



Appendix A: Traffic Operational Analysis Report

City of Barrie

Bradford Street Municipal Class Environmental Assessment

Traffic Operational Analysis Report

Final Report

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B001361

SUBMITTED BY CIMA CANADA INC.

500–5935 Airport Road
Mississauga, ON L4V 1W5
T: 905-695-1005 | F: 905-695-0525
cima.ca

CONTACT

Phil Weber, P.Eng.
phil.weber@cima.ca
T: 905-685-1005, ext. 6732



PREPARED BY:



Ronauq Sabharwal

VERIFIED BY:



Phil Weber

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1. Introduction

1.1. Background

CIMA Canada Inc. (CIMA+) has been retained by the City of Barrie (City) to undertake a Municipal Class Environmental Assessment (MCEA) study for Bradford Street between Dunlop Street and Lakeshore Drive/Tiffin Street. The main impetus of the study relates to traffic congestion at the south end of the corridor, as well as a desire to attract trips from Lakeshore Drive and enhance Bradford Street as a viable transportation corridor with good streetscaping and active transportation infrastructure.

An essential component of this MCEA will be an assessment of existing and future traffic operations throughout the study area, particularly in light of the City being in the process of relocating its primary transit terminal to the Allandale Waterfront GO Station. In addition, the City has approved two other developments within the same area. **Figure 1** outlines the three developments.

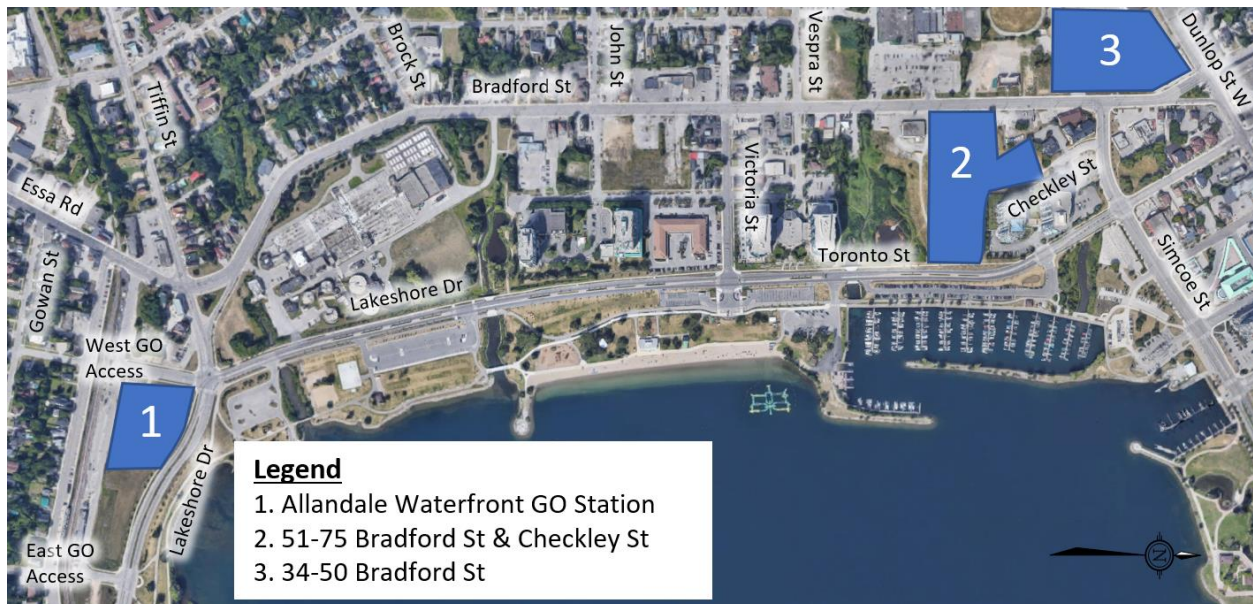


Figure 1: Development Projects

New developments generate additional traffic in the existing transportation network. A development application often requires a traffic impact study. Such studies, however, investigate the impact of the subject development on traffic flows in a limited “catchment” area without necessarily considering the cumulative impact as a result of multiple concurrent developments.

This Traffic Operational Analysis report captures the combined impacts of the planned developments on the key intersections in the City of Barrie waterfront area. In order to objectively quantify the direct impacts of the new developments, the traffic operations at the study intersections were reviewed and consequently compared for four (4) distinct horizons: (1) 2021 existing conditions (baseline), (2) 2031 future conditions (with developments), (3) 2041 future conditions (with all proposed developments), and (4) 2051 (10 years after all proposed developments). The details of these traffic analyses and other complementary reviews are discussed in the remainder of this technical report.

1.2. Study Area

The study area is located within the waterfront area (**Figure 2**) and includes a variety of land uses such as commercial employment, retail and services, residential, recreational and tourism.



Figure 2: Study Area

The study area includes eight (8) signalized intersections and five (5) two-way stop-controlled intersections, as shown in **Table 1**.

Table 1: Study Intersections

Intersections	Control Type
Bradford Street and Dunlop Street West	Signalized
Bradford Street and Simcoe Street	Signalized
Simcoe Street and Checkley Street	Minor Stop Controlled
Simcoe Street and Toronto Street	Signalized
Bradford Street and Vespra Street	Minor Stop Controlled
Bradford Street and Victoria Street	Signalized
Bradford Street and John Street	Minor Stop Controlled
Bradford Street and Brock Street	Minor Stop Controlled
Bradford Street/Essa Road and Tiffin Street	Signalized
Lakeshore Drive/West GO Access and Tiffin Street	Signalized
East GO Access and Tiffin Street	Signalized
Essa Road and Gowan Street	Signalized

Intersections	Control Type
Essa Road and South GO Access	Minor Stop Controlled

Characteristics of the roadways in the vicinity of the study area are as follows:

- **Lakeshore Drive / Toronto Street** is a City Parkway traveling in the north-south direction north of Tiffin Street and in the east-west direction east of the GO Station West Access. This corridor has a two-lane cross-section within the study area. Lakeshore Drive widens and accommodates an additional through lane on the east approach to Tiffin Street/GO Station West Access. The posted speed limit is 50 km/h within the study area.
- **Bradford Street** is an Arterial corridor traveling in the north-south direction parallel to Lakeshore Drive, with a four-lane cross-section within the study area. The posted speed limit is 50 km/h within the study area.
- **Tiffin Street** is an Arterial corridor traveling in the east-west direction and provides a connection to Lakeshore Drive at the Allandale GO Station West Access. The segment in the study area has a two-lane cross-section. The posted speed limit is 50 km/h within the study area.
- **Essa Road** is an Arterial corridor traveling in the north-south direction and connects to Bradford Street at the Tiffin Street intersection. It has a four-lane cross-section within the study area. The signalized intersection at Gowan Street also accommodates an at-grade railway crossing. A 'bus-only' access to the GO Station is located 20 m north of the Essa Road and Gowan Street intersection. Within the study area, the posted speed limit is 50 km/h.
- **Gowan Street** is a Minor Collector traveling in the east-west direction. At the Essa Road intersection, Gowan Street is stop-controlled. It has a two-lane cross-section, and a posted speed limit is 50 km/h.
- **Brock Street** is a local street traveling generally in the east-west direction. The road has a two-lane cross-section. At the Bradford Street intersection, Brock Street is stop-controlled. The assumed local speed limit is 50 km/h.
- **John Street** is a local street traveling in east-west direction. At the Bradford Street intersection, John Street is stop-controlled. The road has a two-lane cross-section and an assumed local speed limit of 50 km/h.
- **Victoria Street** is a Minor Collector traveling in the east-west direction. The road has a two-lane cross-section with an assumed local speed limit of 50 km/h.
- **Vespa Street** is a local street traveling east-west direction. At the Bradford Street intersection, Vespa Street is stop-controlled. The road has a two-lane cross-section and an assumed local speed limit of 50 km/h.
- **Simcoe Street** is a Major Collector traveling generally in the east-west direction. The road has a two-lane cross-section. The assumed local speed limit is 50 km/h.
- **Checkley Street** is a local street traveling north-south direction, extending from Simcoe Street in the north to approximately 70 metres south of Simcoe Street where the road terminates. At the Simcoe Street intersection, Checkley Street is stop-controlled. The road has a two-lane cross-section. The assumed local speed limit is 50 km/h.

- **Dunlop Street West** is an Arterial corridor traveling in the east-west direction. The segment in the study area has a two-lane cross-section. The posted speed limit is 50 km/h within the study area.

1.3. Allandale Waterfront GO Station

The City commissioned the Mobility Hub Study which assessed the feasibility of moving the main Barrie Transit Terminal from its current location on Maple Avenue to the Allandale Waterfront GO Station. The Mobility Hub Study determined that the relocation of the main Transit Terminal is feasible, and the new expanded Allandale Waterfront GO Station is planned to open in 2022.

The expanded Allandale Waterfront GO Station includes eleven (11) bus bays and will act as a central station for GO transit and Ontario Northland buses. Additionally, it will improve transit connections to GO Rail. Metrolinx, under GO Transit's Regional Express Rail (RER) program, will be upgrading rail service from Toronto's Union Station to Allandale Waterfront GO Station.

Once the station opens, vehicular access to the Allandale Waterfront GO Station will be restricted to the east entrance on Lakeshore Drive. All buses will enter/exit the Allandale Waterfront GO Station via the GO Station West Access at Lakeshore Drive and Tiffin Street. The South GO access on Essa Road will no longer be used.

2. Data Collection and Processing

At the onset of this study, the City provided the following information/data:

- Turning Movement Counts (TMCs) for all study intersections;
- Signal Timing Plans (STPs) for all signalized intersections within the study area;
- *Allandale Mobility Hub Transportation Impact Study*, WSP, October 2020;
- *Barrie Central Redevelopment Transportation Impact Study: 34-50 Bradford Street*, C.F. Crozier & Associates, June 2019; and
- *51-75 Bradford Street and 20 Checkley Street-Urban Transportation Considerations*, BA Group, December 2019;

The provided information was used to estimate AM and PM peak volumes, which were essential for conducting the analysis as it forms the basis of understanding existing and future traffic conditions. The available traffic volume data were collected on different dates (from 2017 to 2019 and one from 2012) resulting in some volume imbalances across the study area. Additionally, the TMCs provided by the City were also used in the Allandale Mobility Hub Study. The 2024 Future Total volumes and bus volumes from the Allandale Mobility Hub Study were incorporated into the operational analysis.

The intersections which were counted are summarized in **Table 2**. The TMCs and signal timing plans are available in **Appendix A**.

