Trinity Development Group Inc.

UPDATED TRANSPORTATION IMPACT STUDY

Northumberland Mall, Town of Cobourg

Proposed Driveway Relocation and Commercial Addition

April 2020

20045.00 / 230

LEA Consulting Ltd.
625 Cochrane Drive, 9th Floor
Markham, ON, L3R 9R9 Canada
T | 905 470 0015 F | 905 470 0030
WWW.LEA.CA

April 13, 2020 **Reference Number:** 20045.00/230

Aly Premji
Trinity Development Group Inc.
77 Bloor Street W, Suite 1601
Toronto, ON
M5S 1M2

Dear Mr. Premji,

RE: Updated Transportation Impact Study
Proposed Driveway Relocation and Commercial Addition
Northumberland Mall, Town of Cobourg

LEA Consulting Ltd. is please to present the findings of our Updated Transportation Impact Study (Updated TIS) for the proposed driveway relocation and commercial addition at Northumberland Mall in the Town of Cobourg. This report concludes that the traffic associated with the proposed works will have minimum traffic impact to the immediate roadways.

Should you have any comments with our assumptions or have any concerns, please contact the undersigned.

Yours truly,w

LEA CONSULTING LTD.

Tony Chiu, M.A.Sc., P.Eng.
Project Manager, Transportation Engineering

Natalie Tsui, B.A.Sc., EIT
Transportation Analyst

Disclaimer

This Report represents the work of LEA Consulting Ltd ("LEA"). This Report may not be relied upon for detailed implementation or any other purpose not specifically identified within this Report. This Document is confidential and prepared solely for the use of Trinity Development Group Inc. Neither LEA, its sub-consultants nor their respective employees assume any liability for any reason, including, but not limited to, negligence, to any party other than Trinity Development Group Inc. for any information or representation herein.

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

1 INTRODUCTION

LEA Consulting Ltd. (LEA) was retained by Trinity Development Group Inc. to undertake a Traffic Impact Assessment (TIA) for Northumberland Mall in the Town of Cobourg (herein referred to as the "subject site"). The TIA is to assess the traffic impacts of the proposed relocation of the Northumberland Mall access on Rogers Road, as well as the proposed commercial addition.

By way of background, LEA prepared and submitted the TIA for this development in July 2019. Following the submission of the report, staff has provided comments with respect to the TIA. This updated TIA is in response to the comments, dated October 2019, received from the Town of Cobourg, which are appended in **Appendix E**.

The subject site is located in the southeast corner of Rogers Rd and Elgin St W, approximately 600 m west of Burnham St. Currently, Northumberland Mall contains approximately 35,400 m² (~381,200 ft²) of retail use. The subject site and context of the location is illustrated in **Figure 1.1**.

Figure 1.1: Site Location

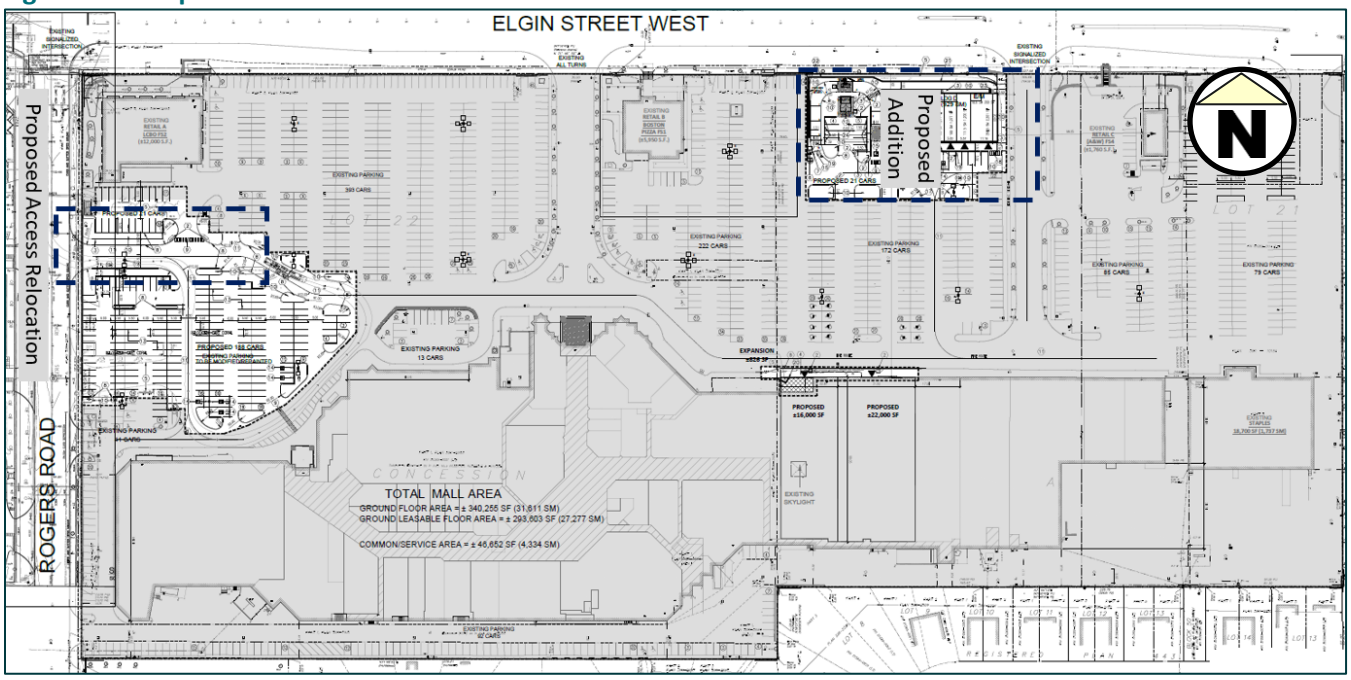
In addition to the proposed access relocation, a retail pad containing approximately 910 m² (9,800 ft²) of commercial use is proposed on the subject site, to be located at the southwest corner of Strathy Rd and Elgin St W. It is noted that as part of the access relocation, the parking supply between the existing Metro foodstore and LCBO will be reconfigured. The overall parking supply is to increase to almost 1,400 spaces, which is increased from the existing supply of 1,163 spaces.

The Rogers Rd access is proposed to be relocated due to safety concerns from customers at the food store having to cross the main drive aisle of the mall to access their vehicles. By relocating the access, the ratio of parking spaces provided south of the main drive aisle will increase and reduce the need for foodstore customers to parking in spaces located north of the main drive aisle. The preliminary site statistics are outlined in **Table 1.1**, with the proposed site plan shown in **Figure 1.2**.

Table 1.1: Site Statistics

Site	GFA	
	ft²	m²
Existing	381,227	35,417
Addition	9,800	910
Total	**391,027**	**36,346**

Figure 1.2: Proposed Site Plan



Source: Petroff Partnership Architects (Dated: March 2020)

2 EXISTING CONDITIONS

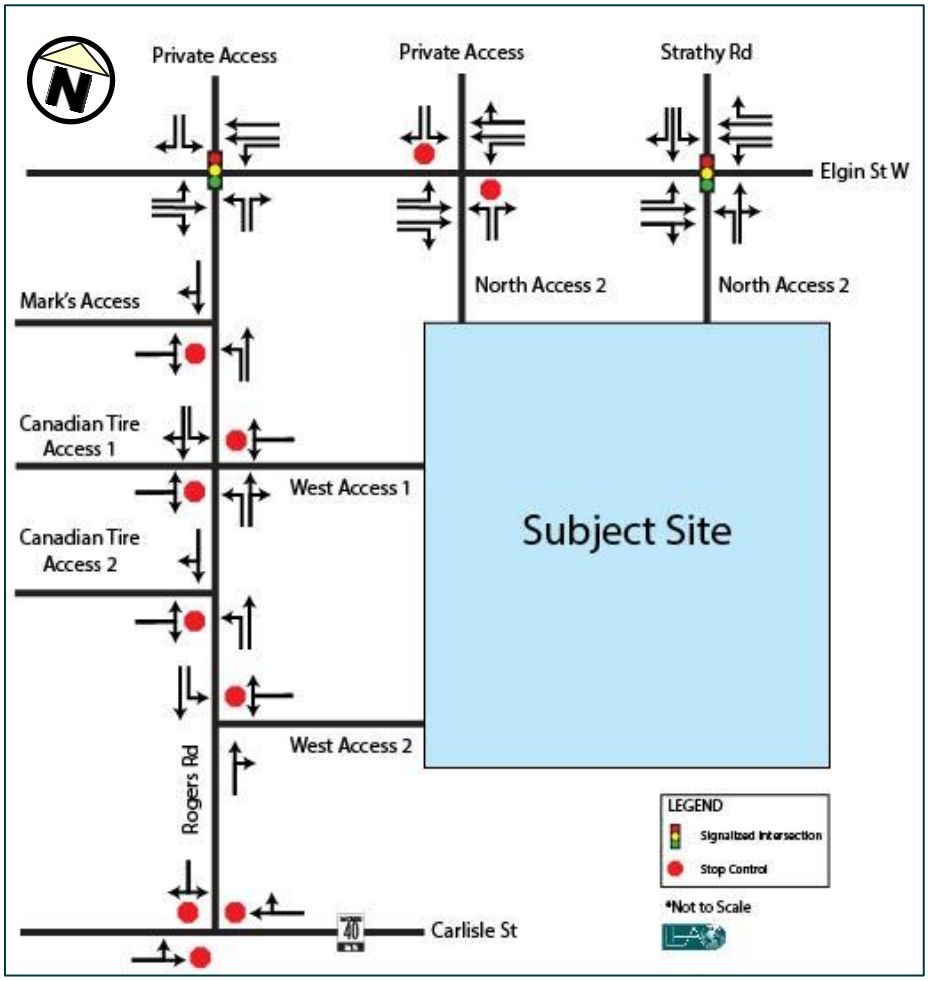
2.1 ROAD NETWORK

The following intersections have been included in this intersection capacity study:

- Elgin Street West and Northumberland Mall North Access 1/Strathy Road (signalized);
- Elgin Street West and Northumberland Mall North Access 2/Private Access (unsignalized);
- Elgin Street West and Rogers Road (signalized);
- Rogers Road and Mark's Access (unsignalized);
- Rogers Road and Canadian Tire Access 1/Northumberland Mall West Access 1 (unsignalized);
- Rogers Road and Canadian Tire Access 2 (unsignalized);
- Rogers Road and Northumberland Mall Access 2 (unsignalized); and
- Rogers Road and Carlisle Street (unsignalized).

Figure 2.1 illustrates the intersections and lane configurations within the study area.

Figure 2.1: Existing Lane Configuration



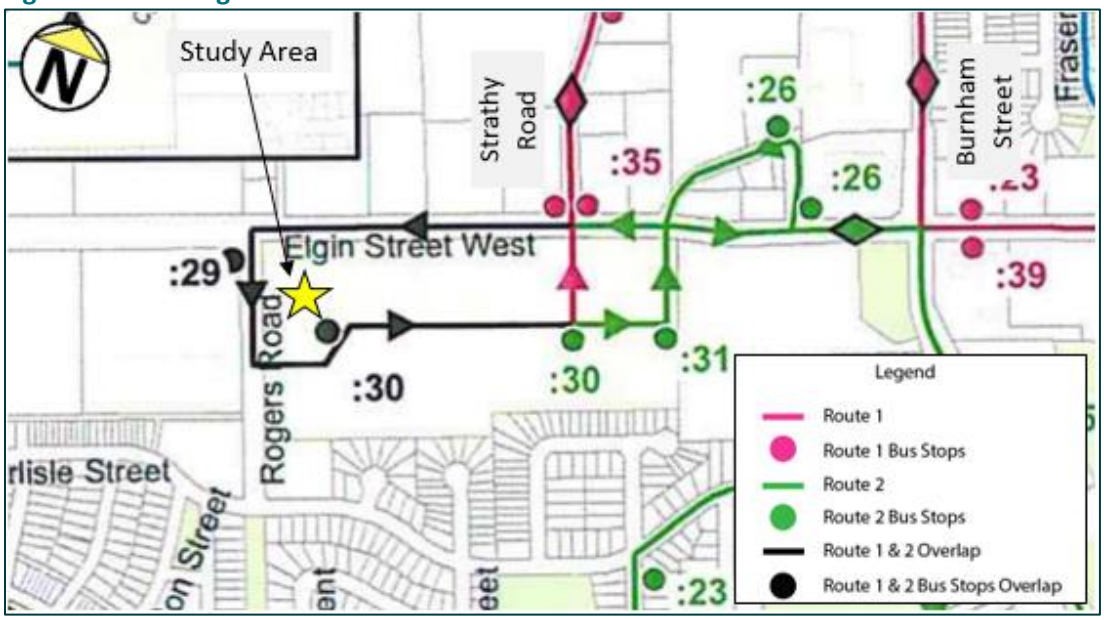
Below is a detailed description of the roadways in the study area. All roads are under the jurisdictions of the Town unless otherwise noted:

- **Elgin Street West** is an east-west major arterial road under the jurisdiction of County of Northumberland that operates with a four-lane cross-section (two lanes per direction) in the vicinity of the subject site. This road operates with a posted speed limit of 50km/h in the area.
- **Strathy Road** is a collector road running north-south with a five-lane cross section (two lanes per direction and one two-way left turn lane). As no speed limit is posted on the roadway, a speed limit of 50 km/h is assumed for Strathy Rd.
- **Rogers Road** is a north-south collector road running from Carlisle Street to Elgin Street West with a three-lane cross section (one lane per direction and one centre two-way left turn lane). As no speed limit is posted on the roadway, a speed limit of 50 km/h is assumed for Rogers Rd.
- **Carlisle Street** is a local road operating primarily in the east-west direction from Burnham Street to New Amherst Boulevard with a width of two lanes (one per direction). This road operates with a posted speed limit of 40km/h.

2.2 TRANSIT NETWORK

The study area is currently serviced by Cobourg Transit, which provides two routes in the Town. Both routes service the subject site. **Figure 2.2** illustrates the existing transit network within the vicinity of the study area, as of August 2018.

Figure 2.2: Existing Transit Services



Source: Town of Cobourg "Where's My Bus" (December 12, 2018)

Route 1 – Northumberland Mall through Downtown to Lucas Point

Route 1 is a bus route that generally operates in the northwest-southeast direction, connecting local residential areas to the southern area of the Township of Cobourg along Lake Ontario. This route originates from the Downtown Terminal, and operates seven days of the week. The closest bus stop for this route from the subject site is at the Northumberland Mall.

Route 2 - Northumberland Mall through Downtown to Densmore Road

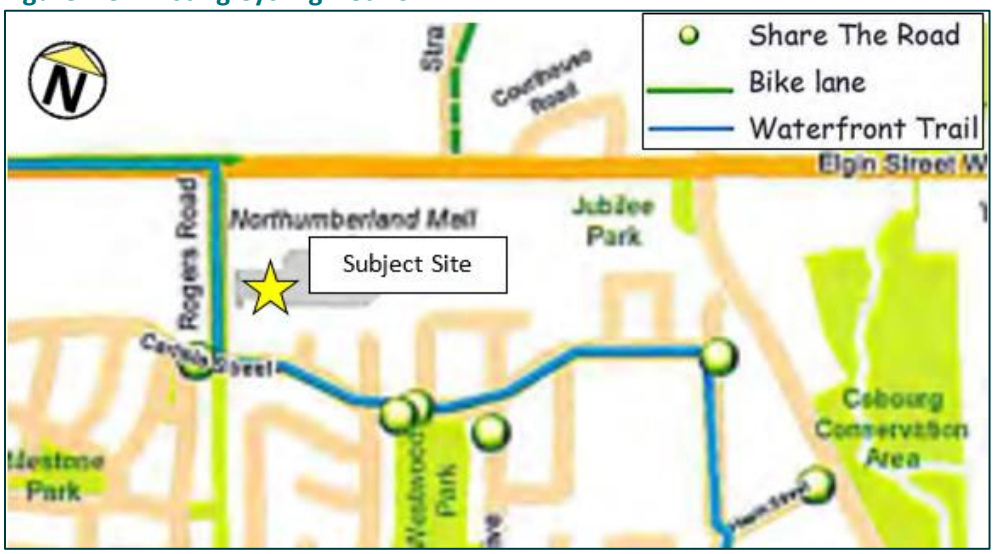
Route 2 is a local bus route that operates primarily in the northeast-southwest direction, connecting the northeast residential areas with the westerly developments of the Town of Cobourg. Route 2 originates from the Downtown Terminal, and also provides service to the Cobourg Community Centre. The closest bus stop for this route can be accessed at the Northumberland mall.

2.3 CYCLING NETWORK

Some cycling infrastructure exists within vicinity of Northumberland Mall, as shown in **Figure 2.3**. The following are existing cycling infrastructure within vicinity of the subject site, which forms the Waterfront Trail:

- Multi-use trail along the boulevard of the south side of Elgin St W; and
- Bike lanes on Rogers Rd.

Figure 2.3: Existing Cycling Network



Source: Town of Cobourg Cycling Facilities (2016)

2.4 TRAFFIC DATA COLLECTION

Turning movement counts (TMCs) for intersections within the study area were collected by LEA. In response to the received comments, additional TMCs were collected for weekday AM and PM peak hour analysis. A summary of the TMC collection details are provided in **Table 2.1**.The detailed TMCs and signal timing plans are included in **Appendix A**.

Table 2.1: Data Collection Summary

Location	Date and Time of Survey
Elgin Street W and Northumberland Mall North Access 1/Strathy Road	Wkdy: Jan 23, 2020 (07:00-09:00 & 16:00-18:00)
Elgin Street W and Northumberland Mall North Access 2/Private A	
Elgin Street W and Rogers Road	
Rogers Road and Mark's Access	Fri: May 24, 2019 (15:00-19:00)
Rogers Road and Canadian Tire Access 1/Northumberland Mall West Access 1	
Rogers Road and Canadian Tire Access 2	Sat: May 25. 2019 (10:00-16:00)
Rogers Road and Carlisle Street	

2.5 EXISTING INTERSECTION CAPACITY ANALYSIS

Existing traffic operations provide the baseline for future traffic operations. As such, it is important to understand how existing traffic operates on the boundary road network. The capacity analysis for the study area was undertaken using Synchro version 9.0, adhering to the methodology outlined in Highway Capacity Manual (2000). The existing traffic volumes utilized in the intersection capacity analyses for the Weekday AM and PM peak hours are illustrated in **Figure 2.4** while Friday PM and Saturday peak hours are illustrated in **Figure 2.5**.

Figure 2.4: Existing Traffic Volumes – Weekday AM & PM Peak Hour

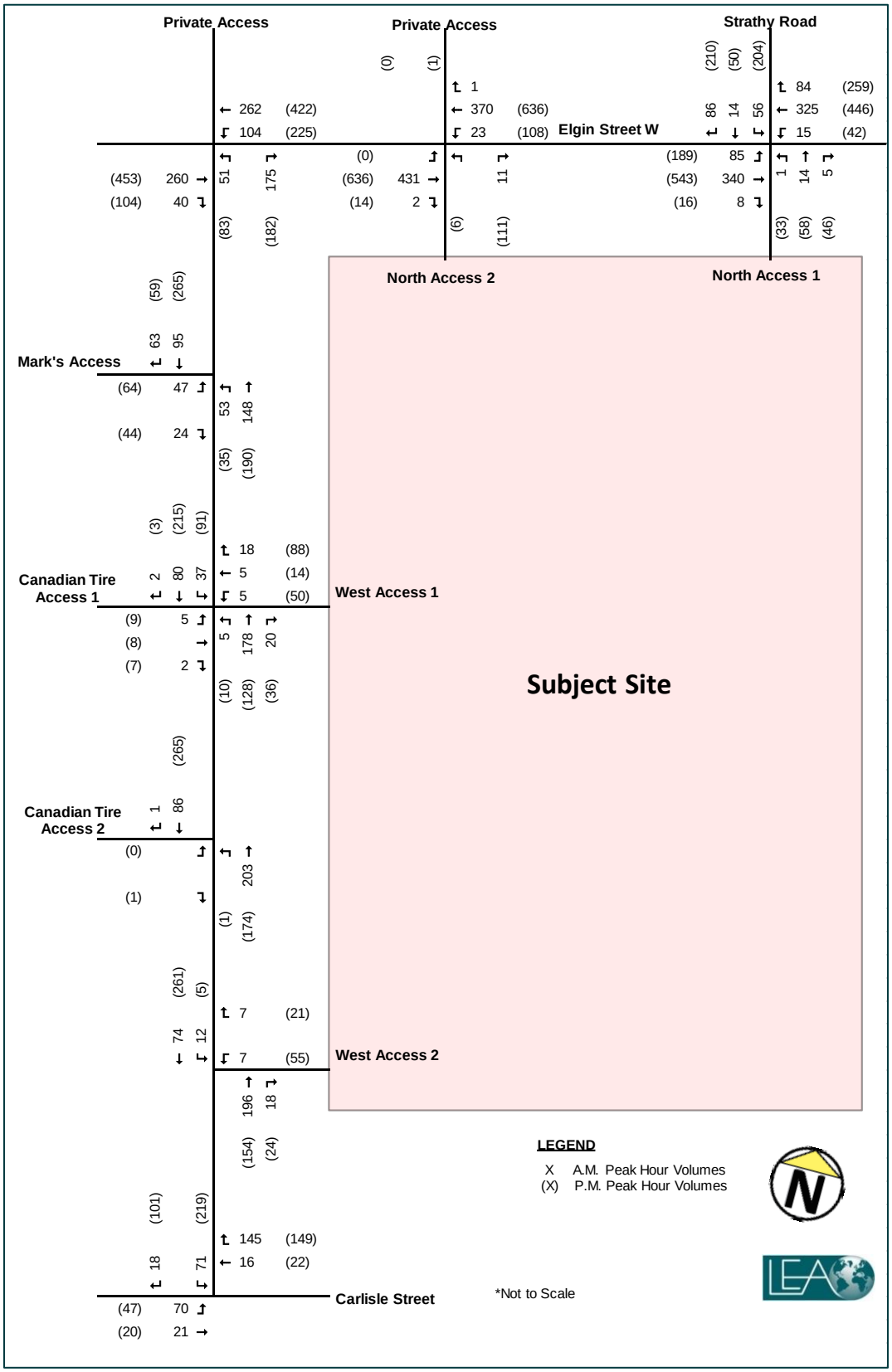
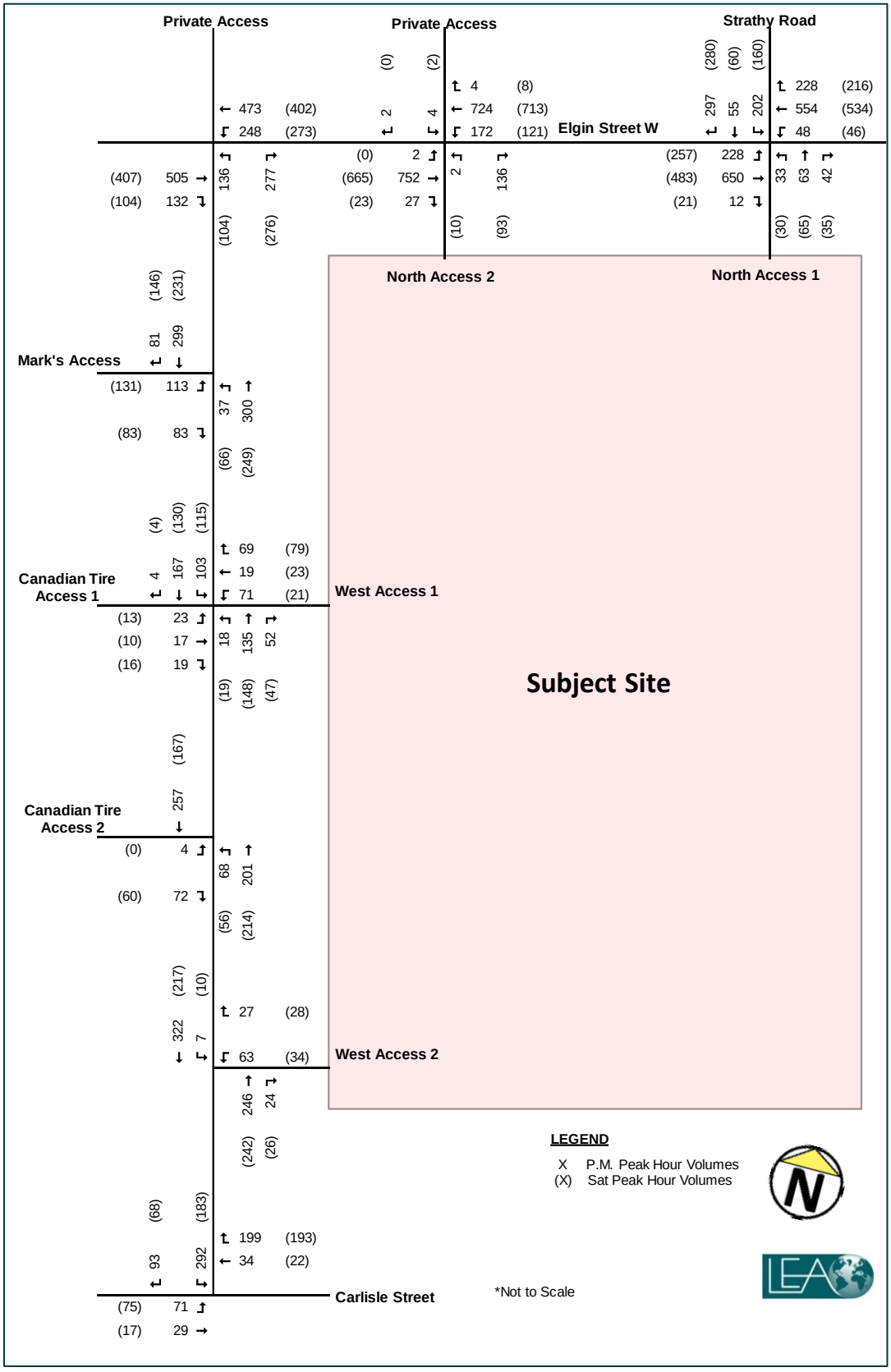


Figure 2.5: Existing Traffic Volumes – Fri & Sat Peak Hours



The intersection capacity analysis was completed for the Weekday AM and PM, Friday PM, and Saturday peak hours. **Table 2.2** summarizes the Levels Of Service (LOS) of the studied peak hours under existing traffic conditions for the signalized intersections, which summarizes the movements of interest, which are defined by movements with either a volume-to-capacity (v/c) ratio of 0.85 or higher, or a LOS E or worse are shown.

Table 2.2: Existing Signalized Traffic Capacity Analysis – All Peak Hours

Intersection	Peak Hour	Overall: V/C / Delay / LOS	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access 1/Strathy Rd & Elgin St W	AM	0.20 / 13 / B	-	-	-	-
	PM	0.49 / 20 / B	-	-	-	-
	Fri PM	0.56 / 20 / C	-	-	-	-
	Sat	0.55 / 20 / B	-	-	-	-
Rogers Rd/Private Access & Elgin St W	AM	0.18 / 9 / A	-	-	-	-
	PM	0.42 / 8 / A	-	-	-	-
	Fri PM	0.52 / 10 / B	-	-	-	-
	Sat	0.48 / 10 / A	-	-	-	-

No movements of interests are identified in the existing traffic conditions for all four studied peak hours. As such, all intersection movements at the signalized intersections are operating with a V/C ratio below 0.85 and LOS of D or better. It is noted that the highest overall intersection V/C ratio is 0.56 and delay is at most 20 seconds. The studied signalized intersections are thus operating acceptably in the existing traffic conditions.

Table 2.3 to **Table 2.6** summarizes the LOS for unsignalized intersections for the Weekday AM, Weekday PM, Friday PM and Saturday peak hours respectively. All intersection movements at the studied unsignalized intersections are operating with significant residual capacity, with the highest V/C ratio being 0.35. The maximum delay experienced at each intersection movement is approximately 30 seconds. Under the existing traffic conditions, all studied unsignalized intersections are operating acceptably as a result. Detailed reports are provided in **Appendix B.**

Table 2.3: Existing Unsignalized Traffic Capacity Analysis – Weekday AM Peak Hour

Intersection	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access / Private Access & Elgin St.	WBL	A (8)	1	0.02
	NBL	A (0)	0	0.00
	NBR	A (10)	0	0.01
	SBL	A (0)	0	0.00
	SBR	A (0)	0	0.00
Rogers Rd & Mark's Access	EBL	B (10)	2	0.07
	EBR	A (9)	1	0.03
	NBL	A (8)	1	0.04
Rogers Rd & Canadian Tire Access/West Access 1	EBLTR	B (10)	0	0.01
	WBLTR	A (10)	1	0.04
	NBL	A (8)	0	0.00
	SBL	A (8)	1	0.03
Rogers Rd & Canadian Tire Access 2	EBLR	A (0)	0	0.00
Rogers Rd & West Access 2	WBLR	A (10)	1	0.02
	SBL	A (1)	0	0.01
Carlisle St Rogers Rd	EBLT	A (8)	-	-
	WBTR	A (8)	-	-
	SBLR	A (8)	-	-

Table 2.4: Existing Unsignalized Traffic Capacity Analysis – Weekday PM Peak Hour

Intersection	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access / Private Access & Elgin St.	WBL	A (10)	3	0.12
	NBL	C (16)	0	0.02
	NBR	B (12)	5	0.18
	SBL	C (20)	0	0.00
	SBR	A (0)	0	0.00
Rogers Rd & Mark's Access	EBL	B (11)	3	0.11
	EBR	B (10)	2	0.07
	NBL	A (8)	1	0.03
Rogers Rd & Canadian Tire Access/West Access 1	EBLTR	B (12)	1	0.05
	WBLTR	B (12)	8	0.25
	NBL	A (8)	0	0.01
	SBL	A (8)	2	0.07
Rogers Rd & Canadian Tire Access 2	EBLR	A (10)	0	0.00
	NBL	A (8)	0	0.00
Rogers Rd & West Access 2	WBLR	B (11)	3	0.12
	SBL	A (0)	0	0.00
Carlisle St Rogers Rd	EBLT	A (9)	-	-
	WBTR	A (9)	-	-
	SBLR	B (11)	-	-

Table 2.5: Existing Unsignalized Traffic Capacity Analysis – Friday PM Peak Hour

Intersection	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access / Private Access & Elgin St.	EBL	A (9)	0.1	0.00
	WBL	B (11)	6.7	0.22
	NBL	C (20)	0.2	0.01
	NBR	B (13)	7.3	0.24
	SBL	D (30)	0.7	0.03
	SBR	A (10)	0.1	0.00
Rogers Rd & Mark's Access	EBL	B (13)	7	0.22
	EBR	B (11)	4	0.13
	NBL	A (8)	0.9	0.03
Rogers Rd & Canadian Tire Access/West Access 1	EBLTR	B (13)	3.3	0.12
	WBLTR	B (14)	10.1	0.30
	NBL	A (8)	0.4	0.01
	SBL	A (8)	2.2	0.08
Rogers Rd & Canadian Tire Access 2	EBLR	B (10)	2.9	0.11
	NBL	A (8)	1.5	0.06
Rogers Rd & West Access 2	WBLR	B (12)	4.3	0.15
	SBL	A (0)	0.2	0.01
Carlisle St Rogers Rd	EBLT	A (10)	-	-
	WBTR	A (10)	-	-

Table 2.6: Existing Unsignalized Traffic Capacity Analysis – Saturday Peak Hour

Intersection	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access / Private Access & Elgin St.	WBL	A (10)	4	0.14
	NBL	C (17)	1	0.03
	NBR	B (12)	4	0.15
	SBL	C (22)	0	0.01
	SBR	A (0)	0	0.00
Rogers Rd & Mark's Access	EBL	B (14)	11	0.32
	EBR			
	NBL	A (8)	2	0.06
Rogers Rd & Canadian Tire Access/West Access 1	SBLTR	B (12)	2	0.07
	WBLTR	B (11)	6	0.19
	NBL	A (8)	0	0.01
	SBL	A (8)	2	0.09
Rogers Rd & Canadian Tire Access 2	EBLR	A (10)	2	0.08
	NBL	A (8)	1	0.04
Rogers Rd & West Access 2	WBLR	B (11)	3	0.10
	SBL	A (0)	0	0.01
Carlisle St Rogers Rd	EBLT	A (9)	-	-
	WBTR	A (9)	-	-
	SBLR	B (11)	-	-

3 FUTURE BACKGROUND CONDITIONS

3.1 BACKGROUND GROWTH AND DEVELOPMENTS

It is our understanding that the proposed Rogers Rd access relocation and the additional retail will be completed by mid-2020. However, for a conservative analysis, a five-year horizon to the year 2024 is considered. A growth rate of 2% per year was applied to the volumes on all corridors as a result of the received comments. As per the received comments, one background development, the redevelopment of the Golden Plough Lodge, was included in our analysis.

It was also requested that the mall was to be analyzed at full occupancy. The occupancy rate at the time the TMCs were collected were obtained. It was found that the mall was approximately 60% occupied at the time of the data collection dates. **Table 3.1** summarizes the occupancy percentage at the time of TMC collection. Additional site trips for Northumberland Mall for the remaining 40% of mall occupancy is illustrated in **Figure 3.1** and **Figure 3.2** for the studied peak hours.

Table 3.1: Northumberland Mall Occupancy

TMC Collection Month	Occupancy
June 2019	60.7%
January 2020	56.7%

Figure 3.1: Additional Site Trips for Fully Occupied Mall – Weekday AM and PM Peak Hours

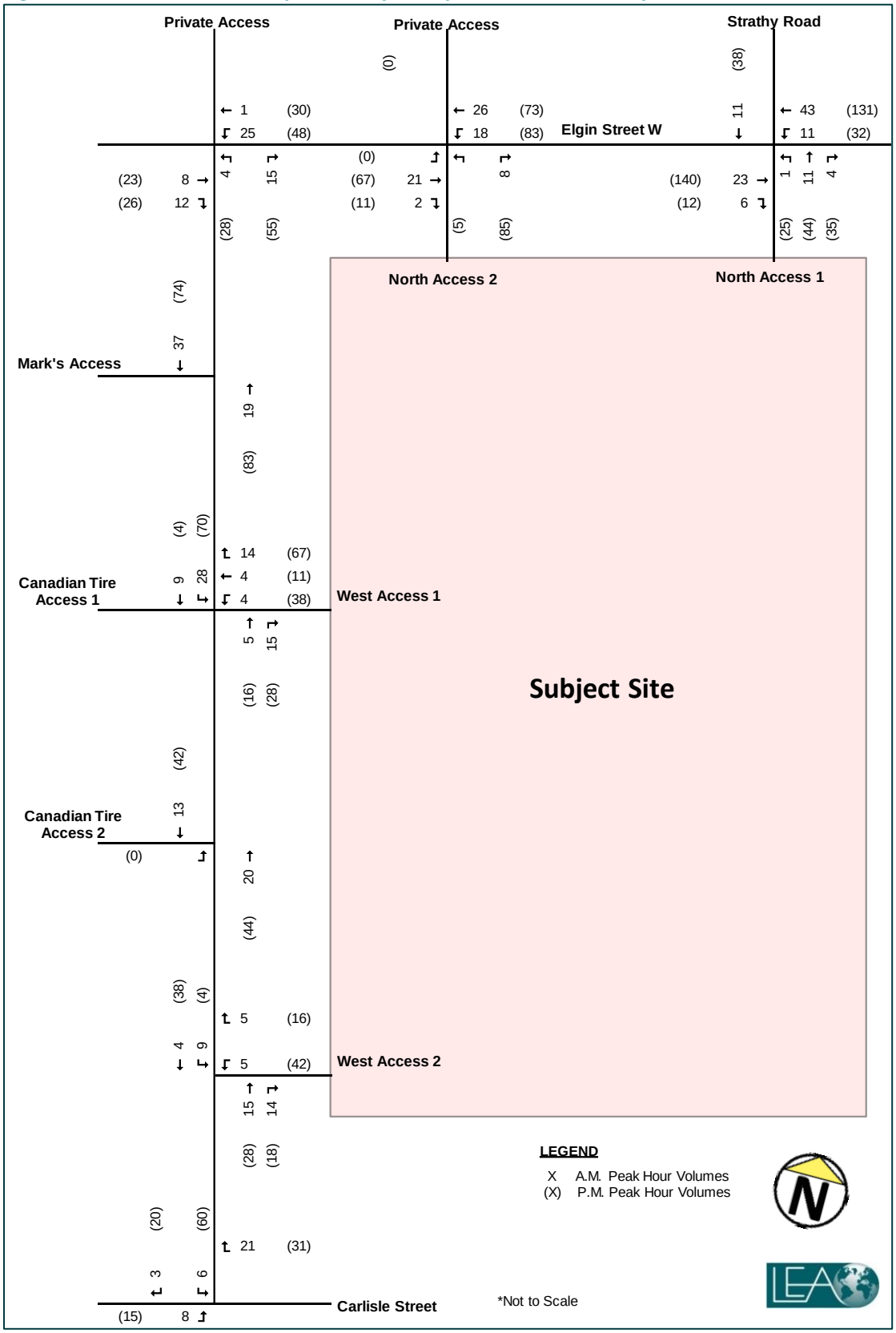
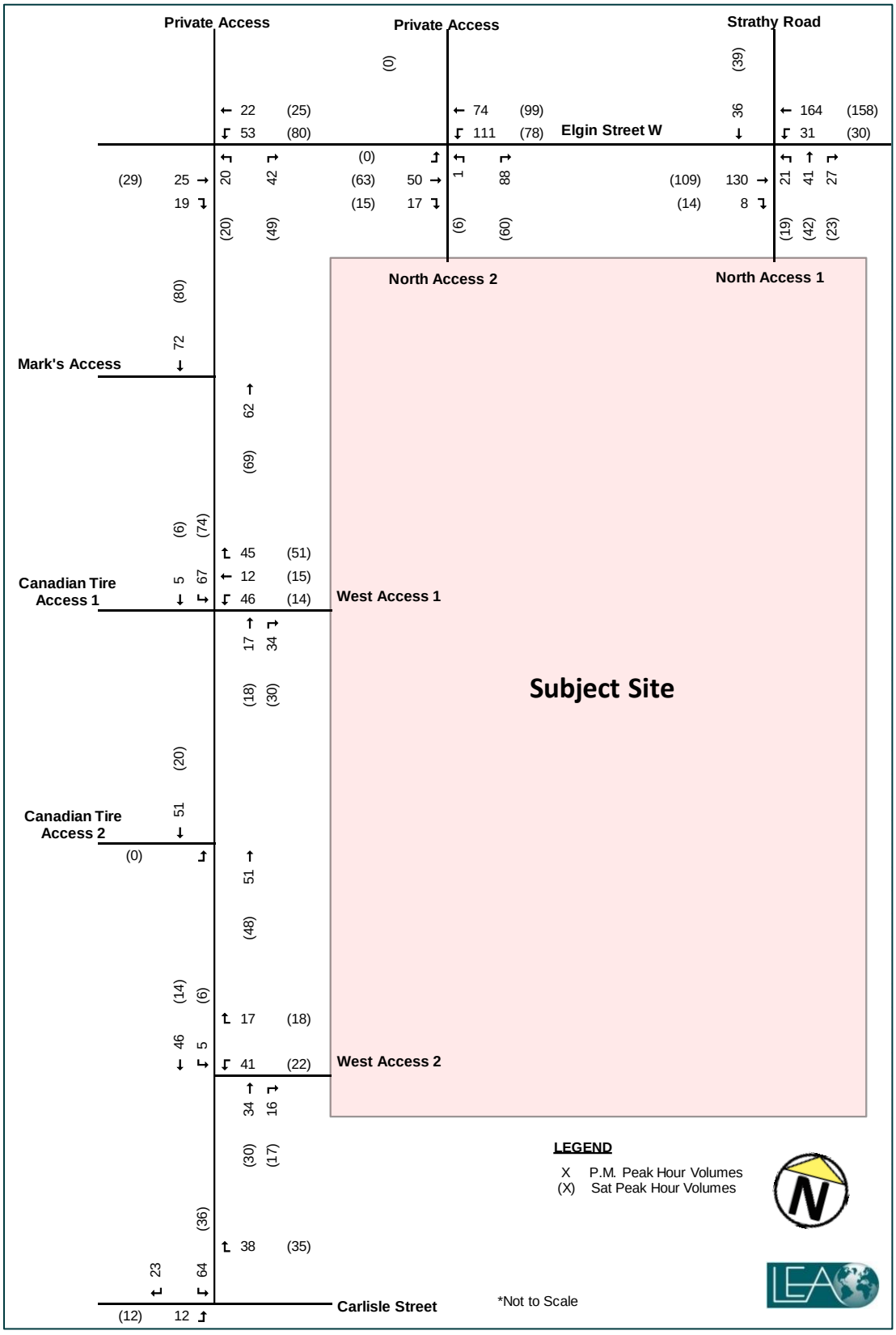


Figure 3.2: Additional Site Trips for Fully Occupied Mall – Friday PM and Saturday Peak Hours



3.2 FUTURE BACKGROUND INTERSECTION CAPACITY ANALYSIS

The future background traffic volumes utilized in the intersection capacity analysis was determined by adding corridor growth to the existing traffic volumes and are illustrated in **Figure 3.3** and **Figure 3.4** for the studied peak hours. An intersection capacity analysis was conducted for the intersections within the study area under future background traffic conditions, with the movements of interest for the signalized intersections summarized in **Table 3.2**.

The northbound left movement for the intersection of Rogers Rd and Elgin St W was identified to be a movement of interest operating with a V/C of 0.85. It is noted, that despite being identified to be a movement of interest, the LOS for this movement was found to be operating with LOS D. All other intersection movements are expected to operate with a V/C ratio below 0.85 and LOS of D and better in the future background traffic condition. The overall signalized intersections are also anticipated to operate with ample residual capacity.

Table 3.2: Future Background Signalized Traffic Capacity Analysis – All Peak Hours

Intersection	Peak Hour	Overall: V/C / Delay / LOS	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access 1/Strathy Rd & Elgin St W	AM	0.23 / 14 / B	-	-	-	-
	PM	0.61 / 23 / C	-	-	-	-
	Fri PM	0.67 / 25 / C	-	-	-	-
	Sat	0.64 / 24 / C	-	-	-	-
Rogers Rd/Private Access & Elgin St W	AM	0.23 / 9 / A	-	-	-	-
	PM	0.61 /10 / A	-	-	-	-
	Fri PM	0.73 / 13 / B	NBL	D (53)	52	0.85
	Sat	0.70 / 12 / B	-	-	-	-

Figure 3.3: Future Background Traffic Volumes – Weekday AM & PM Peak Hours

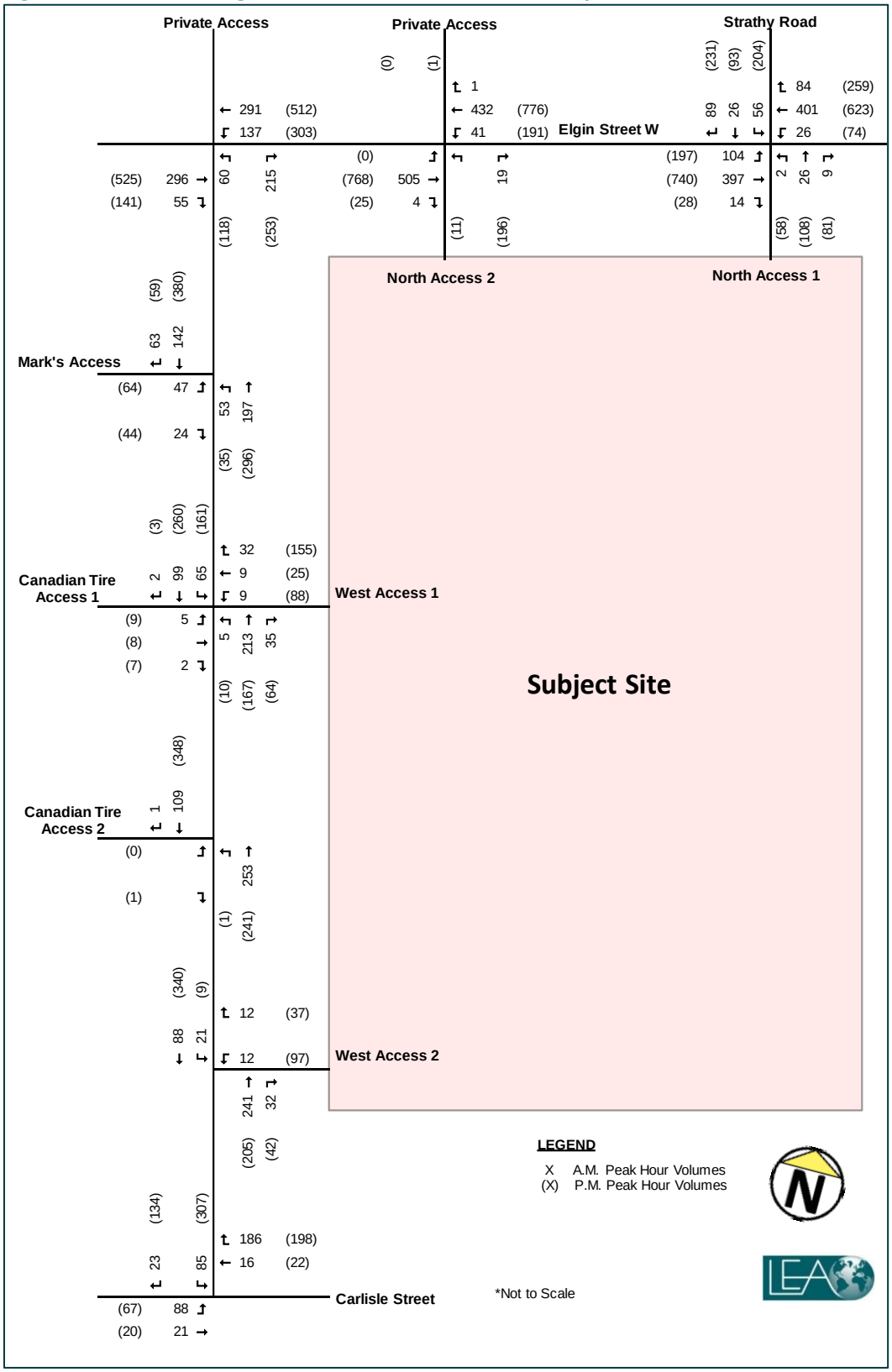


Figure 3.4: Future Background Traffic Volumes – Friday PM & Saturday Peak Hours

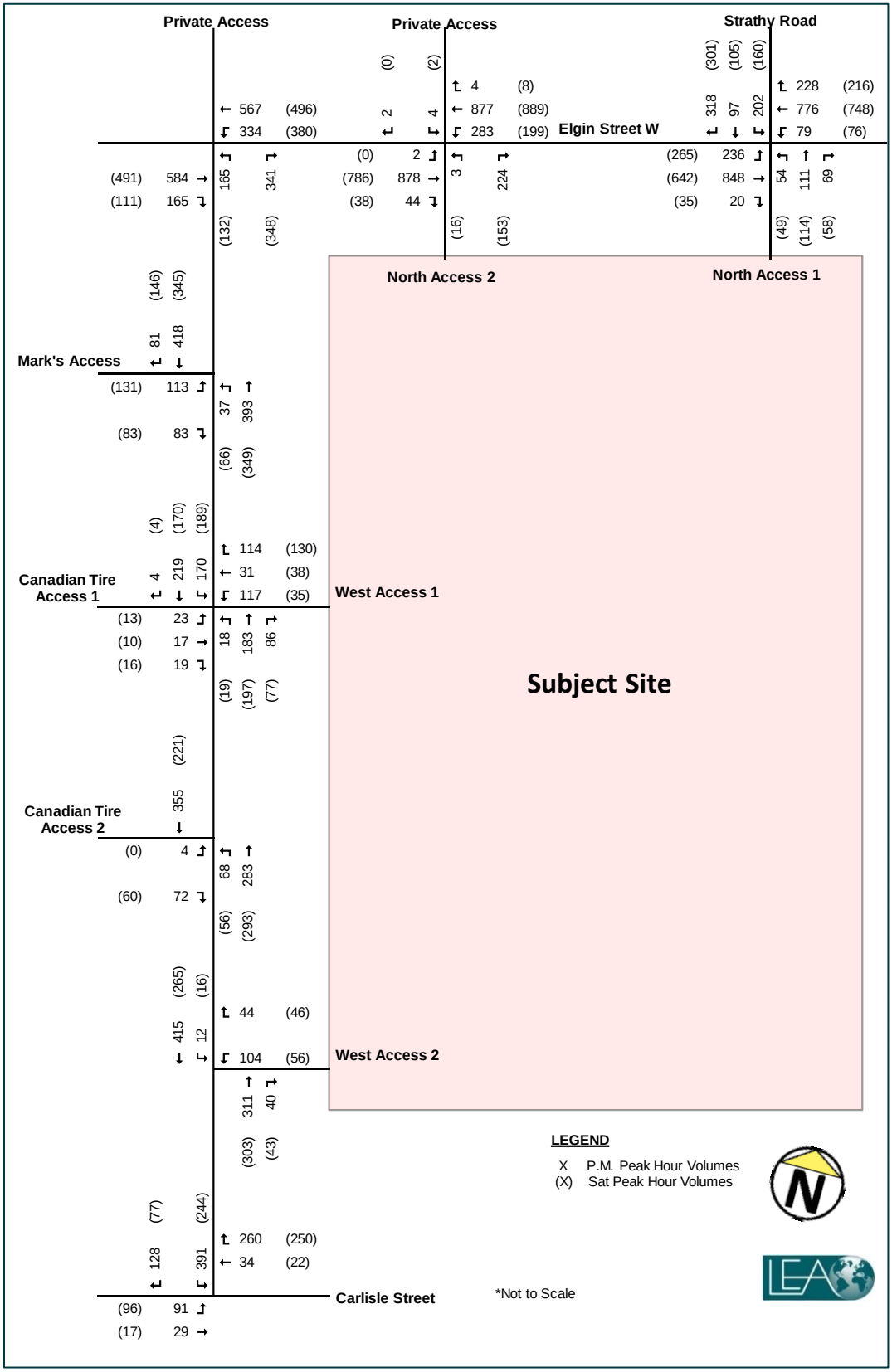


Table 3.3 to **Table 3.6**, summarizes the findings of the intersection capacity analyses for the unsignalized intersections during the roadway AM and PM, as well as the Friday PM and Saturday peak hours. All unsignalized intersections within the study area are expected to continue operating at acceptable LOS and delay, with all movements operating with residual capacity. Under the future background traffic condition, operations of inbound and outbound movements from the subject site at the unsignalized intersections are expected to operate similarly to the existing traffic condition. It is noted that the southbound left turn from the neighbour across the North Access 2 will be experiencing delay up over 5 minutes long despite ample residual capacity during the Friday peak hour as a result of the background traffic growth. It should be emphasized that the proposed changes to the subject site will not be adding any traffic to this movement. Detailed capacity results are provided in **Appendix C**.

