant

AM Peak Hour
2030 Future Background

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations	↖	↗	↖	↗	↗	↗	
Traffic Volume (vph)	118	95	77	424	473	78	
Future Volume (vph)	118	95	77	424	473	78	
Satd. Flow (prot)	1658	1483	1642	1728	1679	1401	
Fit Permitted	0.950		0.473				
Satd. Flow (perm)	1654	1393	809	1728	1679	1337	
Satd. Flow (RTOR)		95				78	
Lane Group Flow (vph)	118	95	77	424	473	78	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	10.9	10.9	42.3	42.3	42.3	42.3	
Actuated g/C Ratio	0.18	0.18	0.70	0.70	0.70	0.70	
v/c Ratio	0.39	0.29	0.14	0.35	0.40	0.08	
Control Delay	25.6	7.9	5.6	6.2	4.0	0.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.6	7.9	5.6	6.2	4.0	0.4	
LOS	C	A	A	A	A	A	
Approach Delay	17.7			6.1	3.5		
Approach LOS	B			A	A		
Queue Length 50th (m)	11.8	0.0	2.7	17.9	9.8	0.0	
Queue Length 95th (m)	23.0	9.5	8.3	37.1	16.1	0.2	
Internal Link Dist (m)	450.4			257.0	226.8		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	427	430	570	1219	1184	966	
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	0.28	0.22	0.14	0.35	0.40	0.08	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 3 (5%), Referenced to phase 2:NBL and 6:SBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
5: St. Laurent & Pleasant

AM Peak Hour
2030 Future Background

Maximum v/c Ratio: 0.40
Intersection Signal Delay: 6.9
Intersection Capacity Utilization 57.8%
Analysis Period (min) 15
Intersection LOS: A
ICU Level of Service B

Splits and Phases: 5: St. Laurent & Pleasant



HCM 2010 TWSC
6: Russell & Access #1

AM Peak Hour
2030 Future Background

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↕		↕	
Traffic Vol, veh/h	10	4	2	816	368	2
Future Vol, veh/h	10	4	2	816	368	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	4	2	816	368	2
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1189	369	370	0	-	0
Stage 1	369	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	208	677	1189	-	-	-
Stage 1	699	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	207	677	1189	-	-	-
Mov Cap-2 Maneuver	207	-	-	-	-	-
Stage 1	697	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	19.8	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1189	-	258	-	-	
HCM Lane V/C Ratio	0.002	-	0.054	-	-	
HCM Control Delay (s)	8	0	19.8	-	-	
HCM Lane LOS	A	A	C	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

Lanes, Volumes, Timings
1: Russell/St. Laurent & Smyth/Lancaster

PM Peak Hour
2030 Future Background

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	527	279	224	100	146	230	124	788	93	143	1126	442
Future Volume (vph)	527	279	224	100	146	230	124	788	93	143	1126	442
Satd. Flow (prot)	3216	1745	1469	1642	2935	0	1537	3195	0	1658	3316	1483
Fit Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3128	1745	1430	1625	2935	0	1530	3195	0	1647	3316	1427
Satd. Flow (RTOR)			224		195			12				393
Lane Group Flow (vph)	527	279	224	100	376	0	124	881	0	143	1126	442
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4	4	3	8		5	2		1	6	6
Permitted Phases				4								6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0		17.0	49.0		17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%		14.2%	40.8%		14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
Lost Time Adjust (s)	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		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	20.4	24.9	24.9	12.6	17.1		12.7	45.9		13.5	46.6	46.6
Actuated g/C Ratio	0.17	0.21	0.21	0.10	0.14		0.11	0.38		0.11	0.39	0.39
v/c Ratio	0.97	0.77	0.47	0.58	0.64		0.76	0.72		0.77	0.87	0.56
Control Delay	80.5	60.1	8.6	64.0	27.5		81.2	35.8		79.1	43.8	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	80.5	60.1	8.6	64.0	27.5		81.2	35.8		79.1	43.8	7.4
LOS	F	E	A	E	C		F	D		E	D	A
Approach Delay		59.4			35.1			41.4				37.4
Approach LOS		E			D			D				D
Queue Length 50th (m)	64.2	61.9	0.0	22.8	20.6		28.1	94.4		32.6	134.4	7.6
Queue Length 95th (m)	#97.8	#99.7	20.3	38.9	35.3		#64.5	118.8		#73.5	#177.8	35.3
Internal Link Dist (m)		111.7			91.7			251.9				606.7
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	546	361	474	279	704		163	1229		185	1287	794
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.97	0.77	0.47	0.36	0.53		0.76	0.72		0.77	0.87	0.56

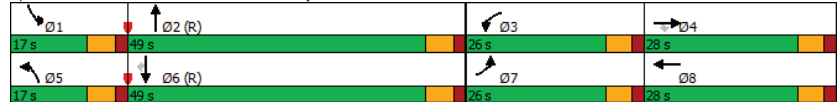
Intersection Summary	
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle:	105
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
1: Russell/St. Laurent & Smyth/Lancaster

PM Peak Hour
2030 Future Background

Maximum v/c Ratio: 0.97	Intersection LOS: D
Intersection Signal Delay: 43.4	ICU Level of Service E
Intersection Capacity Utilization 90.8%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster



Lanes, Volumes, Timings
2: Russell & St. Laurent

PM Peak Hour
2030 Future Background

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔		↔	↕↕	↕↕	↕
Traffic Volume (vph)	629	110	54	374	723	741
Future Volume (vph)	629	110	54	374	723	741
Satd. Flow (prot)	2961	0	1580	2941	3131	1483
Fit Permitted	0.959		0.290			
Satd. Flow (perm)	2961	0	481	2941	3131	1448
Satd. Flow (RTOR)	32					741
Lane Group Flow (vph)	739	0	54	374	723	741
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			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)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	26.3	26.3
Actuated g/C Ratio	0.36		0.48	0.48	0.38	0.38
v/c Ratio	0.69		0.17	0.27	0.61	0.74
Control Delay	22.2		12.8	11.6	22.1	7.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	22.2		12.8	11.6	22.1	7.3
LOS	C		B	B	C	A
Approach Delay	22.2			11.7	14.6	
Approach LOS	C			B	B	
Queue Length 50th (m)	39.7		3.6	14.5	44.3	0.0
Queue Length 95th (m)	57.4		8.9	22.5	63.1	29.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1078		332	1407	1176	1006
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.69		0.16	0.27	0.61	0.74

Intersection Summary

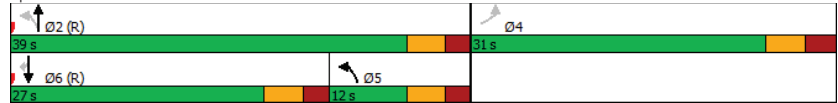
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
2: Russell & St. Laurent

PM Peak Hour
2030 Future Background

Maximum v/c Ratio: 0.74	Intersection LOS: B
Intersection Signal Delay: 16.3	ICU Level of Service B
Intersection Capacity Utilization 62.9%	
Analysis Period (min) 15	

Splits and Phases: 2: Russell & St. Laurent



Lanes, Volumes, Timings
3: Southvale & Russell

PM Peak Hour
2030 Future Background

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	16	108	317	13	201	638
Future Volume (vph)	16	108	317	13	201	638
Satd. Flow (prot)	1658	1441	1672	0	1642	1695
Fit Permitted	0.950				0.561	
Satd. Flow (perm)	1608	1370	1672	0	966	1695
Satd. Flow (RTOR)		108	5			
Lane Group Flow (vph)	16	108	330	0	201	638
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		15.5	15.5
Total Split (s)	22.3	22.3	37.7		37.7	37.7
Total Split (%)	37.2%	37.2%	62.8%		62.8%	62.8%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.0		42.0	42.0
Actuated g/C Ratio	0.19	0.19	0.70		0.70	0.70
v/c Ratio	0.05	0.31	0.28		0.30	0.54
Control Delay	18.7	7.2	6.1		7.3	9.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	18.7	7.2	6.1		7.3	9.0
LOS	B	A	A		A	A
Approach Delay	8.7		6.1			8.6
Approach LOS	A		A			A
Queue Length 50th (m)	1.5	0.0	12.7		8.0	32.0
Queue Length 95th (m)	4.9	9.2	32.9		24.6	81.3
Internal Link Dist (m)	422.1		26.8			60.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	455	465	1171		675	1185
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.23	0.28		0.30	0.54

Intersection Summary

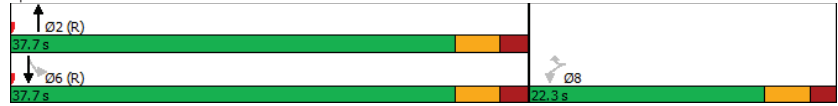
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 53 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
3: Southvale & Russell

PM Peak Hour
2030 Future Background

Maximum v/c Ratio: 0.54	Intersection LOS: A
Intersection Signal Delay: 8.0	ICU Level of Service B
Intersection Capacity Utilization 61.2%	
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

PM Peak Hour
2030 Future Background

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations	↔		↔	↔↔	↔↔	
Traffic Volume (vph)	119	125	53	620	723	72
Future Volume (vph)	119	125	53	620	723	72
Satd. Flow (prot)	1252	0	1658	3252	3261	0
Fit Permitted	0.976		0.330			
Satd. Flow (perm)	1243	0	575	3252	3261	0
Satd. Flow (RTOR)	102				21	
Lane Group Flow (vph)	244	0	53	620	795	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	14.0		35.2	35.2	35.2	
Actuated g/C Ratio	0.23		0.59	0.59	0.59	
v/c Ratio	0.66		0.16	0.32	0.41	
Control Delay	20.5		6.5	5.7	8.3	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	20.5		6.5	5.7	8.3	
LOS	C		A	A	A	
Approach Delay	20.5			5.7	8.3	
Approach LOS	C			A	A	
Queue Length 50th (m)	14.0		2.0	12.7	19.8	
Queue Length 95th (m)	28.7		15.2	19.1	42.3	
Internal Link Dist (m)	15.1			104.0	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	569		337	1909	1923	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.43		0.16	0.32	0.41	

Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

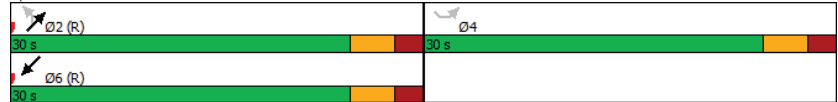
Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

PM Peak Hour
2030 Future Background

Maximum v/c Ratio: 0.66	Intersection LOS: A
Intersection Signal Delay: 9.0	ICU Level of Service C
Intersection Capacity Utilization 65.4%	
Analysis Period (min) 15	

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

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



Lanes, Volumes, Timings
5: St. Laurent & Pleasant

PM Peak Hour
2030 Future Background

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations	↖	↗	↖	↗	↖	↗	
Traffic Volume (vph)	126	149	101	543	649	155	
Future Volume (vph)	126	149	101	543	649	155	
Satd. Flow (prot)	1566	1469	1658	1712	1745	1483	
Fit Permitted	0.950		0.356				
Satd. Flow (perm)	1548	1424	618	1712	1745	1421	
Satd. Flow (RTOR)		149				155	
Lane Group Flow (vph)	126	149	101	543	649	155	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	11.2	11.2	42.0	42.0	42.0	42.0	
Actuated g/C Ratio	0.19	0.19	0.70	0.70	0.70	0.70	
v/c Ratio	0.43	0.39	0.23	0.45	0.53	0.15	
Control Delay	26.2	7.4	7.3	7.5	10.5	2.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.2	7.4	7.3	7.5	10.5	2.6	
LOS	C	A	A	A	B	A	
Approach Delay	16.0			7.5	9.0		
Approach LOS	B			A	A		
Queue Length 50th (m)	12.7	0.0	3.9	25.5	53.3	1.5	
Queue Length 95th (m)	24.1	11.6	12.6	55.0	101.7	4.5	
Internal Link Dist (m)	450.4			257.0	226.8		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	399	478	432	1197	1220	1040	
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	0.32	0.31	0.23	0.45	0.53	0.15	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 23 (38%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

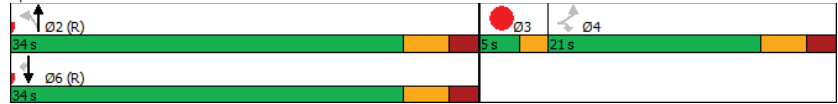
Lanes, Volumes, Timings
5: St. Laurent & Pleasant

PM Peak Hour
2030 Future Background

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 66.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



HCM 2010 TWSC
6: Russell & Access #1

PM Peak Hour
2030 Future Background

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↕		↕	
Traffic Vol, veh/h	11	18	8	417	814	19
Future Vol, veh/h	11	18	8	417	814	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	18	8	417	814	19

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1257	824	833
Stage 1	824	-	-
Stage 2	433	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	189	373	800
Stage 1	431	-	-
Stage 2	654	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	187	373	800
Mov Cap-2 Maneuver	187	-	-
Stage 1	425	-	-
Stage 2	654	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.9	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	800	-	271	-	-
HCM Lane V/C Ratio	0.01	-	0.107	-	-
HCM Control Delay (s)	9.5	0	19.9	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Appendix H

Synchro Intersection Worksheets – 2035 Future Background Conditions

Lanes, Volumes, Timings

1: Russell/St. Laurent & Smyth/Lancaster

AM Peak Hour

2035 Future Background-Signalized

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	424	148	132	32	280	107	191	1138	96	137	617	653
Future Volume (vph)	424	148	132	32	280	107	191	1138	96	137	617	653
Satd. Flow (prot)	3216	1728	1339	1421	3066	0	1483	3119	0	1626	3191	1483
Fit Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3175	1728	1295	1396	3066	0	1476	3119	0	1622	3191	1448
Satd. Flow (RTOR)			132		41			8				403
Lane Group Flow (vph)	424	148	132	32	387	0	191	1234	0	137	617	653
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				4								6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0		20.0	52.0		20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%		16.7%	43.3%		16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
Lost Time Adjust (s)	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		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	14.4	29.4	29.4	8.2	18.5		17.8	50.2		13.7	46.1	46.1
Actuated g/C Ratio	0.12	0.24	0.24	0.07	0.15		0.15	0.42		0.11	0.38	0.38
v/c Ratio	1.10	0.35	0.32	0.33	0.76		0.87	0.94		0.74	0.50	0.81
Control Delay	124.7	41.7	8.8	61.4	53.5		85.9	49.0		74.8	30.0	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	124.7	41.7	8.8	61.4	53.5		85.9	49.0		74.8	30.0	21.4
LOS	F	D	A	E	D		F	D		E	C	C
Approach Delay		85.5			54.1			53.9			30.4	
Approach LOS		F			D			D			C	
Queue Length 50th (m)	-58.3	30.3	0.0	7.3	41.5		44.7	149.5		31.0	57.7	56.0
Queue Length 95th (m)	#89.9	50.2	16.0	17.2	56.6		#96.8	#205.0		#60.3	74.8	113.4
Internal Link Dist (m)		111.9			87.8			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	385	422	416	170	603		220	1309		197	1225	804
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	1.10	0.35	0.32	0.19	0.64		0.87	0.94		0.70	0.50	0.81

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: 115

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

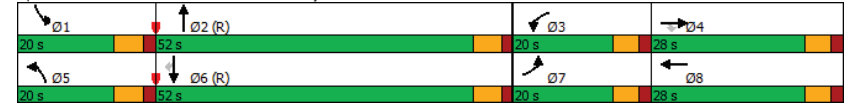
1: Russell/St. Laurent & Smyth/Lancaster

AM Peak Hour

2035 Future Background-Signalized

Maximum v/c Ratio: 1.10	Intersection LOS: D
Intersection Signal Delay: 51.2	ICU Level of Service E
Intersection Capacity Utilization 90.1%	
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.	