Table 2: Existing Traffic Data Sources

Intersection	Count Date
High St & Dunlop St	April 2019
Simcoe St & Toronto St	October 2019
Simcoe St & Checkley St	October 2019
Simcoe St & Bradford St	October 2019
Bradford St & Vespra St	December 2012
Bradford St & Victoria St	October 2017
Bradford St & John St	October 2017
Bradford St/Essa Rd & Tiffin St	February 2018
Lakeshore Dr & East GO	February 2018
Lakeshore Dr/West GO& Tiffin St	February 2018
Essa Rd & Gowan St	February 2018
Private Access & Essa Road	February 2018

For the sake of compatibility, the following two data processing steps were considered:

- Identified peak hour volumes were converted into 2021 numbers by utilizing a growth factor of 3.0% per annum based on discussions with the City;
- The Allandale Mobility Hub Study applied a 3.30% per annum growth rate to the following study area intersection volumes to achieve their 2024 background volumes:
 - Essa Road & Gowan Street;
 - Essa Road & Private Access/ South GO Station Access;
 - Essa Road/Bradford Street & Tiffin Street;
 - Lakeshore Drive & Tiffin Street/West GO Station Access; and
 - Lakeshore Drive & East GO Station Access.
- The Allandale Mobility Hub Study added additional bus volumes from the expanded mobility hub to the study area intersections to achieve their 2024 future total volumes;
- A 2.5% growth rate was then applied to the Allandale Mobility Hub Study 2024 future background volumes (seven (7) years from 2024 to 2031) to achieve the 2031 volumes used in this operational analysis;
- A 2.5% growth rate was applied from 2021 to 2031 to the study area intersection north of Tiffin Street;
- A modal share reduction, based on values outlined in Table 5-2 of the City's TMP, was applied to all through movements along Bradford Street and Essa Road for all future horizon years; and
- Volumes were balanced at the following intersections where the TMC were collected at different times:
 - Bradford Street & Vespra Street;

- Private Access & Essa Road; and
- Bradford Street & Simcoe Street.

3. Existing 2021 Operational Analysis

Capacity analysis of the study intersections was undertaken using the Synchro/SimTraffic software. This software package follows the Highway Capacity Manual (HCM) approach to evaluate the operational performance of signalized and unsignalized intersections.

The following inputs were used for the analyses:

- Input traffic volumes were estimated for four different study horizons (i.e., 2021, 2031, 2041 and 2051);
- The intersection geometry (e.g., lane widths and storage lengths) was coded according to the existing lane configuration;
- Where the eight-hour TMC data was available the calculated Peak Hour Factor (PHF) was used and where it was not available a PHF of 0.92 was utilized, as recommended by the HCM;
- A base saturation flow rate of 1900 vehicles per hour per lane which is a typical value for urban conditions was utilized; and
- The signal timing plans were coded for each intersection. Signal timings were optimized for each future horizon year.

To determine the performance of signalized intersections, four performance measures were identified: (1) volume to capacity (v/c), (2) level of service (LOS), (3) 50th percentile queue lengths and (4) 95th percentile queue lengths. Intersection LOS is an indication of the acceptability of delay levels to motorists. Theoretically, a V/C ratio above 1.0 indicates that the examined intersection or turning movement is over saturated. The 95th percentile queue is the queue length that has only a 5% probability of being exceeded during the analysis period. It is industry practice and accepted methodology to use the 95th percentile queue length for design and operational analysis purposes.

In this study, consistent with the City of Barrie TIS Guidelines, “critical” movements were identified considering the following criteria:

- Level of Service (LOS) for overall intersection operations exceeds LOS D;
- A volume to capacity (v/c) ratio for overall intersection operations of 0.85 or higher for signalized intersections;
- v/c ratios for exclusive movements increase to 0.85 or above;
- Excessive delays, indicated by LOS “E” or worse for both signalized and unsignalized intersections; and
- 50th or 95th percentile queue lengths for individual movements that exceed available lane storage or queues that reach upstream intersections for both signalized and un-signalized intersections.

The results of the capacity analysis for the study intersections are presented in the following subsections. To better address the study objectives, these results are provided separately for the three horizons of interest.

3.1. Existing Lane Configuration

The existing lane configurations for study intersections are illustrated in **Figure 3**.

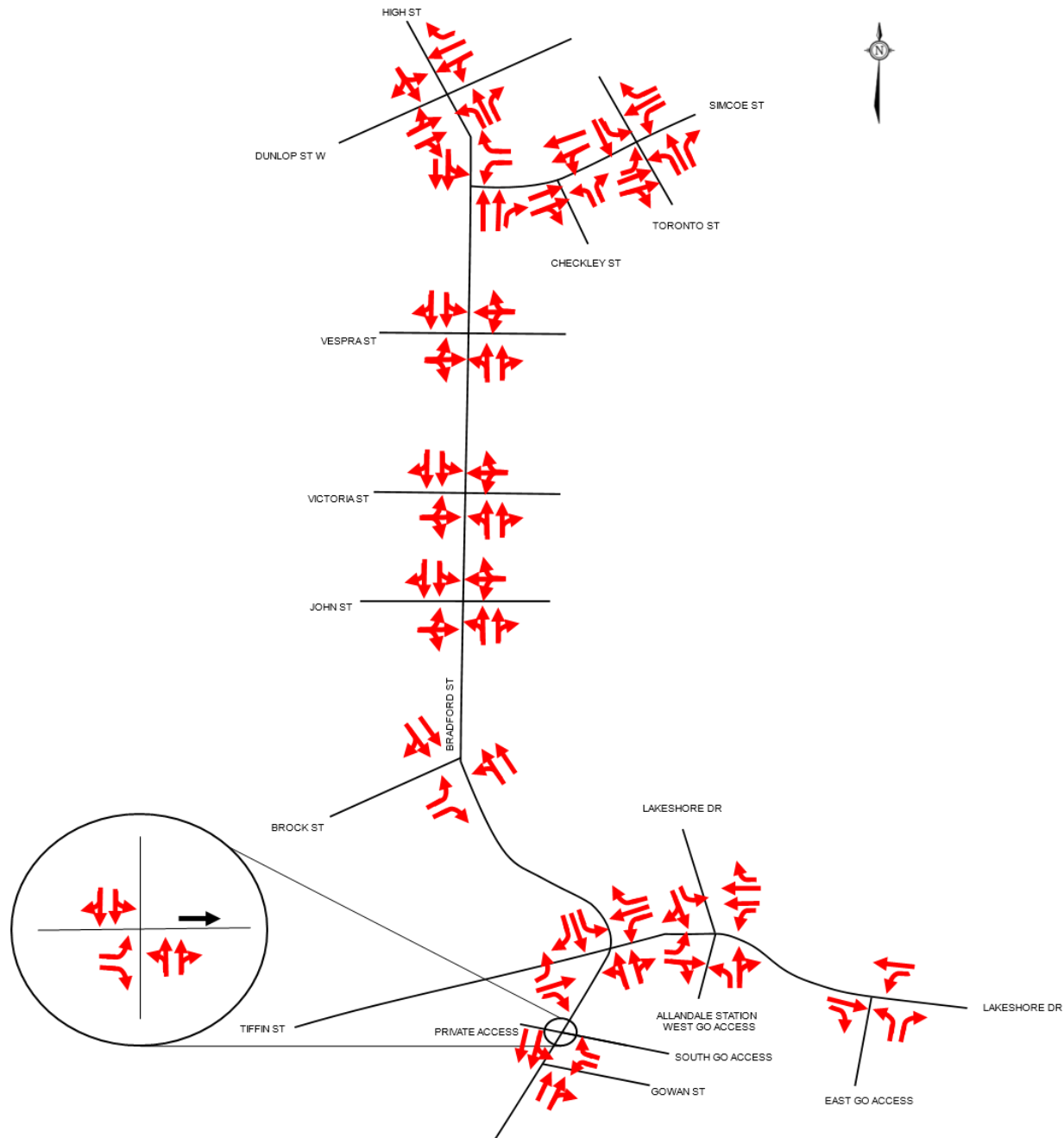


Figure 3: Existing Lane Configuration

3.2. Existing Traffic Volumes

As mentioned earlier, the available traffic volume data were collected on different dates (2012 to 2019) resulting in some volume imbalances across the study area. Therefore, the AM and PM peak hour

volumes at different intersections were converted into 2021 numbers by utilizing a growth factor of 3.0% per annum and then volumes were balanced across intersections. The estimated peak traffic volumes for 2021 existing conditions are illustrated in **Figure 4**.

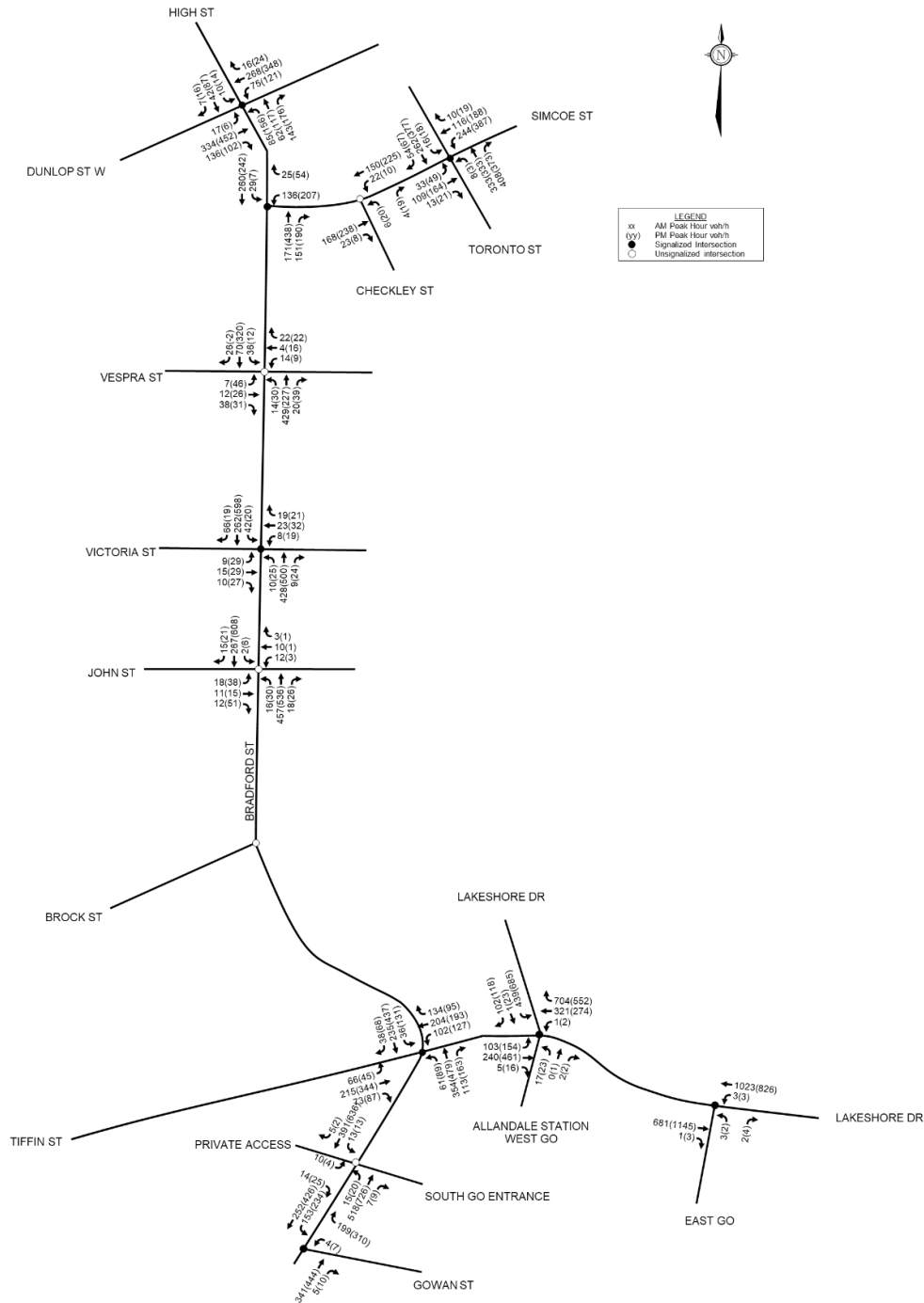


Figure 4: Intersection Volumes – 2021

3.3. 2021 Operational Analysis

Table 3 summarize 2017 existing traffic operations for signalized intersections. Full Synchro and SimTraffic reports are provided in **Appendix B** and **Appendix C** respectively.

