BERRY HILLS PHASE 8

TRAFFIC IMPACT STUDY

PREPARED FOR:

DESIGN POINT

200 WATERFRONT DRIVE, SUITE 100

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HARBOURSIDE Transportation Consultants

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PROJECT NAME: BERRY HILLS PHASE 8 TRAFFIC IMPACT STUDY

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ENGINEERING SEAL

PERMIT TO PRACTICE

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1.0 Introduction and Understanding

1.1 Project Scope

Harbourside Transportation Consultants (HTC) was retained by DesignPoint, on behalf of Armco Ltd., to update the Berry Hill Phase 8, Middle Sackville Traffic Impact Study (TIS) completed by CBCL in August 2014. The updated TIS has been prepared in support of the revised development plan for the Phase 8 of the Berry Hills development.

The TIS was completed in accordance with Halifax Regional Municipality's (HRM) *Guidelines for the Preparation of Transportation Impact Studies (8th revision)*. The TIS addresses the items identified in the Transportation Impact Studies Checklist found in Appendix A of the Guidelines. The checklist includes the following items:

- Description of the development proposal and the study area;
- Establishing a transportation context for the analysis horizon year and the time periods for analysis;
- Estimation of travel that will be generated by the development proposal and development of a transportation demand management plan;
- Evaluation of transportation impacts and identification of transportation system changes needed to mitigate these impacts; and
- Documentation and reporting.

As per the requirements, a scoping document was prepared and issued to HRM on July 26th, 2017. HRM approved the methodology on August 1st, 2017. The scoping document can be found in Appendix A.

1.2 Context

The proposed development is located in Middle Sackville off of Exit 2A on Highway 101. The development site is bounded by vacant land to the north, Lively Road to the west, Wilson Lake Drive to the east and Sackville Drive (Nova Scotia Trunk 1) to the south.

Sackville Drive is a rural arterial road that runs east-west parallel to Highway 101. In the vicinity of the proposed development Sackville Drive has one lane in each direction and a posted speed limit of 70 km/h. There are 1.5m wide bike lanes present on both sides of the roadway. Sackville Drive is linked to Highway 101 through Margeson Drive at the Sackville Drive and Margeson Road roundabout. Margeson Drive has a posted speed limit of 80 km/h.

Lively Road and Wilson Lake Drive are local residential roads that run north-south along the proposed development and intersect with Sackville Drive. Both roads are rural in nature and posted to a speed of 50 km/h. The intersections of Sackville Drive/Lively Road and Sackville Drive/Wilson Lake Drive are stop controlled on the minor street.

It should be noted that the 2014 study completed by CBCL identified an existing speeding problem on Wilson Lake Drive. A speed study conducted by HRM in October 2013 indicated an 85th percentile speed of 68 km/h.

The study area and the location of three (3) study intersections Sackville Drive and Margeson Drive, Sackville Drive and Lively Road and Sackville Drive and Wilson Lake Drive are shown in Figure 1.

Figure 1: Study Area and Intersections

1.2.1 Active Transportation

There are no sidewalks present within the study area with the exception of a short section at the Sackville Drive and Margeson Drive roundabout. Pedestrian crosswalks are provided at the Sackville Drive and Margeson Drive roundabout east of the development and at the intersection of Sackville Drive and Rosemary Drive, approximately 375 metres west of Lively Road.

Bike lanes are provided along both sides of Sackville Drive that extend from Lower Sackville to approximately 150 metres west of Lively Road. There are no other cycling facilities present in the study area.

1.2.2 Transit

The study area is serviced by one Halifax Transit Route along Sackville Drive, Route 83 - Springfield. This route provides service from Springfield Avenue in Middle Sackville to the Sackville Terminal in Lower Sackville where it connects to a number of other routes. Stops are provided in both directions east of the Lively Road intersection and west of Wilson Lake Drive intersection.

1.3 Development Proposal

The proposed development will include a total of 226 lots, including 206 single family homes and 40 semi-detached units. The development plan for Phase 8 of the Berry Hills Development can be found in Figure 2. Proposed access to the development will be via two (2) new unsignalized intersection, one on Wilson Lake Drive and one on Lively Road. The estimated start of construction for the development is 2020 with full completion expected by 2024.

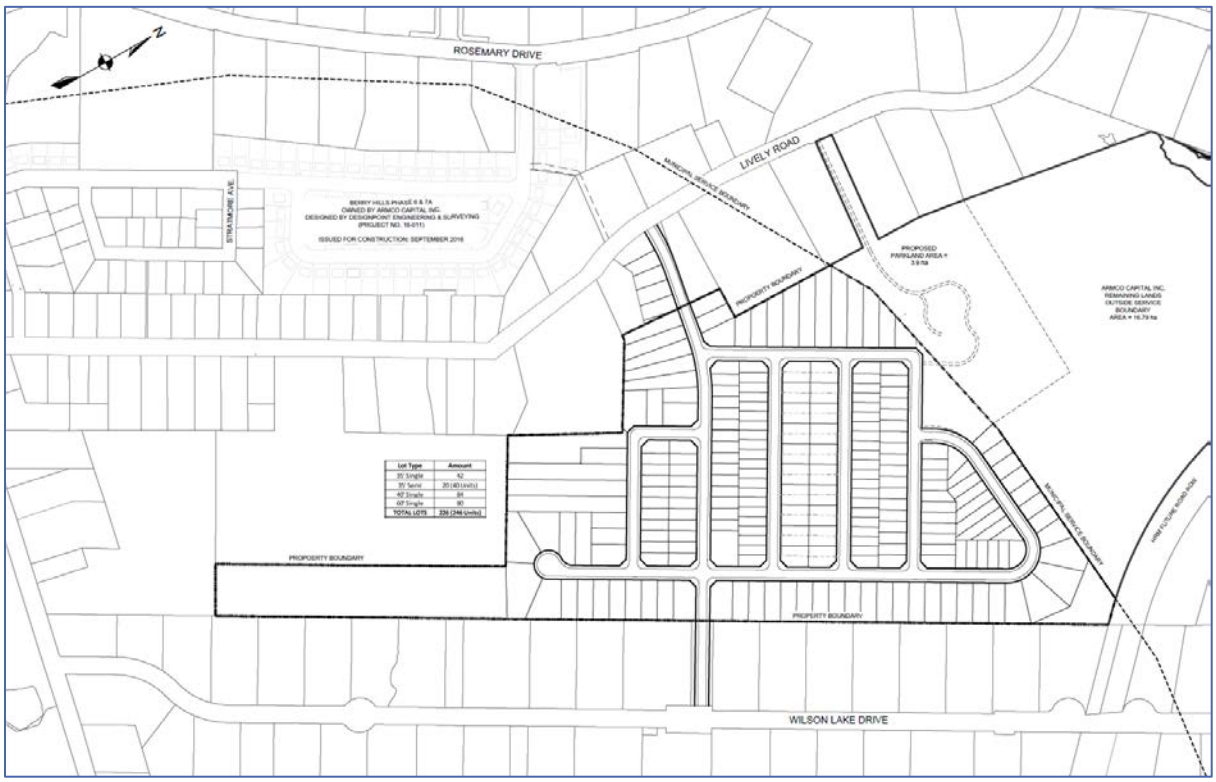

Figure 2: Berry Hills Phase 8 Development Plan

1.3.1 Data Collection

Traffic counts were gathered at the three (3) study intersections using Miovision Scout video data collection units. Traffic counts were collected Tuesday, Wednesday or Thursday during the AM (7:00am to 9:00am), noon (11:00am to 1:00pm) and PM (4:00pm to 6:00pm) peak hours. Traffic data for this project were recorded on the following dates:

1. Sackville Drive/Margeson Drive – Wednesday, August 9, 2017
2. Sackville Drive/Lively Road – Tuesday, August 22, 2017
3. Sackville Drive/Wilson Lake Drive – Tuesday, August 22, 2017

2.0 Intersection Performance and Capacity Analysis

The performance of an intersection can be evaluated using a number of measures of effectiveness. Delay and level of service (LOS), volume-to-capacity ratio (v/c) and vehicle queuing are the primary measures of effectiveness used in traffic analyses.

Delay is defined in the Highway Capacity Manual 2000 as the additional travel time experienced by a motor vehicle, pedestrian or cyclist attributable to the presence of traffic control (unsignalized or signalized

intersection) and conflicting traffic. Delay is used as the basis to calculate LOS, a qualitative measure used to describe operational conditions based on service measures such as freedom to maneuver, travel time, speed, and traffic interruptions. LOS is expressed as a scale from 'A' to 'F', where LOS A represents free flow conditions or very low delay and LOS F represents delay times that are unacceptable to motorists using the facility. The level of service criteria for unsignalized (stop/yield controlled and roundabouts) and signalized intersections are described in Table 1.

The volume-to-capacity ratio relates the estimated traffic volume (demand volume) to the theoretical maximum volume that could be accommodated (capacity volume/adjusted saturation flow rate). As the v/c ratio approaches 1.0, the movement has reduced ability to accommodate any additional volume of traffic.

Vehicle queuing at intersections is critical to the performance of the network. The 95th percentile queue length is typically used to determine if sufficient vehicle storage is available to maintain efficient traffic flow. The 95th percentile queue length is the length of queue which is exceeded only 5 percent of the time.

Table 1: LOS Criteria Signalized and Unsignalized Intersections

LOS	Description	Signalized Intersection Control Delay	Unsignalized Intersection Control Delay
A	Very low delay. Majority of through traffic on main street does not stop at all. **(Excellent)**	≤ 10 sec/veh	≤ 10 sec/veh
B	Somewhat higher delay. More vehicles have to stop for red lights. **(Very Good)**	10 – 20 sec/veh	10 – 15 sec/veh
C	Higher level of congestion and vehicles wait through more than one signal indication, occasionally backups may develop, however traffic flow is still stable and acceptable. **(Good)**	20 – 35 sec/veh	15 – 25 sec/veh
D	Congestion is noticeable and delays may become extensive. Most cars have to wait more than one red light to pass. This threshold is the upper limit for design. **(Satisfactory)**	35 – 55 sec/veh	25 – 35 sec/veh
E	Congested conditions. Traffic fills intersection capacity with long queues and delays. Many vehicles need to wait more than one green indication. The LOS is nearing capacity and is unsatisfactory. **(Unsatisfactory)**	55 – 80 sec/veh	35 – 50 sec/veh
F	Very congested conditions. Traffic demand exceeds capacity of the intersection with very long queues and delays. The LOS is generally considered to be unacceptable. **(Unacceptable)**	≥ 80 sec/veh	≥ 50 sec/veh

The Synchro Studio (Version 9) software package was used as the primary evaluation tool. Synchro, an analysis and optimization software package, was used to analyze network intersections based on the methodology of the *Highway Capacity Manual* (2000) published by the Transportation Research Board. SimTraffic, the micro-simulation component of the software package, was also used in the course of the analysis to check delay, illustrate and identify interactions between individual driver types and to illustrate the effects of adjacent or closely spaced intersections.

The combination of the two components within the software allows the analyst to review the intersections using two different approaches. The Synchro software models each intersection in isolation, while the

SimTraffic software analyzes the network as a whole. SimTraffic will identify external influences on intersections such as spillbacks from upstream and/or downstream intersections include in the model.

The ARCADY/Junctions 8 software was used to analyze roundabouts throughout the study area. The software can be used to predict capacities, queues, delays and accident risk at roundabouts. ARCADY uses an empirical framework based on the application of statistical regression to a large data set of observed roundabout operations in the United Kingdom. The ARCADY model takes into account key roundabout geometric features such as entry width, approach width, flare length, conflict angle, inscribed circle diameter and entry radius.

Three (3) network scenarios were analyzed to quantify the impact of the proposed development.

- Scenario 1 - Existing Conditions (2017)
- Scenario 2 - Future Conditions without Development (2024)
- Scenario 3 - Future Conditions with Development (2024)

3.0 Scenario 1 - Existing Conditions (2017)

The traffic counts collected in August 2017 were factored using HRM's AADT factors. The traffic volumes used for this scenario can be found in Appendix C.

3.1 Scenario 1 - Analysis Results

The level of service conditions for the AM and PM peak hours of Scenario 1 Existing Conditions are summarized in Table 2 and Table 3. The detailed Synchro/SimTraffic and Arcady are included in Appendices D and E, respectively. Results of the analysis show existing operational problems at the intersection of Sackville Drive and Wilson Lake Drive. The southbound movements the intersection of Sackville Drive and Wilson Lake Drive operate at LOS E during the AM peak hour and LOS F during the PM peak hour. During the PM peak hour, the northbound left-turn movement operates at LOS E. The overall intersection operates at LOS A during both peak hours. It should be noted that the SimTraffic analysis shows only the southbound through and left movements operating at LOS E during the PM peak hour.

The intersections of Sackville Drive and Lively Road and Sackville Drive and Margeson Drive operate at acceptable levels of service during both the AM and PM peak hours.

Table 2: Scenario 1 - Existing Conditions (2017) Arcady Results

Intersection		S1 Existing 2017							
		AM Peak Hour				PM Peak Hour			
Street	Movement	Delay/ Veh (s)	APP LOS	V/C	Queue (PCE)	Delay/ Veh (s)	APP LOS	V/C	Queue (PCE)
Sackville Drive & Margeson Drive		**2.79**	A			**3.23**	A		
Sackville Drive	EB Through	3.12	A	0.39	0.64	2.64	A	0.29	0.40
	EB Right - Turn								
	WB Left - Turn	2.22	A	0.14	0.17	3.42	A	0.35	0.53
	WB Through								
Margeson Drive	NB Left - Turn	2.30	A	0.10	0.11	3.54	A	0.41	0.69
	NB Right - Turn								

Table 3: Scenario 1 - Existing Conditions (2017) Synchro/SimTraffic Results

Intersection		Scenario 1 Existing Conditions 2017 - AM Peak Hour							
		Synchro					SimTraffic		
Street	Movement	Delay/ Veh (s)	APP LOS	MVT LOS	V/C	Queue (m) 95th%ile	Delay/ Veh (s)	Equivalent LOS	Queue (m) 95th%ile
Sackville Drive/Lively Road		**1.1**	**A**				**1.2**	**A**	
Sackville Drive	EB Left - Turn	0.2	-	A	0.01	0.1	2.4	A	5.5
	EB Through						0.8	A	
	WB Through	0.0	-	-	0.16	0.0	0.9	A	0.0
	WB Right - Turn						0.4	A	
Lively Road	SB Left - Turn	17.3	C	C	0.15	4.3	9.3	A	13.1
	SB Right - Turn						3.0	A	
Sackville Drive/Wilson Lake Drive		**5.0**	**A**				**2.5**	**A**	
Sackville Drive	EB Left - Turn	7.9	-	A	0.00	0.1	2.6	A	2.9
	EB Through	0.0		-	0.38	0.0	1.5	A	0.0
	EB Right - Turn						0.5	A	
	WB Left - Turn	8.9	-	A	0.00	0.1	2.8	A	2.3
	WB Through	0.0		-	0.18	0.0	0.7	A	0.0
	WB Right - Turn						0.1	A	
Wilson Lake Drive	NB Left - Turn	21.8	B	C	0.01	0.3	10.7	B	3.4
	NB Through	13.4		B	0.08	2.0	0.0	A	14.0
	NB Right - Turn						6.2	A	
	SB Left - Turn	40.3	E	E	0.57	25.0	12.9	B	20.7
	SB Through						11.3	B	
	SB Right - Turn						5.6	A	

Intersection		Scenario 1 Existing Conditions 2017 - PM Peak Hour							
		Synchro					SimTraffic		
Street	Movement	Delay/ Veh (s)	APP LOS	MVT LOS	V/C	Queue (m) 95th%ile	Delay/ Veh (s)	Equivalent LOS	Queue (m) 95th%ile
Sackville Drive/Lively Road		**1.8**	**A**				**2.9**	**A**	
Sackville Drive	EB Left - Turn	0.1	-	A	0.00	0.1	7.8	A	9.2
	EB Through						0.8	A	
	WB Through	0.0	-	-	0.50	0.0	3.0	A	0.7
	WB Right - Turn						2.0	A	
Lively Road	SB Left - Turn	30.0	D	D	0.35	12.1	18.1	C	16.8
	SB Right - Turn						8.9	A	
Sackville Drive/Wilson Lake Drive		**9.5**	**A**				**4.2**	**A**	
Sackville Drive	EB Left - Turn	9.8	-	A	0.02	0.4	10.2	B	8.2
	EB Through	0.0		-	0.30	0.0	1.2	A	0.0
	EB Right - Turn						0.7	A	
	WB Left - Turn	8.5	-	A	0.02	0.6	3.8	A	8.8
	WB Through	0.0		-	0.53	0.0	3.1	A	1.9
	WB Right - Turn						1.1	A	
Wilson Lake Drive	NB Left - Turn	41.1	C	E	0.12	3.0	19.9	C	8.9
	NB Through	11.9		B	0.08	2.1	0.0	A	14.5
	NB Right - Turn						5.7	A	
	SB Left - Turn	140.4	F	F	0.92	44.4	42.4	E	31.1
	SB Through						35.5	E	
	SB Right - Turn						23.1	C	

3.2 Traffic Signal Warrant Analysis

The Transportation Association of Canada's (TAC) developed the Canadian Traffic Signal Warrant Matrix Procedure in 2005 to provide a basis for making rational, defensible decisions on the installation of traffic signals. The matrix uses a "cumulative factors methodology" to evaluate vehicle to vehicle and vehicle to pedestrian interactions while considering local factors such as demographics and roadway characteristics. The procedure also incorporates collision prediction theory which anticipates the amount of collisions based on traffic volume and intersection geometry. However, it should be noted that some of the data required for this warrant procedure is subjective in nature, such as the intersection being located "near a school". The matrix provides a final score for the intersection, in order for traffic signals to be considered an intersection must score 100 priority points or more. A traffic signal installation would be deemed unwarranted if the scoring is less than 100 points.

The Traffic Signal Warrant (TSW) Matrix was used to evaluate if traffic signals should be considered for the intersections of Sackville Drive and Lively Road and Sackville Drive and Wilson Lake Dive. The intersection of Sackville Drive and Lively Road scored 23 points and the intersection of Sackville Drive and Wilson Lake Drive scored 43 points, therefore traffic signals are not warranted at this time. The traffic signal warrant worksheets can be found in Appendix F.

4.0 Scenario 2 – Future without Development (2024)

4.1 Background Traffic Forecast

Existing traffic volumes were factored using a background traffic growth to reflect normal increases in traffic on the study area road network. A background growth rate of 1.5 percent was used to be consistent with the 2014 study by CBCL. This growth rate was determined using trend lines traffic forecasts for Highway 101 from the Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR).

To provide a complete outlook of future conditions in 2024, significant development proposals in the vicinity of the study area must also be incorporated in the analysis. There are a number of existing proposals for developments immediately adjacent to the study area.

Margeson Drive Extension: A proposal exists for the extension of Margeson Drive to Stonewick Cross, southwest of Webber Lake. There are no details available regarding the proposed road network change, however, the change is not anticipated to have an impact on trips in the study area.

Berry Hills Phase 6: Phase 6 of the Berry Hills Development included 108 residential units and is expected to be completed by 2018. The majority of trips generated from Phase 6 have been taken into account in the 2017 traffic counts. The remaining development for 2018 would be considered as background growth and taken into account in the background growth rate for the area.

Sunset Ridge: Sunset Ridge is a master planned community located off of Margeson Drive. Sunset Ridge features a mix of residential units including single-family, semi-detached, townhouses, apartments and condominiums. The next phase of the development includes commercial development adjacent to the existing residential development. Due to the location of the development in relation to the study area, between Highway 101 and the Sackville Drive/Margeson Drive roundabout, it can be assumed that the majority of traffic would access the development via Highway 101. The development would likely not have a significant impact on the Sackville Drive/Margeson Drive Roundabout. The Sunset Ridge development has

not been taken into account as part of this TIS; however, a traffic impact study is currently being undertaken for the Sunset Ridge Development.

Margeson Drive Park and Ride: Halifax Transit has plans to develop a Park-and-Ride lot on Margeson Drive south of the Highway 101 Exit 2A. The Park-and-Ride facility would include parking for approximately 500 vehicles. According to the *Moving Forward Together Plan*, the tentative date for the beginning of this service is 2020. In the 2014 study, the Institute of Transportation Engineers (ITE) trip generation rates for Park-and-Ride facilities were found to be low when compared to Halifax Transit ridership data at similar facilities in the region. An assumption of 350 trips in the AM and PM peak hours was made for a facility with 400 parking spaces. Of these trips, 50 were assumed to be new trips on the road network. For this traffic impact study, 75 new trips were assumed for a facility with 500 parking spaces. Buses using the facility are assumed to access the site through Highway 101 and would not impact the study area. The new trips were distributed using the following trip distribution:

- 10 percent to/from Windsor, Hantsport and Mount Uniacke areas via Highway 101
- 20 percent to/from Upper and Middle Sackville via Sackville Drive from the west
- 70 percent to/from Lower Sackville from Sackville Drive to the east

4.2 Scenario 2 - Analysis Results

The traffic volumes in Scenario 2 Future Conditions without Development represents background traffic growth to the year 2024 and anticipated trips generated by the Margeson Drive Park and Ride. The traffic volumes used for this scenario can be found in Appendix C.

The level of service conditions for the AM and PM peak hours of the Future Conditions without Development scenario are summarized in Table 4 and Table 5. The detailed Synchro/SimTraffic and Arcady are included in Appendices D and E, respectively. Results of the analysis show that the level of service conditions at the intersection of Sackville Drive and Wilson Lake Drive deteriorate.

The southbound movements the intersection of Sackville Drive and Wilson Lake Drive operate at LOS F during both the AM and PM peak hours. The southbound movements are over capacity in the PM peak hour. The northbound left-turn movement also operates at LOS F during the PM peak hour. The overall intersection operates at LOS C or better during both peak hours. It should be noted that the SimTraffic analysis results show only the southbound movements operating at LOS F during the PM peak hour.

The intersection of Sackville Drive and Lively Road operates at acceptable levels of service during the AM peak hour. During the PM peak hour, the southbound movements operate at LOS E. The intersection of Sackville Drive and Margeson Drive operates at acceptable levels of service during both the AM and PM peak hours.

Table 4: Scenario 2 – Future Conditions without Development (2024) Synchro/SimTraffic Results

Intersection		Scenario 2 Future 2024 without Development - AM Peak Hour							
		Synchro					SimTraffic		
Street	Movement	Delay/ Veh (s)	APP LOS	MVT LOS	V/C	Queue (m) 95th%ile	Delay/ Veh (s)	Equivalent LOS	Queue (m) 95th%ile
Sackville Drive/Lively Road		**1.2**	**A**				**1.4**	**A**	
Sackville Drive	EB Left - Turn	0.2	-	A	0.01	0.2	2.4	A	6.3
	EB Through						0.9	A	
	WB Through	0.0	-	-	0.18	0.0	1.0	A	0.0
	WB Right - Turn						0.5	A	
Lively Road	SB Left - Turn	19.9	C	C	0.19	5.6	11.0	B	14.7
	SB Right - Turn						2.9	A	
Sackville Drive/Wilson Lake Drive		**8.6**	**A**				**3.2**	**A**	
Sackville Drive	EB Left - Turn	8.0	-	A	0.01	0.1	2.7	A	3.7
	EB Through	0.0		-	0.44	0.0	1.7	A	0.0
	EB Right - Turn						0.9	A	
	WB Left - Turn	9.2	-	A	0.00	0.1	3.0	A	2.5
	WB Through	0.0		-	0.20	0.0	0.8	A	0.0
	WB Right - Turn						0.1	A	
Wilson Lake Drive	NB Left - Turn	25.6	C	D	0.02	0.4	6.9	A	3.9
	NB Through	14.6		B	0.10	2.6	0.0	A	15.2
	NB Right - Turn						7.1	A	
	SB Left - Turn	72.9	F	F	0.78	41.7	16.8	C	27.2
	SB Through						16.3	C	
	SB Right - Turn						8.6	A	

Intersection		Scenario 2 Future 2024 without Development - PM Peak Hour							
		Synchro					SimTraffic		
Street	Movement	Delay/ Veh (s)	APP LOS	MVT LOS	V/C	Queue (m) 95th%ile	Delay/ Veh (s)	Equivalent LOS	Queue (m) 95th%ile
Sackville Drive/Lively Road		**2.5**	**A**				**3.8**	**A**	
Sackville Drive	EB Left - Turn	0.1	-	A	0.00	0.1	5.3	A	6.1
	EB Through						0.7	A	
	WB Through	0.0	-	-	0.56	0.0	4.0	A	-
	WB Right - Turn						2.5	A	
Lively Road	SB Left - Turn	42.1	E	E	0.48	18.4	26.0	D	18.8
	SB Right - Turn						13.3	B	
Sackville Drive/Wilson Lake Drive		**20.6**	**C**				**7.6**	**A**	
Sackville Drive	EB Left - Turn	10.4	-	B	0.02	0.5	12.0	B	8.1
	EB Through	0.0		-	0.33	0.0	1.3	A	-
	EB Right - Turn						0.7	A	
	WB Left - Turn	8.7	-	A	0.03	0.7	4.7	A	8.8
	WB Through	0.0		-	0.59	0.0	4.2	A	2.2
	WB Right - Turn						1.7	A	
Wilson Lake Drive	NB Left - Turn	56.3	C	F	0.17	4.5	27.7	D	9.8
	NB Through	12.5		B	0.10	2.6	0.0	A	14.6
	NB Right - Turn						6.8	A	
	SB Left - Turn	319.5	F	F	1.37	67.9	118.8	F	43.9
	SB Through						73.8	F	
	SB Right - Turn						86.7	F	

Table 5: Scenario 2 – Future Conditions without Development (2024) Arcady Results

Intersection		Future 2024 without Development							
		AM Peak Hour				PM Peak Hour			
Street	Movement	Delay/ Veh (s)	APP LOS	V/C	Queue (PCE)	Delay/ Veh (s)	APP LOS	V/C	Queue (PCE)
Sackville Drive & Margeson Drive		**3.09**	A			**3.71**	A		
Sackville Drive	EB Through	3.57	A	0.45	0.83	2.77	A	0.32	0.47
	EB Right - Turn								
	WB Left - Turn	2.35	A	0.19	0.23	3.82	A	0.40	0.66
	WB Through								
Margeson Drive	NB Left - Turn	2.36	A	0.11	0.13	4.29	A	0.50	1.01
	NB Right - Turn								

5.0 Scenario 3 – Future with Development (2024)

5.1 Trip Generation Characteristics

The trip generation rates for the proposed development were quantified using the 9th edition of the *Trip Generation Manual* published by the Institute of Transportation Engineers (ITE). Two land use codes were used, Single-Family Detached Housing (Land Use Code 210) and Residential Condominium/Townhouse (Land Use Code 230). The trip generation rates for the development are summarized in Table 6. The proposed development is expected to generate 173 trips during the AM peak hour (42 trips in/131 trips out) and 227 trips during the PM peak hour (144 trips in/83 trips out). Since no continuous active transportation facilities are present within the study area, no reductions were made for modal split.

It was assumed that 70 percent of trips from the development would be made using the entrance on Wilson Lake Drive and 30 percent would be made using Lively Road. The trips were then distributed to the road network using existing travel patterns.

Table 6: Proposed Trip Generation Rates for Berry Hills Phase 8

Use	Number	Unit	1000 sq ft GFA * Coverage	ITE Code	AM Peak Rate	AM Peak Trip Gen	AM Peak In	AM Peak Out	PM Peak Rate	PM Peak Trip Gen	PM Peak In	PM Peak Out
Single-Family Detached Housing	206	DU	-	210	0.75	155	39	116	1.0	206	130	76
Semi Detached Housing	40	DU	-	230	0.44	18	3	15	0.52	21	14	7
Trips Generated at Full Build-Out						**173**	**42**	**131**		**227**	**144**	**83**

5.2 Scenario 3 - Analysis Results

The traffic volumes in Scenario 3 Future Conditions with Development represents background traffic growth to the year 2024 and anticipated trips generated by the Margeson Drive Park and Ride and Phase 8 of the Berry Hills Development. The traffic volumes used for this scenario can be found in Appendix C.

The level of service conditions for the AM and PM peak hours of the Future Conditions with Development scenario are summarized in Table 7 and Table 8. The detailed Synchro/SimTraffic and Arcady are included in Appendices D and E, respectively. Results of the analysis show that the problems observed in Scenario 2 worsen with new development, however, the development does not create additional operational issues. No significant delays are observed on Sackville Drive, vehicles turning left and right into the development do not create operational problems at Sackville Drive and Lively Road and Sackville Drive and Wilson Lake Drive.

The southbound movements the intersection of Sackville Drive and Wilson Lake Drive operate at LOS F and are over capacity during both the AM and PM peak hours. During the PM peak hour, the northbound left-turn movement operates at LOS F. The overall intersection operates at LOS F during both peak hours.

The intersection of Sackville Drive and Lively Road operates at acceptable levels of service during the AM peak hour. During the PM peak hour, the southbound movements operate at LOS F. The intersection of Sackville Drive and Margeson Drive operates at acceptable levels of service during both the AM and PM peak hours.