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster



Lanes, Volumes, Timings
2: Russell & St. Laurent

AM Peak Hour
2035 Future Background-Signalized

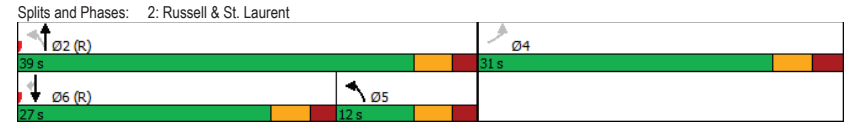
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔		↔	↑↑	↑↑	↔
Traffic Volume (vph)	678	50	80	746	333	471
Future Volume (vph)	678	50	80	746	333	471
Satd. Flow (prot)	3029	0	1658	2866	2866	1441
Fit Permitted	0.956		0.551			
Satd. Flow (perm)	3029	0	957	2866	2866	1412
Satd. Flow (RTOR)	12					471
Lane Group Flow (vph)	728	0	80	746	333	471
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			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)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	23.9	23.9
Actuated g/C Ratio	0.36		0.48	0.48	0.34	0.34
v/c Ratio	0.67		0.15	0.54	0.34	0.59
Control Delay	22.3		11.5	14.7	19.5	5.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	22.3		11.5	14.7	19.5	5.7
LOS	C		B	B	B	A
Approach Delay	22.3			14.4	11.4	
Approach LOS	C			B	B	
Queue Length 50th (m)	39.9		5.4	34.2	17.7	0.0
Queue Length 95th (m)	57.1		11.9	49.0	28.1	19.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1089		523	1371	978	792
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.67		0.15	0.54	0.34	0.59

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

Lanes, Volumes, Timings
2: Russell & St. Laurent

AM Peak Hour
2035 Future Background-Signalized

Maximum v/c Ratio: 0.67	Intersection LOS: B
Intersection Signal Delay: 15.8	ICU Level of Service B
Intersection Capacity Utilization 57.7%	
Analysis Period (min) 15	



Lanes, Volumes, Timings
3: Southvale & Russell

AM Peak Hour
2035 Future Background-Signalized

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Traffic Volume (vph)	17	222	596	9	55	325
Future Volume (vph)	17	222	596	9	55	325
Satd. Flow (prot)	1595	1455	1560	0	1458	1548
Fit Permitted	0.950				0.377	
Satd. Flow (perm)	1531	1401	1560	0	578	1548
Satd. Flow (RTOR)		222	2			
Lane Group Flow (vph)	17	222	605	0	55	325
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		23.5	23.5
Total Split (s)	22.3	22.3	42.7		42.7	42.7
Total Split (%)	34.3%	34.3%	65.7%		65.7%	65.7%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.8		42.8	42.8
Actuated g/C Ratio	0.18	0.18	0.66		0.66	0.66
v/c Ratio	0.06	0.52	0.59		0.14	0.32
Control Delay	21.4	8.3	9.9		6.2	6.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	21.4	8.3	9.9		6.2	6.4
LOS	C	A	A		A	A
Approach Delay	9.2		9.9			6.4
Approach LOS	A		A			A
Queue Length 50th (m)	1.8	0.0	30.9		1.9	12.9
Queue Length 95th (m)	5.6	14.0	78.4		7.8	33.2
Internal Link Dist (m)	422.1		18.0			54.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	400	530	1027		380	1019
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.42	0.59		0.14	0.32

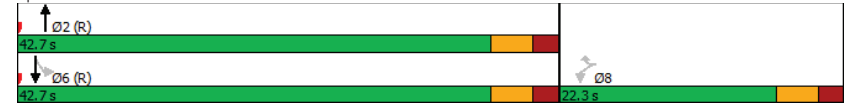
Intersection Summary	
Cycle Length:	65
Actuated Cycle Length:	65
Offset: (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
3: Southvale & Russell

AM Peak Hour
2035 Future Background-Signalized

Maximum v/c Ratio: 0.59	Intersection LOS: A
Intersection Signal Delay: 8.7	ICU Level of Service C
Intersection Capacity Utilization 65.5%	
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

AM Peak Hour
2035 Future Background-Signalized

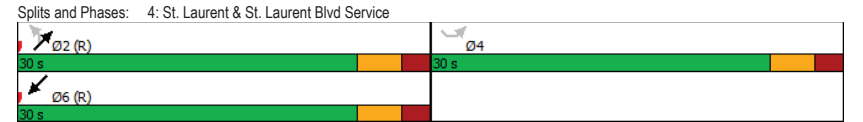
Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	54	56	34	674	486	65
Future Volume (vph)	54	56	34	674	486	65
Satd. Flow (prot)	1112	0	1551	3283	3228	0
Fit Permitted	0.976		0.446			
Satd. Flow (perm)	1103	0	728	3283	3228	0
Satd. Flow (RTOR)	56			29		
Lane Group Flow (vph)	110	0	34	674	551	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	11.0		42.3	42.3	42.3	
Actuated g/C Ratio	0.18		0.70	0.70	0.70	
v/c Ratio	0.44		0.07	0.29	0.24	
Control Delay	18.0		4.8	5.0	4.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	18.0		4.8	5.0	4.7	
LOS	B		A	A	A	
Approach Delay	18.0			5.0	4.7	
Approach LOS	B			A	A	
Queue Length 50th (m)	5.3		1.3	17.4	10.2	
Queue Length 95th (m)	16.2		4.8	33.3	20.4	
Internal Link Dist (m)	18.7			103.8	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	485		513	2315	2285	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.23		0.07	0.29	0.24	

Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

AM Peak Hour
2035 Future Background-Signalized

Maximum v/c Ratio: 0.44	Intersection LOS: A
Intersection Signal Delay: 5.9	ICU Level of Service B
Intersection Capacity Utilization 57.2%	
Analysis Period (min) 15	



Lanes, Volumes, Timings
5: St. Laurent & Pleasant

AM Peak Hour
2035 Future Background-Signalized

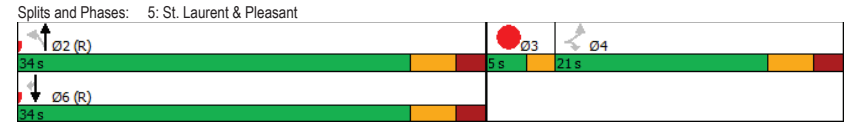
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations	↖	↗	↖	↗	↗	↗	
Traffic Volume (vph)	118	95	77	424	473	78	
Future Volume (vph)	118	95	77	424	473	78	
Satd. Flow (prot)	1658	1483	1642	1728	1679	1401	
Fit Permitted	0.950		0.473				
Satd. Flow (perm)	1654	1393	808	1728	1679	1337	
Satd. Flow (RTOR)		95				78	
Lane Group Flow (vph)	118	95	77	424	473	78	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	10.9	10.9	42.3	42.3	42.3	42.3	
Actuated g/C Ratio	0.18	0.18	0.70	0.70	0.70	0.70	
v/c Ratio	0.39	0.29	0.14	0.35	0.40	0.08	
Control Delay	25.6	7.9	5.6	6.2	4.0	0.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.6	7.9	5.6	6.2	4.0	0.4	
LOS	C	A	A	A	A	A	
Approach Delay	17.7			6.1	3.5		
Approach LOS	B			A	A		
Queue Length 50th (m)	11.8	0.0	2.7	17.9	9.8	0.0	
Queue Length 95th (m)	23.0	9.5	8.3	37.1	16.1	0.2	
Internal Link Dist (m)	450.4			257.0	226.8		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	427	430	570	1219	1184	966	
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	0.28	0.22	0.14	0.35	0.40	0.08	

Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	3 (5%), Referenced to phase 2:NBL and 6:SBT, Start of Green
Natural Cycle:	50
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
5: St. Laurent & Pleasant

AM Peak Hour
2035 Future Background-Signalized

Maximum v/c Ratio: 0.40	Intersection LOS: A
Intersection Signal Delay: 6.9	ICU Level of Service B
Intersection Capacity Utilization 57.8%	
Analysis Period (min) 15	



HCM 2010 TWSC
6: Russell & Access #1

AM Peak Hour
2035 Future Background-Signalized

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↕		↕	
Traffic Vol, veh/h	10	4	2	816	381	2
Future Vol, veh/h	10	4	2	816	381	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	4	2	816	381	2
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1202	382	383	0	-	0
Stage 1	382	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	204	665	1175	-	-	-
Stage 1	690	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	203	665	1175	-	-	-
Mov Cap-2 Maneuver	203	-	-	-	-	-
Stage 1	688	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	20.1	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1175	-	253	-	-	
HCM Lane V/C Ratio	0.002	-	0.055	-	-	
HCM Control Delay (s)	8.1	0	20.1	-	-	
HCM Lane LOS	A	A	C	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

Lanes, Volumes, Timings
1: Russell/St. Laurent & Smyth/Lancaster

PM Peak Hour
2035 Future Background-Signalized

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↕		↕		↕	
Traffic Volume (vph)	527	279	224	100	166	230	137	788	93	143	1126	487
Future Volume (vph)	527	279	224	100	166	230	137	788	93	143	1126	487
Satd. Flow (prot)	3216	1745	1469	1642	2955	0	1537	3195	0	1658	3316	1483
Fit Permitted	0.950		0.950		0.950		0.950		0.950		0.950	
Satd. Flow (perm)	3125	1745	1430	1625	2955	0	1529	3195	0	1647	3316	1427
Satd. Flow (RTOR)	224		195		12		12		12		433	
Lane Group Flow (vph)	527	279	224	100	396	0	137	881	0	143	1126	487
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4	4	3	8		5	2		1	6	6
Permitted Phases					4				6			
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0		17.0	49.0		17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%		14.2%	40.8%		14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
Lost Time Adjust (s)	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		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Model	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	20.4	24.9	24.9	12.6	17.1		14.0	45.9		13.5	45.4	45.4
Actuated g/C Ratio	0.17	0.21	0.21	0.10	0.14		0.12	0.38		0.11	0.38	0.38
v/c Ratio	0.97	0.77	0.47	0.58	0.67		0.77	0.72		0.77	0.90	0.60
Control Delay	80.5	60.1	8.6	64.0	29.7		79.4	35.8		79.1	46.5	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	80.5	60.1	8.6	64.0	29.7		79.4	35.8		79.1	46.5	7.9
LOS	F	E	A	E	C		E	D		E	D	A
Approach Delay	59.4		36.6		41.7		38.5					
Approach LOS	E		D		D		D					
Queue Length 50th (m)	64.2	61.9	0.0	22.8	23.3		31.3	94.4		32.6	134.4	8.4
Queue Length 95th (m)	#97.8	#99.7	20.3	38.9	38.3		#72.3	118.8		#73.5	#177.8	38.9
Internal Link Dist (m)	111.7		91.7		251.9		606.7					
Turn Bay Length (m)	54.0		36.0		166.0		105.0		78.0			
Base Capacity (vph)	546	361	474	279	707		178	1229		185	1253	808
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.97	0.77	0.47	0.36	0.56		0.77	0.72		0.77	0.90	0.60
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: 115												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings
1: Russell/St. Laurent & Smyth/Lancaster

PM Peak Hour
2035 Future Background-Signalized

Maximum v/c Ratio: 0.97	Intersection LOS: D
Intersection Signal Delay: 44.0	ICU Level of Service F
Intersection Capacity Utilization 91.8%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Lanes, Volumes, Timings
2: Russell & St. Laurent

PM Peak Hour
2035 Future Background-Signalized

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔↔		↔↔	↕↕	↕↕	↕↕
Traffic Volume (vph)	629	110	54	387	723	741
Future Volume (vph)	629	110	54	387	723	741
Satd. Flow (prot)	2961	0	1580	2941	3131	1483
Fit Permitted	0.959		0.290			
Satd. Flow (perm)	2961	0	481	2941	3131	1448
Satd. Flow (RTOR)	32					741
Lane Group Flow (vph)	739	0	54	387	723	741
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			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)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	26.3	26.3
Actuated g/C Ratio	0.36		0.48	0.48	0.38	0.38
v/c Ratio	0.69		0.17	0.28	0.61	0.74
Control Delay	22.2		12.8	11.6	22.1	7.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	22.2		12.8	11.6	22.1	7.3
LOS	C		B	B	C	A
Approach Delay	22.2			11.8	14.6	
Approach LOS	C			B	B	
Queue Length 50th (m)	39.7		3.6	15.1	44.3	0.0
Queue Length 95th (m)	57.4		8.9	23.3	63.1	29.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1078		332	1407	1176	1006
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.69		0.16	0.28	0.61	0.74

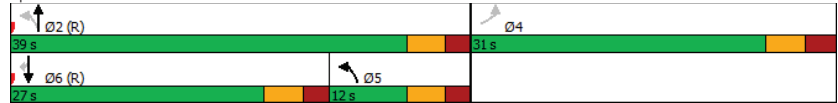
Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Lanes, Volumes, Timings
2: Russell & St. Laurent

PM Peak Hour
2035 Future Background-Signalized

Maximum v/c Ratio: 0.74	Intersection LOS: B
Intersection Signal Delay: 16.3	ICU Level of Service B
Intersection Capacity Utilization 62.9%	
Analysis Period (min) 15	

Splits and Phases: 2: Russell & St. Laurent



Lanes, Volumes, Timings
3: Southvale & Russell

PM Peak Hour
2035 Future Background-Signalized

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	16	108	330	13	201	638
Future Volume (vph)	16	108	330	13	201	638
Satd. Flow (prot)	1658	1441	1672	0	1642	1695
Fit Permitted	0.950				0.555	
Satd. Flow (perm)	1608	1370	1672	0	956	1695
Satd. Flow (RTOR)		108	5			
Lane Group Flow (vph)	16	108	343	0	201	638
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		15.5	15.5
Total Split (s)	22.3	22.3	37.7		37.7	37.7
Total Split (%)	37.2%	37.2%	62.8%		62.8%	62.8%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.0		42.0	42.0
Actuated g/C Ratio	0.19	0.19	0.70		0.70	0.70
v/c Ratio	0.05	0.31	0.29		0.30	0.54
Control Delay	18.7	7.2	6.2		7.3	9.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	18.7	7.2	6.2		7.3	9.0
LOS	B	A	A		A	A
Approach Delay	8.7		6.2			8.6
Approach LOS	A		A			A
Queue Length 50th (m)	1.5	0.0	13.2		8.0	32.0
Queue Length 95th (m)	4.9	9.2	34.4		24.8	81.3
Internal Link Dist (m)	422.1		26.8			60.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	455	465	1171		668	1185
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.23	0.29		0.30	0.54

Intersection Summary

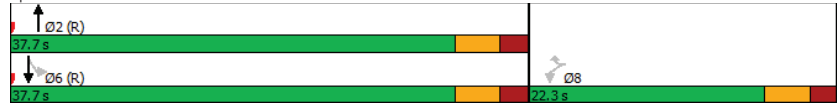
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 53 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
3: Southvale & Russell

PM Peak Hour
2035 Future Background-Signalized

Maximum v/c Ratio: 0.54	Intersection LOS: A
Intersection Signal Delay: 8.0	ICU Level of Service B
Intersection Capacity Utilization 61.2%	
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

PM Peak Hour
2035 Future Background-Signalized

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations	↔		↔	↔↔	↔↔	
Traffic Volume (vph)	119	125	53	620	723	72
Future Volume (vph)	119	125	53	620	723	72
Satd. Flow (prot)	1252	0	1658	3252	3261	0
Fit Permitted	0.976		0.330			
Satd. Flow (perm)	1243	0	575	3252	3261	0
Satd. Flow (RTOR)	102				21	
Lane Group Flow (vph)	244	0	53	620	795	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	14.0		35.2	35.2	35.2	
Actuated g/C Ratio	0.23		0.59	0.59	0.59	
v/c Ratio	0.66		0.16	0.32	0.41	
Control Delay	20.5		6.5	5.7	8.3	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	20.5		6.5	5.7	8.3	
LOS	C		A	A	A	
Approach Delay	20.5			5.7	8.3	
Approach LOS	C			A	A	
Queue Length 50th (m)	14.0		2.0	12.7	19.8	
Queue Length 95th (m)	28.7		m5.2	19.1	42.3	
Internal Link Dist (m)	15.1			104.0	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	569		337	1909	1923	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.43		0.16	0.32	0.41	

Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

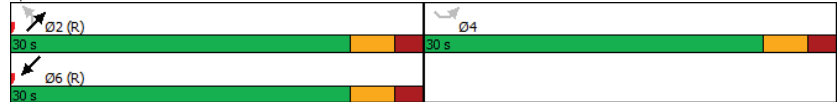
Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

PM Peak Hour
2035 Future Background-Signalized

Maximum v/c Ratio: 0.66	Intersection LOS: A
Intersection Signal Delay: 9.0	ICU Level of Service C
Intersection Capacity Utilization 65.4%	
Analysis Period (min) 15	

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

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



Lanes, Volumes, Timings
5: St. Laurent & Pleasant

PM Peak Hour
2035 Future Background-Signalized

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations	↖	↗	↖	↗	↖	↗	
Traffic Volume (vph)	126	149	101	543	649	155	
Future Volume (vph)	126	149	101	543	649	155	
Satd. Flow (prot)	1566	1469	1658	1712	1745	1483	
Fit Permitted	0.950		0.356				
Satd. Flow (perm)	1548	1424	617	1712	1745	1421	
Satd. Flow (RTOR)		149				155	
Lane Group Flow (vph)	126	149	101	543	649	155	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	11.2	11.2	42.0	42.0	42.0	42.0	
Actuated g/C Ratio	0.19	0.19	0.70	0.70	0.70	0.70	
v/c Ratio	0.43	0.39	0.23	0.45	0.53	0.15	
Control Delay	26.2	7.4	7.4	7.5	10.5	2.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.2	7.4	7.4	7.5	10.5	2.6	
LOS	C	A	A	A	B	A	
Approach Delay	16.0			7.5	9.0		
Approach LOS	B			A	A		
Queue Length 50th (m)	12.7	0.0	3.9	25.5	53.3	1.5	
Queue Length 95th (m)	24.1	11.6	12.6	55.0	101.7	4.5	
Internal Link Dist (m)	450.4			257.0	226.8		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	399	478	431	1197	1220	1040	
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	0.32	0.31	0.23	0.45	0.53	0.15	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 23 (38%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

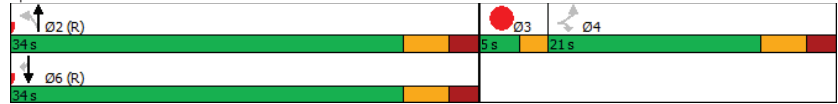
Lanes, Volumes, Timings
5: St. Laurent & Pleasant

PM Peak Hour
2035 Future Background-Signalized

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 66.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



HCM 2010 TWSC
6: Russell & Access #1

PM Peak Hour
2035 Future Background-Signalized

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔ ↗ ↘ ↖ ↗ ↘ ↖ ↗ ↘ ↖ ↗ ↘ ↖					
Traffic Vol, veh/h	11	18	8	430	814	19
Future Vol, veh/h	11	18	8	430	814	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	18	8	430	814	19

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1270	824	833
Stage 1	824	-	-
Stage 2	446	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	186	373	800
Stage 1	431	-	-
Stage 2	645	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	184	373	800
Mov Cap-2 Maneuver	184	-	-
Stage 1	425	-	-
Stage 2	645	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	800	-	268	-
HCM Lane V/C Ratio	0.01	-	0.108	-
HCM Control Delay (s)	9.5	0	20.1	-
HCM Lane LOS	A	A	C	-
HCM 95th %tile Q(veh)	0	-	0.4	-

Appendix I

Sidra Intersection Worksheets - 2035 Future Background Conditions

MOVEMENT SUMMARY

Site: 101 [St Laurent - Elmvale AM FB2035 (Site Folder: General)]

Starlight 1971 St Laurent Blvd
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist m				
South: St Laurent														
1	L2	34	2.0	34	2.0	0.256	7.7	LOS A	1.3	9.0	0.20	0.39	0.20	39.8
2	T1	10	2.0	10	2.0	0.256	2.3	LOS A	1.3	9.0	0.20	0.39	0.20	49.5
3	R2	664	2.0	664	2.0	0.256	2.7	LOS A	1.3	9.0	0.20	0.37	0.20	48.1
Approach		708	2.0	708	2.0	0.256	3.0	LOS A	1.3	9.0	0.20	0.37	0.20	47.6
East: St Laurent														
4	L2	486	2.0	486	2.0	0.196	7.6	LOS A	0.8	6.0	0.15	0.55	0.15	47.7
5	T1	49	2.0	49	2.0	0.196	4.4	LOS A	0.8	6.0	0.14	0.54	0.14	35.5
6	R2	16	2.0	16	2.0	0.196	2.6	LOS A	0.8	6.0	0.14	0.54	0.14	46.0
Approach		551	2.0	551	2.0	0.196	7.2	LOS A	0.8	6.0	0.15	0.55	0.15	46.2
North: Service Road														
7	L2	9	50.0	9	50.0	0.024	10.3	LOS B	0.1	0.8	0.47	0.60	0.47	47.3
8	T1	6	50.0	6	50.0	0.024	4.7	LOS A	0.1	0.8	0.47	0.60	0.47	47.1
9	R2	2	50.0	2	50.0	0.024	5.0	LOS A	0.1	0.8	0.47	0.60	0.47	45.6
Approach		17	50.0	17	50.0	0.024	7.7	LOS A	0.1	0.8	0.47	0.60	0.47	47.0
West: Elmvale Mall														
10	L2	5	2.0	5	2.0	0.114	3.6	LOS A	0.4	3.1	0.44	0.33	0.44	37.9
11	T1	49	2.0	49	2.0	0.114	1.6	LOS A	0.4	3.1	0.44	0.33	0.44	37.2
12	R2	56	2.0	56	2.0	0.114	1.6	LOS A	0.4	3.1	0.44	0.33	0.44	36.5
Approach		110	2.0	110	2.0	0.114	1.7	LOS A	0.4	3.1	0.44	0.33	0.44	36.9
All Vehicles		1386	2.6	1386	2.6	0.256	4.6	LOS A	1.3	9.0	0.20	0.44	0.20	46.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [St Laurent - Elmvale PM FB2035 (Site Folder: General)]

Starlight 1971 St Laurent Blvd
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist m				
South: St Laurent														
1	L2	53	2.0	53	2.0	0.279	8.0	LOS A	1.4	9.6	0.31	0.44	0.31	39.5
2	T1	10	2.0	10	2.0	0.279	2.6	LOS A	1.4	9.6	0.31	0.44	0.31	48.9
3	R2	610	2.0	610	2.0	0.279	3.0	LOS A	1.4	9.8	0.30	0.42	0.30	47.7
Approach		673	2.0	673	2.0	0.279	3.4	LOS A	1.4	9.8	0.30	0.42	0.30	46.9
East: St Laurent														
4	L2	723	2.0	723	2.0	0.290	7.7	LOS A	1.4	10.2	0.20	0.56	0.20	47.5
5	T1	54	2.0	54	2.0	0.290	4.5	LOS A	1.4	10.2	0.20	0.55	0.20	35.4
6	R2	18	2.0	18	2.0	0.290	2.7	LOS A	1.4	10.2	0.20	0.55	0.20	45.8
Approach		795	2.0	795	2.0	0.290	7.4	LOS A	1.4	10.2	0.20	0.56	0.20	46.4
North: Service Road														
7	L2	9	50.0	9	50.0	0.030	11.2	LOS B	0.1	1.0	0.54	0.67	0.54	46.9
8	T1	6	50.0	6	50.0	0.030	5.6	LOS A	0.1	1.0	0.54	0.67	0.54	46.7
9	R2	3	50.0	3	50.0	0.030	5.9	LOS A	0.1	1.0	0.54	0.67	0.54	45.3
Approach		18	50.0	18	50.0	0.030	8.5	LOS A	0.1	1.0	0.54	0.67	0.54	46.6
West: Elmvale Mall														
10	L2	5	2.0	5	2.0	0.284	4.5	LOS A	1.2	8.4	0.57	0.51	0.57	37.6
11	T1	114	2.0	114	2.0	0.284	2.6	LOS A	1.2	8.4	0.57	0.51	0.57	37.0
12	R2	125	2.0	125	2.0	0.284	2.6	LOS A	1.2	8.4	0.57	0.51	0.57	36.3
Approach		244	2.0	244	2.0	0.284	2.6	LOS A	1.2	8.4	0.57	0.51	0.57	36.7
All Vehicles		1730	2.5	1730	2.5	0.290	5.2	LOS A	1.4	10.2	0.30	0.50	0.30	44.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

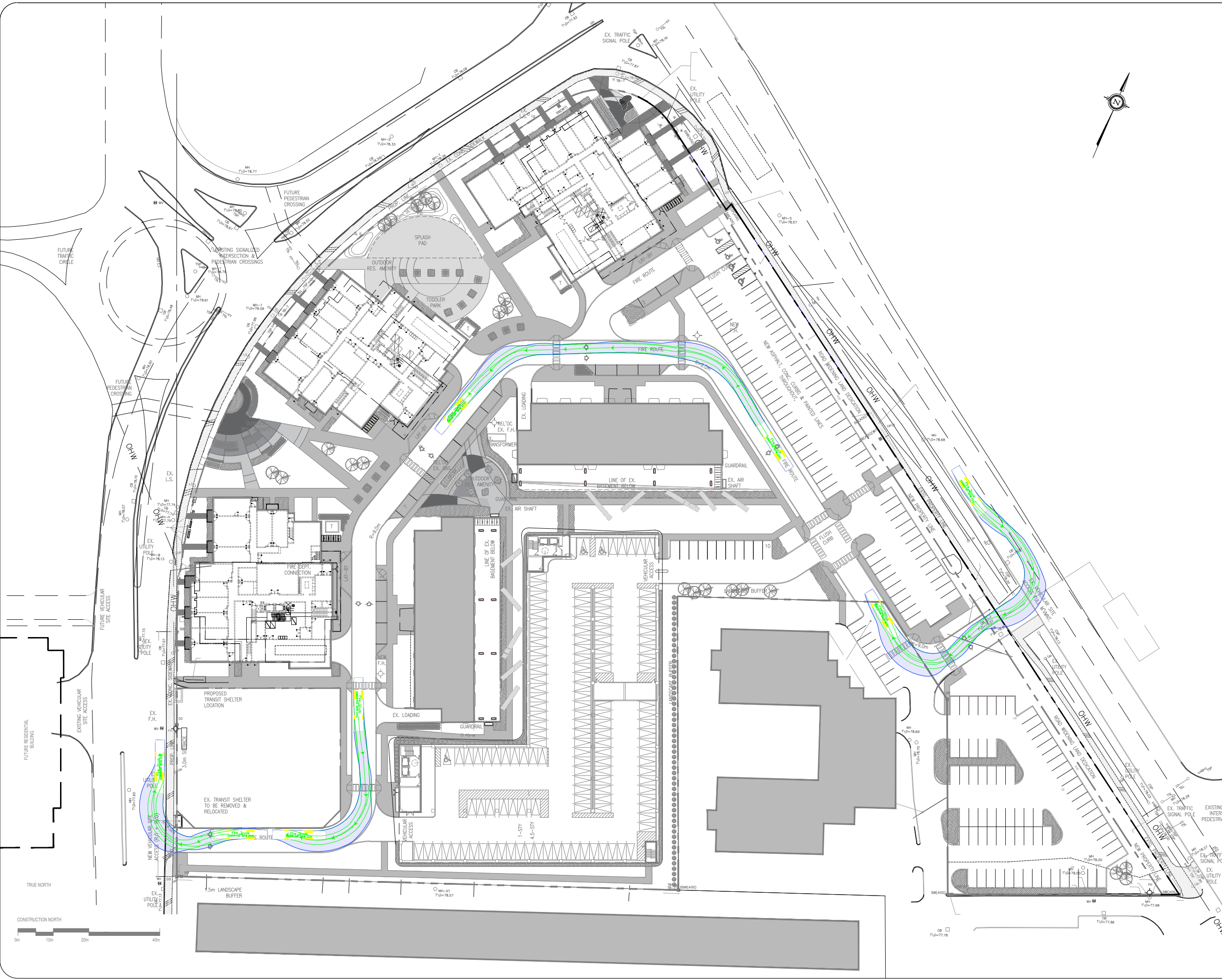
Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

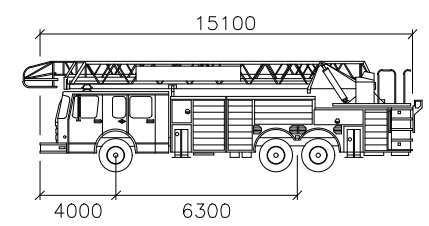
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix J

Turning Templates



Notes:



Fire Truck

Width : 2600 mm
 Track : 2600 mm
 Lock to Lock Time : 6.0 mm
 Steering Angle : 32.6 mm

05	Updated Site Plan	AN	2023-03-21
04	Updated Site Plan	AN	2022-12-12
03	Issued for Review	AN	2022-12-05
02	Issued for Review	AN	2022-10-20
01	Issued for Review	BB	2022-10-05
REV: DESCRIPTION:		BY:	DATE:
STATUS:			

CGH Transportation
 6 Plaza Court
 Ottawa, ON
 K2H 7W1
 (343) 999-9117

CLIENT: **Starlight Development**
 1400-3280 Bloor Street West, Centre Town
 Toronto, ON
 M8X 2X3

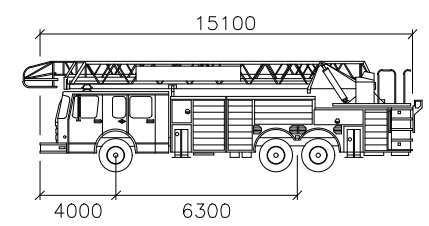
SITE: **1971-1975 St. Laurent**

TITLE: **Turning Movement Analysis
 Fire Truck Movements (1)**

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH
PROJECT NO:	DRAWING NO:	REVISION:	
2020-23	001	05	



Notes:



Fire Truck

Width : 2600
 Track : 2600
 Lock to Lock Time : 6.0
 Steering Angle : 32.6

05	Updated Site Plan	AN	2023-03-21
04	Updated Site Plan	AN	2022-12-12
03	Issued for Review	AN	2022-12-05
02	Issued for Review	AN	2022-10-20
01	Issued for Review	BB	2022-10-05
REV: DESCRIPTION:		BY:	DATE:
STATUS:			