The following observations can be made from **Table 3**:

- All study area intersections are operating well at a LOS D or better.
- The only individual movement that is operating at a LOS E is the southbound left turn during the PM peak hour at the GO Station West Access/Lakeshore Drive & Tiffin Street intersection.
- The reported 95th percentile queue lengths at the following intersections extend to their upstream intersection:
 - GO Station West Access/Lakeshore Drive & Tiffin Street (PM peak hour);
 - Southbound left turn extends to upstream parking lot intersection
- The reported queue lengths for a number of turning movements slightly exceed their available storage lengths (8 movements for a maximum of 4 vehicles).

Table 3: Existing 2021 Signalized Operational Analysis – AM (PM)

Direction / Movement		Storage (m)	v/c ratio	LOS	50 th Percentile Queue (m)	95 th Percentile Queue (m)
High Street & Dunlop Street West (Signalized)						
EB	EBL/T/R	272	0.32 (0.32)	A (A)	19 (24)	32 (40)
WB	WBT/L	193	0.29 (0.41)	A (A)	24 (36)	21 (57)
	WBR	17	0.02 (0.02)	A (A)	2 (3)	9 (9)
NB	NBL	15	0.26 (0.73)	B (D)	12 (24)	25 (42)
	NBT	50	0.13 (0.24)	B (C)	9 (18)	21 (33)
	NBR	-	0.11 (0.13)	B (C)	0 (0)	0 (0)
SB	SBL/T/R	164	0.39 (0.52)	C (C)	7 (18)	17 (33)
Overall		-	0.36 (0.53)	B (B)	-	-
Toronto Street & Simcoe Street (Signalized)						
EB	EBL	17	0.08 (0.13)	B (C)	5 (6)	13 (15)
	EBT	73	0.10 (0.16)	B (C)	6 (10)	16 (21)
WB	WBL	25	0.37 (0.64)	B (B)	23 (28)	36 (37)
	WBT	76	0.08 (0.12)	A (B)	15 (36)	39 (76)
NB	NBL	30	0.04 (0.03)	C (C)	2 (1)	12 (4)
	NBT	123	0.76 (0.63)	D (C)	60 (45)	110 (72)
	NBR	38	0.46 (0.37)	C (C)	37 (26)	55 (47)
SB	SBL	111	0.09 (0.11)	C (C)	4 (4)	10 (20)

Direction / Movement		Storage (m)	v/c ratio	LOS	50 th Percentile Queue (m)	95 th Percentile Queue (m)
	SBT	111	0.69 (0.81)	C (D)	38 (57)	65 (91)
Overall		-	0.50 (0.71)	C (C)	-	-
Bradford Street & Simcoe Street (Signalized)						
WB	WBL	33	0.54 (0.53)	C (B)	17 (23)	29 (37)
	WBR	33	0.02 (0.05)	B (B)	5 (7)	12 (15)
NB	NBT	405	0.14 (0.23)	A (A)	18 (25)	37 (46)
	NBR	8	0.13 (0.16)	A (A)	12 (14)	19 (14)
SB	SBL/T	59	0.18 (0.20)	A (A)	10 (12)	21 (23)
Overall-		-	0.73 (0.33)	A (A)	-	-
Bradford Street & Victoria Street (Signalized)						
EB	EBL/T/R	101	0.17 (0.25)	C (C)	7 (11)	15 (21)
WB	WBL	9	0.06 (0.08)	C (B)	2 (5)	8 (13)
	WBT/R	108	0.15 (0.12)	C (C)	7 (8)	16 (18)
NB	NBL/T/R	159	0.22 (0.27)	A (A)	15 (21)	32 (39)
SB	SBL/T/R	83	0.17 (0.31)	A (A)	10 (19)	20 (36)
Overall		-	0.21 (0.30)	A (A)	-	-
Essa Road/Bradford Street & Tiffin Street (Signalized)						
EB	EBL	47	0.13 (0.09)	A (B)	9 (16)	20 (47)
	EBT/R	159	0.37 (0.55)	B (B)	22 (68)	39 (134)
WB	WBL	23	0.24 (0.48)	A (B)	16 (25)	30 (35)
	WBT	41	0.26 (0.25)	A (B)	20 (32)	42 (55)
NB	NBL/T/R	51	0.68 (0.66)	B (B)	19 (27)	35 (45)
SB	SBL/T	46	0.42 (0.72)	B (B)	20 (43)	35 (59)
	SBR	46	0.03 (0.05)	B (B)	5 (7)	13 (17)
Overall		-	0.53 (0.69)	B (B)	-	-
GO Station East Access & Lakeshore Drive (Signalized)						
EB	EBT	153	0.48 (0.73)	A (A)	5 (12)	24 (51)
	EBR	-	0.00 (0.00)	A (A)	0 (0)	0 (2)
WB	WBL	70	0.01 (0.01)	A (A)	1 (1)	4 (4)
	WBT	137	0.66 (0.51)	A (A)	9 (5)	48 (27)
NB	NBL	39	0.14 (0.05)	D (D)	1 (1)	4 (4)

Direction / Movement		Storage (m)	v/c ratio	LOS	50 th Percentile Queue (m)	95 th Percentile Queue (m)
	NBR	39	0.00 (0.00)	D (D)	1 (1)	4 (5)
Overall		-	0.67 (0.72)	A (A)	-	-
GO Station West Access/Lakeshore Drive & Tiffin Street (Signalized)						
EB	EBL	35	0.26 (0.35)	C (C)	19 (27)	36 (45)
	EBT/R	49	0.33 (0.59)	C (C)	31 (43)	52 (58)
WB	WBL	23	0.00 (0.01)	C (C)	0 (1)	2 (6)
	WBT	112	0.30 (0.26)	C (C)	37 (26)	107 (50)
	WBR	55	0.45 (0.52)	C (C)	46 (36)	73 (62)
NB	NBL	96	0.23 (0.22)	D (D)	8 (12)	24 (30)
	NBT/R	96	0.01 (0.01)	D (C)	1 (0)	3 (2)
SB	SBL	75	0.67 (0.99)	C (E)	54 (78)	81 (92)
	SBT/R	110	0.07 (0.10)	B (B)	15 (79)	53 (157)
Overall		-	0.59 (0.85)	C (D)	-	-
Essa Road & Gowan Street (Signalized)						
WB	WBL/R	123	0.18 (0.29)	D (D)	17 (28)	32 (59)
NB	NBT/R	89	0.15 (0.19)	A (A)	11 (14)	25 (30)
SB	SBL/T	23	0.23 (0.43)	A (A)	17 (23)	29 (33)
Overall		-	0.23 (0.43)	B (B)	-	-

Legend: AM (PM)

4. Future Background Developments

Table 4 details the currently approved developments. The traffic impacts of these developments were reviewed under all the future horizon years (i.e., 2031, 2041 and 2051) traffic conditions. The analysis of signalized intersections was completed considering optimized signal timings. The results of these analyses are presented in the following subsections.

Table 4: Background Development TIS Details

Location	TIS Author	TIS Date	Development Phases	Development Description	Accesses
51-75 BRADFORD STREET AND 20 CHECKLEY STREET	BA Group	December 2019	4 phases in total	1900 Residential units	- North access on Checkley Street - West access on Bradford Street across from the

Location	TIS Author	TIS Date	Development Phases	Development Description	Accesses
			- Phase 1 completed by 2024 - Full buildout by 2039	152 room Hotel 3371m² retail space	- existing Tim Hortons Driveway - East access on Toronto Street south of signalized intersection for the Barrie Marina
34-50 Bradford Street	Crozier	June 2019	- Phase 1 complete by 2023. - Full build by in 2025.	600 Residential Units 6968 m² YMCA facility	- West leg (site driveway) is added to Bradford Street & Simcoe Street intersection - South site access is located approximately 100 m south of Bradford Street & Simcoe Street intersection

5. City of Barrie TMP Road Modifications

Table 5 details the City's planned road modifications outline in their 2019 Transportation Master Plan (TMP). The traffic impacts of these road modifications were reviewed under all the future horizon years (i.e., 2031, 2041 and 2051) traffic conditions. Due to limitations in Synchro for modelling high occupancy vehicle (HOV) lanes, specifically at the Bradford Street/Essa Road & Tiffin Street intersection where the southbound and northbound exclusive right turn lanes would still be used by all vehicles, the HOV lanes were not implemented in the 2041 and 2051 scenarios. The analysis of signalized intersections was completed considering optimized signal timings. The results of these analyses are presented in the following subsections.

Table 5: City of Barrie Planned Road Modifications

Road	From	To	Modification	Expected Date
Tiffin St	Ferndale Dr	Essa Rd	4+1 lanes	2031
Tiffin St	Essa Rd	Lakeshore Dr	6+1 lanes (includes turn lanes)	2031
Bradford St	High St	Tiffin St	4+1 lanes	2031
Lakeshore Dr	Minet's Point Rd	Lakeshore Dr	4+1 lanes	2031

Road	From	To	Modification	Expected Date
Essa Rd	Tiffin St	Gowan St	4+1 lanes	2031
Bradford St	High St	Tiffin St	HOV in curb lane	2041
Essa Rd	Tiffin St	Gowan St	HOV in curb lane	2041

6. Future Operational Analysis

The 2031, 2041, 2051 future total traffic conditions at study intersections were reviewed using the observed traffic volumes grown at the City approved growth rates, the 2024 future background volumes from the Allandale Mobility Hub Study, and the modal share reductions. The growth rates and modal share reductions applied to each horizon year are shown in **Table 6**. The modal shares were obtained from Table 5.2 in the City's TMP and represent the City's mode share targets for 2041. The modal share reductions were applied to all through movement volumes along Bradford Street and Essa Road.

To analyze when the planned improvements will be necessary, a future baseline scenario was analyzed for each horizon year. The baseline scenario is the same as the future total scenario except without any of the planned improvements from the City's TMP outlined in Section 5.

Signal timing plans were optimized for each peak period and horizon year. The resulted outcomes of this analysis are detailed in the following subsections.