Table 7: Scenario 2 – Future Conditions with Development (2024) Synchro/SimTraffic Results

Intersection		Scenario 3 Future 2024 with Development - AM Peak Hour							
		Synchro					SimTraffic		
Street	Movement	Delay/ Veh (s)	APP LOS	MVT LOS	V/C	Queue (m) 95th%ile	Delay/ Veh (s)	Equivalent LOS	Queue (m) 95th%ile
Sackville Drive/Lively Road		**2.4**	**A**				**2.0**	**A**	
Sackville Drive	EB Left - Turn	0.2	-	A	0.01	0.2	2.4	A	7.4
	EB Through						1.0	A	
	WB Through	0.0	-	-	0.20	0.0	1.2	A	0.7
	WB Right - Turn						0.7	A	
Lively Road	SB Left - Turn	24.6	C	C	0.36	12.8	12.4	B	20.0
	SB Right - Turn						5.4	A	
Sackville Drive/Wilson Lake Drive		**59.6**	**F**				**9.9**	**A**	
Sackville Drive	EB Left - Turn	8.1	-	A	0.01	0.3	3.4	A	5.4
	EB Through	0.0		-	0.46	0.0	2.1	A	-
	EB Right - Turn						0.8	A	
	WB Left - Turn	9.3	-	A	0.00	0.1	6.5	A	3.0
	WB Through	0.0		-	0.23	0.0	1.2	A	1.6
	WB Right - Turn						0.2	A	
Wilson Lake Drive	NB Left - Turn	29.8	C	D	0.02	0.5	7.6	A	4.1
	NB Through	15.3		C	0.10	2.7	0.0	A	15.5
	NB Right - Turn						10.9	B	
	SB Left - Turn	348.7	F	F	1.60	137.7	49.7	E	80.4
	SB Through						35.0	D	
	SB Right - Turn						46.6	E	

Intersection		Scenario 3 Future 2024 with Development - PM Peak Hour							
		Synchro					SimTraffic		
Street	Movement	Delay/ Veh (s)	APP LOS	MVT LOS	V/C	Queue (m) 95th%ile	Delay/ Veh (s)	Equivalent LOS	Queue (m) 95th%ile
Sackville Drive/Lively Road		**5.1**	**A**				**5.9**	**A**	
Sackville Drive	EB Left - Turn	0.3	-	A	0.01	0.2	8.9	A	14.8
	EB Through						1.0	A	
	WB Through	0.0	-	-	0.59	0.0	5.5	A	1.0
	WB Right - Turn						3.8	A	
Lively Road	SB Left - Turn	65.9	F	F	0.71	34.4	37.9	E	33.5
	SB Right - Turn						28.2	D	
Sackville Drive/Wilson Lake Drive		**1021.9**	**F**				**34.6**	**D**	
Sackville Drive	EB Left - Turn	11.2	-	B	0.04	1.0	26.0	D	13.1
	EB Through	0.0		-	0.34	0.0	1.6	A	4.6
	EB Right - Turn						0.8	A	
	WB Left - Turn	8.7	-	A	0.03	0.7	5.6	A	8.3
	WB Through	0.0		-	0.67	0.0	6.4	A	5.9
	WB Right - Turn						3.0	A	
Wilson Lake Drive	NB Left - Turn	82.0	D	F	0.23	6.4	49.3	E	10.1
	NB Through	12.8		B	0.10	2.7	0.0	A	15.4
	NB Right - Turn						7.4	A	
	SB Left - Turn	ERR	F	F	3.34	ERR	497.3	F	134.9
	SB Through						495.6	F	
	SB Right - Turn						466.9	F	

Table 8: Scenario 2 – Future Conditions with Development (2024) Arcady Results

Intersection		S3 Future 2024 with Development							
		AM Peak Hour				PM Peak Hour			
Street	Movement	Delay/ Veh (s)	APP LOS	V/C	Queue (PCE)	Delay/ Veh (s)	APP LOS	V/C	Queue (PCE)
Sackville Drive & Margeson Drive		**3.44**	A			**4.59**	A		
Sackville Drive	EB Through	4.07	A	0.52	1.08	3.23	A	0.36	0.62
	EB Right - Turn								
	WB Left - Turn	2.40	A	0.20	0.25	4.84	A	0.46	0.93
	WB Through								
Margeson Drive	NB Left - Turn	2.44	A	0.12	0.14	5.42	A	0.56	1.38
	NB Right - Turn								

6.0 Improvements

A number of operational problems exist throughout the study area under existing conditions, these problems will be exacerbated by background growth and future development in the study area. Long delays on minor street approaches are typical for unsignalized access points on high volumes, high speed arterial roadways such as Sackville Drive.

Existing traffic volumes do not warrant traffic signals at the intersections of Sackville Drive and Lively Road and Sackville Drive and Wilson Lake Drive. Completing a warrant analysis for both intersections using the forecasted background traffic volumes indicates that traffic signals would not be warranted in 2024. Conditions at these intersections should be monitored closely to determine when traffic signals will be necessary. It should be noted that due to the proximity of the intersection of Sackville Drive and Wilson

Lake Drive to the Sackville Drive and Margeson Drive roundabout combined with the high westbound volumes, traffic signals could cause spillbacks into the roundabout. The westbound approach may need to be widened to two lanes from the roundabout to the traffic signal.

Congestion in the area is mainly caused by a number of residential areas in and around the study area using Sackville Drive as their only access. Providing an alternate route to the Berry Hills development and other developments within the area could alleviate congestion. This could be done by developing a north leg to the Sackville Drive and Margeson Drive roundabout and creating a collector roadway that could connect to the Wilson Lake Drive and other roadways such as Jackladder Drive and Rafting Drive. The possibility of eventually adding a north leg was considered during the design stages of the roundabout and there is sufficient capacity at the roundabout to accommodate additional volumes.

HRM has indicated that a speeding problem exists on Wilson Lake Drive, where the 85th percentile speed was previously measured as high as 68 km/h (CBCL 2014). While this is an existing problem, it presents an opportunity to mitigate this issue in the construction of a new intersection to the development by installing a compact roundabout at the entrance. Other potential solutions to mitigate the speeding issue along Wilson Lake Drive include:

- Installing radar speed feedback signs
- If and when a new roadway extending from the Sackville Drive and Margeson Drive roundabout is connected to Wilson Lake Drive, the intersection could be designed as a compact roundabout.

A detailed comprehensive traffic calming process should be undertaken for the roadway.

7.0 Conclusions and Recommendations

Harbourside was retained by DesignPoint, on behalf of Armco Ltd., to update the Berry Hill Phase 8 Traffic Impact Study. This study has been prepared in support of the revised development plan for Phase 8 of development.

The proposed development is located along Sackville Drive in Middle Sackville west of the Sackville Drive and Margeson Drive roundabout. The development plan is proposing 246 residential units with access through Lively Road and Wilson Lake Drive. The trips generation rates for the proposed development were quantified using ITE's *Trip Generation Manual*. The development is expected to generate 173 trips during the AM peak hour (42 trips in/131 trips out) and 227 trips during the PM peak hour (144 trips in/83 trips out). Trips were distributed to the road network using existing travel patterns.

Three (3) network scenarios were analyzed to quantify the impact of the proposed development.

- Scenario 1 - Existing Conditions (2017)
- Scenario 2 - Future Conditions without Development (2024)
- Scenario 3 - Future Conditions with Development (2024)

Results of the analysis for Scenario 1 indicate that there are existing problems at the intersection of Sackville Drive and Wilson Lake Drive, minor street movements operate at poor levels of service. Traffic signals warrant analyses for Sackville Drive and Wilson Lake Drive and Sackville Drive and Lively Road indicate that traffic are not warranted by existing traffic volumes.

The level of service conditions at Sackville Drive and Wilson Lake Drive deteriorate with background traffic growth in Scenario 2. Result for Scenario 2 also show poor levels for minor street movements at Sackville

Drive and Lively Road. Traffic signals are still not warranted when considering background volumes to the year 2024.

The poor level of service conditions observed in Scenario 2 continue to deteriorate when the development volumes are added in Scenario 3, however, no other operational problems are created by the development volumes. Sackville Drive does not experience significant delays, all left and right turning movements into the development operate at acceptable levels of service.

A number of operational problems exist throughout the study area under existing conditions, the analysis shows that these problems will be exacerbated by background growth and future development. Long delays on minor street approaches are typical for unsignalized access points on high volumes, high speed arterial roadways such as Sackville Drive.

Traffic signals are not warranted the intersections of Sackville Drive and Lively Road and Sackville Drive and Wilson Lake Drive. These intersections should be closely monitored to determine when traffic signals will be necessary. Due to the proximity of the intersection of Sackville Drive and Wilson Lake Drive to the Sackville Drive and Margeson Drive roundabout and the high westbound volumes, traffic signals could cause spillbacks into the roundabout. The westbound approach may need to be widened to two lanes from the roundabout to the traffic signal.

Congestion in the study area is mainly caused by a number of residential areas in and around the study area that use Sackville Drive as their only access route. Creating a north leg to the Sackville Drive and Margeson Drive roundabout to serve as an alternate route to the Berry Hills development and other developments within the area could alleviate congestion.

This development at full build it out is expected to increase the traffic volumes at the intersections of Sackville Drive and Lively Road and Sackville Drive and Wilson Lake Drive. The analysis shows that congestion can be expected on the side street stop controlled approaches of both of these intersections during peak hours. The level of congestion is likely to be no different than many of the existing residential subdivision connections along Sackville Drive. While traffic signals are not an option to address the concerns at these intersections, there does exist an opportunity in this situation to address the congestion issues through a more suitable road network configuration for the area. This would involve a roadway connection as the fourth leg into the Sackville Drive and Margeson Drive roundabout that extends northwards with possible connections to Wilson Lake Drive and other roadways such as Jackladder Drive and Rafting Drive.

APPENDIX A

Scoping Document

Harbourside Transportation Consultants
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Tel: (902) 405.4696 ◆ www.harboursideengineering.ca

26 July 2017

HTC Project: 172054

Halifax Regional Municipality
P.O. Box 1749
Halifax, NS B3J 3A5

T. 902.490.5525 | **F.** 902.490.6696
E. [redacted]

ATTENTION: JODY DEBAIE, P.ENG.
TRANSPORTATION ROAD SAFETY ENGINEER

RE: SCOPING DOCUMENT FOR BERRY HILLS PHASE 8 TIS UPDATE

Ms. DeBaie,

Harbourside Transportation Consultants (HTC) was retained to update the Berry Hill Phase 8, Middle Sackville Traffic Impact Study (TIS) completed by CBCL in August 2014. An update is required to reflect changes made to the development plan. These changes include:

- Only one access on Wilson Lake Drive
- New access on Lively Road
- Reduced number of lots

As per your request this Scoping Document was prepared for the Halifax Regional Municipality's (HRM) review. The following section outlined the proposed methodology for the study.

The TIS will be completed in accordance with HRM's *Guidelines for the Preparation of Transportation Impact Studies (8th revision)*. The TIS will address the items identified in the Transportation Impact Studies Checklist in Appendix A of the Guidelines. The checklist includes the following items:

- Description of the development proposal and the study area;
- Establishing a transportation context for the analysis horizon year and the time periods for analysis;
- Estimation of travel that will be generated by the development proposal and development of a transportation demand management plan;
- Evaluation of transportation impacts and identification of transportation system changes needed to mitigate these impacts; and
- Documentation and reporting.

Study Area and Intersections

The study area is located in Middle Sackville off of Exit 2A on Highway 101. The study intersections in the original TIS were Sackville Drive/Margeson Drive and Sackville Drive/Wilson Lake Drive. Due to the new access on Lively Road, the intersection of Sackville Drive/Lively Road will also be included in the TIS update. The proposed study area and intersections for the TIS are shown in Figure 1. New traffic counts will be gathered at all three study areas intersections.

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Figure 1: Study Intersection

Trip Generation and Trip Distribution

Trip generations rates will be developed for the proposed development and others in the study area using the 9th edition of the Institute of Transportation Engineers' (ITE) Trip Generation Manual. Trips will be distributed using the existing trip distribution. Unless otherwise indicated by HRM no reductions will be made for modal split since no continuous cycling or walking facilities are provided on the roadways within the study area. This follows the same methodology as the 2014 study.

Study Horizons

The updated TIS will include an analysis of the following scenarios:

- Existing conditions
- Future No-Build 2024
- Future Full Build-Out 2024
- Future Full Build-Out 2024 with Improvements (if required)

A background traffic growth rate of 1.5 percent per year will be assumed for the area, this rate was used in the 2014 study. The scenarios will include any other development proposed within the study area, including the Park and Ride on Margeson Drive and any others identified by HRM.

Improvements

Warrants analyses will be complete to identify if traffic signals or auxiliary turning lanes are warranted at the intersections of Wilson Lake Drive and Lively Road. Any improvement required to mitigate the impact of the proposed development will be identified if required.

If you have any further questions or comments, or would like to discuss any aspect of this document, please feel free to contact the undersigned at your convenience.

Regards,

Harbourside Transportation Consultants
Originally Signed

Michael MacDonald, P. Eng.
Senior Transportation Engineer
P: 902.405.4655
E: mmacdonald@harboursideengineering.ca

APPENDIX B

Traffic Counts

Harbourside Transportation Consultants
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Terrace on the Square
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709.579.6435 fallaire@harboursideengineering.ca

Count Name: Sackville Drive & Lively Road
Site Code:
Start Date: 08/22/2017

Turning Movement Data

Start Time	Lively Road Southbound				Sackville Drive WB Westbound				Sackville Drive EB Eastbound				
	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
7:00 AM	0	8	0	8	5	39	0	44	127	1	0	128	180
7:15 AM	2	9	0	11	5	40	0	45	137	2	0	139	195
7:30 AM	0	9	0	9	12	50	0	62	133	1	0	134	205
7:45 AM	1	9	0	10	12	59	0	71	113	2	0	115	196
Hourly Total	3	35	0	38	34	188	0	222	510	6	0	516	776
8:00 AM	1	11	0	12	6	41	0	47	93	0	0	93	152
8:15 AM	1	9	0	10	8	65	0	73	139	2	0	141	224
8:30 AM	1	5	0	6	2	54	0	56	112	0	0	112	174
8:45 AM	4	9	0	13	8	60	0	68	96	1	0	97	178
Hourly Total	7	34	0	41	24	220	0	244	440	3	0	443	728
Grand Total	10	69	0	79	58	408	0	466	950	9	0	959	1504
Approach %	12.7	87.3	0.0	-	12.4	87.6	0.0	-	99.1	0.9	0.0	-	-
Total %	0.7	4.6	0.0	5.3	3.9	27.1	0.0	31.0	63.2	0.6	0.0	63.8	-
Lights	9	66	0	75	54	385	0	439	919	7	0	926	1440
% Lights	90.0	95.7	-	94.9	93.1	94.4	-	94.2	96.7	77.8	-	96.6	95.7
Other Vehicles	1	3	0	4	4	23	0	27	31	2	0	33	64
% Other Vehicles	10.0	4.3	-	5.1	6.9	5.6	-	5.8	3.3	22.2	-	3.4	4.3

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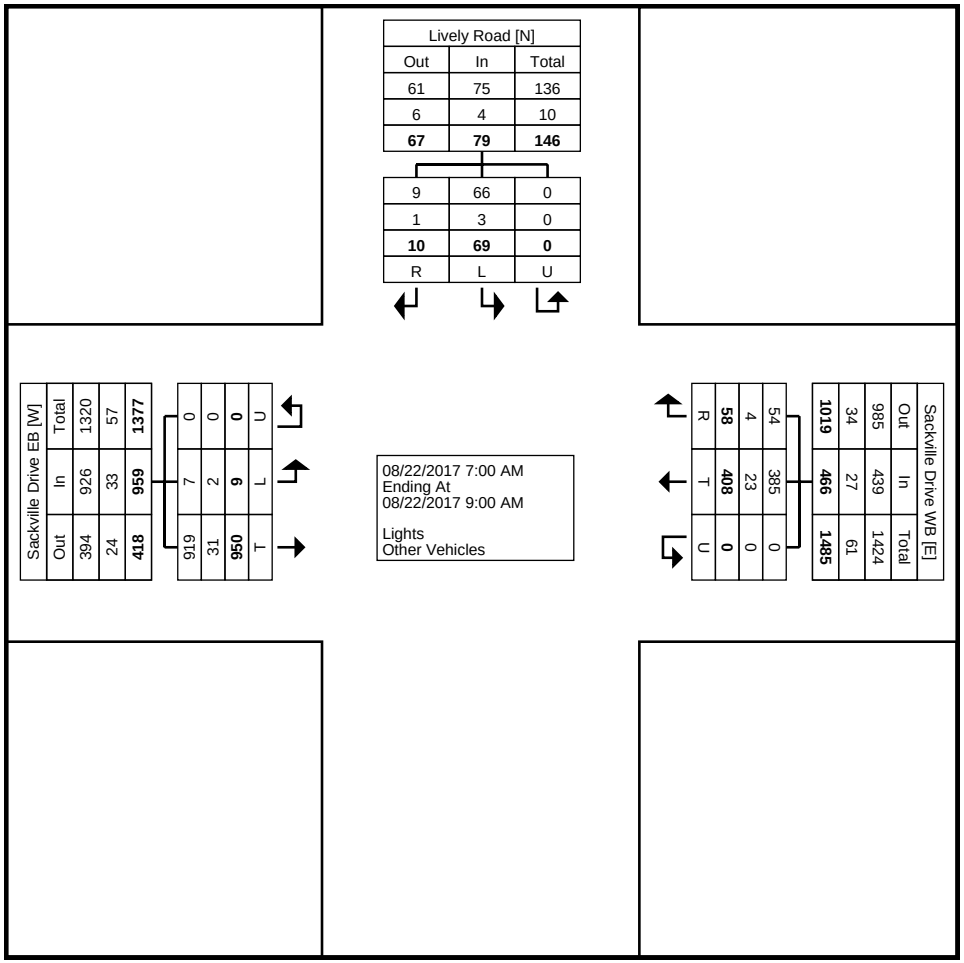

Turning Movement Data Plot

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Count Name: Sackville Drive & Lively Road
Site Code:
Start Date: 08/22/2017

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Lively Road Southbound				Sackville Drive WB Westbound				Sackville Drive EB Eastbound				
	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
7:30 AM	0	9	0	9	12	50	0	62	133	1	0	134	205
7:45 AM	1	9	0	10	12	59	0	71	113	2	0	115	196
8:00 AM	1	11	0	12	6	41	0	47	93	0	0	93	152
8:15 AM	1	9	0	10	8	65	0	73	139	2	0	141	224
Total	3	38	0	41	38	215	0	253	478	5	0	483	777
Approach %	7.3	92.7	0.0	-	15.0	85.0	0.0	-	99.0	1.0	0.0	-	-
Total %	0.4	4.9	0.0	5.3	4.9	27.7	0.0	32.6	61.5	0.6	0.0	62.2	-
PHF	0.750	0.864	0.000	0.854	0.792	0.827	0.000	0.866	0.860	0.625	0.000	0.856	0.867
Lights	3	36	0	39	35	201	0	236	462	5	0	467	742
% Lights	100.0	94.7	-	95.1	92.1	93.5	-	93.3	96.7	100.0	-	96.7	95.5
Other Vehicles	0	2	0	2	3	14	0	17	16	0	0	16	35
% Other Vehicles	0.0	5.3	-	4.9	7.9	6.5	-	6.7	3.3	0.0	-	3.3	4.5

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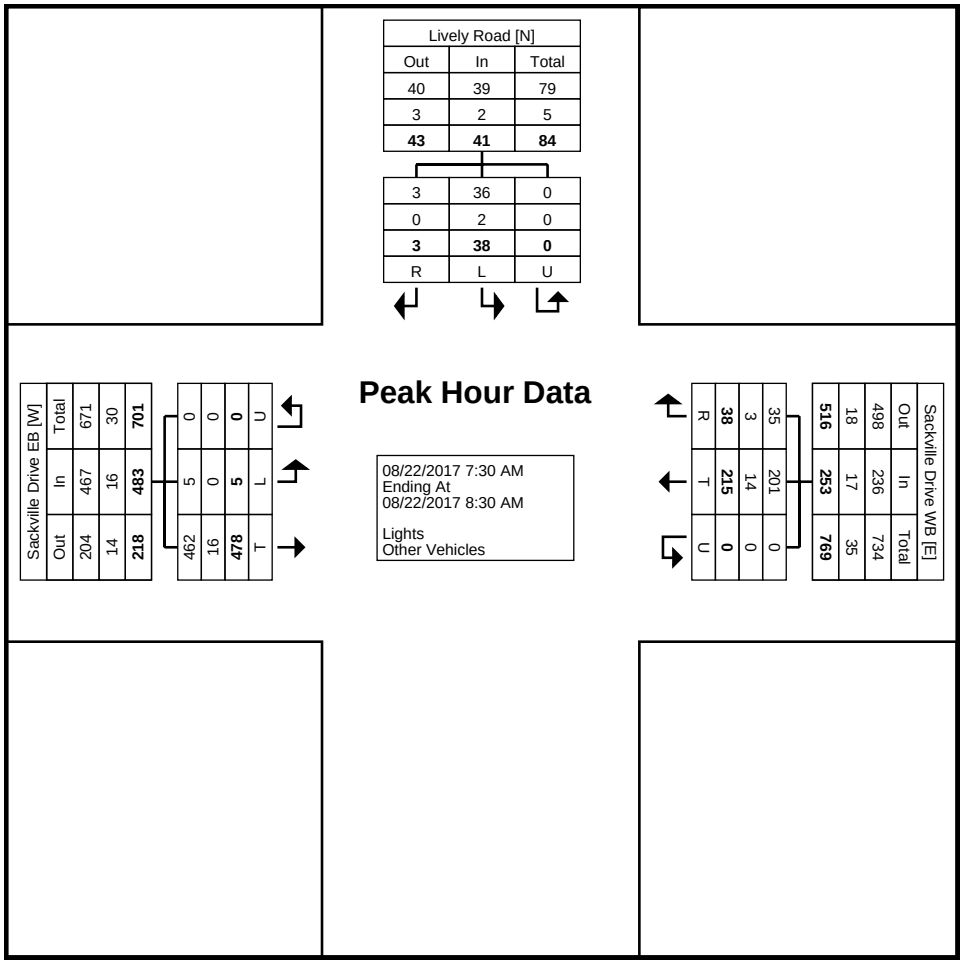

Turning Movement Peak Hour Data Plot (7:30 AM)

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Count Name: Sackville Drive & Lively Road
Site Code:
Start Date: 08/22/2017

Turning Movement Data

Start Time	Lively Road Southbound				Sackville Drive WB Westbound				Sackville Drive EB Eastbound				
	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
11:00 AM	1	6	0	7	6	87	0	93	105	0	0	105	205
11:15 AM	3	9	0	12	8	65	0	73	89	3	0	92	177
11:30 AM	0	8	0	8	5	89	0	94	109	0	0	109	211
11:45 AM	3	6	0	9	11	82	0	93	85	1	0	86	188
Hourly Total	7	29	0	36	30	323	0	353	388	4	0	392	781
12:00 PM	3	8	0	11	8	97	0	105	80	3	0	83	199
12:15 PM	1	9	0	10	7	81	0	88	79	2	0	81	179
12:30 PM	1	10	0	11	15	96	0	111	85	0	0	85	207
12:45 PM	0	9	0	9	7	89	0	96	84	2	0	86	191
Hourly Total	5	36	0	41	37	363	0	400	328	7	0	335	776
Grand Total	12	65	0	77	67	686	0	753	716	11	0	727	1557
Approach %	15.6	84.4	0.0	-	8.9	91.1	0.0	-	98.5	1.5	0.0	-	-
Total %	0.8	4.2	0.0	4.9	4.3	44.1	0.0	48.4	46.0	0.7	0.0	46.7	-
Lights	12	63	0	75	66	665	0	731	694	11	0	705	1511
% Lights	100.0	96.9	-	97.4	98.5	96.9	-	97.1	96.9	100.0	-	97.0	97.0
Other Vehicles	0	2	0	2	1	21	0	22	22	0	0	22	46
% Other Vehicles	0.0	3.1	-	2.6	1.5	3.1	-	2.9	3.1	0.0	-	3.0	3.0

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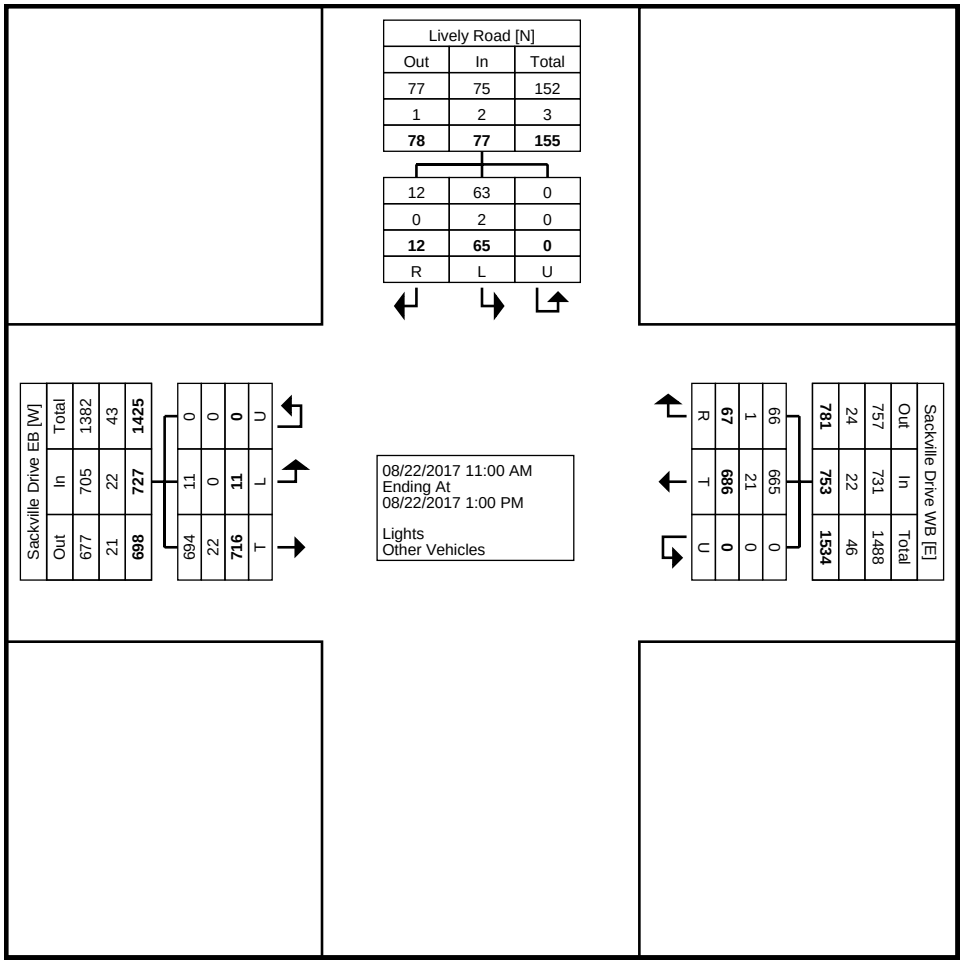

Turning Movement Data Plot

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Count Name: Sackville Drive & Lively Road
Site Code:
Start Date: 08/22/2017

Turning Movement Peak Hour Data (11:00 AM)

Start Time	Lively Road Southbound				Sackville Drive WB Westbound				Sackville Drive EB Eastbound				
	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
11:00 AM	1	6	0	7	6	87	0	93	105	0	0	105	205
11:15 AM	3	9	0	12	8	65	0	73	89	3	0	92	177
11:30 AM	0	8	0	8	5	89	0	94	109	0	0	109	211
11:45 AM	3	6	0	9	11	82	0	93	85	1	0	86	188
Total	7	29	0	36	30	323	0	353	388	4	0	392	781
Approach %	19.4	80.6	0.0	-	8.5	91.5	0.0	-	99.0	1.0	0.0	-	-
Total %	0.9	3.7	0.0	4.6	3.8	41.4	0.0	45.2	49.7	0.5	0.0	50.2	-
PHF	0.583	0.806	0.000	0.750	0.682	0.907	0.000	0.939	0.890	0.333	0.000	0.899	0.925
Lights	7	28	0	35	29	317	0	346	378	4	0	382	763
% Lights	100.0	96.6	-	97.2	96.7	98.1	-	98.0	97.4	100.0	-	97.4	97.7
Other Vehicles	0	1	0	1	1	6	0	7	10	0	0	10	18
% Other Vehicles	0.0	3.4	-	2.8	3.3	1.9	-	2.0	2.6	0.0	-	2.6	2.3