Table 3.3: Future Background Unsignalized Traffic Capacity Analysis - Weekday AM Peak Hour

Intersection	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access / Private Access & Elgin St.	WBL	A (9)	1	0.04
	NBL	A (0)	0	0.00
	NBR	B (10)	1	0.03
	SBL	A (0)	0	0.00
	SBR	A (0)	0	0.00
Rogers Rd & Mark's Access	EBL	B (11)	2	0.08
	EBR	A (9)	11	0.03
	NBL	A (8)	1	0.04
Rogers Rd & Canadian Tire Access/West Access 1	EBLTR	B (11)	0	0.01
	WBLTR	B (11)	2	0.08
	NBL	A (8)	0	0.00
	SBL	A (8)	1	0.06
Rogers Rd & Canadian Tire Access 2	EBLR	A (0)	0	0.00
Rogers Rd & West Access 2	WBLR	B (10)	1	0.04
	SBL	A (2)	1	0.02
Carlisle St Rogers Rd	EBLT	A (8)	-	-
	WBTR	A (8)	-	-
	SBLR	A (9)	-	-

Table 3.4: Future Background Unsignalized Traffic Capacity Analysis - Weekday PM Peak Hour

Intersection	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access / Private Access & Elgin St.	WBL	B (11)	8	0.25
	NBL	C (21)	1	0.05
	NBR	B (14)	12	0.34
	SBL	E (44)	0	0.01
	SBR	A (0)	0	0.00
Rogers Rd & Mark's Access	EBL	B (13)	4	0.13
	EBR	B (11)	2	0.08
	NBL	A (9)	1	0.04
Rogers Rd & Canadian Tire Access/West Access 1	EBLTR	C (16)	2	0.07
	WBLTR	C (20)	27	0.56
	NBL	A (8)	0	0.01
	SBL	A (8)	4	0.14
Rogers Rd & Canadian Tire Access 2	EBLR	B (10)	0	0.00
	NBL	A (8)	0	0.00
Rogers Rd & West Access 2	WBLR	B (12)	7	0.23
	SBL	A (0)	0	0.01
Carlisle St Rogers Rd	EBLT	A (10)	-	-
	WBTR	A (10)	-	-
	SBLR	C (16)	-	-

Table 3.5: Future Background Unsignalized Traffic Capacity Analysis - Friday PM Peak Hour

Intersection	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access / Private Access & Elgin St.	EBL	A (9)	0	0.00
	WBL	B (13)	16	0.41
	NBL	D (28)	1	0.02
	NBR	C (16)	16	0.41
	SBL	F (385)	6	0.31
	SBR	A (9)	0	0.00
Rogers Rd & Mark's Access	EBL	C (15)	8	0.26
	EBR	B (12)	4	0.15
	NBL	A (9)	1	0.04
Rogers Rd & Canadian Tire Access/West Access 1	EBLTR	C (17)	5	0.17
	WBLTR	D (27)	37	0.65
	NBL	A (8)	0	0.02
	SBL	A (8)	4	0.15
Rogers Rd & Canadian Tire Access 2	EBLR	B (11)	3	0.13
	NBL	A (8)	2	0.06
Rogers Rd & West Access 2	WBLR	B (14)	10	0.29
	SBL	A (0)	0	0.01
Carlisle St Rogers Rd	EBLT	B (11)	-	-
	WBTR	B (13)	-	-
	SBLR	D (27)	-	-

Table 3.6: Future Background Unsignalized Traffic Capacity Analysis – Saturday Peak Hour

Intersection	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access / Private Access & Elgin St.	WBL	B (11)	9	0.27
	NBL	C (22)	2	0.07
	NBR	B (13)	9	0.27
	SBL	E (41)	1	0.02
	SBR	A (0)	0	0.00
Rogers Rd & Mark's Access	EBL	C (16)	10	0.30
	EBR	B (12)	4	0.14
	NBL	A (9)	2	0.07
Rogers Rd & Canadian Tire Access/West Access 1	EBLTR	C (15)	3	0.10
	WBLTR	C (15)	14	0.38
	NBL	A (8)	0	0.01
	SBL	A (8)	4	0.16
Rogers Rd & Canadian Tire Access 2	EBLR	A (10)	2	0.08
	NBL	A (8)	1	0.05
Rogers Rd & West Access 2	WBLR	B (12)	5	0.19
	SBL	A (1)	0	0.02
Carlisle St Rogers Rd	EBLT	A (10)	-	-
	WBTR	B (11)	-	-
	SBLR	B (13)	-	-

4 SITE TRAFFIC

4.1 ROGERS ROAD ACCESS RELOCATION

Currently, the Rogers Rd access is located close to the Canadian Tire Access #1. It is proposed that this access be relocated to be aligned with the access by Mark's Work Warehouse. The redistributed traffic at the Rogers Rd access is illustrated in **Figure 4.1** and **Figure 4.2** for the studied peak hours.

It should be noted that the distribution has been further refined at the boundary road intersection level based on the related local information and factors such as site access locations, ease of turning movements (e.g. right turn verses left turn), shortest distance, and/or quickest time for a route, existing traffic congestion and delay for a movement, and turning movement prohibitions.

Figure 4.1: Redistributed Mall Traffic – Weekday AM & PM Peak Hours

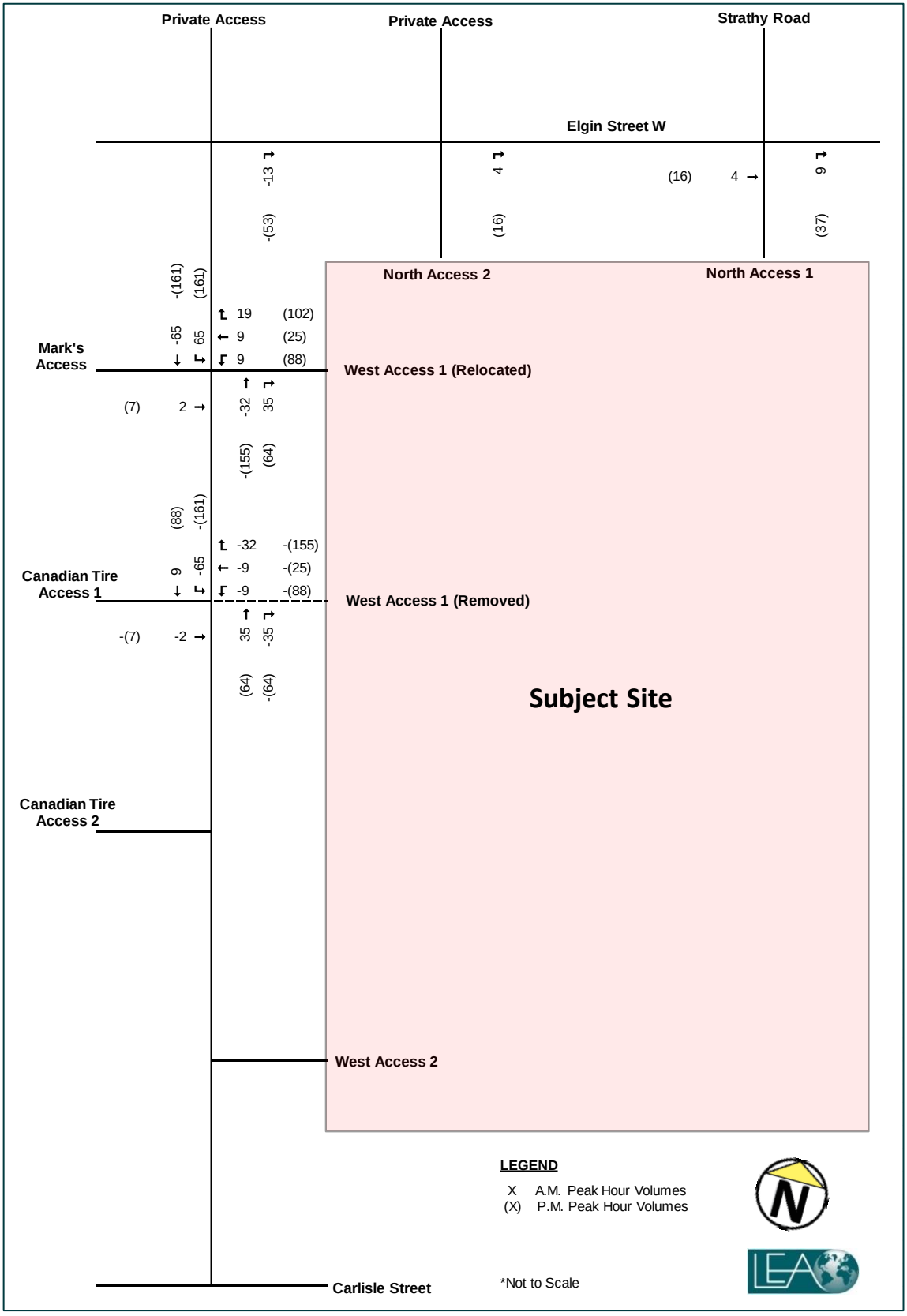
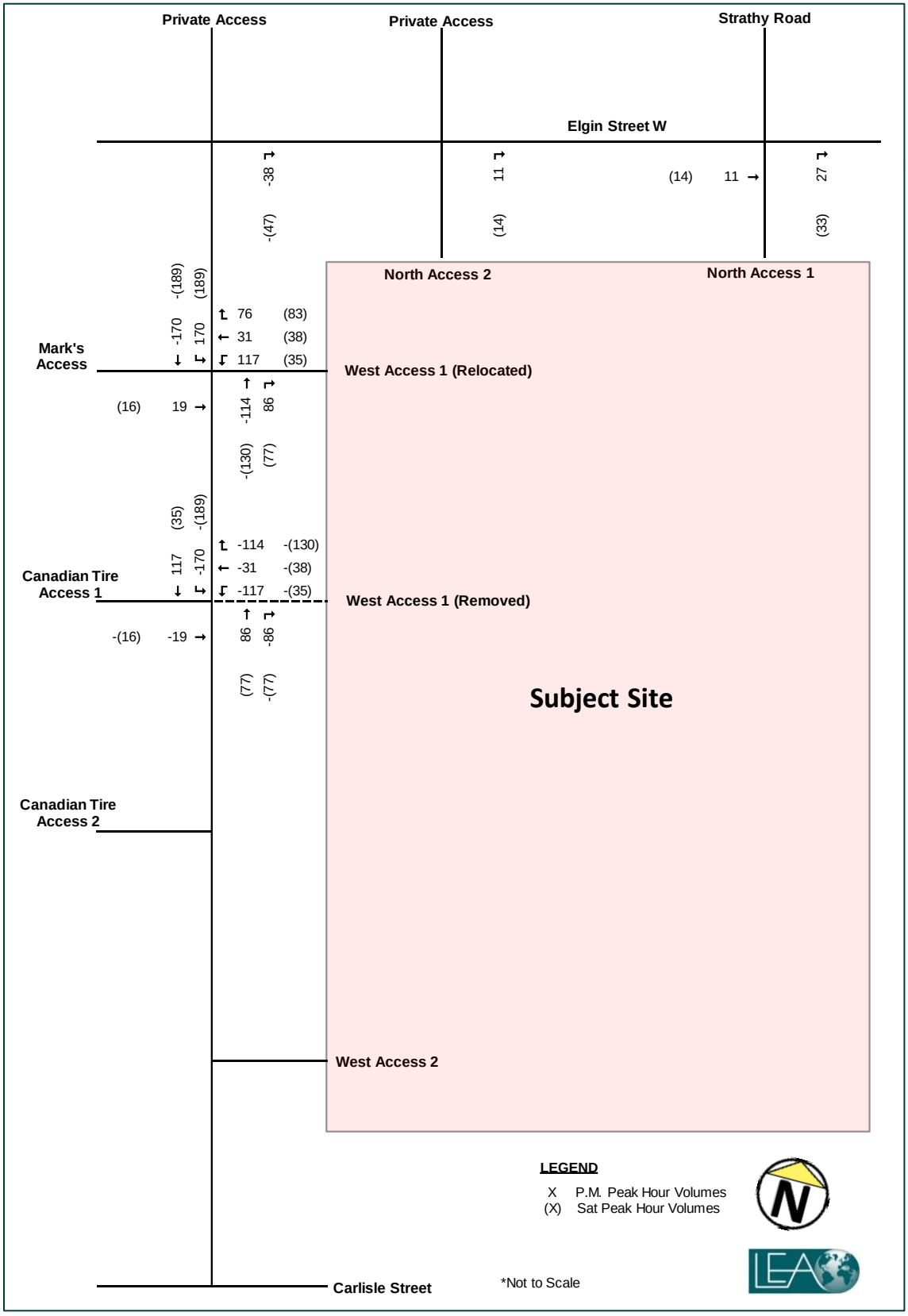


Figure 4.2: Redistributed Mall Traffic – Friday & Saturday Peak Hours



4.2 SITE-GENERATED TRIPS

Trip generation for the proposed retail addition was based on a combination of proxy trip generation rates and rates for the applicable uses in the ITE Trip Generation Manual 10th Edition. The trip generation rates for the proposed financial use is obtained from proxy trip generation in LEA's database at 549 Holland St W in the Town of Bradford-West Gwillimbury. Proxy trip generation was used for the proposed financial use since ITE did not contain rates for financial institutions for the Saturday Mid-day peak hour. The remaining uses, such as the proposed restaurant and the retail units are determined using ITE's Fast-Food Restaurant with Drive-through and Shopping Centre rates, respectively. A maximum of 103 new two-way trips are expected for the proposed retail addition. **Table 4.1** and

Table 4.2 summarizes the trips generation for the proposed additional retail for the studied peak hours.

Table 4.1: Trip Generation – Weekday AM & PM Peak Hours

Land Use	Size		Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
Financial (Proxy Survey)	2,045 ft²	Trip Rate	6.40	5.24	11.64	6.08	7.55	13.63
		Trips Generated	14	12	26	13	17	30
		Pass-by	0	0	0	0	0	0
		Primary	**14**	**12**	**26**	**13**	**17**	**30**
Shopping Centre (LUC 820)	5,554 ft²	Trip Rate	0.29	0.25	0.54	2.11	2.11	4.21
		Trips Generated	2	1	3	12	12	24
		Pass-by (PM=34%, Sat=26%)	0	0	0	-5	-5	-10
		Primary	**2**	**1**	**3**	**7**	**7**	**14**
Fast-food Restaurant with Drive-through (LUC 934)	2,201 ft²	Trip Rate	26.19	25.17	51.36	26.19	25.17	51.36
		Trips Generated	54	50	104	54	51	105
		Pass-by (AM=49% & PM =50%)	-25	-25	-50	-27	-27	-54
		Primary	**29**	**25**	**54**	**27**	**24**	**51**
Total Development	**9,800 ft²**	Trips Generated	70	63	133	79	80	158
		Pass-by	-25	-25	-50	-32	-32	-64
		Primary	**45**	**38**	**83**	**47**	**48**	**95**

Table 4.2: Trip Generation – Friday PM & Saturday Peak Hours

Land Use	Size		Fri PM Peak Hour			Sat Peak Hour		
			In	Out	Total	In	Out	Total
Financial (Proxy Survey)	2,045 ft²	Trip Rate	6.08	7.55	13.63	6.53	6.64	13.17
		Trips Generated	13	17	30	14	15	29
		Pass-by	0	0	0	0	0	0
		Primary	**13**	**17**	**30**	**14**	**15**	**29**
Shopping Centre (LUC 820)	5,554 ft²	Trip Rate	2.10	2.10	4.20	2.25	2.25	4.50
		Trips Generated	12	12	24	12	12	24
		Pass-by (PM=34%, Sat=26%)	-5	-5	-10	-4	-4	-8
		Primary	**7**	**7**	**14**	**8**	**8**	**16**
Fast-food Restaurant with Drive-through (LUC 934)	2,201 ft²	Trip Rate	26.19	25.17	51.36	27.98	26.88	54.86
		Trips Generated	54	51	105	57	55	112
		Pass-by (PM & Sat=50%)	-27	-27	-54	-28	-28	-56
		Primary	**27**	**24**	**51**	**29**	**27**	**56**
Total Development	**9,800 ft²**	Trips Generated	79	80	159	83	82	165
		Pass-by	-32	-32	-64	-32	-32	-64
		Primary	**47**	**49**	**95**	**51**	**50**	**101**

Trip distribution of these additional site trips is expected to follow the distribution of traffic at the existing site accesses and the studied network. The net site traffic, which accounts for the site trips due to the relocation of the Rogers Rd access and additional site trips, for the studied peak hours are illustrated in **Figure 4.3** and **Figure 4.4**.

Figure 4.3: Net Site Traffic – Weekday AM & PM Peak Hours

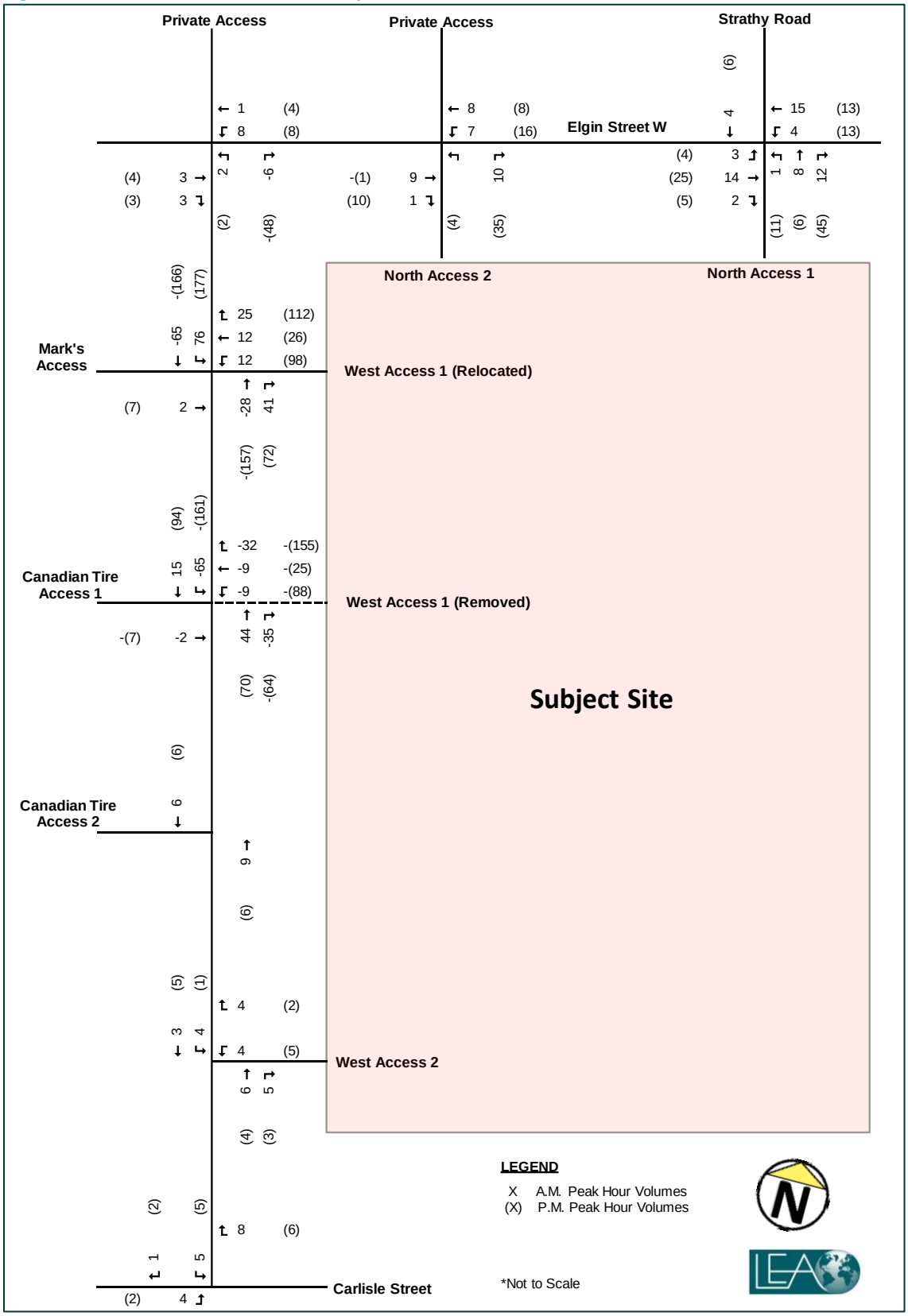
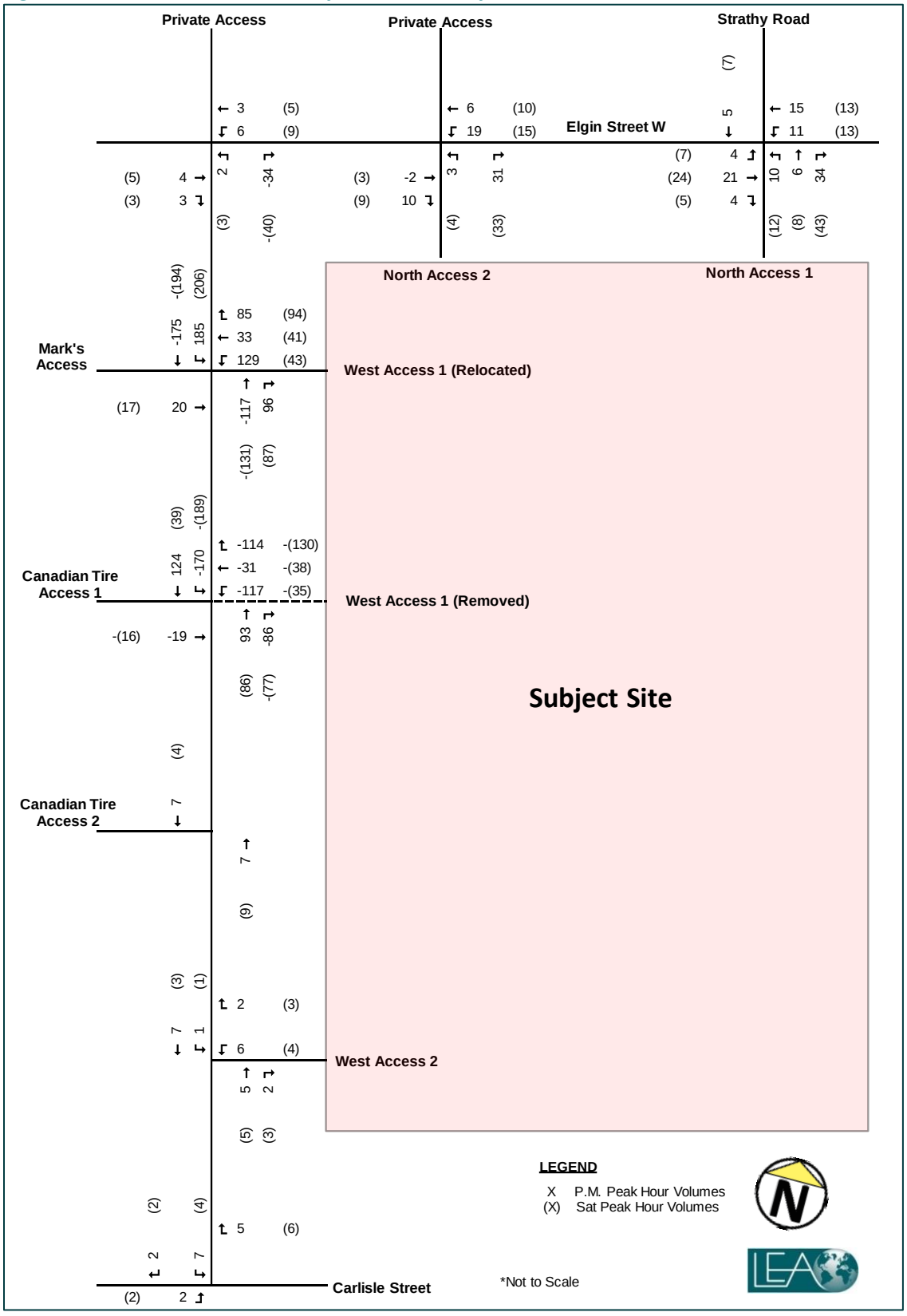


Figure 4.4: Net Site Traffic – Friday PM & Saturday Peak Hours



5 FUTURE CONDITIONS

Future total traffic is the sum of the future background traffic and site-generated traffic added to the intersections within the study area. As noted, the proposal is to relocate the existing West Access #1 to align with the Mark's Access. **Figure 5.1** illustrates the future lane configuration. **Figure 5.2** and **Figure 5.3** illustrate the future total traffic volumes for the studied peak hours.

Figure 5.1: Future Lane Configuration

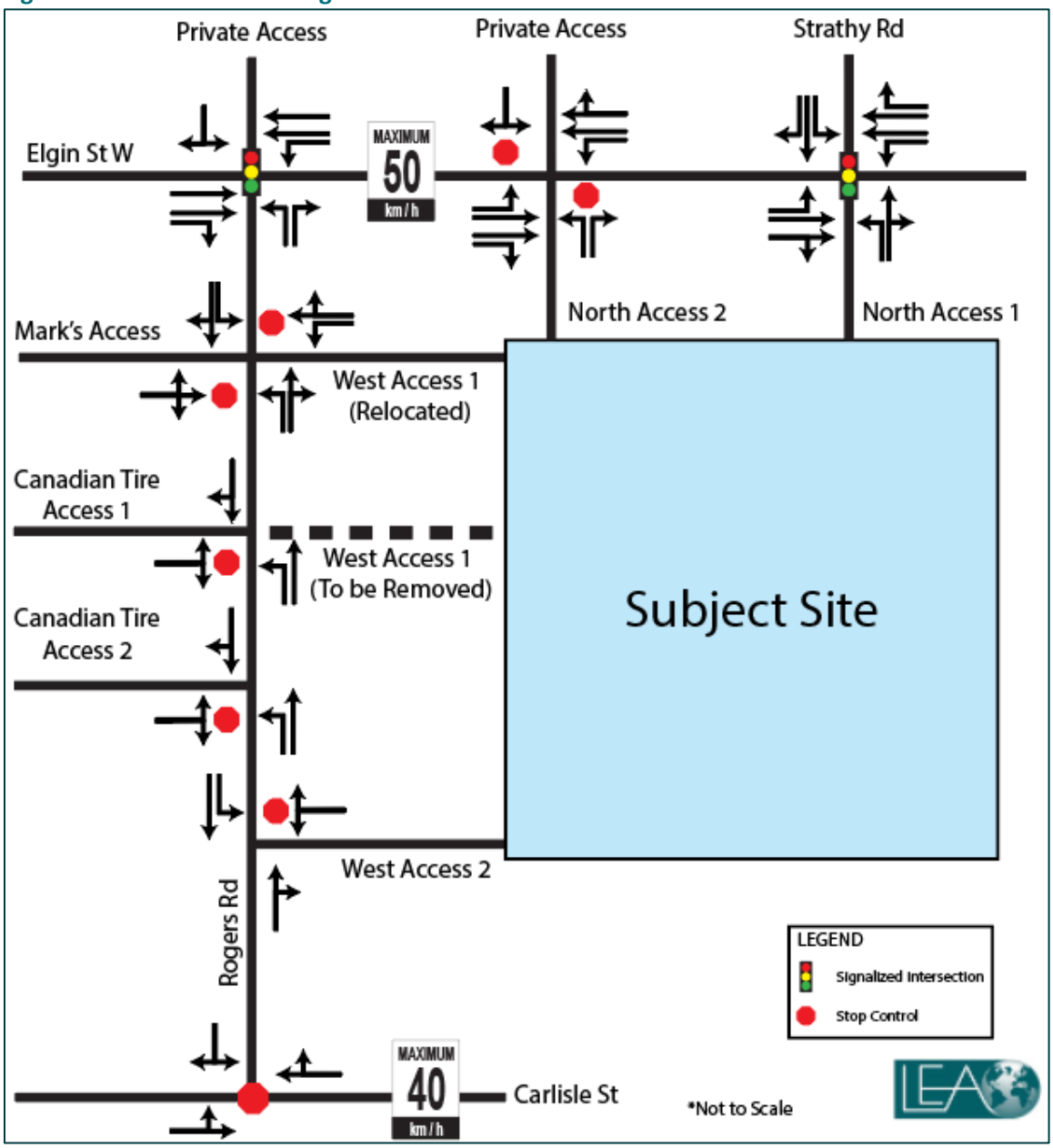


Figure 5.2: Future Total Traffic Volumes – Weekday AM & PM Peak Hours

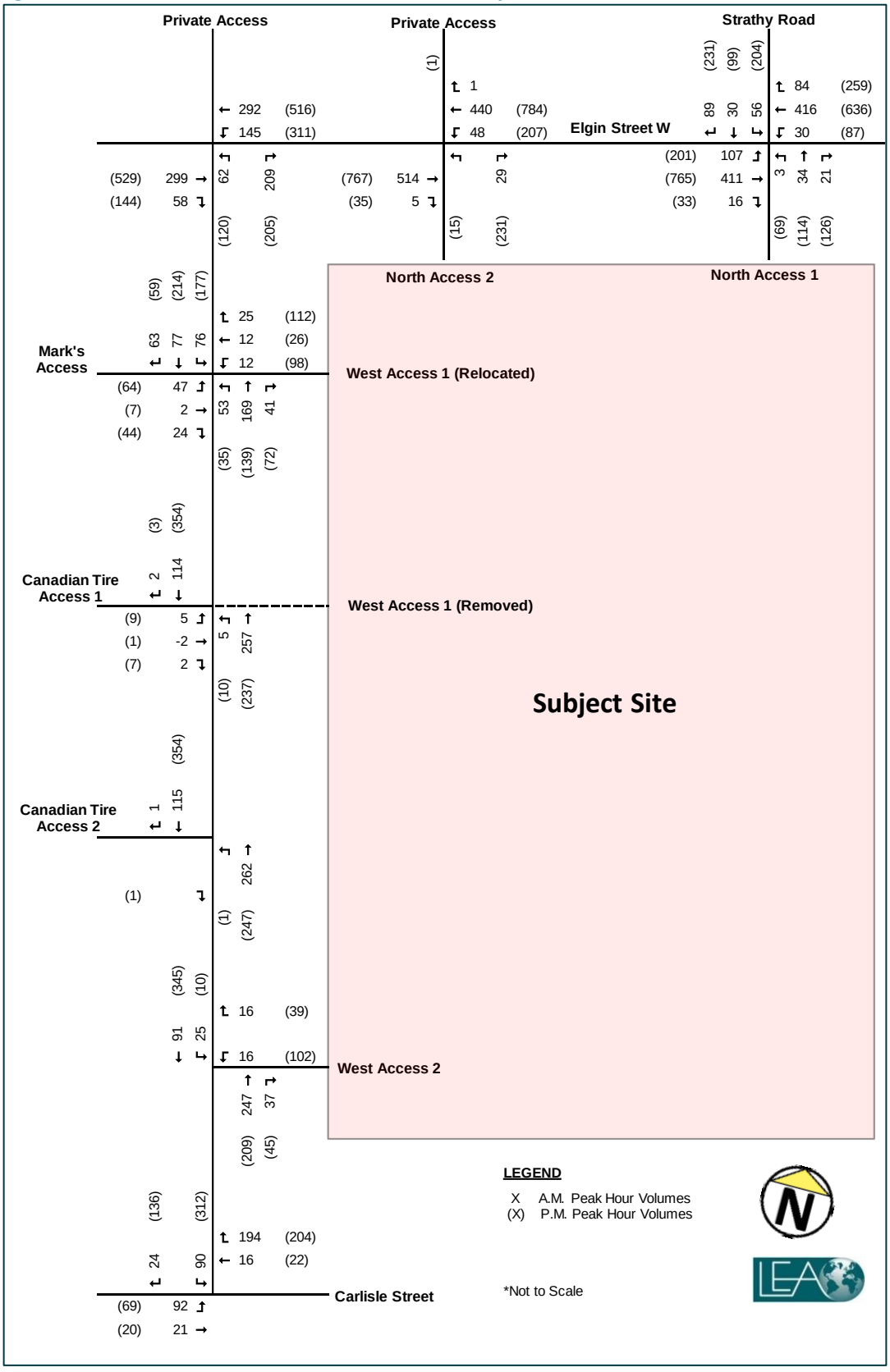
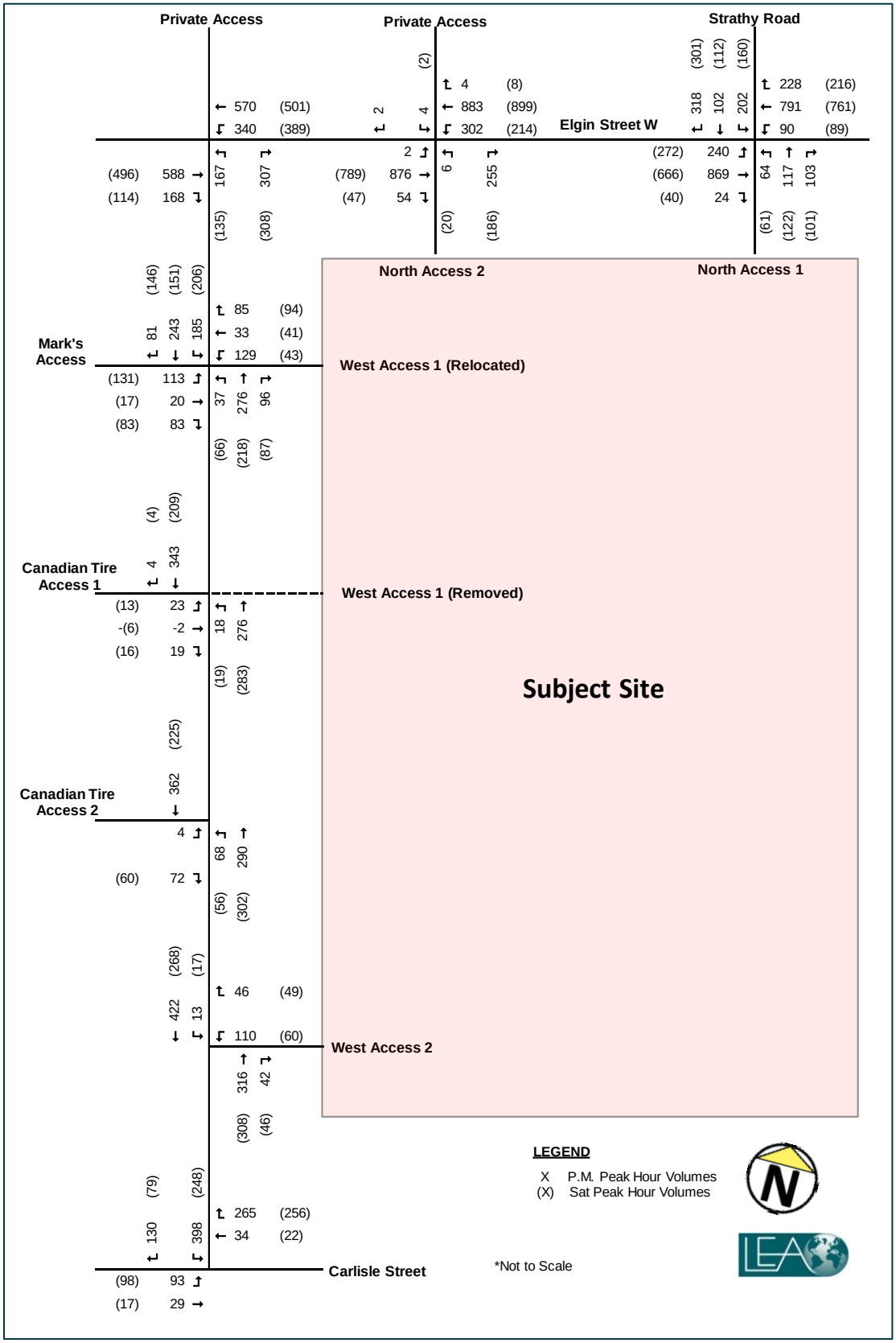


Figure 5.3: Future Total Traffic Volumes – Friday PM & Saturday Peak Hours



5.1 FUTURE TOTAL INTERSECTION CAPACITY ANALYSIS

Table 5.1 summarizes the movements of interest for the signalized for the studied peak hours. As with the future background traffic conditions, no movements of interests are identified in the studied signalized intersections. The overall intersection V/C ratio is expected to increase by up to 0.02 and the overall delay is expected to increase by a maximum of one (1) second.

Table 5.1: Future Total Signalized Traffic Capacity Analysis – All Peak Hours

Intersection	Peak Hour	Overall: V/C / Delay / LOS	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access 1/Strathy Rd & Elgin St W	AM	0.25 / 15 / B	-	-	-	-
	PM	0.67 / 25 / C	SBL	E (62)	55	0.89
	Fri PM	0.58 / 21 / C	-	-	-	-
	Sat	0.57 / 21 / C	-	-	-	-
Rogers Rd/Private Access & Elgin St W	AM	0.25 / 9 / A	-	-	-	-
	PM	0.62 / 10 / A	-	-	-	-
	Fri PM	0.57 / 10 / B	-	-	-	-
	Sat	0.52 / 10 / A	-	-	-	-

Capacity results for the unsignalized intersections are summarized in **Table 5.2** to **Table 5.5** for the studied peak hours. Detailed capacity results are provided in **Appendix D**.

Table 5.2: Future Total Unsignalized Traffic Capacity Analysis - Weekday AM Peak Hour

Intersection	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access / Private Access & Elgin St.	WBL	A (9)	1	0.05
	NBL	A (0)	0	0.00
	NBTR	B (10)	1	0.04
	SBL	A (0)	0	0.00
	SBTR	A (0)	0	0.00
Rogers Rd & Mark's Access/West Access 1	EBL	B (13)	3	0.10
	EBTR	A (9)	1	0.03
	WBL	B (12)	1	0.02
	WBTR	B (11)	2	0.06
	NBL	A (8)	1	0.04
	SBL	A (8)	2	0.06
Rogers Rd & Canadian Tire Access	EBLR	A (10)	0	0.01
Rogers Rd & Canadian Tire Access 2	EBLR	A (8)	0	0.00
	NBL	A (0)	0	0.00
Rogers Rd & West Access 2	WBLR	B (11)	1	0.05
	SBL	A (2)	1	0.02
Carlisle St Rogers Rd	EBLT	A (9)	-	-
	WBTR	A (8)	-	-
	SBLR	A (9)	-	-

Table 5.3: Future Total Unsignalized Traffic Capacity Analysis - Weekday PM Peak Hour

Intersection	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access / Private Access & Elgin St.	WBL	B (11)	9	0.27
	NBL	C (22)	2	0.07
	NBTR	B (15)	15	0.39
	SBL	F (75)	1	0.02
	SBTR	A (0)	0	0.00
Rogers Rd & Mark's Access/West Access 1	EBL	C (22)	8	0.25
	EBTR	B (11)	2	0.09
	WBL	C (24)	13	0.36
	WBTR	B (12)	7	0.23
	NBL	A (8)	1	0.03
	SBL	A (8)	4	0.14
Rogers Rd & Canadian Tire Access	EBLR	B (11)	1	0.03
	NBL	A (8)	0	0.01
Rogers Rd & Canadian Tire Access 2	EBLR	B (10)	0	0.00
	NBL	A (8)	0	0.00
Rogers Rd & West Access 2	WBLR	B (13)	8	0.24
	SBL	A (0)	0	0.01
Carlisle St Rogers Rd	EBLT	A (10)	-	-
	WBTR	B (10)	-	-
	SBLR	C (16)	-	-

Table 5.4: Future Total Unsignalized Traffic Capacity Analysis - Friday PM Peak Hour

Intersection	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access / Private Access & Elgin St.	EBL	A (9)	0	0.00
	WBL	B (14)	18	0.43
	NBL	D (30)	1	0.04
	NBR	C (16)	19	0.45
	SBL	F (468)	7	0.37
	SBR	A (9)	0	0.00
Rogers Rd & Mark's Access/West Access 1	EBL	E (44)	26	0.58
	EBTR	B (13)	6	0.20
	WBL	E (47)	31	0.64
	WBTR	B (15)	8	0.26
	NBL	A (8)	1	0.03
	SBL	A (9)	5	0.17
Rogers Rd & Canadian Tire Access	EBLR	B (11)	2	0.08
	NBL	A (8)	0	0.02
Rogers Rd & Canadian Tire Access 2	EBLR	B (11)	4	0.13
	NBL	A (8)	2	0.06
Rogers Rd & West Access 2	WBLR	B (15)	11	0.31
	SBL	A (0)	0	0.01
Carlisle St Rogers Rd	EBLT	B (11)	-	-
	WBTR	B (13)	-	-
	SBLR	D (29)	-	-

Table 5.5: Future Total Unsignalized Traffic Capacity Analysis – Saturday Peak Hour

Intersection	Movement of Interest	LOS (Delay in seconds)	95th Queue (m)	V/C
North Access / Private Access & Elgin St.	WBL	B (12)	10	0.30
	NBL	C (23)	2	0.09
	NBR	B (14)	12	0.33
	SBL	F (62)	1	0.03
	SBR	A (0)	0	0.00
Rogers Rd & Mark's Access/West Access 1	EBL	F (79)	44	0.81
	EBTR	B (12)	5	0.18
	WBL	D (27)	7	0.22
	WBTR	C (16)	11	0.32
	NBL	A (8)	2	0.06
	SBL	A (9)	5	0.18
Rogers Rd & Canadian Tire Access	EBLR	B (10)	1	0.04
	NBL	A (8)	0	0.01
Rogers Rd & Canadian Tire Access 2	EBLR	A (10)	2	0.08
	NBL	A (8)	1	0.05
Rogers Rd & West Access 2	WBLR	B (12)	6	0.20
	SBL	A (1)	0	0.02
Carlisle St Rogers Rd	EBLT	A (10)	-	-
	WBTR	B (11)	-	-
	SBLR	B (14)	-	-

All the inbound and outbound movements from the subject site at the unsignalized intersections are expected to continue operating at LOS "D" or better under the future total scenario. As such, it is concluded that the proposed driveway relocation and the commercial addition will have minimal impacts on the studied road network. It is noted that despite not adding trips to the southbound left movement at the intersection of the Private Access/North Access and Elgin St, the operations of this movement will continue operating with excessive delay similar to the future background condition.

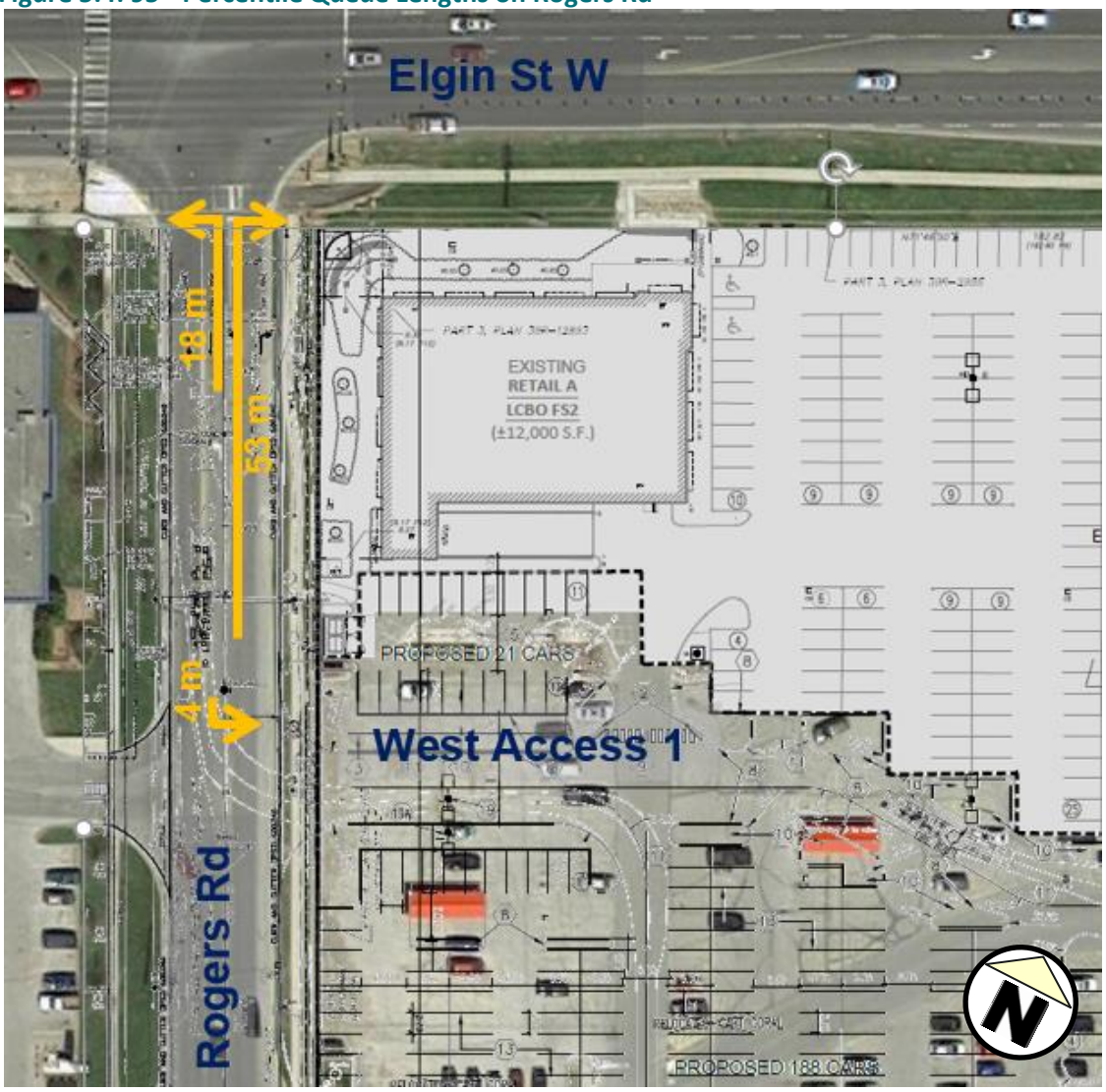
5.2 QUEUE ANALYSIS OF RELOCATED ACCESS ON ROGERS ROAD

A queuing assessment was undertaken to examine the potential blockage of the proposed site access on Rogers Road. **Table 5.6** summarizes the 95th percentile queues of the southbound left movement from Rogers Road onto the relocated West Access 1 (proposed site access) and the northbound movements at Rogers Rd and Elgin St W intersection. **Figure 5.4** visualizes the forecasted 95th percentile queues associated with the interested movements for the weekday PM peak hour, which is identified to have the longest 95th-percentile queues.

Table 5.6: Summary of 95th-Queue Lengths

Movement	Weekday AM Peak	Weekday PM Peak	Friday PM Peak	Saturday Peak	Segment Length
SBL @ West Access 1	7.9 m	4.0 m	2.7 m	2.8 m	68 m
NBL @ Rogers Rd/Elgin St W	2.6 m	17.7 m	13.8 m	11.6 m	
NBR @ Rogers Rd/Elgin St W	17.2 m	52.6 m	28.5 m	30.2 m	

Figure 5.4: 95th Percentile Queue Lengths on Rogers Rd



The forecasted 95th-percentile queue for the southbound left turn (SB-L) movement is estimated to be 4 metres during this peak hour. It should be noted that the northbound right movement into the subject site is not anticipated to incur a delay; as such, queue is not expected to occur for this movement.

The 95th-percentile queue for the northbound movements at the signalized intersection of Rogers Rd and Elgin St W is projected to reach a maximum of 53 m. The southbound left movement at West Access 1, which is an inbound movement into the subject site, is expected to have a 95th-percentile queue of 4 m. As the segment of Rogers Rd between Elgin St W and West Access 1 spans approximately 68 m in length, the 95th-percentage queues are not expected to block the inbound and outbound movements at the proposed site access location.

6 CONCLUSION

It is proposed that an existing access at Northumberland Mall on Rogers Rd be relocated, along with an additional commercial GFA of approximately 9,800 ft². As part of the access relocation, the existing parking supply between the existing LCBO and Metro foodstore will be reconfigured with the number of spaces provided increased to 1,393 spaces from 1,163 spsaces.

Under the existing traffic conditions, all studied intersections are operating with residual capacity and with acceptable LOS during all peak hours. The future background scenario, which included background growth, developments and expected full occupation of the mall, is expected to operate similarly to the existing traffic condition.

The proposed commercial addition is expected to generate a maximum of 101 two-way trips during the studied peak hours. Some increases to V/C ratio and delay for the inbound and outbound movements are expected at the mall accesses as a result of the proposed access relocation and commercial addition. The queue lengths of the inbound movements at Rogers Rd and West Access 1 were found to not conflict with the northbound movement queues at the Rogers Rd and Elgin St W. As such, proposed access relocation is not anticipated to impede the operation of the neighbouring intersection. The proposed commercial addition and access relocation will thus have minimal impact on the studied road network as a result.

The parking supply between the Metro food store and Retail A (LCBO) is to be reconfigured as part of the access relocation, with the number of parking spaces provided in this area to be consistent between the existing site plan and the proposed reconfiguration.