Table 6: TMP Growth Rates and Modal Shares

Horizon Year	Growth Rate	Modal Share Reduction	
		Transit	Active Transportation
2031	2.5%*	3.5%	6%
2041	2.0%	7%	12%
2051	1.0%	7%	12%

* 3.3% to 2024 for intersection near Allandale GO Station

6.1. 2031 Operational Analysis

As mentioned, the 2031 operational review was conducted using the 2021 base year volumes for intersections north of Tiffin Street and applying a 2.5% growth rate. The intersection along and south of Tiffin Street used the 2024 future background volumes from the Allandale Mobility Hub Study whereby the 2.5% per annum growth rate was applied to 2031 horizon year.

Additionally, the through movement volumes along Bradford Street and Essa Road were reduced by 9.5% to represent an increase in transit and active transportation usage outlined in the City's TMP. Finally, new buses from the expanded Allandale GO Station were applied to the network along Tiffin Street, Bradford Street and Essa Road.

The following background developments were included in the future baseline and total scenarios:

- 51-75 Bradford Street & 20 Checkley Street – Phase 1 – 1723 Residential units. Only access is on Checkley Street; and
- 34-50 Bradford Street – Full buildout – 600 Residential units and 6868 m² YMCA. Includes two site access on Bradford Street.

The following road modifications outlined in the City's TMP were included in the future total scenario:

- Tiffin Street – from Ferndale Drive to Essa Road added Two Way Left Turn Lane (TWLTL) for a total of 5 lanes);
- Tiffin Street – from Essa Road to Lakeshore Drive added TWLTL for a total of 7 lanes (including turning lanes);
- Bradford Street – from High Street to Tiffin Street added TWLTL for a total of 5 lanes; and
- Lakeshore Drive – from Lakeshore Drive to Minet's Point Road added TWLTL for a total of 5 lanes.

The resulting intersection volumes are shown in **Figure 5**.

Due to the added site access points from the background developments and the TWLTL, lane configurations changed most of the study area intersections except for at Dunlop Street & High Street and Simcoe Street & Toronto Street. Cycle lengths, phasing and splits were optimized in both the future baseline and total scenarios for the updated lane configurations and increased volumes.

Table 7 shows the operational analysis for the 2031 horizon year while **Table 8** shows the queue analysis. Full Synchro and SimTraffic reports are provided in **Appendix B** and **Appendix C** respectively.

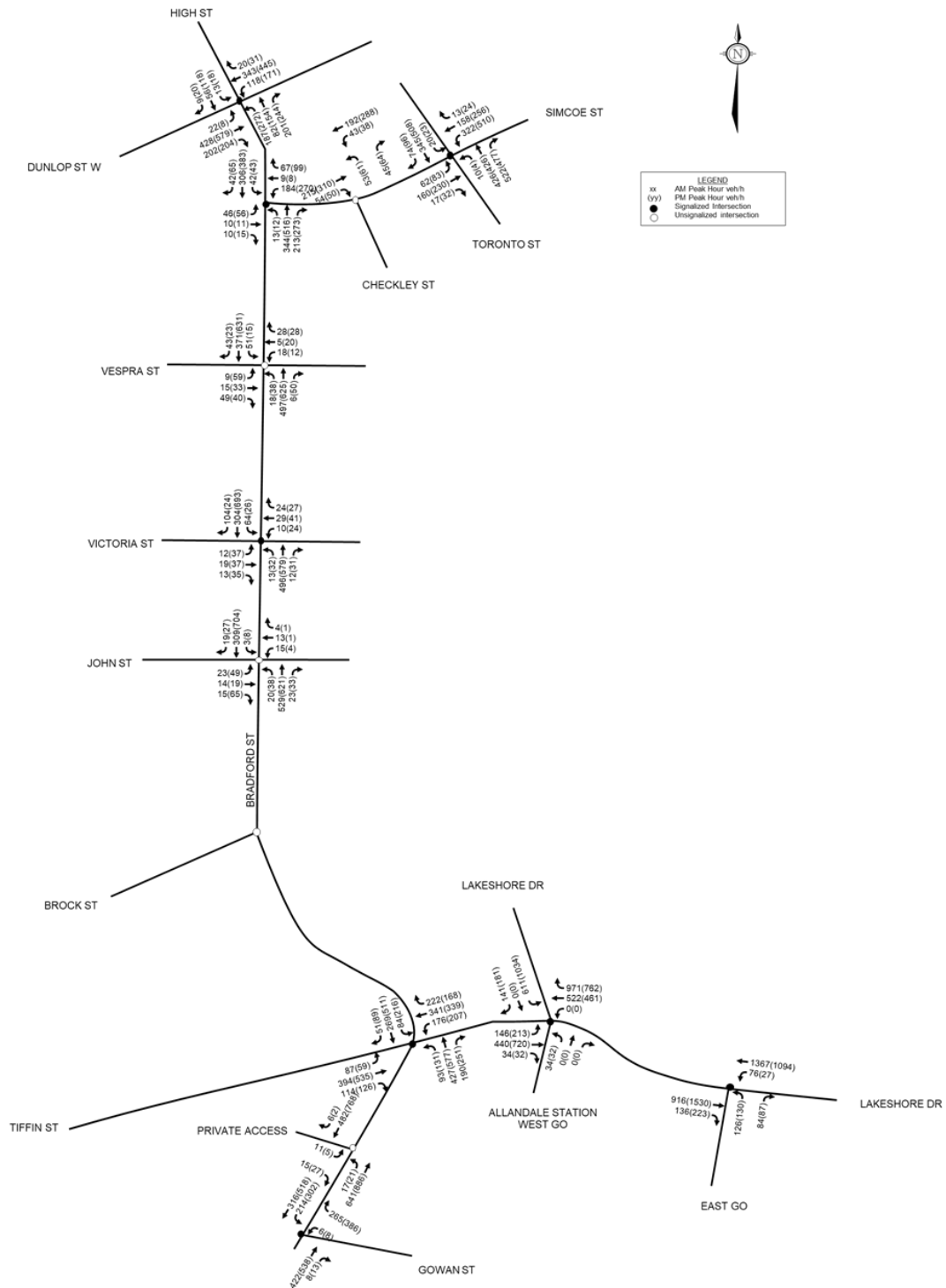


Figure 5: Intersection Volumes – 2031

Table 7: 2031 Operational Analysis

Intersection	Movement	2031 Future Baseline						2031 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
High Street & Dunlop Street West (Signalized)	EBL/T/R	0.48	B	12	0.59	B	15	0.48	B	12	0.59	B	15
	WBL/T	0.52	B	12	1.17dl ¹	C	20	0.52	B	12	1.17dl ¹	C	20
	WBR	0.02	S	9	0.03	A	10	0.02	A	9	0.03	A	10
	NBL	0.51	B	16	0.88	D	39	0.51	B	16	0.88	D	39
	NBT	0.12	B	11	0.21	B	13	0.12	B	11	0.21	B	13
	NBR	0.16	B	11	0.19	B	13	0.16	B	11	0.19	B	13
	SBL/T/R	0.40	C	22	0.59	C	25	0.40	C	22	0.59	C	25
	Overall	0.57	B	13	0.90	B	20	0.57	B	13	0.90	B	20
Toronto street & Simcoe Street (signalized)	EBL	0.14	B	17	0.25	C	25	0.14	B	17	0.25	C	25
	EBT	0.14	B	16	0.26	C	24	0.14	B	16	0.26	C	24
	WBL	0.63	B	18	1.01	E	65	0.63	B	18	1.01	E	65
	WBT/R	0.11	B	10	0.18	B	13	0.11	B	10	0.18	B	13

1 De facto Left Turn Lane (dl): indicates that the shared left lane has congestion exceeding that of the other through lanes. Consider adding an exclusive left lane.

Intersection	Movement	2031 Future Baseline						2031 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
	NBL	0.09	C	27	0.05	C	26	0.09	C	27	0.05	C	26
	NBT	0.78	C	32	0.71	C	31	0.78	C	32	0.71	C	31
	NBR	0.57	C	25	0.54	C	26	0.57	C	25	0.54	C	26
	SBL	0.18	C	22	0.16	C	23	0.18	C	22	0.16	C	23
	SBT/R	0.73	C	29	0.98	E	61	0.73	C	29	0.98	E	61
	Overall	0.68	C	24	1.00	D	40	0.68	C	24	1.00	D	40
Bradford Street & Simcoe Street/North Site Access (signalized)	EBL/T/R	0.48	C	32	0.57	D	36	0.48	C	32	0.57	D	36
	WBL	0.35	B	15	0.48	B	16	0.35)	B	15	0.48	B	16
	WBT/R	0.07	B	14	0.09	B	13	0.07	B	14	0.09	B	13
	NBL	-	-	-	-	-	-	0.03	A	8	0.04	A	10
	NBT(/L)	0.24	A	10	0.37	B	12	0.21	A	10	0.34	B	12
	NBR	0.25	B	10	0.38	B	13	0.25	B	10	0.38	B	13
	SBL	-	-	-	-	-	-	0.11	A	9	0.16	B	11
	SBT/R(/L)	0.30	B	10	0.41	B	13	0.23	A	10	0.31	B	12
	Overall	0.35	B	12	0.48	B	14	0.32	B	12	0.46	B	14
	EBL/T/R	0.17	C	23	0.33	C	21	0.17	C	23	0.33	C	21

Intersection	Movement	2031 Future Baseline						2031 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
Bradford Street & Victoria Street (signalized)	WBL	0.06	C	22	0.11	B	20	0.06	C	22	0.11	B	20
	WBT/R	0.15	C	22	0.16	C	20	0.15	C	22	0.16	C	20
	NBL	-	-	-	-	-	-	0.03	A	2	0.10	A	4
	NBT/R(/L)	0.24	A	3	0.34	A	4	0.22	A	3	0.28	A	4
	SBL	-	-	-	-	-	-	0.11	A	3	0.05	A	3
	SBT/R(/L)	0.24	A	3	0.38	A	5	0.17	A	3	0.33	A	4
	Overall	0.23	A	5	0.37	A	6	0.21	A	5	0.33	A	6
Essa Road/Bradford Street & Tiffin Street (signalized)	EBL	0.23	B	10	0.20	C	33	0.22	B	12	0.25	C	31
	EBT/R	0.64	B	15	1.20	F	151	0.34	B	12	0.78	D	40
	WBL	0.78	C	34	1.29	F	205	0.62	C	22	0.89	D	54
	WBT	0.42	B	11	0.45	C	28	0.23	B	11	0.25	B	19
	NBL	-	-	-	-	-	-	0.37	B	19	0.47	C	23
	NBT/R(/L)	0.76	B	20	1.15	F	116	0.67	C	22	0.92	D	47
	SBL	-	-	-	-	-	-	0.53	B	18	0.92	E	73

Intersection	Movement	2031 Future Baseline						2031 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
	SBT(/L)	0.60	B	17	2.50 ²	F	118	0.24	B	13	0.55	C	26
	SBR	0.04	B	12	0.07	B	18	0.04	B	11	0.07	C	22
	Overall	0.83	B	18	1.27	F	116	0.63	B	16	0.93	D	39
GO Station East Access & Lakeshore Drive (signalized)	EBT	0.82	C	25	1.28	F	154	0.52	B	15	0.80	B	19
	EBR	0.12	A	10	0.20	A	9	0.10	B	11	0.20	A	10
	WBL	0.36	C	22	0.27	D	41	0.26	A	9	0.22	B	15
	WBT	1.04	D	55	0.81	B	17	0.63	B	11	0.49	A	9
	NBL	1.05	F	112	1.17	F	163	0.82	D	41	0.89	D	52
	NBR	0.30	D	45	0.60	E	57	0.27	C	26	0.40	C	30
	Overall	1.10	D	49	1.27	F	96	0.74	B	17	0.84	B	20
GO Station West Access/ Lakeshore Drive & Tiffin Street (signalized)	EBL	0.48	B	20	0.77	D	50	0.48	B	20	1.08	F	133
	EBT/R	0.64	C	25	1.14	F	125	0.23	B	17	0.52	D	43
	WBL	-	-	-	-	-	-	-	-	-	-	-	-
	WBT	0.45	C	27	0.46	D	44	0.45	C	27	0.60	D	55
	WBR	0.63	C	33	0.49	D	47	0.63	C	33	0.49	D	55

² De facto Left Turn Lane (dl): indicates that the shared left lane has congestion exceeding that of the other through lanes. Consider adding an exclusive left lane.