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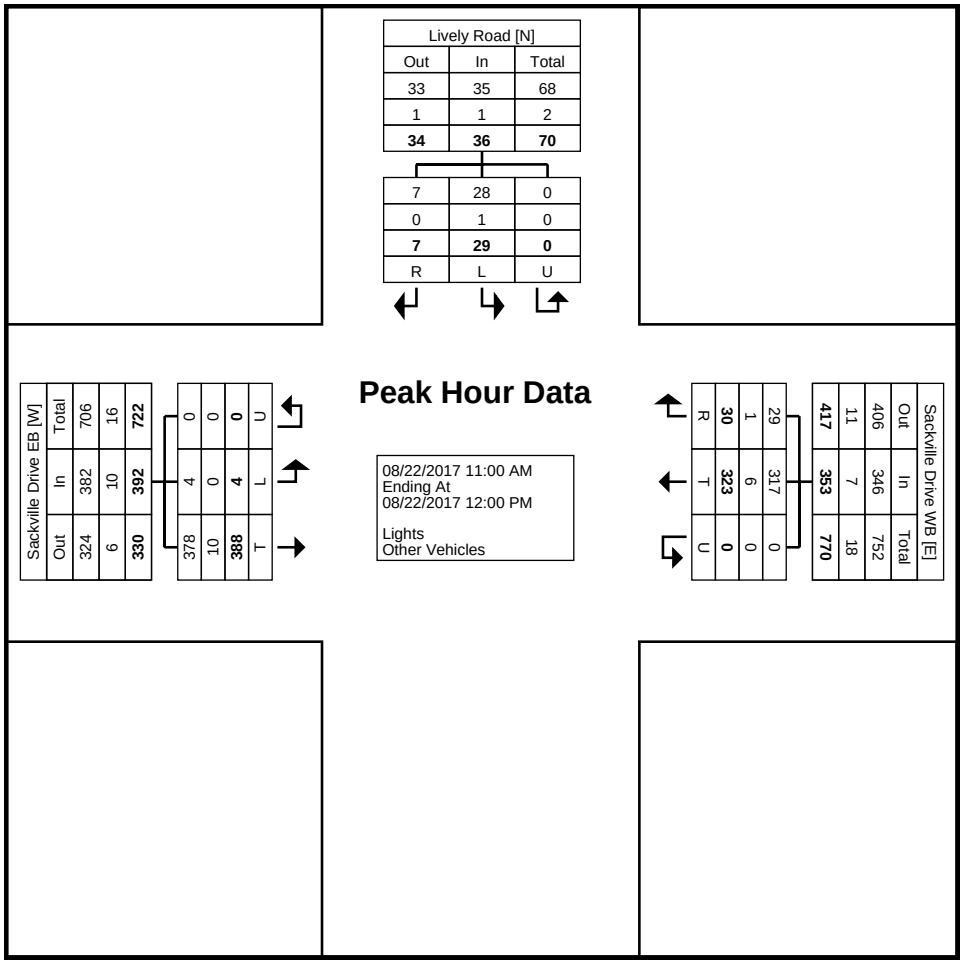

Turning Movement Peak Hour Data Plot (11:00 AM)

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Count Name: Sackville Drive & Lively Road
Site Code:
Start Date: 08/22/2017

Turning Movement Peak Hour Data (12:00 PM)

Start Time	Lively Road Southbound				Sackville Drive WB Westbound				Sackville Drive EB Eastbound				
	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
12:00 PM	3	8	0	11	8	97	0	105	80	3	0	83	199
12:15 PM	1	9	0	10	7	81	0	88	79	2	0	81	179
12:30 PM	1	10	0	11	15	96	0	111	85	0	0	85	207
12:45 PM	0	9	0	9	7	89	0	96	84	2	0	86	191
Total	5	36	0	41	37	363	0	400	328	7	0	335	776
Approach %	12.2	87.8	0.0	-	9.3	90.8	0.0	-	97.9	2.1	0.0	-	-
Total %	0.6	4.6	0.0	5.3	4.8	46.8	0.0	51.5	42.3	0.9	0.0	43.2	-
PHF	0.417	0.900	0.000	0.932	0.617	0.936	0.000	0.901	0.965	0.583	0.000	0.974	0.937
Lights	5	35	0	40	37	348	0	385	316	7	0	323	748
% Lights	100.0	97.2	-	97.6	100.0	95.9	-	96.3	96.3	100.0	-	96.4	96.4
Other Vehicles	0	1	0	1	0	15	0	15	12	0	0	12	28
% Other Vehicles	0.0	2.8	-	2.4	0.0	4.1	-	3.8	3.7	0.0	-	3.6	3.6

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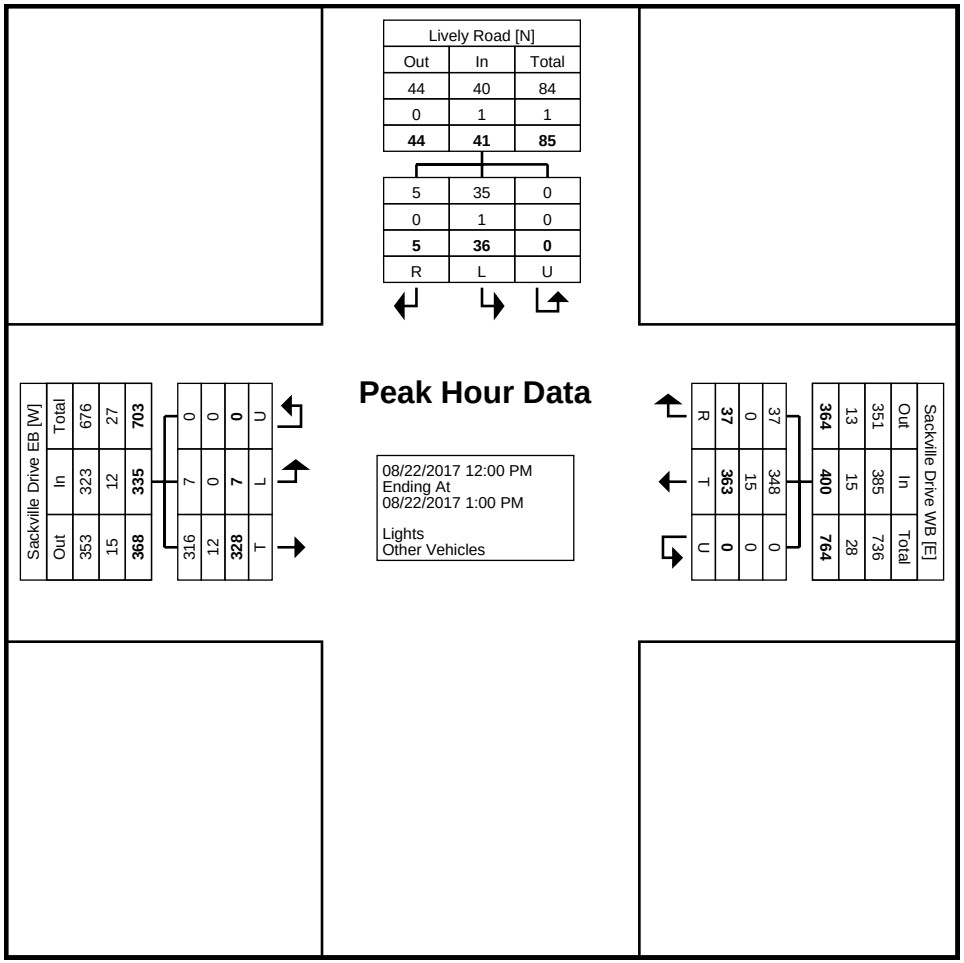
Terrace on the Square
St. John's, Newfoundland and Labrador, Canada A1B 2X1
709.579.6435 fallaire@harboursideengineering.ca

Count Name: Sackville Drive & Lively Road
Site Code:
Start Date: 08/22/2017



Turning Movement Peak Hour Data Plot (12:00 PM)

Harbourside Transportation Consultants
8 Rowan Street, Suite 306
Terrace on the Square
St. John's, Newfoundland and Labrador, Canada A1B 2X1
709.579.6435 fallaire@harboursideengineering.ca

Count Name: Sackville Drive & Lively Road
Site Code:
Start Date: 08/22/2017

Turning Movement Data

Start Time	Lively Road Southbound				Sackville Drive WB Westbound				Sackville Drive EB Eastbound				
	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
4:00 PM	3	11	0	14	15	160	0	175	98	2	0	100	289
4:15 PM	4	16	0	20	15	151	0	166	77	2	0	79	265
4:30 PM	3	11	0	14	12	163	0	175	91	2	0	93	282
4:45 PM	3	8	0	11	8	158	1	167	78	1	0	79	257
Hourly Total	13	46	0	59	50	632	1	683	344	7	0	351	1093
5:00 PM	3	16	0	19	19	182	0	201	98	1	0	99	319
5:15 PM	2	9	0	11	11	168	0	179	96	0	0	96	286
5:30 PM	3	9	0	12	10	178	0	188	70	0	0	70	270
5:45 PM	2	6	0	8	8	160	0	168	89	2	0	91	267
Hourly Total	10	40	0	50	48	688	0	736	353	3	0	356	1142
Grand Total	23	86	0	109	98	1320	1	1419	697	10	0	707	2235
Approach %	21.1	78.9	0.0	-	6.9	93.0	0.1	-	98.6	1.4	0.0	-	-
Total %	1.0	3.8	0.0	4.9	4.4	59.1	0.0	63.5	31.2	0.4	0.0	31.6	-
Lights	23	86	0	109	90	1293	1	1384	684	10	0	694	2187
% Lights	100.0	100.0	-	100.0	91.8	98.0	100.0	97.5	98.1	100.0	-	98.2	97.9
Other Vehicles	0	0	0	0	8	27	0	35	13	0	0	13	48
% Other Vehicles	0.0	0.0	-	0.0	8.2	2.0	0.0	2.5	1.9	0.0	-	1.8	2.1

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Count Name: Sackville Drive & Lively Road
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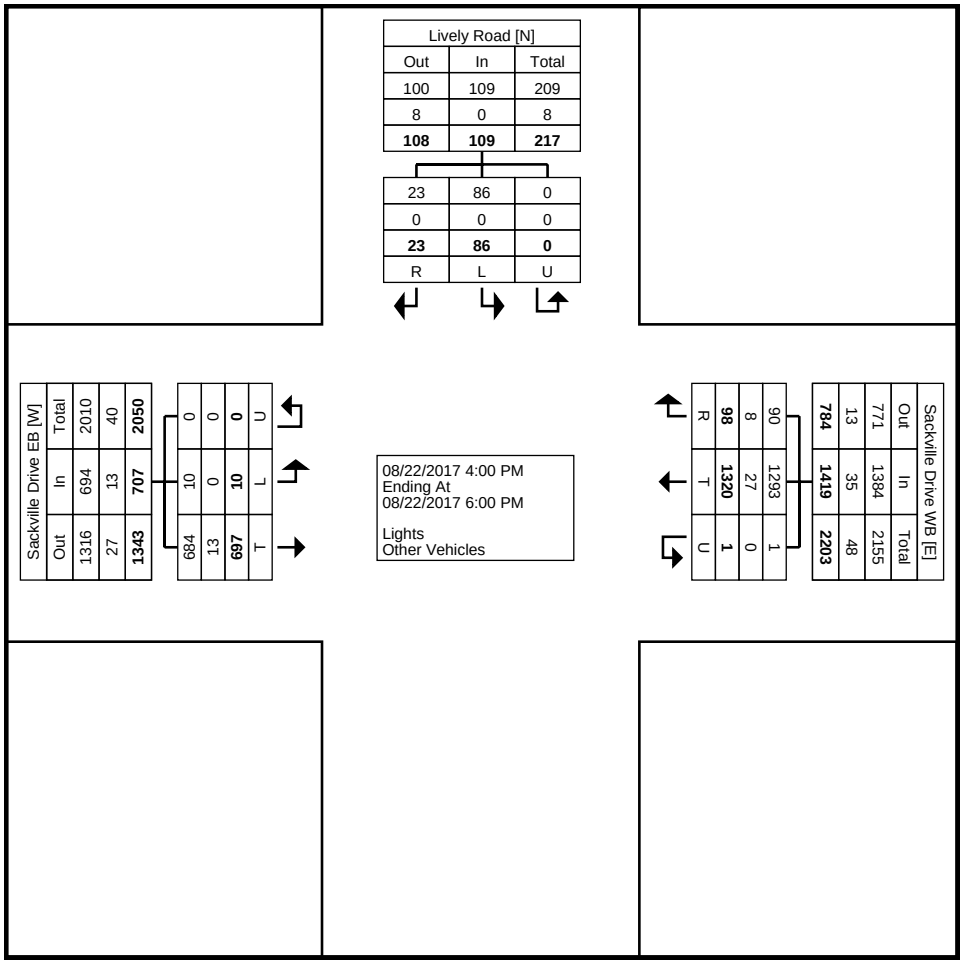

Turning Movement Data Plot

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Count Name: Sackville Drive & Lively Road
Site Code:
Start Date: 08/22/2017

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Lively Road Southbound				Sackville Drive WB Westbound				Sackville Drive EB Eastbound				
	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
4:30 PM	3	11	0	14	12	163	0	175	91	2	0	93	282
4:45 PM	3	8	0	11	8	158	1	167	78	1	0	79	257
5:00 PM	3	16	0	19	19	182	0	201	98	1	0	99	319
5:15 PM	2	9	0	11	11	168	0	179	96	0	0	96	286
Total	11	44	0	55	50	671	1	722	363	4	0	367	1144
Approach %	20.0	80.0	0.0	-	6.9	92.9	0.1	-	98.9	1.1	0.0	-	-
Total %	1.0	3.8	0.0	4.8	4.4	58.7	0.1	63.1	31.7	0.3	0.0	32.1	-
PHF	0.917	0.688	0.000	0.724	0.658	0.922	0.250	0.898	0.926	0.500	0.000	0.927	0.897
Lights	11	44	0	55	47	661	1	709	358	4	0	362	1126
% Lights	100.0	100.0	-	100.0	94.0	98.5	100.0	98.2	98.6	100.0	-	98.6	98.4
Other Vehicles	0	0	0	0	3	10	0	13	5	0	0	5	18
% Other Vehicles	0.0	0.0	-	0.0	6.0	1.5	0.0	1.8	1.4	0.0	-	1.4	1.6

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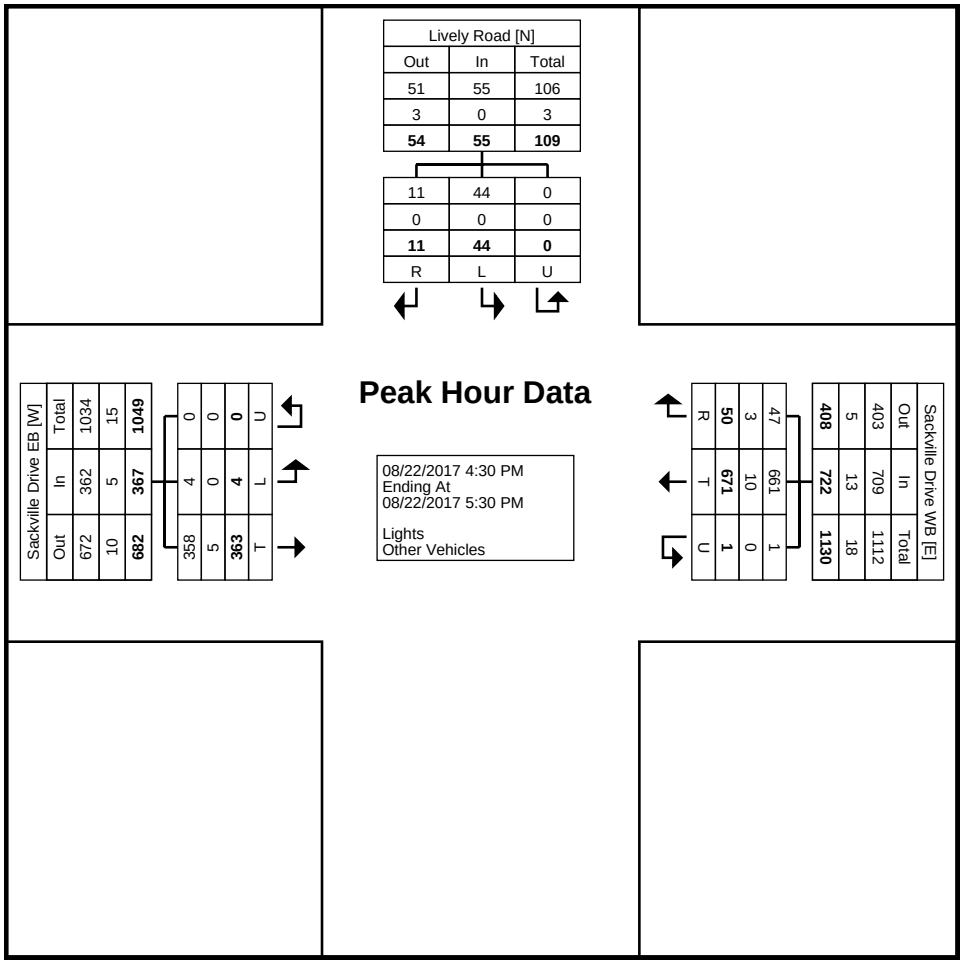
Count Name: Sackville Drive & Lively Road
Site Code:
Start Date: 08/22/2017



Turning Movement Peak Hour Data Plot (4:30 PM)

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St. John's, Newfoundland and Labrador, Canada A1B 2X1
709.579.6435 fallaire@harboursideengineering.ca

Count Name: Sackville Drive & Margeson Drive
Site Code:
Start Date: 08/09/2017

Turning Movement Data

Start Time	Sackville Drive Westbound					Margeson Drive Northbound					Sackville Drive Eastbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:00 AM	37	36	1	0	74	8	18	1	0	27	98	64	0	0	162	263
7:15 AM	26	29	0	0	55	19	25	0	1	44	107	64	0	1	171	270
7:30 AM	35	26	1	0	62	17	26	0	0	43	102	78	2	0	182	287
7:45 AM	45	18	1	0	64	17	23	0	0	40	75	62	3	0	140	244
Hourly Total	143	109	3	0	255	61	92	1	1	154	382	268	5	1	655	1064
8:00 AM	43	19	0	0	62	12	16	1	0	29	86	85	0	0	171	262
8:15 AM	53	14	3	0	70	23	21	0	0	44	71	70	3	0	144	258
8:30 AM	38	18	0	0	56	15	24	0	0	39	64	73	0	0	137	232
8:45 AM	61	16	0	0	77	8	22	2	0	32	46	64	3	0	113	222
Hourly Total	195	67	3	0	265	58	83	3	0	144	267	292	6	0	565	974
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	101	18	1	0	120	27	95	4	0	126	34	74	1	0	109	355
4:15 PM	112	15	2	0	129	42	109	0	0	151	44	65	2	0	111	391
4:30 PM	111	14	1	0	126	35	104	7	0	146	32	88	0	0	120	392
4:45 PM	110	11	4	0	125	45	103	0	0	148	35	78	7	0	120	393
Hourly Total	434	58	8	0	500	149	411	11	0	571	145	305	10	0	460	1531
5:00 PM	102	12	1	0	115	49	113	5	0	167	45	65	0	0	110	392
5:15 PM	117	19	2	0	138	50	113	2	0	165	47	86	0	0	133	436
5:30 PM	129	20	1	0	150	29	121	0	0	150	43	96	4	0	143	443
5:45 PM	120	21	1	0	142	32	86	0	0	118	37	71	3	0	111	371
Hourly Total	468	72	5	0	545	160	433	7	0	600	172	318	7	0	497	1642
Grand Total	1240	306	19	0	1565	428	1019	22	1	1469	966	1183	28	1	2177	5211
Approach %	79.2	19.6	1.2	-	-	29.1	69.4	1.5	-	-	44.4	54.3	1.3	-	-	-
Total %	23.8	5.9	0.4	-	30.0	8.2	19.6	0.4	-	28.2	18.5	22.7	0.5	-	41.8	-
Lights	1206	297	18	-	1521	419	987	21	-	1427	931	1158	27	-	2116	5064
% Lights	97.3	97.1	94.7	-	97.2	97.9	96.9	95.5	-	97.1	96.4	97.9	96.4	-	97.2	97.2
Other Vehicles	34	9	1	-	44	9	32	1	-	42	35	25	1	-	61	147
% Other Vehicles	2.7	2.9	5.3	-	2.8	2.1	3.1	4.5	-	2.9	3.6	2.1	3.6	-	2.8	2.8
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-

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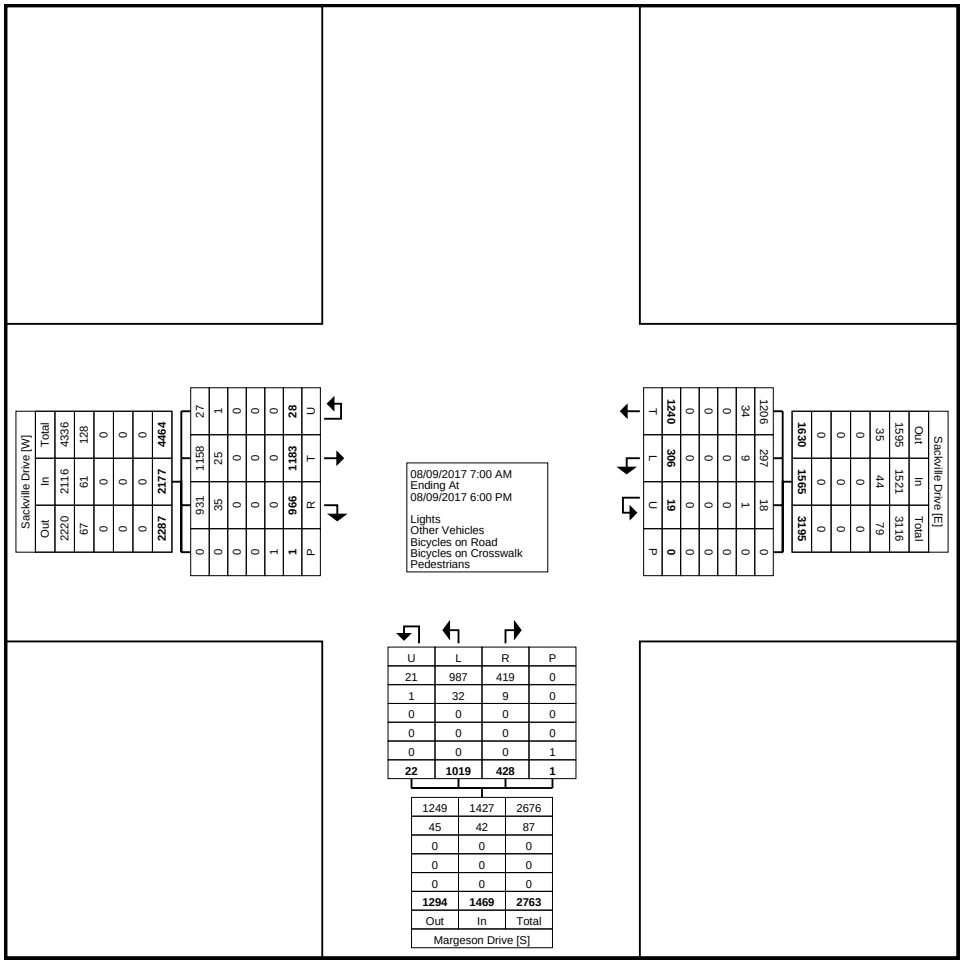
Count Name: Sackville Drive & Margeson Drive
Site Code:
Start Date: 08/09/2017



Turning Movement Data Plot

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Terrace on the Square
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Count Name: Sackville Drive & Margeson Drive
Site Code:
Start Date: 08/09/2017

Approach Data

Start Time	Westbound Street Westbound						Northbound Street Northbound						Eastbound Street Eastbound					
	Peds CCW	Peds CW	Circulating	Out	In	Next	Peds CCW	Peds CW	Circulating	Out	In	Next	Peds CCW	Peds CW	Circulating	Out	In	Next
7:00 AM	0	0	21	72	75	37	0	0	65	135	29	8	0	0	38	54	163	98
7:15 AM	0	0	25	84	55	26	0	1	64	137	44	19	0	1	29	51	171	107
7:30 AM	0	0	26	96	63	35	0	0	80	128	43	17	0	0	28	63	182	102
7:45 AM	0	0	22	82	64	45	0	0	64	93	39	17	0	0	19	72	139	75
Hourly Total	0	0	94	334	257	143	0	1	273	493	155	61	0	1	114	240	655	382
8:00 AM	0	0	18	97	62	43	0	0	85	106	30	12	0	0	19	59	171	86
8:15 AM	0	0	22	95	71	53	0	0	73	84	45	23	0	0	18	77	144	71
8:30 AM	0	0	26	87	58	38	0	0	74	81	41	15	0	0	20	61	138	64
8:45 AM	0	0	22	73	75	61	0	0	66	65	30	8	0	0	14	87	112	46
Hourly Total	0	0	88	352	266	195	0	0	298	336	146	58	0	0	71	284	565	267
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	0	100	102	121	101	0	0	76	54	127	27	0	0	20	195	110	34
4:15 PM	0	0	108	109	129	112	0	0	66	59	150	42	0	0	17	224	110	44
4:30 PM	0	0	114	123	128	111	0	0	90	51	149	35	0	0	17	211	122	32
4:45 PM	0	0	101	129	125	110	0	0	84	46	146	45	0	0	15	223	119	35
Hourly Total	0	0	423	463	503	434	0	0	316	210	572	149	0	0	69	853	461	145
5:00 PM	0	0	119	115	116	102	0	0	65	61	168	49	0	0	14	213	110	45
5:15 PM	0	0	118	136	140	117	0	0	87	66	168	50	0	0	23	229	134	47
5:30 PM	0	0	119	128	148	129	0	0	99	64	148	29	0	0	19	257	142	43
5:45 PM	0	0	84	105	142	120	0	0	72	60	116	32	0	0	22	211	109	37
Hourly Total	0	0	440	484	546	468	0	0	323	251	600	160	0	0	78	910	495	172
Grand Total	0	0	1045	1633	1572	1240	0	1	1210	1290	1473	428	0	1	332	2287	2176	966
Approach %	-	-	19.0	29.7	28.6	22.6	-	-	27.5	29.3	33.5	9.7	-	-	5.8	39.7	37.8	16.8
Total %	-	-	6.7	10.4	10.0	7.9	-	-	7.7	8.2	9.4	2.7	-	-	2.1	14.6	13.9	6.2
Lights	-	-	1009	1596	1528	1206	-	-	1184	1243	1428	419	-	-	322	2218	2115	931
% Lights	-	-	96.6	97.7	97.2	97.3	-	-	97.9	96.4	96.9	97.9	-	-	97.0	97.0	97.2	96.4
Other Vehicles	-	-	36	37	44	34	-	-	26	47	45	9	-	-	10	69	61	35
% Other Vehicles	-	-	3.4	2.3	2.8	2.7	-	-	2.1	3.6	3.1	2.1	-	-	3.0	3.0	2.8	3.6
Bicycles on Road	-	-	0	0	0	0	-	-	0	0	0	0	-	-	0	0	0	0
% Bicycles on Road	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0
Bicycles on Crosswalk	0	0	-	-	-	-	0	0	-	-	-	-	0	0	-	-	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-
Pedestrians	0	0	-	-	-	-	0	1	-	-	-	-	0	1	-	-	-	-
% Pedestrians	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-

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Count Name: Sackville Drive & Margeson Drive
Site Code:
Start Date: 08/09/2017

Turning Movement Peak Hour Data (7:00 AM)

Start Time	Sackville Drive Westbound					Margeson Drive Northbound					Sackville Drive Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
7:00 AM	37	36	1	0	74	8	18	1	0	27	98	64	0	0	162	263
7:15 AM	26	29	0	0	55	19	25	0	1	44	107	64	0	1	171	270
7:30 AM	35	26	1	0	62	17	26	0	0	43	102	78	2	0	182	287
7:45 AM	45	18	1	0	64	17	23	0	0	40	75	62	3	0	140	244
Total	143	109	3	0	255	61	92	1	1	154	382	268	5	1	655	1064
Approach %	56.1	42.7	1.2	-	-	39.6	59.7	0.6	-	-	58.3	40.9	0.8	-	-	-
Total %	13.4	10.2	0.3	-	24.0	5.7	8.6	0.1	-	14.5	35.9	25.2	0.5	-	61.6	-
PHF	0.794	0.757	0.750	-	0.861	0.803	0.885	0.250	-	0.875	0.893	0.859	0.417	-	0.900	0.927
Lights	137	109	2	-	248	57	92	1	-	150	371	261	5	-	637	1035
% Lights	95.8	100.0	66.7	-	97.3	93.4	100.0	100.0	-	97.4	97.1	97.4	100.0	-	97.3	97.3
Other Vehicles	6	0	1	-	7	4	0	0	-	4	11	7	0	-	18	29
% Other Vehicles	4.2	0.0	33.3	-	2.7	6.6	0.0	0.0	-	2.6	2.9	2.6	0.0	-	2.7	2.7
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-

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Count Name: Sackville Drive & Margeson Drive
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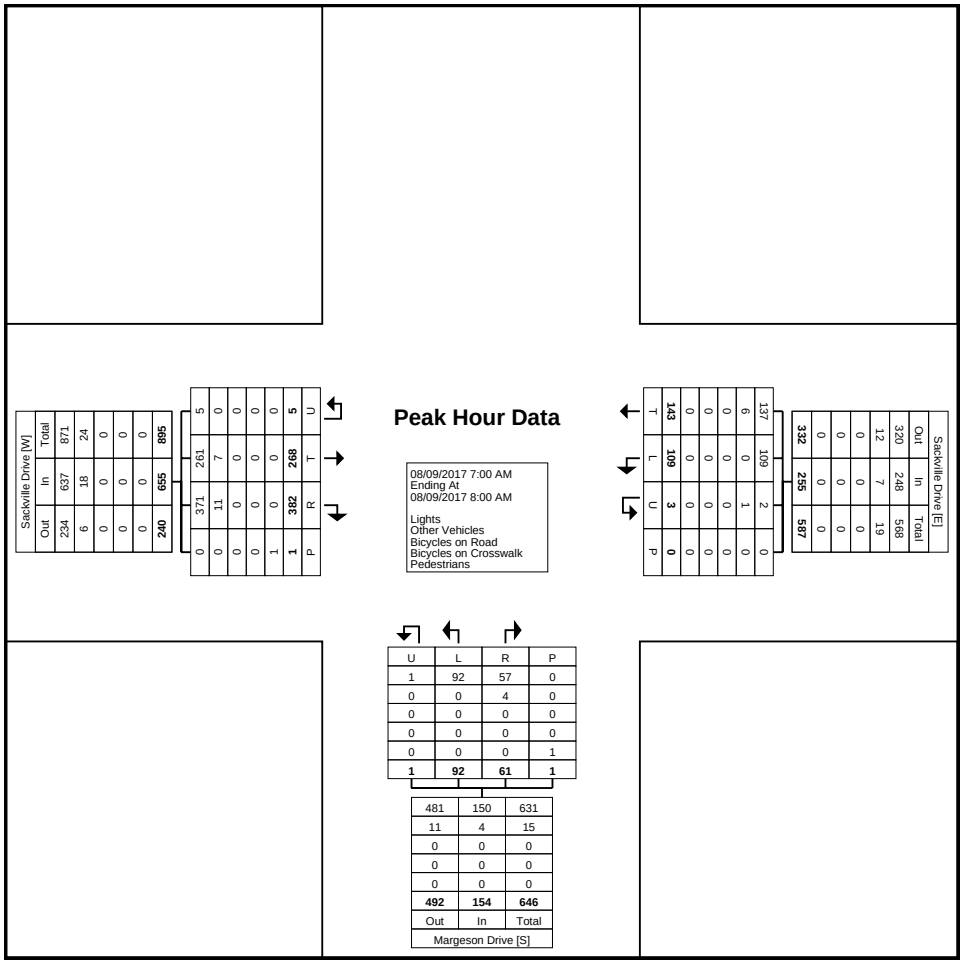