APPENDIX A

Existing Traffic Data

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_StrathyRd&ElginSt W-AM
Site Code: 20045
Start Date: 01/23/2020

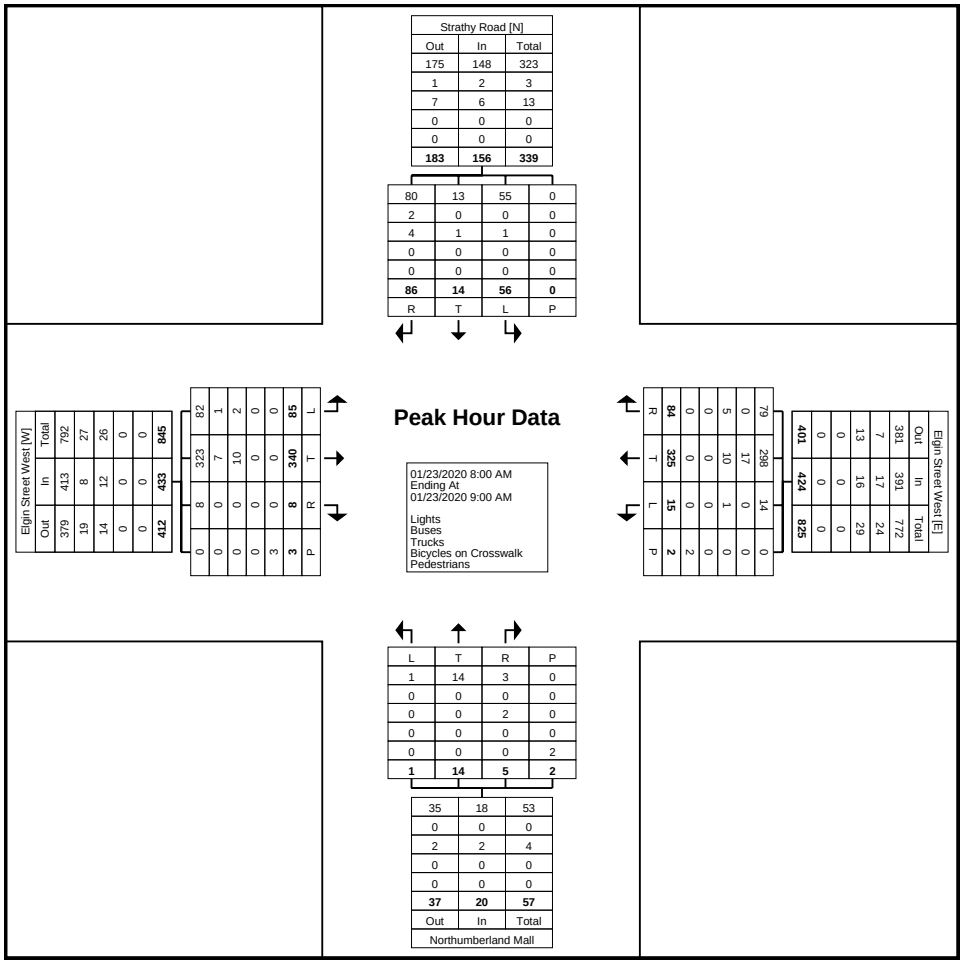
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Strathy Road Southbound					Elgin Street West Westbound					Northumberland Mall Access Northbound					Elgin Street West Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
8:00 AM	13	2	23	0	38	4	66	15	0	85	0	3	1	0	4	15	89	0	0	104	231
8:15 AM	8	2	21	0	31	4	99	19	1	122	0	1	1	1	2	19	84	1	0	104	259
8:30 AM	16	4	17	0	37	4	92	20	0	116	0	3	2	1	5	18	76	6	2	100	258
8:45 AM	19	6	25	0	50	3	68	30	1	101	1	7	1	0	9	33	91	1	1	125	285
Total	56	14	86	0	156	15	325	84	2	424	1	14	5	2	20	85	340	8	3	433	1033
Approach %	35.9	9.0	55.1	-	-	3.5	76.7	19.8	-	-	5.0	70.0	25.0	-	-	19.6	78.5	1.8	-	-	-
Total %	5.4	1.4	8.3	-	15.1	1.5	31.5	8.1	-	41.0	0.1	1.4	0.5	-	1.9	8.2	32.9	0.8	-	41.9	-
PHF	0.737	0.583	0.860	-	0.780	0.938	0.821	0.700	-	0.869	0.250	0.500	0.625	-	0.556	0.644	0.934	0.333	-	0.866	0.906
Lights	55	13	80	-	148	14	298	79	-	391	1	14	3	-	18	82	323	8	-	413	970
% Lights	98.2	92.9	93.0	-	94.9	93.3	91.7	94.0	-	92.2	100.0	100.0	60.0	-	90.0	96.5	95.0	100.0	-	95.4	93.9
Buses	0	0	2	-	2	0	17	0	-	17	0	0	0	-	0	1	7	0	-	8	27
% Buses	0.0	0.0	2.3	-	1.3	0.0	5.2	0.0	-	4.0	0.0	0.0	0.0	-	0.0	1.2	2.1	0.0	-	1.8	2.6
Trucks	1	1	4	-	6	1	10	5	-	16	0	0	2	-	2	2	10	0	-	12	36
% Trucks	1.8	7.1	4.7	-	3.8	6.7	3.1	6.0	-	3.8	0.0	0.0	40.0	-	10.0	2.4	2.9	0.0	-	2.8	3.5
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	2	-	-	-	-	2	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_StrathyRd&ElginSt W-AM
Site Code: 20045
Start Date: 01/23/2020



Turning Movement Peak Hour Data Plot (8:00 AM)

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_StrathyRd&ElginStW-PM
Site Code: 20045
Start Date: 01/23/2020

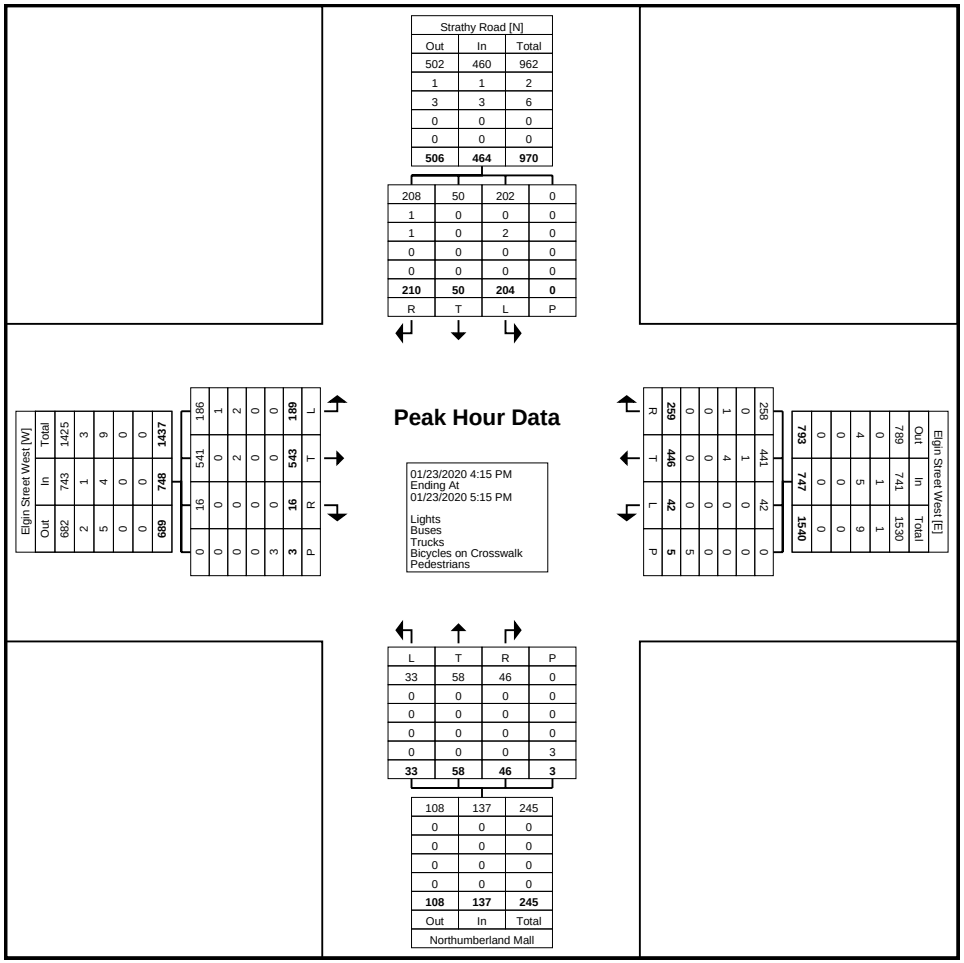
Turning Movement Peak Hour Data (4:15 PM)

Start Time	Strathy Road Southbound					Elgin Street West Westbound					Northumberland Mall Access Northbound					Elgin Street West Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
4:15 PM	45	16	60	0	121	9	123	43	3	175	3	10	7	2	20	42	137	9	2	188	504
4:30 PM	57	11	65	0	133	15	113	69	1	197	15	15	13	0	43	39	119	3	0	161	534
4:45 PM	42	12	40	0	94	8	112	66	0	186	10	15	12	0	37	58	135	1	1	194	511
5:00 PM	60	11	45	0	116	10	98	81	1	189	5	18	14	1	37	50	152	3	0	205	547
Total	204	50	210	0	464	42	446	259	5	747	33	58	46	3	137	189	543	16	3	748	2096
Approach %	44.0	10.8	45.3	-	-	5.6	59.7	34.7	-	-	24.1	42.3	33.6	-	-	25.3	72.6	2.1	-	-	-
Total %	9.7	2.4	10.0	-	22.1	2.0	21.3	12.4	-	35.6	1.6	2.8	2.2	-	6.5	9.0	25.9	0.8	-	35.7	-
PHF	0.850	0.781	0.808	-	0.872	0.700	0.907	0.799	-	0.948	0.550	0.806	0.821	-	0.797	0.815	0.893	0.444	-	0.912	0.958
Lights	202	50	208	-	460	42	441	258	-	741	33	58	46	-	137	186	541	16	-	743	2081
% Lights	99.0	100.0	99.0	-	99.1	100.0	98.9	99.6	-	99.2	100.0	100.0	100.0	-	100.0	98.4	99.6	100.0	-	99.3	99.3
Buses	0	0	1	-	1	0	1	0	-	1	0	0	0	-	0	1	0	0	-	1	3
% Buses	0.0	0.0	0.5	-	0.2	0.0	0.2	0.0	-	0.1	0.0	0.0	0.0	-	0.0	0.5	0.0	0.0	-	0.1	0.1
Trucks	2	0	1	-	3	0	4	1	-	5	0	0	0	-	0	2	2	0	-	4	12
% Trucks	1.0	0.0	0.5	-	0.6	0.0	0.9	0.4	-	0.7	0.0	0.0	0.0	-	0.0	1.1	0.4	0.0	-	0.5	0.6
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	5	-	-	-	-	3	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_StrathyRd&ElginStW-PM
Site Code: 20045
Start Date: 01/23/2020



Turning Movement Peak Hour Data Plot (4:15 PM)

LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

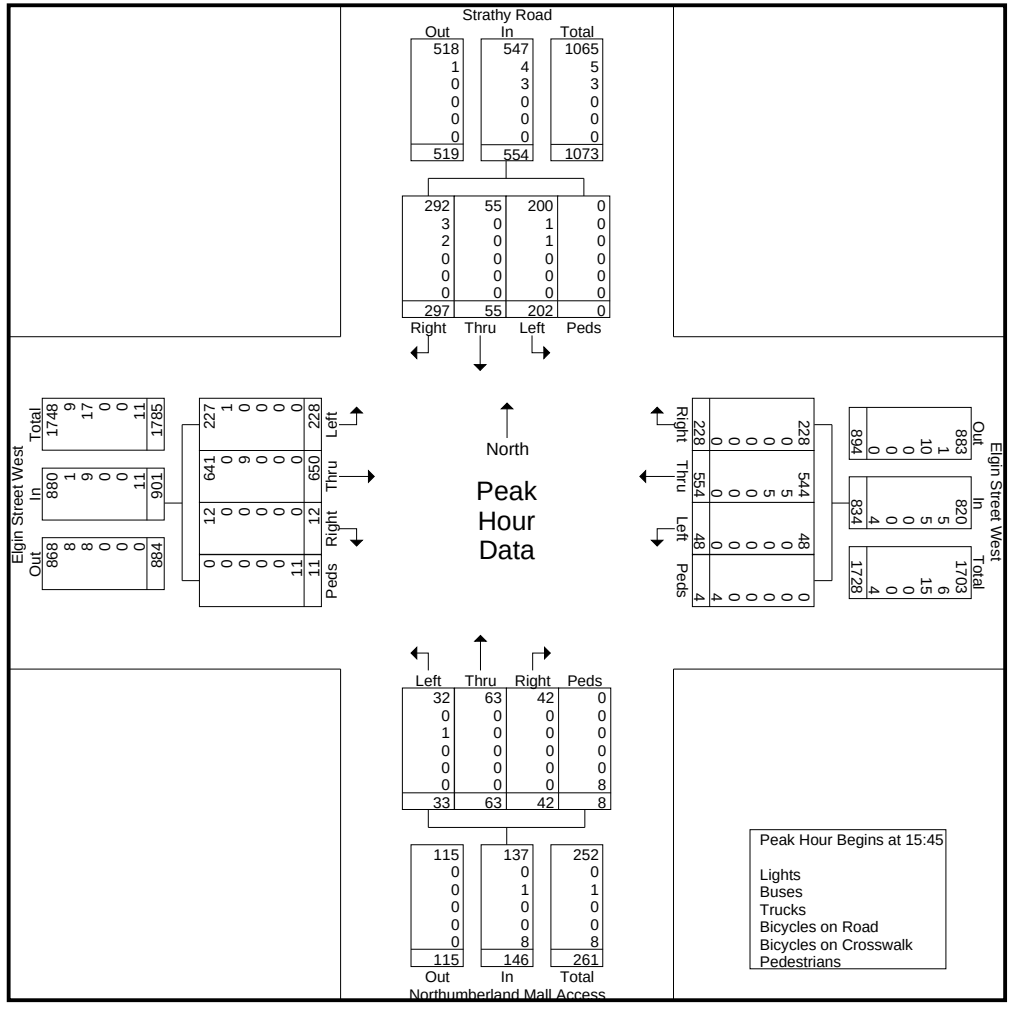
File Name : 20045_StrathyRd&ElginStW-FRI_660551_05-24-2019
Site Code : 20045
Start Date : 2019-05-24

	Strathy Road Southbound					Elgin Street West Westbound					Northumberland Mall Access Northbound					Elgin Street West Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 15:45 to 16:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 15:45																					
15:45	42	**19**	74	0	135	14	136	**63**	0	213	**13**	13	14	0	40	54	151	3	**4**	212	600
16:00	**62**	18	**85**	0	**165**	12	125	48	**3**	188	8	16	7	2	33	**66**	168	**4**	3	**241**	**627**
16:15	50	9	62	0	121	**18**	**151**	55	0	**224**	7	10	**15**	0	32	57	**171**	3	1	232	609
16:30	48	9	76	0	133	4	142	62	1	209	5	**24**	6	**6**	**41**	51	160	2	3	216	599
Total Volume	202	55	297	0	554	48	554	228	4	834	33	63	42	8	146	228	650	12	11	901	2435
% App. Total	36.5	9.9	53.6	0		5.8	66.4	27.3	0.5		22.6	43.2	28.8	5.5		25.3	72.1	1.3	1.2		
PHF	.815	.724	.874	.000	.839	.667	.917	.905	.333	.931	.635	.656	.700	.333	.890	.864	.950	.750	.688	.935	.971
Lights	200	55	292	0	547	48	544	228	0	820	32	63	42	0	137	227	641	12	0	880	2384
% Lights	99.0	100	98.3	0	98.7	100	98.2	100	0	98.3	97.0	100	100	0	93.8	99.6	98.6	100	0	97.7	97.9
Buses	1	0	3	0	4	0	5	0	0	5	0	0	0	0	0	1	0	0	0	1	10
% Buses	0.5	0	1.0	0	0.7	0	0.9	0	0	0.6	0	0	0	0	0	0.4	0	0	0	0.1	0.4
Trucks	1	0	2	0	3	0	5	0	0	5	1	0	0	0	1	0	9	0	0	9	18
% Trucks	0.5	0	0.7	0	0.5	0	0.9	0	0	0.6	3.0	0	0	0	0.7	0	1.4	0	0	1.0	0.7
Bicycles on Road	0	0	0	0	0	0	0	0	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
Bicycles on Crosswalk	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	4	4	0	0	0	8	8	0	0	0	11	11	23
% Pedestrians	0	0	0	0	0	0	0	0	100	0.5	0	0	0	100	5.5	0	0	0	100	1.2	0.9

LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

File Name : 20045_StrathyRd&ElginStW-FRI_660551_05-24-2019
Site Code : 20045
Start Date : 2019-05-24
Page No : 4



LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

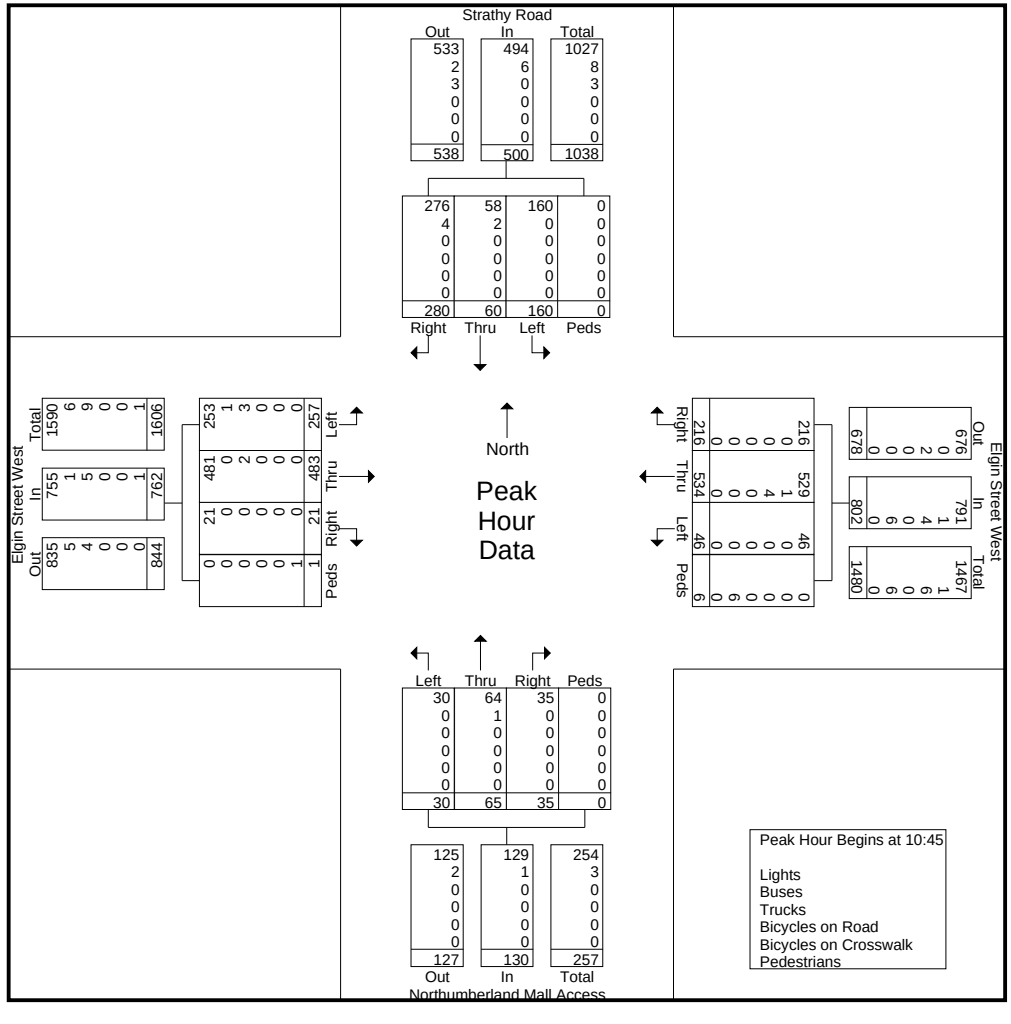
File Name : 20045_StrathyRd&ElginStW-SAT_660552_05-25-2019
Site Code : 20045
Start Date : 2019-05-25
Page No : 4

	Strathy Road Southbound					Elgin Street West Westbound					Northumberland Mall Access Northbound					Elgin Street West Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 10:45 to 11:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 10:45																					
10:45	**46**	15	64	0	125	12	**137**	46	0	195	5	19	7	0	31	63	99	**7**	0	169	520
11:00	42	**17**	**75**	0	**134**	7	130	**69**	**3**	**209**	**11**	**21**	7	0	**39**	63	123	4	**1**	191	**573**
11:15	36	13	66	0	115	**15**	131	47	0	193	9	15	**12**	0	36	**72**	127	4	0	**203**	547
11:30	36	15	75	0	126	12	136	54	3	205	5	10	9	0	24	59	**134**	6	0	199	554
Total Volume	160	60	280	0	500	46	534	216	6	802	30	65	35	0	130	257	483	21	1	762	2194
% App. Total	32	12	56	0		5.7	66.6	26.9	0.7		23.1	50	26.9	0		33.7	63.4	2.8	0.1		
PHF	.870	.882	.933	.000	.933	.767	.974	.783	.500	.959	.682	.774	.729	.000	.833	.892	.901	.750	.250	.938	.957
Lights	160	58	276	0	494	46	529	216	0	791	30	64	35	0	129	253	481	21	0	755	2169
% Lights	100	96.7	98.6	0	98.8	100	99.1	100	0	98.6	100	98.5	100	0	99.2	98.4	99.6	100	0	99.1	98.9
Buses	0	2	4	0	6	0	1	0	0	1	0	1	0	0	1	1	0	0	0	1	9
% Buses	0	3.3	1.4	0	1.2	0	0.2	0	0	0.1	0	1.5	0	0	0.8	0.4	0	0	0	0.1	0.4
Trucks	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	3	2	0	0	5	9
% Trucks	0	0	0	0	0	0	0.7	0	0	0.5	0	0	0	0	0	1.2	0.4	0	0	0.7	0.4
Bicycles on Road	0	0	0	0	0	0	0	0	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
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0	6
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	100	0.7	0	0	0	0	0	0	0	0	0	0	0.3
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0.1	0.0

LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

File Name : 20045_StrathyRd&ElginStW-SAT_660552_05-25-2019
Site Code : 20045
Start Date : 2019-05-25
Page No : 5



LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_NorthumberlandMallMain&ElginStW-AM
Site Code: 20045
Start Date: 01/23/2020

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Pool & Spa Centre Driveway Southbound					Elgin Street West Westbound					Northumberland Mall Main Access Northbound					Elgin Street West Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
8:00 AM	0	0	0	0	0	6	80	0	0	86	0	0	2	0	2	0	101	1	0	102	190
8:15 AM	0	0	0	0	0	4	112	1	0	117	0	0	0	0	0	0	104	1	0	105	222
8:30 AM	0	0	0	0	0	2	93	0	0	95	0	0	3	3	3	0	102	0	0	102	200
8:45 AM	0	0	0	0	0	11	85	0	0	96	0	0	6	0	6	0	124	0	0	124	226
Total	0	0	0	0	0	23	370	1	0	394	0	0	11	3	11	0	431	2	0	433	838
Approach %	0.0	0.0	0.0	-	-	5.8	93.9	0.3	-	-	0.0	0.0	100.0	-	-	0.0	99.5	0.5	-	-	-
Total %	0.0	0.0	0.0	-	0.0	2.7	44.2	0.1	-	47.0	0.0	0.0	1.3	-	1.3	0.0	51.4	0.2	-	51.7	-
PHF	0.000	0.000	0.000	-	0.000	0.523	0.826	0.250	-	0.842	0.000	0.000	0.458	-	0.458	0.000	0.869	0.500	-	0.873	0.927
Lights	0	0	0	-	0	22	340	1	-	363	0	0	10	-	10	0	409	2	-	411	784
% Lights	-	-	-	-	-	95.7	91.9	100.0	-	92.1	-	-	90.9	-	90.9	-	94.9	100.0	-	94.9	93.6
Buses	0	0	0	-	0	0	18	0	-	18	0	0	1	-	1	0	8	0	-	8	27
% Buses	-	-	-	-	-	0.0	4.9	0.0	-	4.6	-	-	9.1	-	9.1	-	1.9	0.0	-	1.8	3.2
Trucks	0	0	0	-	0	1	12	0	-	13	0	0	0	-	0	0	14	0	-	14	27
% Trucks	-	-	-	-	-	4.3	3.2	0.0	-	3.3	-	-	0.0	-	0.0	-	3.2	0.0	-	3.2	3.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_NorthumberlandMallMain&ElginStW-AM
Site Code: 20045
Start Date: 01/23/2020
Page No: 4

Peak Hour Data

01/23/2020 8:00 AM
Ending At
01/23/2020 9:00 AM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Pool & Spa Centre

Out	In	Total
1	0	1
0	0	0
0	0	0
0	0	0
0	0	0
1	**0**	**1**

R	T	L	P
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	**0**	**0**	**0**

Elgin Street West [W]

Out	In	Total
340	411	751
18	8	26
12	14	26
0	0	0
0	0	0
370	**433**	**803**

L	T	R	P
0	409	2	0
0	8	0	0
0	14	0	0
0	0	0	0
0	0	0	0
0	**431**	**2**	**0**

Elgin Street West [E]

Out	In	Total
419	363	782
9	18	27
14	13	27
0	0	0
0	0	0
442	**394**	**836**

R	T	L	P
1	340	22	0
0	18	0	0
0	12	1	0
0	0	0	0
0	0	0	0
1	**370**	**23**	**0**

Northumberland Mall Main

L	T	R	P
0	0	10	0
0	0	1	0
0	0	0	0
0	0	0	0
0	0	0	3
0	**0**	**11**	**3**

Out	In	Total
24	10	34
0	1	1
1	0	1
0	0	0
0	0	0
25	**11**	**36**

Turning Movement Peak Hour Data Plot (8:00 AM)

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_NorthumberlandMallMain&ElginStW-PM
Site Code: 20045
Start Date: 01/23/2020

Turning Movement Peak Hour Data (4:00 PM)

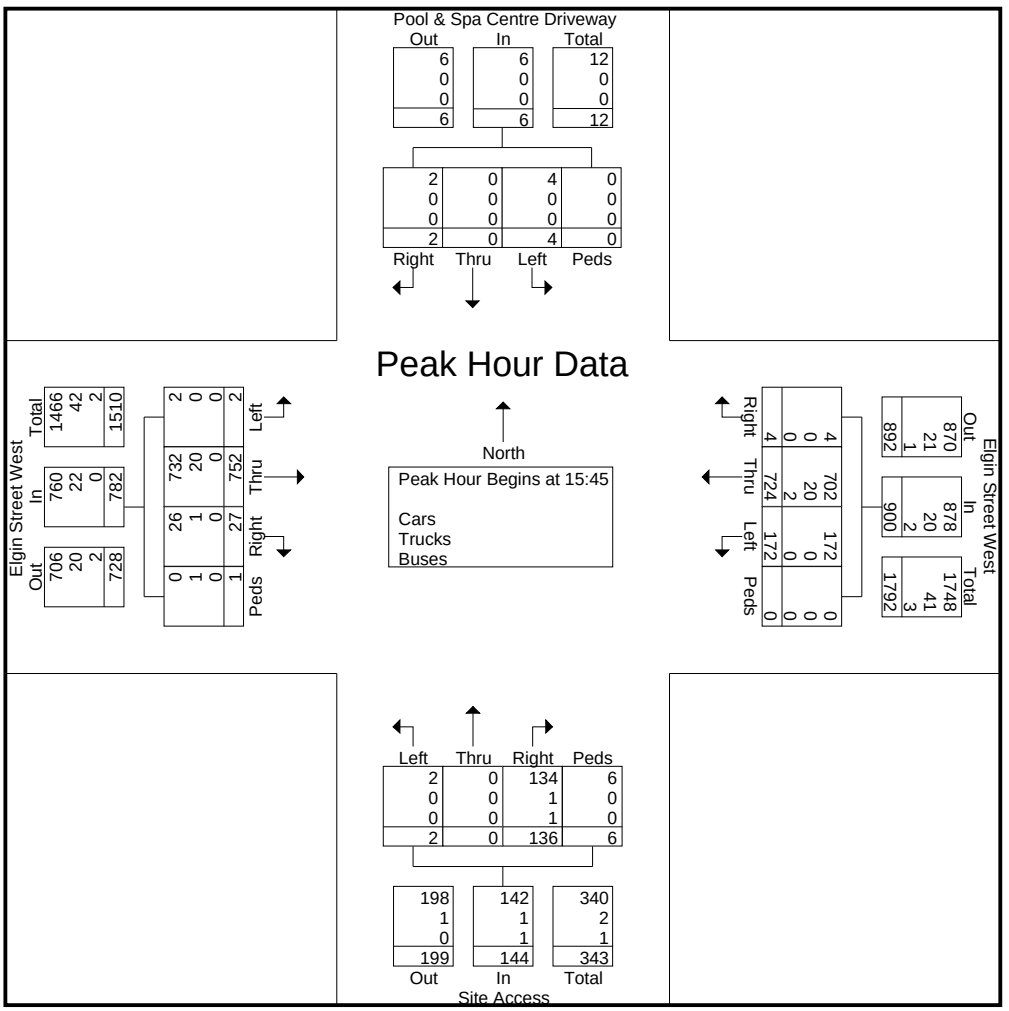
Start Time	Pool & Spa Centre Driveway					Elgin Street West					Northumberland Mall Main Access					Elgin Street West					
	Southbound					Westbound					Northbound					Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
4:00 PM	0	0	0	0	0	33	162	0	0	195	2	0	28	1	30	0	169	5	0	174	399
4:15 PM	0	0	0	0	0	32	159	0	0	191	0	0	19	1	19	0	161	3	0	164	374
4:30 PM	0	0	0	0	0	27	167	0	0	194	3	0	28	0	31	0	156	4	0	160	385
4:45 PM	1	0	0	0	1	16	148	0	0	164	1	0	36	0	37	0	150	2	0	152	354
Total	1	0	0	0	1	108	636	0	0	744	6	0	111	2	117	0	636	14	0	650	1512
Approach %	100.0	0.0	0.0	-	-	14.5	85.5	0.0	-	-	5.1	0.0	94.9	-	-	0.0	97.8	2.2	-	-	-
Total %	0.1	0.0	0.0	-	0.1	7.1	42.1	0.0	-	49.2	0.4	0.0	7.3	-	7.7	0.0	42.1	0.9	-	43.0	-
PHF	0.250	0.000	0.000	-	0.250	0.818	0.952	0.000	-	0.954	0.500	0.000	0.771	-	0.791	0.000	0.941	0.700	-	0.934	0.947
Lights	1	0	0	-	1	108	627	0	-	735	6	0	110	-	116	0	629	14	-	643	1495
% Lights	100.0	-	-	-	100.0	100.0	98.6	-	-	98.8	100.0	-	99.1	-	99.1	-	98.9	100.0	-	98.9	98.9
Buses	0	0	0	-	0	0	2	0	-	2	0	0	1	-	1	0	1	0	-	1	4
% Buses	0.0	-	-	-	0.0	0.0	0.3	-	-	0.3	0.0	-	0.9	-	0.9	-	0.2	0.0	-	0.2	0.3
Trucks	0	0	0	-	0	0	7	0	-	7	0	0	0	-	0	0	6	0	-	6	13
% Trucks	0.0	-	-	-	0.0	0.0	1.1	-	-	0.9	0.0	-	0.0	-	0.0	-	0.9	0.0	-	0.9	0.9
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

File Name : SiteAccess&Elgin-FRI
Site Code : 20045027
Start Date : 2019-05-24
Page No : 3

	Pool & Spa Centre Driveway Southbound					Elgin Street West Westbound					Site Access Northbound					Elgin Street West Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 15:45 to 16:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 15:45																					
15:45	1	0	**1**	0	2	42	181	0	0	223	**1**	0	27	0	28	**1**	176	7	0	184	437
16:00	**2**	0	1	0	**3**	35	**190**	1	0	226	0	0	32	1	33	1	**208**	5	**1**	**215**	**477**
16:15	1	0	0	0	1	44	176	1	0	221	0	0	30	0	30	0	188	**8**	0	196	448
16:30	0	0	0	0	0	**51**	177	**2**	0	**230**	1	0	**47**	**5**	**53**	0	180	7	0	187	470
Total Volume	4	0	2	0	6	172	724	4	0	900	2	0	136	6	144	2	752	27	1	782	1832
% App. Total	66.7	0	33.3	0		19.1	80.4	0.4	0		1.4	0	94.4	4.2		0.3	96.2	3.5	0.1		
PHF	.500	.000	.500	.000	.500	.843	.953	.500	.000	.978	.500	.000	.723	.300	.679	.500	.904	.844	.250	.909	.960
Cars	4	0	2	0	6	172	702	4	0	878	2	0	134	6	142	2	732	26	0	760	1786
% Cars	100	0	100	0	100	100	97.0	100	0	97.6	100	0	98.5	100	98.6	100	97.3	96.3	0	97.2	97.5
Trucks	0	0	0	0	0	0	20	0	0	20	0	0	1	0	1	0	20	1	1	22	43
% Trucks	0	0	0	0	0	0	2.8	0	0	2.2	0	0	0.7	0	0.7	0	2.7	3.7	100	2.8	2.3
Buses	0	0	0	0	0	0	2	0	0	2	0	0	1	0	1	0	0	0	0	0	3
% Buses	0	0	0	0	0	0	0.3	0	0	0.2	0	0	0.7	0	0.7	0	0	0	0	0	0.2

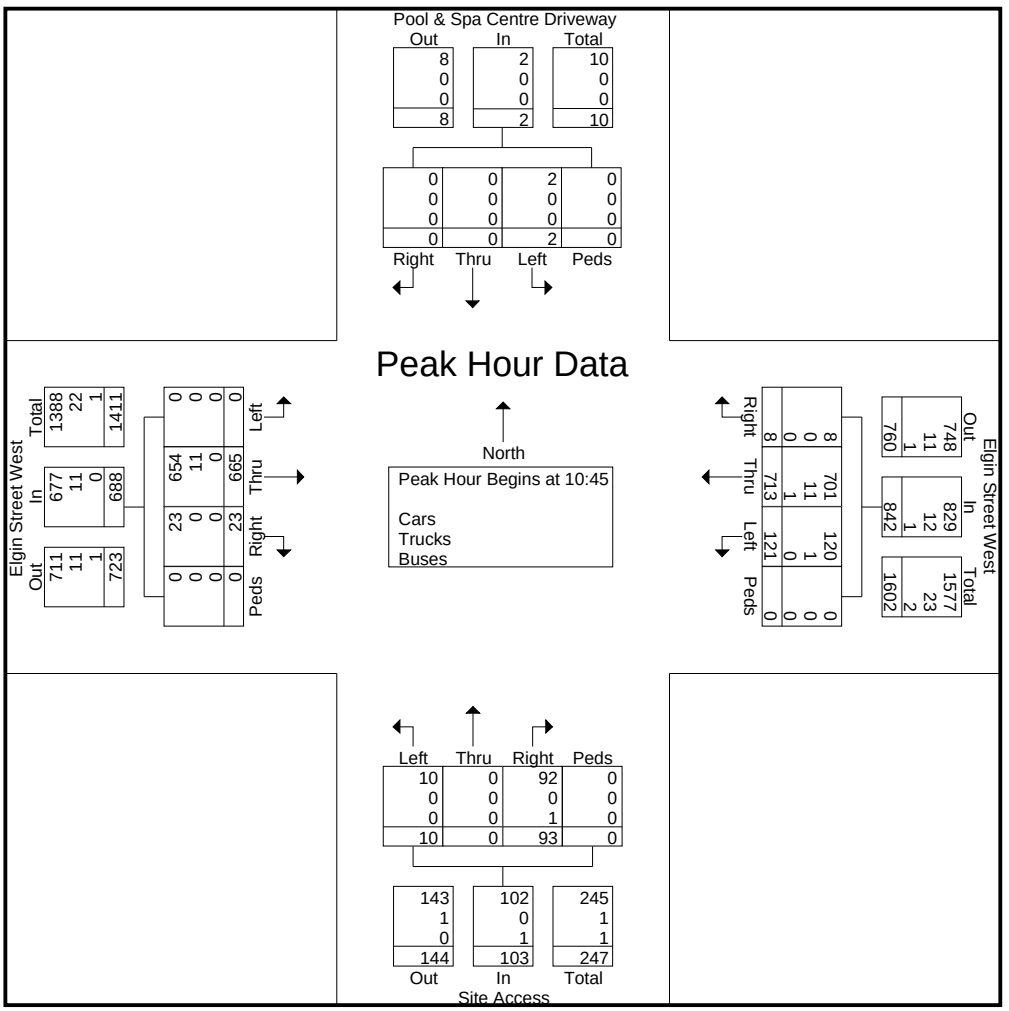


LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

File Name : SiteAccess&Elgin-SAT
Site Code : 20045127
Start Date : 2019-05-25
Page No : 3

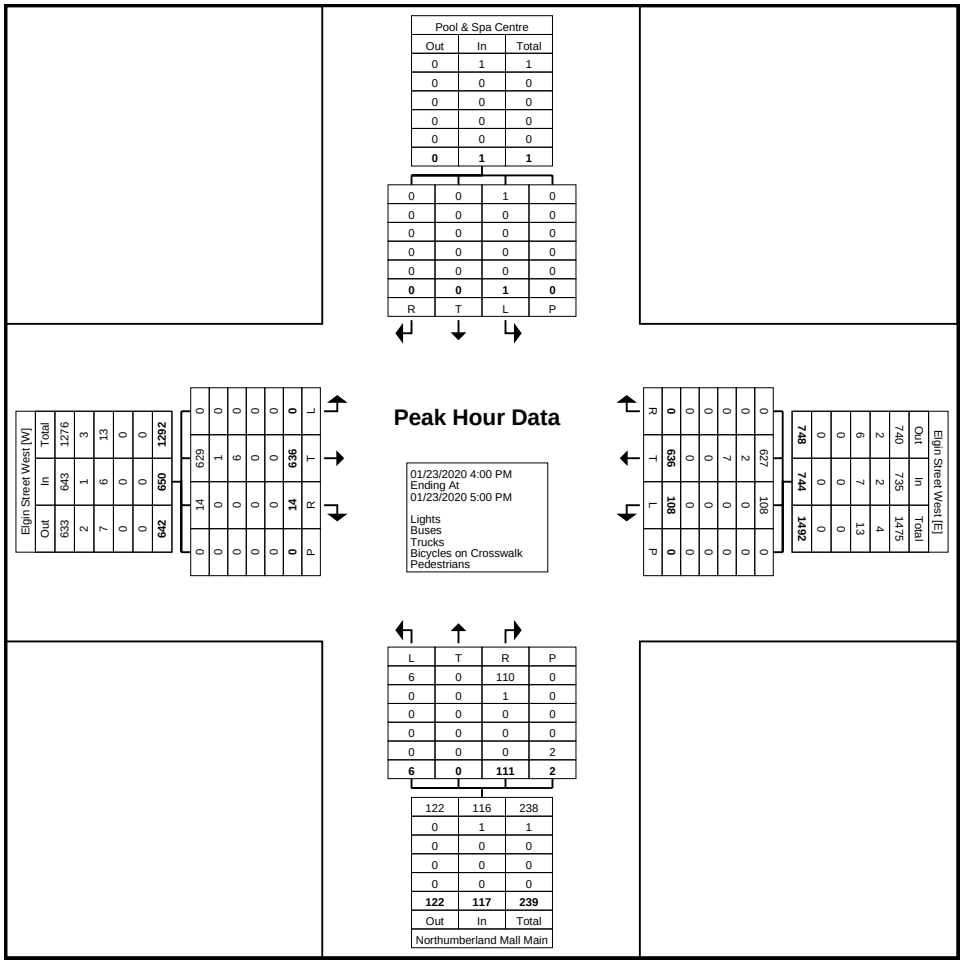
	Pool & Spa Centre Driveway Southbound					Elgin Street West Westbound					Site Access Northbound					Elgin Street West Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 10:45 to 11:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 10:45																					
10:45	**2**	0	0	0	**2**	28	174	1	0	203	1	0	**25**	0	26	0	142	5	0	147	378
11:00	0	0	0	0	0	26	**184**	**5**	0	215	2	0	21	0	23	0	167	**9**	0	176	414
11:15	0	0	0	0	0	28	178	1	0	207	**5**	0	24	0	**29**	0	**189**	4	0	**193**	**429**
11:30	0	0	0	0	0	**39**	177	1	0	**217**	2	0	23	0	25	0	167	5	0	172	414
Total Volume	2	0	0	0	2	121	713	8	0	842	10	0	93	0	103	0	665	23	0	688	1635
% App. Total	100	0	0	0		14.4	84.7	1	0		9.7	0	90.3	0		0	96.7	3.3	0		
PHF	.250	.000	.000	.000	.250	.776	.969	.400	.000	.970	.500	.000	.930	.000	.888	.000	.880	.639	.000	.891	.953
Cars	2	0	0	0	2	120	701	8	0	829	10	0	92	0	102	0	654	23	0	677	1610
% Cars	100	0	0	0	100	99.2	98.3	100	0	98.5	100	0	98.9	0	99.0	0	98.3	100	0	98.4	98.5
Trucks	0	0	0	0	0	1	11	0	0	12	0	0	0	0	0	0	11	0	0	11	23
% Trucks	0	0	0	0	0	0.8	1.5	0	0	1.4	0	0	0	0	0	0	1.7	0	0	1.6	1.4
Buses	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	2
% Buses	0	0	0	0	0	0	0.1	0	0	0.1	0	0	1.1	0	1.0	0	0	0	0	0	0.1



LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_NorthumberlandMallMain&ElginStW-PM
Site Code: 20045
Start Date: 01/23/2020



Turning Movement Peak Hour Data Plot (4:00 PM)

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_RogersRd&ElginStW-AM
Site Code: 20045
Start Date: 01/23/2020

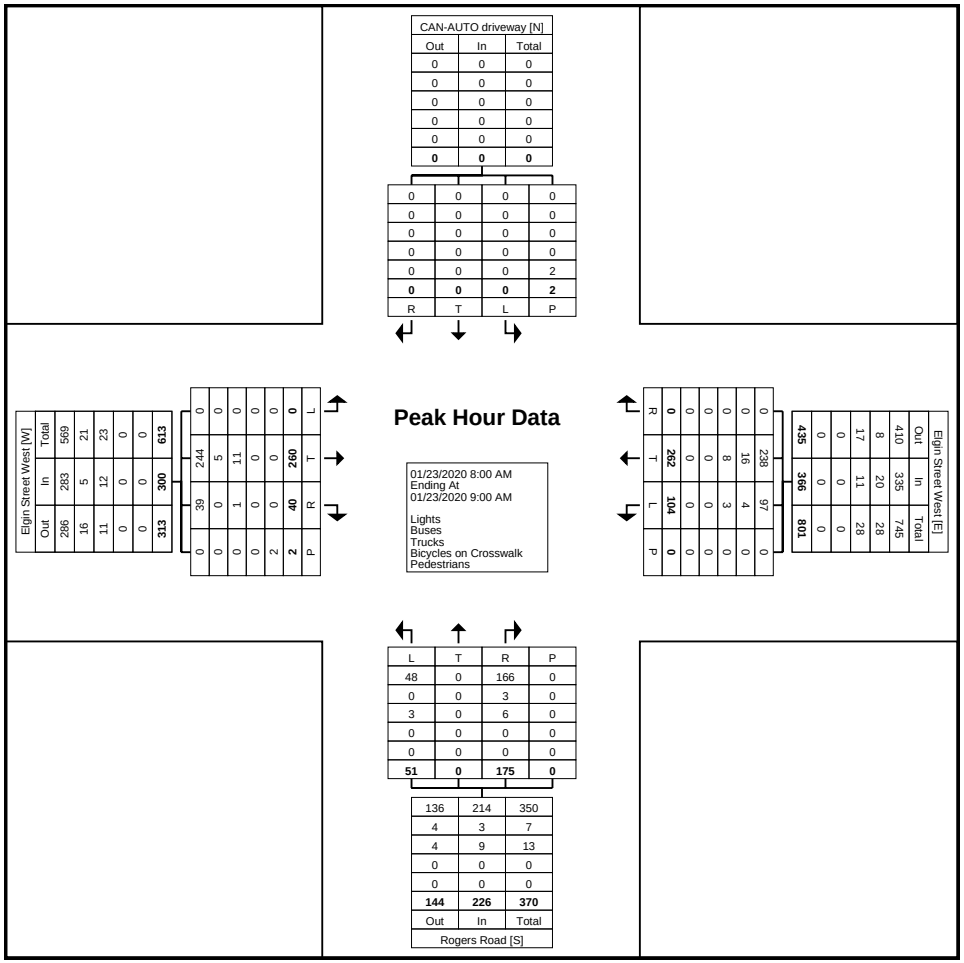
Turning Movement Peak Hour Data (8:00 AM)

Start Time	CAN-AUTO driveway Southbound					Elgin Street West Westbound					Rogers Road Northbound					Elgin Street West Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
8:00 AM	0	0	0	1	0	23	53	0	0	76	9	0	50	0	59	0	53	7	1	60	195
8:15 AM	0	0	0	0	0	29	85	0	0	114	19	0	39	0	58	0	66	11	0	77	249
8:30 AM	0	0	0	1	0	28	65	0	0	93	9	0	38	0	47	0	64	14	1	78	218
8:45 AM	0	0	0	0	0	24	59	0	0	83	14	0	48	0	62	0	77	8	0	85	230
Total	0	0	0	2	0	104	262	0	0	366	51	0	175	0	226	0	260	40	2	300	892
Approach %	0.0	0.0	0.0	-	-	28.4	71.6	0.0	-	-	22.6	0.0	77.4	-	-	0.0	86.7	13.3	-	-	-
Total %	0.0	0.0	0.0	-	0.0	11.7	29.4	0.0	-	41.0	5.7	0.0	19.6	-	25.3	0.0	29.1	4.5	-	33.6	-
PHF	0.000	0.000	0.000	-	0.000	0.897	0.771	0.000	-	0.803	0.671	0.000	0.875	-	0.911	0.000	0.844	0.714	-	0.882	0.896
Lights	0	0	0	-	0	97	238	0	-	335	48	0	166	-	214	0	244	39	-	283	832
% Lights	-	-	-	-	-	93.3	90.8	-	-	91.5	94.1	-	94.9	-	94.7	-	93.8	97.5	-	94.3	93.3
Buses	0	0	0	-	0	4	16	0	-	20	0	0	3	-	3	0	5	0	-	5	28
% Buses	-	-	-	-	-	3.8	6.1	-	-	5.5	0.0	-	1.7	-	1.3	-	1.9	0.0	-	1.7	3.1
Trucks	0	0	0	-	0	3	8	0	-	11	3	0	6	-	9	0	11	1	-	12	32
% Trucks	-	-	-	-	-	2.9	3.1	-	-	3.0	5.9	-	3.4	-	4.0	-	4.2	2.5	-	4.0	3.6
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_RogersRd&ElginStW-AM
Site Code: 20045
Start Date: 01/23/2020



Turning Movement Peak Hour Data Plot (8:00 AM)

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_RogersRd&ElginStW-PM
Site Code: 20045
Start Date: 01/23/2020

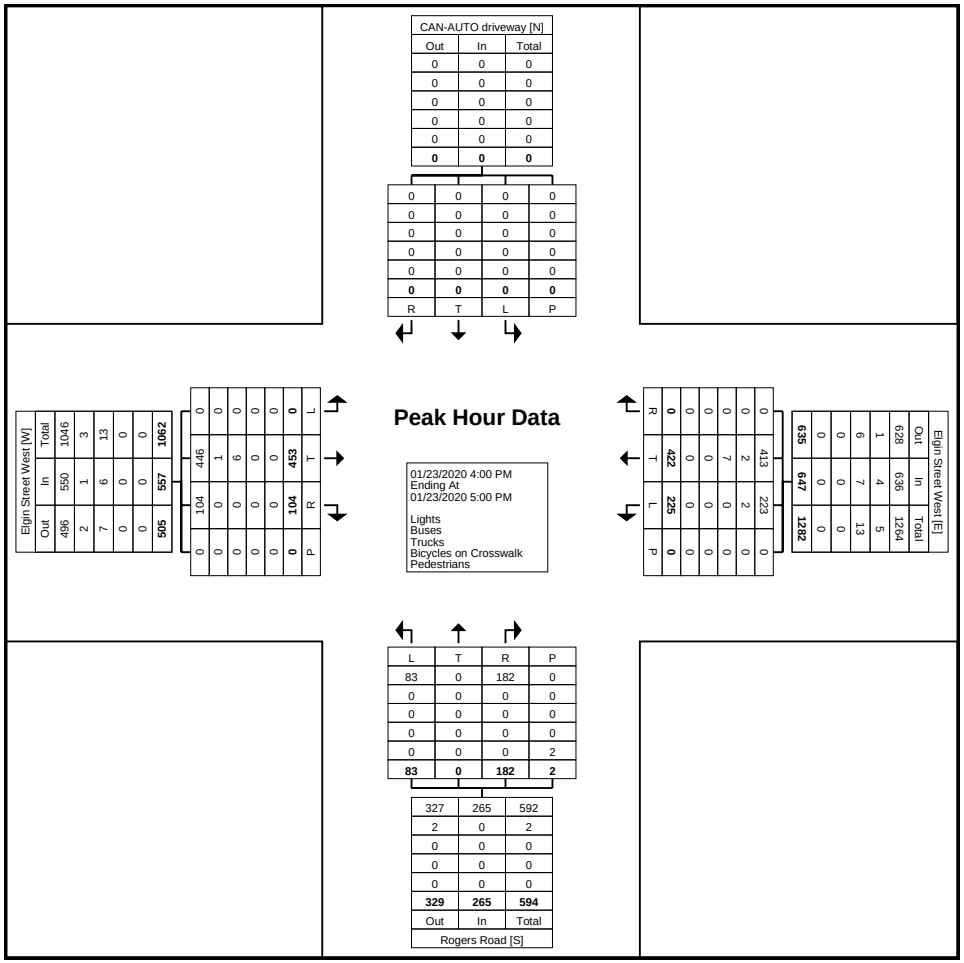
Turning Movement Peak Hour Data (4:00 PM)

Start Time	CAN-AUTO driveway Southbound					Elgin Street West Westbound					Rogers Road Northbound					Elgin Street West Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
4:00 PM	0	0	0	0	0	63	103	0	0	166	21	0	47	1	68	0	122	33	0	155	389
4:15 PM	0	0	0	0	0	51	113	0	0	164	25	0	46	0	71	0	116	25	0	141	376
4:30 PM	0	0	0	0	0	61	103	0	0	164	15	0	39	1	54	0	109	26	0	135	353
4:45 PM	0	0	0	0	0	50	103	0	0	153	22	0	50	0	72	0	106	20	0	126	351
Total	0	0	0	0	0	225	422	0	0	647	83	0	182	2	265	0	453	104	0	557	1469
Approach %	0.0	0.0	0.0	-	-	34.8	65.2	0.0	-	-	31.3	0.0	68.7	-	-	0.0	81.3	18.7	-	-	-
Total %	0.0	0.0	0.0	-	0.0	15.3	28.7	0.0	-	44.0	5.7	0.0	12.4	-	18.0	0.0	30.8	7.1	-	37.9	-
PHF	0.000	0.000	0.000	-	0.000	0.893	0.934	0.000	-	0.974	0.830	0.000	0.910	-	0.920	0.000	0.928	0.788	-	0.898	0.944
Lights	0	0	0	-	0	223	413	0	-	636	83	0	182	-	265	0	446	104	-	550	1451
% Lights	-	-	-	-	-	99.1	97.9	-	-	98.3	100.0	-	100.0	-	100.0	-	98.5	100.0	-	98.7	98.8
Buses	0	0	0	-	0	2	2	0	-	4	0	0	0	-	0	0	1	0	-	1	5
% Buses	-	-	-	-	-	0.9	0.5	-	-	0.6	0.0	-	0.0	-	0.0	-	0.2	0.0	-	0.2	0.3
Trucks	0	0	0	-	0	0	7	0	-	7	0	0	0	-	0	0	6	0	-	6	13
% Trucks	-	-	-	-	-	0.0	1.7	-	-	1.1	0.0	-	0.0	-	0.0	-	1.3	0.0	-	1.1	0.9
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_RogersRd&ElginStW-PM
Site Code: 20045
Start Date: 01/23/2020



Turning Movement Peak Hour Data Plot (4:00 PM)