Intersection	Movement	2031 Future Baseline						2031 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
	NBL	0.43	D	37	0.79	F	110	0.43	D	37	0.75	F	97
	NBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	SBL	1.00	E	60	1.21	F	135	1.00	E	60	1.06	E	70
	SBT/R	0.10	B	14	0.13	B	15	0.10	B	14	0.13	B	11
	Overall	0.88	D	35	1.25	F	90	0.83	C	34	1.10	E	60
Essa Road & Gowan Street (signalized)	WBL/R	0.24	D	48	0.44	B	20	0.24	D	47	0.44	B	20
	NBT/R	0.19	A	3	0.36	B	11	0.21	A	6	0.52	C	21
	SBL	-	-	-	-	-	-	0.32	A	3	0.81	C	25
	SBT(/L)	0.31	A	3	0.88	B	19	0.12	A	2	0.30	B	11
	Overall	0.32	B	13	0.69	B	17	0.31	B	14	0.66	B	19

Table 8: 2031 Queues Analysis

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
High Street & Dunlop Street West (Signalized)	EBL/T/R	272	26	177	43	359	27	36	44	53
	WBL/T	80	38	148	62	254	37	27	59	101
	WBR	17	3	3	10	14	16	68	12	19
	NBL	15	22	24	39	44	3	21	25	26
	NBT	50	10	13	22	27	18	38	45	71
	NBR	-	-	-	-	-	-	-	-	-
	SBL/T/R	164	9	105	19	213	10	20	20	38
Toronto street & Simcoe Street (signalized)	EBL	17	7	6	18	16	7	11	16	22
	EBT	73	8	11	21	27	9	16	22	34
	WBL	25	26	15	37	41	27	32	38	34
	WBT/R	76	26	75	61	86	28	72	68	101
	NBL	30	4	3	19	15	4	1	17	11
	NBT	95	101	75	158	144	105	112	162	159
	NBR	38	43	39	55	56	43	44	53	53
	SBL	111	4	55	11	146	4	60	11	149

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
	SBT/R	111	54	110	89	133	52	106	86	137
Bradford Street & Simcoe Street/North Site Access (signalized)	EBL/T/R	81	78	84	100	88	79	82	94	86
	WBL	33	19	31	33	40	18	26	32	38
	WBT/R	33	6	3	14	13	7	9	15	20
	NBL	15	-	-	-	-	2	2	8	10
	NBT	157	10	35	23	69	16	22	35	50
	NBR	8	14	14	18	18	13	15	18	17
	SBL	15	-	-	-	-	7	7	16	16
	SBT/R(/L)	57	15	65	26	108	14	20	26	34
Bradford Street & Victoria Street (signalized)	EBL/T/R	99	8	90	18	135	8	19	17	47
	WBL	9	2	10	9	18	3	6	10	15
	WBT/R	106	9	64	18	138	8	11	16	21
	NBL	15	-	-	-	-	4	8	15	20
	NBT/R(/L)	159	18	34	38	59	16	23	34	45
	SBL	15	-	-	-	-	8	5	17	16

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
	SBT/R(/L)	83	15	96	28	96	11	27	26	58
Essa Road/Bradford Street & Tiffin Street (signalized)	EBL	47	29	15	63	50	11	32	25	69
	EBT/R	154	84	165	163	171	24	139	40	206
	WBL	23	27	27	37	37	22	27	34	36
	WBT	36	41	40	62	60	19	34	43	60
	NBL	15	-	-	-	-	12	17	25	29
	NBT/R(/L)	45	30	52	47	61	26	48	43	52
	SBL	15	-	-	-	-	13	32	27	35
	SBT(/L)	40	42	50	62	55	18	54	34	65
	SBR	40	6	2	14	11	6	9	17	20
GO Station East Access & Lakeshore Drive (signalized)	EBT	153	66	101	130	184	32	43	56	72
	EBR	40	19	16	50	46	12	17	34	43
	WBL	70	32	15	84	57	14	7	43	28
	WBT	137	140	124	167	187	142	142	148	160
	NBL	39	28	29	46	48	22	23	39	40
	NBR	39	12	14	22	27	10	10	18	20

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
GO Station West Access/ Lakeshore Drive & Tiffin Street (signalized)	EBL	35	28	33	47	50	20	42	34	45
	EBT/R	49	49	53	62	60	20	56	39	67
	WBL	23	-	-	-	-	-	-	-	-
	WBT	113	132	123	148	172	135	135	140	140
	WBR	55	63	60	63	73	63	63	63	63
	NBL	96	18	28	42	63	13	23	33	54
	NBT/R	96	-	-	-	-	-	-	-	-
	SBL	75	76	116	93	121	74	111	95	117
	SBT/R	110	70	33	150	98	60	33	141	97
Essa Road & Gowan Street (signalized)	WBL/R	123	22	95	38	167	21	115	38	157
	NBT/R	89	12	45	28	89	14	65	30	101
	SBL	23	-	-	-	-	13	16	20	21
	SBT(/L)	23	20	24	32	34	8	28	25	43

The future total results indicate that all study area intersections are expected to operate well at a LOS D or better except for the GO Station West Access/Lakeshore Drive & Tiffin Street intersection during the PM peak hour (LOS E).

Compared to the future baseline scenario, the future total scenario indicates a significant improvement (where additional capacity was necessary) at the following intersections:

- Essa Road/Bradford Street & Tiffin Street (PM peak hour);
- GO Station East Access & Lakeshore Drive (AM and PM peak hours); and
- GO Station West Access/ Lakeshore Drive & Tiffin Street (PM peak hour).

It should be noted that due to the shared southbound left/through lane at Essa Road/Bradford Street & Tiffin Street intersection and the limitation of the Synchro software, the future background v/c ratio is exaggerated. Therefore, it is unclear if the two-way left-turn lane on Bradford Street is needed by the 2031 horizon year. However, the two-way left-turn lane on Tiffin Street is recommended by the 2031 horizon year to increase capacity for the east and westbound movements.

All study area intersections are expected to operate with excess capacity (i.e., v/c ratio <0.85) during the AM peak hour. However, the following intersections are expected to operate near or above capacity during the PM peak hour:

- High Street & Dunlop Street West (0.90 v/c ratio);
- Toronto Street & Simcoe Street (1.00 v/c ratio);
- Essa Road/Bradford Street & Tiffin Street (0.93 v/c ratio); and
- GO Station West Access/Lakeshore Drive & Tiffin Street (1.10 v/c ratio).

The following individual movements north of Tiffin Street are expected to operate with long delays (LOS E or F) and/or a high v/c ratio of 0.85 or more:

- Westbound left/through (v/c 1.17) and northbound left (v/c 0.88) movements at High Street & Dunlop Street West during the PM peak hour; and
- Westbound left turn (v/c 1.01) and southbound through (v/c 0.98) movements (both LOS E) at Toronto Street & Simcoe Street during the PM peak hour.

It should be noted that the westbound left/through movement was flagged by Synchro as a de facto turn lane meaning that the shared left turn lane has congestion exceeding the level of the other through lane. Synchro does not model this situation correctly and recommends converting the shared lane to an exclusive lane to be correctly modeled.

Additionally, the following movements at intersections along Tiffin Street are expected to operate with long delays:

- Southbound left turn (LOS E and v/c 0.97) at Essa Road/Bradford Street & Tiffin Street during PM peak hour;
- Northbound left turn (v/c 0.89) at GO Station East Access & Lakeshore Drive during PM peak hour;
- Southbound left turn (LOS E and v/c 1.00) at GO Station West Access/Lakeshore Drive & Tiffin Street during the AM peak hour; and
- Eastbound (LOS F and v/c 1.08), northbound (LOS F) and southbound (LOS E and v/c 1.06) left turn at GO Station West Access/Lakeshore Drive & Tiffin Street during the PM peak hour.

The reported 95th percentile queue lengths at the following intersections are expected to extend to their upstream intersection and/or exceed their available storage:

- High Street & Dunlop Street West during PM peak hour;
- Westbound left/through extends to upstream intersection at Toronto Street
- Toronto Street & Simcoe Street during PM peak hour;
- Westbound through/right to upstream intersection at Mary Street
- Northbound through to upstream intersection at City of Barrie Marina/Private Access
- Essa Road/Bradford Street & Tiffin Street during PM peak hour;
- Eastbound through/right to upstream intersection at Short Street
- GO Station West Access/Lakeshore Drive & Tiffin Street during PM peak hour;
- Southbound left turn extends past upstream parking lot intersection
- Essa Road & Gowan Street during PM peak hour; and
- Westbound left/right to upstream intersection at William Street
- Southbound left turn at Toronto Street & Simcoe Street is expected to be 38 metres beyond available storage.

The reported queue lengths for a number of turning movements are expected to slightly exceed their available storage lengths (22 movements for a maximum of four (4) vehicles).

6.2. 2041 Operational Analysis

As previously discussed, the 2041 operational review was conducted using the 2031 horizon year volumes and applying a 2.0% per annum growth rate.

Additionally, the through movement volumes along Bradford Street and Essa Road were reduced by 19% to represent an increase in transit and active transportation usage outlined in the City's TMP.

The background developments include the same as in the 2031 horizon year with the additional full buildout of 34-50 Bradford Street. The following details for the background developments include:

- 51-75 Bradford Street & 20 Checkley Street – Full buildout – 1723 Residential units, 152 room Hotel, 3371 m² retail space. Includes one additional site access on Bradford Street; and
- 34-50 Bradford Street – Full buildout – 600 Residential units and 6868 m² YMCA. Includes two site access on Bradford Street.

The roadway modifications were carried over from the 2031 horizon year for the future total scenario.

The resulting intersection volumes are shown in **Figure 6**.