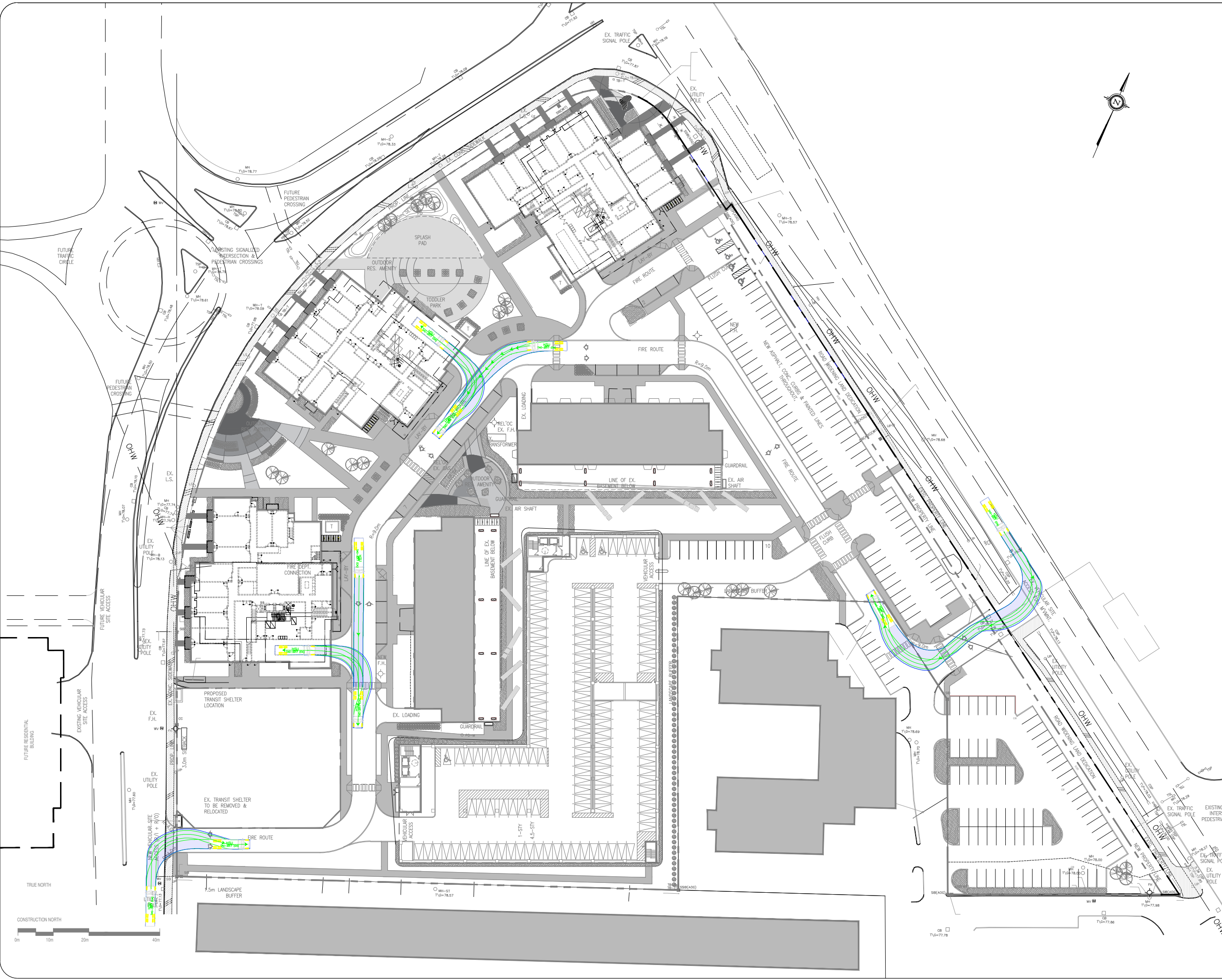
CGH Transportation
 6 Plaza Court
 Ottawa, ON
 K2H 7W1
 (343) 999-9117

CLIENT: **Sarlight Development**
 1400-3280 Bloor Street West, Centre Town
 Toronto, ON
 M8X 2X3

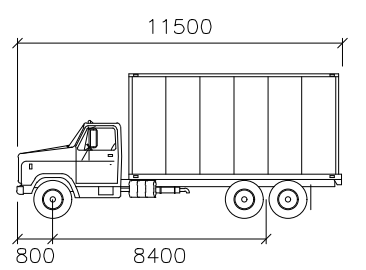
SITE: **1971-1975 St. Laurent**

TITLE: **Turning Movement Analysis
 Fire Truck Movements (2)**

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH
PROJECT NO:	DRAWING NO:	REVISION:	
2020-23	002	05	



Notes:



HSU
 Width : 2600 mm
 Track : 2600 mm
 Lock to Lock Time : 6.0
 Steering Angle : 40.0

05	Updated Site Plan	AN	2023-03-21
04	Updated Site Plan	AN	2022-12-12
03	Issued for Review	AN	2022-12-05
02	Issued for Review	AN	2022-10-20
01	Issued for Review	BB	2022-10-05
REV: DESCRIPTION:		BY:	DATE:
STATUS:			

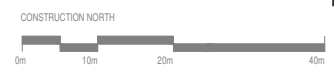
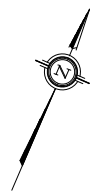
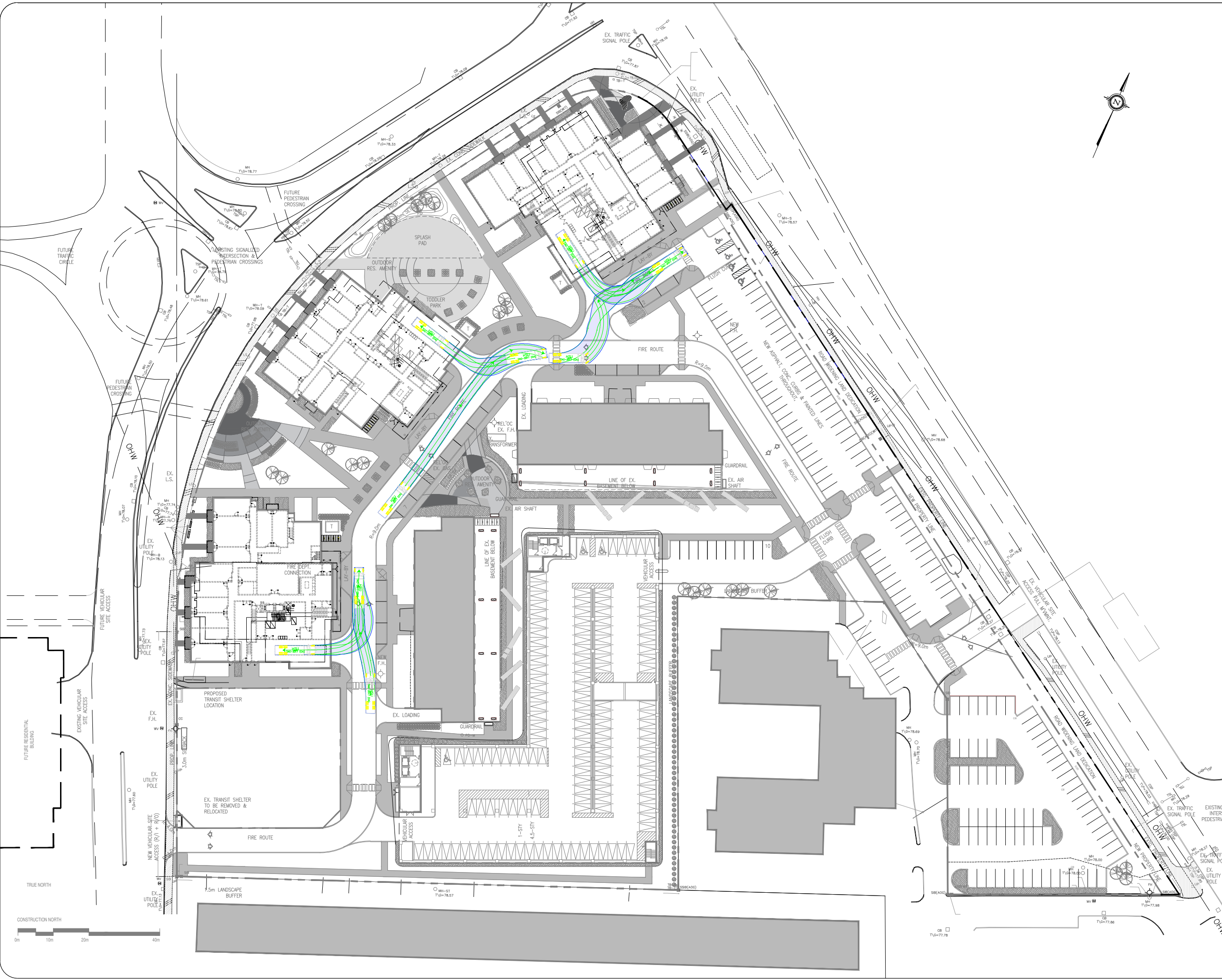
CGH Transportation
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 Ottawa, ON
 K2H 7W1
 (343) 999-9117

CLIENT: **Sarlight Development**
 1400-3280 Bloor Street West, Centre Town
 Toronto, ON
 M8X 2X3

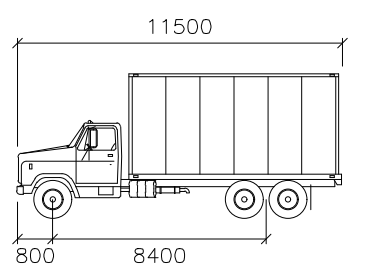
ARCHITECT:

SITE: **1971-1975 St. Laurent**
 TITLE: **Turning Movement Analysis
 HSJ Turning Movements (1)**

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH
PROJECT NO:	DRAWING NO:	REVISION:	
2020-23	003	05	



Notes:



HSU
 Width : 2600 mm
 Track : 2600 mm
 Lock to Lock Time : 6.0
 Steering Angle : 40.0

05	Updated Site Plan	AN	2023-03-21
04	Updated Site Plan	AN	2022-12-12
03	Issued for Review	AN	2022-12-05
02	Issued for Review	AN	2022-10-20
01	Issued for Review	BB	2022-10-05
REV: DESCRIPTION:		BY:	DATE:
STATUS:			

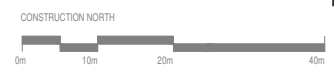
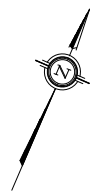
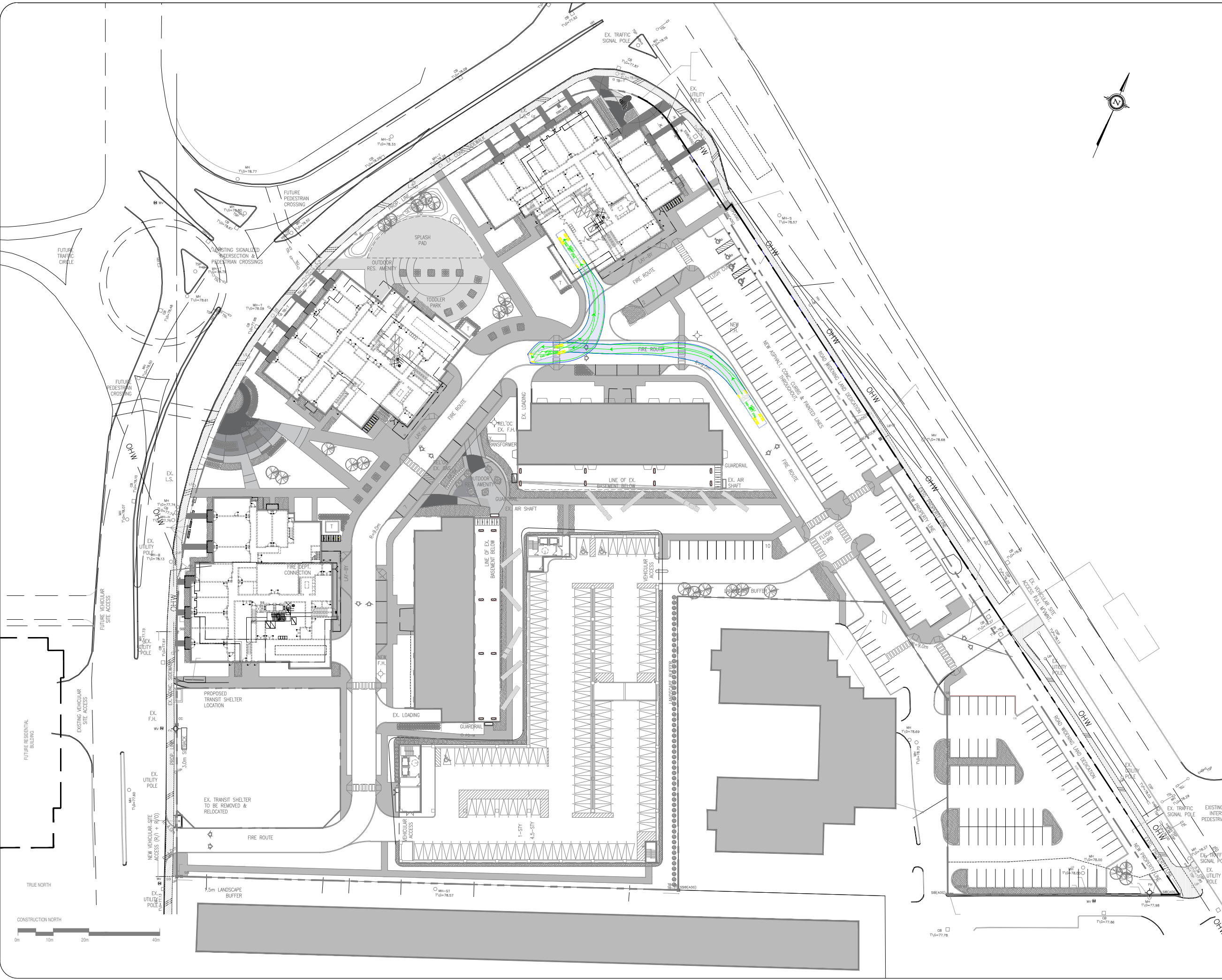
CGH Transportation
 6 Plaza Court
 Ottawa, ON
 K2H 7W1
 (343) 999-9117

CLIENT: **Sarlight Development**
 1400-3280 Bloor Street West, Centre Town
 Toronto, ON
 M8X 2X3

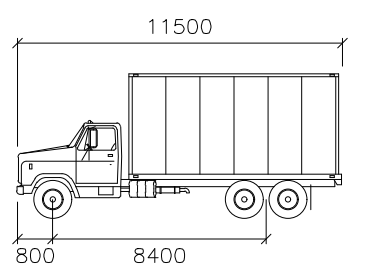
SITE: **1971-1975 St. Laurent**

TITLE: **Turning Movement Analysis
 HSJ Turning Movements (2)**

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH
PROJECT NO:	DRAWING NO:	REVISION:	
2020-23	004	05	



Notes:



HSU
 Width : 2600 mm
 Track : 2600
 Lock to Lock Time : 6.0
 Steering Angle : 40.0

05	Updated Site Plan	AN	2023-03-21
04	Updated Site Plan	AN	2022-12-12
03	Issued for Review	AN	2022-12-05
02	Issued for Review	AN	2022-10-20
01	Issued for Review	BB	2022-10-05
REV: DESCRIPTION:		BY:	DATE:
STATUS:			

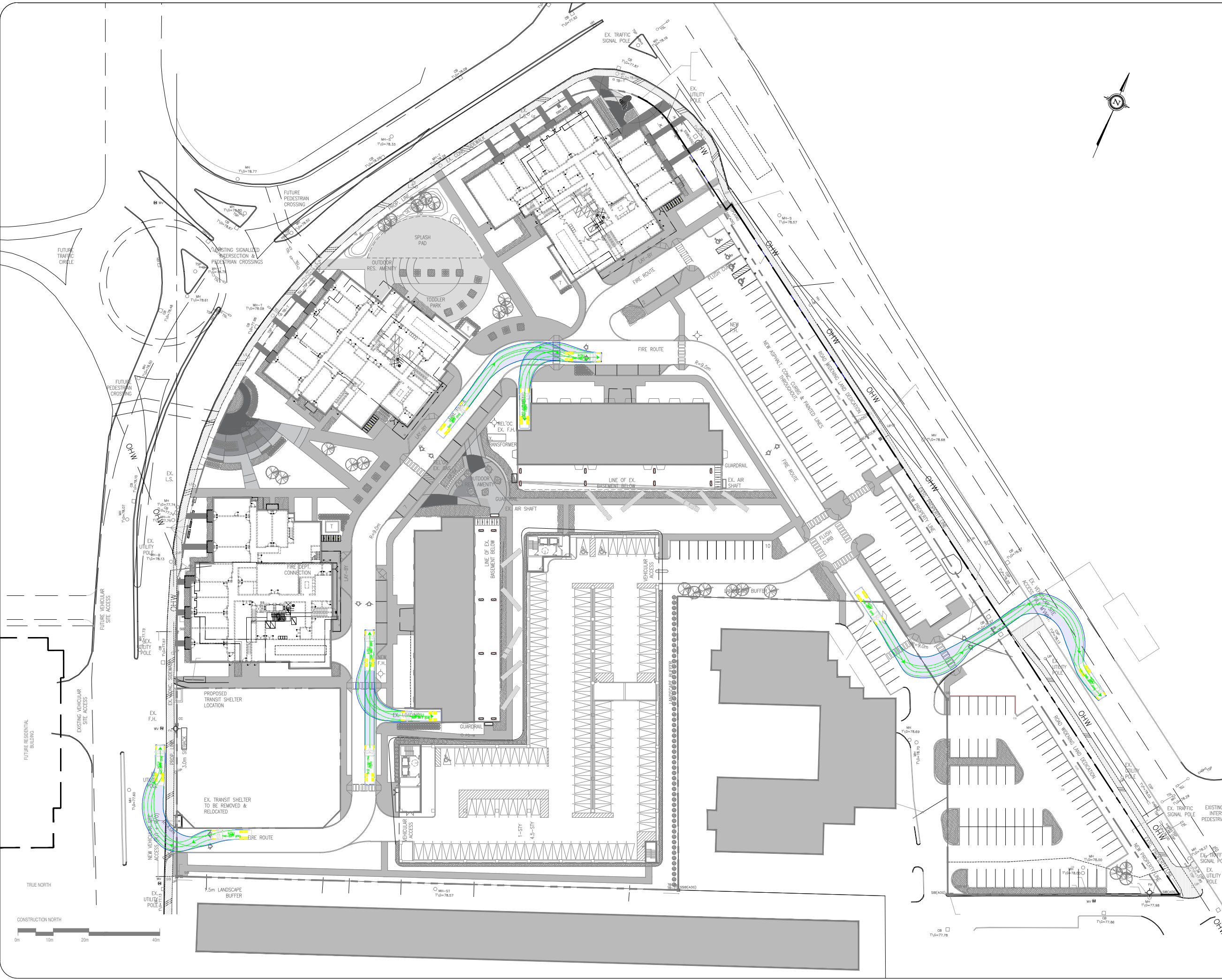
CGH Transportation
 6 Plaza Court
 Ottawa, ON
 K2H 7W1
 (343) 999-9117