Sackville Drive [W]							
Total	871	24	0	0	0	0	**895**
In	637	18	0	0	0	0	**655**
Out	234	6	0	0	0	0	**240**

U	T	R	P
5	261	371	0
0	7	11	0
0	0	0	0
0	0	0	0
0	0	0	1
5	**268**	**382**	**1**
U	T	R	P

T	L	U	P
137	109	2	0
6	0	1	0
0	0	0	0
0	0	0	0
0	0	0	0
143	**109**	**3**	**0**
T	L	U	P

Sackville Drive [E]							
Out	320	12	0	0	0	0	**332**
In	248	7	0	0	0	0	**255**
Total	568	19	0	0	0	0	**587**

U	L	R	P
1	92	57	0
0	0	4	0
0	0	0	0
0	0	0	0
0	0	0	1
1	**92**	**61**	**1**

481	150	631
11	4	15
0	0	0
0	0	0
0	0	0
492	**154**	**646**
Out	In	Total
Margeson Drive [S]		

Turning Movement Peak Hour Data Plot (7:00 AM)

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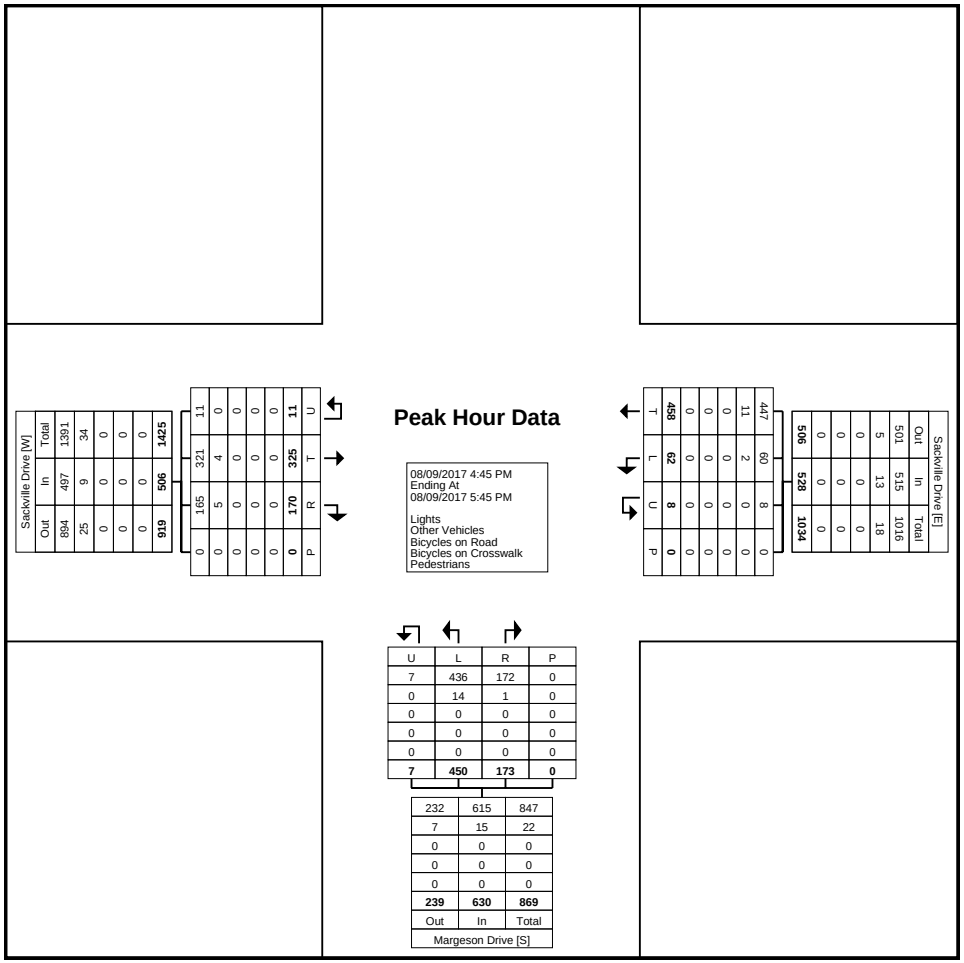
Count Name: Sackville Drive & Margeson Drive
Site Code:
Start Date: 08/09/2017

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Sackville Drive Westbound					Margeson Drive Northbound					Sackville Drive Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
4:45 PM	110	11	4	0	125	45	103	0	0	148	35	78	7	0	120	393
5:00 PM	102	12	1	0	115	49	113	5	0	167	45	65	0	0	110	392
5:15 PM	117	19	2	0	138	50	113	2	0	165	47	86	0	0	133	436
5:30 PM	129	20	1	0	150	29	121	0	0	150	43	96	4	0	143	443
Total	458	62	8	0	528	173	450	7	0	630	170	325	11	0	506	1664
Approach %	86.7	11.7	1.5	-	-	27.5	71.4	1.1	-	-	33.6	64.2	2.2	-	-	-
Total %	27.5	3.7	0.5	-	31.7	10.4	27.0	0.4	-	37.9	10.2	19.5	0.7	-	30.4	-
PHF	0.888	0.775	0.500	-	0.880	0.865	0.930	0.350	-	0.943	0.904	0.846	0.393	-	0.885	0.939
Lights	447	60	8	-	515	172	436	7	-	615	165	321	11	-	497	1627
% Lights	97.6	96.8	100.0	-	97.5	99.4	96.9	100.0	-	97.6	97.1	98.8	100.0	-	98.2	97.8
Other Vehicles	11	2	0	-	13	1	14	0	-	15	5	4	0	-	9	37
% Other Vehicles	2.4	3.2	0.0	-	2.5	0.6	3.1	0.0	-	2.4	2.9	1.2	0.0	-	1.8	2.2
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Harbourside Transportation Consultants
8 Rowan Street, Suite 306
Terrace on the Square
St. John's, Newfoundland and Labrador, Canada A1B 2X1
709.579.6435 fallaire@harboursideengineering.ca

Count Name: Sackville Drive & Margeson Drive
Site Code:
Start Date: 08/09/2017



Sackville Drive [W]							
Total	1391	34	0	0	0	0	**1425**
In	497	9	0	0	0	0	**506**
Out	894	25	0	0	0	0	**919**

11	0	0	0	0	0	**11**	U
321	4	0	0	0	0	**325**	T
165	5	0	0	0	0	**170**	R
0	0	0	0	0	0	**0**	P

T	**458**	0	0	0	11	447	
L	**62**	0	0	0	2	60	
U	**8**	0	0	0	0	8	
P	**0**	0	0	0	0	0	

Out	501	5	0	0	0	**506**
In	515	13	0	0	0	**528**
Total	1016	18	0	0	0	**1034**
Sackville Drive [E]						

U	L	R	P
7	436	172	0
0	14	1	0
0	0	0	0
0	0	0	0
0	0	0	0
7	**450**	**173**	**0**

232	615	847
7	15	22
0	0	0
0	0	0
0	0	0
239	**630**	**869**
Out	In	Total
Margeson Drive [S]		

Turning Movement Peak Hour Data Plot (4:45 PM)

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Count Name: Sackville Drive & Wilson Lake Drive
Site Code:
Start Date: 08/22/2017

Turning Movement Data

Start Time	Wilson Lake Drive Southbound					Sackville Drive WB Westbound					Atlantic Gardens Northbound					Sackville Drive EB Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:00 AM	0	0	17	0	17	3	49	0	0	52	5	0	0	0	5	0	137	1	0	138	212
7:15 AM	3	1	26	0	30	0	56	0	0	56	9	0	0	0	9	1	144	1	0	146	241
7:30 AM	3	0	26	0	29	5	58	2	0	65	6	0	0	0	6	1	162	1	0	164	264
7:45 AM	2	1	15	0	18	4	81	0	0	85	6	0	1	0	7	1	123	2	0	126	236
Hourly Total	8	2	84	0	94	12	244	2	0	258	26	0	1	0	27	3	566	5	0	574	953
8:00 AM	5	0	18	0	23	4	68	0	0	72	5	0	0	0	5	0	114	0	0	114	214
8:15 AM	3	0	17	0	20	5	72	0	0	77	7	0	0	0	7	0	121	5	0	126	230
8:30 AM	6	0	12	0	18	3	53	2	0	58	11	0	1	0	12	2	125	6	0	133	221
8:45 AM	6	0	5	0	11	6	58	2	0	66	3	0	0	0	3	0	101	4	0	105	185
Hourly Total	20	0	52	0	72	18	251	4	0	273	26	0	1	0	27	2	461	15	0	478	850
Grand Total	28	2	136	0	166	30	495	6	0	531	52	0	2	0	54	5	1027	20	0	1052	1803
Approach %	16.9	1.2	81.9	0.0	-	5.6	93.2	1.1	0.0	-	96.3	0.0	3.7	0.0	-	0.5	97.6	1.9	0.0	-	-
Total %	1.6	0.1	7.5	0.0	9.2	1.7	27.5	0.3	0.0	29.5	2.9	0.0	0.1	0.0	3.0	0.3	57.0	1.1	0.0	58.3	-
Lights	25	2	135	0	162	27	467	4	0	498	51	0	2	0	53	5	993	19	0	1017	1730
% Lights	89.3	100.0	99.3	-	97.6	90.0	94.3	66.7	-	93.8	98.1	-	100.0	-	98.1	100.0	96.7	95.0	-	96.7	96.0
Other Vehicles	3	0	1	0	4	3	28	2	0	33	1	0	0	0	1	0	34	1	0	35	73
% Other Vehicles	10.7	0.0	0.7	-	2.4	10.0	5.7	33.3	-	6.2	1.9	-	0.0	-	1.9	0.0	3.3	5.0	-	3.3	4.0

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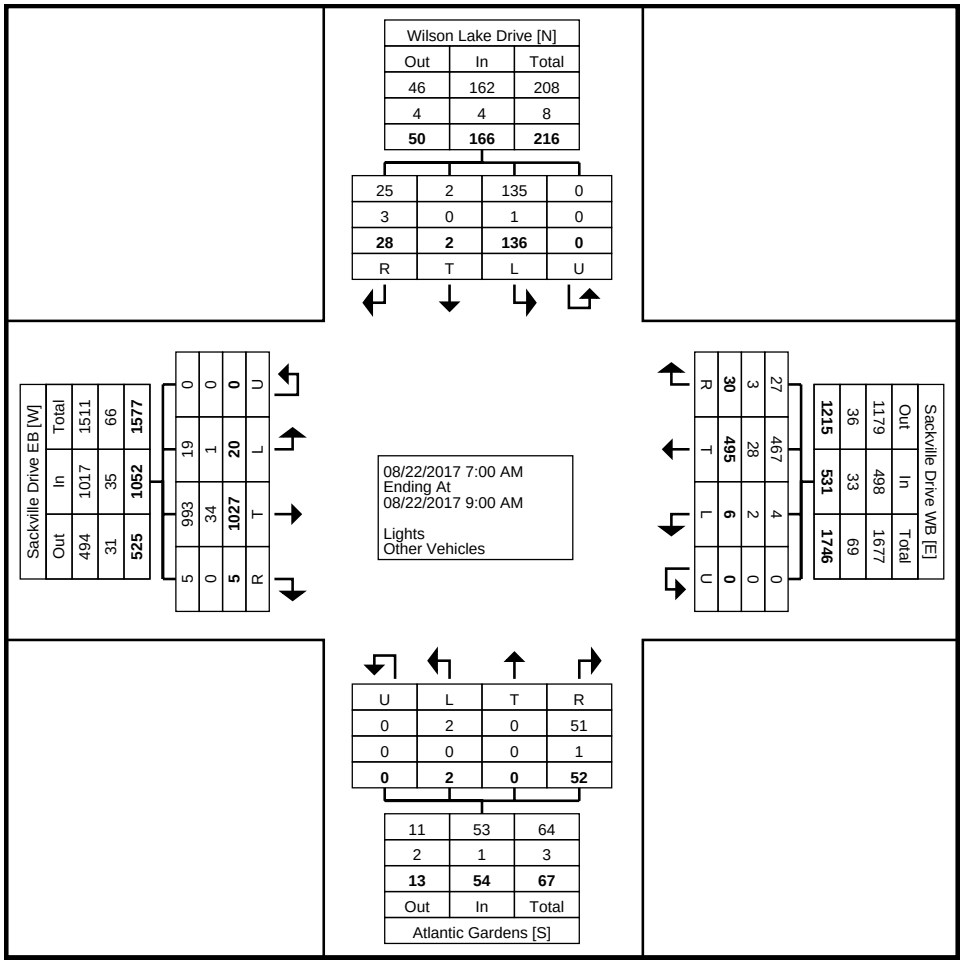
Count Name: Sackville Drive & Wilson Lake Drive
Site Code:
Start Date: 08/22/2017



Turning Movement Data Plot

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Count Name: Sackville Drive & Wilson Lake Drive
Site Code:
Start Date: 08/22/2017

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Wilson Lake Drive Southbound					Sackville Drive WB Westbound					Atlantic Gardens Northbound					Sackville Drive EB Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:15 AM	3	1	26	0	30	0	56	0	0	56	9	0	0	0	9	1	144	1	0	146	241
7:30 AM	3	0	26	0	29	5	58	2	0	65	6	0	0	0	6	1	162	1	0	164	264
7:45 AM	2	1	15	0	18	4	81	0	0	85	6	0	1	0	7	1	123	2	0	126	236
8:00 AM	5	0	18	0	23	4	68	0	0	72	5	0	0	0	5	0	114	0	0	114	214
Total	13	2	85	0	100	13	263	2	0	278	26	0	1	0	27	3	543	4	0	550	955
Approach %	13.0	2.0	85.0	0.0	-	4.7	94.6	0.7	0.0	-	96.3	0.0	3.7	0.0	-	0.5	98.7	0.7	0.0	-	-
Total %	1.4	0.2	8.9	0.0	10.5	1.4	27.5	0.2	0.0	29.1	2.7	0.0	0.1	0.0	2.8	0.3	56.9	0.4	0.0	57.6	-
PHF	0.650	0.500	0.817	0.000	0.833	0.650	0.812	0.250	0.000	0.818	0.722	0.000	0.250	0.000	0.750	0.750	0.838	0.500	0.000	0.838	0.904
Lights	12	2	84	0	98	13	249	2	0	264	25	0	1	0	26	3	526	4	0	533	921
% Lights	92.3	100.0	98.8	-	98.0	100.0	94.7	100.0	-	95.0	96.2	-	100.0	-	96.3	100.0	96.9	100.0	-	96.9	96.4
Other Vehicles	1	0	1	0	2	0	14	0	0	14	1	0	0	0	1	0	17	0	0	17	34
% Other Vehicles	7.7	0.0	1.2	-	2.0	0.0	5.3	0.0	-	5.0	3.8	-	0.0	-	3.7	0.0	3.1	0.0	-	3.1	3.6

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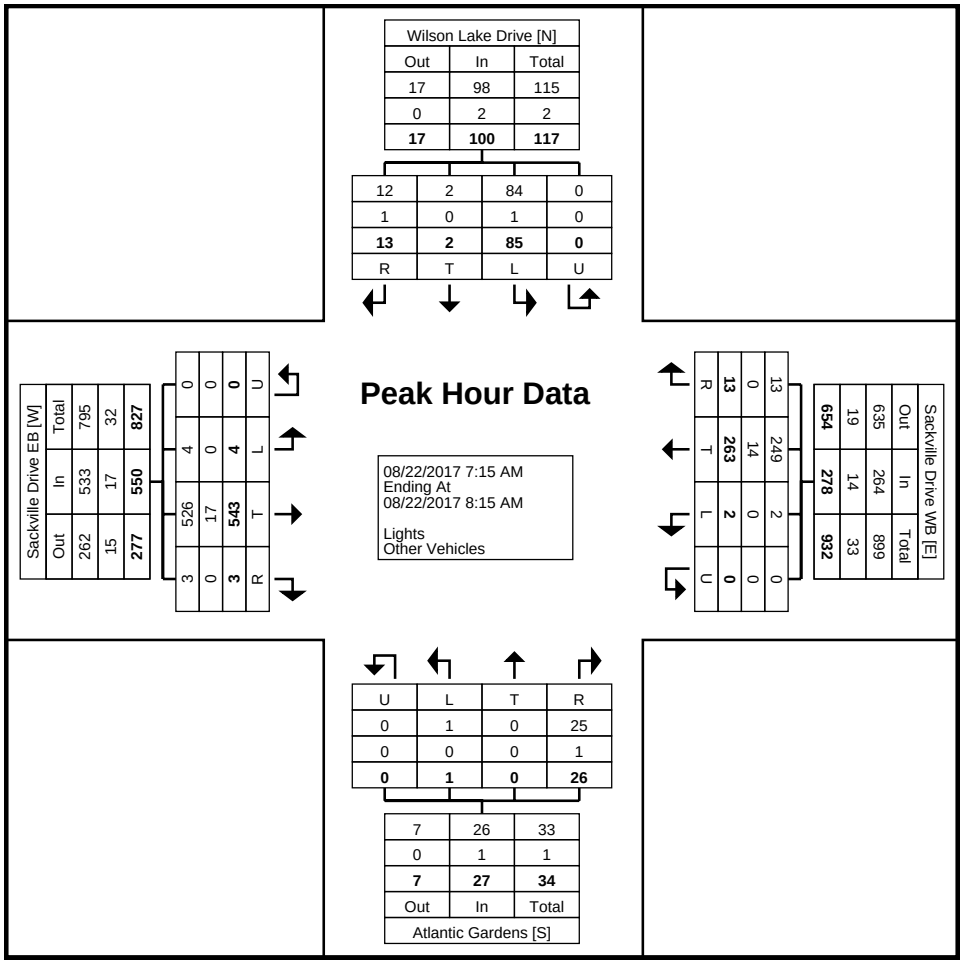
Count Name: Sackville Drive & Wilson Lake Drive
Site Code:
Start Date: 08/22/2017



Turning Movement Peak Hour Data Plot (7:15 AM)

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Count Name: Sackville Drive & Wilson Lake Drive
Site Code:
Start Date: 08/22/2017

Turning Movement Data

Start Time	Wilson Lake Drive Southbound					Sackville Drive WB Westbound					Atlantic Gardens Northbound					Sackville Drive EB Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
11:00 AM	3	0	6	0	9	12	89	2	0	103	3	0	0	0	3	4	110	0	0	114	229
11:15 AM	3	0	5	0	8	5	77	5	0	87	9	0	1	0	10	2	94	2	0	98	203
11:30 AM	2	0	6	0	8	4	99	1	0	104	10	0	1	0	11	0	108	2	0	110	233
11:45 AM	3	0	5	0	8	7	101	0	0	108	7	0	1	0	8	3	94	3	0	100	224
Hourly Total	11	0	22	0	33	28	366	8	0	402	29	0	3	0	32	9	406	7	0	422	889
12:00 PM	1	1	10	0	12	9	111	1	0	121	7	1	0	0	8	1	88	8	0	97	238
12:15 PM	1	0	13	0	14	8	87	1	0	96	6	0	0	0	6	1	82	2	0	85	201
12:30 PM	3	0	10	0	13	6	96	6	0	108	9	0	0	0	9	1	92	3	0	96	226
12:45 PM	3	0	6	0	9	11	103	4	0	118	7	0	0	0	7	0	84	1	0	85	219
Hourly Total	8	1	39	0	48	34	397	12	0	443	29	1	0	0	30	3	346	14	0	363	884
Grand Total	19	1	61	0	81	62	763	20	0	845	58	1	3	0	62	12	752	21	0	785	1773
Approach %	23.5	1.2	75.3	0.0	-	7.3	90.3	2.4	0.0	-	93.5	1.6	4.8	0.0	-	1.5	95.8	2.7	0.0	-	-
Total %	1.1	0.1	3.4	0.0	4.6	3.5	43.0	1.1	0.0	47.7	3.3	0.1	0.2	0.0	3.5	0.7	42.4	1.2	0.0	44.3	-
Lights	19	1	57	0	77	61	739	20	0	820	56	1	3	0	60	11	726	20	0	757	1714
% Lights	100.0	100.0	93.4	-	95.1	98.4	96.9	100.0	-	97.0	96.6	100.0	100.0	-	96.8	91.7	96.5	95.2	-	96.4	96.7
Other Vehicles	0	0	4	0	4	1	24	0	0	25	2	0	0	0	2	1	26	1	0	28	59
% Other Vehicles	0.0	0.0	6.6	-	4.9	1.6	3.1	0.0	-	3.0	3.4	0.0	0.0	-	3.2	8.3	3.5	4.8	-	3.6	3.3

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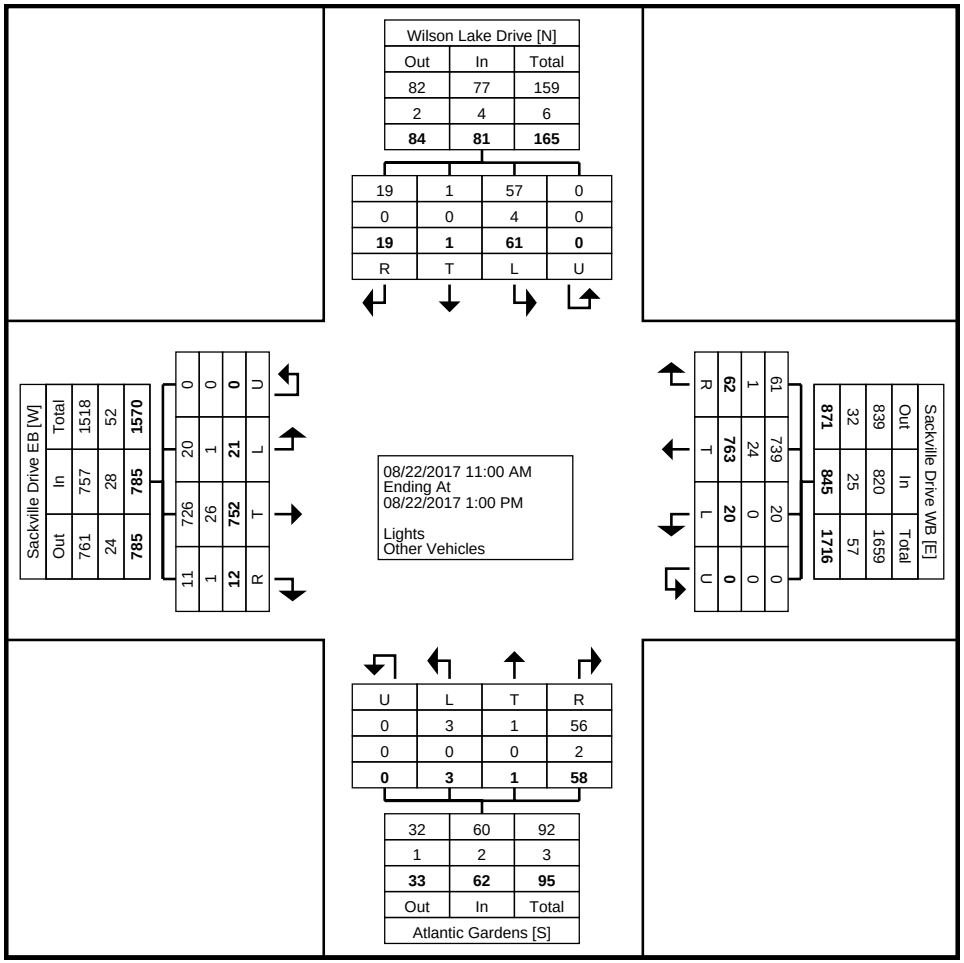
Count Name: Sackville Drive & Wilson Lake Drive
Site Code:
Start Date: 08/22/2017



Turning Movement Data Plot

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709.579.6435 fallaire@harboursideengineering.ca

Count Name: Sackville Drive & Wilson Lake Drive
Site Code:
Start Date: 08/22/2017

Turning Movement Peak Hour Data (11:00 AM)

Start Time	Wilson Lake Drive Southbound					Sackville Drive WB Westbound					Atlantic Gardens Northbound					Sackville Drive EB Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
11:00 AM	3	0	6	0	9	12	89	2	0	103	3	0	0	0	3	4	110	0	0	114	229
11:15 AM	3	0	5	0	8	5	77	5	0	87	9	0	1	0	10	2	94	2	0	98	203
11:30 AM	2	0	6	0	8	4	99	1	0	104	10	0	1	0	11	0	108	2	0	110	233
11:45 AM	3	0	5	0	8	7	101	0	0	108	7	0	1	0	8	3	94	3	0	100	224
Total	11	0	22	0	33	28	366	8	0	402	29	0	3	0	32	9	406	7	0	422	889
Approach %	33.3	0.0	66.7	0.0	-	7.0	91.0	2.0	0.0	-	90.6	0.0	9.4	0.0	-	2.1	96.2	1.7	0.0	-	-
Total %	1.2	0.0	2.5	0.0	3.7	3.1	41.2	0.9	0.0	45.2	3.3	0.0	0.3	0.0	3.6	1.0	45.7	0.8	0.0	47.5	-
PHF	0.917	0.000	0.917	0.000	0.917	0.583	0.906	0.400	0.000	0.931	0.725	0.000	0.750	0.000	0.727	0.563	0.923	0.583	0.000	0.925	0.954
Lights	11	0	22	0	33	28	354	8	0	390	27	0	3	0	30	9	395	7	0	411	864
% Lights	100.0	-	100.0	-	100.0	100.0	96.7	100.0	-	97.0	93.1	-	100.0	-	93.8	100.0	97.3	100.0	-	97.4	97.2
Other Vehicles	0	0	0	0	0	0	12	0	0	12	2	0	0	0	2	0	11	0	0	11	25
% Other Vehicles	0.0	-	0.0	-	0.0	0.0	3.3	0.0	-	3.0	6.9	-	0.0	-	6.3	0.0	2.7	0.0	-	2.6	2.8

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Count Name: Sackville Drive & Wilson Lake Drive
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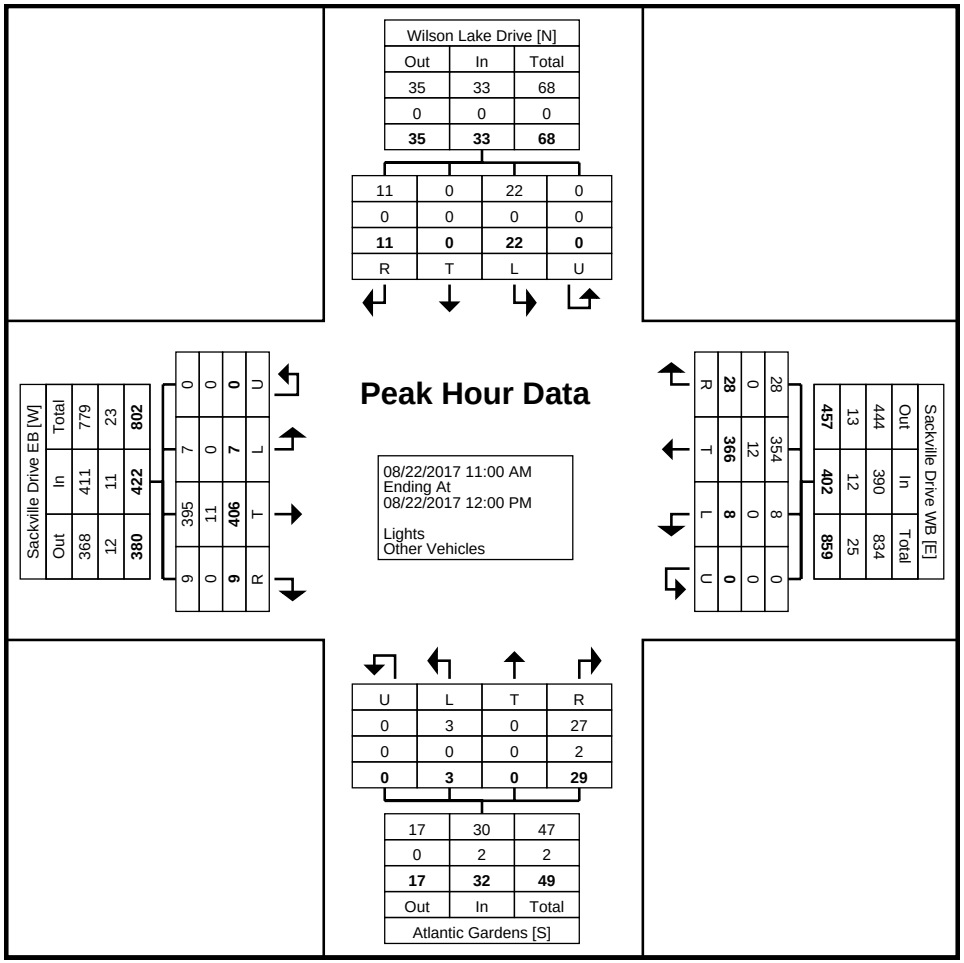