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 akung@LEA.ca

Count Name: 20045_RogersRd&ElginStW-FRI
Site Code: 20045
Start Date: 05/24/2019

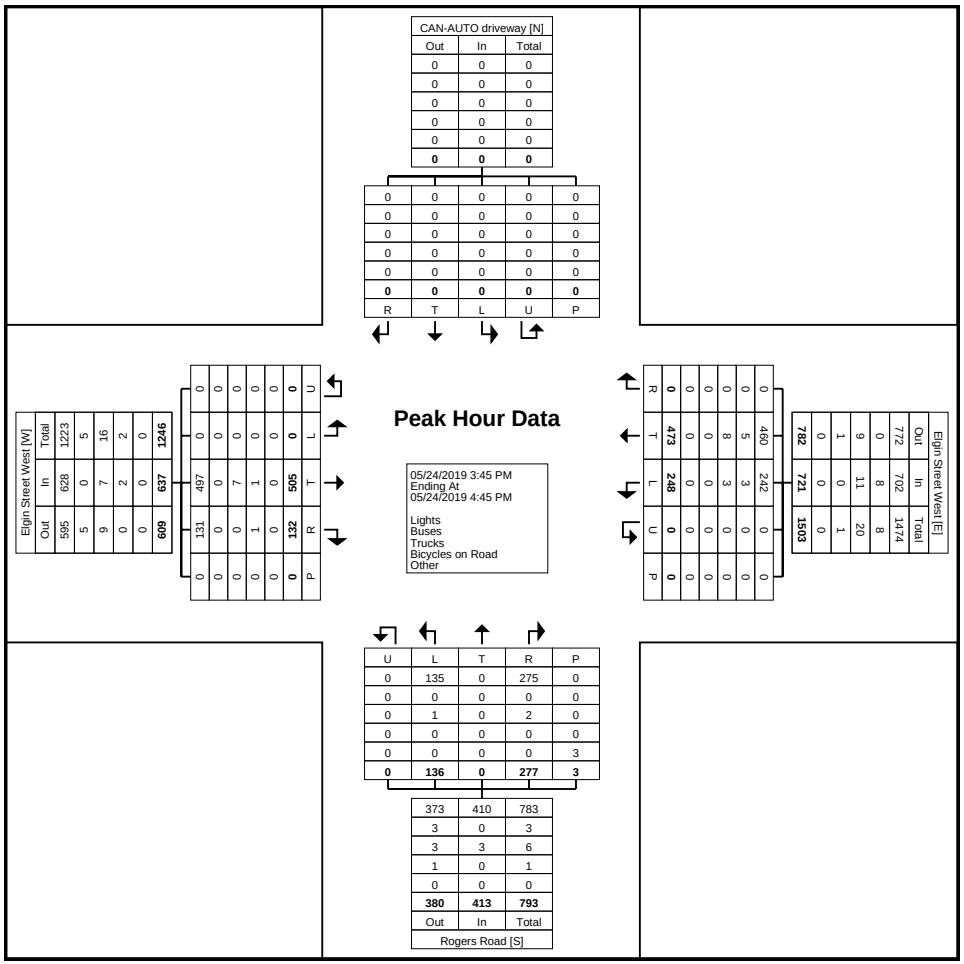
Turning Movement Peak Hour Data (3:45 PM)

Start Time	CAN-AUTO driveway Southbound						Elgin Street West Westbound						Rogers Road Northbound						Elgin Street West Eastbound						
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
3:45 PM	0	0	0	0	0	0	0	123	55	0	0	178	68	0	41	0	0	109	25	112	0	0	0	137	424
4:00 PM	0	0	0	0	0	0	0	120	64	0	0	184	67	0	34	0	0	101	34	154	0	0	0	188	473
4:15 PM	0	0	0	0	0	0	0	110	66	0	0	176	73	0	28	0	0	101	33	122	0	0	0	155	432
4:30 PM	0	0	0	0	0	0	0	120	63	0	0	183	69	0	33	0	3	102	40	117	0	0	0	157	442
Total	0	0	0	0	0	0	0	473	248	0	0	721	277	0	136	0	3	413	132	505	0	0	0	637	1771
Approach %	0.0	0.0	0.0	0.0	-	-	0.0	65.6	34.4	0.0	-	-	67.1	0.0	32.9	0.0	-	-	20.7	79.3	0.0	0.0	-	-	-
Total %	0.0	0.0	0.0	0.0	-	0.0	0.0	26.7	14.0	0.0	-	40.7	15.6	0.0	7.7	0.0	-	23.3	7.5	28.5	0.0	0.0	-	36.0	-
PHF	0.000	0.000	0.000	0.000	-	0.000	0.000	0.961	0.939	0.000	-	0.980	0.949	0.000	0.829	0.000	-	0.947	0.825	0.820	0.000	0.000	-	0.847	0.936
Lights	0	0	0	0	-	0	0	460	242	0	-	702	275	0	135	0	-	410	131	497	0	0	-	628	1740
% Lights	-	-	-	-	-	-	-	97.3	97.6	-	-	97.4	99.3	-	99.3	-	-	99.3	99.2	98.4	-	-	-	98.6	98.2
Buses	0	0	0	0	-	0	0	5	3	0	-	8	0	0	0	0	-	0	0	0	0	0	-	0	8
% Buses	-	-	-	-	-	-	-	1.1	1.2	-	-	1.1	0.0	-	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.5
Trucks	0	0	0	0	-	0	0	8	3	0	-	11	2	0	1	0	-	3	0	7	0	0	-	7	21
% Trucks	-	-	-	-	-	-	-	1.7	1.2	-	-	1.5	0.7	-	0.7	-	-	0.7	0.0	1.4	-	-	-	1.1	1.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	1	0	0	-	2	2
% Bicycles on Road	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.8	0.2	-	-	-	0.3	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 akung@LEA.ca

Count Name: 20045_RogersRd&ElginStW-FRI
Site Code: 20045
Start Date: 05/24/2019



Turning Movement Peak Hour Data Plot (3:45 PM)

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 akung@LEA.ca

Count Name: 20045_RogersRd&ElginStW-SAT
Site Code: 20045
Start Date: 05/25/2019

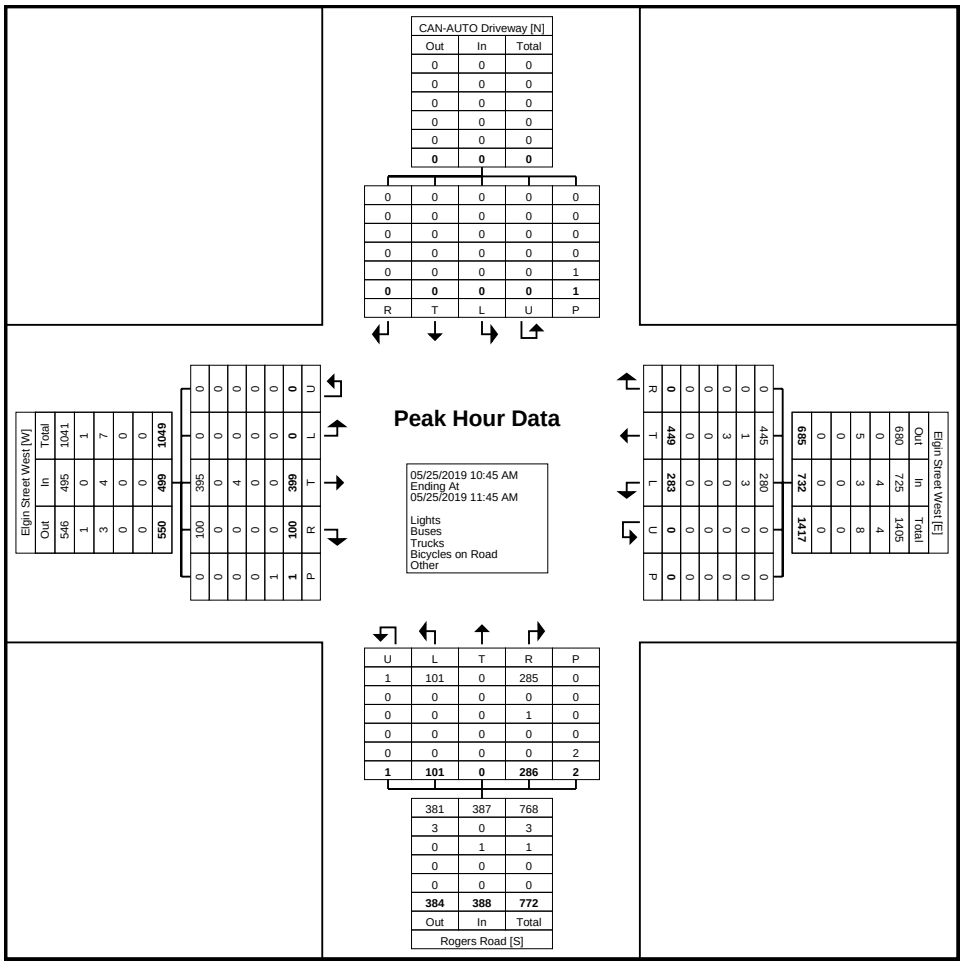
Turning Movement Peak Hour Data (10:45 AM)

Start Time	CAN-AUTO Driveway Southbound						Elgin Street West Westbound						Rogers Road Northbound						Elgin Street West Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
10:45 AM	0	0	0	0	1	0	0	104	70	0	0	174	65	0	25	0	0	90	32	84	0	0	1	116	380
11:00 AM	0	0	0	0	0	0	0	116	67	0	0	183	77	0	16	1	2	94	29	93	0	0	0	122	399
11:15 AM	0	0	0	0	0	0	0	125	71	0	0	196	74	0	32	0	0	106	16	121	0	0	0	137	439
11:30 AM	0	0	0	0	0	0	0	104	75	0	0	179	70	0	28	0	0	98	23	101	0	0	0	124	401
Total	0	0	0	0	1	0	0	449	283	0	0	732	286	0	101	1	2	388	100	399	0	0	1	499	1619
Approach %	0.0	0.0	0.0	0.0	-	-	0.0	61.3	38.7	0.0	-	-	73.7	0.0	26.0	0.3	-	-	20.0	80.0	0.0	0.0	-	-	-
Total %	0.0	0.0	0.0	0.0	-	0.0	0.0	27.7	17.5	0.0	-	45.2	17.7	0.0	6.2	0.1	-	24.0	6.2	24.6	0.0	0.0	-	30.8	-
PHF	0.000	0.000	0.000	0.000	-	0.000	0.000	0.898	0.943	0.000	-	0.934	0.929	0.000	0.789	0.250	-	0.915	0.781	0.824	0.000	0.000	-	0.911	0.922
Lights	0	0	0	0	-	0	0	445	280	0	-	725	285	0	101	1	-	387	100	395	0	0	-	495	1607
% Lights	-	-	-	-	-	-	-	99.1	98.9	-	-	99.0	99.7	-	100.0	100.0	-	99.7	100.0	99.0	-	-	-	99.2	99.3
Buses	0	0	0	0	-	0	0	1	3	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	4
% Buses	-	-	-	-	-	-	-	0.2	1.1	-	-	0.5	0.0	-	0.0	0.0	-	0.0	0.0	0.0	-	-	-	0.0	0.2
Trucks	0	0	0	0	-	0	0	3	0	0	-	3	1	0	0	0	-	1	0	4	0	0	-	4	8
% Trucks	-	-	-	-	-	-	-	0.7	0.0	-	-	0.4	0.3	-	0.0	0.0	-	0.3	0.0	1.0	-	-	-	0.8	0.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	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
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 akung@LEA.ca

Count Name: 20045_RogersRd&ElginStW-SAT
Site Code: 20045
Start Date: 05/25/2019



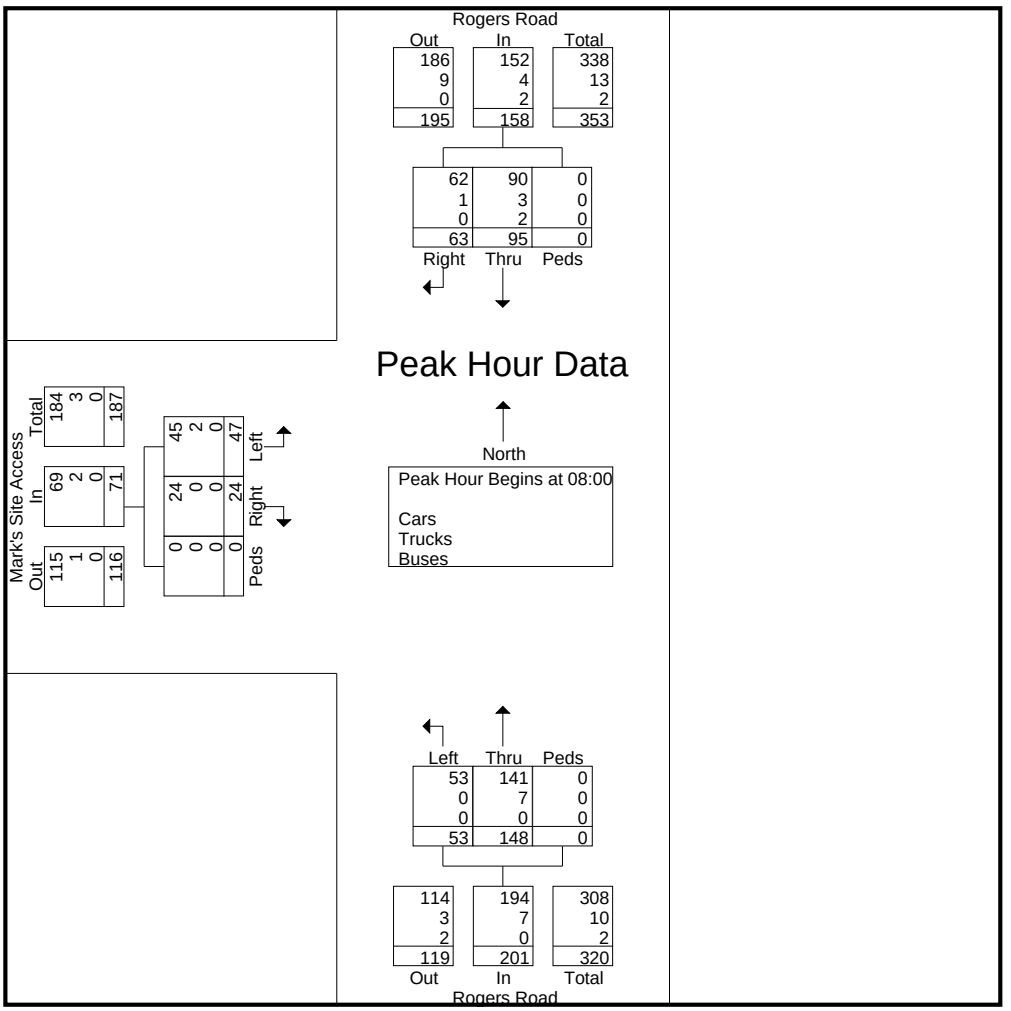
Turning Movement Peak Hour Data Plot (10:45 AM)

LEA Consulting Ltd.

625 Cochrane Drive, 9th Floor
Markham, ON L3R 9R9

File Name : RogersRd&MarksAccess-AM
Site Code : 20045000
Start Date : 2020-01-23
Page No : 3

	Rogers Road Southbound				Rogers Road Northbound				Mark's Site Access Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00													
08:00	16	15	0	31	**15**	33	0	48	8	**8**	0	16	95
08:15	26	**22**	0	**48**	12	41	0	53	**16**	4	0	20	**121**
08:30	**28**	12	0	40	13	32	0	45	15	8	0	**23**	108
08:45	25	14	0	39	13	**42**	0	**55**	8	4	0	12	106
Total Volume	95	63	0	158	53	148	0	201	47	24	0	71	430
% App. Total	60.1	39.9	0		26.4	73.6	0		66.2	33.8	0		
PHF	.848	.716	.000	.823	.883	.881	.000	.914	.734	.750	.000	.772	.888
Cars	90	62	0	152	53	141	0	194	45	24	0	69	415
% Cars	94.7	98.4	0	96.2	100	95.3	0	96.5	95.7	100	0	97.2	96.5
Trucks	3	1	0	4	0	7	0	7	2	0	0	2	13
% Trucks	3.2	1.6	0	2.5	0	4.7	0	3.5	4.3	0	0	2.8	3.0
Buses	2	0	0	2	0	0	0	0	0	0	0	0	2
% Buses	2.1	0	0	1.3	0	0	0	0	0	0	0	0	0.5

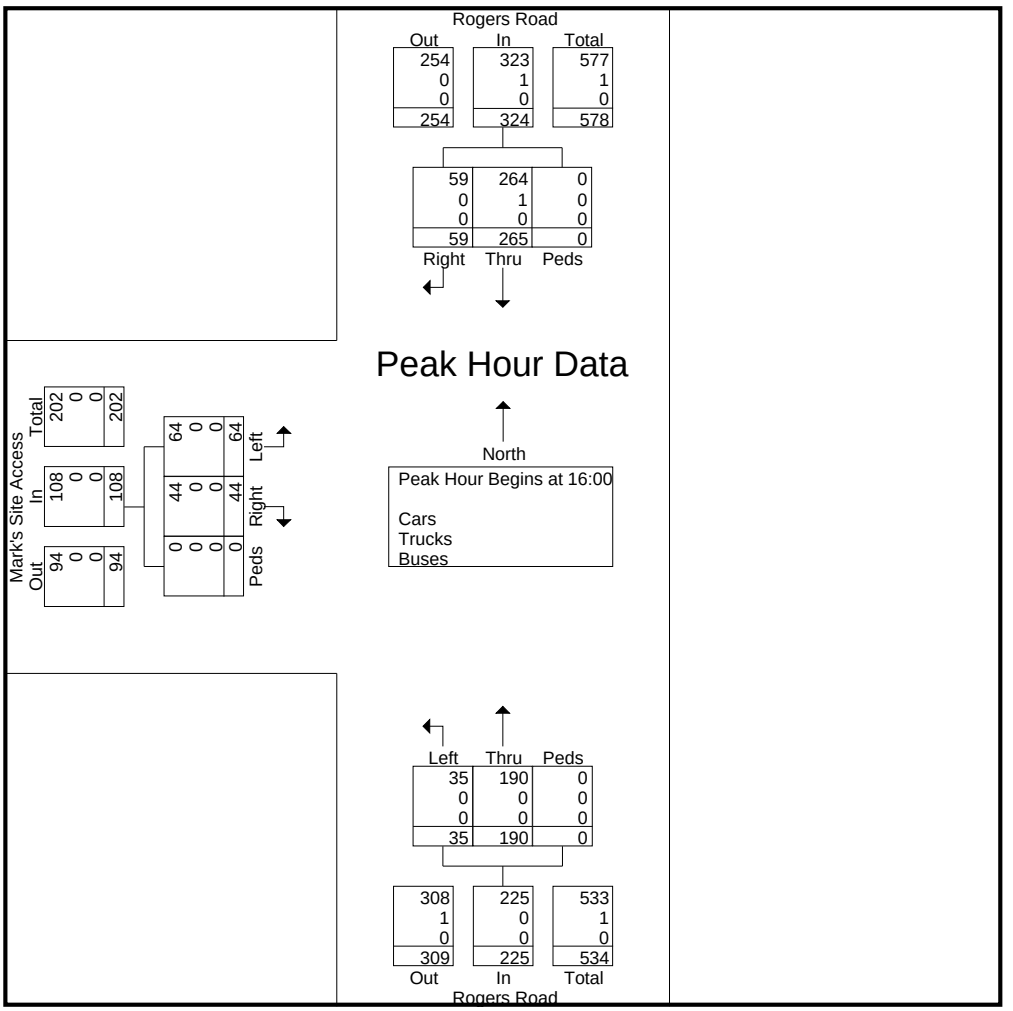


LEA Consulting Ltd.

625 Cochrane Drive, 9th Floor
Markham, ON L3R 9R9

File Name : RogersRd&MarksAccess-PM
Site Code : 20045000
Start Date : 2020-01-23
Page No : 3

	Rogers Road Southbound				Rogers Road Northbound				Mark's Site Access Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 18:15 - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 16:00													
16:00	70	**23**	0	**93**	10	49	0	59	**17**	**15**	0	**32**	**184**
16:15	**71**	11	0	82	**13**	50	0	**63**	16	8	0	24	169
16:30	68	14	0	82	5	36	0	41	15	8	0	23	146
16:45	56	11	0	67	7	**55**	0	62	16	13	0	29	158
Total Volume	265	59	0	324	35	190	0	225	64	44	0	108	657
% App. Total	81.8	18.2	0		15.6	84.4	0		59.3	40.7	0		
PHF	.933	.641	.000	.871	.673	.864	.000	.893	.941	.733	.000	.844	.893
Cars	264	59	0	323	35	190	0	225	64	44	0	108	656
% Cars	99.6	100	0	99.7	100	100	0	100	100	100	0	100	99.8
Trucks	1	0	0	1	0	0	0	0	0	0	0	0	1
% Trucks	0.4	0	0	0.3	0	0	0	0	0	0	0	0	0.2
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0

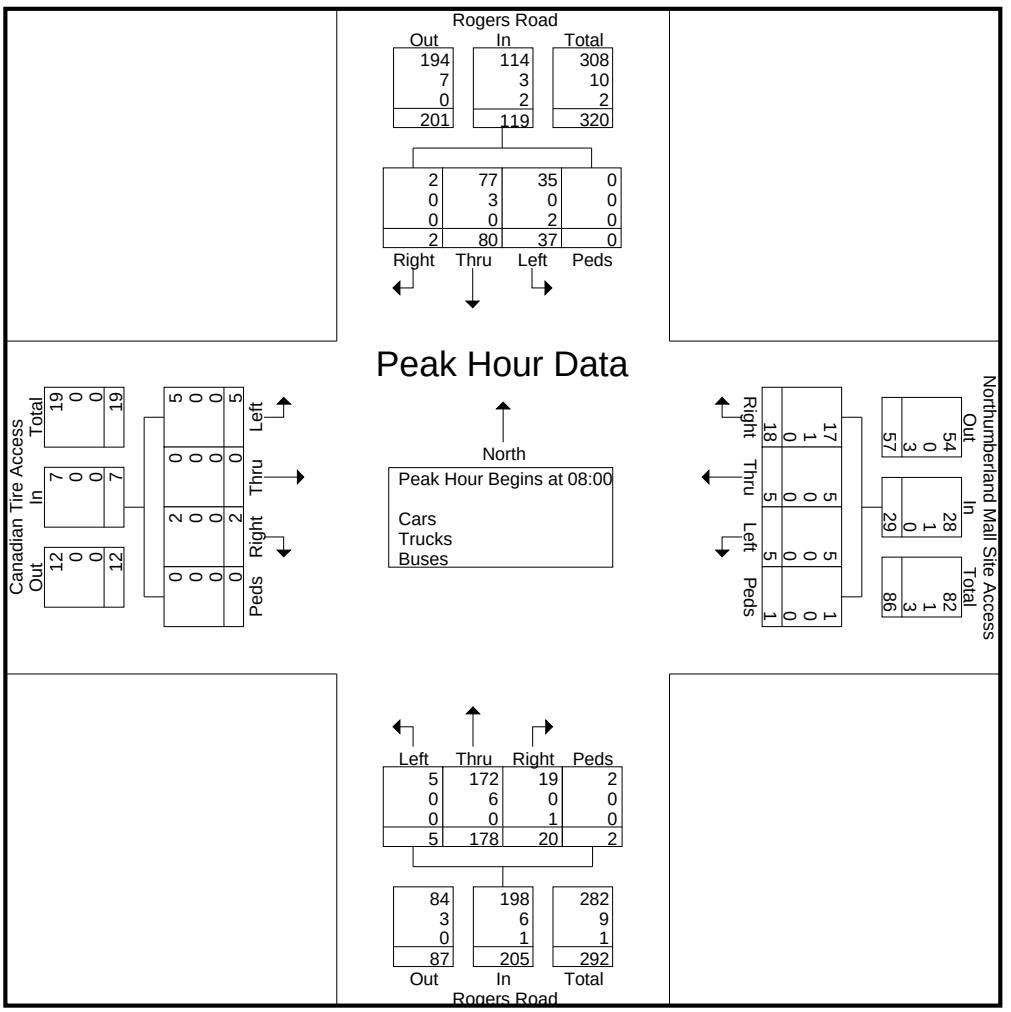


LEA Consulting Ltd.

625 Cochrane Drive, 9th Floor
Markham, ON L3R 9R9

File Name : RogersRd&MallSiteAccess-AM
Site Code : 20045000
Start Date : 2020-01-23
Page No : 3

	Rogers Road Southbound					Northumberland Mall Site Access Westbound					Rogers Road Northbound					Canadian Tire Access Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00																					
08:00	7	16	**1**	0	24	1	**2**	3	0	6	1	43	1	0	45	**2**	0	0	0	**2**	77
08:15	9	21	0	0	30	**2**	1	4	0	7	0	**48**	**7**	0	55	1	0	**1**	0	2	94
08:30	**12**	**23**	1	0	**36**	1	0	4	**1**	6	1	40	6	**2**	49	1	0	0	0	1	92
08:45	9	20	0	0	29	1	2	**7**	0	**10**	**3**	47	6	0	**56**	1	0	1	0	2	**97**
Total Volume	37	80	2	0	119	5	5	18	1	29	5	178	20	2	205	5	0	2	0	7	360
% App. Total	31.1	67.2	1.7	0		17.2	17.2	62.1	3.4		2.4	86.8	9.8	1		71.4	0	28.6	0		
PHF	.771	.870	.500	.000	.826	.625	.625	.643	.250	.725	.417	.927	.714	.250	.915	.625	.000	.500	.000	.875	.928
Cars	35	77	2	0	114	5	5	17	1	28	5	172	19	2	198	5	0	2	0	7	347
% Cars	94.6	96.3	100	0	95.8	100	100	94.4	100	96.6	100	96.6	95.0	100	96.6	100	0	100	0	100	96.4
Trucks	0	3	0	0	3	0	0	1	0	1	0	6	0	0	6	0	0	0	0	0	10
% Trucks	0	3.8	0	0	2.5	0	0	5.6	0	3.4	0	3.4	0	0	2.9	0	0	0	0	0	2.8
Buses	2	0	0	0	2	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	3
% Buses	5.4	0	0	0	1.7	0	0	0	0	0	0	0	5.0	0	0.5	0	0	0	0	0	0.8

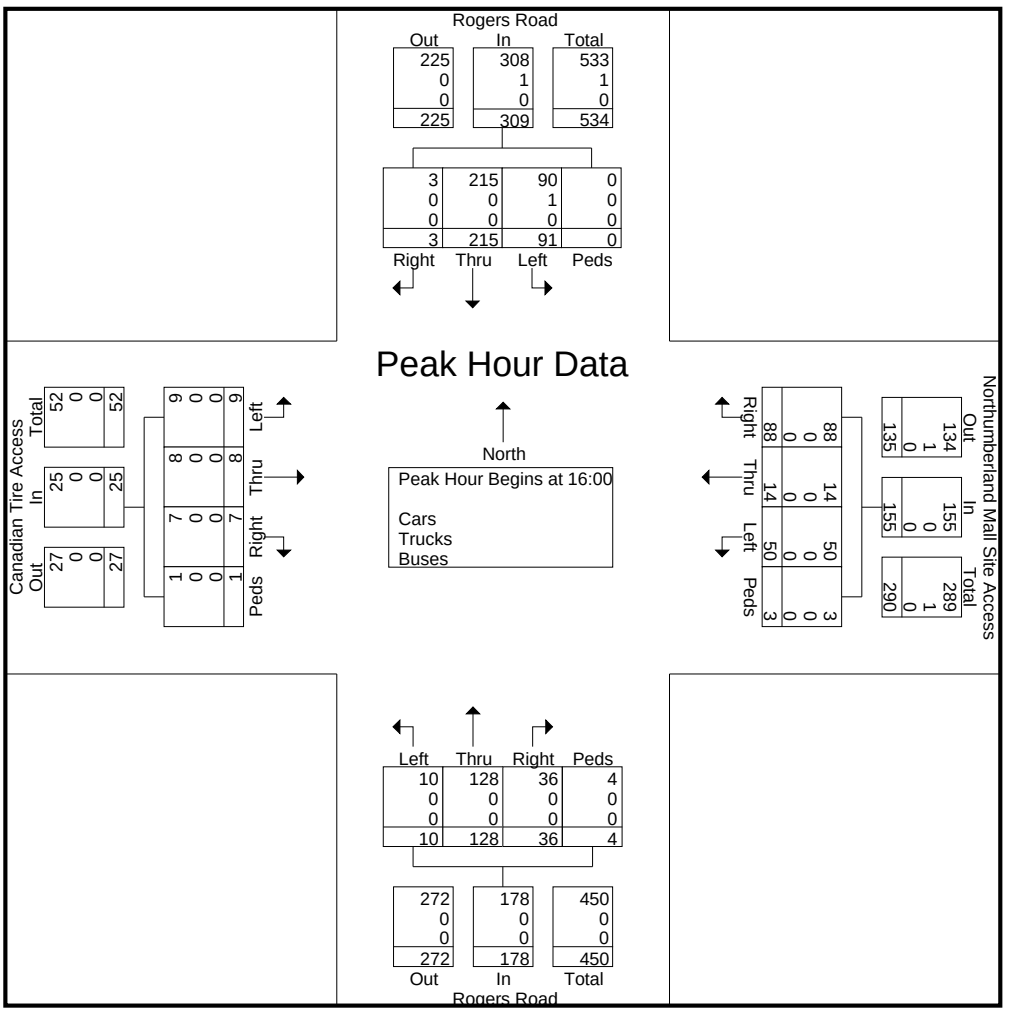


LEA Consulting Ltd.

625 Cochrane Drive, 9th Floor
Markham, ON L3R 9R9

File Name : RogersRd&MallSiteAccess-PM
Site Code : 20045000
Start Date : 2020-01-23
Page No : 3

	Rogers Road Southbound					Northumberland Mall Site Access Westbound					Rogers Road Northbound					Canadian Tire Access Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 18:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	21	**63**	**1**	0	**85**	**17**	**7**	**30**	**2**	**56**	3	25	8	**3**	39	**4**	2	1	**1**	**8**	**188**
16:15	**30**	48	1	0	79	16	2	20	1	39	1	41	**12**	0	**54**	2	**3**	2	0	7	179
16:30	21	54	1	0	76	10	3	21	0	34	**4**	18	8	1	31	2	1	**3**	0	6	147
16:45	19	50	0	0	69	7	2	17	0	26	2	**44**	8	0	54	1	2	1	0	4	153
Total Volume	91	215	3	0	309	50	14	88	3	155	10	128	36	4	178	9	8	7	1	25	667
% App. Total	29.4	69.6	1	0		32.3	9	56.8	1.9		5.6	71.9	20.2	2.2		36	32	28	4		
PHF	.758	.853	.750	.000	.909	.735	.500	.733	.375	.692	.625	.727	.750	.333	.824	.563	.667	.583	.250	.781	.887
Cars	90	215	3	0	308	50	14	88	3	155	10	128	36	4	178	9	8	7	1	25	666
% Cars	98.9	100	100	0	99.7	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99.9
Trucks	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Trucks	1.1	0	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

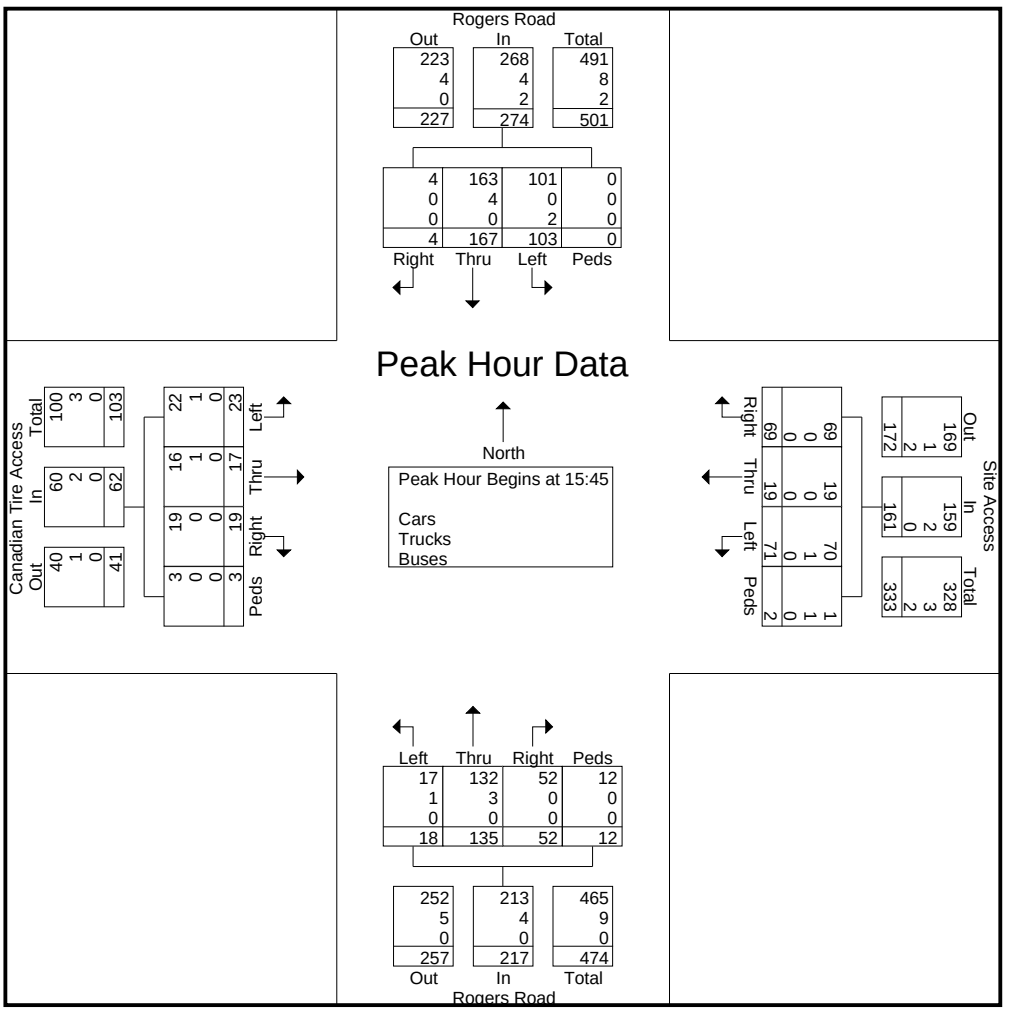


LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

File Name : Rogers&SiteAccess-FRI
Site Code : 20045019
Start Date : 2019-05-24
Page No : 3

	Rogers Road Southbound					Site Access Westbound					Rogers Road Northbound					Canadian Tire Access Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 15:45 to 16:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 15:45																					
15:45	20	36	**1**	0	57	17	**8**	13	0	38	**9**	40	13	1	63	**9**	4	**6**	**1**	**20**	178
16:00	**30**	**52**	1	0	**83**	22	1	**20**	**1**	44	2	22	10	**5**	39	9	3	6	1	19	185
16:15	27	46	1	0	74	**25**	4	16	0	**45**	4	**45**	14	3	**66**	3	4	4	1	12	**197**
16:30	26	33	1	0	60	7	6	20	1	34	3	28	**15**	3	49	2	**6**	3	0	11	154
Total Volume	103	167	4	0	274	71	19	69	2	161	18	135	52	12	217	23	17	19	3	62	714
% App. Total	37.6	60.9	1.5	0		44.1	11.8	42.9	1.2		8.3	62.2	24	5.5		37.1	27.4	30.6	4.8		
PHF	.858	.803	1.00	.000	.825	.710	.594	.863	.500	.894	.500	.750	.867	.600	.822	.639	.708	.792	.750	.775	.906
Cars	101	163	4	0	268	70	19	69	1	159	17	132	52	12	213	22	16	19	3	60	700
% Cars	98.1	97.6	100	0	97.8	98.6	100	100	50.0	98.8	94.4	97.8	100	100	98.2	95.7	94.1	100	100	96.8	98.0
Trucks	0	4	0	0	4	1	0	0	1	2	1	3	0	0	4	1	1	0	0	2	12
% Trucks	0	2.4	0	0	1.5	1.4	0	0	50.0	1.2	5.6	2.2	0	0	1.8	4.3	5.9	0	0	3.2	1.7
Buses	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Buses	1.9	0	0	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3

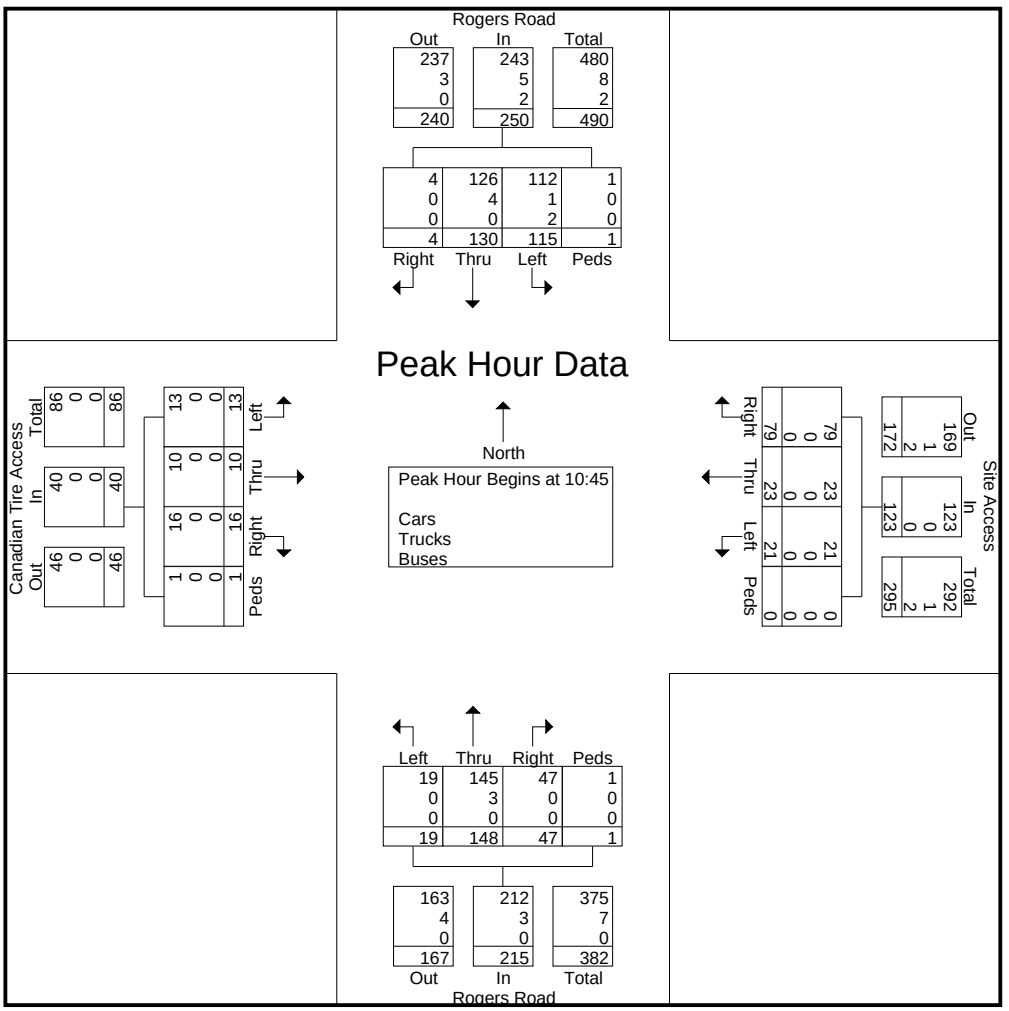


LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

File Name : Rogers&SiteAccess-SAT
Site Code : 20045119
Start Date : 2019-05-25
Page No : 3

	Rogers Road Southbound					Site Access Westbound					Rogers Road Northbound					Canadian Tire Access Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 10:45 to 11:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 10:45																					
10:45	28	29	**2**	0	59	4	**7**	**25**	0	**36**	6	33	10	**1**	50	**4**	**4**	**5**	0	**13**	158
11:00	24	**37**	0	**1**	62	**7**	6	18	0	31	4	40	10	0	54	4	2	3	**1**	10	157
11:15	27	34	2	0	63	6	6	16	0	28	**7**	**47**	12	0	**66**	3	2	4	0	9	**166**
11:30	**36**	30	0	0	**66**	4	4	20	0	28	2	28	**15**	0	45	2	2	4	0	8	147
Total Volume	115	130	4	1	250	21	23	79	0	123	19	148	47	1	215	13	10	16	1	40	628
% App. Total	46	52	1.6	0.4		17.1	18.7	64.2	0		8.8	68.8	21.9	0.5		32.5	25	40	2.5		
PHF	.799	.878	.500	.250	.947	.750	.821	.790	.000	.854	.679	.787	.783	.250	.814	.813	.625	.800	.250	.769	.946
Cars	112	126	4	1	243	21	23	79	0	123	19	145	47	1	212	13	10	16	1	40	618
% Cars	97.4	96.9	100	100	97.2	100	100	100	0	100	100	98.0	100	100	98.6	100	100	100	100	100	98.4
Trucks	1	4	0	0	5	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	8
% Trucks	0.9	3.1	0	0	2.0	0	0	0	0	0	0	2.0	0	0	1.4	0	0	0	0	0	1.3
Buses	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Buses	1.7	0	0	0	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3

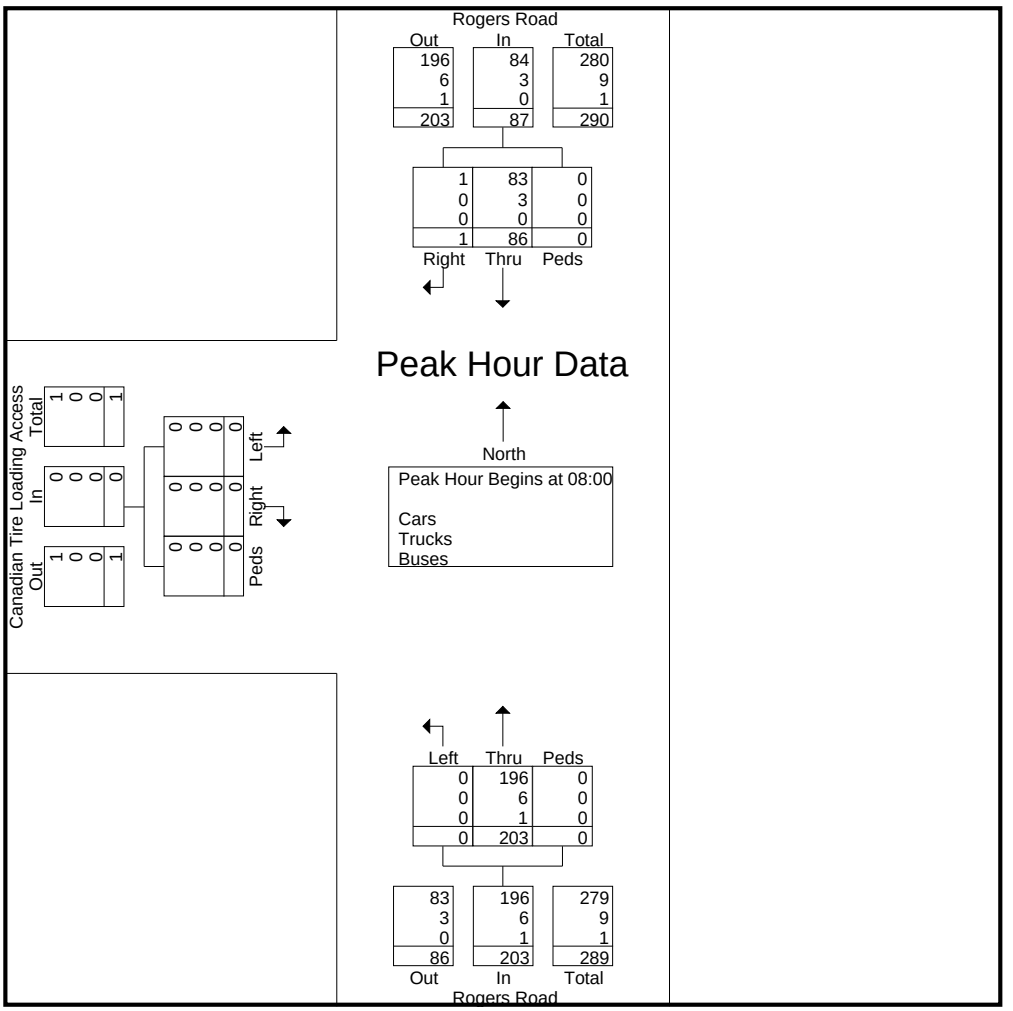


LEA Consulting Ltd.

625 Cochrane Drive, 9th Floor
Markham, ON L3R 9R9

File Name : RogersRd&CanadianTireLoadingAccess-AM
Site Code : 20045000
Start Date : 2020-01-23
Page No : 3

	Rogers Road Southbound				Rogers Road Northbound				Canadian Tire Loading Access Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00													
08:00	16	**1**	0	17	0	45	0	45	0	0	0	0	62
08:15	**24**	0	0	**24**	0	55	0	55	0	0	0	0	**79**
08:30	24	0	0	24	0	47	0	47	0	0	0	0	71
08:45	22	0	0	22	0	**56**	0	**56**	0	0	0	0	78
Total Volume	86	1	0	87	0	203	0	203	0	0	0	0	290
% App. Total	98.9	1.1	0		0	100	0		0	0	0		
PHF	.896	.250	.000	.906	.000	.906	.000	.906	.000	.000	.000	.000	.918
Cars	83	1	0	84	0	196	0	196	0	0	0	0	280
% Cars	96.5	100	0	96.6	0	96.6	0	96.6	0	0	0	0	96.6
Trucks	3	0	0	3	0	6	0	6	0	0	0	0	9
% Trucks	3.5	0	0	3.4	0	3.0	0	3.0	0	0	0	0	3.1
Buses	0	0	0	0	0	1	0	1	0	0	0	0	1
% Buses	0	0	0	0	0	0.5	0	0.5	0	0	0	0	0.3

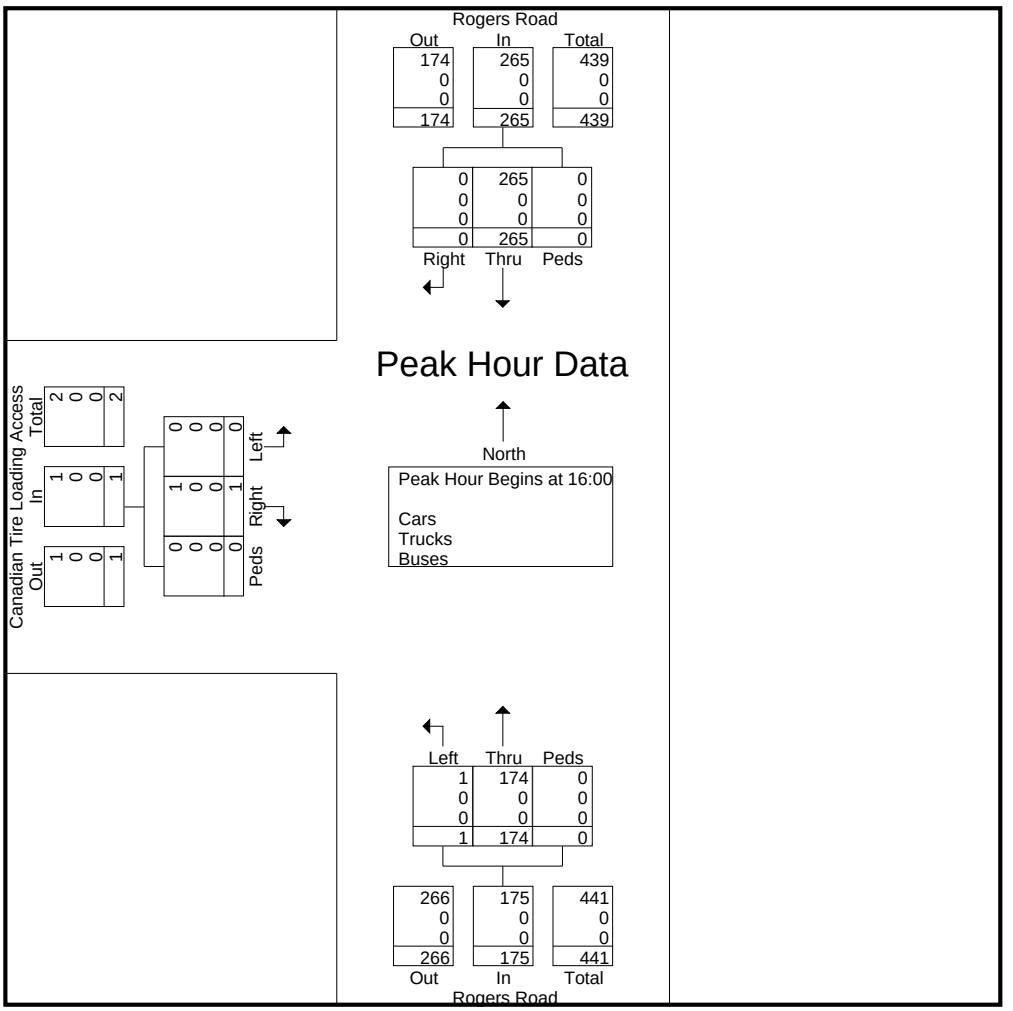


LEA Consulting Ltd.

625 Cochrane Drive, 9th Floor
Markham, ON L3R 9R9

File Name : RogersRd&CanadianTireLoadingAccess-PM
Site Code : 20045000
Start Date : 2020-01-23
Page No : 3

	Rogers Road Southbound				Rogers Road Northbound				Canadian Tire Loading Access Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 18:15 - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 16:00													
16:00	**80**	0	0	**80**	**1**	36	0	37	0	**1**	0	**1**	**118**
16:15	64	0	0	64	0	**54**	0	**54**	0	0	0	0	118
16:30	64	0	0	64	0	30	0	30	0	0	0	0	94
16:45	57	0	0	57	0	54	0	54	0	0	0	0	111
Total Volume	265	0	0	265	1	174	0	175	0	1	0	1	441
% App. Total	100	0	0		0.6	99.4	0		0	100	0		
PHF	.828	.000	.000	.828	.250	.806	.000	.810	.000	.250	.000	.250	.934
Cars	265	0	0	265	1	174	0	175	0	1	0	1	441
% Cars	100	0	0	100	100	100	0	100	0	100	0	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0

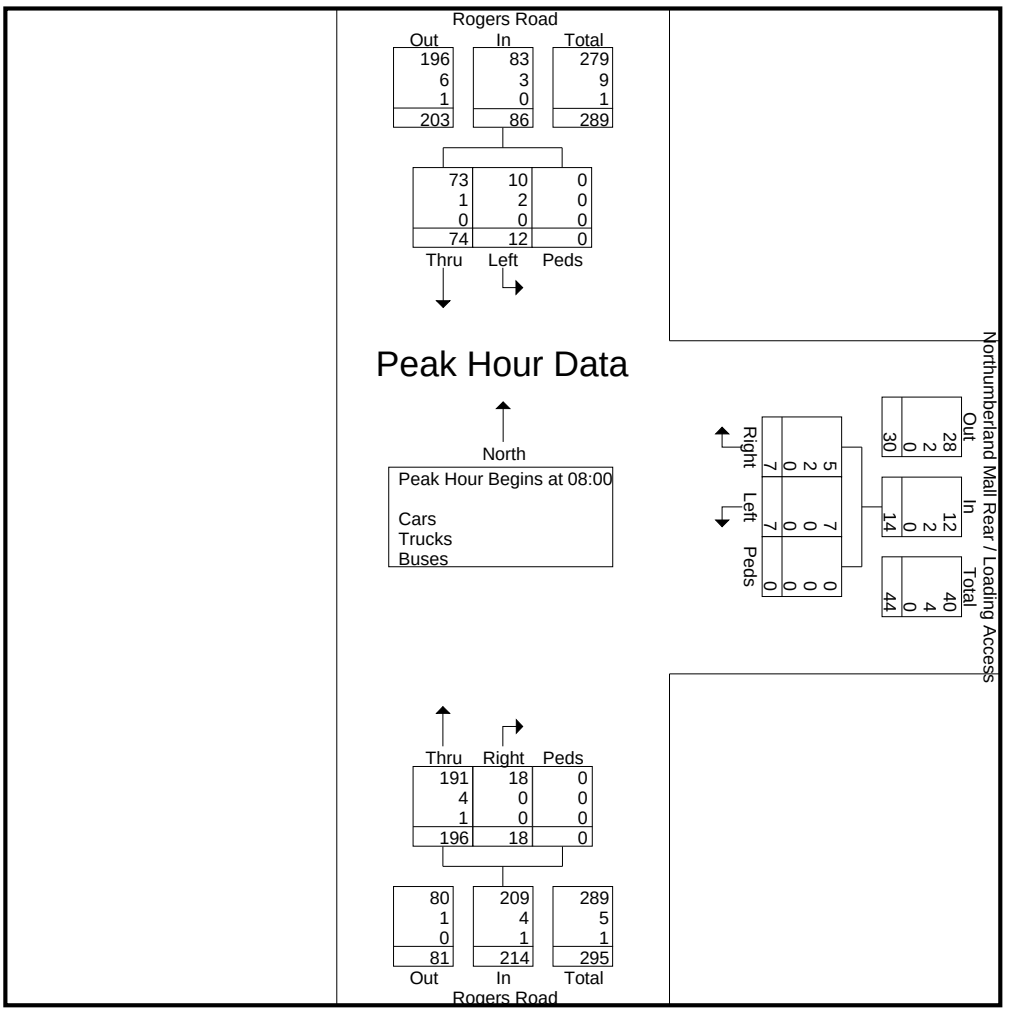


LEA Consulting Ltd.