CLIENT: **Sarlight Development**
 1400-3280 Bloor Street West, Centre Town
 Toronto, ON
 M8X 2X3

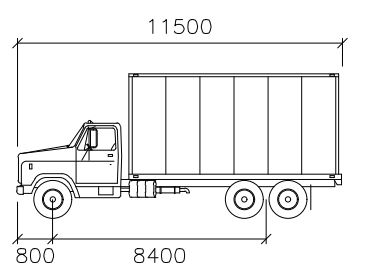
SITE: **1971-1975 St. Laurent**

TITLE: **Turning Movement Analysis
 HSJ Turning Movements (3)**

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH
PROJECT NO:	DRAWING NO:	REVISION:	
2020-23	005	05	



Notes:



HSU
 Width : 2600 mm
 Track : 2600 mm
 Lock to Lock Time : 6.0
 Steering Angle : 40.0

05	Updated Site Plan	AN	2023-03-21
04	Updated Site Plan	AN	2022-12-12
03	Issued for Review	AN	2022-12-05
02	Issued for Review	AN	2022-10-20
01	Issued for Review	BB	2022-10-05
REV: DESCRIPTION:		BY:	DATE:
STATUS:			

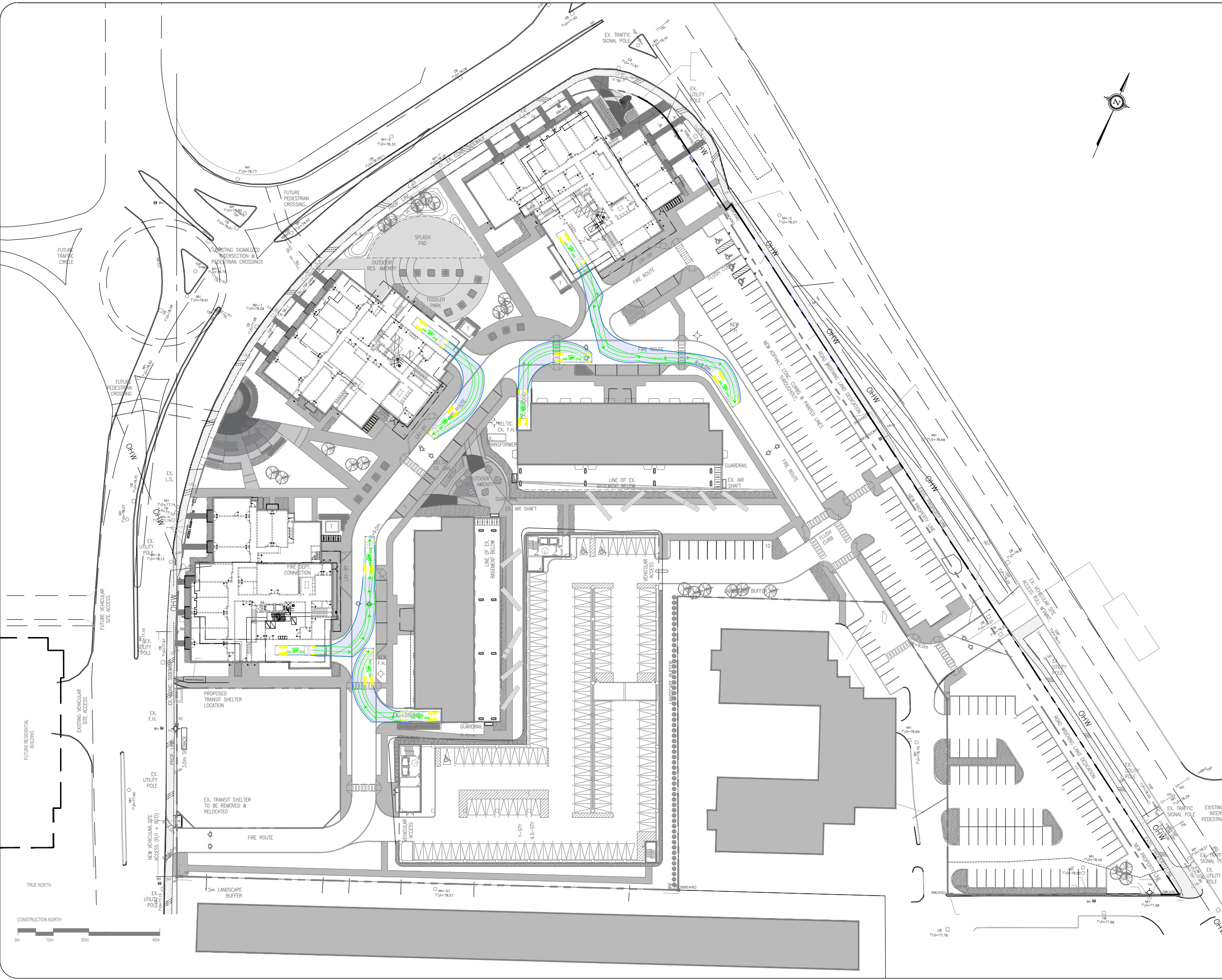
CGH Transportation
 6 Plaza Court
 Ottawa, ON
 K2H 7W1
 (343) 999-9117

CLIENT: **Sarlight Development**
 1400-3280 Bloor Street West, Centre Town
 Toronto, ON
 M8X 2X3

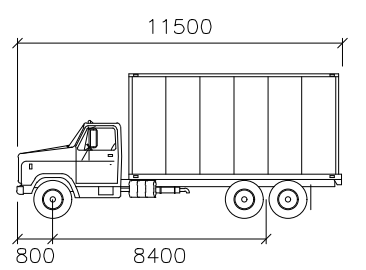
SITE: **1971-1975 St. Laurent**

TITLE: **Turning Movement Analysis
 HSJ Turning Movements (4)**

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH
PROJECT NO:	DRAWING NO:	REVISION:	
2020-23	006	05	



Notes:



HSU
 Width : 2600 mm
 Track : 2600 mm
 Lock to Lock Time : 6.0
 Steering Angle : 40.0

05	Updated Site Plan	AN	2023-03-21
04	Updated Site Plan	AN	2022-12-12
03	Issued for Review	AN	2022-12-05
02	Issued for Review	AN	2022-10-20
01	Issued for Review	BB	2022-10-13
REV: DESCRIPTION:		BY:	DATE:
STATUS:			

CGH Transportation
 6 Plaza Court
 Ottawa, ON
 K2H 7W1
 (343) 999-9117

CLIENT: **Sarlight Development**
 1400-3280 Bloor Street West, Centre Town
 Toronto, ON
 M8X 2X3

SITE: **1971-1975 St. Laurent**

TITLE: **Turning Movement Analysis
 HSJ Turning Movements (5)**

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH
PROJECT NO:	DRAWING NO:	REVISION:	
2020-23	007	05	

Appendix K

MMLOS Analysis

Multi-Modal Level of Service - Intersections Form

Consultant Scenario Comments	CGH Transportation Inc.	Project Date	1971 & 1975 St. Laurent Boulevard
	Existing/Future		12/12/2022

INTERSECTIONS		St. Laurent Boulevard at Smyth Road/ Lancaster Road				Russell Road at St. Laurent Boulevard				Russell Road at Southvale Crescent				St. Laurent Boulevard at St. Laurent Boulevard Service Road (Existing)				St. Laurent Boulevard at Pleasant Park				
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	
Pedestrian	Lanes	10+	10+	10+	10+		9		10+	4	4	5		10+	10+		9	5	5		4	
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	
	Conflicting Left Turns	Protected	Protected	Protected	Protected		No left turn / Prohib.		Protected/ Permissive	No left turn / Prohib.	Permissive	Permissive		Permissive	No left turn / Prohib.		Permissive	No left turn / Prohib.		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	No right turn	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	
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed		RTOR allowed	RTOR allowed	RTOR prohibited	RTOR allowed		RTOR allowed	RTOR prohibited		RTOR allowed	RTOR prohibited		RTOR allowed	RTOR allowed	
	Ped Signal Leading Interval?	No	No	No	No		No		No	No	No	No		No	No		No	No		No	Yes	
	Right Turn Channel	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 Channel	No Right Turn	No Channel		No Right Turn	Conventional with Receiving Lane		Conv'tl without Receiving Lane	No Channel		No Right Turn	No Channel	
	Corner Radius	>25m	>25m	>25m	>25m		15-25m		15-25m	5-10m	No Right Turn	10-15m		No Right Turn	15-25m		15-25m	10-15m		No Right Turn	5-10m	
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	
	PETS I Score		-36	-36	-36	-36		-19		-46	62	71	37		-30	-35		-27	52	48		56
Ped. Exposure to Traffic LoS		F	F	F	F		F		F	C	C	E		F	F		F	D	D		D	
Cycle Length		120	120	120	120		70		70	60	60	60		60	60		60	60	60		60	
Effective Walk Time		31	31	7	7		34		10	7	18	18		17	17		9	21	29		8	
Average Pedestrian Delay		33	33	53	53		9		26	23	15	15		15	15		22	13	8		23	
Pedestrian Delay LoS		D	D	E	E		A		C	C	B	B		B	B		C	B	A		C	
Level of Service		F	F	F	F		F		F	C	C	E		F	F		F	D	D		D	
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	
Bicycle	Bicycle Lane Arrangement on Approach	Curb Bike Lane, Cycletrack or MUP	Pocket Bike Lane	Pocket Bike Lane	Pocket Bike Lane	Pocket Bike Lane	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	
	Right Turn Lane Configuration	Not Applicable	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn			≤ 50 m		≤ 50 m	≤ 50 m		≤ 50 m			≤ 50 m	> 50 m			≤ 50 m	
	Right Turning Speed	Not Applicable	> 30 km/h	> 30 km/h	> 30 km/h	> 30 km/h	> 25 to 30 km/h		> 25 km/h		≤ 25 km/h	≤ 25 km/h		> 25 km/h			> 25 km/h	≤ 25 km/h			≤ 25 km/h	
	Cyclist relative to RT motorists	Not Applicable	F	F	F	F	F	#N/A	-	E	#N/A	D	D		E	#N/A	-	E	F	#N/A	-	D
	Separated or Mixed Traffic	Separated	Separated	Separated	Separated	Separated	Separated	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic
	Left Turn Approach	2-stage, LT box	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed		≥ 2 lanes crossed		No lane crossed	One lane crossed		One lane crossed		≥ 2 lanes crossed		One lane crossed		One lane crossed			One lane crossed
Operating Speed	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 50 to < 60 km/h		> 50 to < 60 km/h	> 40 to ≤ 50 km/h		> 40 to ≤ 50 km/h		> 50 to < 60 km/h		> 50 to < 60 km/h		> 50 to < 60 km/h			> 50 to < 60 km/h	
Left Turning Cyclist		A	F	F	F		F		C	D		D		F		E		E			E	
Level of Service		A	F	F	F		#N/A		E	#N/A		D		#N/A		E		#N/A			E	
Level of Service			F				#N/A			#N/A				#N/A				#N/A				
Transit	Average Signal Delay	≤ 40 sec	> 40 sec		≤ 10 sec	≤ 30 sec	≤ 20 sec		≤ 30 sec	≤ 10 sec	≤ 10 sec	≤ 10 sec		≤ 10 sec	≤ 10 sec		≤ 30 sec	≤ 10 sec	≤ 10 sec		≤ 10 sec	
	Level of Service	E	F	-	B	D	C		D	B	B	B		B	B		D	B	B		-	
Level of Service			F				D			B				D				B				
Truck	Effective Corner Radius	> 15 m	> 15 m	> 15 m	> 15 m																	
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	≥ 2	≥ 2																	
Level of Service		A	A	A	A																	
Level of Service			A																			
Auto	Volume to Capacity Ratio		0.91 - 1.00				0.61 - 0.70				0.0 - 0.60				0.0 - 0.60				0.0 - 0.60			
	Level of Service		E				B				A				A				A			

Multi-Modal Level of Service - Segments Form

Consultant Scenario Comments	CGH Transportation Inc.	Project Date	1971 & 1975 St. Laurent Boulevard
	Existing/Future		12/12/2022

SEGMENTS			St. Laurent Blvd 1	Russell Rd 2	Section 3
Pedestrian	Sidewalk Width	-	≥ 2 m	1.5 m	
	Boulevard Width		< 0.5	> 2 m	
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	
	Operating Speed		> 50 to 60 km/h	> 50 to 60 km/h	
	On-Street Parking		no	no	
	Exposure to Traffic PLoS		E	E	-
	Effective Sidewalk Width				
Pedestrian Volume					
Crowding PLoS	-	-	-		
Level of Service	-	-	-		
Bicycle	Type of Cycling Facility	E	Mixed Traffic	Mixed Traffic	
	Number of Travel Lanes		4-5 lanes total	≤ 2 (no centreline)	
	Operating Speed		≥ 50 to 60 km/h	≥ 50 to 60 km/h	
	# of Lanes & Operating Speed LoS		E	D	-
	Bike Lane (+ Parking Lane) Width				
	Bike Lane Width LoS		-	-	-
	Bike Lane Blockages				
	Blockage LoS		-	-	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	
	Sidestreet Operating Speed		≤ 40 km/h	≤ 40 km/h	
Unsignalized Crossing - Lowest LoS	A	A	-		
Level of Service	E	D	-		
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic	
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	
	Level of Service		D	D	-
Truck	Truck Lane Width	B		> 3.7 m	
	Travel Lanes per Direction			1	
	Level of Service		-	B	-

Appendix L

TDM Checklist

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

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

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

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

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

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

TDM measures: Residential developments		Check if proposed & add descriptions
6. TDM MARKETING & COMMUNICATIONS		
6.1 Multimodal travel information		
BASIC ★	6.1.1 Provide a multimodal travel option information package to new residents	<input checked="" type="checkbox"/>
6.2 Personalized trip planning		
BETTER ★	6.2.1 Offer personalized trip planning to new residents	<input type="checkbox"/>

Appendix M

Synchro Intersection Worksheets – 2030 Future Total Conditions

Lanes, Volumes, Timings

1: Russell/St. Laurent & Smyth/Lancaster

AM Peak Hour

2030 Future Total

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	386	135	120	32	280	107	193	1172	96	137	632	653
Future Volume (vph)	386	135	120	32	280	107	193	1172	96	137	632	653
Satd. Flow (prot)	3216	1728	1339	1421	3066	0	1483	3122	0	1626	3191	1483
Fit Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3175	1728	1295	1396	3066	0	1476	3122	0	1622	3191	1448
Satd. Flow (RTOR)			132		41			8				402
Lane Group Flow (vph)	386	135	120	32	387	0	193	1268	0	137	632	653
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0		20.0	52.0		20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%		16.7%	43.3%		16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
Lost Time Adjust (s)	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		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	14.4	29.4	29.4	8.2	18.5		17.8	50.2		13.7	46.1	46.1
Actuated g/C Ratio	0.12	0.24	0.24	0.07	0.15		0.15	0.42		0.11	0.38	0.38
v/c Ratio	1.00	0.32	0.29	0.33	0.76		0.88	0.97		0.74	0.52	0.81
Control Delay	99.4	41.1	7.2	61.4	53.5		87.3	53.2		74.8	30.2	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	99.4	41.1	7.2	61.4	53.5		87.3	53.2		74.8	30.2	21.5
LOS	F	D	A	E	D		F	D		E	C	C
Approach Delay		69.9			54.1			57.7			30.5	
Approach LOS		E			D			E			C	
Queue Length 50th (m)	-47.5	27.5	0.0	7.3	41.5		45.2	~166.1		31.0	59.4	56.3
Queue Length 95th (m)	#79.3	46.3	12.8	17.2	56.6		#97.8	#213.8		#60.3	77.0	113.8
Internal Link Dist (m)		111.9			87.8			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	385	422	416	170	603		220	1310		197	1225	803
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	1.00	0.32	0.29	0.19	0.64		0.88	0.97		0.70	0.52	0.81

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: 115

Control Type: Actuated-Coordinated

Scenario 1 1971 - 1975 St. Laurent Boulevard 11:59 pm 10/21/2021 2030 Future Total

Synchro 11 Report
Page 1

Lanes, Volumes, Timings

1: Russell/St. Laurent & Smyth/Lancaster

AM Peak Hour

2030 Future Total

Maximum v/c Ratio: 1.00	Intersection LOS: D
Intersection Signal Delay: 49.5	ICU Level of Service E
Intersection Capacity Utilization 90.0%	
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.	