Turning Movement Peak Hour Data Plot (11:00 AM)

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Count Name: Sackville Drive & Wilson Lake Drive
Site Code:
Start Date: 08/22/2017

Turning Movement Peak Hour Data (12:00 PM)

Start Time	Wilson Lake Drive Southbound					Sackville Drive WB Westbound					Atlantic Gardens Northbound					Sackville Drive EB Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
12:00 PM	1	1	10	0	12	9	111	1	0	121	7	1	0	0	8	1	88	8	0	97	238
12:15 PM	1	0	13	0	14	8	87	1	0	96	6	0	0	0	6	1	82	2	0	85	201
12:30 PM	3	0	10	0	13	6	96	6	0	108	9	0	0	0	9	1	92	3	0	96	226
12:45 PM	3	0	6	0	9	11	103	4	0	118	7	0	0	0	7	0	84	1	0	85	219
Total	8	1	39	0	48	34	397	12	0	443	29	1	0	0	30	3	346	14	0	363	884
Approach %	16.7	2.1	81.3	0.0	-	7.7	89.6	2.7	0.0	-	96.7	3.3	0.0	0.0	-	0.8	95.3	3.9	0.0	-	-
Total %	0.9	0.1	4.4	0.0	5.4	3.8	44.9	1.4	0.0	50.1	3.3	0.1	0.0	0.0	3.4	0.3	39.1	1.6	0.0	41.1	-
PHF	0.667	0.250	0.750	0.000	0.857	0.773	0.894	0.500	0.000	0.915	0.806	0.250	0.000	0.000	0.833	0.750	0.940	0.438	0.000	0.936	0.929
Lights	8	1	35	0	44	33	385	12	0	430	29	1	0	0	30	2	331	13	0	346	850
% Lights	100.0	100.0	89.7	-	91.7	97.1	97.0	100.0	-	97.1	100.0	100.0	-	-	100.0	66.7	95.7	92.9	-	95.3	96.2
Other Vehicles	0	0	4	0	4	1	12	0	0	13	0	0	0	0	0	1	15	1	0	17	34
% Other Vehicles	0.0	0.0	10.3	-	8.3	2.9	3.0	0.0	-	2.9	0.0	0.0	-	-	0.0	33.3	4.3	7.1	-	4.7	3.8

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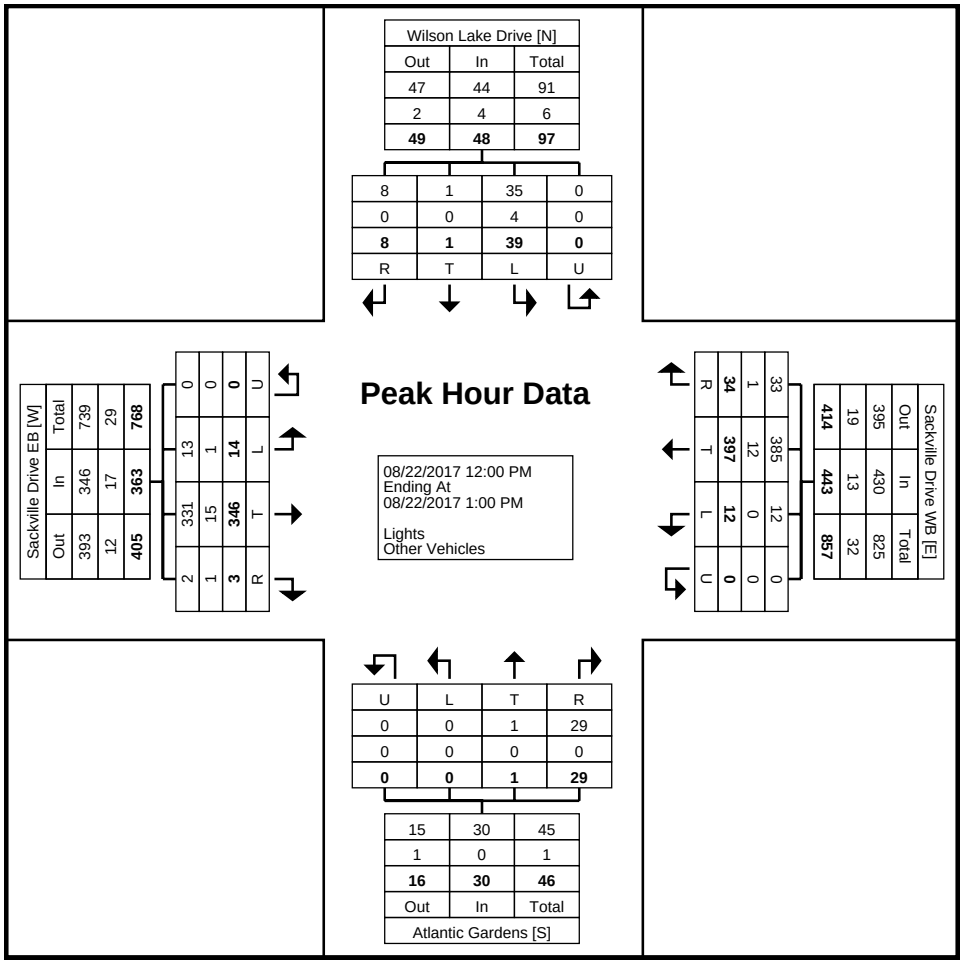

Turning Movement Peak Hour Data Plot (12:00 PM)

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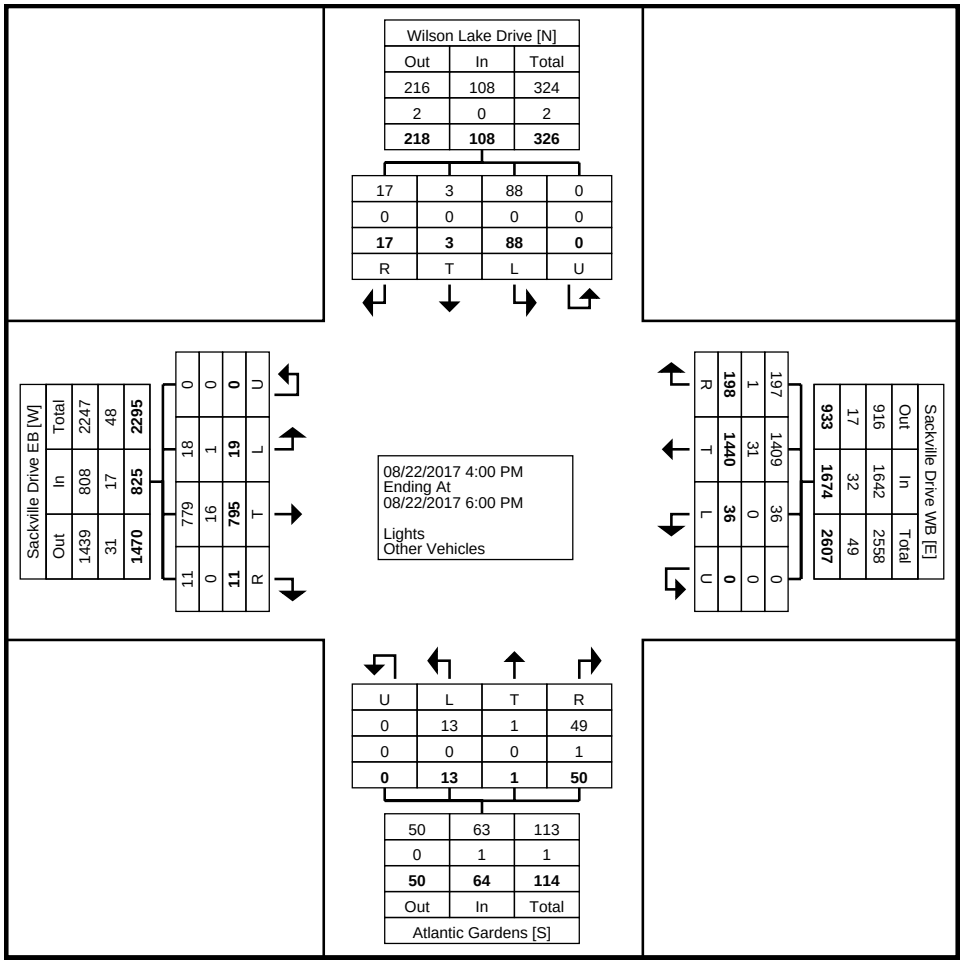
Site Code:
Start Date: 08/22/2017

Turning Movement Data

Start Time	Wilson Lake Drive Southbound					Sackville Drive WB Westbound					Atlantic Gardens Northbound					Sackville Drive EB Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
4:00 PM	3	0	9	0	12	18	189	3	0	210	7	0	1	0	8	1	117	1	0	119	349
4:15 PM	3	0	15	0	18	22	170	2	0	194	5	0	2	0	7	1	104	1	0	106	325
4:30 PM	2	0	7	0	9	31	164	5	0	200	4	0	1	0	5	1	110	4	0	115	329
4:45 PM	1	0	6	0	7	29	196	1	0	226	3	0	2	0	5	1	80	2	0	83	321
Hourly Total	9	0	37	0	46	100	719	11	0	830	19	0	6	0	25	4	411	8	0	423	1324
5:00 PM	0	0	4	0	4	25	182	10	0	217	5	0	1	0	6	2	103	4	0	109	336
5:15 PM	0	2	21	0	23	28	186	6	0	220	11	0	3	0	14	3	114	3	0	120	377
5:30 PM	4	1	14	0	19	25	186	5	0	216	10	0	1	0	11	1	85	1	0	87	333
5:45 PM	4	0	12	0	16	20	167	4	0	191	5	1	2	0	8	1	82	3	0	86	301
Hourly Total	8	3	51	0	62	98	721	25	0	844	31	1	7	0	39	7	384	11	0	402	1347
Grand Total	17	3	88	0	108	198	1440	36	0	1674	50	1	13	0	64	11	795	19	0	825	2671
Approach %	15.7	2.8	81.5	0.0	-	11.8	86.0	2.2	0.0	-	78.1	1.6	20.3	0.0	-	1.3	96.4	2.3	0.0	-	-
Total %	0.6	0.1	3.3	0.0	4.0	7.4	53.9	1.3	0.0	62.7	1.9	0.0	0.5	0.0	2.4	0.4	29.8	0.7	0.0	30.9	-
Lights	17	3	88	0	108	197	1409	36	0	1642	49	1	13	0	63	11	779	18	0	808	2621
% Lights	100.0	100.0	100.0	-	100.0	99.5	97.8	100.0	-	98.1	98.0	100.0	100.0	-	98.4	100.0	98.0	94.7	-	97.9	98.1
Other Vehicles	0	0	0	0	0	1	31	0	0	32	1	0	0	0	1	0	16	1	0	17	50
% Other Vehicles	0.0	0.0	0.0	-	0.0	0.5	2.2	0.0	-	1.9	2.0	0.0	0.0	-	1.6	0.0	2.0	5.3	-	2.1	1.9

Harbourside Transportation Consultants
8 Rowan Street, Suite 306
Terrace on the Square
St. John's, Newfoundland and Labrador, Canada A1B 2X1
709.579.6435 fallaire@harboursideengineering.ca

Count Name: Sackville Drive & Wilson Lake Drive
Site Code:
Start Date: 08/22/2017



Turning Movement Data Plot

Harbourside Transportation Consultants
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Terrace on the Square
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709.579.6435 fallaire@harboursideengineering.ca

Count Name: Sackville Drive & Wilson Lake Drive
Site Code:
Start Date: 08/22/2017

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Wilson Lake Drive Southbound					Sackville Drive WB Westbound					Atlantic Gardens Northbound					Sackville Drive EB Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
4:45 PM	1	0	6	0	7	29	196	1	0	226	3	0	2	0	5	1	80	2	0	83	321
5:00 PM	0	0	4	0	4	25	182	10	0	217	5	0	1	0	6	2	103	4	0	109	336
5:15 PM	0	2	21	0	23	28	186	6	0	220	11	0	3	0	14	3	114	3	0	120	377
5:30 PM	4	1	14	0	19	25	186	5	0	216	10	0	1	0	11	1	85	1	0	87	333
Total	5	3	45	0	53	107	750	22	0	879	29	0	7	0	36	7	382	10	0	399	1367
Approach %	9.4	5.7	84.9	0.0	-	12.2	85.3	2.5	0.0	-	80.6	0.0	19.4	0.0	-	1.8	95.7	2.5	0.0	-	-
Total %	0.4	0.2	3.3	0.0	3.9	7.8	54.9	1.6	0.0	64.3	2.1	0.0	0.5	0.0	2.6	0.5	27.9	0.7	0.0	29.2	-
PHF	0.313	0.375	0.536	0.000	0.576	0.922	0.957	0.550	0.000	0.972	0.659	0.000	0.583	0.000	0.643	0.583	0.838	0.625	0.000	0.831	0.906
Lights	5	3	45	0	53	106	734	22	0	862	28	0	7	0	35	7	376	10	0	393	1343
% Lights	100.0	100.0	100.0	-	100.0	99.1	97.9	100.0	-	98.1	96.6	-	100.0	-	97.2	100.0	98.4	100.0	-	98.5	98.2
Other Vehicles	0	0	0	0	0	1	16	0	0	17	1	0	0	0	1	0	6	0	0	6	24
% Other Vehicles	0.0	0.0	0.0	-	0.0	0.9	2.1	0.0	-	1.9	3.4	-	0.0	-	2.8	0.0	1.6	0.0	-	1.5	1.8

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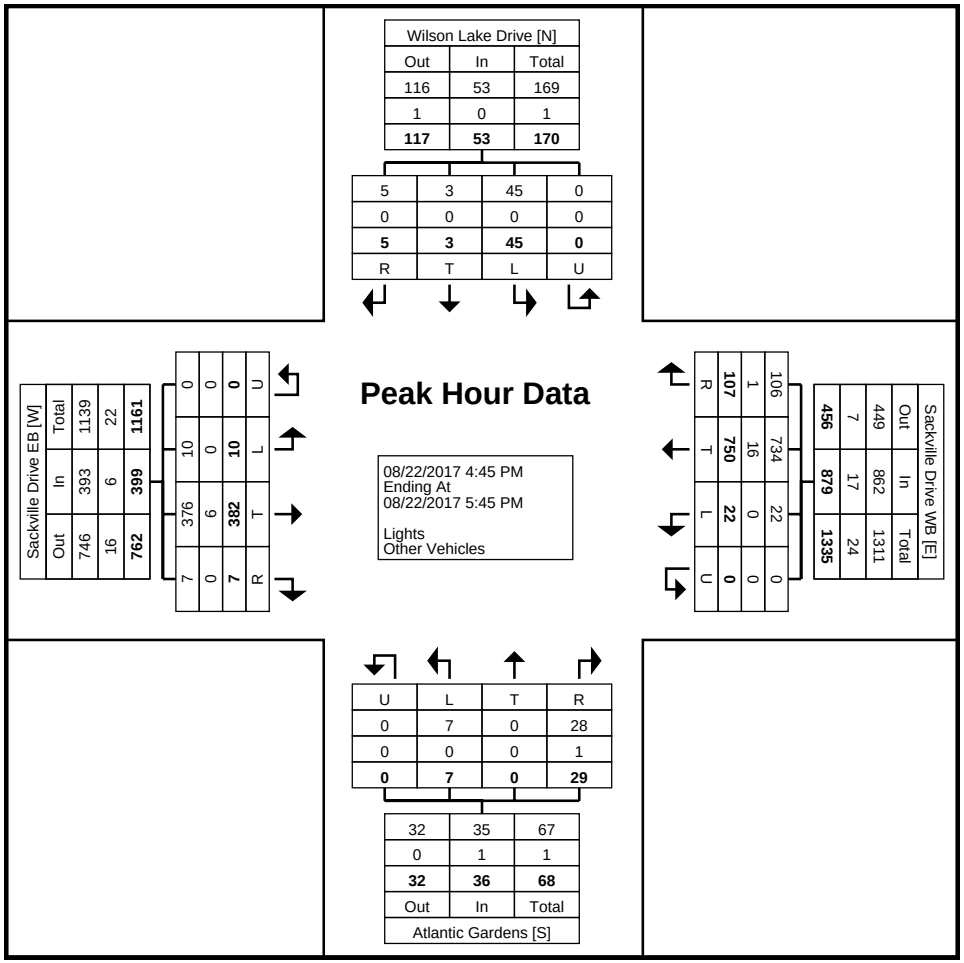
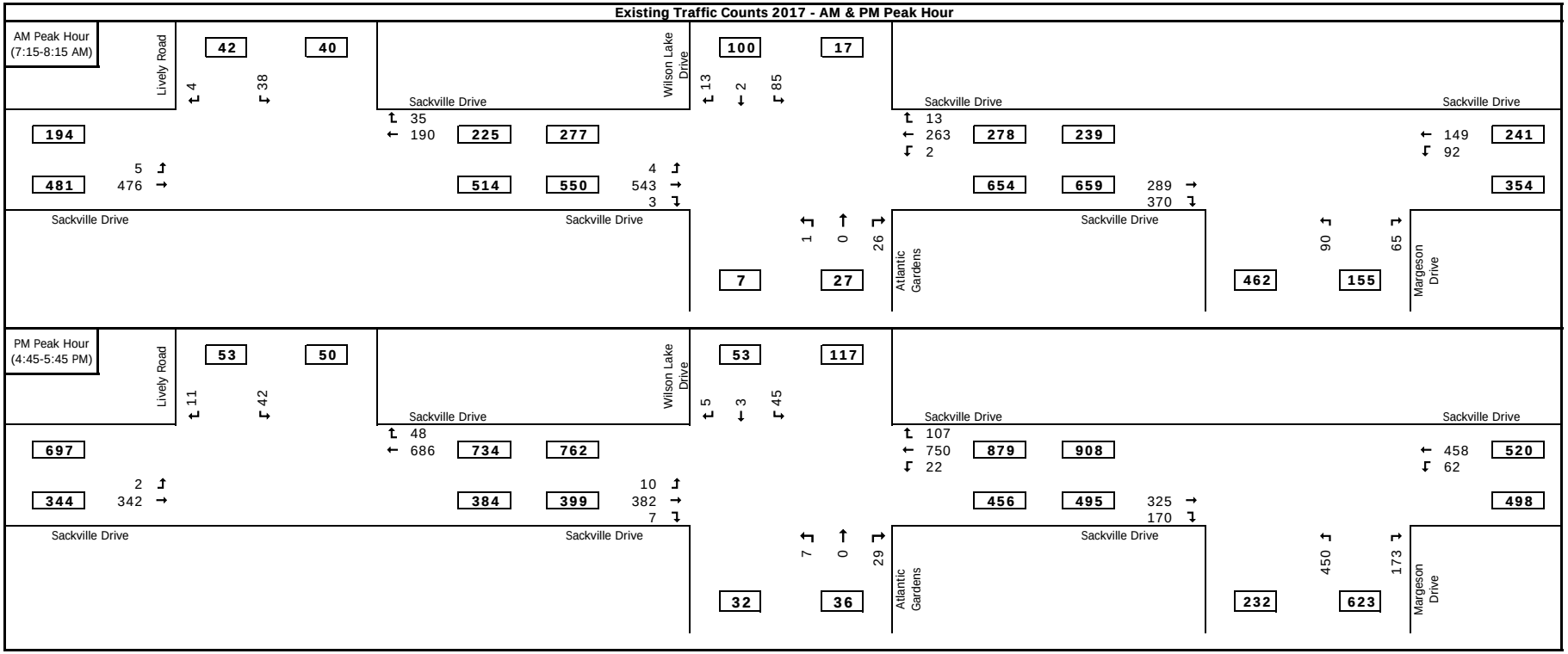
Count Name: Sackville Drive & Wilson Lake Drive
Site Code:
Start Date: 08/22/2017



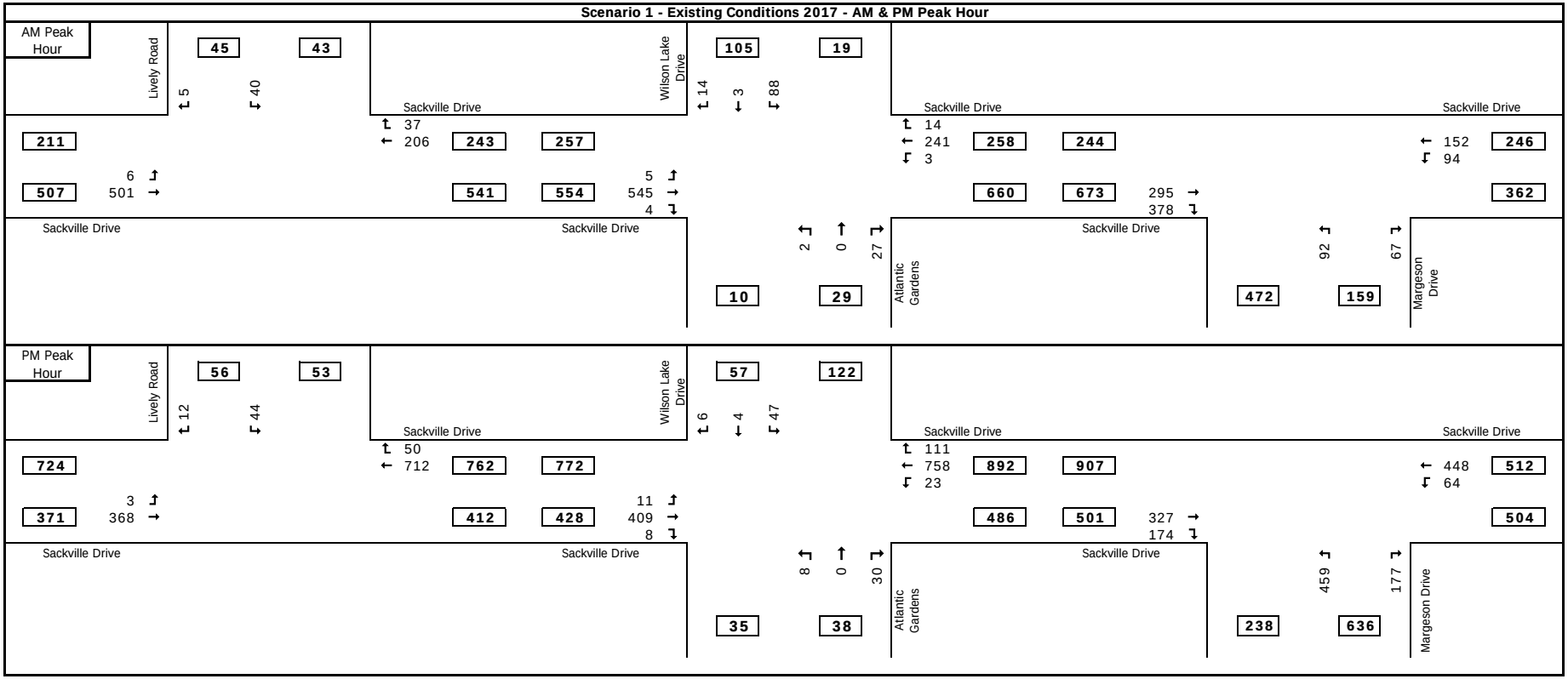
Turning Movement Peak Hour Data Plot (4:45 PM)

APPENDIX C

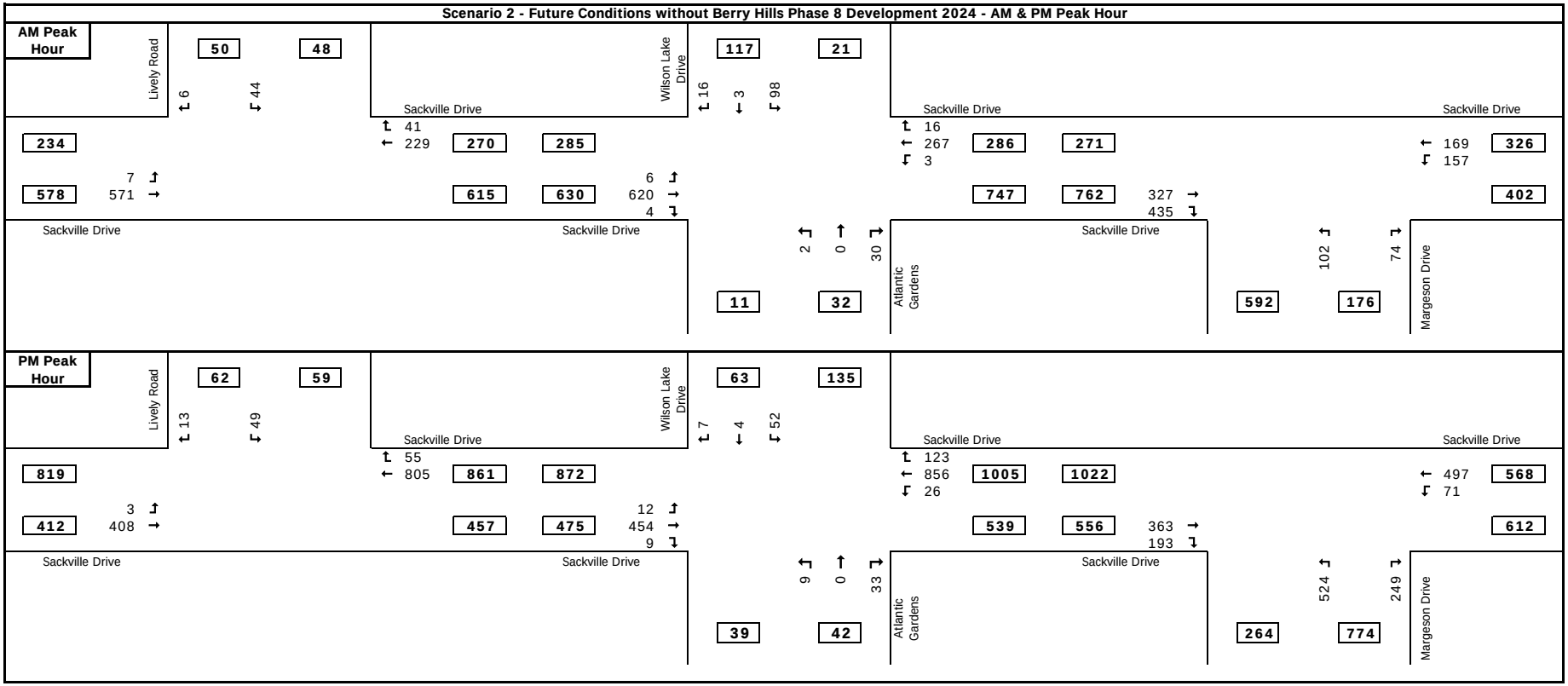
Traffic Design Volumes

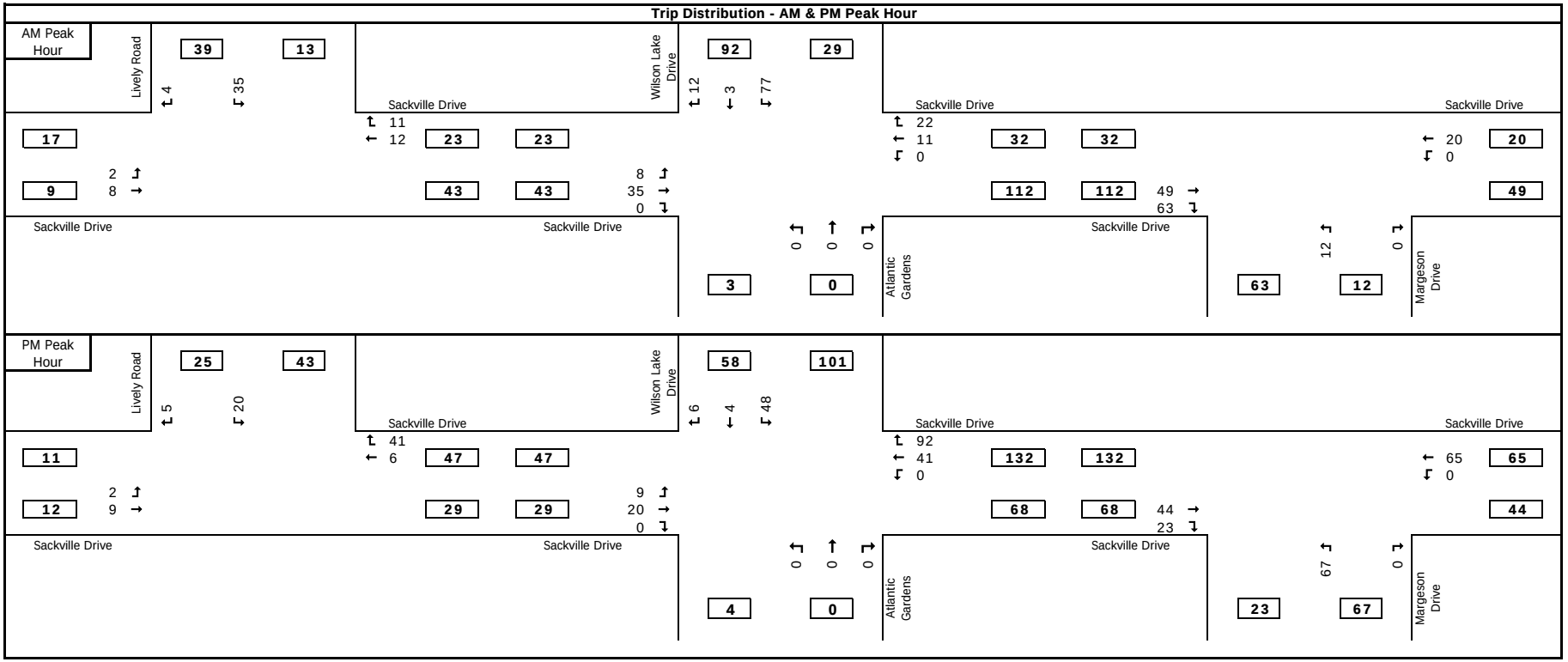

Existing Traffic Counts 2017 - AM & PM Peak Hour
AM Peak Hour (7:15-8:15 AM)
Lively Road
Wilson Lake Drive
Sackville Drive
Sackville Drive
Sackville Drive
Sackville Drive
Sackville Drive
Sackville Drive
Atlantic Gardens
Margeson Drive
42
40
100
17
194
225
277
278
239
241
481
514
550
654
659
354
7
27
462
155
4
38
13
2
85
35
190
5
476
4
543
3
1
0
26
13
263
2
149
92
289
370
90
65
PM Peak Hour (4:45-5:45 PM)
53
50
53
117
697
734
762
879
908
520
344
384
399
456
495
498
32
36
232
623
11
42
5
3
45
48
686
2
342
10
382
7
7
0
29
107
750
22
458
62
325
170
450
173