625 Cochrane Drive, 9th Floor
Markham, ON L3R 9R9

File Name : RogersRd&MallRearLoadingAccess-AM
Site Code : 20045000
Start Date : 2020-01-23
Page No : 3

	Rogers Road Southbound				Northumberland Mall Rear / Loading Access Westbound				Rogers Road Northbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00													
08:00	2	14	0	16	1	0	0	1	45	3	0	48	65
08:15	3	**21**	0	**24**	0	2	0	2	53	3	0	56	82
08:30	**5**	19	0	24	**4**	**3**	0	**7**	44	**6**	0	50	81
08:45	2	20	0	22	2	2	0	4	**54**	6	0	**60**	**86**
Total Volume	12	74	0	86	7	7	0	14	196	18	0	214	314
% App. Total	14	86	0		50	50	0		91.6	8.4	0		
PHF	.600	.881	.000	.896	.438	.583	.000	.500	.907	.750	.000	.892	.913
Cars	10	73	0	83	7	5	0	12	191	18	0	209	304
% Cars	83.3	98.6	0	96.5	100	71.4	0	85.7	97.4	100	0	97.7	96.8
Trucks	2	1	0	3	0	2	0	2	4	0	0	4	9
% Trucks	16.7	1.4	0	3.5	0	28.6	0	14.3	2.0	0	0	1.9	2.9
Buses	0	0	0	0	0	0	0	0	1	0	0	1	1
% Buses	0	0	0	0	0	0	0	0	0.5	0	0	0.5	0.3

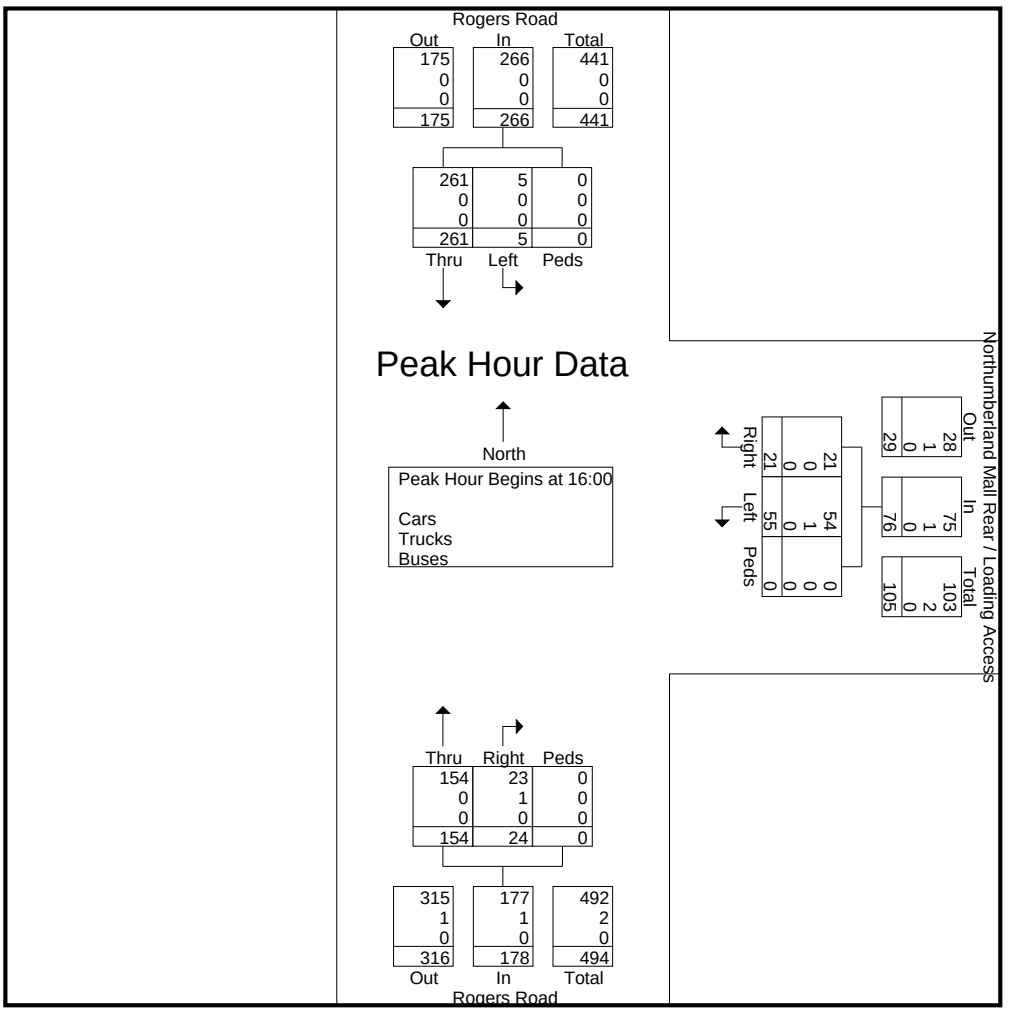


LEA Consulting Ltd.

625 Cochrane Drive, 9th Floor
Markham, ON L3R 9R9

File Name : RogersRd&MallRearLoadingAccess-PM
Site Code : 20045000
Start Date : 2020-01-23
Page No : 3

	Rogers Road Southbound				Northumberland Mall Rear / Loading Access Westbound				Rogers Road Northbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 18:15 - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 16:00													
16:00	**2**	**79**	0	**81**	11	**7**	0	18	30	6	0	36	135
16:15	2	62	0	64	**16**	7	0	**23**	47	**9**	0	**56**	**143**
16:30	0	64	0	64	14	4	0	18	26	4	0	30	112
16:45	1	56	0	57	14	3	0	17	**51**	5	0	56	130
Total Volume	5	261	0	266	55	21	0	76	154	24	0	178	520
% App. Total	1.9	98.1	0		72.4	27.6	0		86.5	13.5	0		
PHF	.625	.826	.000	.821	.859	.750	.000	.826	.755	.667	.000	.795	.909
Cars	5	261	0	266	54	21	0	75	154	23	0	177	518
% Cars	100	100	0	100	98.2	100	0	98.7	100	95.8	0	99.4	99.6
Trucks	0	0	0	0	1	0	0	1	0	1	0	1	2
% Trucks	0	0	0	0	1.8	0	0	1.3	0	4.2	0	0.6	0.4
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0

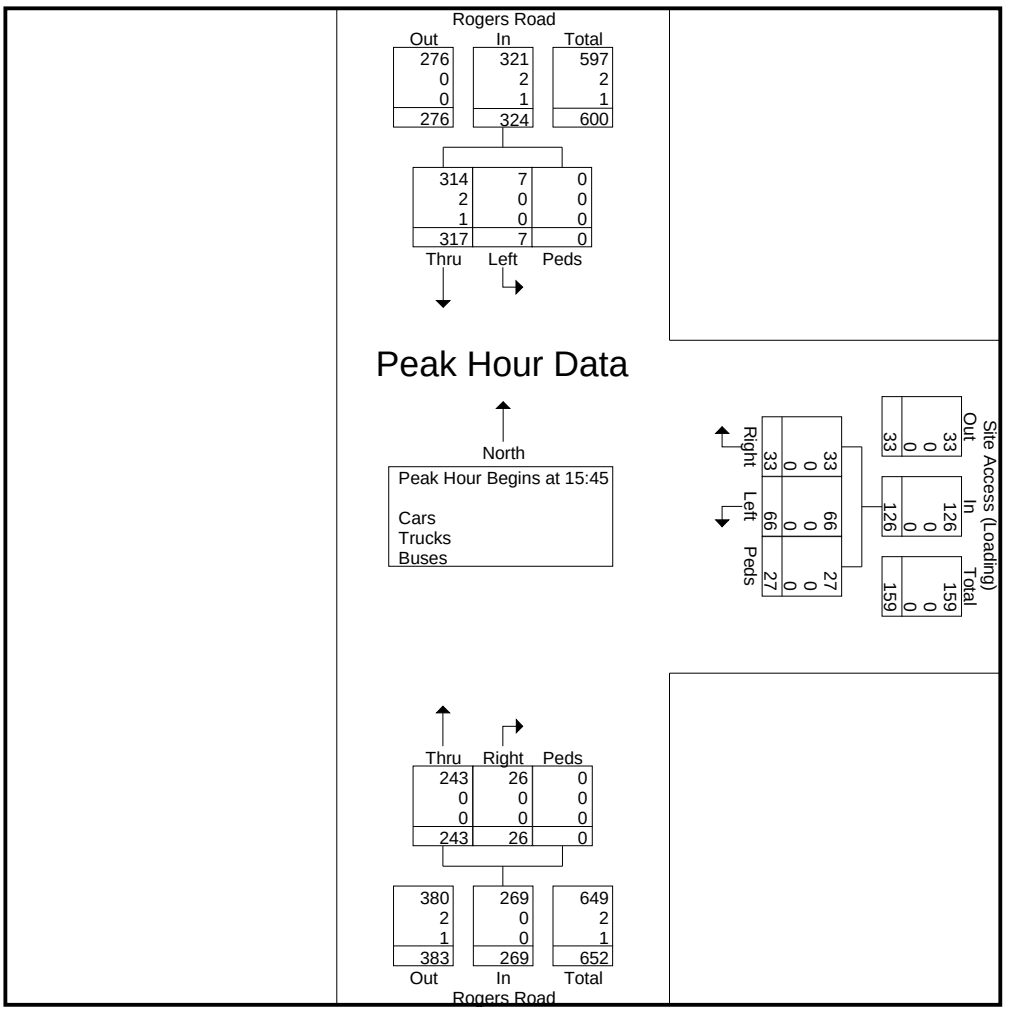


LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

File Name : Rogers&SiteLoadingAccess-FRI
Site Code : 20045019
Start Date : 2019-05-24
Page No : 3

	Rogers Road Southbound				Site Access (Loading) Westbound				Rogers Road Northbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 15:00 to 18:45 - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 15:45													
15:45	1	84	0	85	13	**9**	**8**	30	64	4	0	68	183
16:00	1	**87**	0	**88**	**20**	9	7	**36**	40	7	0	47	171
16:15	1	81	0	82	20	9	6	35	**71**	7	0	**78**	**195**
16:30	**4**	65	0	69	13	6	6	25	68	**8**	0	76	170
Total Volume	7	317	0	324	66	33	27	126	243	26	0	269	719
% App. Total	2.2	97.8	0		52.4	26.2	21.4		90.3	9.7	0		
PHF	.438	.911	.000	.920	.825	.917	.844	.875	.856	.813	.000	.862	.922
Cars	7	314	0	321	66	33	27	126	243	26	0	269	716
% Cars	100	99.1	0	99.1	100	100	100	100	100	100	0	100	99.6
Trucks	0	2	0	2	0	0	0	0	0	0	0	0	2
% Trucks	0	0.6	0	0.6	0	0	0	0	0	0	0	0	0.3
Buses	0	1	0	1	0	0	0	0	0	0	0	0	1
% Buses	0	0.3	0	0.3	0	0	0	0	0	0	0	0	0.1

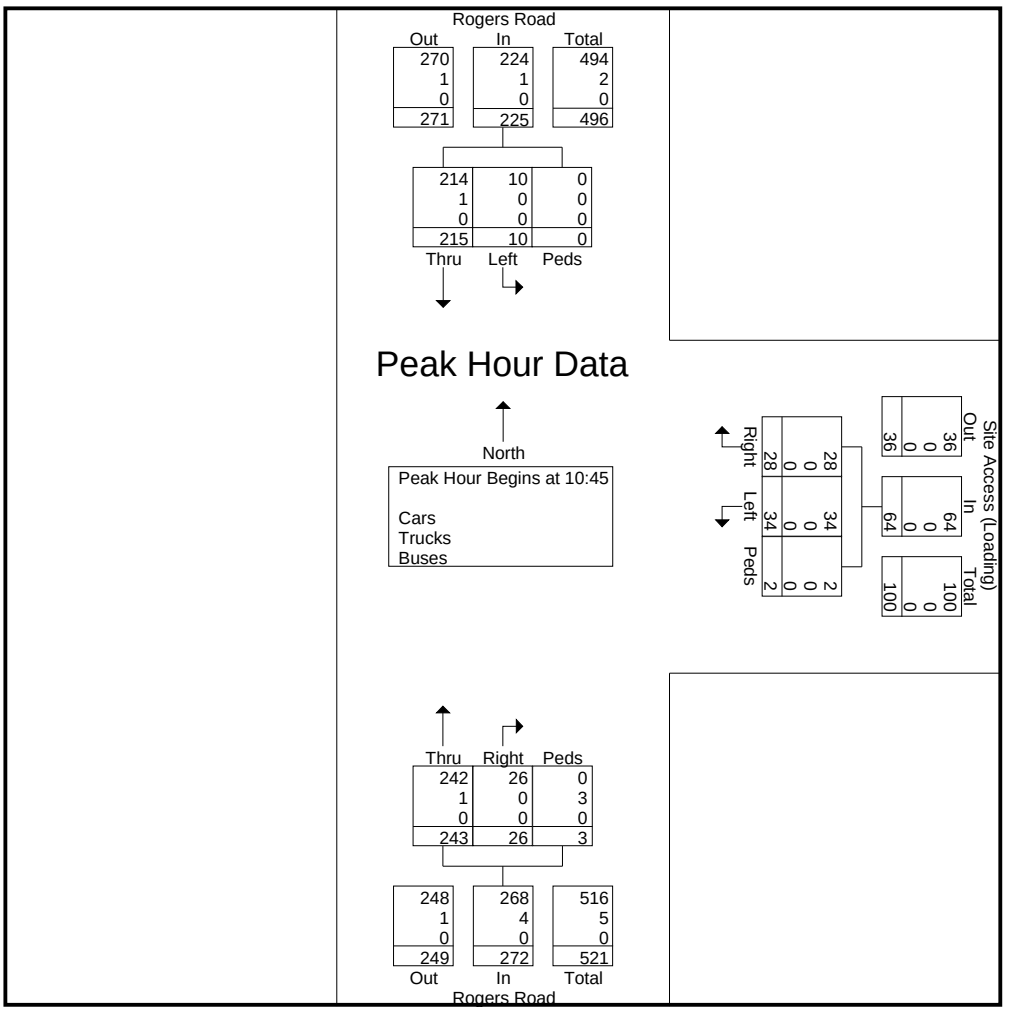


LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

File Name : Rogers&SiteLoadingAccess-SAT
Site Code : 20045119
Start Date : 2019-05-25
Page No : 3

	Rogers Road Southbound				Site Access (Loading) Westbound				Rogers Road Northbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 10:00 to 15:45 - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 10:45													
10:45	**5**	44	0	49	7	**8**	**1**	16	57	6	0	63	128
11:00	3	53	0	56	**14**	6	0	**20**	59	8	0	67	143
11:15	1	**62**	0	**63**	9	8	1	18	**76**	3	0	**79**	**160**
11:30	1	56	0	57	4	6	0	10	51	**9**	**3**	63	130
Total Volume	10	215	0	225	34	28	2	64	243	26	3	272	561
% App. Total	4.4	95.6	0		53.1	43.8	3.1		89.3	9.6	1.1		
PHF	.500	.867	.000	.893	.607	.875	.500	.800	.799	.722	.250	.861	.877
Cars	10	214	0	224	34	28	2	64	242	26	0	268	556
% Cars	100	99.5	0	99.6	100	100	100	100	99.6	100	0	98.5	99.1
Trucks	0	1	0	1	0	0	0	0	1	0	3	4	5
% Trucks	0	0.5	0	0.4	0	0	0	0	0.4	0	100	1.5	0.9
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0



LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_RogersRd&CarlisleSt-AM
Site Code: 20045
Start Date: 01/23/2020

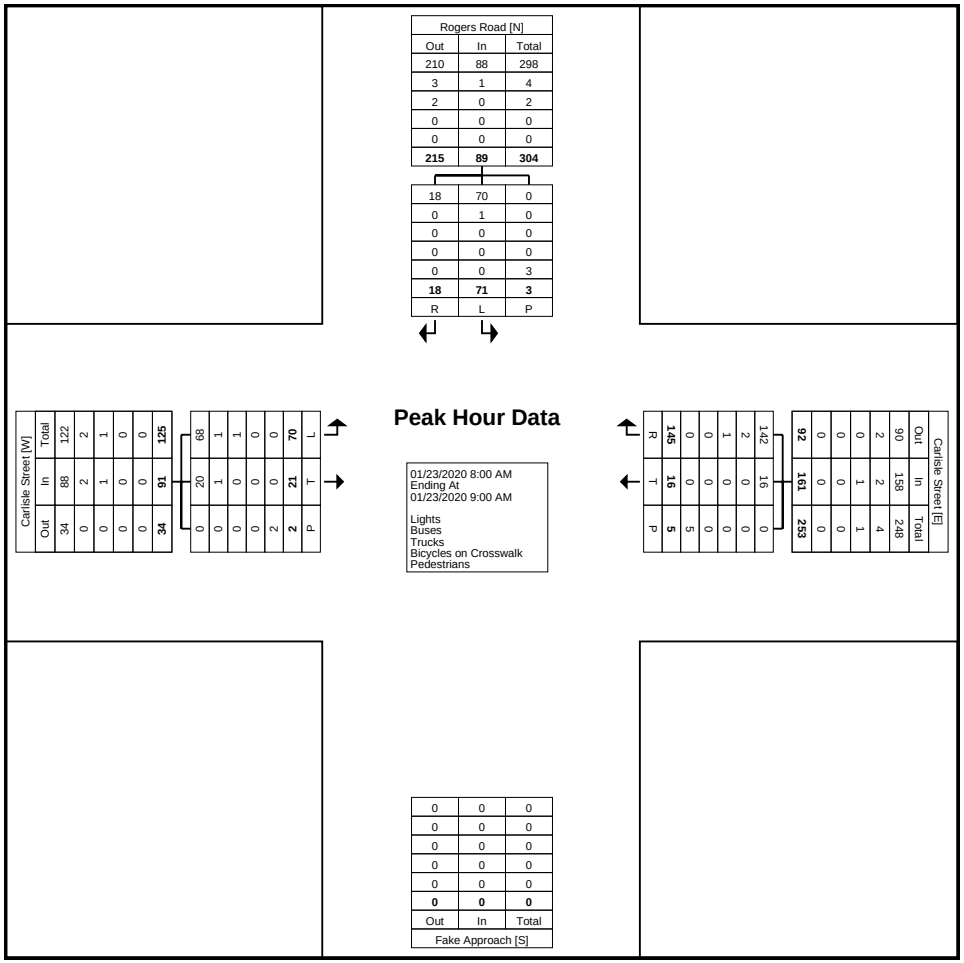
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Rogers Road Southbound				Carlisle Street Westbound				Carlisle Street Eastbound				
	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
8:00 AM	9	5	2	14	2	35	0	37	16	1	0	17	68
8:15 AM	19	5	0	24	3	33	1	36	20	2	1	22	82
8:30 AM	23	4	1	27	8	34	1	42	19	13	0	32	101
8:45 AM	20	4	0	24	3	43	3	46	15	5	1	20	90
Total	71	18	3	89	16	145	5	161	70	21	2	91	341
Approach %	79.8	20.2	-	-	9.9	90.1	-	-	76.9	23.1	-	-	-
Total %	20.8	5.3	-	26.1	4.7	42.5	-	47.2	20.5	6.2	-	26.7	-
PHF	0.772	0.900	-	0.824	0.500	0.843	-	0.875	0.875	0.404	-	0.711	0.844
Lights	70	18	-	88	16	142	-	158	68	20	-	88	334
% Lights	98.6	100.0	-	98.9	100.0	97.9	-	98.1	97.1	95.2	-	96.7	97.9
Buses	1	0	-	1	0	2	-	2	1	1	-	2	5
% Buses	1.4	0.0	-	1.1	0.0	1.4	-	1.2	1.4	4.8	-	2.2	1.5
Trucks	0	0	-	0	0	1	-	1	1	0	-	1	2
% Trucks	0.0	0.0	-	0.0	0.0	0.7	-	0.6	1.4	0.0	-	1.1	0.6
Bicycles on Crosswalk	-	-	0	-	-	-	0	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	0.0	-	-	-	0.0	-	-	-	0.0	-	-
Pedestrians	-	-	3	-	-	-	5	-	-	-	2	-	-
% Pedestrians	-	-	100.0	-	-	-	100.0	-	-	-	100.0	-	-

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_RogersRd&CarlisleSt-AM
Site Code: 20045
Start Date: 01/23/2020



Turning Movement Peak Hour Data Plot (8:00 AM)

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_RogersRd&CarlisleSt-PM
Site Code: 20045
Start Date: 01/23/2020

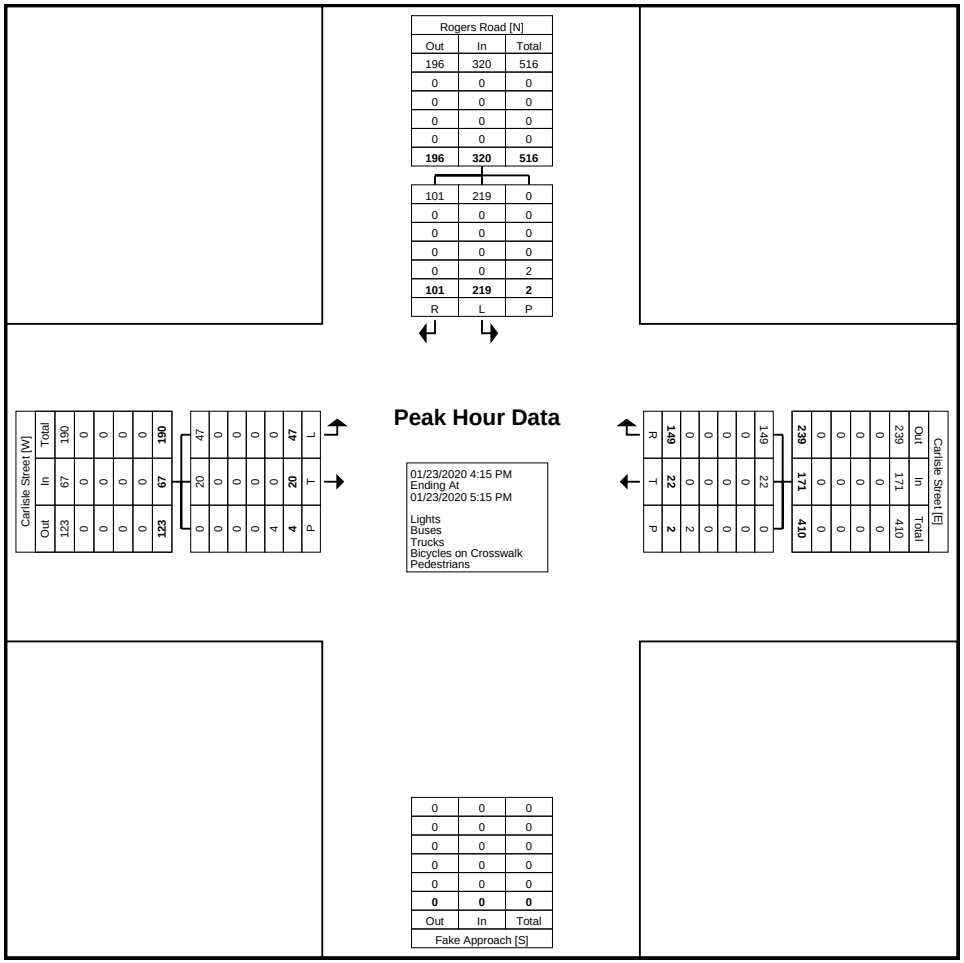
Turning Movement Peak Hour Data (4:15 PM)

Start Time	Rogers Road Southbound				Carlisle Street Westbound				Carlisle Street Eastbound				
	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
4:15 PM	58	25	0	83	6	43	0	49	14	5	1	19	151
4:30 PM	55	29	0	84	4	25	1	29	5	5	0	10	123
4:45 PM	53	21	2	74	4	43	1	47	14	4	1	18	139
5:00 PM	53	26	0	79	8	38	0	46	14	6	2	20	145
Total	219	101	2	320	22	149	2	171	47	20	4	67	558
Approach %	68.4	31.6	-	-	12.9	87.1	-	-	70.1	29.9	-	-	-
Total %	39.2	18.1	-	57.3	3.9	26.7	-	30.6	8.4	3.6	-	12.0	-
PHF	0.944	0.871	-	0.952	0.688	0.866	-	0.872	0.839	0.833	-	0.838	0.924
Lights	219	101	-	320	22	149	-	171	47	20	-	67	558
% Lights	100.0	100.0	-	100.0	100.0	100.0	-	100.0	100.0	100.0	-	100.0	100.0
Buses	0	0	-	0	0	0	-	0	0	0	-	0	0
% Buses	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0
Trucks	0	0	-	0	0	0	-	0	0	0	-	0	0
% Trucks	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	-	-	-	0.0	-	-
Pedestrians	-	-	2	-	-	-	2	-	-	-	4	-	-
% Pedestrians	-	-	100.0	-	-	-	100.0	-	-	-	100.0	-	-

LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 Klo@LEA.ca

Count Name: 20045_RogersRd&CarlisleSt-PM
Site Code: 20045
Start Date: 01/23/2020



Turning Movement Peak Hour Data Plot (4:15 PM)

LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

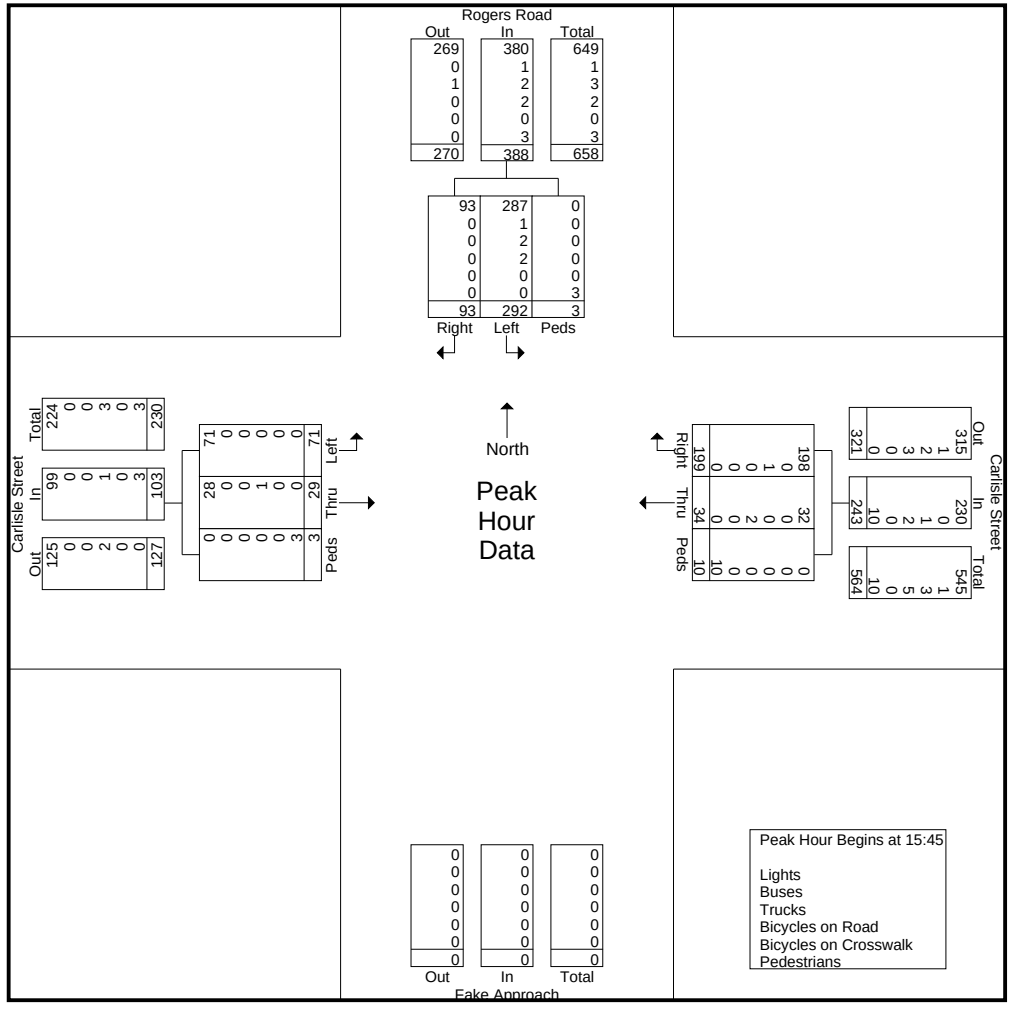
File Name : 20045_RogersRd&CarlisleSt-FRI_660555_05-24-2019
Site Code : 20045
Start Date : 2019-05-24
Page No : 3

	Rogers Road Southbound				Carlisle Street Westbound				Carlisle Street Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 15:45 to 16:30 - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 15:45													
15:45	**78**	19	0	97	**9**	49	4	62	19	3	**1**	23	182
16:00	76	**31**	1	**108**	7	39	**5**	51	8	8	1	17	176
16:15	72	29	0	101	9	54	1	64	**25**	**11**	0	**36**	**201**
16:30	66	14	**2**	82	9	**57**	0	**66**	19	7	1	27	175
Total Volume	292	93	3	388	34	199	10	243	71	29	3	103	734
% App. Total	75.3	24	0.8		14	81.9	4.1		68.9	28.2	2.9		
PHF	.936	.750	.375	.898	.944	.873	.500	.920	.710	.659	.750	.715	.913
Lights	287	93	0	380	32	198	0	230	71	28	0	99	709
% Lights	98.3	100	0	97.9	94.1	99.5	0	94.7	100	96.6	0	96.1	96.6
Buses	1	0	0	1	0	0	0	0	0	0	0	0	1
% Buses	0.3	0	0	0.3	0	0	0	0	0	0	0	0	0.1
Trucks	2	0	0	2	0	1	0	1	0	0	0	0	3
% Trucks	0.7	0	0	0.5	0	0.5	0	0.4	0	0	0	0	0.4
Bicycles on Road	2	0	0	2	2	0	0	2	0	1	0	1	5
% Bicycles on Road	0.7	0	0	0.5	5.9	0	0	0.8	0	3.4	0	1.0	0.7
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	3	3	0	0	10	10	0	0	3	3	16
% Pedestrians	0	0	100	0.8	0	0	100	4.1	0	0	100	2.9	2.2

LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

File Name : 20045_RogersRd&CarlisleSt-FRI_660555_05-24-2019
Site Code : 20045
Start Date : 2019-05-24
Page No : 4



LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

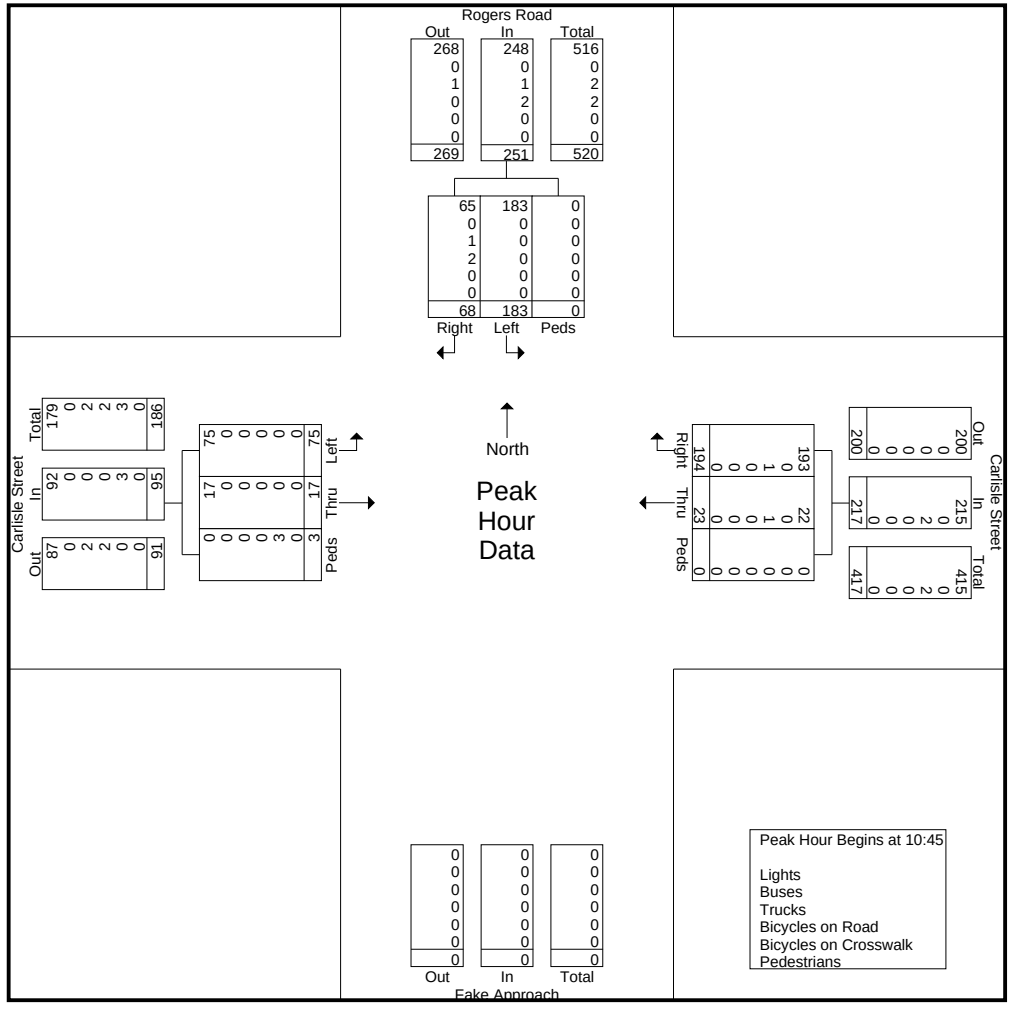
File Name : 20045_RogersRd&CarlisleSt-SAT_660556_05-25-2019
Site Code : 20045
Start Date : 2019-05-25
Page No : 4

	Rogers Road Southbound				Carlisle Street Westbound				Carlisle Street Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 10:45 to 11:30 - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 10:45													
10:45	43	8	0	51	3	47	0	50	16	4	0	20	121
11:00	**51**	16	0	67	5	46	0	51	**21**	5	**3**	**29**	147
11:15	42	**29**	0	**71**	6	**58**	0	**64**	21	**7**	0	28	**163**
11:30	47	15	0	62	**9**	43	0	52	17	1	0	18	132
Total Volume	183	68	0	251	23	194	0	217	75	17	3	95	563
% App. Total	72.9	27.1	0		10.6	89.4	0		78.9	17.9	3.2		
PHF	.897	.586	.000	.884	.639	.836	.000	.848	.893	.607	.250	.819	.863
Lights	183	65	0	248	22	193	0	215	75	17	0	92	555
% Lights	100	95.6	0	98.8	95.7	99.5	0	99.1	100	100	0	96.8	98.6
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	0	1	0	1	1	1	0	2	0	0	0	0	3
% Trucks	0	1.5	0	0.4	4.3	0.5	0	0.9	0	0	0	0	0.5
Bicycles on Road	0	2	0	2	0	0	0	0	0	0	0	0	2
% Bicycles on Road	0	2.9	0	0.8	0	0	0	0	0	0	0	0	0.4
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	3	3	3
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	100	3.2	0.5
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0

LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

File Name : 20045_RogersRd&CarlisleSt-SAT_660556_05-25-2019
Site Code : 20045
Start Date : 2019-05-25
Page No : 5



Programmed EPAC Data

5/30/200
10:13:40P

Intersection Name: Elgin and Northumberland Mall **Intersection Alias: 100**

Access Code: 9999 Channel: 5 Address: 0 Revision: 3.30d

Access Data

Port 2 Comm :1200 Baud
Port 3 Comm :1200 Baud

Phase Data

Vehical Basic Timings

Phase	Min_Grn	Passage	Max1	Max2	Yellow	All Red
2	20	5.0	45	45	4.1	2.1
4	8	5.0	15	15	4.1	2.4
6	20	5.0	45	45	4.1	2.1

Vehical Density Timings

Added Initial	Max_Initial	Time B4 Reduction	Cars Before Reduction	Time To Reduce	Min_Gap
0.0	0	0	0	0	0.0
0.0	0	0	0	0	0.0
0.0	0	0	0	0	0.0

Pedestrian Timing

Phase	Walk	Ped Clear	Flashing Walk	Extended Ped Clear	Actuated Rest in Walk
2	10	15	No	0	Yes
4	0	0	No	0	No
6	10	15	No	0	Yes

General Control

Initialize	Non-Act Response	Veh Recall	Ped Recall	Recall Delay
Yellow	NonActI	Max	Non	0
Inactive	None	None	None	0
Yellow	NonActI	Max	Non	0

Miscellaneous

Non Lock	Dual Entry	Last Car Passage	Conditional Service	No Simultaneous Gap Out
Yes	Yes	No	No	No
Yes	Yes	No	No	No
No	Yes	No	No	No

Special Sequence
Default Data

Vehical Detector Phase Assignment

Assigned Phase	Mode	Switched Phase	Extend	Delay

Default Data

Pedestrian Detector
Default Data

Special Detector Phase Assignment

Assign Phase	Mode	Switched Phase	Extend	Delay

Default Data

Unit Data

General Control

Startup Time: 5sec Startup State: Flash Red Revert: 4sec
Auto Ped Clear: Yes Stop Time Reset: No Alternate Sequence: 0
ABC connector Input Modes: 0
ABC connector Output Modes: 0
D connector Input Modes: 0
D connector Output Modes: 0

Ring	Input Respons	Output Selection
1	Ring 1	Ring 1
2	Ring 2	Ring 2
3	None	None
4	None	None

Remote Flash
Test A = Flash

Phase	Flash Entry Phase	Flash Exit Phase

Channel	Flash Color	Flash Alternat

Default Data - No Flash

Default Data - No Flash

Overlaps

Overlaps

Phase(s)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trail Red	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring

Phase	Ring	Next Phase
2	1	3
4	1	1
6	2	7

Concurrent Phases

Phase(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	1	2	3	4	1	1	3	3	9	1	1	1	1	1	1	1
	5	5	7	7	2	2	4	4								
	6	6	8	8	5	6	7	8								

Programmed EPAC Data IP

9/19/2007
2:38:45PM

Intersection Name: Elgin and Strathy **Intersection Alias: 111**

Access Code: 9999 Channel: 17 Address: 001 IP: 172.16.16.111 / 24 Revision: 3.33e

Access Data

Port 2 Comm :1200 Baud
Port 3 Comm :1200 Baud

Phase Data

Vehical Basic Timings

Phase	Min_Grn	Passage	Max1	Max2	Yellow	All Red
1	6	3.0	18	18	3.0	1.0
2	10	3.0	30	30	4.0	2.0
3	6	3.0	18	18	3.0	1.0
4	12	3.0	20	20	4.0	2.0
5	6	3.0	18	18	3.0	1.0
6	10	3.0	30	30	4.0	2.0
7	6	3.0	18	18	3.0	1.0
8	12	3.0	20	20	4.0	2.0

Vehical Density Timings

Added Initial	Max_Initial	Time B4 Reduction	Cars Before	Time To Reduce	Min_Gap
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	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	0	0	0.0
0.0	0	0	0	0	0.0

Pedestrian Timing

Phase	Walk	Ped Clear	Flashing Walk	Extended Actuated Ped Clear	Rest in Walk
1	0	0	No	0	No
2	10	16	No	2	No
3	0	0	No	0	No
4	10	23	No	2	No
5	0	0	No	0	No
6	10	16	No	2	No
7	0	0	No	0	No
8	10	23	No	2	No

General Control

Initialize	Non-Act Response	Veh Recall	Ped Recall	Recall Delay
Inactive	None	None	None	0
Yellow	NonActI	Max	Non Act	0
Inactive	None	None	None	0
Inactive	NonActII	None	None	0
Inactive	None	None	None	0
Yellow	NonActI	Max	Non Act	0
Inactive	None	None	None	0
Inactive	NonActII	None	None	0

Miscellaneous

Non Lock	Dual Entry	Last Car Passage	Conditional Service	No Simultaneous Gap Out
Yes	No	No	No	No
Yes	Yes	No	No	No
Yes	No	No	No	No
Yes	Yes	No	No	No
Yes	No	No	No	No
Yes	Yes	No	No	No
Yes	No	No	No	No
Yes	Yes	No	No	No

Special Sequence

Phase	Phase Omit	Minus Yellow Phase	Omit Call
1	2	0	0
2	0	0	0
3	4	0	0
4	0	0	0
5	6	0	0
6	0	0	0
7	8	0	0
8	0	0	0

Vehical Detector Phase Assignment

Assigned Phase	Mode	Switched Phase	Extend	Delay

Default Data

Pedestrian Detector

Default Data

Special Detector Phase Assignment

Assign Phase	Mode	Switched Phase	Extend	Delay

Default Data

Unit Data

General Control

Startup Time: 5sec Startup State: Flash Red Revert: 4sec

Auto Ped Clear: No Stop Time Reset: No Alternate Sequence: 0

ABC connector Input Modes: 0

ABC connector Output Modes: 0

D connector Input Modes: 0

D connector Output Modes: 0

Ring	Input Respons	Output Selection
1	Ring 1	Ring 1
2	Ring 2	Ring 2
3	None	None
4	None	None

Remote Flash

Test A = Flash

Phase	Flash Entry Phase	Flash Exit Phase

Default Data - No Flash

Channel	Flash Color	Flash Alternat

Default Data - No Flash

APPENDIX B

Intersection Capacity Analysis Results – Existing Conditions

Queues
1: North Access 1/Strathy Rd & Elgin St W

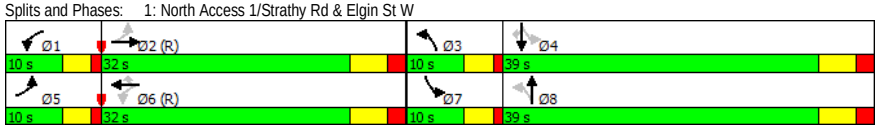
20045 | Northumberland Mall
Ex AM

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	85	340	15	325	84	1	14	56	14	86
Future Volume (vph)	85	340	15	325	84	1	14	56	14	86
Lane Group Flow (vph)	88	359	15	335	87	1	19	58	14	89
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (%)	11.0%	35.2%	11.0%	35.2%	35.2%	11.0%	42.9%	11.0%	42.9%	42.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
v/c Ratio	0.12	0.15	0.02	0.15	0.08	0.00	0.08	0.26	0.05	0.26
Control Delay	5.2	6.7	5.4	9.8	1.0	26.0	29.3	31.4	32.8	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.2	6.7	5.4	9.8	1.0	26.0	29.3	31.4	32.8	4.3
Queue Length 50th (m)	3.3	8.4	0.6	12.4	0.0	0.2	2.3	9.5	2.3	0.0
Queue Length 95th (m)	10.7	26.1	3.0	26.0	3.2	1.4	8.9	18.0	8.0	6.0
Internal Link Dist (m)		159.2		205.9			85.3		125.9	
Turn Bay Length (m)	24.0		95.0		38.1			50.4		
Base Capacity (vph)	761	2461	739	2258	1031	209	662	224	658	646
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.15	0.02	0.15	0.08	0.00	0.03	0.26	0.02	0.14

Intersection Summary

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 10 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Splits and Phases: 1: North Access 1/Strathy Rd & Elgin St W



HCM Signalized Intersection Capacity Analysis
1: North Access 1/Strathy Rd & Elgin St W

20045 | Northumberland Mall
Ex AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	340	8	15	325	84	1	14	5	56	14	86
Future Volume (vph)	85	340	8	15	325	84	1	14	5	56	14	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.2	3.2	3.2	3.5	3.4	3.6	3.6	3.6	3.0	3.2	3.6
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1738	3405		1725	3500	1526	1740	1818		1666	1816	1550
Flt Permitted	0.51	1.00		0.54	1.00	1.00	0.83	1.00		0.45	1.00	1.00
Satd. Flow (perm)	934	3405		975	3500	1526	1526	1818		797	1816	1550
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	88	351	8	15	335	87	1	14	5	58	14	89
RTOR Reduction (vph)	0	1	0	0	0	37	0	5	0	0	0	78
Lane Group Flow (vph)	88	358	0	15	335	50	1	14	0	58	14	11
Confl. Peds. (#/hr)	8					8	11		4	4		11
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	62.2	56.9		53.6	52.3	52.3	6.0	4.8		16.8	11.6	11.6
Effective Green, g (s)	62.2	56.9		53.6	52.3	52.3	6.0	4.8		16.8	11.6	11.6
Actuated g/C Ratio	0.68	0.63		0.59	0.57	0.57	0.07	0.05		0.18	0.13	0.13
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	690	2129		585	2011	877	103	95		223	231	197
v/s Ratio Prot	c0.01	c0.11		0.00	0.10		0.00	0.01		c0.02	0.01	
v/s Ratio Perm	0.08			0.01		0.03	0.00			c0.03		0.01
v/c Ratio	0.13	0.17		0.03	0.17	0.06	0.01	0.15		0.26	0.06	0.06
Uniform Delay, d1	4.9	7.1		7.8	9.1	8.5	39.7	41.2		31.4	34.9	34.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2		0.0	0.2	0.1	0.0	0.7		0.6	0.1	0.1
Delay (s)	5.0	7.3		7.8	9.3	8.6	39.8	41.9		32.1	35.0	35.0
Level of Service	A	A		A	A	A	D	D		C	D	D
Approach Delay (s)		6.9			9.1			41.8			34.0	
Approach LOS		A			A			D			C	

Intersection Summary

HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.20			
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	55.4%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	431	2	23	370	1	0	0	11	0	0	0
Future Volume (Veh/h)	0	431	2	23	370	1	0	0	11	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	449	2	24	385	1	0	0	11	0	0	0
Pedestrians								6				
Lane Width (m)								3.8				
Walking Speed (m/s)								1.2				
Percent Blockage								1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		201			183							
pX, platoon unblocked	1.00						1.00	1.00		1.00	1.00	1.00
vC, conflicting volume	386			457			696	889	230	669	890	193
vC1, stage 1 conf vol							455	455		434	434	
vC2, stage 2 conf vol							240	434		236	457	
vCu, unblocked vol	375			457			686	880	230	659	882	181
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			100	100	99	100	100	100
cM capacity (veh/h)	1189			1109			506	463	771	514	454	833

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	0	224	224	2	24	257	129	0	11	0	0
Volume Left	0	0	0	0	24	0	0	0	0	0	0
Volume Right	0	0	0	2	0	0	1	0	11	0	0
cSH	1700	1700	1700	1700	1109	1700	1700	1700	771	1700	1700
Volume to Capacity	0.00	0.13	0.13	0.00	0.02	0.15	0.08	0.00	0.01	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.3	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	8.3	0.0	0.0	0.0	9.7	0.0	0.0
Lane LOS					A			A	A	A	A
Approach Delay (s)	0.0				0.5			9.7		0.0	
Approach LOS								A		A	

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	260	40	104	262	51	175	
Future Volume (vph)	260	40	104	262	51	175	
Lane Group Flow (vph)	277	43	111	279	54	186	
Turn Type	NA	Perm	Perm	NA	Perm	Perm	
Protected Phases	2			6			8
Permitted Phases		2	6		4	4	
Detector Phase	2	2	6	6	4	4	
Switch Phase							
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0
Minimum Split (s)	31.2	31.2	31.2	31.2	14.5	14.5	14.5
Total Split (s)	45.0	45.0	45.0	45.0	15.0	15.0	15.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.1	2.1	2.1	2.1	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.5	6.5	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
v/c Ratio	0.12	0.04	0.16	0.12	0.27	0.49	
Control Delay	4.2	0.9	4.8	4.2	27.1	9.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.2	0.9	4.8	4.2	27.1	9.5	
Queue Length 50th (m)	5.2	0.0	4.0	5.2	5.7	0.0	
Queue Length 95th (m)	9.0	1.8	9.4	9.0	14.8	15.3	
Internal Link Dist (m)	178.7			176.6			
Turn Bay Length (m)		57.7	40.0		35.5		
Base Capacity (vph)	2251	1037	703	2283	206	383	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.12	0.04	0.16	0.12	0.26	0.49	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 3: Rogers Rd/Private Access & Elgin St W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	260	40	104	262	0	51	0	175	0	0	0
Future Volume (vph)	0	260	40	104	262	0	51	0	175	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.3	3.5	3.6	3.6	3.6	3.8	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00			
Frpb, ped/bikes		1.00	0.98	1.00	1.00		1.00		1.00			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3455	1558	1765	3505		1827		1581			
Flt Permitted		1.00	1.00	0.58	1.00		0.76		1.00			
Satd. Flow (perm)		3455	1558	1081	3505		1456		1581			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	277	43	111	279	0	54	0	186	0	0	0
RTOR Reduction (vph)	0	0	15	0	0	0	0	0	161	0	0	0
Lane Group Flow (vph)	0	277	28	111	279	0	54	0	25	0	0	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	1%	0%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type		NA	Perm	Perm	NA		Perm		Perm			
Protected Phases		2			6						8	
Permitted Phases			2	6			4		4	8		
Actuated Green, G (s)		39.1	39.1	39.1	39.1		8.2		8.2			
Effective Green, g (s)		39.1	39.1	39.1	39.1		8.2		8.2			
Actuated g/C Ratio		0.65	0.65	0.65	0.65		0.14		0.14			
Clearance Time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		2251	1015	704	2284		198		216			
v/s Ratio Prot		0.08			0.08							
v/s Ratio Perm			0.02	c0.10			c0.04		0.02			
v/c Ratio		0.12	0.03	0.16	0.12		0.27		0.12			
Uniform Delay, d1		4.0	3.7	4.1	4.0		23.2		22.7			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.1	0.1	0.5	0.1		0.7		0.2			
Delay (s)		4.1	3.8	4.5	4.1		24.0		23.0			
Level of Service		A	A	A	A		C		C			
Approach Delay (s)		4.0			4.2			23.2			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.18			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.7	
Intersection Capacity Utilization	54.5%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	47	24	53	148	95	63
Future Volume (Veh/h)	47	24	53	148	95	63
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	51	26	58	161	103	68
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					89	
pX, platoon unblocked						
vC, conflicting volume	414	137	171			
vC1, stage 1 conf vol	137					
vC2, stage 2 conf vol	277					
vCu, unblocked vol	414	137	171			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	97	96			
cM capacity (veh/h)	695	911	1406			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	51	26	58	161	171
Volume Left	51	0	58	0	0
Volume Right	0	26	0	0	68
cSH	695	911	1406	1700	1700
Volume to Capacity	0.07	0.03	0.04	0.09	0.10
Queue Length 95th (m)	1.9	0.7	1.0	0.0	0.0
Control Delay (s)	10.6	9.1	7.7	0.0	0.0
Lane LOS	B	A	A		
Approach Delay (s)	10.1		2.0		0.0
Approach LOS	B				