Due to the added background development traffic and background growth traffic growth, the following signal timing changes were made to the 2031 signal timings to improve operations in addition to split optimization:

- Dunlop Street West & High Street;
- Cycle length increased from 75 to 120 seconds (PM peak)
- Toronto Street & Simcoe Street;
- Cycle length increased from 100 to 150 seconds (PM peak)

- Essa Road/Bradford Street & Tiffin Street;
- Cycle length increased from 70 to 75 seconds (AM peak)
 - GO Station East Access & Lakeshore Drive; and
- Cycle length increased from 95 to 120 seconds (PM peak)
 - GO Station West Access/Lakeshore Drive & Tiffin Street.
- Cycle length increased from 95 seconds to 145 seconds (AM and PM peak)
- WBR changes from permissive to permissive + overlap phase (AM and PM peak)

Table 9 shows the operational analysis for the 2041 horizon year while **Table 10** shows the queue analysis. Full Synchro and SimTraffic reports are provided in **Appendix B** and **Appendix C** respectively.

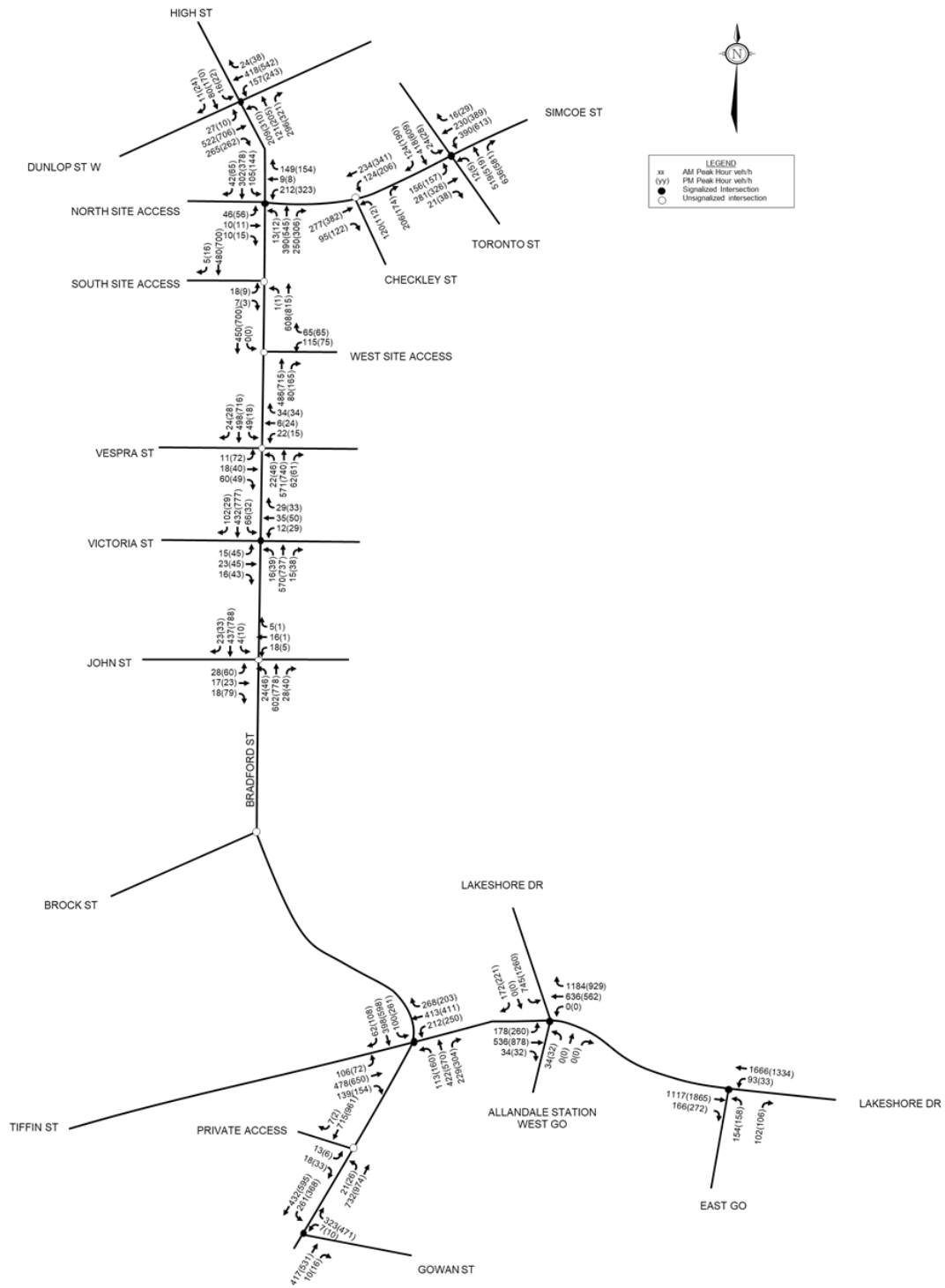


Figure 6: Intersection Volumes – 2041

Table 9: 2041 Operational Analysis

Intersection	Movement	2031 Future Background						2031 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
High Street & Dunlop Street West (Signalized)	EBL/T/R	0.59	B	14	0.69	C	25	0.59	B	14	0.69	C	25
	WBL/T	1.07dl ³	B	16	2.36dl ³	E	55	1.07dl ³	B	16	2.36dl ³	E	55
	WBR	0.02	A	9	0.04	B	15	0.02	A	9	0.04	B	15
	NBL	0.64	B	20	0.94	E	58	0.64	B	20	0.94	E	58
	NBT	0.18	B	12	0.27	C	22	0.18	B	12	0.27	C	22
	NBR	0.27	B	13	0.41	C	24	0.27	B	13	0.41	C	24
	SBL/T/R	0.44	C	22	0.92	E	72	0.44	C	22	0.92	E	72
	Overall	0.74	B	15	1.00	D	41	0.74	B	15	1.00	D	41
Toronto street & Simcoe Street (signalized)	EBL	0.41	C	23	0.47	D	39	0.41	C	23	0.47	D	39
	EBT	0.26	B	19	0.53	D	52	0.26	B	19	0.53	D	52
	WBL	0.93	D	47	1.19	F	133	0.93	D	47	1.19	F	133
	WBT/R	0.16	B	12	0.34	C	30	0.16	B	12	0.34	C	30
	NBL	0.14	C	28	0.09	D	38	0.14	C	28	0.09	D	38

³ De facto Left Turn Lane (dl): indicates that the shared left lane has congestion exceeding that of the other through lanes. Consider adding an exclusive left lane.

Intersection	Movement	2031 Future Background						2031 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
	NBT	0.86	D	37	0.76	D	42	0.86	D	37	0.76	D	42
	NBR	0.77	C	31	0.53	B	13	0.77	C	31	0.53	B	13
	SBL	0.21	C	22	0.20	C	31	0.21	C	22	0.20	C	31
	SBT/R	0.87	D	37	1.14	F	120	0.87	D	37	1.14	F	120
	Overall	0.91	C	32	1.16	E	71	0.91	C	32	1.16	E	71
Bradford Street & Simcoe Street/North Site Access (signalized)	EBL/T/R	0.51	C	33	0.59	D	38	0.51	C	33	0.59	D	38
	WBL	0.40	B	16	0.55	B	17	0.40	B	16	0.55	B	17
	WBT/R	0.13	B	14	0.19	B	13	0.13	B	14	0.19	B	13
	NBL	-	-	-	-	-	-	0.03	A	9	0.04	B	11
	NBT	0.27	B	10	0.40	B	14	0.25	B	10	0.37	B	13
	NBR	0.32	B	11	0.45	B	15	0.31	B	11	0.45	B	15
	SBL	-	-	-	-	-	-	0.31	B	12	0.61	C	23
	SBT/R	0.42	B	12	0.69	B	19	0.23	B	10	0.32	B	13
	Overall	0.45	B	13	0.67	B	17	0.38	B	12	0.62	B	16
	EBL/T/R	0.21	C	23	0.42	C	22	0.21	C	23	0.42	C	22

Intersection	Movement	2031 Future Background						2031 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
Bradford Street & Victoria Street (signalized)	WBL	0.07	C	22	0.14	B	20	0.07	C	22	0.14	B	20
	WBT/R	0.18	C	22	0.18	C	20	0.18	C	22	0.18	C	20
	NBL	-	-	-	-	-	-	0.03	A	2	0.13	A	4
	NBT/R	0.24	A	3	0.44	A	5	0.22	A	3	0.36	A	5
	SBL	-	-	-	-	-	-	0.12	A	3	0.09	A	4
	SBT/R	0.31	A	4	0.44	A	5	0.23	A	3	0.38	A	5
	Overall	0.29	A	5	0.43	A	7	0.23	A	5	0.39	A	7
Essa Road/Bradford Street & Tiffin Street (signalized)	EBL	0.35	B	14	0.22	B	16	0.28	B	12	0.33	C	33
	EBT/R	0.78	C	23	1.29	F	165	0.39	B	12	0.95	E	57
	WBL	1.51	F	280	1.30	F	182	0.83	D	38	0.99	E	76
	WBT	0.51	B	15	0.48	B	13	0.26	B	11	0.29	B	18
	NBL	-	-	-	-	-	-	0.55	C	25	0.68	C	32
	NBT/R	0.36	C	32	1.79	F	383	0.72	C	26	1.05	E	79
	SBL	-	-	-	-	-	-	0.69	C	29	1.06	F	97
	SBT(/L)	0.34	C	27	3.59dl	F	304	0.38	B	16	0.67	C	30
	SBR	0.02	B	13	0.09	B	15	0.05	B	14	0.09	C	23

Intersection	Movement	2031 Future Background						2031 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
	Overall	1.31	D	44	1.65	F	242	0.78	B	19	1.04	D	55
GO Station East Access & Lakeshore Drive (signalized)	EBT	1.03	E	60	1.63	F	314	0.66	B	19	1.02	D	52
	EBR	0.16	B	11	0.26	B	11	0.14	B	13	0.28	B	15
	WBL	0.66	D	51	0.28	D	38	0.44	B	14	0.27	C	28
	WBT	1.30	F	161	1.02	D	49	0.79	B	17	0.62	B	15
	NBL	1.17	F	157	1.29	F	204	0.91	D	51	0.92	E	59
	NBR	0.53	D	50	0.77	E	63	0.41	C	27	0.52	C	35
	Overall	1.33	F	112	1.56	F	181	0.89	C	22	1.00	D	38
GO Station West Access/ Lakeshore Drive & Tiffin Street (signalized)	EBL	0.79	D	41	0.88	E	59	0.72	D	44	1.35	F	231
	EBT/R	0.83	D	39	1.32	F	198	0.28	C	27	0.58	D	42
	WBL	-	-	-	-	-	-	0.00	-	-	0.00	-	-
	WBT	0.60	C	34	0.66	D	54	0.50	D	38	0.71	E	58
	WBR	0.90	C	32	0.67	B	19	0.84	C	23	0.63	B	13
	NBL	0.37	D	35	0.89	F	144	0.51	E	59	0.85	F	127
	NBT/R	-	-	-	-	-	-	0.00	-	-	0.00	-	-