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster



Scenario 1 1971 - 1975 St. Laurent Boulevard 11:59 pm 10/21/2021 2030 Future Total

Synchro 11 Report
Page 2

Lanes, Volumes, Timings
2: Russell & St. Laurent

AM Peak Hour
2030 Future Total

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔		↔	↕↕	↕↕	↔
Traffic Volume (vph)	712	58	80	748	337	471
Future Volume (vph)	712	58	80	748	337	471
Satd. Flow (prot)	3020	0	1658	2866	2866	1441
Fit Permitted	0.956		0.549			
Satd. Flow (perm)	3020	0	953	2866	2866	1412
Satd. Flow (RTOR)	14					471
Lane Group Flow (vph)	770	0	80	748	337	471
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			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)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	23.9	23.9
Actuated g/C Ratio	0.36		0.48	0.48	0.34	0.34
v/c Ratio	0.71		0.15	0.55	0.34	0.59
Control Delay	23.3		11.5	14.8	19.6	5.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.3		11.5	14.8	19.6	5.7
LOS	C		B	B	B	A
Approach Delay	23.3			14.4	11.5	
Approach LOS	C			B	B	
Queue Length 50th (m)	42.9		5.4	34.2	18.0	0.0
Queue Length 95th (m)	61.2		11.9	49.2	28.5	19.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1087		521	1371	978	792
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.71		0.15	0.55	0.34	0.59

Intersection Summary

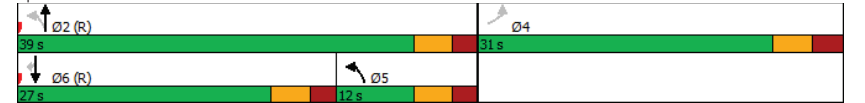
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
2: Russell & St. Laurent

AM Peak Hour
2030 Future Total

Maximum v/c Ratio: 0.71	Intersection LOS: B
Intersection Signal Delay: 16.3	ICU Level of Service B
Intersection Capacity Utilization 58.9%	
Analysis Period (min) 15	

Splits and Phases: 2: Russell & St. Laurent



Lanes, Volumes, Timings
3: Southvale & Russell

AM Peak Hour
2030 Future Total

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	17	222	596	9	55	324
Future Volume (vph)	17	222	596	9	55	324
Satd. Flow (prot)	1595	1455	1560	0	1458	1548
Fit Permitted	0.950				0.377	
Satd. Flow (perm)	1531	1401	1560	0	578	1548
Satd. Flow (RTOR)		222	2			
Lane Group Flow (vph)	17	222	605	0	55	324
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		23.5	23.5
Total Split (s)	22.3	22.3	42.7		42.7	42.7
Total Split (%)	34.3%	34.3%	65.7%		65.7%	65.7%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.8		42.8	42.8
Actuated g/C Ratio	0.18	0.18	0.66		0.66	0.66
v/c Ratio	0.06	0.52	0.59		0.14	0.32
Control Delay	21.4	8.3	9.9		6.2	6.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	21.4	8.3	9.9		6.2	6.4
LOS	C	A	A		A	A
Approach Delay	9.2		9.9			6.4
Approach LOS	A		A			A
Queue Length 50th (m)	1.8	0.0	30.9		1.9	12.8
Queue Length 95th (m)	5.6	14.0	78.4		7.8	33.1
Internal Link Dist (m)	422.1		18.0			54.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	400	530	1027		380	1019
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.42	0.59		0.14	0.32

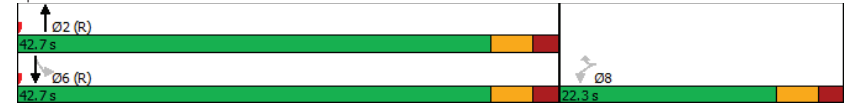
Intersection Summary	
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	10 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
3: Southvale & Russell

AM Peak Hour
2030 Future Total

Maximum v/c Ratio: 0.59	Intersection LOS: A
Intersection Signal Delay: 8.7	ICU Level of Service C
Intersection Capacity Utilization 65.5%	
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

AM Peak Hour
2030 Future Total

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	54	56	34	716	486	65
Future Volume (vph)	54	56	34	716	486	65
Satd. Flow (prot)	1112	0	1551	3283	3228	0
Fit Permitted	0.976		0.446			
Satd. Flow (perm)	1103	0	728	3283	3228	0
Satd. Flow (RTOR)	56			29		
Lane Group Flow (vph)	110	0	34	716	551	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	11.0		42.3	42.3	42.3	
Actuated g/C Ratio	0.18		0.70	0.70	0.70	
v/c Ratio	0.44		0.07	0.31	0.24	
Control Delay	18.0		4.8	5.2	4.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	18.0		4.8	5.2	4.7	
LOS	B		A	A	A	
Approach Delay	18.0			5.1	4.7	
Approach LOS	B			A	A	
Queue Length 50th (m)	5.3		1.3	18.7	10.2	
Queue Length 95th (m)	16.2		m4.7	35.4	20.4	
Internal Link Dist (m)	18.7			139.8	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	485		513	2315	2285	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.23		0.07	0.31	0.24	

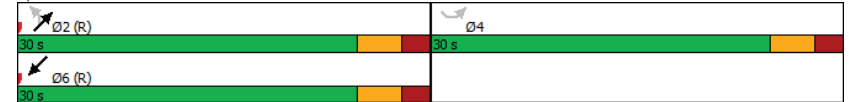
Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

AM Peak Hour
2030 Future Total

Maximum v/c Ratio: 0.44	Intersection Signal Delay: 6.0	Intersection LOS: A
Intersection Capacity Utilization 57.2%	ICU Level of Service B	
Analysis Period (min) 15		
m Volume for 95th percentile queue is metered by upstream signal.		

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



Lanes, Volumes, Timings
5: St. Laurent & Pleasant

AM Peak Hour
2030 Future Total

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations	↖	↗	↖	↗	↗	↖	
Traffic Volume (vph)	118	95	77	430	473	78	
Future Volume (vph)	118	95	77	430	473	78	
Satd. Flow (prot)	1658	1483	1642	1728	1679	1401	
Fit Permitted	0.950		0.473				
Satd. Flow (perm)	1654	1393	808	1728	1679	1337	
Satd. Flow (RTOR)		95				78	
Lane Group Flow (vph)	118	95	77	430	473	78	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	10.9	10.9	42.3	42.3	42.3	42.3	
Actuated g/C Ratio	0.18	0.18	0.70	0.70	0.70	0.70	
v/c Ratio	0.39	0.29	0.14	0.35	0.40	0.08	
Control Delay	25.6	7.9	5.6	6.2	4.0	0.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.6	7.9	5.6	6.2	4.0	0.3	
LOS	C	A	A	A	A	A	
Approach Delay	17.7			6.1	3.4		
Approach LOS	B			A	A		
Queue Length 50th (m)	11.8	0.0	2.7	18.1	9.4	0.0	
Queue Length 95th (m)	23.0	9.5	8.3	37.9	15.2	0.1	
Internal Link Dist (m)	450.4			257.0	107.5		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	427	430	570	1219	1184	966	
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	0.28	0.22	0.14	0.35	0.40	0.08	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 3 (5%), Referenced to phase 2:NBL and 6:SBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
5: St. Laurent & Pleasant

AM Peak Hour
2030 Future Total

Maximum v/c Ratio: 0.40	Intersection LOS: A
Intersection Signal Delay: 6.9	ICU Level of Service B
Intersection Capacity Utilization 57.8%	
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕	↕	
Traffic Vol, veh/h	12	32	2	816	368	27
Future Vol, veh/h	12	32	2	816	368	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	-	-	-	-	-
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	12	32	2	816	368	27

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1202	382	395
Stage 1	382	-	-
Stage 2	820	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	204	665	1164
Stage 1	690	-	-
Stage 2	433	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	203	665	1164
Mov Cap-2 Maneuver	203	-	-
Stage 1	688	-	-
Stage 2	433	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1164	-	410	-	-
HCM Lane V/C Ratio	0.002	-	0.107	-	-
HCM Control Delay (s)	8.1	0	14.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↕	↕		↕
Traffic Vol, veh/h	0	58	721	14	0	537
Future Vol, veh/h	0	58	721	14	0	537
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	58	721	14	0	537

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	368	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	629	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	629	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	629	-
HCM Lane V/C Ratio	-	-	0.092	-
HCM Control Delay (s)	-	-	11.3	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Lanes, Volumes, Timings
1: Russell/St. Laurent & Smyth/Lancaster

PM Peak Hour
2030 Future Total

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	527	279	227	100	146	230	126	814	93	143	1162	442
Future Volume (vph)	527	279	227	100	146	230	126	814	93	143	1162	442
Satd. Flow (prot)	3216	1745	1469	1642	2935	0	1537	3198	0	1658	3316	1483
Fit Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3123	1745	1430	1625	2935	0	1529	3198	0	1647	3316	1427
Satd. Flow (RTOR)			227		192			11				381
Lane Group Flow (vph)	527	279	227	100	376	0	126	907	0	143	1162	442
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases				4								6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0		17.0	49.0		17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%		14.2%	40.8%		14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
Lost Time Adjust (s)	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		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	20.4	24.9	24.9	12.6	17.1		12.9	45.9		13.5	46.5	46.5
Actuated g/C Ratio	0.17	0.21	0.21	0.10	0.14		0.11	0.38		0.11	0.39	0.39
v/c Ratio	0.97	0.77	0.48	0.58	0.65		0.77	0.74		0.77	0.91	0.56
Control Delay	80.5	60.1	8.6	64.0	28.0		81.5	36.6		79.1	46.6	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	80.5	60.1	8.6	64.0	28.0		81.5	36.6		79.1	46.6	8.1
LOS	F	E	A	E	C		F	D		E	D	A
Approach Delay		59.2			35.5			42.1			39.5	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	64.2	61.9	0.0	22.8	21.0		28.6	98.4		32.6	140.9	9.5
Queue Length 95th (m)	#97.8	#99.7	20.6	38.9	35.7		#65.5	123.6		#73.5	#187.3	38.6
Internal Link Dist (m)		111.7			91.7			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	546	361	476	279	701		164	1229		185	1283	785
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.97	0.77	0.48	0.36	0.54		0.77	0.74		0.77	0.91	0.56

Intersection Summary

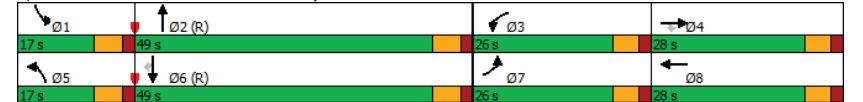
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
1: Russell/St. Laurent & Smyth/Lancaster

PM Peak Hour
2030 Future Total

Maximum v/c Ratio: 0.97	Intersection LOS: D
Intersection Signal Delay: 44.4	ICU Level of Service F
Intersection Capacity Utilization 92.0%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster



Lanes, Volumes, Timings
2: Russell & St. Laurent

PM Peak Hour
2030 Future Total

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔		↔	↕↕	↕↕	↔
Traffic Volume (vph)	655	145	54	376	761	741
Future Volume (vph)	655	145	54	376	761	741
Satd. Flow (prot)	2938	0	1580	2941	3131	1483
Fit Permitted	0.961		0.269			
Satd. Flow (perm)	2938	0	446	2941	3131	1448
Satd. Flow (RTOR)	43					741
Lane Group Flow (vph)	800	0	54	376	761	741
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases	5		2	6		
Permitted Phases	4		2			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)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	26.3	26.3
Actuated g/C Ratio	0.36		0.48	0.48	0.38	0.38
v/c Ratio	0.74		0.17	0.27	0.65	0.74
Control Delay	23.7		13.2	11.6	23.0	7.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.7		13.2	11.6	23.0	7.3
LOS	C		B	B	C	A
Approach Delay	23.7			11.8	15.3	
Approach LOS	C			B	B	
Queue Length 50th (m)	43.8		3.6	14.6	47.4	0.0
Queue Length 95th (m)	63.2		8.9	22.6	#68.7	29.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1076		318	1407	1176	1006
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.74		0.17	0.27	0.65	0.74

Intersection Summary

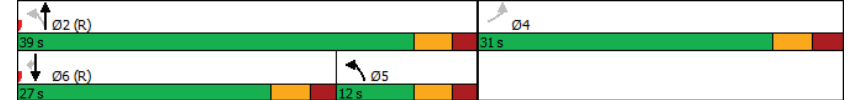
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
2: Russell & St. Laurent

PM Peak Hour
2030 Future Total

Maximum v/c Ratio: 0.74	Intersection LOS: B
Intersection Signal Delay: 17.2	ICU Level of Service C
Intersection Capacity Utilization 65.3%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: Russell & St. Laurent



Lanes, Volumes, Timings
3: Southvale & Russell

PM Peak Hour
2030 Future Total

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	16	108	317	13	201	647
Future Volume (vph)	16	108	317	13	201	647
Satd. Flow (prot)	1658	1441	1672	0	1642	1695
Fit Permitted	0.950				0.561	
Satd. Flow (perm)	1608	1370	1672	0	966	1695
Satd. Flow (RTOR)		108	5			
Lane Group Flow (vph)	16	108	330	0	201	647
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		15.5	15.5
Total Split (s)	22.3	22.3	37.7		37.7	37.7
Total Split (%)	37.2%	37.2%	62.8%		62.8%	62.8%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.0		42.0	42.0
Actuated g/C Ratio	0.19	0.19	0.70		0.70	0.70
v/c Ratio	0.05	0.31	0.28		0.30	0.55
Control Delay	18.7	7.2	6.1		7.3	9.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	18.7	7.2	6.1		7.3	9.2
LOS	B	A	A		A	A
Approach Delay	8.7		6.1			8.7
Approach LOS	A		A			A
Queue Length 50th (m)	1.5	0.0	12.7		8.0	32.7
Queue Length 95th (m)	4.9	9.2	32.9		24.6	83.1
Internal Link Dist (m)	422.1		26.8			60.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	455	465	1171		675	1185
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.23	0.28		0.30	0.55

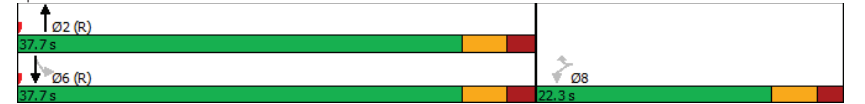
Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	53 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
3: Southvale & Russell

PM Peak Hour
2030 Future Total

Maximum v/c Ratio: 0.55	Intersection Signal Delay: 8.1	Intersection LOS: A
Intersection Capacity Utilization 61.2%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 3: Southvale & Russell



Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

PM Peak Hour
2030 Future Total

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	119	125	53	681	723	72
Future Volume (vph)	119	125	53	681	723	72
Satd. Flow (prot)	1252	0	1658	3252	3261	0
Fit Permitted	0.976		0.330			
Satd. Flow (perm)	1243	0	575	3252	3261	0
Satd. Flow (RTOR)	102				21	
Lane Group Flow (vph)	244	0	53	681	795	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	14.0		35.2	35.2	35.2	
Actuated g/C Ratio	0.23		0.59	0.59	0.59	
v/c Ratio	0.66		0.16	0.36	0.41	
Control Delay	20.5		6.5	5.8	8.3	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	20.5		6.5	5.8	8.3	
LOS	C		A	A	A	
Approach Delay	20.5			5.8	8.3	
Approach LOS	C			A	A	
Queue Length 50th (m)	14.0		2.0	13.9	19.8	
Queue Length 95th (m)	28.7		m5.1	20.5	42.3	
Internal Link Dist (m)	15.1			138.0	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	569		337	1909	1923	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.43		0.16	0.36	0.41	

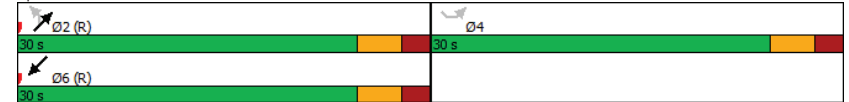
Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

PM Peak Hour
2030 Future Total

Maximum v/c Ratio: 0.66	Intersection Signal Delay: 9.0	Intersection LOS: A
Intersection Capacity Utilization 65.4%	ICU Level of Service C	
Analysis Period (min) 15		
m Volume for 95th percentile queue is metered by upstream signal.		