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	25.5%	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)	5	0	2	5	5	18	5	178	20	37	80	2
Future Volume (Veh/h)	5	0	2	5	5	18	5	178	20	37	80	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	0	2	5	5	20	5	196	22	41	88	2
Pedestrians		3			1			12				
Lane Width (m)		3.6			3.6			3.8				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)											141	
pX, platoon unblocked												
vC, conflicting volume	402	403	104	402	393	208	93			219		
vC1, stage 1 conf vol	174	174		218	218							
vC2, stage 2 conf vol	228	229		184	175							
vCu, unblocked vol	402	403	104	402	393	208	93			219		
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)	6.1	5.6		6.1	5.5							
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	99	100	100	99	99	98	100			97		
cM capacity (veh/h)	649	613	944	684	643	837	1473			1349		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	30	5	218	41	90
Volume Left	5	5	5	0	41	0
Volume Right	2	20	0	22	0	2
cSH	713	770	1473	1700	1349	1700
Volume to Capacity	0.01	0.04	0.00	0.13	0.03	0.05
Queue Length 95th (m)	0.2	1.0	0.1	0.0	0.8	0.0
Control Delay (s)	10.1	9.9	7.5	0.0	7.8	0.0
Lane LOS	B	A	A		A	
Approach Delay (s)	10.1	9.9	0.2		2.4	
Approach LOS	B	A				

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	30.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	203	86	1
Future Volume (Veh/h)	0	0	0	203	86	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	221	93	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					201	
pX, platoon unblocked						
vC, conflicting volume	314	94	94			
vC1, stage 1 conf vol	94					
vC2, stage 2 conf vol	221					
vCu, unblocked vol	314	94	94			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	775	963	1500			

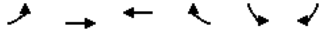
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	0	0	221	94
Volume Left	0	0	0	0
Volume Right	0	0	0	1
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.13	0.06
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.0	0.0		0.0
Approach LOS	A			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	14.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	7	196	18	12	74
Future Volume (Veh/h)	7	7	196	18	12	74
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	8	213	20	13	80
Pedestrians	27					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						246
pX, platoon unblocked						
vC, conflicting volume	356	250			260	
vC1, stage 1 conf vol	250					
vC2, stage 2 conf vol	106					
vCu, unblocked vol	356	250			260	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			99	
cM capacity (veh/h)	737	776			1287	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	16	233	93
Volume Left	8	0	13
Volume Right	8	20	0
cSH	756	1700	1287
Volume to Capacity	0.02	0.14	0.01
Queue Length 95th (m)	0.5	0.0	0.2
Control Delay (s)	9.9	0.0	1.2
Lane LOS	A		A
Approach Delay (s)	9.9	0.0	1.2
Approach LOS	A		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		24.1%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	70	21	16	145	71	18
Future Volume (vph)	70	21	16	145	71	18
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	77	23	18	159	78	20

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	100	177	98
Volume Left (vph)	77	0	78
Volume Right (vph)	0	159	20
Hadj (s)	0.15	-0.52	0.05
Departure Headway (s)	4.4	3.7	4.5
Degree Utilization, x	0.12	0.18	0.12
Capacity (veh/h)	782	938	748
Control Delay (s)	8.1	7.5	8.1
Approach Delay (s)	8.1	7.5	8.1
Approach LOS	A	A	A

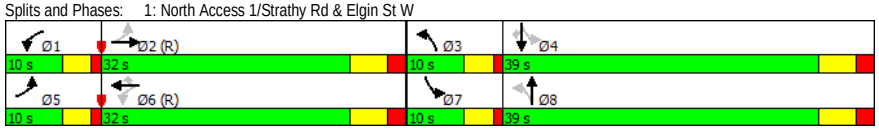
Intersection Summary			
Delay		7.8	
Level of Service		A	
Intersection Capacity Utilization		31.3%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	189	543	42	446	259	33	58	204	50	210
Future Volume (vph)	189	543	42	446	259	33	58	204	50	210
Lane Group Flow (vph)	195	576	43	460	267	34	107	210	52	216
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (%)	11.0%	35.2%	11.0%	35.2%	35.2%	11.0%	42.9%	11.0%	42.9%	42.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
v/c Ratio	0.31	0.29	0.08	0.26	0.30	0.12	0.38	0.82	0.18	0.51
Control Delay	7.7	11.9	6.8	14.9	3.0	26.0	25.7	58.1	35.9	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	11.9	6.8	14.9	3.0	26.0	25.7	58.1	35.9	9.9
Queue Length 50th (m)	12.7	30.8	2.6	25.6	0.0	4.7	10.1	32.6	8.7	0.0
Queue Length 95th (m)	22.5	45.0	6.5	40.0	13.9	11.8	25.4	#68.6	19.3	19.8
Internal Link Dist (m)		159.2		205.9			85.3		125.9	
Turn Bay Length (m)	24.0		95.0		38.1			50.4		
Base Capacity (vph)	624	1954	532	1738	892	282	669	256	658	699
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.29	0.08	0.26	0.30	0.12	0.16	0.82	0.08	0.31

Intersection Summary

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 10 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: North Access 1/Strathy Rd & Elgin St W



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	189	543	16	42	446	259	33	58	46	204	50	210
Future Volume (vph)	189	543	16	42	446	259	33	58	46	204	50	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.2	3.2	3.2	3.5	3.4	3.6	3.6	3.6	3.0	3.2	3.6
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1740	3402		1725	3500	1526	1742	1763		1666	1816	1550
Flt Permitted	0.43	1.00		0.44	1.00	1.00	0.72	1.00		0.50	1.00	1.00
Satd. Flow (perm)	792	3402		790	3500	1526	1326	1763		869	1816	1550
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	195	560	16	43	460	267	34	60	47	210	52	216
RTOR Reduction (vph)	0	1	0	0	0	139	0	42	0	0	0	182
Lane Group Flow (vph)	195	575	0	43	460	128	34	65	0	210	52	34
Confl. Peds. (#/hr)	8					8	11		4	4		11
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	57.1	49.0		47.7	43.6	43.6	13.9	10.3		21.9	14.3	14.3
Effective Green, g (s)	57.1	49.0		47.7	43.6	43.6	13.9	10.3		21.9	14.3	14.3
Actuated g/C Ratio	0.63	0.54		0.52	0.48	0.48	0.15	0.11		0.24	0.16	0.16
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	595	1831		456	1676	731	219	199		275	285	243
v/s Ratio Prot	c0.03	0.17		0.00	0.13		0.01	0.04		c0.06	0.03	
v/s Ratio Perm	c0.17			0.05		0.08	0.02			c0.12		0.02
v/c Ratio	0.33	0.31		0.09	0.27	0.18	0.16	0.33		0.76	0.18	0.14
Uniform Delay, d1	7.3	11.7		10.6	14.2	13.5	33.3	37.2		31.1	33.3	33.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	0.4		0.1	0.4	0.5	0.3	1.0		11.9	0.3	0.3
Delay (s)	7.6	12.1		10.7	14.6	14.0	33.6	38.1		43.0	33.6	33.3
Level of Service	A	B		B	B	B	C	D		D	C	C
Approach Delay (s)		11.0			14.2			37.1			37.6	
Approach LOS		B			B			D			D	

Intersection Summary

HCM 2000 Control Delay	19.7	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.49				
Actuated Cycle Length (s)	91.0	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	66.4%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	636	14	108	636	0	6	0	111	1	0	0
Future Volume (Veh/h)	0	636	14	108	636	0	6	0	111	1	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	663	15	113	663	0	6	0	116	1	0	0
Pedestrians								6				
Lane Width (m)								3.8				
Walking Speed (m/s)								1.2				
Percent Blockage								1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		201			183							
pX, platoon unblocked	0.96						0.96	0.96		0.96	0.96	0.96
vC, conflicting volume	663			684			1226	1558	338	1336	1573	332
vC1, stage 1 conf vol							669	669		889	889	
vC2, stage 2 conf vol							558	889		448	684	
vCu, unblocked vol	557			684			1146	1493	338	1261	1508	211
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			88			98	100	82	100	100	100
cM capacity (veh/h)	979			914			331	282	658	238	253	767

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	0	332	332	15	113	442	221	6	116	1	0
Volume Left	0	0	0	0	113	0	0	6	0	1	0
Volume Right	0	0	0	15	0	0	0	0	116	0	0
cSH	1700	1700	1700	1700	914	1700	1700	331	658	238	1700
Volume to Capacity	0.00	0.20	0.20	0.01	0.12	0.26	0.13	0.02	0.18	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	3.4	0.0	0.0	0.4	5.1	0.1	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	9.5	0.0	0.0	16.1	11.6	20.2	0.0
Lane LOS					A			C	B	C	A
Approach Delay (s)	0.0				1.4			11.9		20.2	
Approach LOS								B		C	

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	37.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	453	104	225	422	83	182	
Future Volume (vph)	453	104	225	422	83	182	
Lane Group Flow (vph)	482	111	239	449	88	194	
Turn Type	NA	Perm	Perm	NA	Perm	Perm	
Protected Phases	2			6			8
Permitted Phases		2	6		4	4	
Detector Phase	2	2	6	6	4	4	
Switch Phase							
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0
Minimum Split (s)	31.2	31.2	31.2	31.2	14.5	14.5	14.5
Total Split (s)	45.0	45.0	45.0	45.0	15.0	15.0	15.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.1	2.1	2.1	2.1	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.5	6.5	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
v/c Ratio	0.21	0.11	0.41	0.20	0.44	0.50	
Control Delay	4.6	1.3	7.8	4.5	31.2	9.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.6	1.3	7.8	4.5	31.2	9.5	
Queue Length 50th (m)	10.0	0.0	11.1	9.1	9.5	0.0	
Queue Length 95th (m)	15.2	4.0	23.7	14.1	21.7	15.5	
Internal Link Dist (m)	178.7			176.6			
Turn Bay Length (m)		57.7	40.0		35.5		
Base Capacity (vph)	2246	1051	576	2278	206	390	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.21	0.11	0.41	0.20	0.43	0.50	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 3: Rogers Rd/Private Access & Elgin St W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	453	104	225	422	0	83	0	182	0	0	0
Future Volume (vph)	0	453	104	225	422	0	83	0	182	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.3	3.5	3.6	3.6	3.6	3.8	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00			
Frpb, ped/bikes		1.00	0.98	1.00	1.00		1.00		1.00			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3455	1558	1766	3505		1827		1581			
Flt Permitted		1.00	1.00	0.48	1.00		0.76		1.00			
Satd. Flow (perm)		3455	1558	887	3505		1456		1581			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	482	111	239	449	0	88	0	194	0	0	0
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	167	0	0	0
Lane Group Flow (vph)	0	482	72	239	449	0	88	0	27	0	0	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	1%	0%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type		NA	Perm	Perm	NA		Perm		Perm			
Protected Phases		2			6						8	
Permitted Phases			2	6			4		4	8		
Actuated Green, G (s)		39.0	39.0	39.0	39.0		8.3		8.3			
Effective Green, g (s)		39.0	39.0	39.0	39.0		8.3		8.3			
Actuated g/C Ratio		0.65	0.65	0.65	0.65		0.14		0.14			
Clearance Time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		2245	1012	576	2278		201		218			
v/s Ratio Prot		0.14			0.13							
v/s Ratio Perm			0.05	c0.27			c0.06		0.02			
v/c Ratio		0.21	0.07	0.41	0.20		0.44		0.12			
Uniform Delay, d1		4.3	3.9	5.0	4.2		23.7		22.7			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.2	0.1	2.2	0.2		1.5		0.3			
Delay (s)		4.5	4.0	7.2	4.4		25.2		22.9			
Level of Service		A	A	A	A		C		C			
Approach Delay (s)		4.4			5.4			23.6			0.0	
Approach LOS		A			A			C			A	

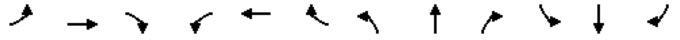
Intersection Summary				
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.7	
Intersection Capacity Utilization	55.8%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	64	44	35	190	265	59
Future Volume (Veh/h)	64	44	35	190	265	59
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	48	38	207	288	64
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					89	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	603	320	352			
vC1, stage 1 conf vol	320					
vC2, stage 2 conf vol	283					
vCu, unblocked vol	568	274	308			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	93	97			
cM capacity (veh/h)	630	736	1206			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	70	48	38	207	352
Volume Left	70	0	38	0	0
Volume Right	0	48	0	0	64
cSH	630	736	1206	1700	1700
Volume to Capacity	0.11	0.07	0.03	0.12	0.21
Queue Length 95th (m)	3.0	1.7	0.8	0.0	0.0
Control Delay (s)	11.4	10.2	8.1	0.0	0.0
Lane LOS	B	B	A		
Approach Delay (s)	10.9		1.3		0.0
Approach LOS	B				

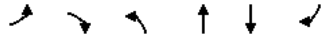
Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	8	7	50	14	88	10	128	36	91	215	3
Future Volume (Veh/h)	9	8	7	50	14	88	10	128	36	91	215	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	10	9	8	55	15	97	11	141	40	100	236	3
Pedestrians		3			1			12				
Lane Width (m)		3.6			3.6			3.8				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)											141	
pX, platoon unblocked												
vC, conflicting volume	708	644	252	644	626	162	242			182		
vC1, stage 1 conf vol	440	440		184	184							
vC2, stage 2 conf vol	268	204		460	442							
vCu, unblocked vol	708	644	252	644	626	162	242			182		
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)	6.1	5.6		6.1	5.5							
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	98	98	99	89	97	89	99			93		
cM capacity (veh/h)	444	480	781	485	497	887	1298			1392		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	27	167	11	181	100	239
Volume Left	10	55	11	0	100	0
Volume Right	8	97	0	40	0	3
cSH	524	660	1298	1700	1392	1700
Volume to Capacity	0.05	0.25	0.01	0.11	0.07	0.14
Queue Length 95th (m)	1.3	8.0	0.2	0.0	1.9	0.0
Control Delay (s)	12.2	12.3	7.8	0.0	7.8	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.2	12.3	0.4		2.3	
Approach LOS	B	B				

Intersection Summary				
Average Delay	4.5			
Intersection Capacity Utilization	36.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1	1	174	265	0
Future Volume (Veh/h)	0	1	1	174	265	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	189	288	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					201	
pX, platoon unblocked						
vC, conflicting volume	479	288	288			
vC1, stage 1 conf vol	288					
vC2, stage 2 conf vol	191					
vCu, unblocked vol	479	288	288			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	693	751	1274			

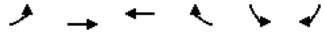
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	1	1	189	288
Volume Left	0	1	0	0
Volume Right	1	0	0	0
cSH	751	1274	1700	1700
Volume to Capacity	0.00	0.00	0.11	0.17
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	9.8	7.8	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.8	0.0		0.0
Approach LOS	A			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	23.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	55	21	154	24	5	261
Future Volume (Veh/h)	55	21	154	24	5	261
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	23	167	26	5	284
Pedestrians	27					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						246
pX, platoon unblocked						
vC, conflicting volume	501	207			220	
vC1, stage 1 conf vol	207					
vC2, stage 2 conf vol	294					
vCu, unblocked vol	501	207			220	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	97			100	
cM capacity (veh/h)	678	820			1331	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	83	193	289
Volume Left	60	0	5
Volume Right	23	26	0
cSH	712	1700	1331
Volume to Capacity	0.12	0.11	0.00
Queue Length 95th (m)	3.2	0.0	0.1
Control Delay (s)	10.7	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	10.7	0.0	0.2
Approach LOS	B		

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization		28.7%	ICU Level of Service
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	47	20	22	149	219	101
Future Volume (vph)	47	20	22	149	219	101
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	52	22	24	164	241	111

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	74	188	352
Volume Left (vph)	52	0	241
Volume Right (vph)	0	164	111
Hadj (s)	0.14	-0.51	-0.04
Departure Headway (s)	5.1	4.3	4.5
Degree Utilization, x	0.11	0.23	0.44
Capacity (veh/h)	644	765	773
Control Delay (s)	8.7	8.6	10.9
Approach Delay (s)	8.7	8.6	10.9
Approach LOS	A	A	B

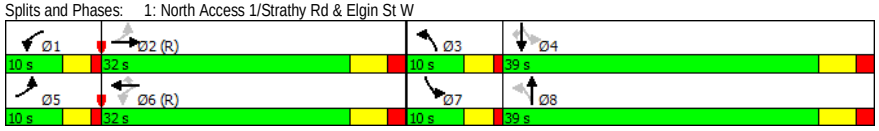
Intersection Summary			
Delay		10.0	
Level of Service		A	
Intersection Capacity Utilization		43.0%	ICU Level of Service
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	228	650	48	554	228	33	63	202	55	297
Future Volume (vph)	228	650	48	554	228	33	63	202	55	297
Lane Group Flow (vph)	235	682	49	571	235	34	108	208	57	306
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (%)	11.0%	35.2%	11.0%	35.2%	35.2%	11.0%	42.9%	11.0%	42.9%	42.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
v/c Ratio	0.41	0.35	0.10	0.35	0.28	0.12	0.38	0.80	0.19	0.60
Control Delay	9.0	13.0	7.6	17.4	3.5	25.2	26.8	54.0	35.2	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	13.0	7.6	17.4	3.5	25.2	26.8	54.0	35.2	9.8
Queue Length 50th (m)	15.7	38.1	2.9	34.7	0.0	4.7	11.3	32.2	9.5	0.0
Queue Length 95th (m)	29.5	58.1	7.7	54.9	14.6	11.4	25.9	#59.9	20.2	22.7
Internal Link Dist (m)		159.2		205.9			85.3		125.9	
Turn Bay Length (m)	24.0		95.0		38.1			50.4		
Base Capacity (vph)	572	1934	475	1646	842	288	669	261	658	757
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.35	0.10	0.35	0.28	0.12	0.16	0.80	0.09	0.40

Intersection Summary

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 10 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: North Access 1/Strathy Rd & Elgin St W



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	650	12	48	554	228	33	63	42	202	55	297
Future Volume (vph)	228	650	12	48	554	228	33	63	42	202	55	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.2	3.2	3.2	3.5	3.4	3.6	3.6	3.6	3.0	3.2	3.6
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1742	3407		1725	3500	1526	1742	1776		1666	1816	1550
Flt Permitted	0.36	1.00		0.39	1.00	1.00	0.72	1.00		0.50	1.00	1.00
Satd. Flow (perm)	660	3407		712	3500	1526	1320	1776		877	1816	1550
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	235	670	12	49	571	235	34	65	43	208	57	306
RTOR Reduction (vph)	0	1	0	0	0	129	0	36	0	0	0	257
Lane Group Flow (vph)	235	681	0	49	571	106	34	72	0	208	57	49
Confl. Peds. (#/hr)	8					8	11		4	4		11
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	56.7	48.5		45.4	41.2	41.2	14.3	10.7		22.3	14.7	14.7
Effective Green, g (s)	56.7	48.5		45.4	41.2	41.2	14.3	10.7		22.3	14.7	14.7
Actuated g/C Ratio	0.62	0.53		0.50	0.45	0.45	0.16	0.12		0.25	0.16	0.16
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	547	1815		401	1584	690	224	208		280	293	250
v/s Ratio Prot	c0.05	0.20		0.01	0.16		0.01	0.04		c0.06	0.03	
v/s Ratio Perm	c0.21			0.06		0.07	0.02			c0.12		0.03
v/c Ratio	0.43	0.38		0.12	0.36	0.15	0.15	0.35		0.74	0.19	0.20
Uniform Delay, d1	8.0	12.4		11.8	16.3	14.6	33.0	36.9		30.6	33.0	33.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.6		0.1	0.6	0.5	0.3	1.0		10.2	0.3	0.4
Delay (s)	8.5	13.0		11.9	16.9	15.1	33.3	37.9		40.8	33.4	33.4
Level of Service	A	B		B	B	B	C	D		D	C	C
Approach Delay (s)		11.8			16.1			36.8			36.1	
Approach LOS		B			B			D			D	

Intersection Summary

HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	68.4%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	752	27	172	724	4	2	0	136	4	0	2
Future Volume (Veh/h)	2	752	27	172	724	4	2	0	136	4	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	2	783	28	179	754	4	2	0	142	4	0	2
Pedestrians								6				
Lane Width (m)								3.8				
Walking Speed (m/s)								1.2				
Percent Blockage								1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		201			183							
pX, platoon unblocked	0.93						0.93	0.93		0.93	0.93	0.93
vC, conflicting volume	758			817			1530	1909	398	1652	1935	379
vC1, stage 1 conf vol							793	793		1114	1114	
vC2, stage 2 conf vol							737	1116		538	821	
vCu, unblocked vol	594			817			1422	1829	398	1553	1857	187
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			78			99	100	76	97	100	100
cM capacity (veh/h)	924			816			250	205	602	146	163	773

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	2	392	392	28	179	503	255	2	142	4	2
Volume Left	2	0	0	0	179	0	0	2	0	4	0
Volume Right	0	0	0	28	0	0	4	0	142	0	2
cSH	924	1700	1700	1700	816	1700	1700	250	602	146	773
Volume to Capacity	0.00	0.23	0.23	0.02	0.22	0.30	0.15	0.01	0.24	0.03	0.00
Queue Length 95th (m)	0.1	0.0	0.0	0.0	6.7	0.0	0.0	0.2	7.3	0.7	0.1
Control Delay (s)	8.9	0.0	0.0	0.0	10.7	0.0	0.0	19.5	12.8	30.4	9.7
Lane LOS	A				B			C	B	D	A
Approach Delay (s)	0.0				2.0			12.9		23.5	
Approach LOS								B		C	

Intersection Summary					
Average Delay		2.1			
Intersection Capacity Utilization		43.6%	ICU Level of Service		A
Analysis Period (min)		15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	505	132	248	473	136	277	
Future Volume (vph)	505	132	248	473	136	277	
Lane Group Flow (vph)	537	140	264	503	145	295	
Turn Type	NA	Perm	Perm	NA	Perm	Perm	
Protected Phases	2			6			8
Permitted Phases		2	6		4	4	
Detector Phase	2	2	6	6	4	4	
Switch Phase							
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0
Minimum Split (s)	31.2	31.2	31.2	31.2	14.5	14.5	14.5
Total Split (s)	45.0	45.0	45.0	45.0	15.0	15.0	15.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.1	2.1	2.1	2.1	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.5	6.5	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
v/c Ratio	0.24	0.13	0.49	0.22	0.71	0.62	
Control Delay	4.7	1.2	9.2	4.6	46.9	10.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.7	1.2	9.2	4.6	46.9	10.1	
Queue Length 50th (m)	11.3	0.0	13.0	10.4	16.3	0.0	
Queue Length 95th (m)	17.0	4.5	28.9	15.8	#41.1	19.0	
Internal Link Dist (m)	178.7			176.6			
Turn Bay Length (m)		57.7	40.0		35.5		
Base Capacity (vph)	2240	1058	544	2272	206	477	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.24	0.13	0.49	0.22	0.70	0.62	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Rogers Rd/Private Access & Elgin St W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	505	132	248	473	0	136	0	277	0	0	0
Future Volume (vph)	0	505	132	248	473	0	136	0	277	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.3	3.5	3.6	3.6	3.6	3.8	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00			
Frpb, ped/bikes		1.00	0.98	1.00	1.00		1.00		1.00			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3455	1558	1767	3505		1827		1581			
Flt Permitted		1.00	1.00	0.45	1.00		0.76		1.00			
Satd. Flow (perm)		3455	1558	841	3505		1456		1581			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	537	140	264	503	0	145	0	295	0	0	0
RTOR Reduction (vph)	0	0	49	0	0	0	0	0	254	0	0	0
Lane Group Flow (vph)	0	537	91	264	503	0	145	0	41	0	0	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	1%	0%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type		NA	Perm	Perm	NA		Perm		Perm			
Protected Phases		2			6						8	
Permitted Phases			2	6			4		4	8		
Actuated Green, G (s)		38.9	38.9	38.9	38.9		8.4		8.4			
Effective Green, g (s)		38.9	38.9	38.9	38.9		8.4		8.4			
Actuated g/C Ratio		0.65	0.65	0.65	0.65		0.14		0.14			
Clearance Time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		2239	1010	545	2272		203		221			
v/s Ratio Prot		0.16			0.14							
v/s Ratio Perm			0.06	c0.31			c0.10		0.03			
v/c Ratio		0.24	0.09	0.48	0.22		0.71		0.19			
Uniform Delay, d1		4.4	3.9	5.4	4.3		24.7		22.8			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.3	0.2	3.1	0.2		11.3		0.4			
Delay (s)		4.6	4.1	8.5	4.6		35.9		23.2			
Level of Service		A	A	A	A		D		C			
Approach Delay (s)		4.5			5.9			27.4			0.0	
Approach LOS		A			A			C			A	

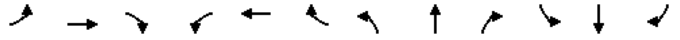
Intersection Summary				
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.7	
Intersection Capacity Utilization	58.7%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	113	83	37	300	299	81
Future Volume (Veh/h)	113	83	37	300	299	81
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	123	90	40	326	325	88
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					89	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	775	369	413			
vC1, stage 1 conf vol	369					
vC2, stage 2 conf vol	406					
vCu, unblocked vol	739	313	359			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	87	97			
cM capacity (veh/h)	554	693	1143			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	123	90	40	326	413
Volume Left	123	0	40	0	0
Volume Right	0	90	0	0	88
cSH	554	693	1143	1700	1700
Volume to Capacity	0.22	0.13	0.03	0.19	0.24
Queue Length 95th (m)	6.7	3.6	0.9	0.0	0.0
Control Delay (s)	13.3	11.0	8.3	0.0	0.0
Lane LOS	B	B	A		
Approach Delay (s)	12.3		0.9		0.0
Approach LOS	B				

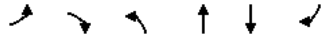
Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	17	19	71	19	69	18	135	52	103	167	4
Future Volume (Veh/h)	23	17	19	71	19	69	18	135	52	103	167	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	25	19	21	78	21	76	20	148	57	113	184	4
Pedestrians		3			1			12				
Lane Width (m)		3.6			3.6			3.8				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)											141	
pX, platoon unblocked												
vC, conflicting volume	690	661	201	670	634	178	191			206		
vC1, stage 1 conf vol	415	415		218	218							
vC2, stage 2 conf vol	274	246		452	417							
vCu, unblocked vol	690	661	201	670	634	178	191			206		
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)	6.1	5.6		6.1	5.5							
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	94	96	97	83	96	91	99			92		
cM capacity (veh/h)	445	470	834	457	491	870	1356			1364		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	65	175	20	205	113	188
Volume Left	25	78	20	0	113	0
Volume Right	21	76	0	57	0	4
cSH	534	582	1356	1700	1364	1700
Volume to Capacity	0.12	0.30	0.01	0.12	0.08	0.11
Queue Length 95th (m)	3.3	10.1	0.4	0.0	2.2	0.0
Control Delay (s)	12.7	13.8	7.7	0.0	7.9	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.7	13.8	0.7		3.0	
Approach LOS	B	B				

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	38.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	72	68	201	257	0
Future Volume (Veh/h)	4	72	68	201	257	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	78	74	218	279	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					201	
pX, platoon unblocked						
vC, conflicting volume	645	279	279			
vC1, stage 1 conf vol	279					
vC2, stage 2 conf vol	366					
vCu, unblocked vol	645	279	279			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	90	94			
cM capacity (veh/h)	591	760	1284			

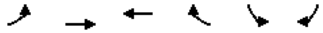
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	82	74	218	279
Volume Left	4	74	0	0
Volume Right	78	0	0	0
cSH	749	1284	1700	1700
Volume to Capacity	0.11	0.06	0.13	0.16
Queue Length 95th (m)	2.9	1.5	0.0	0.0
Control Delay (s)	10.4	8.0	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	10.4	2.0		0.0
Approach LOS	B			

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	32.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	63	27	246	24	7	322
Future Volume (Veh/h)	63	27	246	24	7	322
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	29	267	26	8	350
Pedestrians	27					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						246
pX, platoon unblocked						
vC, conflicting volume	673	307			320	
vC1, stage 1 conf vol	307					
vC2, stage 2 conf vol	366					
vCu, unblocked vol	673	307			320	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	96			99	
cM capacity (veh/h)	600	721			1223	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	97	293	358
Volume Left	68	0	8
Volume Right	29	26	0
cSH	632	1700	1223
Volume to Capacity	0.15	0.17	0.01
Queue Length 95th (m)	4.3	0.0	0.2
Control Delay (s)	11.7	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	11.7	0.0	0.2
Approach LOS	B		

Intersection Summary			
Average Delay		1.6	
Intersection Capacity Utilization		34.4%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	71	29	34	199	292	93
Future Volume (vph)	71	29	34	199	292	93
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	78	32	37	219	321	102

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	110	256	423
Volume Left (vph)	78	0	321
Volume Right (vph)	0	219	102
Hadj (s)	0.14	-0.50	0.02
Departure Headway (s)	5.5	4.7	4.8
Degree Utilization, x	0.17	0.33	0.57
Capacity (veh/h)	596	713	709
Control Delay (s)	9.6	10.0	14.0
Approach Delay (s)	9.6	10.0	14.0
Approach LOS	A	A	B

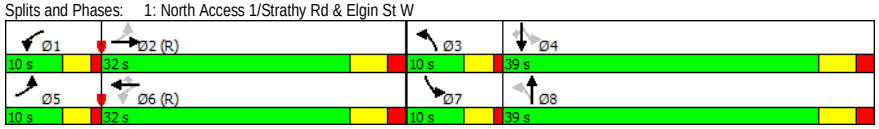
Intersection Summary			
Delay		12.1	
Level of Service		B	
Intersection Capacity Utilization		51.7%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	257	483	46	534	216	30	65	160	60	280
Future Volume (vph)	257	483	46	534	216	30	65	160	60	280
Lane Group Flow (vph)	268	525	48	556	225	31	104	167	63	292
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (%)	11.0%	35.2%	11.0%	35.2%	35.2%	11.0%	42.9%	11.0%	42.9%	42.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
v/c Ratio	0.45	0.27	0.09	0.35	0.28	0.10	0.38	0.63	0.22	0.59
Control Delay	9.5	12.0	7.6	18.6	3.7	25.2	28.8	40.7	35.9	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	12.0	7.6	18.6	3.7	25.2	28.8	40.7	35.9	9.7
Queue Length 50th (m)	18.4	27.5	2.9	35.6	0.0	4.3	12.0	25.2	10.6	0.0
Queue Length 95th (m)	33.2	42.6	7.5	54.3	14.5	10.7	26.6	41.5	21.9	22.2
Internal Link Dist (m)		159.2		205.9			85.3		125.9	
Turn Bay Length (m)	24.0		95.0		38.1			50.4		
Base Capacity (vph)	590	1953	514	1581	810	296	665	263	639	758
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.27	0.09	0.35	0.28	0.10	0.16	0.63	0.10	0.39

Intersection Summary

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 10 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Splits and Phases: 1: North Access 1/Strathy Rd & Elgin St W



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	257	483	21	46	534	216	30	65	35	160	60	280
Future Volume (vph)	257	483	21	46	534	216	30	65	35	160	60	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.2	3.2	3.2	3.5	3.4	3.6	3.6	3.6	3.0	3.2	3.6
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	3428		1725	3535	1539	1804	1778		1685	1763	1579
Flt Permitted	0.36	1.00		0.46	1.00	1.00	0.72	1.00		0.50	1.00	1.00
Satd. Flow (perm)	649	3428		830	3535	1539	1360	1778		888	1763	1579
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	268	503	22	48	556	225	31	68	36	167	62	292
RTOR Reduction (vph)	0	2	0	0	0	128	0	29	0	0	0	245
Lane Group Flow (vph)	268	523	0	48	556	97	31	75	0	167	63	47
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)						6						
Heavy Vehicles (%)	2%	0%	0%	0%	1%	0%	0%	2%	0%	0%	3%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	56.8	48.6		43.3	39.1	39.1	14.2	10.6		22.2	14.6	14.6
Effective Green, g (s)	56.8	48.6		43.3	39.1	39.1	14.2	10.6		22.2	14.6	14.6
Actuated g/C Ratio	0.62	0.53		0.48	0.43	0.43	0.16	0.12		0.24	0.16	0.16
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	564	1830		436	1518	661	229	207		283	282	253
v/s Ratio Prot	c0.07	0.15		0.01	0.16		0.01	0.04		c0.05	0.04	
v/s Ratio Perm	c0.22			0.05		0.06	0.02			c0.09		0.03
v/c Ratio	0.48	0.29		0.11	0.37	0.15	0.14	0.36		0.59	0.22	0.19
Uniform Delay, d1	8.2	11.7		12.9	17.6	15.8	33.0	37.1		29.0	33.3	33.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	0.4		0.1	0.7	0.5	0.3	1.1		3.3	0.4	0.4
Delay (s)	8.8	12.0		13.0	18.2	16.3	33.2	38.2		32.2	33.7	33.4
Level of Service	A	B		B	B	B	C	D		C	C	C
Approach Delay (s)		10.9			17.4			37.0			33.1	
Approach LOS		B			B			D			C	

Intersection Summary

HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	665	23	121	713	8	10	0	93	2	0	0
Future Volume (Veh/h)	0	665	23	121	713	8	10	0	93	2	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	700	24	127	751	8	11	0	98	2	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		201			183							
pX, platoon unblocked	0.92						0.92	0.92		0.92	0.92	0.92
vC, conflicting volume	759			724			1330	1713	350	1457	1733	380
vC1, stage 1 conf vol							700	700		1009	1009	
vC2, stage 2 conf vol							630	1013		448	724	
vCu, unblocked vol	570			724			1189	1604	350	1327	1626	159
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			86			97	100	85	99	100	100
cM capacity (veh/h)	934			881			316	255	649	218	225	798

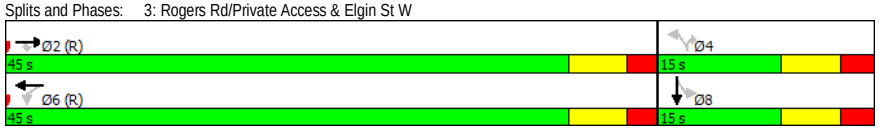
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	0	350	350	24	127	501	258	11	98	2	0
Volume Left	0	0	0	0	127	0	0	11	0	2	0
Volume Right	0	0	0	24	0	0	8	0	98	0	0
cSH	1700	1700	1700	1700	881	1700	1700	316	649	218	1700
Volume to Capacity	0.00	0.21	0.21	0.01	0.14	0.29	0.15	0.03	0.15	0.01	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.9	4.2	0.2	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	9.8	0.0	0.0	16.8	11.5	21.7	0.0
Lane LOS					A			C	B	C	A
Approach Delay (s)	0.0				1.4			12.1		21.7	
Approach LOS								B		C	

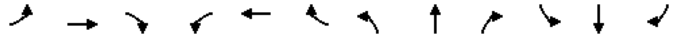
Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	38.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	407	104	273	402	104	276	
Future Volume (vph)	407	104	273	402	104	276	
Lane Group Flow (vph)	424	108	284	419	108	288	
Turn Type	NA	Perm	Perm	NA	Perm	Perm	
Protected Phases	2			6			8
Permitted Phases		2	6		4	4	
Detector Phase	2	2	6	6	4	4	
Switch Phase							
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0
Minimum Split (s)	31.2	31.2	31.2	31.2	14.5	14.5	14.5
Total Split (s)	45.0	45.0	45.0	45.0	15.0	15.0	15.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.1	2.1	2.1	2.1	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.5	6.5	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
v/c Ratio	0.19	0.10	0.46	0.18	0.54	0.61	
Control Delay	4.5	1.2	8.4	4.4	35.3	10.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.5	1.2	8.4	4.4	35.3	10.0	
Queue Length 50th (m)	8.5	0.0	13.8	8.4	11.8	0.0	
Queue Length 95th (m)	13.3	3.9	29.1	13.1	#28.4	18.7	
Internal Link Dist (m)	178.7			176.6			
Turn Bay Length (m)		57.7	40.0		35.5		
Base Capacity (vph)	2267	1075	611	2322	204	473	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.19	0.10	0.46	0.18	0.53	0.61	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Rogers Rd/Private Access & Elgin St W

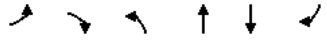




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	407	104	273	402	0	104	0	276	0	0	0
Future Volume (vph)	0	407	104	273	402	0	104	0	276	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.3	3.5	3.6	3.6	3.6	3.8	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3490	1597	1770	3574		1809		1597			
Flt Permitted		1.00	1.00	0.50	1.00		0.76		1.00			
Satd. Flow (perm)		3490	1597	940	3574		1442		1597			
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	424	108	284	419	0	108	0	288	0	0	0
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	248	0	0	0
Lane Group Flow (vph)	0	424	70	284	419	0	108	0	40	0	0	0
Heavy Vehicles (%)	0%	0%	0%	2%	1%	0%	2%	0%	0%	0%	0%	0%
Turn Type		NA	Perm	Perm	NA		Perm		Perm			
Protected Phases		2			6						8	
Permitted Phases			2	6			4		4	8		
Actuated Green, G (s)		39.0	39.0	39.0	39.0		8.3		8.3			
Effective Green, g (s)		39.0	39.0	39.0	39.0		8.3		8.3			
Actuated g/C Ratio		0.65	0.65	0.65	0.65		0.14		0.14			
Clearance Time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		2268	1038	611	2323		199		220			
v/s Ratio Prot		0.12			0.12							
v/s Ratio Perm			0.04	c0.30			c0.07		0.02			
v/c Ratio		0.19	0.07	0.46	0.18		0.54		0.18			
Uniform Delay, d1		4.2	3.8	5.3	4.2		24.1		22.8			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.2	0.1	2.5	0.2		3.0		0.4			
Delay (s)		4.4	4.0	7.8	4.3		27.1		23.2			
Level of Service		A	A	A	A		C		C			
Approach Delay (s)		4.3			5.7			24.3			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.48			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.7	
Intersection Capacity Utilization	52.8%	ICU Level of Service	A	
Analysis Period (min)	15			

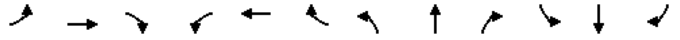
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	88	97	64	292	231	146
Future Volume (Veh/h)	88	97	64	292	231	146
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	96	105	70	317	251	159
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					89	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	788	330	410			
vC1, stage 1 conf vol	330					
vC2, stage 2 conf vol	457					
vCu, unblocked vol	747	264	348			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	82	86	94			
cM capacity (veh/h)	536	738	1156			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	96	105	70	317	410
Volume Left	96	0	70	0	0
Volume Right	0	105	0	0	159
cSH	536	738	1156	1700	1700
Volume to Capacity	0.18	0.14	0.06	0.19	0.24
Queue Length 95th (m)	5.2	4.0	1.5	0.0	0.0
Control Delay (s)	13.2	10.7	8.3	0.0	0.0
Lane LOS	B	B	A		
Approach Delay (s)	11.9		1.5		0.0
Approach LOS	B				

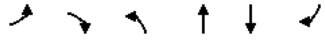
Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	10	16	21	23	79	19	148	47	115	130	4
Future Volume (Veh/h)	13	10	16	21	23	79	19	148	47	115	130	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	14	11	17	22	24	83	20	156	49	121	137	4
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.8			3.8	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)											141	
pX, platoon unblocked												
vC, conflicting volume	674	627	141	623	604	182	142			205		
vC1, stage 1 conf vol	382	382		220	220							
vC2, stage 2 conf vol	292	245		402	384							
vCu, unblocked vol	674	627	141	623	604	182	142			205		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	98	98	96	95	90	99			91		
cM capacity (veh/h)	444	487	911	499	504	866	1452			1360		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	42	129	20	205	121	141
Volume Left	14	22	20	0	121	0
Volume Right	17	83	0	49	0	4
cSH	577	688	1452	1700	1360	1700
Volume to Capacity	0.07	0.19	0.01	0.12	0.09	0.08
Queue Length 95th (m)	1.9	5.5	0.3	0.0	2.3	0.0
Control Delay (s)	11.7	11.4	7.5	0.0	7.9	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	11.7	11.4	0.7		3.7	
Approach LOS	B	B				

Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	35.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	60	56	214	167	0
Future Volume (Veh/h)	0	60	56	214	167	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	65	61	233	182	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					201	
pX, platoon unblocked						
vC, conflicting volume	537	182	182			
vC1, stage 1 conf vol	182					
vC2, stage 2 conf vol	355					
vCu, unblocked vol	537	182	182			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	92	96			
cM capacity (veh/h)	632	861	1393			

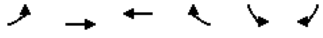
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	65	61	233	182
Volume Left	0	61	0	0
Volume Right	65	0	0	0
cSH	861	1393	1700	1700
Volume to Capacity	0.08	0.04	0.14	0.11
Queue Length 95th (m)	2.0	1.1	0.0	0.0
Control Delay (s)	9.5	7.7	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.5	1.6		0.0
Approach LOS	A			

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	25.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	34	28	242	26	10	217
Future Volume (Veh/h)	34	28	242	26	10	217
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	39	32	275	30	11	247
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						246
pX, platoon unblocked						
vC, conflicting volume	561	292			307	
vC1, stage 1 conf vol	292					
vC2, stage 2 conf vol	269					
vCu, unblocked vol	561	292			307	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	96			99	
cM capacity (veh/h)	658	741			1263	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	71	305	258
Volume Left	39	0	11
Volume Right	32	30	0
cSH	693	1700	1263
Volume to Capacity	0.10	0.18	0.01
Queue Length 95th (m)	2.7	0.0	0.2
Control Delay (s)	10.8	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	10.8	0.0	0.4
Approach LOS	B		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	75	17	22	193	183	68
Future Volume (vph)	75	17	22	193	183	68
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	87	20	26	224	213	79

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	107	250	292
Volume Left (vph)	87	0	213
Volume Right (vph)	0	224	79
Hadj (s)	0.16	-0.51	0.00
Departure Headway (s)	5.1	4.3	4.7
Degree Utilization, x	0.15	0.30	0.38
Capacity (veh/h)	653	788	723
Control Delay (s)	9.0	9.1	10.6
Approach Delay (s)	9.0	9.1	10.6
Approach LOS	A	A	B

Intersection Summary			
Delay	9.8		
Level of Service	A		
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX C

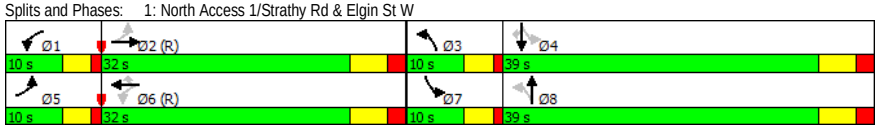
Intersection Capacity Analysis Results – Future Background Conditions

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	104	397	26	401	84	2	26	56	26	89
Future Volume (vph)	104	397	26	401	84	2	26	56	26	89
Lane Group Flow (vph)	107	423	27	413	87	2	36	58	27	92
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (%)	11.0%	35.2%	11.0%	35.2%	35.2%	11.0%	42.9%	11.0%	42.9%	42.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
v/c Ratio	0.15	0.18	0.04	0.19	0.09	0.01	0.15	0.25	0.08	0.24
Control Delay	5.9	8.8	5.9	11.3	1.0	25.0	30.0	29.5	31.8	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	8.8	5.9	11.3	1.0	25.0	30.0	29.5	31.8	4.3
Queue Length 50th (m)	6.6	15.6	1.6	21.6	0.0	0.3	4.4	8.2	3.8	0.0
Queue Length 95th (m)	12.6	31.0	4.4	32.3	3.2	2.1	13.4	18.0	12.4	6.7
Internal Link Dist (m)		159.2		205.9			85.3		125.9	
Turn Bay Length (m)	24.0		95.0		38.1			50.4		
Base Capacity (vph)	699	2301	681	2164	994	240	666	234	658	646
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.18	0.04	0.19	0.09	0.01	0.05	0.25	0.04	0.14

Intersection Summary

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 10 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Splits and Phases: 1: North Access 1/Strathy Rd & Elgin St W



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	397	14	26	401	84	2	26	9	56	26	89
Future Volume (vph)	104	397	14	26	401	84	2	26	9	56	26	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.2	3.2	3.2	3.5	3.4	3.6	3.6	3.6	3.0	3.2	3.6
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1739	3400		1725	3500	1526	1741	1822		1666	1816	1550
Flt Permitted	0.47	1.00		0.51	1.00	1.00	0.74	1.00		0.50	1.00	1.00
Satd. Flow (perm)	869	3400		917	3500	1526	1356	1822		871	1816	1550
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	107	409	14	27	413	87	2	27	9	58	27	92
RTOR Reduction (vph)	0	2	0	0	0	39	0	8	0	0	0	78
Lane Group Flow (vph)	107	421	0	27	413	48	2	28	0	58	27	14
Confl. Peds. (#/hr)	8					8	11		4	4		11
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	59.9	53.6		52.5	49.9	49.9	9.6	8.4		18.8	13.6	13.6
Effective Green, g (s)	59.9	53.6		52.5	49.9	49.9	9.6	8.4		18.8	13.6	13.6
Actuated g/C Ratio	0.66	0.59		0.58	0.55	0.55	0.11	0.09		0.21	0.15	0.15
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	632	2002		552	1919	836	148	168		235	271	231
v/s Ratio Prot	c0.01	c0.12		0.00	0.12		0.00	0.02		c0.02	0.01	
v/s Ratio Perm	0.10			0.03		0.03	0.00			c0.03		0.01
v/c Ratio	0.17	0.21		0.05	0.22	0.06	0.01	0.17		0.25	0.10	0.06
Uniform Delay, d1	5.7	8.8		8.3	10.5	9.6	36.4	38.1		29.8	33.4	33.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2		0.0	0.3	0.1	0.0	0.5		0.6	0.2	0.1
Delay (s)	5.9	9.0		8.3	10.8	9.7	36.5	38.5		30.3	33.6	33.3
Level of Service	A	A		A	B	A	D	D		C	C	C
Approach Delay (s)		8.4			10.5			38.4			32.4	
Approach LOS		A			B			D			C	

Intersection Summary

HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.23			
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	56.1%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	505	4	41	432	1	0	0	19	0	0	0
Future Volume (Veh/h)	0	505	4	41	432	1	0	0	19	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	526	4	43	450	1	0	0	20	0	0	0
Pedestrians								6				
Lane Width (m)								3.8				
Walking Speed (m/s)								1.2				
Percent Blockage								1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		201			183							
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	451			536			843	1069	269	820	1072	226
vC1, stage 1 conf vol							532	532		536	536	
vC2, stage 2 conf vol							311	537		283	536	
vCu, unblocked vol	386			536			788	1020	269	764	1024	155
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			100	100	97	100	100	100
cM capacity (veh/h)	1154			1037			452	414	728	451	398	848

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	0	263	263	4	43	300	151	0	20	0	0
Volume Left	0	0	0	0	43	0	0	0	0	0	0
Volume Right	0	0	0	4	0	0	1	0	20	0	0
cSH	1700	1700	1700	1700	1037	1700	1700	1700	728	1700	1700
Volume to Capacity	0.00	0.15	0.15	0.00	0.04	0.18	0.09	0.00	0.03	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.7	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	8.6	0.0	0.0	0.0	10.1	0.0	0.0
Lane LOS					A			A	B	A	A
Approach Delay (s)	0.0				0.8			10.1		0.0	
Approach LOS								B		A	

Intersection Summary					
Average Delay		0.5			
Intersection Capacity Utilization	24.0%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	296	55	137	291	60	215	
Future Volume (vph)	296	55	137	291	60	215	
Lane Group Flow (vph)	315	59	146	310	64	229	
Turn Type	NA	Perm	Perm	NA	Perm	Perm	
Protected Phases	2			6			8
Permitted Phases		2	6		4	4	
Detector Phase	2	2	6	6	4	4	
Switch Phase							
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0
Minimum Split (s)	31.2	31.2	31.2	31.2	14.5	14.5	14.5
Total Split (s)	45.0	45.0	45.0	45.0	15.0	15.0	15.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.1	2.1	2.1	2.1	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.5	6.5	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
v/c Ratio	0.14	0.06	0.22	0.14	0.32	0.55	
Control Delay	4.2	1.3	5.3	4.2	28.2	9.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.2	1.3	5.3	4.2	28.2	9.8	
Queue Length 50th (m)	5.9	0.0	5.6	5.8	6.9	0.0	
Queue Length 95th (m)	10.0	2.7	12.3	9.9	16.8	16.9	
Internal Link Dist (m)	178.7			176.6			
Turn Bay Length (m)		57.7	40.0		35.5		
Base Capacity (vph)	2251	1037	679	2283	206	420	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.06	0.22	0.14	0.31	0.55	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 3: Rogers Rd/Private Access & Elgin St W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	296	55	137	291	0	60	0	215	0	0	0
Future Volume (vph)	0	296	55	137	291	0	60	0	215	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.3	3.5	3.6	3.6	3.6	3.8	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00			
Frpb, ped/bikes		1.00	0.98	1.00	1.00		1.00		1.00			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3455	1558	1765	3505		1827		1581			
Flt Permitted		1.00	1.00	0.56	1.00		0.76		1.00			
Satd. Flow (perm)		3455	1558	1042	3505		1456		1581			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	315	59	146	310	0	64	0	229	0	0	0
RTOR Reduction (vph)	0	0	21	0	0	0	0	0	198	0	0	0
Lane Group Flow (vph)	0	315	38	146	310	0	64	0	31	0	0	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	1%	0%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type		NA	Perm	Perm	NA		Perm		Perm			
Protected Phases		2			6						8	
Permitted Phases			2	6			4		4	8		
Actuated Green, G (s)		39.1	39.1	39.1	39.1		8.2		8.2			
Effective Green, g (s)		39.1	39.1	39.1	39.1		8.2		8.2			
Actuated g/C Ratio		0.65	0.65	0.65	0.65		0.14		0.14			
Clearance Time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		2251	1015	679	2284		198		216			
v/s Ratio Prot		0.09			0.09							
v/s Ratio Perm			0.02	c0.14			c0.04		0.02			
v/c Ratio		0.14	0.04	0.22	0.14		0.32		0.14			
Uniform Delay, d1		4.0	3.7	4.2	4.0		23.4		22.8			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.1	0.1	0.7	0.1		1.0		0.3			
Delay (s)		4.1	3.8	5.0	4.1		24.3		23.1			
Level of Service		A	A	A	A		C		C			
Approach Delay (s)		4.1			4.4			23.4			0.0	
Approach LOS		A			A			C			A	