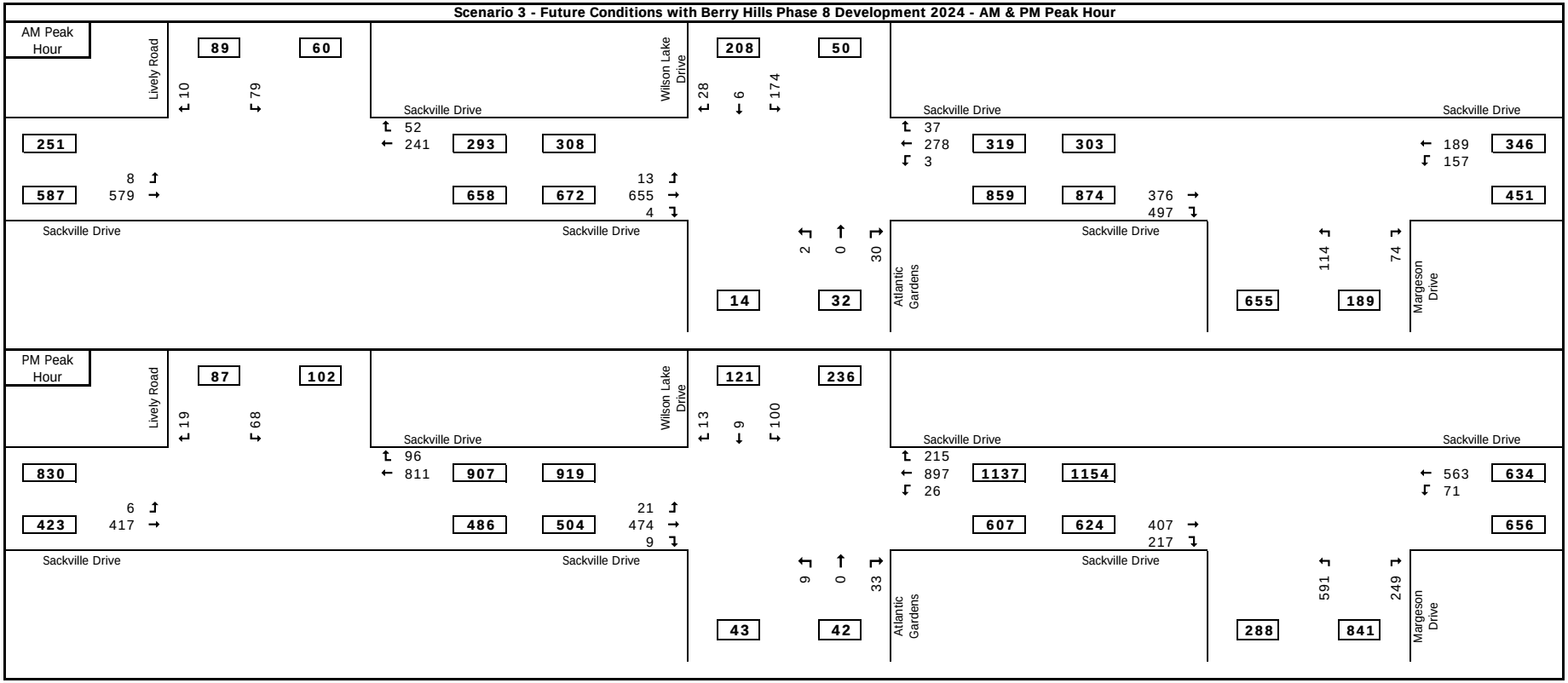
Scenario 1 - Existing Conditions 2017 - AM & PM Peak Hour



Scenario 2 - Future Conditions without Berry Hills Phase 8 Development 2024 - AM & PM Peak Hour




Trip Distribution - AM & PM Peak Hour
AM Peak Hour
Lively Road
Wilson Lake Drive
Sackville Drive
Sackville Drive
Sackville Drive
Sackville Drive
Sackville Drive
Sackville Drive
Atlantic Gardens
Margeson Drive
39
13
92
29
17
23
23
32
32
20
9
43
43
112
112
49
3
0
63
12
4
35
12
3
77
11
12
22
11
0
20
0
2
8
8
35
0
49
63
0
0
0
12
0
PM Peak Hour
25
43
58
101
11
47
47
132
132
65
12
29
29
68
68
44
4
0
23
67
5
20
6
4
48
41
6
92
41
0
65
0
2
9
9
20
0
44
23
0
0
0
67
0


Scenario 3 - Future Conditions with Berry Hills Phase 8 Development 2024 - AM & PM Peak Hour
AM Peak Hour
Lively Road
Wilson Lake Drive
Sackville Drive
Sackville Drive
Sackville Drive
Sackville Drive
Sackville Drive
Sackville Drive
Atlantic Gardens
Margeson Drive
89
60
208
50
251
293
308
319
303
346
587
658
672
859
874
451
14
32
655
189
PM Peak Hour
87
102
121
236
830
907
919
1137
1154
634
423
486
504
607
624
656
43
42
288
841

APPENDIX D

Synchro/SimTraffic Reports

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	6:30	6:30	6:30	6:30	6:30	6:30	6:30
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	90	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4	4
Vehs Entered	949	928	990	954	954	941	977
Vehs Exited	947	927	991	952	955	941	973
Starting Vehs	10	11	12	9	6	4	8
Ending Vehs	12	12	11	11	5	4	12
Travel Distance (km)	521	512	546	526	522	522	534
Travel Time (hr)	9.3	9.0	9.8	9.2	9.2	9.3	9.5
Total Delay (hr)	1.2	1.0	1.3	1.0	1.1	1.2	1.2
Total Stops	191	173	190	167	171	170	190
Fuel Used (l)	43.1	42.2	45.1	42.7	42.8	43.6	45.3

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	6:30	6:30	6:30	6:30
End Time	8:00	8:00	8:00	8:00
Total Time (min)	90	90	90	90
Time Recorded (min)	60	60	60	60
# of Intervals	5	5	5	5
# of Recorded Intervals	4	4	4	4
Vehs Entered	963	952	980	957
Vehs Exited	958	959	977	958
Starting Vehs	7	10	6	9
Ending Vehs	12	3	9	8
Travel Distance (km)	527	522	539	527
Travel Time (hr)	9.3	9.2	9.6	9.3
Total Delay (hr)	1.1	1.1	1.2	1.2
Total Stops	184	174	189	179
Fuel Used (l)	43.4	43.8	44.9	43.7

Interval #0 Information Seeding

Start Time	6:30
End Time	7:00
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording #1

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	218	217	222	228	233	200	205
Vehs Exited	222	219	224	223	226	199	205
Starting Vehs	10	11	12	9	6	4	8
Ending Vehs	6	9	10	14	13	5	8
Travel Distance (km)	121	123	125	127	125	111	112
Travel Time (hr)	2.1	2.1	2.1	2.1	2.2	1.9	2.0
Total Delay (hr)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total Stops	43	37	38	34	44	36	41
Fuel Used (l)	9.6	9.8	9.7	10.3	10.3	8.7	9.2

Interval #1 Information Recording #1

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	220	223	227	218
Vehs Exited	220	225	224	217
Starting Vehs	7	10	6	9
Ending Vehs	7	8	9	7
Travel Distance (km)	122	126	124	122
Travel Time (hr)	2.1	2.2	2.2	2.1
Total Delay (hr)	0.2	0.2	0.3	0.2
Total Stops	41	36	36	37
Fuel Used (l)	10.0	10.2	10.1	9.8

Interval #2 Information Recording #2

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	287	275	310	269	294	304	288
Vehs Exited	282	273	307	276	291	304	284
Starting Vehs	6	9	10	14	13	5	8
Ending Vehs	11	11	13	7	16	5	12
Travel Distance (km)	155	148	166	147	159	168	157
Travel Time (hr)	2.8	2.7	3.3	2.6	2.9	3.1	2.8
Total Delay (hr)	0.4	0.3	0.7	0.3	0.4	0.5	0.4
Total Stops	55	55	69	46	52	51	56
Fuel Used (l)	13.0	12.3	14.6	12.1	13.6	14.4	13.4

Interval #2 Information Recording #2

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	288	298	296	289
Vehs Exited	282	293	294	288
Starting Vehs	7	8	9	7
Ending Vehs	13	13	11	9
Travel Distance (km)	150	156	163	157
Travel Time (hr)	2.8	2.8	2.9	2.9
Total Delay (hr)	0.4	0.4	0.4	0.4
Total Stops	56	57	58	53
Fuel Used (l)	12.5	13.6	13.7	13.3

Interval #3 Information Recording #3

Start Time	7:30
End Time	7:45
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	212	218	221	216	215	210	241
Vehs Exited	218	223	227	214	221	207	242
Starting Vehs	11	11	13	7	16	5	12
Ending Vehs	5	6	7	9	10	8	11
Travel Distance (km)	117	123	124	119	119	117	130
Travel Time (hr)	2.1	2.1	2.2	2.1	2.1	2.0	2.3
Total Delay (hr)	0.2	0.2	0.2	0.2	0.2	0.2	0.3
Total Stops	46	38	38	36	37	35	49
Fuel Used (l)	9.8	10.1	10.0	9.5	9.4	9.5	11.6

Interval #3 Information Recording #3

Start Time	7:30
End Time	7:45
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	211	219	220	218
Vehs Exited	210	225	219	219
Starting Vehs	13	13	11	9
Ending Vehs	14	7	12	6
Travel Distance (km)	119	120	124	121
Travel Time (hr)	2.0	2.2	2.2	2.1
Total Delay (hr)	0.2	0.3	0.2	0.2
Total Stops	38	51	38	39
Fuel Used (l)	9.7	10.3	10.1	10.0

Interval #4 Information Recording #4

Start Time	7:45
End Time	8:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	232	218	237	241	212	227	243
Vehs Exited	225	212	233	239	217	231	242
Starting Vehs	5	6	7	9	10	8	11
Ending Vehs	12	12	11	11	5	4	12
Travel Distance (km)	127	118	130	132	119	127	134
Travel Time (hr)	2.3	2.1	2.3	2.4	2.1	2.2	2.4
Total Delay (hr)	0.3	0.2	0.3	0.3	0.2	0.3	0.3
Total Stops	47	43	45	51	38	48	44
Fuel Used (l)	10.7	10.1	10.7	10.9	9.6	10.9	11.1

Interval #4 Information Recording #4

Start Time	7:45
End Time	8:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	244	212	237	231
Vehs Exited	246	216	240	229
Starting Vehs	14	7	12	6
Ending Vehs	12	3	9	8
Travel Distance (km)	136	121	127	127
Travel Time (hr)	2.4	2.1	2.3	2.2
Total Delay (hr)	0.3	0.2	0.3	0.3
Total Stops	49	30	57	45
Fuel Used (l)	11.2	9.7	11.0	10.6

3: Sackville Drive & Lively Road Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.4	0.4	0.0	0.0	0.1	0.1	0.3
Total Delay (hr)	0.0	0.1	0.1	0.0	0.1	0.0	0.3
Total Del/Veh (s)	2.4	0.8	0.9	0.4	9.3	3.0	1.2
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Stop Del/Veh (s)	0.8	0.0	0.0	0.0	7.3	2.9	0.4

5: Sackville Drive & Wilson Lake Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.1	3.0	0.2	0.3	0.1	0.1	0.2	0.2	0.1	0.1
Total Delay (hr)	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.7
Total Del/Veh (s)	2.6	1.5	0.5	2.8	0.7	0.1	10.7	6.2	12.9	11.3	5.6	2.5
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.3
Stop Del/Veh (s)	0.9	0.1	0.1	1.9	0.0	0.0	8.8	6.0	10.4	7.4	4.9	1.3

Total Network Performance

Denied Delay (hr)	0.1
Denied Del/Veh (s)	0.3
Total Delay (hr)	1.1
Total Del/Veh (s)	4.0
Stop Delay (hr)	0.4
Stop Del/Veh (s)	1.7

Intersection: 3: Sackville Drive & Lively Road

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	11.4	17.6
Average Queue (m)	0.5	6.3
95th Queue (m)	5.5	13.1
Link Distance (m)	101.2	111.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Sackville Drive & Wilson Lake Drive

Movement	EB	WB	NB	NB	SB
Directions Served	L	L	L	TR	LTR
Maximum Queue (m)	7.9	4.6	6.9	17.1	26.4
Average Queue (m)	0.3	0.2	0.4	5.4	11.3
95th Queue (m)	2.9	2.3	3.4	14.0	20.7
Link Distance (m)			36.3	36.3	104.5
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	25.0	25.0			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	501	206	37	40	5
Future Volume (Veh/h)	6	501	206	37	40	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.86	0.86	0.87	0.87	0.86	0.86
Hourly flow rate (vph)	7	583	237	43	47	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	280				856	258
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	280				856	258
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				85	99
cM capacity (veh/h)	1283				323	780

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	590	280	53
Volume Left	7	0	47
Volume Right	0	43	6
cSH	1283	1700	346
Volume to Capacity	0.01	0.16	0.15
Queue Length 95th (m)	0.1	0.0	4.3
Control Delay (s)	0.2	0.0	17.3
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	17.3
Approach LOS			C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	545	4	3	241	14	2	0	27	88	3	14
Future Volume (Veh/h)	5	545	4	3	241	14	2	0	27	88	3	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.82	0.82	0.82	0.75	0.75	0.75	0.83	0.83	0.83
Hourly flow rate (vph)	6	649	5	4	294	17	3	0	36	106	4	17
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	311			654			984	982	652	1008	976	302
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	311			654			984	982	652	1008	976	302
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			100			99	100	92	47	98	98
cM capacity (veh/h)	1249			933			218	247	465	201	249	723

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	6	654	4	311	3	36	127
Volume Left	6	0	4	0	3	0	106
Volume Right	0	5	0	17	0	36	17
cSH	1249	1700	933	1700	218	465	224
Volume to Capacity	0.00	0.38	0.00	0.18	0.01	0.08	0.57
Queue Length 95th (m)	0.1	0.0	0.1	0.0	0.3	2.0	25.0
Control Delay (s)	7.9	0.0	8.9	0.0	21.8	13.4	40.3
Lane LOS	A		A		C	B	E
Approach Delay (s)	0.1		0.1		14.0		40.3
Approach LOS					B		E

Intersection Summary				
Average Delay	5.0			
Intersection Capacity Utilization	48.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	4:15	4:15	4:15	4:15	4:15	4:15	4:15
End Time	5:45	5:45	5:45	5:45	5:45	5:45	5:45
Total Time (min)	90	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4	4
Vehs Entered	1410	1409	1402	1400	1409	1478	1440
Vehs Exited	1409	1415	1409	1403	1393	1473	1445
Starting Vehs	14	18	18	17	9	14	15
Ending Vehs	15	12	11	14	25	19	10
Travel Distance (km)	773	774	771	772	771	807	793
Travel Time (hr)	14.7	14.9	14.7	14.9	15.3	16.8	15.2
Total Delay (hr)	2.6	3.0	2.7	3.0	3.3	4.2	2.9
Total Stops	166	175	156	180	171	197	180
Fuel Used (l)	66.1	67.7	66.1	66.9	66.5	71.1	68.4

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	4:15	4:15	4:15	4:15
End Time	5:45	5:45	5:45	5:45
Total Time (min)	90	90	90	90
Time Recorded (min)	60	60	60	60
# of Intervals	5	5	5	5
# of Recorded Intervals	4	4	4	4
Vehs Entered	1392	1388	1441	1415
Vehs Exited	1385	1389	1443	1417
Starting Vehs	11	15	15	13
Ending Vehs	18	14	13	13
Travel Distance (km)	755	771	783	777
Travel Time (hr)	14.6	14.8	15.6	15.1
Total Delay (hr)	2.8	2.9	3.4	3.1
Total Stops	177	152	204	174
Fuel Used (l)	65.7	66.5	69.6	67.5

Interval #0 Information Seeding

Start Time	4:15
End Time	4:45
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording #1

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	337	337	338	327	333	361	369
Vehs Exited	338	341	345	325	329	363	375
Starting Vehs	14	18	18	17	9	14	15
Ending Vehs	13	14	11	19	13	12	9
Travel Distance (km)	189	183	186	183	181	202	208
Travel Time (hr)	3.7	3.5	3.6	3.3	3.3	3.9	4.1
Total Delay (hr)	0.7	0.7	0.7	0.5	0.5	0.7	0.9
Total Stops	39	39	31	32	34	40	40
Fuel Used (l)	15.9	15.9	16.0	15.3	15.1	17.3	18.5

Interval #1 Information Recording #1

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	324	355	330	342
Vehs Exited	328	362	329	342
Starting Vehs	11	15	15	13
Ending Vehs	7	8	16	10
Travel Distance (km)	179	199	183	189
Travel Time (hr)	3.4	3.8	3.3	3.6
Total Delay (hr)	0.6	0.7	0.5	0.7
Total Stops	25	29	33	34
Fuel Used (l)	15.3	17.2	15.2	16.2

Interval #2 Information Recording #2

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	395	392	413	418	410	420	409
Vehs Exited	389	393	406	424	411	416	398
Starting Vehs	13	14	11	19	13	12	9
Ending Vehs	19	13	18	13	12	16	20
Travel Distance (km)	205	207	220	227	220	224	222
Travel Time (hr)	3.9	4.2	4.4	4.8	4.9	5.6	4.3
Total Delay (hr)	0.7	0.9	0.9	1.3	1.4	2.1	0.9
Total Stops	58	64	57	64	67	72	54
Fuel Used (l)	17.8	19.2	19.7	20.4	19.9	20.6	18.9

Interval #2 Information Recording #2

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	397	368	410	403
Vehs Exited	386	362	415	400
Starting Vehs	7	8	16	10
Ending Vehs	18	14	11	14
Travel Distance (km)	203	196	217	214
Travel Time (hr)	4.2	4.2	4.9	4.5
Total Delay (hr)	1.0	1.2	1.5	1.2
Total Stops	77	62	78	65
Fuel Used (l)	18.7	18.2	20.8	19.4

Interval #3 Information Recorsding #3

Start Time	5:15
End Time	5:30
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	339	341	324	317	324	363	343
Vehs Exited	349	345	330	324	318	366	347
Starting Vehs	19	13	18	13	12	16	20
Ending Vehs	9	9	12	6	18	13	16
Travel Distance (km)	191	195	184	174	181	204	191
Travel Time (hr)	3.5	3.7	3.3	3.3	3.5	3.9	3.7
Total Delay (hr)	0.6	0.7	0.5	0.6	0.6	0.7	0.7
Total Stops	35	34	35	46	33	46	35
Fuel Used (l)	16.5	16.8	15.4	15.2	15.1	17.8	16.3

Interval #3 Information Recorsding #3

Start Time	5:15
End Time	5:30
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	318	317	357	334
Vehs Exited	319	321	354	337
Starting Vehs	18	14	11	14
Ending Vehs	17	10	14	11
Travel Distance (km)	179	180	192	187
Travel Time (hr)	3.2	3.2	3.8	3.5
Total Delay (hr)	0.5	0.4	0.8	0.6
Total Stops	34	28	46	37
Fuel Used (l)	14.6	14.3	16.8	15.9

Interval #4 Information Recording #4

Start Time	5:30
End Time	5:45
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	339	339	327	338	342	334	319
Vehs Exited	333	336	328	330	335	328	325
Starting Vehs	9	9	12	6	18	13	16
Ending Vehs	15	12	11	14	25	19	10
Travel Distance (km)	189	189	181	188	189	177	172
Travel Time (hr)	3.6	3.6	3.4	3.4	3.6	3.5	3.2
Total Delay (hr)	0.7	0.7	0.5	0.6	0.7	0.6	0.5
Total Stops	34	38	33	38	37	39	51
Fuel Used (l)	15.9	15.8	15.1	16.1	16.3	15.4	14.8

Interval #4 Information Recording #4

Start Time	5:30
End Time	5:45
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	353	348	344	338
Vehs Exited	352	344	345	336
Starting Vehs	17	10	14	11
Ending Vehs	18	14	13	13
Travel Distance (km)	195	196	191	187
Travel Time (hr)	3.8	3.6	3.6	3.5
Total Delay (hr)	0.7	0.6	0.6	0.6
Total Stops	41	33	47	39
Fuel Used (l)	17.1	16.9	16.8	16.0

3: Sackville Drive & Lively Road Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.3	0.3	0.0	0.0	0.1	0.1	0.1
Total Delay (hr)	0.0	0.1	0.6	0.0	0.2	0.0	1.0
Total Del/Veh (s)	7.8	0.8	3.0	2.0	18.1	8.9	2.9
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.2	0.0	0.2
Stop Del/Veh (s)	6.1	0.1	0.0	0.0	15.9	8.7	0.7

5: Sackville Drive & Wilson Lake Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Denied Del/Veh (s)	0.2	0.0	0.0	2.9	0.9	1.0	0.1	0.1	0.2	0.1	0.1	0.6
Total Delay (hr)	0.0	0.1	0.0	0.0	0.7	0.0	0.0	0.0	0.6	0.0	0.0	1.6
Total Del/Veh (s)	10.2	1.2	0.7	3.8	3.1	1.1	19.9	5.7	42.4	35.5	23.1	4.2
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.7
Stop Del/Veh (s)	8.6	0.1	0.1	1.5	0.0	0.0	18.5	5.5	40.4	31.6	22.8	1.9

Total Network Performance

Denied Delay (hr)	0.3
Denied Del/Veh (s)	0.7
Total Delay (hr)	2.8
Total Del/Veh (s)	7.1
Stop Delay (hr)	1.0
Stop Del/Veh (s)	2.6

Intersection: 3: Sackville Drive & Lively Road

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	20.4	0.7	21.9
Average Queue (m)	1.0	0.0	7.9
95th Queue (m)	9.2	0.7	16.8
Link Distance (m)	101.2	363.1	111.0
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Sackville Drive & Wilson Lake Drive

Movement	EB	WB	WB	NB	NB	SB
Directions Served	L	L	TR	L	TR	LTR
Maximum Queue (m)	10.7	9.8	3.3	10.8	17.4	38.2
Average Queue (m)	2.2	2.5	0.1	2.3	6.0	11.6
95th Queue (m)	8.2	8.8	1.9	8.9	14.5	31.1
Link Distance (m)			117.0	36.3	36.3	104.5
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	25.0	25.0				
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	368	712	50	44	12
Future Volume (Veh/h)	3	368	712	50	44	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.90	0.90	0.72	0.72
Hourly flow rate (vph)	3	396	791	56	61	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	847				1221	819
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	847				1221	819
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				69	95
cM capacity (veh/h)	790				198	375

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	399	847	78
Volume Left	3	0	61
Volume Right	0	56	17
cSH	790	1700	221
Volume to Capacity	0.00	0.50	0.35
Queue Length 95th (m)	0.1	0.0	12.1
Control Delay (s)	0.1	0.0	30.0
Lane LOS	A		D
Approach Delay (s)	0.1	0.0	30.0
Approach LOS			D

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	409	8	23	758	111	8	0	30	47	4	6
Future Volume (Veh/h)	11	409	8	23	758	111	8	0	30	47	4	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.97	0.97	0.97	0.64	0.64	0.64	0.58	0.58	0.58
Hourly flow rate (vph)	13	493	10	24	781	114	13	0	47	81	7	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	895			503			1366	1467	498	1452	1415	838
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	895			503			1366	1467	498	1452	1415	838
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			88	100	92	16	95	97
cM capacity (veh/h)	758			1061			113	123	570	96	132	366

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	13	503	24	895	13	47	98
Volume Left	13	0	24	0	13	0	81
Volume Right	0	10	0	114	0	47	10
cSH	758	1700	1061	1700	113	570	107
Volume to Capacity	0.02	0.30	0.02	0.53	0.12	0.08	0.92
Queue Length 95th (m)	0.4	0.0	0.6	0.0	3.0	2.1	44.4
Control Delay (s)	9.8	0.0	8.5	0.0	41.1	11.9	140.4
Lane LOS	A		A		E	B	F
Approach Delay (s)	0.2		0.2		18.2		140.4
Approach LOS					C		F

Intersection Summary				
Average Delay	9.5			
Intersection Capacity Utilization	63.1%	ICU Level of Service	B	
Analysis Period (min)	15			

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	6:30	6:30	6:30	6:30	6:30	6:30	6:30
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	90	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4	4
Vehs Entered	1050	1056	1100	1045	1109	1133	1086
Vehs Exited	1055	1056	1103	1045	1110	1126	1084
Starting Vehs	18	13	13	9	9	7	10
Ending Vehs	13	13	10	9	8	14	12
Travel Distance (km)	579	580	609	574	608	620	601
Travel Time (hr)	10.3	10.6	11.3	10.2	11.1	11.9	10.7
Total Delay (hr)	1.3	1.6	1.8	1.3	1.7	2.2	1.4
Total Stops	187	194	221	190	226	221	192
Fuel Used (l)	48.0	48.9	51.0	47.9	51.3	53.8	50.6

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	6:30	6:30	6:30	6:30
End Time	8:00	8:00	8:00	8:00
Total Time (min)	90	90	90	90
Time Recorded (min)	60	60	60	60
# of Intervals	5	5	5	5
# of Recorded Intervals	4	4	4	4
Vehs Entered	1073	1070	1089	1081
Vehs Exited	1073	1073	1081	1079
Starting Vehs	13	8	7	10
Ending Vehs	13	5	15	11
Travel Distance (km)	583	588	600	594
Travel Time (hr)	10.5	10.6	10.8	10.8
Total Delay (hr)	1.4	1.4	1.5	1.6
Total Stops	221	188	214	205
Fuel Used (l)	49.5	48.6	50.5	50.0

Interval #0 Information Seeding

Start Time	6:30
End Time	7:00
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording #1

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	235	234	248	266	261	245	227
Vehs Exited	247	239	256	259	258	247	229
Starting Vehs	18	13	13	9	9	7	10
Ending Vehs	6	8	5	16	12	5	8
Travel Distance (km)	135	133	141	148	143	137	128
Travel Time (hr)	2.4	2.4	2.5	2.6	2.6	2.4	2.2
Total Delay (hr)	0.3	0.3	0.3	0.3	0.4	0.3	0.2
Total Stops	43	35	41	42	55	46	38
Fuel Used (l)	10.8	10.7	11.0	12.4	11.9	11.3	10.2

Interval #1 Information Recording #1

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	260	237	261	245
Vehs Exited	260	233	251	248
Starting Vehs	13	8	7	10
Ending Vehs	13	12	17	9
Travel Distance (km)	142	129	141	138
Travel Time (hr)	2.5	2.2	2.5	2.4
Total Delay (hr)	0.3	0.2	0.4	0.3
Total Stops	52	45	51	43
Fuel Used (l)	12.1	10.6	11.9	11.3

Interval #2 Information Recording #2

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	311	330	346	303	312	344	342
Vehs Exited	305	317	336	312	308	338	335
Starting Vehs	6	8	5	16	12	5	8
Ending Vehs	12	21	15	7	16	11	15
Travel Distance (km)	170	171	186	165	168	185	188
Travel Time (hr)	3.0	3.2	3.8	3.0	3.2	4.1	3.5
Total Delay (hr)	0.4	0.5	0.9	0.4	0.6	1.2	0.6
Total Stops	47	73	78	52	68	63	54
Fuel Used (l)	13.8	15.0	16.4	14.0	14.6	16.8	16.0

Interval #2 Information Recording #2

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	307	323	333	324
Vehs Exited	306	321	337	321
Starting Vehs	13	12	17	9
Ending Vehs	14	14	13	11
Travel Distance (km)	162	174	187	176
Travel Time (hr)	3.0	3.2	3.4	3.3
Total Delay (hr)	0.5	0.5	0.5	0.6
Total Stops	64	59	59	61
Fuel Used (l)	13.6	14.7	15.9	15.1