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



Lanes, Volumes, Timings
5: St. Laurent & Pleasant

PM Peak Hour
2030 Future Total

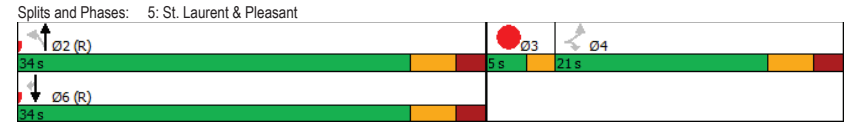
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations	↖	↗	↖	↗	↗	↖	
Traffic Volume (vph)	126	149	101	556	649	155	
Future Volume (vph)	126	149	101	556	649	155	
Satd. Flow (prot)	1566	1469	1658	1712	1745	1483	
Fit Permitted	0.950		0.356				
Satd. Flow (perm)	1548	1424	617	1712	1745	1421	
Satd. Flow (RTOR)		149				155	
Lane Group Flow (vph)	126	149	101	556	649	155	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	11.2	11.2	42.0	42.0	42.0	42.0	
Actuated g/C Ratio	0.19	0.19	0.70	0.70	0.70	0.70	
v/c Ratio	0.43	0.39	0.23	0.46	0.53	0.15	
Control Delay	26.2	7.4	7.4	7.7	10.7	2.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.2	7.4	7.4	7.7	10.7	2.8	
LOS	C	A	A	A	B	A	
Approach Delay	16.0			7.6	9.1		
Approach LOS	B			A	A		
Queue Length 50th (m)	12.7	0.0	3.9	26.2	54.7	1.7	
Queue Length 95th (m)	24.1	11.6	12.6	56.8	102.6	4.9	
Internal Link Dist (m)	450.4			257.0	100.4		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	399	478	431	1197	1220	1040	
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	0.32	0.31	0.23	0.46	0.53	0.15	

Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	23 (38%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
5: St. Laurent & Pleasant

PM Peak Hour
2030 Future Total

Maximum v/c Ratio: 0.53	Intersection LOS: A
Intersection Signal Delay: 9.6	ICU Level of Service C
Intersection Capacity Utilization 66.8%	
Analysis Period (min) 15	



Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕	↕	
Traffic Vol, veh/h	13	37	8	417	814	92
Future Vol, veh/h	13	37	8	417	814	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	37	8	417	814	92

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1293	860	906
Stage 1	860	-	-
Stage 2	433	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	180	356	751
Stage 1	414	-	-
Stage 2	654	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	177	356	751
Mov Cap-2 Maneuver	177	-	-
Stage 1	408	-	-
Stage 2	654	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.5	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	751	-	282	-	-
HCM Lane V/C Ratio	0.011	-	0.177	-	-
HCM Control Delay (s)	9.8	0	20.5	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↕	↕		↕
Traffic Vol, veh/h	0	51	701	33	0	824
Future Vol, veh/h	0	51	701	33	0	824
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	51	701	33	0	824

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	367	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	630	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	630	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	630	-
HCM Lane V/C Ratio	-	-	0.081	-
HCM Control Delay (s)	-	-	11.2	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Appendix N

Synchro Intersection Worksheets – 2035 Future Total Conditions

Lanes, Volumes, Timings

1: Russell/St. Laurent & Smyth/Lancaster

AM Peak Hour

2035 Future Total-Signalized

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	424	148	133	32	280	107	193	1172	96	137	632	653
Future Volume (vph)	424	148	133	32	280	107	193	1172	96	137	632	653
Satd. Flow (prot)	3216	1728	1339	1421	3066	0	1483	3122	0	1626	3191	1483
Fit Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3175	1728	1295	1396	3066	0	1476	3122	0	1622	3191	1448
Satd. Flow (RTOR)			133		41			8				402
Lane Group Flow (vph)	424	148	133	32	387	0	193	1268	0	137	632	653
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0		20.0	52.0		20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%		16.7%	43.3%		16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
Lost Time Adjust (s)	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		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	14.4	29.4	29.4	8.2	18.5		17.8	50.2		13.7	46.1	46.1
Actuated g/C Ratio	0.12	0.24	0.24	0.07	0.15		0.15	0.42		0.11	0.38	0.38
v/c Ratio	1.10	0.35	0.32	0.33	0.76		0.88	0.97		0.74	0.52	0.81
Control Delay	124.7	41.7	8.8	61.4	53.5		87.3	53.2		74.8	30.2	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	124.7	41.7	8.8	61.4	53.5		87.3	53.2		74.8	30.2	21.5
LOS	F	D	A	E	D		F	D		E	C	C
Approach Delay		85.4			54.1			57.7			30.5	
Approach LOS		F			D			E			C	
Queue Length 50th (m)	~58.3	30.3	0.0	7.3	41.5		45.2	~166.1		31.0	59.4	56.3
Queue Length 95th (m)	#89.9	50.2	16.0	17.2	56.6		#97.8	#213.8		#60.3	77.0	113.8
Internal Link Dist (m)		111.9			87.8			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	385	422	417	170	603		220	1310		197	1225	803
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	1.10	0.35	0.32	0.19	0.64		0.88	0.97		0.70	0.52	0.81

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: 115

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings

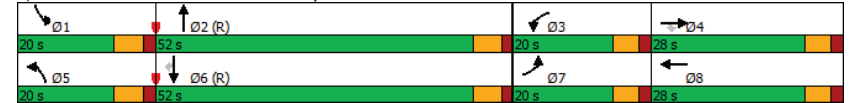
1: Russell/St. Laurent & Smyth/Lancaster

AM Peak Hour

2035 Future Total-Signalized

Maximum v/c Ratio: 1.10	Intersection LOS: D
Intersection Signal Delay: 52.6	ICU Level of Service F
Intersection Capacity Utilization 91.1%	
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.	

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster



Lanes, Volumes, Timings
2: Russell & St. Laurent

AM Peak Hour
2035 Future Total-Signalized

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔		↔	↕↕	↕↕	↔
Traffic Volume (vph)	712	58	80	748	350	471
Future Volume (vph)	712	58	80	748	350	471
Satd. Flow (prot)	3020	0	1658	2866	2866	1441
Fit Permitted	0.956		0.542			
Satd. Flow (perm)	3020	0	941	2866	2866	1412
Satd. Flow (RTOR)	14					471
Lane Group Flow (vph)	770	0	80	748	350	471
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			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)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	23.9	23.9
Actuated g/C Ratio	0.36		0.48	0.48	0.34	0.34
v/c Ratio	0.71		0.16	0.55	0.36	0.59
Control Delay	23.3		11.5	14.8	19.7	5.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.3		11.5	14.8	19.7	5.7
LOS	C		B	B	B	A
Approach Delay	23.3			14.4	11.7	
Approach LOS	C			B	B	
Queue Length 50th (m)	42.9		5.4	34.2	18.8	0.0
Queue Length 95th (m)	61.2		11.9	49.2	29.5	19.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1087		516	1371	978	792
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.71		0.16	0.55	0.36	0.59

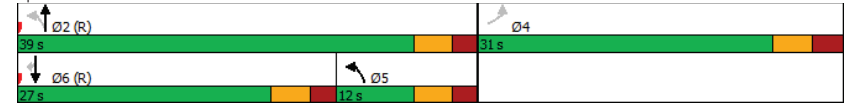
Intersection Summary	
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle:	70
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
2: Russell & St. Laurent

AM Peak Hour
2035 Future Total-Signalized

Maximum v/c Ratio: 0.71	Intersection LOS: B
Intersection Signal Delay: 16.3	ICU Level of Service B
Intersection Capacity Utilization 58.9%	
Analysis Period (min) 15	

Splits and Phases: 2: Russell & St. Laurent



Lanes, Volumes, Timings
3: Southvale & Russell

AM Peak Hour
2035 Future Total-Signalized

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	17	222	596	9	55	337
Future Volume (vph)	17	222	596	9	55	337
Satd. Flow (prot)	1595	1455	1560	0	1458	1548
Fit Permitted	0.950				0.377	
Satd. Flow (perm)	1531	1401	1560	0	578	1548
Satd. Flow (RTOR)		222	2			
Lane Group Flow (vph)	17	222	605	0	55	337
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		23.5	23.5
Total Split (s)	22.3	22.3	42.7		42.7	42.7
Total Split (%)	34.3%	34.3%	65.7%		65.7%	65.7%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.8		42.8	42.8
Actuated g/C Ratio	0.18	0.18	0.66		0.66	0.66
v/c Ratio	0.06	0.52	0.59		0.14	0.33
Control Delay	21.4	8.3	9.9		6.2	6.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	21.4	8.3	9.9		6.2	6.5
LOS	C	A	A		A	A
Approach Delay	9.2		9.9			6.5
Approach LOS	A		A			A
Queue Length 50th (m)	1.8	0.0	30.9		1.9	13.5
Queue Length 95th (m)	5.6	14.0	78.4		7.8	34.6
Internal Link Dist (m)	422.1		18.0			54.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	400	530	1027		380	1019
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.42	0.59		0.14	0.33

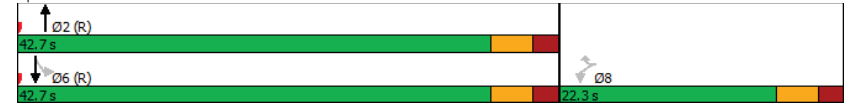
Intersection Summary	
Cycle Length:	65
Actuated Cycle Length:	65
Offset: (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
3: Southvale & Russell

AM Peak Hour
2035 Future Total-Signalized

Maximum v/c Ratio: 0.59	Intersection LOS: A
Intersection Signal Delay: 8.7	ICU Level of Service C
Intersection Capacity Utilization 65.5%	
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

AM Peak Hour
2035 Future Total-Signalized

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	54	56	34	716	486	65
Future Volume (vph)	54	56	34	716	486	65
Satd. Flow (prot)	1112	0	1551	3283	3228	0
Fit Permitted	0.976		0.446			
Satd. Flow (perm)	1103	0	728	3283	3228	0
Satd. Flow (RTOR)	56			29		
Lane Group Flow (vph)	110	0	34	716	551	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	11.0		42.3	42.3	42.3	
Actuated g/C Ratio	0.18		0.70	0.70	0.70	
v/c Ratio	0.44		0.07	0.31	0.24	
Control Delay	18.0		4.8	5.2	4.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	18.0		4.8	5.2	4.7	
LOS	B		A	A	A	
Approach Delay	18.0			5.1	4.7	
Approach LOS	B			A	A	
Queue Length 50th (m)	5.3		1.3	18.7	10.2	
Queue Length 95th (m)	16.2		m4.7	35.4	20.4	
Internal Link Dist (m)	18.7			132.5	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	485		513	2315	2285	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.23		0.07	0.31	0.24	

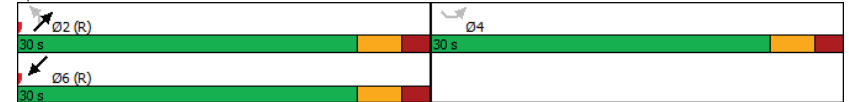
Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

AM Peak Hour
2035 Future Total-Signalized

Maximum v/c Ratio: 0.44	Intersection Signal Delay: 6.0	Intersection LOS: A
Intersection Capacity Utilization 57.2%	ICU Level of Service B	
Analysis Period (min) 15		
m Volume for 95th percentile queue is metered by upstream signal.		

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



Lanes, Volumes, Timings
5: St. Laurent & Pleasant

AM Peak Hour
2035 Future Total-Signalized

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	118	95	77	430	473	78	
Future Volume (vph)	118	95	77	430	473	78	
Satd. Flow (prot)	1658	1483	1642	1728	1679	1401	
Fit Permitted	0.950		0.473				
Satd. Flow (perm)	1654	1393	808	1728	1679	1337	
Satd. Flow (RTOR)		95				78	
Lane Group Flow (vph)	118	95	77	430	473	78	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	10.9	10.9	42.3	42.3	42.3	42.3	
Actuated g/C Ratio	0.18	0.18	0.70	0.70	0.70	0.70	
v/c Ratio	0.39	0.29	0.14	0.35	0.40	0.08	
Control Delay	25.6	7.9	5.6	6.2	4.0	0.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.6	7.9	5.6	6.2	4.0	0.3	
LOS	C	A	A	A	A	A	
Approach Delay	17.7			6.1	3.4		
Approach LOS	B			A	A		
Queue Length 50th (m)	11.8	0.0	2.7	18.1	9.4	0.0	
Queue Length 95th (m)	23.0	9.5	8.3	37.9	15.2	0.1	
Internal Link Dist (m)	450.4			257.0	106.5		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	427	430	570	1219	1184	966	
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	0.28	0.22	0.14	0.35	0.40	0.08	

Intersection Summary

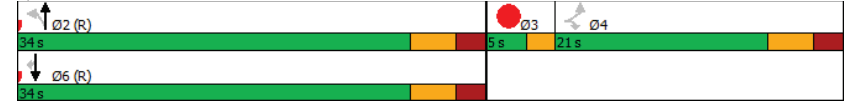
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 3 (5%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
5: St. Laurent & Pleasant

AM Peak Hour
2035 Future Total-Signalized

Maximum v/c Ratio: 0.40	
Intersection Signal Delay: 6.9	Intersection LOS: A
Intersection Capacity Utilization 57.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕	↕	
Traffic Vol, veh/h	12	32	2	816	368	27
Future Vol, veh/h	12	32	2	816	368	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	-	-	-	-	-
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	12	32	2	816	368	27

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1202	382	395
Stage 1	382	-	-
Stage 2	820	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	204	665	1164
Stage 1	690	-	-
Stage 2	433	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	203	665	1164
Mov Cap-2 Maneuver	203	-	-
Stage 1	688	-	-
Stage 2	433	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1164	-	410	-	-
HCM Lane V/C Ratio	0.002	-	0.107	-	-
HCM Control Delay (s)	8.1	0	14.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↕	↕		↕
Traffic Vol, veh/h	0	58	721	14	0	537
Future Vol, veh/h	0	58	721	14	0	537
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	58	721	14	0	537

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	368	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	629	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	629	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	629	-
HCM Lane V/C Ratio	-	-	0.092	-
HCM Control Delay (s)	-	-	11.3	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Lanes, Volumes, Timings
1: Russell/St. Laurent & Smyth/Lancaster