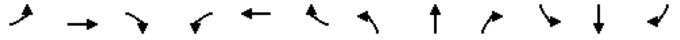
Intersection Summary				
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.23			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.7	
Intersection Capacity Utilization	54.5%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	47	24	53	197	142	63
Future Volume (Veh/h)	47	24	53	197	142	63
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	51	26	58	214	154	68
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					89	
pX, platoon unblocked						
vC, conflicting volume	518	188	222			
vC1, stage 1 conf vol	188					
vC2, stage 2 conf vol	330					
vCu, unblocked vol	518	188	222			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	97	96			
cM capacity (veh/h)	646	854	1347			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	51	26	58	214	222
Volume Left	51	0	58	0	0
Volume Right	0	26	0	0	68
cSH	646	854	1347	1700	1700
Volume to Capacity	0.08	0.03	0.04	0.13	0.13
Queue Length 95th (m)	2.0	0.8	1.1	0.0	0.0
Control Delay (s)	11.0	9.3	7.8	0.0	0.0
Lane LOS	B	A	A		
Approach Delay (s)	10.5		1.7		0.0
Approach LOS	B				

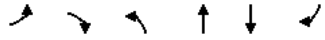
Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	2	9	9	32	5	213	35	65	99	2
Future Volume (Veh/h)	5	0	2	9	9	32	5	213	35	65	99	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	0	2	10	10	35	5	234	38	71	109	2
Pedestrians		3			1			12				
Lane Width (m)		3.6			3.6			3.8				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)											141	
pX, platoon unblocked												
vC, conflicting volume	539	538	125	529	520	254	114			273		
vC1, stage 1 conf vol	255	255		264	264							
vC2, stage 2 conf vol	284	283		265	256							
vCu, unblocked vol	539	538	125	529	520	254	114			273		
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)	6.1	5.6		6.1	5.5							
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	99	100	100	98	98	96	100			94		
cM capacity (veh/h)	548	538	919	604	578	789	1447			1289		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	55	5	272	71	111
Volume Left	5	10	5	0	71	0
Volume Right	2	35	0	38	0	2
cSH	619	703	1447	1700	1289	1700
Volume to Capacity	0.01	0.08	0.00	0.16	0.06	0.07
Queue Length 95th (m)	0.3	2.0	0.1	0.0	1.4	0.0
Control Delay (s)	10.9	10.6	7.5	0.0	8.0	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	10.9	10.6	0.1		3.1	
Approach LOS	B	B				

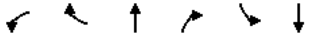
Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	33.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	253	109	1
Future Volume (Veh/h)	0	0	0	253	109	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	275	118	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					201	
pX, platoon unblocked						
vC, conflicting volume	394	118	119			
vC1, stage 1 conf vol	118					
vC2, stage 2 conf vol	275					
vCu, unblocked vol	394	118	119			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	728	933	1469			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	0	0	275	119
Volume Left	0	0	0	0
Volume Right	0	0	0	1
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.16	0.07
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.0	0.0		0.0
Approach LOS	A			

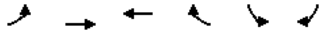
Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	16.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	12	241	32	21	88
Future Volume (Veh/h)	12	12	241	32	21	88
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	13	262	35	23	96
Pedestrians	27					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						246
pX, platoon unblocked						
vC, conflicting volume	448	306			324	
vC1, stage 1 conf vol	306					
vC2, stage 2 conf vol	142					
vCu, unblocked vol	448	306			324	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			98	
cM capacity (veh/h)	685	722			1219	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	26	297	119
Volume Left	13	0	23
Volume Right	13	35	0
cSH	703	1700	1219
Volume to Capacity	0.04	0.17	0.02
Queue Length 95th (m)	0.9	0.0	0.5
Control Delay (s)	10.3	0.0	1.7
Lane LOS	B		A
Approach Delay (s)	10.3	0.0	1.7
Approach LOS	B		

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization		32.7%	ICU Level of Service
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	88	21	16	186	85	23
Future Volume (vph)	88	21	16	186	85	23
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	97	23	18	204	93	25

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	120	222	118
Volume Left (vph)	97	0	93
Volume Right (vph)	0	204	25
Hadj (s)	0.16	-0.54	0.04
Departure Headway (s)	4.6	3.8	4.7
Degree Utilization, x	0.15	0.23	0.15
Capacity (veh/h)	759	916	721
Control Delay (s)	8.4	8.0	8.5
Approach Delay (s)	8.4	8.0	8.5
Approach LOS	A	A	A

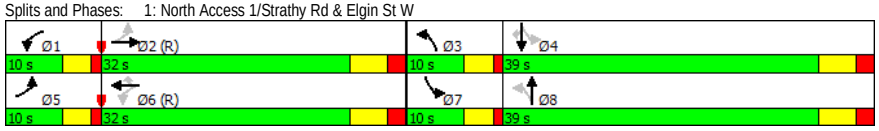
Intersection Summary			
Delay		8.2	
Level of Service		A	
Intersection Capacity Utilization		35.5%	ICU Level of Service
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	197	740	74	623	259	58	108	204	93	231
Future Volume (vph)	197	740	74	623	259	58	108	204	93	231
Lane Group Flow (vph)	203	792	76	642	267	60	195	210	96	238
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (%)	11.0%	35.2%	11.0%	35.2%	35.2%	11.0%	42.9%	11.0%	42.9%	42.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
v/c Ratio	0.41	0.47	0.19	0.42	0.33	0.17	0.61	0.80	0.29	0.50
Control Delay	10.6	17.4	9.2	19.8	4.5	24.0	35.0	51.2	35.3	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.6	17.4	9.2	19.8	4.5	24.0	35.0	51.2	35.3	8.4
Queue Length 50th (m)	13.8	48.2	4.8	40.2	1.5	8.3	25.9	32.0	16.2	0.0
Queue Length 95th (m)	28.5	77.0	12.1	66.4	18.4	16.2	44.8	#53.3	28.7	19.0
Internal Link Dist (m)		159.2		205.9			85.3		125.9	
Turn Bay Length (m)	24.0		95.0		38.1			50.4		
Base Capacity (vph)	494	1695	405	1527	808	345	670	263	658	713
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.47	0.19	0.42	0.33	0.17	0.29	0.80	0.15	0.33

Intersection Summary

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 10 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: North Access 1/Strathy Rd & Elgin St W



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	740	28	74	623	259	58	108	81	204	93	231
Future Volume (vph)	197	740	28	74	623	259	58	108	81	204	93	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.2	3.2	3.2	3.5	3.4	3.6	3.6	3.6	3.0	3.2	3.6
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1743	3398		1725	3500	1526	1743	1766		1666	1816	1550
Flt Permitted	0.31	1.00		0.32	1.00	1.00	0.69	1.00		0.46	1.00	1.00
Satd. Flow (perm)	573	3398		585	3500	1526	1275	1766		814	1816	1550
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	203	763	29	76	642	267	60	111	84	210	96	238
RTOR Reduction (vph)	0	2	0	0	0	144	0	39	0	0	0	195
Lane Group Flow (vph)	203	790	0	76	642	123	60	156	0	210	96	43
Confl. Peds. (#/hr)	8					8	11		4	4		11
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	53.8	43.8		44.9	38.9	38.9	20.0	15.2		22.4	16.4	16.4
Effective Green, g (s)	53.8	43.8		44.9	38.9	38.9	20.0	15.2		22.4	16.4	16.4
Actuated g/C Ratio	0.59	0.48		0.49	0.43	0.43	0.22	0.17		0.25	0.18	0.18
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	478	1635		363	1496	652	304	294		256	327	279
v/s Ratio Prot	c0.05	c0.23		0.01	0.18		0.01	0.09		c0.05	0.05	
v/s Ratio Perm	0.20			0.09		0.08	0.03			c0.15		0.03
v/c Ratio	0.42	0.48		0.21	0.43	0.19	0.20	0.53		0.82	0.29	0.15
Uniform Delay, d1	9.4	15.9		12.3	18.3	16.2	28.7	34.6		31.7	32.3	31.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	1.0		0.3	0.9	0.6	0.3	1.8		18.6	0.5	0.3
Delay (s)	10.0	17.0		12.6	19.2	16.9	29.0	36.5		50.3	32.8	31.7
Level of Service	A	B		B	B	B	C	D		D	C	C
Approach Delay (s)		15.5			18.0			34.7			39.1	
Approach LOS		B			B			C			D	

Intersection Summary

HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	73.4%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	768	25	191	776	0	11	0	196	1	0	0
Future Volume (Veh/h)	0	768	25	191	776	0	11	0	196	1	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	800	26	199	808	0	11	0	204	1	0	0
Pedestrians								6				
Lane Width (m)								3.8				
Walking Speed (m/s)								1.2				
Percent Blockage								1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		201			183							
pX, platoon unblocked	0.91			0.99			0.91	0.91	0.99	0.91	0.91	0.91
vC, conflicting volume	808			832			1608	2012	406	1810	2038	404
vC1, stage 1 conf vol							806	806		1206	1206	
vC2, stage 2 conf vol							802	1206		604	832	
vCu, unblocked vol	588			817			1440	1883	388	1662	1911	144
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			75			95	100	66	99	100	100
cM capacity (veh/h)	906			810			241	189	606	94	146	804

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	0	400	400	26	199	539	269	11	204	1	0
Volume Left	0	0	0	0	199	0	0	11	0	1	0
Volume Right	0	0	0	26	0	0	0	0	204	0	0
cSH	1700	1700	1700	1700	810	1700	1700	241	606	94	1700
Volume to Capacity	0.00	0.24	0.24	0.02	0.25	0.32	0.16	0.05	0.34	0.01	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	7.7	0.0	0.0	1.1	11.8	0.3	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	10.9	0.0	0.0	20.7	13.9	43.5	0.0
Lane LOS					B			C	B	E	A
Approach Delay (s)	0.0				2.2			14.3		43.5	
Approach LOS								B		E	

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	46.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	525	141	303	512	118	253	
Future Volume (vph)	525	141	303	512	118	253	
Lane Group Flow (vph)	559	150	322	545	126	269	
Turn Type	NA	Perm	Perm	NA	Perm	Perm	
Protected Phases	2			6			8
Permitted Phases		2	6		4	4	
Detector Phase	2	2	6	6	4	4	
Switch Phase							
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0
Minimum Split (s)	31.2	31.2	31.2	31.2	14.5	14.5	14.5
Total Split (s)	45.0	45.0	45.0	45.0	15.0	15.0	15.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.1	2.1	2.1	2.1	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.5	6.5	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
v/c Ratio	0.25	0.14	0.61	0.24	0.62	0.60	
Control Delay	4.8	1.2	12.2	4.7	39.8	9.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.8	1.2	12.2	4.7	39.8	9.9	
Queue Length 50th (m)	11.8	0.0	17.9	11.5	13.9	0.0	
Queue Length 95th (m)	17.7	4.6	42.3	17.2	#34.6	18.2	
Internal Link Dist (m)	178.7			176.6			
Turn Bay Length (m)		57.7	40.0		35.5		
Base Capacity (vph)	2240	1062	532	2272	206	454	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.25	0.14	0.61	0.24	0.61	0.59	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Rogers Rd/Private Access & Elgin St W

HCM Signalized Intersection Capacity Analysis
3: Rogers Rd/Private Access & Elgin St W

20045 | Northumberland Mall
FB PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	525	141	303	512	0	118	0	253	0	0	0
Future Volume (vph)	0	525	141	303	512	0	118	0	253	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.3	3.5	3.6	3.6	3.6	3.8	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00			
Frpb, ped/bikes		1.00	0.98	1.00	1.00		1.00		1.00			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3455	1558	1767	3505		1827		1581			
Flt Permitted		1.00	1.00	0.44	1.00		0.76		1.00			
Satd. Flow (perm)		3455	1558	823	3505		1456		1581			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	559	150	322	545	0	126	0	269	0	0	0
RTOR Reduction (vph)	0	0	53	0	0	0	0	0	231	0	0	0
Lane Group Flow (vph)	0	559	97	322	545	0	126	0	38	0	0	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	1%	0%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type		NA	Perm	Perm	NA		Perm		Perm			
Protected Phases		2			6						8	
Permitted Phases			2	6			4		4	8		
Actuated Green, G (s)		38.9	38.9	38.9	38.9		8.4		8.4			
Effective Green, g (s)		38.9	38.9	38.9	38.9		8.4		8.4			
Actuated g/C Ratio		0.65	0.65	0.65	0.65		0.14		0.14			
Clearance Time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		2239	1010	533	2272		203		221			
v/s Ratio Prot		0.16			0.16							
v/s Ratio Perm			0.06	c0.39			c0.09		0.02			
v/c Ratio		0.25	0.10	0.60	0.24		0.62		0.17			
Uniform Delay, d1		4.4	4.0	6.1	4.4		24.3		22.7			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.3	0.2	5.0	0.2		5.8		0.4			
Delay (s)		4.7	4.1	11.1	4.6		30.1		23.1			
Level of Service		A	A	B	A		C		C			
Approach Delay (s)		4.6			7.0			25.3			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.7	
Intersection Capacity Utilization	57.8%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

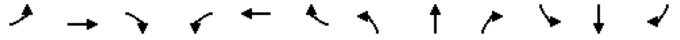
HCM Unsignalized Intersection Capacity Analysis
4: Rogers Rd & Mark's Access

20045 | Northumberland Mall
FB PM

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	64	44	35	296	380	59
Future Volume (Veh/h)	64	44	35	296	380	59
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	48	38	322	413	64
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					89	
pX, platoon unblocked	0.93	0.93	0.93			
vC, conflicting volume	843	445	477			
vC1, stage 1 conf vol	445					
vC2, stage 2 conf vol	398					
vCu, unblocked vol	794	367	401			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	92	96			
cM capacity (veh/h)	530	632	1078			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	70	48	38	322	477
Volume Left	70	0	38	0	0
Volume Right	0	48	0	0	64
cSH	530	632	1078	1700	1700
Volume to Capacity	0.13	0.08	0.04	0.19	0.28
Queue Length 95th (m)	3.6	2.0	0.9	0.0	0.0
Control Delay (s)	12.8	11.2	8.5	0.0	0.0
Lane LOS	B	B	A		
Approach Delay (s)	12.2		0.9		0.0
Approach LOS	B				

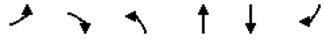
Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	8	7	88	25	155	10	167	64	161	260	3
Future Volume (Veh/h)	9	8	7	88	25	155	10	167	64	161	260	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	10	9	8	97	27	170	11	184	70	177	286	3
Pedestrians		3			1			12				
Lane Width (m)		3.6			3.6			3.8				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)											141	
pX, platoon unblocked												
vC, conflicting volume	1034	922	302	906	888	220	292			255		
vC1, stage 1 conf vol	644	644		242	242							
vC2, stage 2 conf vol	390	277		664	646							
vCu, unblocked vol	1034	922	302	906	888	220	292			255		
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)	6.1	5.6		6.1	5.5							
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	96	97	99	72	93	79	99			86		
cM capacity (veh/h)	262	355	732	346	374	824	1244			1309		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	27	294	11	254	177	289
Volume Left	10	97	11	0	177	0
Volume Right	8	170	0	70	0	3
cSH	363	526	1244	1700	1309	1700
Volume to Capacity	0.07	0.56	0.01	0.15	0.14	0.17
Queue Length 95th (m)	1.9	27.2	0.2	0.0	3.7	0.0
Control Delay (s)	15.7	20.1	7.9	0.0	8.2	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	15.7	20.1	0.3		3.1	
Approach LOS	C	C				

Intersection Summary				
Average Delay	7.5			
Intersection Capacity Utilization	51.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1	1	241	348	0
Future Volume (Veh/h)	0	1	1	241	348	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	262	378	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					201	
pX, platoon unblocked						
vC, conflicting volume	642	378	378			
vC1, stage 1 conf vol	378					
vC2, stage 2 conf vol	264					
vCu, unblocked vol	642	378	378			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	616	669	1180			

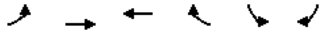
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	1	1	262	378
Volume Left	0	1	0	0
Volume Right	1	0	0	0
cSH	669	1180	1700	1700
Volume to Capacity	0.00	0.00	0.15	0.22
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	10.4	8.1	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	10.4	0.0		0.0
Approach LOS	B			

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	28.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	97	37	205	42	9	340
Future Volume (Veh/h)	97	37	205	42	9	340
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	105	40	223	46	10	370
Pedestrians	27					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						246
pX, platoon unblocked						
vC, conflicting volume	663	273			296	
vC1, stage 1 conf vol	273					
vC2, stage 2 conf vol	390					
vCu, unblocked vol	663	273			296	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	95			99	
cM capacity (veh/h)	601	753			1248	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	145	269	380
Volume Left	105	0	10
Volume Right	40	46	0
cSH	636	1700	1248
Volume to Capacity	0.23	0.16	0.01
Queue Length 95th (m)	7.0	0.0	0.2
Control Delay (s)	12.3	0.0	0.3
Lane LOS	B		A
Approach Delay (s)	12.3	0.0	0.3
Approach LOS	B		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	67	20	22	198	307	134
Future Volume (vph)	67	20	22	198	307	134
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	74	22	24	218	337	147

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	96	242	484
Volume Left (vph)	74	0	337
Volume Right (vph)	0	218	147
Hadj (s)	0.15	-0.53	-0.03
Departure Headway (s)	5.6	4.8	4.7
Degree Utilization, x	0.15	0.32	0.64
Capacity (veh/h)	576	692	730
Control Delay (s)	9.6	10.0	15.6
Approach Delay (s)	9.6	10.0	15.6
Approach LOS	A	A	C

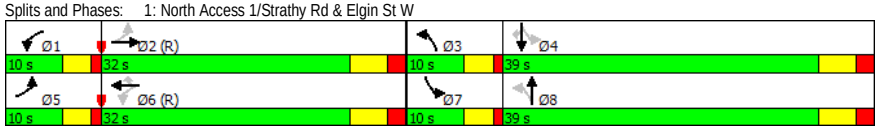
Intersection Summary			
Delay	13.3		
Level of Service	B		
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	236	848	79	776	228	54	111	202	97	318
Future Volume (vph)	236	848	79	776	228	54	111	202	97	318
Lane Group Flow (vph)	243	895	81	800	235	56	185	208	100	328
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (%)	11.0%	35.2%	11.0%	35.2%	35.2%	11.0%	42.9%	11.0%	42.9%	42.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
v/c Ratio	0.49	0.53	0.23	0.63	0.35	0.16	0.60	0.77	0.31	0.60
Control Delay	11.9	18.2	10.1	27.0	7.9	24.1	35.9	48.7	35.8	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	18.2	10.1	27.0	7.9	24.1	35.9	48.7	35.8	8.9
Queue Length 50th (m)	16.9	56.6	5.1	59.1	6.4	7.7	25.5	31.8	17.0	0.0
Queue Length 95th (m)	34.2	89.3	12.6	90.1	25.8	15.5	44.1	#51.6	29.9	22.4
Internal Link Dist (m)		159.2		205.9			85.3		125.9	
Turn Bay Length (m)	24.0		95.0		38.1			50.4		
Base Capacity (vph)	495	1700	360	1265	665	341	669	269	658	771
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.53	0.23	0.63	0.35	0.16	0.28	0.77	0.15	0.43

Intersection Summary

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 10 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: North Access 1/Strathy Rd & Elgin St W



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	236	848	20	79	776	228	54	111	69	202	97	318
Future Volume (vph)	236	848	20	79	776	228	54	111	69	202	97	318
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.2	3.2	3.2	3.5	3.4	3.6	3.6	3.6	3.0	3.2	3.6
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1744	3404		1725	3500	1526	1743	1780		1666	1816	1550
Flt Permitted	0.19	1.00		0.32	1.00	1.00	0.69	1.00		0.49	1.00	1.00
Satd. Flow (perm)	357	3404		577	3500	1526	1270	1780		853	1816	1550
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	243	874	21	81	800	235	56	114	71	208	100	328
RTOR Reduction (vph)	0	2	0	0	0	115	0	33	0	0	0	270
Lane Group Flow (vph)	243	893	0	81	800	120	56	152	0	208	100	58
Confl. Peds. (#/hr)	8					8	11		4	4		11
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	54.0	43.9		38.2	32.1	32.1	19.8	15.0		22.2	16.2	16.2
Effective Green, g (s)	54.0	43.9		38.2	32.1	32.1	19.8	15.0		22.2	16.2	16.2
Actuated g/C Ratio	0.59	0.48		0.42	0.35	0.35	0.22	0.16		0.24	0.18	0.18
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	484	1642		319	1234	538	301	293		261	323	275
v/s Ratio Prot	c0.10	0.26		0.02	c0.23		0.01	0.09		c0.05	0.06	
v/s Ratio Perm	0.20			0.09		0.08	0.03			c0.14		0.04
v/c Ratio	0.50	0.54		0.25	0.65	0.22	0.19	0.52		0.80	0.31	0.21
Uniform Delay, d1	11.0	16.5		16.1	24.7	20.7	28.8	34.7		31.6	32.5	31.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	1.3		0.4	2.6	1.0	0.3	1.7		15.4	0.5	0.4
Delay (s)	11.8	17.8		16.5	27.4	21.6	29.1	36.4		47.0	33.1	32.3
Level of Service	B	B		B	C	C	C	D		D	C	C
Approach Delay (s)		16.5			25.4			34.7			37.2	
Approach LOS		B			C			C			D	

Intersection Summary

HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	878	44	283	877	4	3	0	224	4	0	2
Future Volume (Veh/h)	2	878	44	283	877	4	3	0	224	4	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	2	915	46	295	914	4	3	0	233	4	0	2
Pedestrians								6				
Lane Width (m)								3.8				
Walking Speed (m/s)								1.2				
Percent Blockage								1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		201			183							
pX, platoon unblocked	0.85			0.98			0.86	0.86	0.98	0.86	0.86	0.85
vC, conflicting volume	918			967			1974	2433	464	2200	2477	459
vC1, stage 1 conf vol							925	925		1506	1506	
vC2, stage 2 conf vol							1049	1508		694	971	
vCu, unblocked vol	559			934			1725	2258	423	1988	2309	20
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			59			98	100	59	69	100	100
cM capacity (veh/h)	872			726			162	113	570	13	41	903

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	2	458	458	46	295	609	309	3	233	4	2
Volume Left	2	0	0	0	295	0	0	3	0	4	0
Volume Right	0	0	0	46	0	0	4	0	233	0	2
cSH	872	1700	1700	1700	726	1700	1700	162	570	13	903
Volume to Capacity	0.00	0.27	0.27	0.03	0.41	0.36	0.18	0.02	0.41	0.31	0.00
Queue Length 95th (m)	0.1	0.0	0.0	0.0	15.9	0.0	0.0	0.5	15.8	6.3	0.1
Control Delay (s)	9.1	0.0	0.0	0.0	13.3	0.0	0.0	27.6	15.6	384.5	9.0
Lane LOS	A				B			D	C	F	A
Approach Delay (s)	0.0				3.2			15.8		259.4	
Approach LOS								C		F	

Intersection Summary					
Average Delay	3.8				
Intersection Capacity Utilization	53.3%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	584	165	334	567	165	341	
Future Volume (vph)	584	165	334	567	165	341	
Lane Group Flow (vph)	621	176	355	603	176	363	
Turn Type	NA	Perm	Perm	NA	Perm	Perm	
Protected Phases	2			6			8
Permitted Phases		2	6		4	4	
Detector Phase	2	2	6	6	4	4	
Switch Phase							
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0
Minimum Split (s)	31.2	31.2	31.2	31.2	14.5	14.5	14.5
Total Split (s)	45.0	45.0	45.0	45.0	15.0	15.0	15.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.1	2.1	2.1	2.1	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.5	6.5	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
v/c Ratio	0.28	0.16	0.71	0.27	0.85	0.74	
Control Delay	5.0	1.2	17.5	4.9	63.9	16.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.0	1.2	17.5	4.9	63.9	16.7	
Queue Length 50th (m)	13.4	0.0	22.2	13.0	20.3	5.6	
Queue Length 95th (m)	19.8	5.0	#71.2	19.2	#51.8	#39.7	
Internal Link Dist (m)	178.7			176.6			
Turn Bay Length (m)		57.7	40.0		35.5		
Base Capacity (vph)	2234	1069	500	2266	206	490	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.28	0.16	0.71	0.27	0.85	0.74	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Rogers Rd/Private Access & Elgin St W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	584	165	334	567	0	165	0	341	0	0	0
Future Volume (vph)	0	584	165	334	567	0	165	0	341	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.3	3.5	3.6	3.6	3.6	3.8	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00			
Frpb, ped/bikes		1.00	0.98	1.00	1.00		1.00		1.00			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3455	1558	1767	3505		1827		1581			
Flt Permitted		1.00	1.00	0.42	1.00		0.76		1.00			
Satd. Flow (perm)		3455	1558	775	3505		1456		1581			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	621	176	355	603	0	176	0	363	0	0	0
RTOR Reduction (vph)	0	0	62	0	0	0	0	0	266	0	0	0
Lane Group Flow (vph)	0	621	114	355	603	0	176	0	97	0	0	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	1%	0%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type		NA	Perm	Perm	NA		Perm		Perm	Perm		
Protected Phases		2			6						8	
Permitted Phases			2	6			4		4	8		
Actuated Green, G (s)		38.8	38.8	38.8	38.8		8.5		8.5			
Effective Green, g (s)		38.8	38.8	38.8	38.8		8.5		8.5			
Actuated g/C Ratio		0.65	0.65	0.65	0.65		0.14		0.14			
Clearance Time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		2234	1007	501	2266		206		223			
v/s Ratio Prot		0.18			0.17							
v/s Ratio Perm			0.07	c0.46			c0.12		0.06			
v/c Ratio		0.28	0.11	0.71	0.27		0.85		0.43			
Uniform Delay, d1		4.6	4.0	6.9	4.5		25.1		23.6			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.3	0.2	8.2	0.3		27.5		1.4			
Delay (s)		4.9	4.3	15.1	4.8		52.6		24.9			
Level of Service		A	A	B	A		D		C			
Approach Delay (s)		4.7			8.6			34.0			0.0	
Approach LOS		A			A			C			A	

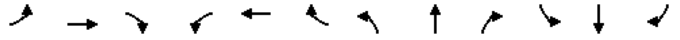
Intersection Summary				
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.7	
Intersection Capacity Utilization	62.1%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	113	83	37	393	418	81
Future Volume (Veh/h)	113	83	37	393	418	81
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	123	90	40	427	454	88
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					89	
pX, platoon unblocked	0.92	0.92	0.92			
vC, conflicting volume	1005	498	542			
vC1, stage 1 conf vol	498					
vC2, stage 2 conf vol	507					
vCu, unblocked vol	961	409	457			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	74	85	96			
cM capacity (veh/h)	470	590	1014			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	123	90	40	427	542
Volume Left	123	0	40	0	0
Volume Right	0	90	0	0	88
cSH	470	590	1014	1700	1700
Volume to Capacity	0.26	0.15	0.04	0.25	0.32
Queue Length 95th (m)	8.3	4.3	1.0	0.0	0.0
Control Delay (s)	15.3	12.2	8.7	0.0	0.0
Lane LOS	C	B	A		
Approach Delay (s)	14.0		0.7		0.0
Approach LOS	B				

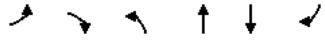
Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	17	19	117	31	114	18	183	86	170	219	4
Future Volume (Veh/h)	23	17	19	117	31	114	18	183	86	170	219	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	25	19	21	129	34	125	20	201	95	187	241	4
Pedestrians		3			1			12				
Lane Width (m)		3.6			3.6			3.8				
Walking Speed (m/s)		1.2			1.2			1.2				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)											141	
pX, platoon unblocked												
vC, conflicting volume	1003	957	258	947	912	250	248			297		
vC1, stage 1 conf vol	620	620		290	290							
vC2, stage 2 conf vol	383	337		658	622							
vCu, unblocked vol	1003	957	258	947	912	250	248			297		
tC, single (s)	7.1	6.6	6.2	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)	6.1	5.6		6.1	5.5							
tF (s)	3.5	4.1	3.3	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	91	94	97	60	91	84	98			85		
cM capacity (veh/h)	273	341	775	320	367	793	1291			1263		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	65	288	20	296	187	245
Volume Left	25	129	20	0	187	0
Volume Right	21	125	0	95	0	4
cSH	373	441	1291	1700	1263	1700
Volume to Capacity	0.17	0.65	0.02	0.17	0.15	0.14
Queue Length 95th (m)	5.0	36.5	0.4	0.0	4.2	0.0
Control Delay (s)	16.7	27.3	7.8	0.0	8.3	0.0
Lane LOS	C	D	A		A	
Approach Delay (s)	16.7	27.3	0.5		3.6	
Approach LOS	C	D				

Intersection Summary				
Average Delay	9.7			
Intersection Capacity Utilization	54.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	72	68	283	355	0
Future Volume (Veh/h)	4	72	68	283	355	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	78	74	308	386	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					201	
pX, platoon unblocked						
vC, conflicting volume	842	386	386			
vC1, stage 1 conf vol	386					
vC2, stage 2 conf vol	456					
vCu, unblocked vol	842	386	386			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	88	94			
cM capacity (veh/h)	515	662	1172			

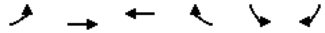
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	82	74	308	386
Volume Left	4	74	0	0
Volume Right	78	0	0	0
cSH	653	1172	1700	1700
Volume to Capacity	0.13	0.06	0.18	0.23
Queue Length 95th (m)	3.4	1.6	0.0	0.0
Control Delay (s)	11.3	8.3	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.3	1.6		0.0
Approach LOS	B			

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	37.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	104	44	311	40	12	415
Future Volume (Veh/h)	104	44	311	40	12	415
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	113	48	338	43	13	451
Pedestrians	27					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						246
pX, platoon unblocked						
vC, conflicting volume	864	386			408	
vC1, stage 1 conf vol	386					
vC2, stage 2 conf vol	477					
vCu, unblocked vol	864	386			408	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	93			99	
cM capacity (veh/h)	523	651			1136	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	161	381	464
Volume Left	113	0	13
Volume Right	48	43	0
cSH	556	1700	1136
Volume to Capacity	0.29	0.22	0.01
Queue Length 95th (m)	9.6	0.0	0.3
Control Delay (s)	14.1	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	14.1	0.0	0.4
Approach LOS	B		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	91	29	34	260	391	128
Future Volume (vph)	91	29	34	260	391	128
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	100	32	37	286	430	141

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	132	323	571
Volume Left (vph)	100	0	430
Volume Right (vph)	0	286	141
Hadj (s)	0.15	-0.52	0.02
Departure Headway (s)	6.2	5.2	5.2
Degree Utilization, x	0.23	0.47	0.82
Capacity (veh/h)	536	638	681
Control Delay (s)	11.0	12.8	27.4
Approach Delay (s)	11.0	12.8	27.4
Approach LOS	B	B	D

Intersection Summary			
Delay	20.7		
Level of Service	C		
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

Queues
1: North Access 1/Strathy Rd & Elgin St W

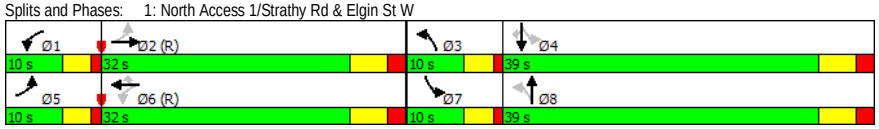
Future Background
Saturday Peak

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	265	642	76	748	216	49	114	160	105	301
Future Volume (vph)	265	642	76	748	216	49	114	160	105	301
Lane Group Flow (vph)	276	705	79	779	225	51	179	167	109	314
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (%)	11.0%	35.2%	11.0%	35.2%	35.2%	11.0%	42.9%	11.0%	42.9%	42.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
v/c Ratio	0.53	0.41	0.21	0.67	0.36	0.15	0.59	0.60	0.31	0.55
Control Delay	14.3	16.4	10.4	30.0	8.3	23.8	37.1	36.4	34.7	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.3	16.4	10.4	30.0	8.3	23.8	37.1	36.4	34.7	8.0
Queue Length 50th (m)	19.8	41.2	5.0	60.2	5.9	7.0	25.9	24.7	18.6	0.0
Queue Length 95th (m)	46.9	66.2	12.4	90.6	25.0	14.5	44.0	38.9	32.3	21.5
Internal Link Dist (m)		159.2		205.9			85.3		125.9	
Turn Bay Length (m)	24.0		95.0		38.1			50.4		
Base Capacity (vph)	518	1713	381	1155	619	351	665	277	639	772
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.41	0.21	0.67	0.36	0.15	0.27	0.60	0.17	0.41

Intersection Summary

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 10 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Splits and Phases: 1: North Access 1/Strathy Rd & Elgin St W



HCM Signalized Intersection Capacity Analysis
1: North Access 1/Strathy Rd & Elgin St W

Future Background
Saturday Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	642	35	76	748	216	49	114	58	160	105	301
Future Volume (vph)	265	642	35	76	748	216	49	114	58	160	105	301
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.2	3.2	3.2	3.5	3.4	3.6	3.6	3.6	3.0	3.2	3.6
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	3423		1725	3535	1536	1804	1781		1685	1763	1579
Flt Permitted	0.17	1.00		0.38	1.00	1.00	0.69	1.00		0.48	1.00	1.00
Satd. Flow (perm)	313	3423		696	3535	1536	1304	1781		847	1763	1579
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	276	669	36	79	779	225	51	119	60	167	109	314
RTOR Reduction (vph)	0	3	0	0	0	121	0	26	0	0	0	251
Lane Group Flow (vph)	276	702	0	79	779	104	51	153	0	167	109	63
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)						6						
Heavy Vehicles (%)	2%	0%	0%	0%	1%	0%	0%	2%	0%	0%	3%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	53.2	43.1		34.3	28.2	28.2	19.4	15.8		24.2	18.2	18.2
Effective Green, g (s)	53.2	43.1		34.3	28.2	28.2	19.4	15.8		24.2	18.2	18.2
Actuated g/C Ratio	0.58	0.47		0.38	0.31	0.31	0.21	0.17		0.27	0.20	0.20
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	505	1621		331	1095	475	297	309		280	352	315
v/s Ratio Prot	c0.13	0.21		0.02	c0.22		0.01	0.09		c0.04	0.06	
v/s Ratio Perm	0.19			0.07		0.07	0.03			c0.12		0.04
v/c Ratio	0.55	0.43		0.24	0.71	0.22	0.17	0.50		0.60	0.31	0.20
Uniform Delay, d1	12.0	15.9		18.5	27.8	23.3	29.0	34.0		28.2	31.0	30.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.2	0.8		0.4	3.9	1.1	0.3	1.3		3.4	0.5	0.3
Delay (s)	13.2	16.7		18.9	31.7	24.3	29.3	35.3		31.5	31.5	30.6
Level of Service	B	B		B	C	C	C	D		C	C	C
Approach Delay (s)		15.7			29.3			33.9			31.1	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	786	38	199	889	8	16	0	153	2	0	0
Future Volume (Veh/h)	0	786	38	199	889	8	16	0	153	2	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	827	40	209	936	8	17	0	161	2	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		201			183							
pX, platoon unblocked	0.83						0.83	0.83		0.83	0.83	0.83
vC, conflicting volume	944			867			1713	2189	414	1932	2225	472
vC1, stage 1 conf vol							827	827		1358	1358	
vC2, stage 2 conf vol							886	1362		574	867	
vCu, unblocked vol	535			867			1457	2028	414	1720	2071	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			73			93	100	73	98	100	100
cM capacity (veh/h)	870			779			239	168	591	103	125	910

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	0	414	414	40	209	624	320	17	161	2	0
Volume Left	0	0	0	0	209	0	0	17	0	2	0
Volume Right	0	0	0	40	0	0	8	0	161	0	0
cSH	1700	1700	1700	1700	779	1700	1700	239	591	103	1700
Volume to Capacity	0.00	0.24	0.24	0.02	0.27	0.37	0.19	0.07	0.27	0.02	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	8.7	0.0	0.0	1.8	8.8	0.5	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	11.3	0.0	0.0	21.2	13.4	40.5	0.0
Lane LOS					B			C	B	E	A
Approach Delay (s)	0.0				2.0			14.1		40.5	
Approach LOS								B		E	

Intersection Summary					
Average Delay	2.3				
Intersection Capacity Utilization	46.1%	ICU Level of Service		A	
Analysis Period (min)	15				

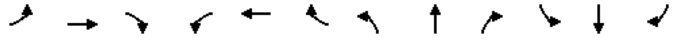
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	491	111	380	496	132	348	
Future Volume (vph)	491	111	380	496	132	348	
Lane Group Flow (vph)	511	116	396	517	138	363	
Turn Type	NA	Perm	Perm	NA	Perm	Perm	
Protected Phases	2			6			8
Permitted Phases		2	6		4	4	
Detector Phase	2	2	6	6	4	4	
Switch Phase							
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0
Minimum Split (s)	31.2	31.2	31.2	31.2	14.5	14.5	14.5
Total Split (s)	45.0	45.0	45.0	45.0	15.0	15.0	15.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.1	2.1	2.1	2.1	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.5	6.5	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
v/c Ratio	0.23	0.11	0.71	0.22	0.68	0.68	
Control Delay	4.7	1.2	16.2	4.6	44.8	10.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.7	1.2	16.2	4.6	44.8	10.7	
Queue Length 50th (m)	10.6	0.0	24.8	10.7	15.4	0.0	
Queue Length 95th (m)	16.2	4.1	#76.1	16.2	#39.1	#22.2	
Internal Link Dist (m)	178.7			176.6			
Turn Bay Length (m)		57.7	40.0		35.5		
Base Capacity (vph)	2262	1076	559	2317	204	537	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.23	0.11	0.71	0.22	0.68	0.68	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Rogers Rd/Private Access & Elgin St W

HCM Signalized Intersection Capacity Analysis
3: Rogers Rd/Private Access & Elgin St W

Future Background
Saturday Peak



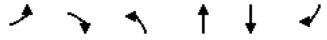
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	491	111	380	496	0	132	0	348	0	0	0
Future Volume (vph)	0	491	111	380	496	0	132	0	348	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.3	3.5	3.6	3.6	3.6	3.8	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3490	1597	1770	3574		1809		1597			
Flt Permitted		1.00	1.00	0.46	1.00		0.76		1.00			
Satd. Flow (perm)		3490	1597	864	3574		1442		1597			
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	511	116	396	517	0	138	0	362	0	0	0
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	312	0	0	0
Lane Group Flow (vph)	0	511	75	396	517	0	138	0	51	0	0	0
Heavy Vehicles (%)	0%	0%	0%	2%	1%	0%	2%	0%	0%	0%	0%	0%
Turn Type		NA	Perm	Perm	NA		Perm		Perm			
Protected Phases		2			6						8	
Permitted Phases			2	6			4		4	8		
Actuated Green, G (s)		38.9	38.9	38.9	38.9		8.4		8.4			
Effective Green, g (s)		38.9	38.9	38.9	38.9		8.4		8.4			
Actuated g/C Ratio		0.65	0.65	0.65	0.65		0.14		0.14			
Clearance Time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		2262	1035	560	2317		201		223			
v/s Ratio Prot		0.15			0.14							
v/s Ratio Perm			0.05	c0.46			c0.10		0.03			
v/c Ratio		0.23	0.07	0.71	0.22		0.69		0.23			
Uniform Delay, d1		4.3	3.9	6.9	4.3		24.5		22.9			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.2	0.1	7.4	0.2		9.3		0.5			
Delay (s)		4.6	4.0	14.2	4.6		33.9		23.4			
Level of Service		A	A	B	A		C		C			
Approach Delay (s)		4.5			8.7			26.3			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.7	
Intersection Capacity Utilization	58.7%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Rogers Rd & Mark's Access

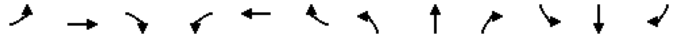
Future Background
Saturday Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	131	83	66	349	345	146
Future Volume (Veh/h)	131	83	66	349	345	146
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	142	90	72	379	375	159
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					89	
pX, platoon unblocked	0.90	0.90	0.90			
vC, conflicting volume	978	454	534			
vC1, stage 1 conf vol	454					
vC2, stage 2 conf vol	523					
vCu, unblocked vol	921	342	430			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	70	86	93			
cM capacity (veh/h)	471	637	1029			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	142	90	72	379	534
Volume Left	142	0	72	0	0
Volume Right	0	90	0	0	159
cSH	471	637	1029	1700	1700
Volume to Capacity	0.30	0.14	0.07	0.22	0.31
Queue Length 95th (m)	10.1	3.9	1.8	0.0	0.0
Control Delay (s)	15.9	11.6	8.8	0.0	0.0
Lane LOS	C	B	A		
Approach Delay (s)	14.2		1.4		0.0
Approach LOS	B				

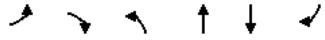
Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	48.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	10	16	35	38	130	19	197	77	189	170	4
Future Volume (Veh/h)	13	10	16	35	38	130	19	197	77	189	170	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	14	11	17	37	40	137	20	207	81	199	179	4
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.8			3.8	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)											141	
pX, platoon unblocked												
vC, conflicting volume	985	908	183	888	870	248	184			288		
vC1, stage 1 conf vol	580	580		288	288							
vC2, stage 2 conf vol	405	328		600	582							
vCu, unblocked vol	985	908	183	888	870	248	184			288		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	97	98	90	89	83	99			84		
cM capacity (veh/h)	258	357	863	356	379	794	1402			1268		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	42	214	20	288	199	183
Volume Left	14	37	20	0	199	0
Volume Right	17	137	0	81	0	4
cSH	400	560	1402	1700	1268	1700
Volume to Capacity	0.10	0.38	0.01	0.17	0.16	0.11
Queue Length 95th (m)	2.8	14.3	0.3	0.0	4.4	0.0
Control Delay (s)	15.0	15.3	7.6	0.0	8.4	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	15.0	15.3	0.5		4.4	
Approach LOS	C	C				

Intersection Summary				
Average Delay	6.1			
Intersection Capacity Utilization	48.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	60	56	293	221	0
Future Volume (Veh/h)	0	60	56	293	221	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	65	61	318	240	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					201	
pX, platoon unblocked						
vC, conflicting volume	680	240	240			
vC1, stage 1 conf vol	240					
vC2, stage 2 conf vol	440					
vCu, unblocked vol	680	240	240			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	92	95			
cM capacity (veh/h)	569	799	1327			

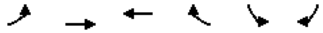
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	65	61	318	240
Volume Left	0	61	0	0
Volume Right	65	0	0	0
cSH	799	1327	1700	1700
Volume to Capacity	0.08	0.05	0.19	0.14
Queue Length 95th (m)	2.1	1.2	0.0	0.0
Control Delay (s)	9.9	7.8	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.9	1.3		0.0
Approach LOS	A			

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	56	46	303	43	16	265
Future Volume (Veh/h)	56	46	303	43	16	265
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	64	52	344	49	18	301
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						246
pX, platoon unblocked						
vC, conflicting volume	708	370			395	
vC1, stage 1 conf vol	370					
vC2, stage 2 conf vol	337					
vCu, unblocked vol	708	370			395	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	92			98	
cM capacity (veh/h)	591	670			1173	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	116	393	319
Volume Left	64	0	18
Volume Right	52	49	0
cSH	624	1700	1173
Volume to Capacity	0.19	0.23	0.02
Queue Length 95th (m)	5.4	0.0	0.4
Control Delay (s)	12.1	0.0	0.6
Lane LOS	B		A
Approach Delay (s)	12.1	0.0	0.6
Approach LOS	B		

Intersection Summary			
Average Delay		1.9	
Intersection Capacity Utilization		39.6%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	96	17	22	250	244	77
Future Volume (vph)	96	17	22	250	244	77
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	112	20	26	291	284	90

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	132	317	374
Volume Left (vph)	112	0	284
Volume Right (vph)	0	291	90
Hadj (s)	0.17	-0.53	0.02
Departure Headway (s)	5.5	4.6	5.0
Degree Utilization, x	0.20	0.40	0.52
Capacity (veh/h)	599	735	676
Control Delay (s)	9.9	10.6	13.4
Approach Delay (s)	9.9	10.6	13.4
Approach LOS	A	B	B

Intersection Summary			
Delay		11.8	
Level of Service		B	
Intersection Capacity Utilization		51.0%	ICU Level of Service A
Analysis Period (min)		15	

APPENDIX D

Intersection Capacity Analysis Results – Future Total Conditions

Queues
1: North Access 1/Strathy Rd & Elgin St W

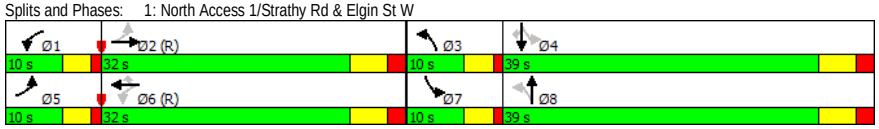
20045 | Northumberland Mall
FT AM

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	107	412	31	417	84	3	34	56	31	89
Future Volume (vph)	107	412	31	417	84	3	34	56	31	89
Lane Group Flow (vph)	110	443	32	430	87	3	57	58	32	92
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (%)	11.0%	35.2%	11.0%	35.2%	35.2%	11.0%	42.9%	11.0%	42.9%	42.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
v/c Ratio	0.16	0.21	0.05	0.21	0.09	0.01	0.23	0.23	0.09	0.22
Control Delay	6.4	10.5	6.2	12.2	1.1	25.0	26.9	28.1	31.3	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	10.5	6.2	12.2	1.1	25.0	26.9	28.1	31.3	4.1
Queue Length 50th (m)	6.8	22.4	1.9	22.6	0.0	0.4	5.8	8.2	4.6	0.0
Queue Length 95th (m)	12.8	32.5	5.0	33.7	3.2	2.6	17.2	18.0	13.9	6.7
Internal Link Dist (m)		159.2		205.9			85.3		125.9	
Turn Bay Length (m)	24.0		95.0		38.1			50.4		
Base Capacity (vph)	674	2147	649	2081	961	281	659	254	658	646
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.21	0.05	0.21	0.09	0.01	0.09	0.23	0.05	0.14

Intersection Summary

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 10 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Splits and Phases: 1: North Access 1/Strathy Rd & Elgin St W



HCM Signalized Intersection Capacity Analysis
1: North Access 1/Strathy Rd & Elgin St W

20045 | Northumberland Mall
FT AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	412	17	31	417	84	3	34	21	56	31	89
Future Volume (vph)	107	412	17	31	417	84	3	34	21	56	31	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.2	3.2	3.2	3.5	3.4	3.6	3.6	3.6	3.0	3.2	3.6
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1739	3396		1725	3500	1526	1741	1779		1665	1816	1550
Flt Permitted	0.47	1.00		0.50	1.00	1.00	0.74	1.00		0.55	1.00	1.00
Satd. Flow (perm)	867	3396		899	3500	1526	1350	1779		971	1816	1550
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	110	425	18	32	430	87	3	35	22	58	32	92
RTOR Reduction (vph)	0	2	0	0	0	41	0	19	0	0	0	76
Lane Group Flow (vph)	110	441	0	32	430	46	3	38	0	58	32	16
Confl. Peds. (#/hr)	8					8	11		4	4		11
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	56.8	50.3		51.6	47.7	47.7	13.2	12.0		20.4	15.6	15.6
Effective Green, g (s)	56.8	50.3		51.6	47.7	47.7	13.2	12.0		20.4	15.6	15.6
Actuated g/C Ratio	0.62	0.55		0.57	0.52	0.52	0.15	0.13		0.22	0.17	0.17
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	603	1877		545	1834	799	200	234		254	311	265
v/s Ratio Prot	c0.01	c0.13		0.00	0.12		0.00	0.02		c0.01	0.02	
v/s Ratio Perm	0.10			0.03		0.03	0.00			c0.04		0.01
v/c Ratio	0.18	0.23		0.06	0.23	0.06	0.01	0.16		0.23	0.10	0.06
Uniform Delay, d1	6.9	10.5		8.7	11.7	10.6	33.3	35.0		28.4	31.8	31.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3		0.0	0.3	0.1	0.0	0.3		0.5	0.1	0.1
Delay (s)	7.1	10.8		8.7	12.0	10.8	33.3	35.4		28.9	31.9	31.7
Level of Service	A	B		A	B	B	C	D		C	C	C
Approach Delay (s)		10.0			11.6			35.3			30.8	
Approach LOS		B			B			D			C	

Intersection Summary

HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.25			
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	56.3%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	515	5	49	441	1	0	0	29	0	0	0
Future Volume (Veh/h)	0	515	5	49	441	1	0	0	29	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	536	5	51	459	1	0	0	30	0	0	0
Pedestrians								6				
Lane Width (m)								3.8				
Walking Speed (m/s)								1.2				
Percent Blockage								1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		201			183							
pX, platoon unblocked	0.97						0.97	0.97		0.97	0.97	0.97
vC, conflicting volume	460			547			874	1104	274	860	1108	230
vC1, stage 1 conf vol							542	542		562	562	
vC2, stage 2 conf vol							332	562		298	547	
vCu, unblocked vol	378			547			805	1043	274	791	1048	141
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	96	100	100	100
cM capacity (veh/h)	1154			1027			444	405	723	433	385	860

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	0	268	268	5	51	306	154	0	30	0	0
Volume Left	0	0	0	0	51	0	0	0	0	0	0
Volume Right	0	0	0	5	0	0	1	0	30	0	0
cSH	1700	1700	1700	1700	1027	1700	1700	1700	723	1700	1700
Volume to Capacity	0.00	0.16	0.16	0.00	0.05	0.18	0.09	0.00	0.04	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	1.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	8.7	0.0	0.0	0.0	10.2	0.0	0.0
Lane LOS					A			A	B	A	A
Approach Delay (s)	0.0				0.9			10.2		0.0	
Approach LOS								B		A	

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	24.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	300	58	146	292	62	210	
Future Volume (vph)	300	58	146	292	62	210	
Lane Group Flow (vph)	319	62	155	311	66	223	
Turn Type	NA	Perm	Perm	NA	Perm	Perm	
Protected Phases	2			6			8
Permitted Phases		2	6		4	4	
Detector Phase	2	2	6	6	4	4	
Switch Phase							
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0
Minimum Split (s)	31.2	31.2	31.2	31.2	14.5	14.5	14.5
Total Split (s)	45.0	45.0	45.0	45.0	15.0	15.0	15.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.1	2.1	2.1	2.1	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.5	6.5	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
v/c Ratio	0.14	0.06	0.23	0.14	0.33	0.55	
Control Delay	4.2	1.4	5.4	4.2	28.4	9.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.2	1.4	5.4	4.2	28.4	9.7	
Queue Length 50th (m)	6.0	0.0	6.0	5.8	7.1	0.0	
Queue Length 95th (m)	10.2	2.9	13.2	9.9	17.3	16.7	
Internal Link Dist (m)	178.7			176.6			
Turn Bay Length (m)		57.7	40.0		35.5		
Base Capacity (vph)	2251	1047	676	2283	206	415	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.06	0.23	0.14	0.32	0.54	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 3: Rogers Rd/Private Access & Elgin St W