Interval #3 Information Recording #3

Start Time	7:30
End Time	7:45
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	252	260	240	235	254	270	253
Vehs Exited	256	273	247	232	258	263	257
Starting Vehs	12	21	15	7	16	11	15
Ending Vehs	8	8	8	10	12	18	11
Travel Distance (km)	141	149	136	129	141	147	139
Travel Time (hr)	2.5	2.8	2.4	2.3	2.5	2.6	2.4
Total Delay (hr)	0.3	0.5	0.3	0.3	0.3	0.3	0.3
Total Stops	48	47	41	42	46	52	55
Fuel Used (l)	11.5	12.8	11.1	10.5	11.6	12.6	12.2

Interval #3 Information Recording #3

Start Time	7:30
End Time	7:45
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	240	260	232	248
Vehs Exited	239	267	235	252
Starting Vehs	14	14	13	11
Ending Vehs	15	7	10	10
Travel Distance (km)	136	146	128	139
Travel Time (hr)	2.3	2.7	2.3	2.5
Total Delay (hr)	0.2	0.4	0.3	0.3
Total Stops	38	45	45	44
Fuel Used (l)	11.4	12.1	10.6	11.6

Interval #4 Information Recording #4

Start Time	7:45
End Time	8:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	252	232	266	241	282	274	264
Vehs Exited	247	227	264	242	286	278	263
Starting Vehs	8	8	8	10	12	18	11
Ending Vehs	13	13	10	9	8	14	12
Travel Distance (km)	135	126	146	133	156	151	147
Travel Time (hr)	2.5	2.2	2.6	2.4	2.8	2.8	2.6
Total Delay (hr)	0.4	0.2	0.4	0.3	0.4	0.4	0.3
Total Stops	49	39	61	54	57	60	45
Fuel Used (l)	11.8	10.4	12.5	11.0	13.2	13.1	12.2

Interval #4 Information Recording #4

Start Time	7:45
End Time	8:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	266	250	263	261
Vehs Exited	268	252	258	259
Starting Vehs	15	7	10	10
Ending Vehs	13	5	15	11
Travel Distance (km)	144	139	143	142
Travel Time (hr)	2.7	2.5	2.6	2.6
Total Delay (hr)	0.4	0.3	0.3	0.3
Total Stops	67	39	59	53
Fuel Used (l)	12.4	11.2	12.1	12.0

3: Sackville Drive & Lively Road Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.6	0.5	0.0	0.0	0.1	0.1	0.3
Total Delay (hr)	0.0	0.1	0.1	0.0	0.1	0.0	0.4
Total Del/Veh (s)	2.4	0.9	1.0	0.5	11.0	2.9	1.4
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Stop Del/Veh (s)	0.7	0.0	0.0	0.0	8.8	2.7	0.5

5: Sackville Drive & Wilson Lake Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.2	3.6	0.2	0.3	0.1	0.1	0.2	0.2	0.2	0.1
Total Delay (hr)	0.0	0.3	0.0	0.0	0.1	0.0	0.0	0.1	0.5	0.0	0.0	0.9
Total Del/Veh (s)	2.7	1.7	0.9	3.0	0.8	0.1	6.9	7.1	16.8	16.3	8.6	3.2
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.5
Stop Del/Veh (s)	0.9	0.1	0.0	1.6	0.0	0.0	5.7	6.9	14.4	11.2	7.8	1.7

Total Network Performance

Denied Delay (hr)	0.1
Denied Del/Veh (s)	0.4
Total Delay (hr)	1.5
Total Del/Veh (s)	4.8
Stop Delay (hr)	0.7
Stop Del/Veh (s)	2.2

Intersection: 3: Sackville Drive & Lively Road

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	11.3	0.7	19.4
Average Queue (m)	0.7	0.0	6.9
95th Queue (m)	6.3	0.0	14.7
Link Distance (m)	101.2	363.1	111.0
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Sackville Drive & Wilson Lake Drive

Movement	EB	WB	NB	NB	SB
Directions Served	L	L	L	TR	LTR
Maximum Queue (m)	7.9	5.5	7.8	18.4	35.8
Average Queue (m)	0.5	0.2	0.5	6.1	13.0
95th Queue (m)	3.7	2.5	3.9	15.2	27.2
Link Distance (m)			36.3	36.3	104.5
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	25.0	25.0			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	571	229	41	44	6
Future Volume (Veh/h)	7	571	229	41	44	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.86	0.86	0.87	0.87	0.86	0.86
Hourly flow rate (vph)	8	664	263	47	51	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	310				966	286
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	310				966	286
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				82	99
cM capacity (veh/h)	1250				277	753

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	672	310	58
Volume Left	8	0	51
Volume Right	0	47	7
cSH	1250	1700	300
Volume to Capacity	0.01	0.18	0.19
Queue Length 95th (m)	0.2	0.0	5.6
Control Delay (s)	0.2	0.0	19.9
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	19.9
Approach LOS			C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	620	4	3	267	16	2	0	30	98	3	16
Future Volume (Veh/h)	6	620	4	3	267	16	2	0	30	98	3	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.82	0.82	0.82	0.75	0.75	0.75	0.83	0.83	0.83
Hourly flow rate (vph)	7	738	5	4	326	20	3	0	40	118	4	19
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	346			743			1110	1108	740	1136	1101	336
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	346			743			1110	1108	740	1136	1101	336
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	99			100			98	100	90	26	98	97
cM capacity (veh/h)	1213			864			178	208	413	161	210	692

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	7	743	4	346	3	40	141
Volume Left	7	0	4	0	3	0	118
Volume Right	0	5	0	20	0	40	19
cSH	1213	1700	864	1700	178	413	180
Volume to Capacity	0.01	0.44	0.00	0.20	0.02	0.10	0.78
Queue Length 95th (m)	0.1	0.0	0.1	0.0	0.4	2.6	41.7
Control Delay (s)	8.0	0.0	9.2	0.0	25.6	14.6	72.9
Lane LOS	A		A		D	B	F
Approach Delay (s)	0.1		0.1		15.4		72.9
Approach LOS					C		F

Intersection Summary				
Average Delay	8.6			
Intersection Capacity Utilization	52.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	4:15	4:15	4:15	4:15	4:15	4:15	4:15
End Time	5:45	5:45	5:45	5:45	5:45	5:45	5:45
Total Time (min)	90	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4	4
Vehs Entered	1558	1586	1671	1612	1655	1669	1587
Vehs Exited	1561	1593	1668	1607	1644	1660	1586
Starting Vehs	21	23	17	21	11	17	16
Ending Vehs	18	16	20	26	22	26	17
Travel Distance (km)	846	868	921	866	910	915	874
Travel Time (hr)	17.3	20.2	21.4	17.8	19.3	18.8	19.7
Total Delay (hr)	4.2	6.7	7.1	4.2	5.2	4.6	6.1
Total Stops	187	184	191	199	190	191	194
Fuel Used (l)	75.8	79.6	84.8	77.6	82.2	82.5	80.0

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	4:15	4:15	4:15	4:15
End Time	5:45	5:45	5:45	5:45
Total Time (min)	90	90	90	90
Time Recorded (min)	60	60	60	60
# of Intervals	5	5	5	5
# of Recorded Intervals	4	4	4	4
Vehs Entered	1633	1663	1589	1620
Vehs Exited	1642	1664	1588	1622
Starting Vehs	24	21	17	17
Ending Vehs	15	20	18	17
Travel Distance (km)	889	916	870	887
Travel Time (hr)	19.4	21.2	18.3	19.3
Total Delay (hr)	5.5	7.0	4.8	5.5
Total Stops	192	172	194	188
Fuel Used (l)	81.2	83.0	78.2	80.5

Interval #0 Information Seeding

Start Time	4:15
End Time	4:45
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording #1

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	375	379	374	420	415	431	362
Vehs Exited	379	388	378	426	403	425	366
Starting Vehs	21	23	17	21	11	17	16
Ending Vehs	17	14	13	15	23	23	12
Travel Distance (km)	206	216	213	231	227	238	202
Travel Time (hr)	4.4	3.9	4.0	4.8	4.7	4.7	3.9
Total Delay (hr)	1.2	0.6	0.7	1.2	1.2	1.1	0.8
Total Stops	39	31	32	55	40	44	38
Fuel Used (l)	18.7	17.7	17.7	20.9	20.3	21.0	16.7

Interval #1 Information Recording #1

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	405	405	392	393
Vehs Exited	407	408	384	397
Starting Vehs	24	21	17	17
Ending Vehs	22	18	25	16
Travel Distance (km)	220	225	219	220
Travel Time (hr)	4.8	4.4	4.5	4.4
Total Delay (hr)	1.3	0.9	1.1	1.0
Total Stops	46	49	40	40
Fuel Used (l)	19.8	19.7	19.2	19.2

Interval #2 Information Recording #2

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	437	466	495	427	471	437	463
Vehs Exited	432	444	470	413	472	451	446
Starting Vehs	17	14	13	15	23	23	12
Ending Vehs	22	36	38	29	22	9	29
Travel Distance (km)	229	241	259	220	251	240	244
Travel Time (hr)	5.0	6.6	7.2	4.7	6.1	5.3	6.5
Total Delay (hr)	1.4	2.9	3.1	1.2	2.2	1.6	2.7
Total Stops	65	79	71	70	77	70	82
Fuel Used (l)	21.4	23.6	25.2	20.0	24.7	22.4	24.4

Interval #2 Information Recording #2

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	452	460	427	451
Vehs Exited	451	452	425	446
Starting Vehs	22	18	25	16
Ending Vehs	23	26	27	23
Travel Distance (km)	238	247	221	239
Travel Time (hr)	6.0	7.6	5.2	6.0
Total Delay (hr)	2.2	3.8	1.7	2.3
Total Stops	73	51	71	70
Fuel Used (l)	23.1	24.2	20.6	23.0

Interval #3 Information Recording #3

Start Time	5:15
End Time	5:30
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	389	391	418	375	379	385	353
Vehs Exited	393	404	442	389	381	376	366
Starting Vehs	22	36	38	29	22	9	29
Ending Vehs	18	23	14	15	20	18	16
Travel Distance (km)	217	217	238	208	211	209	200
Travel Time (hr)	4.2	5.9	5.9	4.2	4.1	4.1	4.5
Total Delay (hr)	0.8	2.5	2.2	0.9	0.9	0.9	1.4
Total Stops	41	40	42	44	43	37	31
Fuel Used (l)	18.7	21.1	23.1	18.4	18.4	19.1	18.3

Interval #3 Information Recording #3

Start Time	5:15
End Time	5:30
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	369	373	382	381
Vehs Exited	373	384	396	390
Starting Vehs	23	26	27	23
Ending Vehs	19	15	13	16
Travel Distance (km)	204	208	218	213
Travel Time (hr)	4.0	4.3	4.5	4.6
Total Delay (hr)	0.9	1.0	1.1	1.3
Total Stops	32	36	42	38
Fuel Used (l)	18.0	18.6	19.4	19.3

Interval #4 Information Recording #4

Start Time	5:30
End Time	5:45
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	357	350	384	390	390	416	409
Vehs Exited	357	357	378	379	388	408	408
Starting Vehs	18	23	14	15	20	18	16
Ending Vehs	18	16	20	26	22	26	17
Travel Distance (km)	193	194	210	207	221	228	227
Travel Time (hr)	3.7	3.7	4.3	4.2	4.3	4.6	4.8
Total Delay (hr)	0.7	0.7	1.0	1.0	0.9	1.1	1.3
Total Stops	42	34	46	30	30	40	43
Fuel Used (l)	17.0	17.2	18.8	18.3	18.9	20.1	20.6

Interval #4 Information Recording #4

Start Time	5:30
End Time	5:45
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	407	425	388	390
Vehs Exited	411	420	383	388
Starting Vehs	19	15	13	16
Ending Vehs	15	20	18	17
Travel Distance (km)	227	236	212	216
Travel Time (hr)	4.6	4.8	4.2	4.3
Total Delay (hr)	1.1	1.2	0.9	1.0
Total Stops	41	36	41	37
Fuel Used (l)	20.3	20.5	19.0	19.1

3: Sackville Drive & Lively Road Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.6	0.3	0.0	0.0	0.2	0.1	0.1
Total Delay (hr)	0.0	0.1	0.9	0.0	0.4	0.1	1.5
Total Del/Veh (s)	5.3	0.7	4.0	2.5	26.0	13.3	3.8
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.3	0.1	0.4
Stop Del/Veh (s)	3.7	0.0	0.0	0.0	23.7	12.6	1.0

5: Sackville Drive & Wilson Lake Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Denied Del/Veh (s)	0.2	0.0	0.0	3.0	1.3	1.2	0.1	0.1	0.8	5.2	0.1	0.9
Total Delay (hr)	0.0	0.2	0.0	0.0	1.0	0.1	0.1	0.1	1.7	0.1	0.2	3.4
Total Del/Veh (s)	12.0	1.3	0.7	4.7	4.2	1.7	27.7	6.8	118.8	73.8	86.7	7.6
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.6	0.1	0.2	2.1
Stop Del/Veh (s)	10.6	0.1	0.1	1.6	0.0	0.0	26.3	6.6	117.4	70.2	86.8	4.7

Total Network Performance

Denied Delay (hr)	0.4
Denied Del/Veh (s)	1.0
Total Delay (hr)	5.1
Total Del/Veh (s)	11.2
Stop Delay (hr)	2.5
Stop Del/Veh (s)	5.5

Intersection: 3: Sackville Drive & Lively Road

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	9.2	26.2
Average Queue (m)	0.4	9.5
95th Queue (m)	4.8	20.6
Link Distance (m)	101.2	111.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Sackville Drive & Wilson Lake Drive

Movement	EB	WB	WB	NB	NB	SB
Directions Served	L	L	TR	L	TR	LTR
Maximum Queue (m)	9.4	9.3	7.0	10.8	20.6	63.2
Average Queue (m)	2.1	2.3	0.3	2.5	6.9	19.8
95th Queue (m)	7.7	8.3	3.5	9.1	16.4	56.3
Link Distance (m)			117.0	36.3	36.3	104.5
Upstream Blk Time (%)						1
Queuing Penalty (veh)						0
Storage Bay Dist (m)	25.0	25.0				
Storage Blk Time (%)			0			
Queuing Penalty (veh)			0			

Network Summary

Network wide Queuing Penalty: 0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	408	805	55	49	13
Future Volume (Veh/h)	3	408	805	55	49	13
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.90	0.90	0.72	0.72
Hourly flow rate (vph)	3	439	894	61	68	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	955				1370	924
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	955				1370	924
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				58	94
cM capacity (veh/h)	720				161	326

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	442	955	86
Volume Left	3	0	68
Volume Right	0	61	18
cSH	720	1700	180
Volume to Capacity	0.00	0.56	0.48
Queue Length 95th (m)	0.1	0.0	18.4
Control Delay (s)	0.1	0.0	42.1
Lane LOS	A		E
Approach Delay (s)	0.1	0.0	42.1
Approach LOS			E

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	454	9	26	856	123	9	0	33	52	4	7
Future Volume (Veh/h)	12	454	9	26	856	123	9	0	33	52	4	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.97	0.97	0.97	0.64	0.64	0.64	0.58	0.58	0.58
Hourly flow rate (vph)	14	547	11	27	882	127	14	0	52	90	7	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1009			558			1532	1644	552	1626	1586	946
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1009			558			1532	1644	552	1626	1586	946
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			83	100	90	0	93	96
cM capacity (veh/h)	687			1013			84	95	531	71	103	317

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	14	558	27	1009	14	52	109
Volume Left	14	0	27	0	14	0	90
Volume Right	0	11	0	127	0	52	12
cSH	687	1700	1013	1700	84	531	80
Volume to Capacity	0.02	0.33	0.03	0.59	0.17	0.10	1.37
Queue Length 95th (m)	0.5	0.0	0.7	0.0	4.5	2.6	67.9
Control Delay (s)	10.4	0.0	8.7	0.0	56.3	12.5	319.5
Lane LOS	B		A		F	B	F
Approach Delay (s)	0.3		0.2		21.8		319.5
Approach LOS					C		F

Intersection Summary				
Average Delay	20.6			
Intersection Capacity Utilization	69.4%	ICU Level of Service	C	
Analysis Period (min)	15			

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	6:30	6:30	6:30	6:30	6:30	6:30	6:30
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	90	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4	4
Vehs Entered	1207	1252	1242	1285	1233	1300	1246
Vehs Exited	1211	1254	1249	1279	1229	1296	1245
Starting Vehs	22	15	17	10	5	11	13
Ending Vehs	18	13	10	16	9	15	14
Travel Distance (km)	641	660	653	671	648	690	659
Travel Time (hr)	12.8	14.1	16.3	13.9	13.6	19.3	15.6
Total Delay (hr)	2.5	3.5	5.7	3.2	3.2	8.3	5.1
Total Stops	309	333	317	349	349	282	317
Fuel Used (l)	57.6	61.4	62.4	62.5	59.5	67.2	62.1

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	6:30	6:30	6:30	6:30
End Time	8:00	8:00	8:00	8:00
Total Time (min)	90	90	90	90
Time Recorded (min)	60	60	60	60
# of Intervals	5	5	5	5
# of Recorded Intervals	4	4	4	4
Vehs Entered	1224	1269	1251	1251
Vehs Exited	1225	1261	1251	1250
Starting Vehs	13	9	17	12
Ending Vehs	12	17	17	13
Travel Distance (km)	646	665	657	659
Travel Time (hr)	13.9	14.5	15.6	15.0
Total Delay (hr)	3.6	3.9	5.0	4.4
Total Stops	334	333	339	327
Fuel Used (l)	60.5	61.7	61.9	61.7

Interval #0 Information Seeding

Start Time	6:30
End Time	7:00
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording #1

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	274	292	282	327	301	273	278
Vehs Exited	283	297	292	318	289	274	282
Starting Vehs	22	15	17	10	5	11	13
Ending Vehs	13	10	7	19	17	10	9
Travel Distance (km)	149	156	153	171	156	148	147
Travel Time (hr)	3.0	3.1	3.0	3.5	3.1	2.9	2.9
Total Delay (hr)	0.6	0.6	0.5	0.8	0.6	0.6	0.6
Total Stops	77	78	73	83	85	72	80
Fuel Used (l)	13.4	14.2	13.7	16.4	13.9	13.0	13.2

Interval #1 Information Recording #1

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	305	283	311	293
Vehs Exited	303	276	310	294
Starting Vehs	13	9	17	12
Ending Vehs	15	16	18	13
Travel Distance (km)	161	149	165	156
Travel Time (hr)	3.2	2.9	3.4	3.1
Total Delay (hr)	0.6	0.5	0.7	0.6
Total Stops	91	77	87	79
Fuel Used (l)	14.8	13.4	15.0	14.1

Interval #2 Information Recording #2

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	347	373	385	368	372	411	383
Vehs Exited	342	357	361	376	372	391	361
Starting Vehs	13	10	7	19	17	10	9
Ending Vehs	18	26	31	11	17	30	31
Travel Distance (km)	178	189	196	194	192	213	195
Travel Time (hr)	3.6	4.4	6.5	4.1	4.6	7.7	5.3
Total Delay (hr)	0.8	1.4	3.4	1.0	1.5	4.3	2.2
Total Stops	83	93	90	96	109	67	89
Fuel Used (l)	16.1	17.9	20.0	18.0	18.7	21.8	18.7

Interval #2 Information Recording #2

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	344	371	379	373
Vehs Exited	348	363	374	365
Starting Vehs	15	16	18	13
Ending Vehs	11	24	23	21
Travel Distance (km)	178	188	193	192
Travel Time (hr)	4.5	5.2	6.1	5.2
Total Delay (hr)	1.6	2.2	3.0	2.1
Total Stops	84	102	102	92
Fuel Used (l)	17.0	18.9	19.8	18.7

Interval #3 Information Recording #3

Start Time	7:30
End Time	7:45
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	276	291	292	288	278	316	273
Vehs Exited	282	310	309	288	283	335	291
Starting Vehs	18	26	31	11	17	30	31
Ending Vehs	12	7	14	11	12	11	13
Travel Distance (km)	149	161	159	154	152	170	148
Travel Time (hr)	2.9	3.6	3.9	3.1	2.9	5.6	4.0
Total Delay (hr)	0.5	0.9	1.3	0.7	0.5	2.9	1.6
Total Stops	70	76	71	72	71	58	71
Fuel Used (l)	13.4	15.2	15.3	14.2	13.3	18.0	15.2

Interval #3 Information Recording #3

Start Time	7:30
End Time	7:45
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	291	308	278	289
Vehs Exited	285	321	290	301
Starting Vehs	11	24	23	21
Ending Vehs	17	11	11	10
Travel Distance (km)	155	167	154	157
Travel Time (hr)	3.1	3.4	3.3	3.6
Total Delay (hr)	0.7	0.8	0.8	1.1
Total Stops	74	87	69	72
Fuel Used (l)	14.4	15.2	14.2	14.8

Interval #4 Information Recording #4

Start Time	7:45
End Time	8:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	310	296	283	302	282	300	312
Vehs Exited	304	290	287	297	285	296	311
Starting Vehs	12	7	14	11	12	11	13
Ending Vehs	18	13	10	16	9	15	14
Travel Distance (km)	165	153	146	151	148	160	169
Travel Time (hr)	3.3	3.0	2.9	3.2	2.9	3.1	3.4
Total Delay (hr)	0.7	0.6	0.5	0.8	0.5	0.6	0.7
Total Stops	79	86	83	98	84	85	77
Fuel Used (l)	14.8	14.1	13.4	13.9	13.5	14.3	15.0

Interval #4 Information Recording #4

Start Time	7:45
End Time	8:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	284	307	283	295
Vehs Exited	289	301	277	293
Starting Vehs	17	11	11	10
Ending Vehs	12	17	17	13
Travel Distance (km)	151	161	145	155
Travel Time (hr)	3.2	3.0	2.8	3.1
Total Delay (hr)	0.7	0.5	0.4	0.6
Total Stops	85	67	81	83
Fuel Used (l)	14.2	14.2	12.9	14.0

3: Sackville Drive & Lively Road Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.4	0.5	0.0	0.0	0.1	0.1	0.3
Total Delay (hr)	0.0	0.2	0.1	0.0	0.3	0.0	0.6
Total Del/Veh (s)	2.4	1.0	1.2	0.7	12.4	5.4	2.0
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.2	0.0	0.2
Stop Del/Veh (s)	1.0	0.0	0.0	0.0	10.1	4.9	0.9

5: Sackville Drive & Wilson Lake Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Denied Del/Veh (s)	0.0	0.0	0.0	4.3	0.3	0.3	0.1	0.1	2.1	2.7	1.5	0.4
Total Delay (hr)	0.0	0.4	0.0	0.0	0.1	0.0	0.0	0.1	2.4	0.1	0.3	3.4
Total Del/Veh (s)	3.4	2.1	0.8	6.5	1.2	0.2	7.6	10.9	49.7	35.0	46.6	9.9
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.3	0.1	0.4	2.9
Stop Del/Veh (s)	1.2	0.1	0.1	4.8	0.0	0.0	6.3	10.7	48.2	31.8	46.9	8.3

Total Network Performance

Denied Delay (hr)	0.2
Denied Del/Veh (s)	0.6
Total Delay (hr)	4.2
Total Del/Veh (s)	11.9
Stop Delay (hr)	3.2
Stop Del/Veh (s)	9.0

Intersection: 3: Sackville Drive & Lively Road

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	16.8	0.7	28.3
Average Queue (m)	1.0	0.0	10.0
95th Queue (m)	7.4	0.7	20.0
Link Distance (m)	101.2	363.1	111.0
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Sackville Drive & Wilson Lake Drive

Movement	EB	WB	WB	NB	NB	SB
Directions Served	L	L	TR	L	TR	LTR
Maximum Queue (m)	8.2	6.2	1.6	7.9	18.7	90.3
Average Queue (m)	1.0	0.4	0.1	0.6	6.9	33.9
95th Queue (m)	5.4	3.0	1.6	4.1	15.5	80.4
Link Distance (m)			117.0	36.3	36.3	104.5
Upstream Blk Time (%)						3
Queuing Penalty (veh)						0
Storage Bay Dist (m)	25.0	25.0				
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	579	241	52	79	10
Future Volume (Veh/h)	8	579	241	52	79	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.86	0.86	0.87	0.87	0.86	0.86
Hourly flow rate (vph)	9	673	277	60	92	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	337				998	307
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	337				998	307
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				65	98
cM capacity (veh/h)	1222				265	733

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	682	337	104
Volume Left	9	0	92
Volume Right	0	60	12
cSH	1222	1700	286
Volume to Capacity	0.01	0.20	0.36
Queue Length 95th (m)	0.2	0.0	12.8
Control Delay (s)	0.2	0.0	24.6
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	24.6
Approach LOS			C

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	655	4	3	278	37	2	0	30	174	6	28
Future Volume (Veh/h)	13	655	4	3	278	37	2	0	30	174	6	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.82	0.82	0.82	0.75	0.75	0.75	0.83	0.83	0.83
Hourly flow rate (vph)	15	780	5	4	339	45	3	0	40	210	7	34
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	384			785			1197	1204	782	1220	1184	362
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	384			785			1197	1204	782	1220	1184	362
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	99			100			98	100	90	0	96	95
cM capacity (veh/h)	1174			834			148	181	391	139	186	670

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	15	785	4	384	3	40	251
Volume Left	15	0	4	0	3	0	210
Volume Right	0	5	0	45	0	40	34
cSH	1174	1700	834	1700	148	391	157
Volume to Capacity	0.01	0.46	0.00	0.23	0.02	0.10	1.60
Queue Length 95th (m)	0.3	0.0	0.1	0.0	0.5	2.7	137.7
Control Delay (s)	8.1	0.0	9.3	0.0	29.8	15.3	348.7
Lane LOS	A		A		D	C	F
Approach Delay (s)	0.2		0.1		16.3		348.7
Approach LOS					C		F

Intersection Summary				
Average Delay	59.6			
Intersection Capacity Utilization	59.7%	ICU Level of Service	B	
Analysis Period (min)	15			

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	4:15	4:15	4:15	4:15	4:15	4:15	4:15
End Time	5:45	5:45	5:45	5:45	5:45	5:45	5:45
Total Time (min)	90	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4	4
Vehs Entered	1778	1807	1841	1799	1780	1829	1817
Vehs Exited	1778	1800	1828	1799	1785	1831	1804
Starting Vehs	33	24	21	27	42	37	23
Ending Vehs	33	31	34	27	37	35	36
Travel Distance (km)	935	950	980	931	941	973	953
Travel Time (hr)	71.7	56.6	47.4	34.8	72.7	70.4	53.8
Total Delay (hr)	56.7	41.3	31.7	19.8	57.6	54.7	38.5
Total Stops	176	184	214	255	175	164	209
Fuel Used (l)	133.6	121.3	116.4	104.0	135.3	135.2	119.9

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	4:15	4:15	4:15	4:15
End Time	5:45	5:45	5:45	5:45
Total Time (min)	90	90	90	90
Time Recorded (min)	60	60	60	60
# of Intervals	5	5	5	5
# of Recorded Intervals	4	4	4	4
Vehs Entered	1791	1815	1797	1806
Vehs Exited	1802	1812	1797	1804
Starting Vehs	41	42	28	33
Ending Vehs	30	45	28	33
Travel Distance (km)	946	963	947	952
Travel Time (hr)	69.4	73.9	83.9	63.5
Total Delay (hr)	54.1	58.5	68.7	48.2
Total Stops	182	178	166	192
Fuel Used (l)	131.9	137.3	144.6	127.9

Interval #0 Information Seeding

Start Time	4:15
End Time	4:45
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording #1

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	438	460	431	453	448	439	432
Vehs Exited	435	455	427	448	443	438	440
Starting Vehs	33	24	21	27	42	37	23
Ending Vehs	36	29	25	32	47	38	15
Travel Distance (km)	223	246	234	235	241	234	235
Travel Time (hr)	11.8	7.6	5.5	7.6	14.6	10.3	6.0
Total Delay (hr)	8.2	3.7	1.8	3.9	10.8	6.5	2.3
Total Stops	38	51	50	71	34	25	59
Fuel Used (l)	27.8	24.4	21.9	25.0	31.1	26.4	23.0

Interval #1 Information Recording #1

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	435	432	433	439
Vehs Exited	435	441	415	438
Starting Vehs	41	42	28	33
Ending Vehs	41	33	46	36
Travel Distance (km)	225	231	229	233
Travel Time (hr)	12.1	13.6	13.4	10.3
Total Delay (hr)	8.5	10.0	9.7	6.5
Total Stops	45	38	41	43
Fuel Used (l)	27.4	29.5	28.5	26.5

Interval #2 Information Recording #2

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	456	477	523	502	466	480	498
Vehs Exited	460	471	498	491	482	484	481
Starting Vehs	36	29	25	32	47	38	15
Ending Vehs	32	35	50	43	31	34	32
Travel Distance (km)	242	243	267	253	245	260	249
Travel Time (hr)	19.4	14.9	11.1	8.7	19.7	18.8	12.5
Total Delay (hr)	15.5	10.9	6.8	4.6	15.8	14.7	8.4
Total Stops	65	55	91	105	65	57	84
Fuel Used (l)	35.6	32.1	30.4	27.9	36.5	35.7	30.7