Intersection	Movement	2031 Future Background						2031 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
	SBL	1.11	F	91	1.52	F	271	1.07	F	86	1.34	F	186
	SBT/R	0.12	B	13	0.16	B	17	0.12	B	19	0.16	B	12
	Overall	1.04	D	46	1.52	F	145	0.97	D	42	1.39	F	94
Essa Road & Gowan Street (signalized)	WBL/R	0.29	D	48	0.66	C	24	0.29	D	48	0.62	C	23
	NBT/R	0.19	A	3	0.36	B	11	0.21	A	6	0.51	C	21
	SBL	-	-	-	-	-	-	0.38	A	4	0.98	E	57
	SBT	0.41	A	3	1.06	C	31	0.17	A	3	0.35	B	11
	Overall	0.41	B	14	0.87	C	23	0.37	B	15	0.84	C	25

Table 10: 2041 Queues Analysis

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
High Street & Dunlop Street West (Signalized)	EBL/T/R	272	35	218	56	371	31	54	50	81
	WBL/T	80	55	189	88	225	57	147	91	221
	WBR	17	3	1	12	8	3	5	13	19
	NBL	15	26	37	45	70	18	21	25	25
	NBT	50	15	25	28	56	24	54	49	84
	NBR	-	-	-	-	-	-	-	-	-
	SBL/T/R	164	13	134	26	221	13	36	26	60
Toronto street & Simcoe Street (signalized)	EBL	17	16	9	27	22	17	18	27	30
	EBT	73	20	16	42	39	20	36	45	67
	WBL	25	31	8	35	29	31	21	36	46
	WBT/R	76	58	76	99	81	59	79	101	84
	NBL	30	5	4	22	15	3	2	16	11
	NBT	95	128	96	133	160	129	128	133	134

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
	NBR	38	45	41	46	56	45	43	49	57
	SBL	111	10	5	51	30	14	22	63	87
	SBT/R	111	82	113	122	125	73	113	115	130
Bradford Street & Simcoe Street/North Site Access (signalized)	EBL/T/R	81	80	82	100	85	81	82	95	87
	WBL	33	24	32	36	39	22	24	34	37
	WBT/R	33	11	4	21	16	12	9	23	20
	NBL	15	-	-	-	-	1	2	6	9
	NBT	157	25	59	50	148	20	23	43	47
	NBR	8	15	13	18	21	14	14	18	18
	SBL	15	-	-	-	-	13	17	21	25
	SBT/R	57	16	73	30	101	14	21	26	40
Bradford Street & Victoria Street (signalized)	EBL/T/R	99	8	93	17	132	9	17	18	31
	WBL	9	3	12	10	18	3	7	11	16
	WBT/R	106	9	99	17	142	9	12	19	24
	NBL	15	-	-	-	-	3	8	12	21

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
	NBT/R	159	19	47	37	117	16	27	32	51
	SBL	15	-	-	-	-	8	5	18	15
	SBT/R	83	17	84	32	88	15	23	28	40
Essa Road/Bradford Street & Tiffin Street (signalized)	EBL	47	42	27	76	68	24	34	55	73
	EBT/R	154	166	167	172	173	50	158	95	174
	WBL	23	29	28	35	36	26	29	36	34
	WBT	36	46	43	63	59	29	40	56	62
	NBL	15	-	-	-	-	15	17	27	29
	NBT/R	45	40	54	58	59	38	48	55	54
	SBL	15	-	-	-	-	22	32	37	34
	SBT	40	53	50	59	54	31	56	52	64
	SBR	40	12	2	38	9	8	10	22	20
GO Station East Access &	EBT	153	101	111	175	193	43	47	74	81
	EBR	40	15	17	43	48	16	19	42	46

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
Lakeshore Drive (signalized)	WBL	70	25	18	67	60	15	8	44	24
	WBT	137	142	142	145	146	142	95	157	170
	NBL	39	32	33	51	50	25	28	41	45
	NBR	39	18	19	36	36	11	12	21	23
GO Station West Access/ Lakeshore Drive & Tiffin Street (signalized)	EBL	35	34	35	50	49	41	42	48	45
	EBT/R	49	52	53	57	60	55	58	69	67
	WBL	23	-	-	-	-	-	-	-	-
	WBT	113	168	103	168	165	135	121	139	161
	WBR	55	56	51	78	77	63	61	63	71
	NBL	96	15	20	39	47	18	20	44	50
	NBT/R	96	-	-	-	-	-	-	-	-
	SBL	75	80	115	90	119	82	111	84	114
	SBT/R	110	99	30	157	90	110	30	129	89
	WBL/R	123	31	129	57	137	47	127	117	134
	NBT/R	89	15	45	33	82	19	91	39	111

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
Essa Road & Gowan Street (signalized)	SBL	23	21	23	33	33	15	17	20	19
	SBT	23	11	17	28	32	13	30	34	40

The results indicate that all study area intersections are expected to operate well at a LOS D or better except for the following two intersections:

- Toronto Street & Simcoe Street during the PM peak hour (LOS E); and
- GO Station West Access/Lakeshore Drive & Tiffin Street during the AM and PM peak hours (LOS E and F respectively).

Similar to the 2031 operational analysis, the same three intersections show improvements in the future total scenario compared to the future background.

- Essa Road/Bradford Street & Tiffin Street (PM peak hour);
- GO Station East Access & Lakeshore Drive (AM and PM peak hours); and
- GO Station West Access/ Lakeshore Drive & Tiffin Street (PM peak hour).

However, by the 2041 horizon year, the planned improvements do not provide enough capacity at the three intersections listed above, to maintain a v/c ratio under 1.00. Additional intersection capacity improvements are recommended by the 2041 horizon year for all three intersections.

Most study area intersections are expected to operate with excess capacity (i.e., v/c ratio <0.85) during the AM peak hour except for Toronto Street & Simcoe Street (v/c ratio 0.91), GO Station East Access & Lakeshore Drive (v/c ratio 0.89) and GO Station West Access/Lakeshore Drive & Tiffin Street (v/c ratio 0.97). The following intersections are expected to operate above capacity during the PM peak hour:

- High Street & Dunlop Street West (1.00 v/c ratio);
- Toronto Street & Simcoe Street (1.16 v/c ratio);
- Essa Road/Bradford Street & Tiffin Street (1.06 v/c ratio);
- GO Station East Access & Lakeshore Drive (1.00 v/c ratio); and
- GO Station West Access/Lakeshore Drive & Tiffin Street (1.39 v/c ratio).

The following individual movements north of Tiffin Street are expected to operate with long delays (LOS E or F) and/or a high v/c ratio of 0.85 or more:

- High Street & Dunlop Street West during the PM peak hour; and
 - Westbound left/through (LOS E) (de facto left turn lane)
 - Northbound left turn (LOS E and 0.94 v/c ratio)
 - Southbound through/left/right (LOS E and 0.92 v/c ratio)
- Toronto Street & Simcoe Street during the PM peak hour.
 - Westbound left turn (LOS F and 1.19 v/c ratio)
 - Southbound through (LOS F and 1.14 v/c ratio)

Additionally, the following movements at intersections along Tiffin Street are expected to operate with long delays and/or a high v/c ratio of 0.85 or more:

- Essa Road/Bradford Street & Tiffin Street during PM peak hour;
 - Southbound left turn (LOS F and 1.06 v/c ratio)
 - Eastbound through/right (LOS E and 0.95 v/c ratio)
 - Westbound left turn (LOS E and 0.99 v/c ratio)
 - Northbound through/right (LOS E and 1.05 v/c ratio)
- GO Station East Access & Lakeshore Drive during the PM peak hour;
 - Northbound left turn (LOS E and 0.92 v/c ratio)

- Eastbound through (1.02 v/c ratio)
 - GO Station West Access/Lakeshore Drive & Tiffin Street during the AM peak hour;
- Northbound left turn (LOS E)
- Southbound left turn (LOS F and 1.07 v/c ratio)
 - GO Station West Access/Lakeshore Drive & Tiffin Street during the PM peak hour; and
- Eastbound left turn (LOS F and 1.35 v/c ratio)
- Westbound through (LOS E)
- Northbound left turn (LOS F and 0.85 v/c ratio)
- Southbound left turn (LOS E and 1.34 v/c ratio)
 - Essa Road & Gowan Street during the PM peak hour.
- Southbound left turn (LOS E and 0.98 v/c ratio)

The reported 95th percentile queue lengths at the following intersections are expected to extend to their upstream intersection and/or exceed their available storage:

- High Street & Dunlop Street West during AM and PM peak hours;
- Westbound left/through extends past upstream intersection at Toronto Street
 - Toronto Street & Simcoe Street during AM and PM peak hours;
- Westbound through/right extends past upstream intersection at Mary Street
- Northbound through extends past upstream intersection at City of Barrie Marina/Private Access
 - Essa Road/Bradford Street & Tiffin Street during PM peak hour;
- Eastbound through/right extends past upstream intersection at Short Street (PM peak hour)
 - GO Station West Access/Lakeshore Drive & Tiffin Street during PM peak hour;
- Southbound left turn extends past upstream parking lot intersection and 39 metres beyond available storage

The reported queue lengths for a number of turning movements are expected to slightly exceed their available storage lengths (20 movements for a maximum of four (4) vehicles).

6.3. 2051 Operational Analysis

The 2051 operational review was conducted using the 2041 horizon year volumes and applying a 1.0% per annum growth rate.

Additionally, the through movement volumes along Bradford Street and Essa Road were reduced by 19% to represent an increase in transit and active transportation usage outlined in the City's TMP.

All background developments and roadway modifications from the previous horizon years are included in the 2051 operational analysis.

The resulting intersection volumes are shown in **Figure 7**.

Due to the added background development traffic and background growth traffic growth, the following signal timing changes were made to the 2041 signal timings to improve operations in addition to split optimization:

- Dunlop Street West & High Street;

- Cycle length decreased from 120 to 90 seconds (PM peak)
 - Toronto Street & Simcoe Street;
- Cycle length increased from 90 to 100 seconds (AM peak)
- NBR changes from permissive to permissive + overlap phase (AM and PM peak)
 - Essa Road/Bradford Street & Tiffin Street; and
- Cycle length increased from 75 to 80 seconds (AM peak)
- Cycle length decreased from 100 to 90 seconds (PM peak)
- EBL, WBL and NBL changed from permissive to permissive + protected phase (AM and PM peak)
 - GO Station East Access & Lakeshore Drive.
- Cycle length increased from 120 to 145 seconds (PM peak)

Table 11 shows the operational analysis for the 2051 horizon year while **Table 12** shows the queue analysis. Full Synchro and SimTraffic reports are provided in **Appendix B** and **Appendix C** respectively.