HCM Signalized Intersection Capacity Analysis — 20045 | Northumberland Mall
3: Rogers Rd/Private Access & Elgin St W — FT AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	300	58	146	292	0	62	0	210	0	0	0
Future Volume (vph)	0	300	58	146	292	0	62	0	210	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.3	3.5	3.6	3.6	3.6	3.8	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00			
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00		1.00			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3455	1573	1767	3505		1827		1581			
Flt Permitted		1.00	1.00	0.56	1.00		0.76		1.00			
Satd. Flow (perm)		3455	1573	1039	3505		1456		1581			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	319	62	155	311	0	66	0	223	0	0	0
RTOR Reduction (vph)	0	0	22	0	0	0	0	0	193	0	0	0
Lane Group Flow (vph)	0	319	40	155	311	0	66	0	30	0	0	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	1%	0%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type		NA	Perm	Perm	NA		Perm		Perm			
Protected Phases		2			6						8	
Permitted Phases			2	6			4		4	8		
Actuated Green, G (s)		39.1	39.1	39.1	39.1		8.2		8.2			
Effective Green, g (s)		39.1	39.1	39.1	39.1		8.2		8.2			
Actuated g/C Ratio		0.65	0.65	0.65	0.65		0.14		0.14			
Clearance Time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		2251	1025	677	2284		198		216			
v/s Ratio Prot		0.09			0.09							
v/s Ratio Perm			0.03	c0.15			c0.05		0.02			
v/c Ratio		0.14	0.04	0.23	0.14		0.33		0.14			
Uniform Delay, d1		4.0	3.7	4.3	4.0		23.4		22.8			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.1	0.1	0.8	0.1		1.0		0.3			
Delay (s)		4.1	3.8	5.1	4.1		24.4		23.1			
Level of Service		A	A	A	A		C		C			
Approach Delay (s)		4.1			4.4			23.4			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.25			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.7	
Intersection Capacity Utilization	54.6%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — 20045 | Northumberland Mall
4: Rogers Rd & Mark's Access/Future West Access 1 — FT AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	2	24	12	12	25	53	169	42	77	77	63
Future Volume (Veh/h)	47	2	24	12	12	25	53	169	42	77	77	63
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	51	2	26	13	13	27	58	184	46	84	84	68
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)											89	
pX, platoon unblocked												
vC, conflicting volume	620	632	118	602	643	207	152			230		
vC1, stage 1 conf vol	286	286		323	323							
vC2, stage 2 conf vol	334	346		279	320							
vCu, unblocked vol	620	632	118	602	643	207	152			230		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	100	97	98	97	97	96			94		
cM capacity (veh/h)	491	482	934	528	493	833	1429			1338		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	51	28	13	40	58	230	84	152
Volume Left	51	0	13	0	58	0	84	0
Volume Right	0	26	0	27	0	46	0	68
cSH	491	875	528	681	1429	1700	1338	1700
Volume to Capacity	0.10	0.03	0.02	0.06	0.04	0.14	0.06	0.09
Queue Length 95th (m)	2.8	0.8	0.6	1.5	1.0	0.0	1.6	0.0
Control Delay (s)	13.2	9.2	12.0	10.6	7.6	0.0	7.9	0.0
Lane LOS	B	A	B	B	A		A	
Approach Delay (s)	11.8		11.0		1.5		2.8	
Approach LOS	B		B					

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	35.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	2	5	259	115	2
Future Volume (Veh/h)	5	2	5	259	115	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	2	5	285	126	2
Pedestrians	3			12		
Lane Width (m)	3.6			3.8		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					141	
pX, platoon unblocked						
vC, conflicting volume	425	142	131			
vC1, stage 1 conf vol	130					
vC2, stage 2 conf vol	295					
vCu, unblocked vol	425	142	131			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.3			
p0 queue free %	99	100	100			
cM capacity (veh/h)	704	899	1426			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	7	5	285	128
Volume Left	5	5	0	0
Volume Right	2	0	0	2
cSH	750	1426	1700	1700
Volume to Capacity	0.01	0.00	0.17	0.08
Queue Length 95th (m)	0.2	0.1	0.0	0.0
Control Delay (s)	9.8	7.5	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.8	0.1		0.0
Approach LOS	A			

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	26.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	264	116	1
Future Volume (Veh/h)	0	0	0	264	116	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	287	126	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					201	
pX, platoon unblocked						
vC, conflicting volume	414	126	127			
vC1, stage 1 conf vol	126					
vC2, stage 2 conf vol	287					
vCu, unblocked vol	414	126	127			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	717	924	1459			

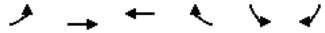
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	0	0	287	127
Volume Left	0	0	0	0
Volume Right	0	0	0	1
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.17	0.07
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.0	0.0		0.0
Approach LOS	A			

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	17.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	16	16	248	38	25	91
Future Volume (Veh/h)	16	16	248	38	25	91
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	17	270	41	27	99
Pedestrians	27					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						246
pX, platoon unblocked						
vC, conflicting volume	470	318			338	
vC1, stage 1 conf vol	318					
vC2, stage 2 conf vol	153					
vCu, unblocked vol	470	318			338	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			98	
cM capacity (veh/h)	674	711			1205	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	34	311	126
Volume Left	17	0	27
Volume Right	17	41	0
cSH	692	1700	1205
Volume to Capacity	0.05	0.18	0.02
Queue Length 95th (m)	1.2	0.0	0.5
Control Delay (s)	10.5	0.0	1.9
Lane LOS	B		A
Approach Delay (s)	10.5	0.0	1.9
Approach LOS	B		

Intersection Summary			
Average Delay		1.3	
Intersection Capacity Utilization		35.2%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	92	21	16	195	90	24
Future Volume (vph)	92	21	16	195	90	24
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	101	23	18	214	99	26

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	124	232	125
Volume Left (vph)	101	0	99
Volume Right (vph)	0	214	26
Hadj (s)	0.16	-0.54	0.05
Departure Headway (s)	4.6	3.8	4.7
Degree Utilization, x	0.16	0.25	0.16
Capacity (veh/h)	752	910	715
Control Delay (s)	8.5	8.1	8.6
Approach Delay (s)	8.5	8.1	8.6
Approach LOS	A	A	A

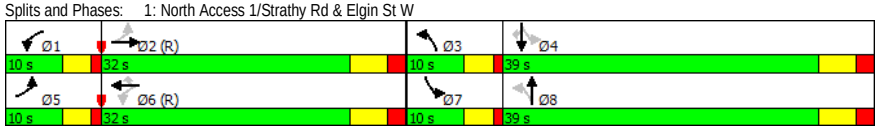
Intersection Summary			
Delay		8.3	
Level of Service		A	
Intersection Capacity Utilization		36.6%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	202	766	87	637	259	70	115	204	100	231
Future Volume (vph)	202	766	87	637	259	70	115	204	100	231
Lane Group Flow (vph)	208	824	90	657	267	72	249	210	103	238
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (%)	11.0%	35.2%	11.0%	35.2%	35.2%	11.0%	42.9%	11.0%	42.9%	42.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
v/c Ratio	0.44	0.51	0.24	0.46	0.35	0.20	0.69	0.87	0.29	0.48
Control Delay	12.0	19.6	10.7	22.2	5.4	22.7	35.0	60.8	33.2	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	19.6	10.7	22.2	5.4	22.7	35.0	60.8	33.2	7.6
Queue Length 50th (m)	15.4	54.0	6.2	44.3	2.2	9.6	31.7	30.8	16.9	0.0
Queue Length 95th (m)	31.8	87.4	15.1	73.1	20.6	17.7	52.6	#55.0	29.0	18.2
Internal Link Dist (m)		159.2		205.9			85.3		125.9	
Turn Bay Length (m)	24.0		95.0		38.1			50.4		
Base Capacity (vph)	477	1620	380	1439	772	365	673	242	658	713
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.51	0.24	0.46	0.35	0.20	0.37	0.87	0.16	0.33

Intersection Summary

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 10 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: North Access 1/Strathy Rd & Elgin St W



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	202	766	33	87	637	259	70	115	126	204	100	231
Future Volume (vph)	202	766	33	87	637	259	70	115	126	204	100	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.2	3.2	3.2	3.5	3.4	3.6	3.6	3.6	3.0	3.2	3.6
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1743	3396		1725	3500	1526	1743	1737		1667	1816	1550
Flt Permitted	0.29	1.00		0.30	1.00	1.00	0.69	1.00		0.37	1.00	1.00
Satd. Flow (perm)	539	3396		542	3500	1526	1267	1737		642	1816	1550
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	208	790	34	90	657	267	72	119	130	210	103	238
RTOR Reduction (vph)	0	3	0	0	0	147	0	55	0	0	0	191
Lane Group Flow (vph)	208	821	0	90	657	120	72	194	0	210	103	47
Confl. Peds. (#/hr)	8					8	11		4	4		11
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	52.2	41.7		43.1	36.6	36.6	21.6	16.8		24.0	18.0	18.0
Effective Green, g (s)	52.2	41.7		43.1	36.6	36.6	21.6	16.8		24.0	18.0	18.0
Actuated g/C Ratio	0.57	0.46		0.47	0.40	0.40	0.24	0.18		0.26	0.20	0.20
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	462	1556		341	1407	613	325	320		236	359	306
v/s Ratio Prot	c0.06	c0.24		0.02	0.19		0.01	0.11		c0.06	0.06	
v/s Ratio Perm	0.20			0.11		0.08	0.04			c0.18		0.03
v/c Ratio	0.45	0.53		0.26	0.47	0.20	0.22	0.60		0.89	0.29	0.15
Uniform Delay, d1	10.3	17.6		13.4	20.0	17.6	27.6	34.1		31.4	31.0	30.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.7	1.3		0.4	1.1	0.7	0.3	3.2		30.7	0.4	0.2
Delay (s)	11.0	18.9		13.8	21.1	18.4	28.0	37.3		62.1	31.5	30.4
Level of Service	B	B		B	C	B	C	D		E	C	C
Approach Delay (s)		17.3			19.8			35.2			42.7	
Approach LOS		B			B			D			D	

Intersection Summary

HCM 2000 Control Delay	24.9	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.67				
Actuated Cycle Length (s)	91.0	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	76.5%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	768	35	208	785	0	15	0	232	1	0	0
Future Volume (Veh/h)	0	768	35	208	785	0	15	0	232	1	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	800	36	217	818	0	16	0	242	1	0	0
Pedestrians								6				
Lane Width (m)								3.8				
Walking Speed (m/s)								1.2				
Percent Blockage								1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		201			183							
pX, platoon unblocked	0.90			0.99			0.91	0.91	0.99	0.91	0.91	0.90
vC, conflicting volume	818			842			1649	2058	406	1894	2094	409
vC1, stage 1 conf vol							806	806		1252	1252	
vC2, stage 2 conf vol							843	1252		642	842	
vCu, unblocked vol	579			814			1447	1898	372	1717	1938	125
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			73			93	100	61	98	100	100
cM capacity (veh/h)	906			807			232	178	617	52	133	819

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	0	400	400	36	217	545	273	16	242	1	0
Volume Left	0	0	0	0	217	0	0	16	0	1	0
Volume Right	0	0	0	36	0	0	0	0	242	0	0
cSH	1700	1700	1700	1700	807	1700	1700	232	617	52	1700
Volume to Capacity	0.00	0.24	0.24	0.02	0.27	0.32	0.16	0.07	0.39	0.02	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	8.7	0.0	0.0	1.8	14.9	0.5	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	11.1	0.0	0.0	21.7	14.6	75.4	0.0
Lane LOS					B			C	B	F	A
Approach Delay (s)	0.0				2.3			15.0		75.4	
Approach LOS								B		F	

Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	48.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	529	145	311	516	121	206	
Future Volume (vph)	529	145	311	516	121	206	
Lane Group Flow (vph)	563	154	331	549	129	219	
Turn Type	NA	Perm	Perm	NA	Perm	Perm	
Protected Phases	2			6			8
Permitted Phases		2	6		4	4	
Detector Phase	2	2	6	6	4	4	
Switch Phase							
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0
Minimum Split (s)	31.2	31.2	31.2	31.2	14.5	14.5	14.5
Total Split (s)	43.0	43.0	43.0	43.0	17.0	17.0	17.0
Total Split (%)	71.7%	71.7%	71.7%	71.7%	28.3%	28.3%	28%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.1	2.1	2.1	2.1	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.5	6.5	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
v/c Ratio	0.26	0.15	0.64	0.25	0.55	0.50	
Control Delay	5.5	1.4	14.8	5.4	32.6	8.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.5	1.4	14.8	5.4	32.6	8.3	
Queue Length 50th (m)	13.5	0.0	21.2	13.1	13.7	0.0	
Queue Length 95th (m)	20.2	5.3	#51.8	19.6	28.8	15.8	
Internal Link Dist (m)	178.7			176.6			
Turn Bay Length (m)		57.7	40.0		35.5		
Base Capacity (vph)	2168	1044	515	2199	254	457	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.26	0.15	0.64	0.25	0.51	0.48	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Rogers Rd/Private Access & Elgin St W

HCM Signalized Intersection Capacity Analysis — 20045 | Northumberland Mall
3: Rogers Rd/Private Access & Elgin St W — FT PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	529	145	311	516	0	121	0	206	0	0	0
Future Volume (vph)	0	529	145	311	516	0	121	0	206	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.3	3.5	3.6	3.6	3.6	3.8	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00			
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00		1.00			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3455	1573	1768	3505		1827		1581			
Flt Permitted		1.00	1.00	0.44	1.00		0.76		1.00			
Satd. Flow (perm)		3455	1573	820	3505		1456		1581			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	563	154	331	549	0	129	0	219	0	0	0
RTOR Reduction (vph)	0	0	57	0	0	0	0	0	184	0	0	0
Lane Group Flow (vph)	0	563	97	331	549	0	129	0	35	0	0	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	1%	0%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type		NA	Perm	Perm	NA		Perm		Perm			
Protected Phases		2			6						8	
Permitted Phases			2	6			4		4	8		
Actuated Green, G (s)		37.7	37.7	37.7	37.7		9.6		9.6			
Effective Green, g (s)		37.7	37.7	37.7	37.7		9.6		9.6			
Actuated g/C Ratio		0.63	0.63	0.63	0.63		0.16		0.16			
Clearance Time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		2170	988	515	2202		232		252			
v/s Ratio Prot		0.16			0.16							
v/s Ratio Perm			0.06	c0.40			c0.09		0.02			
v/c Ratio		0.26	0.10	0.64	0.25		0.56		0.14			
Uniform Delay, d1		5.0	4.4	7.0	4.9		23.2		21.6			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.3	0.2	6.1	0.3		2.9		0.3			
Delay (s)		5.2	4.6	13.0	5.2		26.1		21.9			
Level of Service		A	A	B	A		C		C			
Approach Delay (s)		5.1			8.1			23.5			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.7	
Intersection Capacity Utilization	58.4%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — 20045 | Northumberland Mall
4: Rogers Rd & Mark's Access/Future West Access 1 — FT PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	8	44	98	27	112	35	139	73	178	214	59
Future Volume (Veh/h)	64	8	44	98	27	112	35	139	73	178	214	59
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	9	48	107	29	122	38	151	79	193	233	64
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)											89	
pX, platoon unblocked												
vC, conflicting volume	1014	957	265	938	950	190	297			230		
vC1, stage 1 conf vol	651	651		266	266							
vC2, stage 2 conf vol	364	306		672	683							
vCu, unblocked vol	1014	957	265	938	950	190	297			230		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	75	97	94	64	91	86	97			86		
cM capacity (veh/h)	279	342	774	300	331	851	1264			1338		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	70	57	107	151	38	230	193	297
Volume Left	70	0	107	0	38	0	193	0
Volume Right	0	48	0	122	0	79	0	64
cSH	279	645	300	653	1264	1700	1338	1700
Volume to Capacity	0.25	0.09	0.36	0.23	0.03	0.14	0.14	0.17
Queue Length 95th (m)	7.7	2.3	12.5	7.1	0.7	0.0	4.0	0.0
Control Delay (s)	22.2	11.1	23.5	12.2	7.9	0.0	8.1	0.0
Lane LOS	C	B	C	B	A		A	
Approach Delay (s)	17.2		16.9		1.1		3.2	
Approach LOS	C		C					

Intersection Summary				
Average Delay	7.4			
Intersection Capacity Utilization	46.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	7	10	238	354	3
Future Volume (Veh/h)	9	7	10	238	354	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	10	8	11	262	389	3
Pedestrians	3			12		
Lane Width (m)	3.6			3.8		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					141	
pX, platoon unblocked						
vC, conflicting volume	678	406	395			
vC1, stage 1 conf vol	394					
vC2, stage 2 conf vol	284					
vCu, unblocked vol	678	406	395			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.3			
p0 queue free %	98	99	99			
cM capacity (veh/h)	594	641	1139			

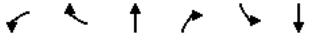
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	18	11	262	392
Volume Left	10	11	0	0
Volume Right	8	0	0	3
cSH	614	1139	1700	1700
Volume to Capacity	0.03	0.01	0.15	0.23
Queue Length 95th (m)	0.7	0.2	0.0	0.0
Control Delay (s)	11.0	8.2	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.0	0.3		0.0
Approach LOS	B			

Intersection Summary				
Average Delay			0.4	
Intersection Capacity Utilization			32.1%	ICU Level of Service
Analysis Period (min)			15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1	1	248	354	0
Future Volume (Veh/h)	0	1	1	248	354	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	270	385	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					201	
pX, platoon unblocked						
vC, conflicting volume	657	385	385			
vC1, stage 1 conf vol	385					
vC2, stage 2 conf vol	272					
vCu, unblocked vol	657	385	385			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	610	663	1173			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	1	1	270	385
Volume Left	0	1	0	0
Volume Right	1	0	0	0
cSH	663	1173	1700	1700
Volume to Capacity	0.00	0.00	0.16	0.23
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	10.4	8.1	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	10.4	0.0		0.0
Approach LOS	B			

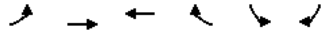
Intersection Summary				
Average Delay			0.0	
Intersection Capacity Utilization			28.6%	ICU Level of Service
Analysis Period (min)			15	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	103	39	210	45	10	345
Future Volume (Veh/h)	103	39	210	45	10	345
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	112	42	228	49	11	375
Pedestrians	27					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						246
pX, platoon unblocked						
vC, conflicting volume	676	280			304	
vC1, stage 1 conf vol	280					
vC2, stage 2 conf vol	397					
vCu, unblocked vol	676	280			304	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	81	94			99	
cM capacity (veh/h)	595	747			1240	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	154	277	386
Volume Left	112	0	11
Volume Right	42	49	0
cSH	630	1700	1240
Volume to Capacity	0.24	0.16	0.01
Queue Length 95th (m)	7.6	0.0	0.2
Control Delay (s)	12.6	0.0	0.3
Lane LOS	B		A
Approach Delay (s)	12.6	0.0	0.3
Approach LOS	B		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	69	20	22	204	312	136
Future Volume (vph)	69	20	22	204	312	136
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	76	22	24	224	343	149

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	98	248	492
Volume Left (vph)	76	0	343
Volume Right (vph)	0	224	149
Hadj (s)	0.16	-0.53	-0.03
Departure Headway (s)	5.7	4.8	4.8
Degree Utilization, x	0.15	0.33	0.65
Capacity (veh/h)	571	688	727
Control Delay (s)	9.7	10.1	16.1
Approach Delay (s)	9.7	10.1	16.1
Approach LOS	A	B	C

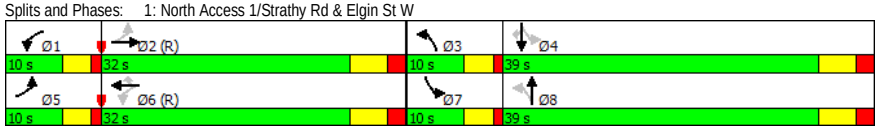
Intersection Summary			
Delay	13.6		
Level of Service	B		
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	241	870	91	793	228	64	118	202	103	318
Future Volume (vph)	241	870	91	793	228	64	118	202	103	318
Lane Group Flow (vph)	248	922	94	818	235	66	228	208	106	328
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (%)	11.0%	35.2%	11.0%	35.2%	35.2%	11.0%	42.9%	11.0%	42.9%	42.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
v/c Ratio	0.51	0.56	0.27	0.70	0.38	0.18	0.66	0.83	0.30	0.59
Control Delay	14.1	20.2	11.5	30.6	9.1	23.0	36.0	54.3	34.2	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.1	20.2	11.5	30.6	9.1	23.0	36.0	54.3	34.2	8.8
Queue Length 50th (m)	18.4	62.1	6.4	64.2	7.3	8.9	30.4	30.8	17.6	1.1
Queue Length 95th (m)	42.7	98.8	15.3	#97.4	27.9	16.8	50.7	#52.4	30.4	22.8
Internal Link Dist (m)		159.2		205.9			85.3		125.9	
Turn Bay Length (m)	24.0		95.0		38.1			50.4		
Base Capacity (vph)	487	1640	346	1172	626	357	670	252	658	766
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.56	0.27	0.70	0.38	0.18	0.34	0.83	0.16	0.43

Intersection Summary

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 10 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: North Access 1/Strathy Rd & Elgin St W



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	241	870	24	91	793	228	64	118	103	202	103	318
Future Volume (vph)	241	870	24	91	793	228	64	118	103	202	103	318
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.2	3.2	3.2	3.5	3.4	3.6	3.6	3.6	3.0	3.2	3.6
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1744	3402		1725	3500	1526	1743	1755		1667	1816	1550
Flt Permitted	0.17	1.00		0.31	1.00	1.00	0.69	1.00		0.40	1.00	1.00
Satd. Flow (perm)	307	3402		562	3500	1526	1263	1755		708	1816	1550
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	248	897	25	94	818	235	66	122	106	208	106	328
RTOR Reduction (vph)	0	2	0	0	0	117	0	44	0	0	0	259
Lane Group Flow (vph)	248	920	0	94	818	118	66	184	0	208	106	69
Confl. Peds. (#/hr)	8					8	11		4	4		11
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	52.7	42.2		36.2	29.7	29.7	21.1	16.3		23.5	17.5	17.5
Effective Green, g (s)	52.7	42.2		36.2	29.7	29.7	21.1	16.3		23.5	17.5	17.5
Actuated g/C Ratio	0.58	0.46		0.40	0.33	0.33	0.23	0.18		0.26	0.19	0.19
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	477	1577		306	1142	498	318	314		246	349	298
v/s Ratio Prot	c0.11	0.27		0.02	c0.23		0.01	0.10		c0.06	0.06	
v/s Ratio Perm	0.19			0.10		0.08	0.04			c0.16		0.04
v/c Ratio	0.52	0.58		0.31	0.72	0.24	0.21	0.58		0.85	0.30	0.23
Uniform Delay, d1	12.1	17.9		17.5	26.9	22.4	27.9	34.2		31.3	31.5	31.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	1.6		0.6	3.9	1.1	0.3	2.8		22.5	0.5	0.4
Delay (s)	13.1	19.5		18.0	30.8	23.5	28.2	37.0		53.8	32.0	31.5
Level of Service	B	B		B	C	C	C	D		D	C	C
Approach Delay (s)		18.2			28.3			35.0			38.8	
Approach LOS		B			C			D			D	

Intersection Summary

HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	77.7%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	876	55	303	884	4	6	0	257	4	0	2
Future Volume (Veh/h)	2	876	55	303	884	4	6	0	257	4	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	2	913	57	316	921	4	6	0	268	4	0	2
Pedestrians								6				
Lane Width (m)								3.8				
Walking Speed (m/s)								1.2				
Percent Blockage								1				
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		201			183							
pX, platoon unblocked	0.84			0.97			0.86	0.86	0.97	0.86	0.86	0.84
vC, conflicting volume	925			976			2018	2480	462	2284	2535	462
vC1, stage 1 conf vol							923	923		1555	1555	
vC2, stage 2 conf vol							1094	1557		728	980	
vCu, unblocked vol	535			917			1703	2244	389	2014	2308	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			57			96	100	55	63	100	100
cM capacity (veh/h)	878			727			153	104	592	11	23	918

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	2	456	456	57	316	614	311	6	268	4	2
Volume Left	2	0	0	0	316	0	0	6	0	4	0
Volume Right	0	0	0	57	0	0	4	0	268	0	2
cSH	878	1700	1700	1700	727	1700	1700	153	592	11	918
Volume to Capacity	0.00	0.27	0.27	0.03	0.43	0.36	0.18	0.04	0.45	0.37	0.00
Queue Length 95th (m)	0.1	0.0	0.0	0.0	17.7	0.0	0.0	1.0	18.7	6.9	0.1
Control Delay (s)	9.1	0.0	0.0	0.0	13.7	0.0	0.0	29.5	16.0	468.1	8.9
Lane LOS	A				B			D	C	F	A
Approach Delay (s)	0.0				3.5			16.3		315.1	
Approach LOS								C		F	

Intersection Summary					
Average Delay		4.3			
Intersection Capacity Utilization		54.3%	ICU Level of Service		A
Analysis Period (min)		15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	588	169	341	570	167	308	
Future Volume (vph)	588	169	341	570	167	308	
Lane Group Flow (vph)	626	180	363	606	178	328	
Turn Type	NA	Perm	Perm	NA	Perm	Perm	
Protected Phases	2			6			8
Permitted Phases		2	6		4	4	
Detector Phase	2	2	6	6	4	4	
Switch Phase							
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0
Minimum Split (s)	31.2	31.2	31.2	31.2	14.5	14.5	14.5
Total Split (s)	43.0	43.0	43.0	43.0	17.0	17.0	17.0
Total Split (%)	71.7%	71.7%	71.7%	71.7%	28.3%	28.3%	28%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.1	2.1	2.1	2.1	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.5	6.5	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
v/c Ratio	0.29	0.17	0.76	0.28	0.74	0.65	
Control Delay	5.8	1.4	22.2	5.7	44.1	12.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.8	1.4	22.2	5.7	44.1	12.0	
Queue Length 50th (m)	15.4	0.0	26.4	14.7	19.6	4.2	
Queue Length 95th (m)	22.7	5.7	#76.9	21.8	#46.2	25.2	
Internal Link Dist (m)	178.7			176.6			
Turn Bay Length (m)		57.7	40.0		35.5		
Base Capacity (vph)	2148	1046	478	2178	254	512	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.29	0.17	0.76	0.28	0.70	0.64	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Rogers Rd/Private Access & Elgin St W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	588	169	341	570	0	167	0	308	0	0	0
Future Volume (vph)	0	588	169	341	570	0	167	0	308	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.3	3.5	3.6	3.6	3.6	3.8	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00			
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00		1.00			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3455	1573	1768	3505		1827		1581			
Flt Permitted		1.00	1.00	0.41	1.00		0.76		1.00			
Satd. Flow (perm)		3455	1573	771	3505		1456		1581			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	626	180	363	606	0	178	0	328	0	0	0
RTOR Reduction (vph)	0	0	68	0	0	0	0	0	238	0	0	0
Lane Group Flow (vph)	0	626	112	363	606	0	178	0	90	0	0	0
Confl. Peds. (#/hr)			3	3								
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	1%	0%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type		NA	Perm	Perm	NA		Perm		Perm			
Protected Phases		2			6						8	
Permitted Phases			2	6			4		4	8		
Actuated Green, G (s)		37.3	37.3	37.3	37.3		10.0		10.0			
Effective Green, g (s)		37.3	37.3	37.3	37.3		10.0		10.0			
Actuated g/C Ratio		0.62	0.62	0.62	0.62		0.17		0.17			
Clearance Time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		2147	977	479	2178		242		263			
v/s Ratio Prot		0.18			0.17							
v/s Ratio Perm			0.07	c0.47			c0.12		0.06			
v/c Ratio		0.29	0.11	0.76	0.28		0.74		0.34			
Uniform Delay, d1		5.2	4.6	8.1	5.2		23.7		22.1			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.3	0.2	10.7	0.3		11.0		0.8			
Delay (s)		5.6	4.9	18.8	5.5		34.8		22.9			
Level of Service		A	A	B	A		C		C			
Approach Delay (s)		5.4			10.5			27.1			0.0	
Approach LOS		A			B			C			A	

Intersection Summary				
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.7	
Intersection Capacity Utilization	62.6%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	113	20	83	129	33	86	37	277	96	185	243	81
Future Volume (Veh/h)	113	20	83	129	33	86	37	277	96	185	243	81
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	123	22	90	140	36	93	40	301	104	201	264	88
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)											89	
pX, platoon unblocked	0.98	0.98	0.98	0.98	0.98		0.98					
vC, conflicting volume	1202	1195	308	1200	1187	353	352			405		
vC1, stage 1 conf vol	710	710		433	433							
vC2, stage 2 conf vol	492	485		767	754							
vCu, unblocked vol	1197	1190	289	1195	1182	353	333			405		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	42	92	88	36	87	87	97			83		
cM capacity (veh/h)	211	272	738	218	282	691	1206			1154		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	123	112	140	129	40	405	201	352
Volume Left	123	0	140	0	40	0	201	0
Volume Right	0	90	0	93	0	104	0	88
cSH	211	553	218	492	1206	1700	1154	1700
Volume to Capacity	0.58	0.20	0.64	0.26	0.03	0.24	0.17	0.21
Queue Length 95th (m)	25.9	6.0	30.9	8.3	0.8	0.0	5.0	0.0
Control Delay (s)	43.5	13.2	47.2	14.9	8.1	0.0	8.8	0.0
Lane LOS	E	B	E	B	A		A	
Approach Delay (s)	29.1		31.7		0.7		3.2	
Approach LOS	D		D					

Intersection Summary				
Average Delay	11.6			
Intersection Capacity Utilization	54.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	19	18	277	344	4
Future Volume (Veh/h)	23	19	18	277	344	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	25	21	20	304	378	4
Pedestrians	3			12		
Lane Width (m)	3.6			3.8		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					141	
pX, platoon unblocked						
vC, conflicting volume	727	395	385			
vC1, stage 1 conf vol	383					
vC2, stage 2 conf vol	344					
vCu, unblocked vol	727	395	385			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.3			
p0 queue free %	96	97	98			
cM capacity (veh/h)	574	650	1149			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	46	20	304	382
Volume Left	25	20	0	0
Volume Right	21	0	0	4
cSH	606	1149	1700	1700
Volume to Capacity	0.08	0.02	0.18	0.22
Queue Length 95th (m)	2.0	0.4	0.0	0.0
Control Delay (s)	11.4	8.2	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.4	0.5		0.0
Approach LOS	B			

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	31.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	72	68	291	363	0
Future Volume (Veh/h)	4	72	68	291	363	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	78	74	316	395	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					201	
pX, platoon unblocked						
vC, conflicting volume	859	395	395			
vC1, stage 1 conf vol	395					
vC2, stage 2 conf vol	464					
vCu, unblocked vol	859	395	395			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	88	94			
cM capacity (veh/h)	509	654	1164			

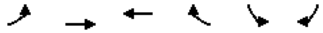
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	82	74	316	395
Volume Left	4	74	0	0
Volume Right	78	0	0	0
cSH	645	1164	1700	1700
Volume to Capacity	0.13	0.06	0.19	0.23
Queue Length 95th (m)	3.5	1.6	0.0	0.0
Control Delay (s)	11.4	8.3	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.4	1.6		0.0
Approach LOS	B			

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	37.5%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	110	47	316	42	13	422
Future Volume (Veh/h)	110	47	316	42	13	422
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	120	51	343	46	14	459
Pedestrians	27					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						246
pX, platoon unblocked						
vC, conflicting volume	880	393			416	
vC1, stage 1 conf vol	393					
vC2, stage 2 conf vol	487					
vCu, unblocked vol	880	393			416	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	92			99	
cM capacity (veh/h)	517	645			1128	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	171	389	473
Volume Left	120	0	14
Volume Right	51	46	0
cSH	549	1700	1128
Volume to Capacity	0.31	0.23	0.01
Queue Length 95th (m)	10.6	0.0	0.3
Control Delay (s)	14.5	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	14.5	0.0	0.4
Approach LOS	B		

Intersection Summary			
Average Delay		2.6	
Intersection Capacity Utilization		48.3%	ICU Level of Service
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	93	29	34	266	398	130
Future Volume (vph)	93	29	34	266	398	130
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	102	32	37	292	437	143

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	134	329	580
Volume Left (vph)	102	0	437
Volume Right (vph)	0	292	143
Hadj (s)	0.15	-0.52	0.02
Departure Headway (s)	6.3	5.3	5.2
Degree Utilization, x	0.23	0.48	0.84
Capacity (veh/h)	536	634	678
Control Delay (s)	11.2	13.1	29.3
Approach Delay (s)	11.2	13.1	29.3
Approach LOS	B	B	D

Intersection Summary			
Delay		21.9	
Level of Service		C	
Intersection Capacity Utilization		65.2%	ICU Level of Service
Analysis Period (min)		15	

Queues
1: North Access 1/Strathy Rd & Elgin St W

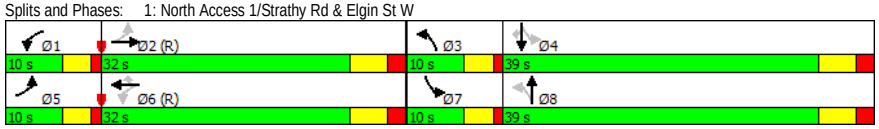
20045 | Northumberland Mall
FT Sat

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	272	667	88	765	216	60	123	160	113	301
Future Volume (vph)	272	667	88	765	216	60	123	160	113	301
Lane Group Flow (vph)	283	738	92	797	225	63	233	167	118	314
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	39.0	10.0	39.0	39.0
Total Split (%)	11.0%	35.2%	11.0%	35.2%	35.2%	11.0%	42.9%	11.0%	42.9%	42.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None
v/c Ratio	0.56	0.45	0.25	0.74	0.38	0.17	0.67	0.65	0.34	0.56
Control Delay	17.7	18.5	11.8	33.3	9.3	22.5	36.7	37.9	34.6	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	18.5	11.8	33.3	9.3	22.5	36.7	37.9	34.6	7.9
Queue Length 50th (m)	22.6	46.3	6.3	66.1	6.8	8.4	31.8	23.9	19.7	0.0
Queue Length 95th (m)	55.7	75.3	15.2	93.5	26.0	16.1	52.0	36.8	33.0	20.4
Internal Link Dist (m)		159.2		205.9			85.3		125.9	
Turn Bay Length (m)	24.0		95.0		38.1			50.4		
Base Capacity (vph)	504	1638	366	1081	588	371	667	255	639	772
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.45	0.25	0.74	0.38	0.17	0.35	0.65	0.18	0.41

Intersection Summary

Cycle Length: 91
Actuated Cycle Length: 91
Offset: 10 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Splits and Phases: 1: North Access 1/Strathy Rd & Elgin St W



HCM Signalized Intersection Capacity Analysis
1: North Access 1/Strathy Rd & Elgin St W

20045 | Northumberland Mall
FT Sat

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	272	667	41	88	765	216	60	123	101	160	113	301
Future Volume (vph)	272	667	41	88	765	216	60	123	101	160	113	301
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.2	3.2	3.2	3.5	3.4	3.6	3.6	3.6	3.0	3.2	3.6
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	3419		1725	3535	1536	1804	1752		1685	1763	1579
Flt Permitted	0.15	1.00		0.37	1.00	1.00	0.68	1.00		0.40	1.00	1.00
Satd. Flow (perm)	276	3419		674	3535	1536	1294	1752		705	1763	1579
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	283	695	43	92	797	225	62	128	105	167	118	314
RTOR Reduction (vph)	0	4	0	0	0	120	0	42	0	0	0	253
Lane Group Flow (vph)	283	734	0	92	797	105	63	191	0	167	118	61
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)						6						
Heavy Vehicles (%)	2%	0%	0%	0%	1%	0%	0%	2%	0%	0%	3%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	52.4	41.9		33.5	27.0	27.0	21.4	16.6		23.8	17.8	17.8
Effective Green, g (s)	52.4	41.9		33.5	27.0	27.0	21.4	16.6		23.8	17.8	17.8
Actuated g/C Ratio	0.58	0.46		0.37	0.30	0.30	0.24	0.18		0.26	0.20	0.20
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	496	1574		323	1048	455	331	319		249	344	308
v/s Ratio Prot	c0.13	0.21		0.02	c0.23		0.01	0.11		c0.04	0.07	
v/s Ratio Perm	0.19			0.08		0.07	0.03			c0.13		0.04
v/c Ratio	0.57	0.47		0.28	0.76	0.23	0.19	0.60		0.67	0.34	0.20
Uniform Delay, d1	13.2	16.9		19.2	29.1	24.2	27.6	34.1		28.9	31.6	30.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.6	1.0		0.5	5.2	1.2	0.3	3.0		6.9	0.6	0.3
Delay (s)	14.8	17.9		19.7	34.3	25.3	27.9	37.2		35.8	32.2	31.0
Level of Service	B	B		B	C	C	C	D		D	C	C
Approach Delay (s)		17.0			31.3			35.2			32.5	
Approach LOS		B			C			D			C	

Intersection Summary

HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	790	48	216	900	8	20	0	187	2	0	0
Future Volume (Veh/h)	0	790	48	216	900	8	20	0	187	2	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	832	51	227	947	8	21	0	197	2	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		201			183							
pX, platoon unblocked	0.83						0.83	0.83		0.83	0.83	0.83
vC, conflicting volume	955			883			1760	2241	416	2018	2288	478
vC1, stage 1 conf vol							832	832		1405	1405	
vC2, stage 2 conf vol							928	1409		613	883	
vCu, unblocked vol	525			883			1499	2082	416	1812	2138	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			70			91	100	67	97	100	100
cM capacity (veh/h)	869			768			227	155	588	66	110	902

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	0	416	416	51	227	631	324	21	197	2	0
Volume Left	0	0	0	0	227	0	0	21	0	2	0
Volume Right	0	0	0	51	0	0	8	0	197	0	0
cSH	1700	1700	1700	1700	768	1700	1700	227	588	66	1700
Volume to Capacity	0.00	0.24	0.24	0.03	0.30	0.37	0.19	0.09	0.33	0.03	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	9.9	0.0	0.0	2.4	11.7	0.7	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	11.6	0.0	0.0	22.5	14.2	61.7	0.0
Lane LOS					B			C	B	F	A
Approach Delay (s)	0.0				2.2			15.0		61.7	
Approach LOS								B		F	

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	47.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	496	115	390	501	135	309	
Future Volume (vph)	496	115	390	501	135	309	
Lane Group Flow (vph)	517	120	406	522	141	322	
Turn Type	NA	Perm	Perm	NA	Perm	Perm	
Protected Phases	2			6			8
Permitted Phases		2	6		4	4	
Detector Phase	2	2	6	6	4	4	
Switch Phase							
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0
Minimum Split (s)	31.2	31.2	31.2	31.2	14.5	14.5	14.5
Total Split (s)	45.0	45.0	45.0	45.0	15.0	15.0	15.0
Total Split (%)	75.0%	75.0%	75.0%	75.0%	25.0%	25.0%	25%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.1	2.1	2.1	2.1	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.5	6.5	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
v/c Ratio	0.23	0.11	0.73	0.23	0.70	0.64	
Control Delay	4.7	1.2	17.5	4.7	46.0	10.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.7	1.2	17.5	4.7	46.0	10.2	
Queue Length 50th (m)	10.7	0.0	26.0	10.8	15.8	0.0	
Queue Length 95th (m)	16.3	4.2	#79.5	16.4	#40.1	19.8	
Internal Link Dist (m)	178.7			176.6			
Turn Bay Length (m)		57.7	40.0		35.5		
Base Capacity (vph)	2262	1077	556	2317	204	502	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.23	0.11	0.73	0.23	0.69	0.64	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Rogers Rd/Private Access & Elgin St W

HCM Signalized Intersection Capacity Analysis
3: Rogers Rd/Private Access & Elgin St W

20045 | Northumberland Mall
FT Sat

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	496	115	390	501	0	135	0	309	0	0	0
Future Volume (vph)	0	496	115	390	501	0	135	0	309	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.3	3.5	3.6	3.6	3.6	3.8	3.6	3.5	3.6	3.6	3.6
Total Lost time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3490	1597	1770	3574		1809		1597			
Flt Permitted		1.00	1.00	0.46	1.00		0.76		1.00			
Satd. Flow (perm)		3490	1597	859	3574		1442		1597			
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	517	120	406	522	0	141	0	322	0	0	0
RTOR Reduction (vph)	0	0	42	0	0	0	0	0	277	0	0	0
Lane Group Flow (vph)	0	517	78	406	522	0	141	0	45	0	0	0
Heavy Vehicles (%)	0%	0%	0%	2%	1%	0%	2%	0%	0%	0%	0%	0%
Turn Type		NA	Perm	Perm	NA		Perm		Perm			
Protected Phases		2			6						8	
Permitted Phases			2	6			4		4	8		
Actuated Green, G (s)		38.9	38.9	38.9	38.9		8.4		8.4			
Effective Green, g (s)		38.9	38.9	38.9	38.9		8.4		8.4			
Actuated g/C Ratio		0.65	0.65	0.65	0.65		0.14		0.14			
Clearance Time (s)		6.2	6.2	6.2	6.2		6.5		6.5			
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		2262	1035	556	2317		201		223			
v/s Ratio Prot		0.15			0.15							
v/s Ratio Perm			0.05	c0.47			c0.10		0.03			
v/c Ratio		0.23	0.08	0.73	0.23		0.70		0.20			
Uniform Delay, d1		4.4	3.9	7.0	4.3		24.6		22.8			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.2	0.1	8.2	0.2		10.5		0.4			
Delay (s)		4.6	4.0	15.3	4.6		35.1		23.3			
Level of Service		A	A	B	A		D		C			
Approach Delay (s)		4.5			9.2			26.9			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.7	
Intersection Capacity Utilization	59.4%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Rogers Rd & Mark's Access/Future West Access 1

20045 | Northumberland Mall
FT Sat

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	17	83	43	41	95	66	218	88	208	151	146
Future Volume (Veh/h)	131	17	83	43	41	95	66	218	88	208	151	146
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	142	18	90	47	45	103	72	237	96	226	164	159
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)											89	
pX, platoon unblocked												
vC, conflicting volume	1202	1172	244	1144	1204	285	323			333		
vC1, stage 1 conf vol	696	696		429	429							
vC2, stage 2 conf vol	506	477		715	775							
vCu, unblocked vol	1202	1172	244	1144	1204	285	323			333		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	19	93	89	78	82	86	94			82		
cM capacity (veh/h)	175	258	800	210	247	754	1248			1226		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	142	108	47	148	72	333	226	323
Volume Left	142	0	47	0	72	0	226	0
Volume Right	0	90	0	103	0	96	0	159
cSH	175	593	210	465	1248	1700	1226	1700
Volume to Capacity	0.81	0.18	0.22	0.32	0.06	0.20	0.18	0.19
Queue Length 95th (m)	44.0	5.3	6.7	10.8	1.5	0.0	5.4	0.0
Control Delay (s)	79.2	12.4	27.1	16.3	8.1	0.0	8.6	0.0
Lane LOS	F	B	D	C	A		A	
Approach Delay (s)	50.3		18.9		1.4		3.5	
Approach LOS	F		C					

Intersection Summary				
Average Delay	13.4			
Intersection Capacity Utilization	56.9%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	16	19	284	209	4
Future Volume (Veh/h)	13	16	19	284	209	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	14	17	20	299	220	4
Pedestrians	1			1	1	
Lane Width (m)	3.6			3.8	3.8	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					141	
pX, platoon unblocked						
vC, conflicting volume	563	224	225			
vC1, stage 1 conf vol	223					
vC2, stage 2 conf vol	340					
vCu, unblocked vol	563	224	225			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	98	99			
cM capacity (veh/h)	647	819	1354			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	31	20	299	224
Volume Left	14	20	0	0
Volume Right	17	0	0	4
cSH	732	1354	1700	1700
Volume to Capacity	0.04	0.01	0.18	0.13
Queue Length 95th (m)	1.1	0.4	0.0	0.0
Control Delay (s)	10.1	7.7	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	10.1	0.5		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	26.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	60	56	303	225	0
Future Volume (Veh/h)	0	60	56	303	225	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	65	61	329	245	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					201	
pX, platoon unblocked						
vC, conflicting volume	696	245	245			
vC1, stage 1 conf vol	245					
vC2, stage 2 conf vol	451					
vCu, unblocked vol	696	245	245			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	92	95			
cM capacity (veh/h)	562	794	1321			

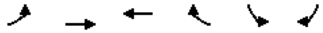
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	65	61	329	245
Volume Left	0	61	0	0
Volume Right	65	0	0	0
cSH	794	1321	1700	1700
Volume to Capacity	0.08	0.05	0.19	0.14
Queue Length 95th (m)	2.1	1.2	0.0	0.0
Control Delay (s)	9.9	7.9	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.9	1.2		0.0
Approach LOS	A			

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	28.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	60	50	309	46	17	268
Future Volume (Veh/h)	60	50	309	46	17	268
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	68	57	351	52	19	305
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)						246
pX, platoon unblocked						
vC, conflicting volume	722	379			405	
vC1, stage 1 conf vol	379					
vC2, stage 2 conf vol	343					
vCu, unblocked vol	722	379			405	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	88	91			98	
cM capacity (veh/h)	584	662			1163	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	125	403	324
Volume Left	68	0	19
Volume Right	57	52	0
cSH	617	1700	1163
Volume to Capacity	0.20	0.24	0.02
Queue Length 95th (m)	6.0	0.0	0.4
Control Delay (s)	12.3	0.0	0.6
Lane LOS	B		A
Approach Delay (s)	12.3	0.0	0.6
Approach LOS	B		

Intersection Summary				
Average Delay		2.0		
Intersection Capacity Utilization		41.1%	ICU Level of Service	A
Analysis Period (min)		15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	98	17	22	256	249	79
Future Volume (vph)	98	17	22	256	249	79
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	114	20	26	298	290	92

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	134	324	382
Volume Left (vph)	114	0	290
Volume Right (vph)	0	298	92
Hadj (s)	0.17	-0.53	0.02
Departure Headway (s)	5.5	4.6	5.0
Degree Utilization, x	0.21	0.42	0.54
Capacity (veh/h)	594	730	673
Control Delay (s)	10.0	10.8	13.7
Approach Delay (s)	10.0	10.8	13.7
Approach LOS	A	B	B

Intersection Summary				
Delay		12.0		
Level of Service		B		
Intersection Capacity Utilization		51.9%	ICU Level of Service	A
Analysis Period (min)		15		

APPENDIX E

Received Comments

THE CORPORATION OF THE TOWN OF COBOURG
Building & Planning Department
55 King Street West
Cobourg ON K9A 2M2
Telephone: 905-372-1005
Fax: 905-372-1533

Thursday, October 10th, 2019.

Aly Premji, Trinity Development Group Inc
77 Bloor St W Suite 1601
Toronto, ON
M5S 1M2

RE: 1111 Elgin Street West – Zoning By-law Amendment Application
Z-07-19

Thank you for submitting plans for the above-noted proposal. The following summarizes the comments received to date from Development Review Team members and commenting agencies.

Please be advised of the following comments received regarding the application for Zoning By-law Amendment at 1111 Elgin Street West from the Development Review Team.

A. PLANNING DEPARTMENT

1. A full, comprehensive examination and evaluation of the proposal within the context of Provincial, County, and Municipal policies and guidelines, and good planning principles will occur once all comments have been compiled and considered and a formal Planning Report prepared.

Should you have any questions regarding the above information, you should contact Desta McAdam, Senior Planner – Development at 905-372-1005 ext. 4302.

B. ENGINEERING DEPARTMENT

Comments from Public Works/Engineering include:

1. The traffic study does not establish a.m/p.m. peaks.

2. Strathy Road and Rogers Road are both classified as collector roads, not local roads.

3. Growth projections should be applied to all roads in the study area, and to the business locations.

4. The future traffic projections should also include a fully occupied mall property.

5. The only figure from the traffic study showing the west side of Rogers Road shows the proposed location of the mall entrance offset from the Marks entrance. These entrances should line up with each other. In future submissions, the entrances on the west side of Rogers Road are to be shown on all drawings and figures.

You should contact Neil Stewart, CET or Terry Hoekstra, Manager of Engineering and Capital Projects at 905-372-9971 regarding the above comments.

C. NORTHUMBERLAND COUNTY

Northumberland County has provided the following comments:

General:

1. Are there any future proposed developments within the Northumberland Mall property? It was noted on the Site Plan Drawing that an additional retail store and fitness centre are proposed adjacent to the Dollarama, and given the recent developments on the property (LCBO, Boston Pizza, A&W), it may be beneficial to review a TIS that incorporates all current and proposed future developments to ensure traffic impacts are identified and addressed appropriately.

Traffic Impact Assessment

1. The TIS indicates there are no other identified developments in the area, however, it may be appropriate to identify the Golden Plough Lodge Redevelopment given the proposed changes to the road network and the overlap in study area for the traffic impact studies.

2. The County has some concerns with the proposed removal of the West Access 1 to Rogers Road and the resulting impacts to the Elgin/Rogers intersection. The report identifies a 3 m queue on Rogers road for SBLT into the new West Access (opposite the Mark's access) in future conditions, which seems low. On Figure 5.2, it appears that the traffic generated in the existing West Access 1 is being reallocated to West Access 2 and not to West Access 1 (Relocated), which is what would be anticipated, and which is also anticipated to result in higher queues on Rogers Road. The proposed relocated access is very close to the intersection and there is a very short shared left hand turn lane, which will create conflict as the queuing length increases.

3. It is also noted that the relocated west access appears to be offset from the Mark's access and it would be anticipated to be directly across if it were to be moved.

4. Table 5.2 shows a LOS 'E' with a 38.3 second delay for the SBL of the private access/Elgin Street, however, in the summary on page 20, it indicates that all unsignalized intersections operation at LOS 'C' or greater in future conditions. There is a concern with queuing on Elgin Street towards the Elgin and Strathy intersection in the future condition.

Site Servicing:

1. Based on the previous site servicing report and drawings, it is understood that water, sanitary and storm sewer connections will all be made within the Northumberland Mall property and no direct connections are proposed to Elgin Street. If this is proposed to change during detailed design and a connection to Elgin Street is proposed, discussions with the County will be required.

You should contact Brooke Gillespie, Traffic & ROW Management Supervisor, at 905-372-3329 ext. 2278 with regard to the above comments.

D. GANARASKA REGION CONSERVATION AUTHORITY

The Ganaraska Region Conservation Authority (GRCA) is in receipt of a zoning by-law amendment to allow for a six unit commercial building to be constructed on the Northumberland Mall property. GRCA provides the following comments with respect to this application.

1. The current application is for a zoning by-law amendment to allow for a six unit commercial building on the existing Northumberland Mall site. GRCA has no objection to the proposed zoning change.

2. The subject property does not fall within a GRCA Regulated Area. On this basis, a permit from the Authority is not required for the development as proposed.

3. The consultant has sufficiently addressed the stormwater aspect of the proposed construction; specifically, there will be no increase in impervious area as a result of the proposed development. The development will be constructed on an area that is already impervious.

Should you have any questions regarding the above information, you should contact Ken Thajer, Planning and Regulations Coordinator, at 905-885-8173 ext. 245.

Yours truly,
The Corporation of the Town of Cobourg

Desta McAdam
Senior Planner - Development