PM Peak Hour
2035 Future Total-Signalized

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	527	279	227	100	166	230	139	814	93	143	1162	487
Future Volume (vph)	527	279	227	100	166	230	139	814	93	143	1162	487
Satd. Flow (prot)	3216	1745	1469	1642	2955	0	1537	3198	0	1658	3316	1483
Fit Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3125	1745	1430	1625	2955	0	1529	3198	0	1647	3316	1427
Satd. Flow (RTOR)			227		192			11				420
Lane Group Flow (vph)	527	279	227	100	396	0	139	907	0	143	1162	487
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0		17.0	49.0		17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%		14.2%	40.8%		14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
Lost Time Adjust (s)	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		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	20.4	24.9	24.9	12.6	17.1		14.2	45.9		13.5	45.1	45.1
Actuated g/C Ratio	0.17	0.21	0.21	0.10	0.14		0.12	0.38		0.11	0.38	0.38
v/c Ratio	0.97	0.77	0.48	0.58	0.68		0.76	0.74		0.77	0.93	0.61
Control Delay	80.5	60.1	8.6	64.0	30.1		78.6	36.6		79.1	50.7	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	80.5	60.1	8.6	64.0	30.1		78.6	36.6		79.1	50.7	8.6
LOS	F	E	A	E	C		E	D		E	D	A
Approach Delay		59.2			37.0			42.2			41.5	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	64.2	61.9	0.0	22.8	23.6		31.8	98.4		32.6	140.9	10.5
Queue Length 95th (m)	#97.8	#99.7	20.6	38.9	38.6		#73.8	123.6		#73.5	#187.3	42.7
Internal Link Dist (m)		111.7			91.7			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	546	361	476	279	705		182	1229		185	1245	798
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.97	0.77	0.48	0.36	0.56		0.76	0.74		0.77	0.93	0.61

Intersection Summary

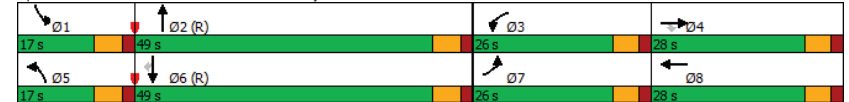
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
1: Russell/St. Laurent & Smyth/Lancaster

PM Peak Hour
2035 Future Total-Signalized

Maximum v/c Ratio: 0.97	Intersection LOS: D
Intersection Signal Delay: 45.3	ICU Level of Service F
Intersection Capacity Utilization 93.0%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster



Lanes, Volumes, Timings
2: Russell & St. Laurent

PM Peak Hour
2035 Future Total-Signalized

	↖	↗	↙	↘	↑	↓
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗		↙↘	↑↑	↑↑	↑
Traffic Volume (vph)	655	145	54	389	761	741
Future Volume (vph)	655	145	54	389	761	741
Satd. Flow (prot)	2938	0	1580	2941	3131	1483
Fit Permitted	0.961		0.269			
Satd. Flow (perm)	2938	0	446	2941	3131	1448
Satd. Flow (RTOR)	43					741
Lane Group Flow (vph)	800	0	54	389	761	741
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			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)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	26.3	26.3
Actuated g/C Ratio	0.36		0.48	0.48	0.38	0.38
v/c Ratio	0.74		0.17	0.28	0.65	0.74
Control Delay	23.7		13.2	11.6	23.0	7.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.7		13.2	11.6	23.0	7.3
LOS	C		B	B	C	A
Approach Delay	23.7			11.8	15.3	
Approach LOS	C			B	B	
Queue Length 50th (m)	43.8		3.6	15.2	47.4	0.0
Queue Length 95th (m)	63.2		8.9	23.4	#68.7	29.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1076		318	1407	1176	1006
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.74		0.17	0.28	0.65	0.74

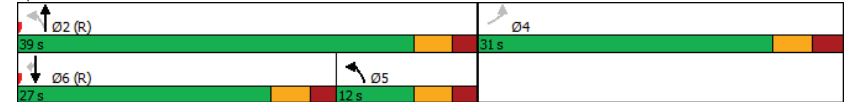
Intersection Summary	
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle:	70
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
2: Russell & St. Laurent

PM Peak Hour
2035 Future Total-Signalized

Maximum v/c Ratio: 0.74	Intersection LOS: B
Intersection Signal Delay: 17.2	ICU Level of Service C
Intersection Capacity Utilization 65.3%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: Russell & St. Laurent



Lanes, Volumes, Timings
3: Southvale & Russell

PM Peak Hour
2035 Future Total-Signalized

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	16	108	330	13	201	647
Future Volume (vph)	16	108	330	13	201	647
Satd. Flow (prot)	1658	1441	1672	0	1642	1695
Fit Permitted	0.950				0.555	
Satd. Flow (perm)	1608	1370	1672	0	956	1695
Satd. Flow (RTOR)		108	5			
Lane Group Flow (vph)	16	108	343	0	201	647
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		15.5	15.5
Total Split (s)	22.3	22.3	37.7		37.7	37.7
Total Split (%)	37.2%	37.2%	62.8%		62.8%	62.8%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.0		42.0	42.0
Actuated g/C Ratio	0.19	0.19	0.70		0.70	0.70
v/c Ratio	0.05	0.31	0.29		0.30	0.55
Control Delay	18.7	7.2	6.2		7.3	9.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	18.7	7.2	6.2		7.3	9.2
LOS	B	A	A		A	A
Approach Delay	8.7		6.2			8.7
Approach LOS	A		A			A
Queue Length 50th (m)	1.5	0.0	13.2		8.0	32.7
Queue Length 95th (m)	4.9	9.2	34.4		24.8	83.1
Internal Link Dist (m)	422.1		26.8			60.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	455	465	1171		668	1185
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.23	0.29		0.30	0.55

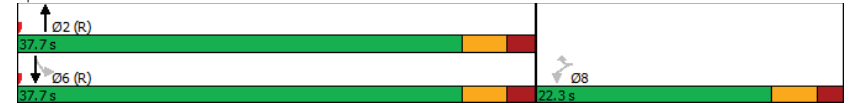
Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	53 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
3: Southvale & Russell

PM Peak Hour
2035 Future Total-Signalized

Maximum v/c Ratio: 0.55	Intersection Signal Delay: 8.1	Intersection LOS: A
Intersection Capacity Utilization 61.2%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 3: Southvale & Russell



Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

PM Peak Hour
2035 Future Total-Signalized

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations	↖		↗	↖↗	↖↗	
Traffic Volume (vph)	119	125	53	681	723	72
Future Volume (vph)	119	125	53	681	723	72
Satd. Flow (prot)	1252	0	1658	3252	3261	0
Fit Permitted	0.976		0.330			
Satd. Flow (perm)	1243	0	575	3252	3261	0
Satd. Flow (RTOR)	102				21	
Lane Group Flow (vph)	244	0	53	681	795	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	14.0		35.2	35.2	35.2	
Actuated g/C Ratio	0.23		0.59	0.59	0.59	
v/c Ratio	0.66		0.16	0.36	0.41	
Control Delay	20.5		6.5	5.8	8.3	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	20.5		6.5	5.8	8.3	
LOS	C		A	A	A	
Approach Delay	20.5			5.8	8.3	
Approach LOS	C			A	A	
Queue Length 50th (m)	14.0		2.0	13.8	19.8	
Queue Length 95th (m)	28.7		m5.0	20.4	42.3	
Internal Link Dist (m)	15.1			135.3	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	569		337	1909	1923	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.43		0.16	0.36	0.41	

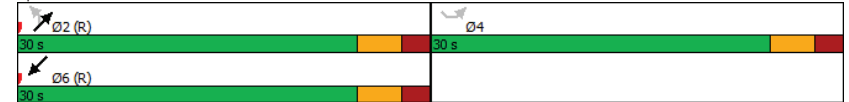
Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
4: St. Laurent & St. Laurent Blvd Service

PM Peak Hour
2035 Future Total-Signalized

Maximum v/c Ratio: 0.66	Intersection Signal Delay: 8.9	Intersection LOS: A
Intersection Capacity Utilization 65.4%	ICU Level of Service C	
Analysis Period (min) 15		
m Volume for 95th percentile queue is metered by upstream signal.		

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



Lanes, Volumes, Timings
5: St. Laurent & Pleasant

PM Peak Hour
2035 Future Total-Signalized

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations	↖	↗	↖	↗	↖	↗	
Traffic Volume (vph)	126	149	101	556	649	155	
Future Volume (vph)	126	149	101	556	649	155	
Satd. Flow (prot)	1566	1469	1658	1712	1745	1483	
Fit Permitted	0.950		0.356				
Satd. Flow (perm)	1548	1424	617	1712	1745	1421	
Satd. Flow (RTOR)		149				155	
Lane Group Flow (vph)	126	149	101	556	649	155	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	11.2	11.2	42.0	42.0	42.0	42.0	
Actuated g/C Ratio	0.19	0.19	0.70	0.70	0.70	0.70	
v/c Ratio	0.43	0.39	0.23	0.46	0.53	0.15	
Control Delay	26.2	7.4	7.4	7.7	10.7	2.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.2	7.4	7.4	7.7	10.7	2.9	
LOS	C	A	A	A	B	A	
Approach Delay	16.0			7.6	9.2		
Approach LOS	B			A	A		
Queue Length 50th (m)	12.7	0.0	3.9	26.2	54.8	1.7	
Queue Length 95th (m)	24.1	11.6	12.6	56.8	102.5	5.2	
Internal Link Dist (m)	450.4			257.0	107.1		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	399	478	431	1197	1220	1040	
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	0.32	0.31	0.23	0.46	0.53	0.15	

Intersection Summary

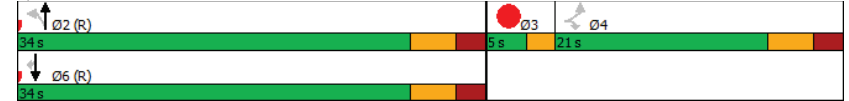
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 23 (38%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
5: St. Laurent & Pleasant

PM Peak Hour
2035 Future Total-Signalized

Maximum v/c Ratio: 0.53	Intersection LOS: A
Intersection Signal Delay: 9.7	ICU Level of Service C
Intersection Capacity Utilization 66.8%	
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕	↕	
Traffic Vol, veh/h	13	37	8	417	814	92
Future Vol, veh/h	13	37	8	417	814	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	37	8	417	814	92

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1293	860	906
Stage 1	860	-	-
Stage 2	433	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	180	356	751
Stage 1	414	-	-
Stage 2	654	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	177	356	751
Mov Cap-2 Maneuver	177	-	-
Stage 1	408	-	-
Stage 2	654	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.5	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	751	-	282	-	-
HCM Lane V/C Ratio	0.011	-	0.177	-	-
HCM Control Delay (s)	9.8	0	20.5	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↕	↕		↕
Traffic Vol, veh/h	0	51	701	33	0	824
Future Vol, veh/h	0	51	701	33	0	824
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	51	701	33	0	824

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	367	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	630	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	630	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	630	-
HCM Lane V/C Ratio	-	-	0.081	-
HCM Control Delay (s)	-	-	11.2	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Appendix O

Sidra Intersection Worksheets - 2035 Future Total Conditions

MOVEMENT SUMMARY

Site: 101 [St Laurent - Elmvale AM FT2035 (Site Folder: General)]

Starlight 1971 St Laurent Blvd
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist. m]				
South: St Laurent														
1	L2	34	2.0	34	2.0	0.277	7.7	LOS A	1.4	9.7	0.20	0.39	0.20	39.8
2	T1	10	2.0	10	2.0	0.277	2.3	LOS A	1.4	9.7	0.20	0.39	0.20	49.5
3	R2	707	2.0	707	2.0	0.277	2.7	LOS A	1.4	9.7	0.20	0.37	0.20	48.1
Approach		751	2.0	751	2.0	0.277	3.0	LOS A	1.4	9.7	0.20	0.37	0.20	47.6
East: St Laurent														
4	L2	486	2.0	486	2.0	0.199	7.6	LOS A	0.8	6.0	0.15	0.55	0.15	47.7
5	T1	49	2.0	49	2.0	0.199	4.4	LOS A	0.8	6.0	0.14	0.54	0.14	35.5
6	R2	16	2.0	16	2.0	0.199	2.6	LOS A	0.8	6.0	0.14	0.54	0.14	46.0
Approach		551	2.0	551	2.0	0.199	7.2	LOS A	0.8	6.0	0.15	0.55	0.15	46.2
North: Service Road														
7	L2	9	50.0	9	50.0	0.024	10.3	LOS B	0.1	0.8	0.47	0.60	0.47	47.3
8	T1	6	50.0	6	50.0	0.024	4.7	LOS A	0.1	0.8	0.47	0.60	0.47	47.1
9	R2	2	50.0	2	50.0	0.024	5.0	LOS A	0.1	0.8	0.47	0.60	0.47	45.6
Approach		17	50.0	17	50.0	0.024	7.7	LOS A	0.1	0.8	0.47	0.60	0.47	47.0
West: Elmvale Mall														
10	L2	5	2.0	5	2.0	0.115	3.6	LOS A	0.4	3.1	0.44	0.33	0.44	37.9
11	T1	49	2.0	49	2.0	0.115	1.6	LOS A	0.4	3.1	0.44	0.33	0.44	37.2
12	R2	56	2.0	56	2.0	0.115	1.6	LOS A	0.4	3.1	0.44	0.33	0.44	36.5
Approach		110	2.0	110	2.0	0.115	1.7	LOS A	0.4	3.1	0.44	0.33	0.44	36.9
All Vehicles		1429	2.6	1429	2.6	0.277	4.6	LOS A	1.4	9.7	0.20	0.44	0.20	46.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [St Laurent - Elmvale PM FT2035 (Site Folder: General)]

Starlight 1971 St Laurent Blvd
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist. m]				
South: St Laurent														
1	L2	53	2.0	53	2.0	0.304	8.0	LOS A	1.5	10.6	0.31	0.44	0.31	39.5
2	T1	10	2.0	10	2.0	0.304	2.6	LOS A	1.5	10.6	0.31	0.44	0.31	49.0
3	R2	667	2.0	667	2.0	0.304	3.0	LOS A	1.5	10.8	0.31	0.42	0.31	47.7
Approach		730	2.0	730	2.0	0.304	3.4	LOS A	1.5	10.8	0.31	0.42	0.31	47.0
East: St Laurent														
4	L2	723	2.0	723	2.0	0.292	7.7	LOS A	1.4	10.2	0.20	0.56	0.20	47.5
5	T1	54	2.0	54	2.0	0.292	4.5	LOS A	1.4	10.2	0.20	0.55	0.20	35.4
6	R2	18	2.0	18	2.0	0.292	2.7	LOS A	1.4	10.2	0.20	0.55	0.20	45.8
Approach		795	2.0	795	2.0	0.292	7.4	LOS A	1.4	10.2	0.20	0.56	0.20	46.4
North: Service Road														
7	L2	9	50.0	9	50.0	0.030	11.2	LOS B	0.1	1.0	0.54	0.67	0.54	46.9
8	T1	6	50.0	6	50.0	0.030	5.6	LOS A	0.1	1.0	0.54	0.67	0.54	46.7
9	R2	3	50.0	3	50.0	0.030	5.9	LOS A	0.1	1.0	0.54	0.67	0.54	45.3
Approach		18	50.0	18	50.0	0.030	8.5	LOS A	0.1	1.0	0.54	0.67	0.54	46.6
West: Elmvale Mall														
10	L2	5	2.0	5	2.0	0.285	4.5	LOS A	1.2	8.4	0.57	0.51	0.57	37.6
11	T1	114	2.0	114	2.0	0.285	2.6	LOS A	1.2	8.4	0.57	0.51	0.57	37.0
12	R2	125	2.0	125	2.0	0.285	2.6	LOS A	1.2	8.4	0.57	0.51	0.57	36.3
Approach		244	2.0	244	2.0	0.285	2.6	LOS A	1.2	8.4	0.57	0.51	0.57	36.7
All Vehicles		1787	2.5	1787	2.5	0.304	5.1	LOS A	1.5	10.8	0.30	0.50	0.30	45.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.