Interval #2 Information Recording #2

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	487	489	485	486
Vehs Exited	491	479	491	483
Starting Vehs	41	33	46	36
Ending Vehs	37	43	40	36
Travel Distance (km)	258	254	254	252
Travel Time (hr)	17.3	19.0	20.4	16.2
Total Delay (hr)	13.1	14.9	16.4	12.1
Total Stops	58	63	58	69
Fuel Used (l)	34.8	35.9	37.2	33.7

Interval #3 Information Recording #3

Start Time	5:15
End Time	5:30
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	446	424	438	418	440	441	427
Vehs Exited	444	422	456	431	433	441	418
Starting Vehs	32	35	50	43	31	34	32
Ending Vehs	34	37	32	30	38	34	41
Travel Distance (km)	236	222	235	221	225	232	221
Travel Time (hr)	21.9	16.7	14.6	10.5	19.8	21.5	17.4
Total Delay (hr)	18.1	13.1	10.8	7.0	16.2	17.8	13.9
Total Stops	40	41	37	30	39	34	30
Fuel Used (l)	36.5	31.2	31.2	26.7	34.3	36.6	31.6

Interval #3 Information Recording #3

Start Time	5:15
End Time	5:30
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	433	434	437	432
Vehs Exited	429	442	441	435
Starting Vehs	37	43	40	36
Ending Vehs	41	35	36	36
Travel Distance (km)	226	236	233	229
Travel Time (hr)	19.6	20.6	25.0	18.8
Total Delay (hr)	15.9	16.8	21.3	15.1
Total Stops	37	37	32	36
Fuel Used (l)	34.0	35.2	39.4	33.7

Interval #4 Information Recording #4

Start Time	5:30
End Time	5:45
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	438	446	449	426	426	469	460
Vehs Exited	439	452	447	429	427	468	465
Starting Vehs	34	37	32	30	38	34	41
Ending Vehs	33	31	34	27	37	35	36
Travel Distance (km)	234	240	244	222	230	247	248
Travel Time (hr)	18.6	17.4	16.2	7.9	18.5	19.7	17.9
Total Delay (hr)	15.0	13.6	12.3	4.3	14.9	15.7	13.9
Total Stops	33	37	36	49	37	48	36
Fuel Used (l)	33.6	33.6	32.9	24.5	33.4	36.5	34.7

Interval #4 Information Recording #4

Start Time	5:30
End Time	5:45
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	436	460	442	445
Vehs Exited	447	450	450	447
Starting Vehs	41	35	36	36
Ending Vehs	30	45	28	33
Travel Distance (km)	237	243	231	238
Travel Time (hr)	20.4	20.7	25.0	18.2
Total Delay (hr)	16.6	16.8	21.2	14.4
Total Stops	42	40	35	38
Fuel Used (l)	35.7	36.6	39.5	34.1

3: Sackville Drive & Lively Road Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.5	0.3	0.0	0.0	0.2	0.2	0.1
Total Delay (hr)	0.0	0.1	1.3	0.1	0.7	0.2	2.4
Total Del/Veh (s)	8.9	1.0	5.5	3.8	37.9	28.2	5.9
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.7	0.2	0.8
Stop Del/Veh (s)	7.4	0.1	0.0	0.0	35.6	27.5	2.1

5: Sackville Drive & Wilson Lake Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	21.7	2.2	3.8	28.2
Denied Del/Veh (s)	0.1	0.0	0.0	2.8	1.5	1.4	0.1	0.1	744.5	734.5	797.6	56.3
Total Delay (hr)	0.2	0.2	0.0	0.0	1.6	0.2	0.1	0.1	11.6	1.2	1.9	17.2
Total Del/Veh (s)	26.0	1.6	0.8	5.6	6.4	3.0	49.3	7.4	497.3	495.6	466.9	34.6
Stop Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	11.8	1.3	2.0	15.3
Stop Del/Veh (s)	24.2	0.1	0.1	1.5	0.0	0.0	48.1	7.2	503.8	501.2	475.0	30.9

Total Network Performance

Denied Delay (hr)	28.3
Denied Del/Veh (s)	55.2
Total Delay (hr)	19.9
Total Del/Veh (s)	39.0
Stop Delay (hr)	16.2
Stop Del/Veh (s)	31.8

Intersection: 3: Sackville Drive & Lively Road

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	24.2	0.7	46.5
Average Queue (m)	2.4	0.0	14.2
95th Queue (m)	14.8	1.0	33.5
Link Distance (m)	101.2	363.1	111.0
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Sackville Drive & Wilson Lake Drive

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	TR	L	TR	L	TR	LTR
Maximum Queue (m)	16.2	4.5	10.5	12.2	14.8	18.4	116.0
Average Queue (m)	4.8	0.2	2.2	1.0	2.7	6.7	102.1
95th Queue (m)	13.1	4.6	8.3	5.9	10.1	15.4	134.9
Link Distance (m)		363.1		117.0	36.3	36.3	104.5
Upstream Blk Time (%)							85
Queuing Penalty (veh)							0
Storage Bay Dist (m)	25.0		25.0				
Storage Blk Time (%)	0			0			
Queuing Penalty (veh)	2			0			

Network Summary

Network wide Queuing Penalty: 2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	417	811	96	68	19
Future Volume (Veh/h)	6	417	811	96	68	19
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.90	0.90	0.72	0.72
Hourly flow rate (vph)	6	448	901	107	94	26
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1008				1414	954
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1008				1414	954
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				37	92
cM capacity (veh/h)	687				150	314

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	454	1008	120
Volume Left	6	0	94
Volume Right	0	107	26
cSH	687	1700	169
Volume to Capacity	0.01	0.59	0.71
Queue Length 95th (m)	0.2	0.0	34.4
Control Delay (s)	0.3	0.0	65.9
Lane LOS	A		F
Approach Delay (s)	0.3	0.0	65.9
Approach LOS			F

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	474	9	26	897	215	9	0	33	100	9	13
Future Volume (Veh/h)	21	474	9	26	897	215	9	0	33	100	9	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.97	0.97	0.97	0.64	0.64	0.64	0.58	0.58	0.58
Hourly flow rate (vph)	25	571	11	27	925	222	14	0	52	172	16	22
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1147			582			1636	1828	576	1763	1722	1036
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1147			582			1636	1828	576	1763	1722	1036
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			97			77	100	90	0	81	92
cM capacity (veh/h)	609			992			60	72	515	56	83	281

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	25	582	27	1147	14	52	210
Volume Left	25	0	27	0	14	0	172
Volume Right	0	11	0	222	0	52	22
cSH	609	1700	992	1700	60	515	63
Volume to Capacity	0.04	0.34	0.03	0.67	0.23	0.10	3.34
Queue Length 95th (m)	1.0	0.0	0.7	0.0	6.4	2.7	Err
Control Delay (s)	11.2	0.0	8.7	0.0	82.0	12.8	Err
Lane LOS	B		A		F	B	F
Approach Delay (s)	0.5		0.2		27.5		Err
Approach LOS					D		F

Intersection Summary				
Average Delay	1021.9			
Intersection Capacity Utilization	80.4%	ICU Level of Service	D	
Analysis Period (min)	15			

APPENDIX E

Arcady Results

Junctions 8

ARCADY 8 - Roundabout Module

Filename: Margeson Analysis.arc8
Path: Z:\Harbourside Transportation Consultants\Projects\172054 Berry Hills Phase 8\Project Files\02 Analysis
Report generation date: 25/08/2017 7:15:27 AM

Summary of intersection performance

	AM						PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Margeson Roundabout - Existing AM 2017											
Sackville Dr Eastbound	0.64	3.12	0.39	A	2.79	A						
Margeson	0.11	2.30	0.10	A								
Sackville Dr Westbound	0.17	2.22	0.14	A								

	Margeson Roundabout - Existing PM 2017											
Sackville Dr Eastbound							0.40	2.64	0.29	A	3.23	A
Margeson							0.69	3.54	0.41	A		
Sackville Dr Westbound							0.53	3.42	0.35	A		
	Margeson Roundabout - Future AM 2024											
Sackville Dr Eastbound	0.83	3.57	0.45	A	3.09	A						
Margeson	0.13	2.36	0.11	A								
Sackville Dr Westbound	0.23	2.35	0.19	A								
	Margeson Roundabout - Future AM with Dev 2024											
Sackville Dr Eastbound	1.08	4.07	0.52	A	3.44	A						
Margeson	0.14	2.44	0.12	A								
Sackville Dr Westbound	0.25	2.40	0.20	A								
	Margeson Roundabout - Future PM 2024											
Sackville Dr Eastbound							0.47	2.77	0.32	A	3.71	A
Margeson							1.01	4.29	0.50	A		
Sackville Dr Westbound							0.66	3.82	0.40	A		
	Margeson Roundabout - Future PM with Dev 2024											
Sackville Dr Eastbound							0.62	3.23	0.36	A	4.59	A
Margeson							1.38	5.42	0.56	A		
Sackville Dr Westbound							0.93	4.84	0.46	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing AM 2017, AM " model duration: 8:00 AM - 9:30 AM
"D2 - Existing PM 2017, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Future AM 2024, AM" model duration: 8:00 AM - 9:30 AM
"D4 - Future PM 2024, PM" model duration: 4:00 PM - 5:30 PM
"D5 - Future AM with Dev 2024, AM" model duration: 8:00 AM - 9:30 AM
"D6 - Future PM with Dev 2024, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.4.487 at 25/08/2017 7:15:27 AM

File summary

Title	Margeson
Location	
Site Number	
Date	24/08/2017
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	hec45
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.00	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Margeson Roundabout - Existing AM 2017, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	DemandSets	D1 - Existing AM 2017, AM	Demand Set 1: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?
Warning	DemandSets	D2 - Existing PM 2017, PM	Demand Set 2: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D3 - Future AM 2024, AM	Demand Set 3: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?
Warning	DemandSets	D4 - Future PM 2024, PM	Demand Set 4: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	DemandSets	D5 - Future AM with Dev 2024, AM	Demand Set 5: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?

Warning	DemandSets	D6 - Future PM with Dev 2024, PM	Demand Set 6: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
Margeson Roundabout	ARCADY			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Existing AM 2017, AM	Existing AM 2017	AM		ONE HOUR	08:00	09:30	90	15		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Intersection Delay (s)	Intersection LOS
1	Margeson Roundabout	Roundabout	1,2,3			2.79	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Name	Leg	Name	Description
Sackville Dr Eastbound	1	Sackville Dr Eastbound	
Margeson	2	Margeson	
Sackville Dr Westbound	3	Sackville Dr Westbound	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)
Sackville Dr Eastbound	0.00	99999.00
Margeson	0.00	99999.00
Sackville Dr Westbound	0.00	99999.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Sackville Dr Eastbound	3.00	8.00	30.00	75.00	45.00	30.00	
Margeson	3.00	8.00	30.00	75.00	45.00	30.00	
Sackville Dr Westbound	3.00	8.00	30.00	75.00	45.00	30.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Sackville Dr Eastbound		(calculated)	(calculated)	0.690	1965.071
Margeson		(calculated)	(calculated)	0.690	1965.071
Sackville Dr Westbound		(calculated)	(calculated)	0.690	1965.071

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
Sackville Dr Eastbound	ONE HOUR	✓	673.00	100.000

Margeson	ONE HOUR	✓	159.00	100.000
Sackville Dr Westbound	ONE HOUR	✓	246.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Margeson Roundabout (for whole period)

		To		
		Sackville Dr Eastbound	**Margeson**	**Sackville Dr Westbound**
From	**Sackville Dr Eastbound**	0.000	378.000	295.000
	Margeson	92.000	0.000	67.000
	Sackville Dr Westbound	152.000	94.000	0.000

Turning Proportions (PCE) - Margeson Roundabout (for whole period)

		To		
		Sackville Dr Eastbound	**Margeson**	**Sackville Dr Westbound**
From	**Sackville Dr Eastbound**	0.00	0.56	0.44
	Margeson	0.58	0.00	0.42
	Sackville Dr Westbound	0.62	0.38	0.00

Vehicle Mix

Average PCE Per Vehicle - Margeson Roundabout (for whole period)

		To		
		Sackville Dr Eastbound	Margeson	Sackville Dr Westbound
From	Sackville Dr Eastbound	1.000	1.000	1.000
	Margeson	1.000	1.000	1.000
	Sackville Dr Westbound	1.000	1.000	1.000

Truck Percentages - Margeson Roundabout (for whole period)

		To		
		Sackville Dr Eastbound	Margeson	Sackville Dr Westbound
From	Sackville Dr Eastbound	0.0	0.0	0.0
	Margeson	0.0	0.0	0.0
	Sackville Dr Westbound	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS
Sackville Dr Eastbound	0.39	3.12	0.64	1.00	A
Margeson	0.10	2.30	0.11	~1	A
Sackville Dr Westbound	0.14	2.22	0.17	~1	A

Main Results for each time segment

Main results: (08:00-08:15)

Name	Total Demand (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	V/C Ratio	End Queue (PCE)	Delay (s)	LOS
Sackville Dr Eastbound	506.67	505.24	70.61	0.00	1916.34	0.264	0.36	2.549	A
Margeson	119.70	119.42	221.46	0.00	1812.22	0.066	0.07	2.126	A
Sackville Dr Westbound	185.20	184.78	69.10	0.00	1917.38	0.097	0.11	2.078	A

Main results: (08:15-08:30)

Name	Total Demand (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	V/C Ratio	End Queue (PCE)	Delay (s)	LOS
Sackville Dr Eastbound	605.01	604.59	84.47	0.00	1906.77	0.317	0.46	2.764	A
Margeson	142.94	142.87	265.02	0.00	1782.16	0.080	0.09	2.195	A

Sackville Dr Westbound	221.15	221.05	82.67	0.00	1908.01	0.116	0.13	2.133	A

Main results: (08:30-08:45)

Name	Total Demand (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	V/C Ratio	End Queue (PCE)	Delay (s)	LOS
Sackville Dr Eastbound	740.99	740.28	103.44	0.00	1893.68	0.391	0.64	3.119	A
Margeson	175.06	174.96	324.49	0.00	1741.11	0.101	0.11	2.298	A
Sackville Dr Westbound	270.85	270.71	101.24	0.00	1895.20	0.143	0.17	2.215	A

Main results: (08:45-09:00)

Name	Total Demand (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	V/C Ratio	End Queue (PCE)	Delay (s)	LOS
Sackville Dr Eastbound	740.99	740.98	103.50	0.00	1893.64	0.391	0.64	3.122	A
Margeson	175.06	175.06	324.80	0.00	1740.90	0.101	0.11	2.298	A
Sackville Dr Westbound	270.85	270.85	101.29	0.00	1895.16	0.143	0.17	2.215	A

Main results: (09:00-09:15)

Name	Total Demand (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	V/C Ratio	End Queue (PCE)	Delay (s)	LOS
Sackville Dr Eastbound	605.01	605.71	84.56	0.00	1906.71	0.317	0.47	2.770	A

Margeson	142.94	143.03	265.50	0.00	1781.82	0.080	0.09	2.198	A
Sackville Dr Westbound	221.15	221.29	82.76	0.00	1907.95	0.116	0.13	2.134	A

Main results: (09:15-09:30)

Name	Total Demand (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	V/C Ratio	End Queue (PCE)	Delay (s)	LOS
Sackville Dr Eastbound	506.67	507.09	70.81	0.00	1916.20	0.264	0.36	2.557	A
Margeson	119.70	119.77	222.28	0.00	1811.66	0.066	0.07	2.129	A
Sackville Dr Westbound	185.20	185.30	69.30	0.00	1917.24	0.097	0.11	2.078	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Sackville Dr Eastbound	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Margeson	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Sackville Dr Westbound	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Sackville Dr Eastbound	0.46	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Margeson	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Sackville Dr Westbound	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Sackville Dr Eastbound	0.64	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Margeson	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Sackville Dr Westbound	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Sackville Dr Eastbound	0.64	0.00	0.00	0.00	1.00			N/A	N/A
Margeson	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Sackville Dr Westbound	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Sackville Dr Eastbound	0.47	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Margeson	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Sackville Dr Westbound	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Sackville Dr Eastbound	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Margeson	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Sackville Dr Westbound	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

APPENDIX F

Traffic Signal Warrants

2005 Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	**Sackville Drive**	**Direction (EW or NS)**	**EW**	**Date:**	**Aug 22, 2017**
Side Street (name)	**Lively Road**	**Direction (EW or NS)**	**NS**	**City:**	**Middle Sackville, NS**
Quadrant (if appl)					

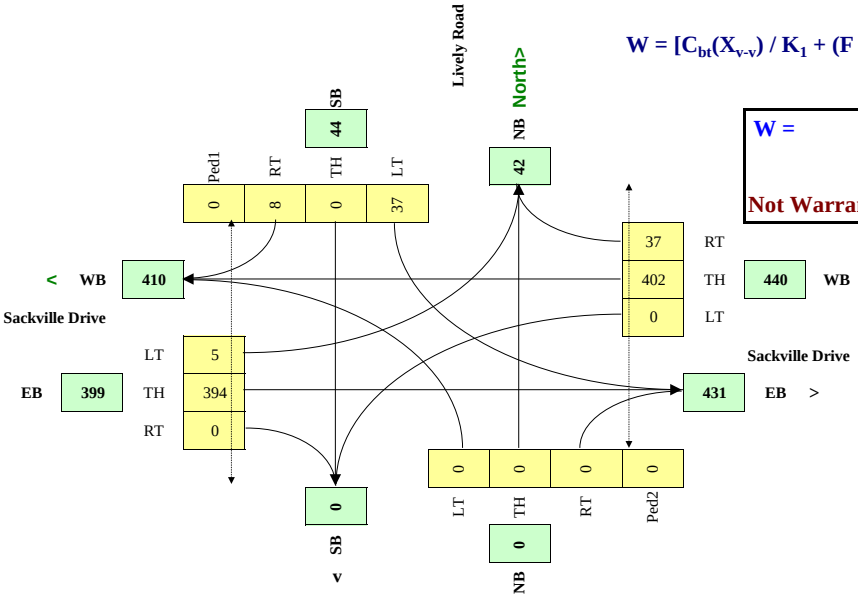
Lane Configuration		Excl LT	Th & LT	Through or Th+RT+LT	Th & RT	Excl RT	Upstream Signal (m)	# of Thru Lanes	
Sackville Drive	WB				1			1	
Sackville Drive	EB		1					1	
Lively Road	NB			1					
Lively Road	SB								

Demographics		
Elementary School	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	10712
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Trucks %	Bus Rt (y/n)	Median (m)
Sackville Drive	EW	70	2.0%	y	0.0
Lively Road	NS			n	

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1**	**Ped2**	**Ped3**	**Ped4**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**NS W Side**	**NS E Side**	**EW N Side**	**EW S side**
7:00 - 8:00				35		3		188	34	6	510					
8:00 - 9:00				34		7		220	24	3	440					
11:00 - 12:00				29		7		323	30	4	388					
12:00 - 13:00				36		5		363	37	7	328					
16:00 - 17:00				46		13		632	50	7	344					
17:00 - 18:00				40		10		688	48	3	353					
Total (6-hour peak)	**0**	**0**	**0**	**220**	**0**	**45**	**0**	**2,414**	**223**	**30**	**2,363**	**0**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**0**	**0**	**0**	**37**	**0**	**8**	**0**	**402**	**37**	**5**	**394**	**0**	**0**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements



$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$

W =	23	23	0
		Veh	*Ped*

Not Warranted - Vs<75

2005 Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	**Sackville Drive**	**Direction (EW or NS)**	**EW**	**Date:**	**Aug 22, 2017**
Side Street (name)	**Wilson Lake Drive**	**Direction (EW or NS)**	**NS**	**City:**	**Middle Sackville, NS**
Quadrant (if appl)					

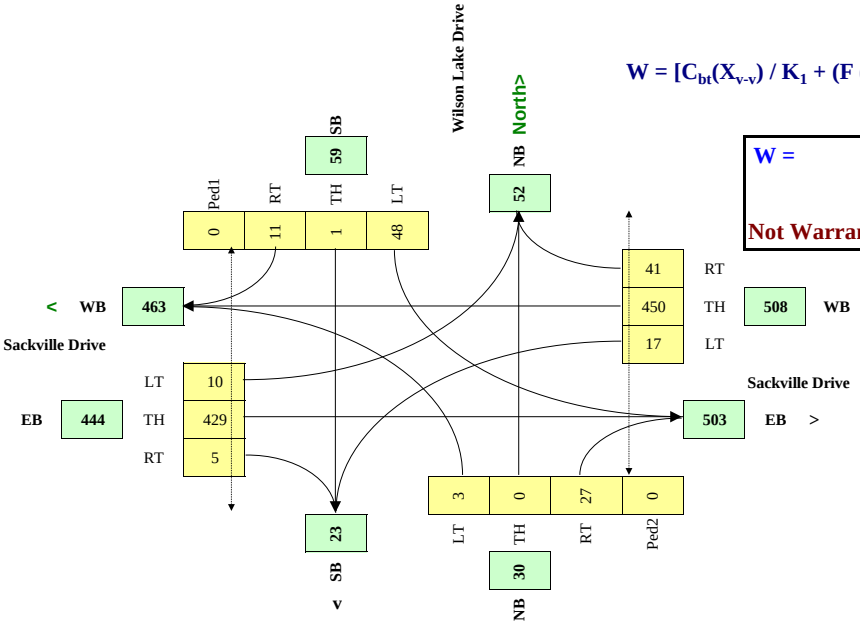
Lane Configuration		Excl LT	Th & LT	Through or Th+RT+LT	Th & RT	Excl RT	Upstream Signal (m)	# of Thru Lanes	
Sackville Drive	WB	1			1			1	
Sackville Drive	EB	1			1			1	
Wilson Lake Drive	NB	1			1				
Wilson Lake Drive	SB			1					

Demographics		
Elementary School	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	10712
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Trucks %	Bus Rt (y/n)	Median (m)
Sackville Drive	EW	70	2.0%	y	0.0
Wilson Lake Drive	NS			n	

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1**	**Ped2**	**Ped3**	**Ped4**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**NS** **W Side**	**NS** **E Side**	**EW** **N Side**	**EW** **S side**
7:00 - 8:00	1	0	26	84	2	8	2	244	12	5	566	3				
8:00 - 9:00	1	0	26	52	0	20	4	251	18	15	461	2				
11:00 - 12:00	3	0	29	22	0	11	28	366	8	7	406	9				
12:00 - 13:00	0	1	29	39	1	8	34	397	12	14	346	3				
16:00 - 17:00	6	0	19	37	0	9	11	719	100	8	411	4				
17:00 - 18:00	7	1	31	51	3	8	25	721	98	11	384	7				
Total (6-hour peak)	**18**	**2**	**160**	**285**	**6**	**64**	**104**	**2,698**	**248**	**60**	**2,574**	**28**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**3**	**0**	**27**	**48**	**1**	**11**	**17**	**450**	**41**	**10**	**429**	**5**	**0**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements



$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$

W =	43	43	0
		Veh	*Ped*

Not Warranted - Vs<75

2005 Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	**Sackville Drive**	**Direction (EW or NS)**	**EW**	**Date:**	**Aug 22, 2024**
Side Street (name)	**Lively Road**	**Direction (EW or NS)**	**NS**	**City:**	**Middle Sackville, NS**
Quadrant (if appl)					

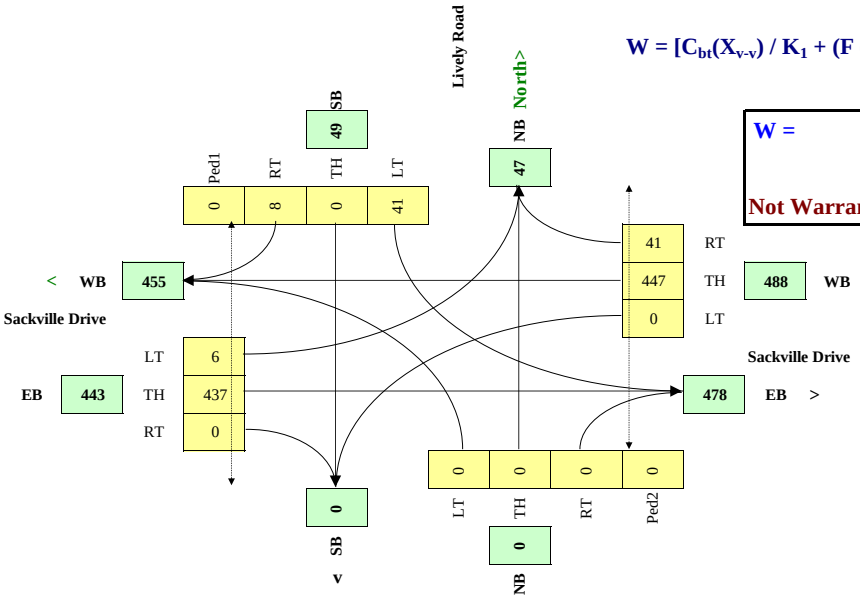
Lane Configuration		Excl LT	Th & LT	Through or Th+RT+LT	Th & RT	Excl RT	Upstream Signal (m)	# of Thru Lanes	
Sackville Drive	WB				1			1	
Sackville Drive	EB		1					1	
Lively Road	NB			1					
Lively Road	SB								

Demographics		
Elementary School	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	10712
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Trucks %	Bus Rt (y/n)	Median (m)
Sackville Drive	EW	70	2.0%	y	0.0
Lively Road	NS			n	

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S side**
7:00 - 8:00				39		3		209	38	7	566					
8:00 - 9:00				38		8		244	27	3	488					
11:00 - 12:00				32		8		358	33	4	431					
12:00 - 13:00				40		6		403	41	8	364					
16:00 - 17:00				51		14		701	55	8	382					
17:00 - 18:00				44		11		764	53	3	392					
Total (6-hour peak)	**0**	**0**	**0**	**244**	**0**	**50**	**0**	**2,679**	**247**	**33**	**2,623**	**0**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**0**	**0**	**0**	**41**	**0**	**8**	**0**	**447**	**41**	**6**	**437**	**0**	**0**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements



$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$

W =	28	28	0
		Veh	*Ped*

Not Warranted - Vs<75

2005 Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	**Sackville Drive**	**Direction (EW or NS)**	**EW**	**Date:**	**Aug 22, 2024**
Side Street (name)	**Wilson Lake Drive**	**Direction (EW or NS)**	**NS**	**City:**	**Middle Sackville, NS**
Quadrant (if appl)					

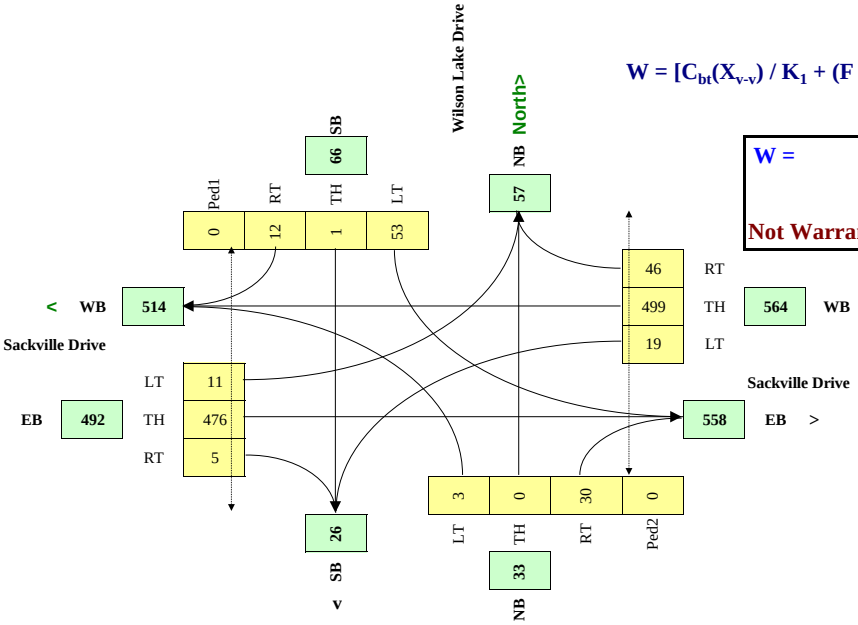
Lane Configuration		Excl LT	Th & LT	Through or Th+RT+LT	Th & RT	Excl RT	Upstream Signal (m)	# of Thru Lanes	
Sackville Drive	WB	1			1			1	
Sackville Drive	EB	1			1			1	
Wilson Lake Drive	NB	1			1				
Wilson Lake Drive	SB			1					

Demographics		
Elementary School	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	10712
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Trucks %	Bus Rt (y/n)	Median (m)
Sackville Drive	EW	70	2.0%	y	0.0
Wilson Lake Drive	NS			n	

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S side**
7:00 - 8:00	1	0	29	93	2	9	2	271	13	6	628	3				
8:00 - 9:00	1	0	29	58	0	22	4	279	20	17	512	2				
11:00 - 12:00	3	0	32	24	0	12	31	406	9	8	451	10				
12:00 - 13:00	0	1	32	43	1	9	38	441	13	16	384	3				
16:00 - 17:00	7	0	21	41	0	10	12	798	111	9	456	4				
17:00 - 18:00	8	1	34	57	3	9	28	800	109	12	426	8				
Total (6-hour peak)	**20**	**2**	**178**	**316**	**7**	**71**	**115**	**2,994**	**275**	**67**	**2,857**	**31**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**3**	**0**	**30**	**53**	**1**	**12**	**19**	**499**	**46**	**11**	**476**	**5**	**0**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements



$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$

W =	53	53	0
		Veh	*Ped*

Not Warranted - Vs<75