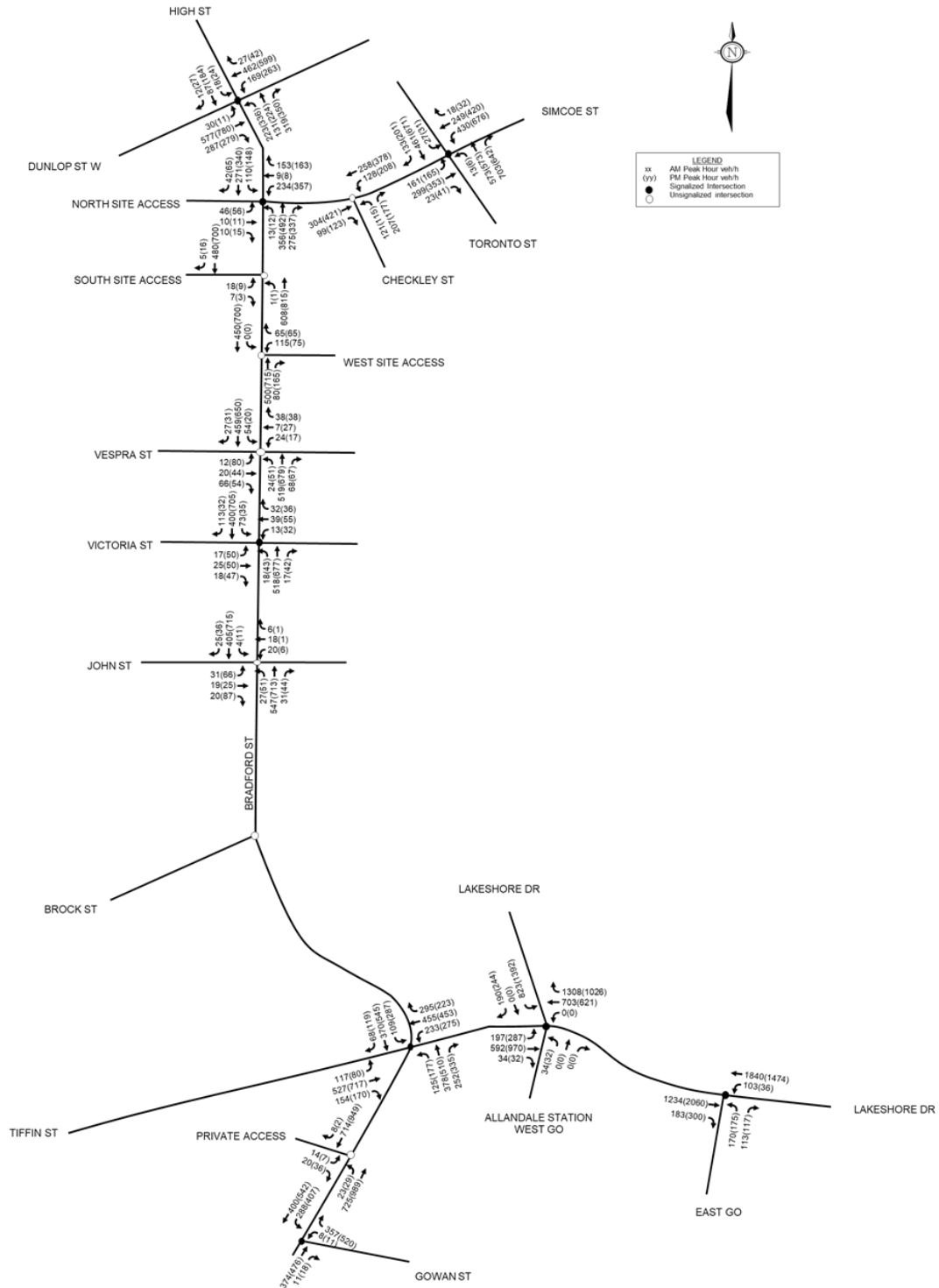


Figure 7: Intersection Volumes – 2051

Table 11: 2051 Operational Analysis

Intersection	Movement	2051 Future Background						2051 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
High Street & Dunlop Street West (Signalized)	EBL/T/R	0.64	B	14	0.76	C	22	0.64	B	14	0.76	C	22
	WBL/T	1.26dl ⁶	B	17	3.23dl ⁴	E	68	1.26dl ⁶	B	17	3.23dl ⁶	E	68
	WBR	0.03	A	8	0.04	B	12	0.03	A	8	0.04	B	12
	NBL	0.76	C	28	1.14	F	115	0.76	C	28	1.14	F	115
	NBT	0.20	B	14	0.31	B	18	0.20	B	14	0.31	B	18
	NBR	0.34	B	15	0.46	B	19	0.34	B	15	0.46	B	19
	SBL/T/R	0.48	C	23	1.03	F	90	0.48	C	23	1.03	F	90
	Overall	0.83	B	17	1.15	D	50	0.83	B	17	1.15	D	50
Toronto street & Simcoe Street (signalized)	EBL	0.34	B	18	0.51	D	40	0.34	B	18	0.51	D	40
	EBT	0.32	C	25	0.58	D	55	0.32	C	25	0.58	D	55
	WBL	0.98	E	61	1.37	F	213	0.98	E	61	1.37	F	213
	WBT/R	0.22	C	20	0.38	C	32	0.22	C	20	0.38	C	32
	NBL	0.17	C	35	0.12	D	39	0.17	C	35	0.12	D	39

⁴ De facto Left Turn Lane (dl): indicates that the shared left lane has congestion exceeding that of the other through lanes. Consider adding an exclusive left lane.

Intersection	Movement	2051 Future Background						2051 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
	NBT	0.93	D	51	0.84	D	48	0.93	D	51	0.84	D	48
	NBR	0.73	C	23	0.62	B	16	0.73	C	23	0.62	B	16
	SBL	0.22	C	25	0.27	C	33	0.22	C	25	0.27	C	33
	SBT/R	0.91	D	45	1.22	F	151	0.91	D	45	1.22	F	151
	Overall	0.95	D	37	1.29	F	94	0.95	D	37	1.29	F	94
Bradford Street & Simcoe Street/North Site Access (signalized)	EBL/T/R	0.52	C	33	0.60	D	39	0.52	C	33	0.60	D	39
	WBL	0.43	B	16	0.59	B	17	0.43	B	16	0.59	B	17
	WBT/R	0.13	B	14	0.18	B	13	0.13	B	14	0.18	B	13
	NBL	-	-	-	-	-	-	0.03	A	9	0.04	B	12
	NBT	0.25	B	11	0.37	B	14	0.23	B	10	0.34	B	14
	NBR	0.34	B	12	0.49	B	17	0.33	B	12	0.48	B	17
	SBL	-	-	-	-	-	-	0.31	B	12	0.58	C	22
	SBT/R	0.41	B	12	0.65	B	19	0.21	B	10	0.29	B	13
	Overall	0.45	B	13	0.67	B	17	0.41	B	13	0.63	B	16
	EBL/T/R	0.23	C	22	0.46	C	22	0.23	C	22	0.46	C	22

Intersection	Movement	2051 Future Background						2051 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
Bradford Street & Victoria Street (signalized)	WBL	0.06	C	21	0.15	B	20	0.06	C	21	0.15	B	20
	WBT/R	0.19	C	22	0.20	C	20	0.19	C	22	0.20	C	20
	NBL	-	-	-	-	-	-	0.04	A	2	0.14	A	4
	NBT/R	0.26	A	3	0.42	A	5	0.23	A	3	0.34	A	5
	SBL	-	-	-	-	-	-	0.13	A	3	0.09	A	4
	SBT/R	0.31	A	3	0.41	A	5	0.22	A	3	0.35	A	5
	Overall	0.30	A	5	0.42	A	7	0.23	A	5	0.37	A	7
Essa Road/Bradford Street & Tiffin Street (signalized)	EBL	0.38	B	13	0.25	B	16	0.29	B	14	0.34	C	28
	EBT/R	1.06	E	73	1.38	F	202	0.61	C	23	0.95	D	49
	WBL	0.91	D	46	1.43	F	235	0.74	C	21	1.14	F	122
	WBT	0.61	B	18	0.51	B	13	0.36	B	17	0.31	B	15
	NBL	-	-	-	-	-	-	0.40	B	18	0.75	C	34
	NBT/R(/L)	1.17	F	116	1.79	F	387	0.72	C	30	1.03	E	73
	SBL	-	-	-	-	-	-	0.69	C	32	1.23	F	153
	SBT(/L)	1.48dl ⁵	F	83	3.95dl ⁷	F	295	0.55	C	26	0.71	C	31

⁵ De facto Left Turn Lane (dl): indicates that the shared left lane has congestion exceeding that of the other through lanes. Consider adding an exclusive left lane.

Intersection	Movement	2051 Future Background						2051 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
	SBR	0.05	B	17	0.10	B	15	0.05	C	22	0.10	C	23
	Overall	1.16	E	72	1.73	F	246	0.66	C	24	1.21	E	60
GO Station East Access & Lakeshore Drive (signalized)	EBT	1.42	F	218	1.82	F	399	0.75	C	22	1.06	E	67
	EBR	0.21	B	14	0.29	B	12	0.17	B	13	0.30	B	16
	WBL	0.58	C	25	0.31	D	38	0.58	C	20	0.31	D	36
	WBT	1.69	F	334	1.14	F	91	0.89	C	22	0.65	B	17
	NBL	0.97	E	62	1.38	F	244	0.97	E	62	1.09	F	118
	NBR	0.49	C	27	0.85	E	71	0.49	C	27	0.67	D	50
	Overall	1.55	F	219	1.72	F	236	0.98	C	27	1.07	D	53
GO Station West Access/ Lakeshore Drive & Tiffin Street (signalized)	EBL	1.11	F	139	0.97	F	86	1.11	F	139	1.63	F	350
	EBT/R	1.09	F	109	1.43	F	244	0.40	D	35	0.64	D	44
	WBL	-	-	-	-	-	-	0.00	-	-	0.00	-	-
	WBT	0.85	E	61	0.76	E	59	0.85	E	61	0.79	E	61
	WBR	1.04	E	65	0.81	C	29	1.01	E	56	0.73	B	17
	NBL	0.48	D	53	0.96	F	172	0.48	D	53	0.89	F	144

Intersection	Movement	2051 Future Background						2051 Future Total					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
	NBT/R	-	-	-	-	-	-	0.00	-	-	0.00	-	-
	SBL	0.97	D	47	1.71	F	354	0.97	D	47	1.48	F	249
	SBT/R	0.13	B	12	0.17	B	17	0.13	B	12	0.17	B	12
	Overall	1.08	E	68	1.68	F	185	1.06	D	54	1.58	F	123
Essa Road & Gowan Street (signalized)	WBL/R	0.32	D	48	0.73	C	27	0.32	D	48	0.70	C	25
	NBT/R	0.17	A	3	0.32	B	11	0.19	A	6	0.46	C	20
	SBL	-	-	-	-	-	-	0.40	A	4	1.02	E	66
	SBT(L)	0.40	A	3	1.08dl ⁶	C	27	0.16	A	3	0.32	B	11
	Overall	0.41	B	15	0.88	C	23	0.40	B	16	0.89	C	28

⁶ De facto Left Turn Lane (dl): indicates that the shared left lane has congestion exceeding that of the other through lanes. Consider adding an exclusive left lane.

Table 12: 2051 Queue Analysis

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
High Street & Dunlop Street West (Signalized)	EBL/T/R	272	49	211	129	370	35	54	56	88
	WBL/T	80	75	195	133	199	70	54	110	199
	WBR	17	5	2	15	11	4	6	15	21
	NBL	15	19	27	27	44	19	22	26	24
	NBT	50	24	20	51	40	26	49	54	79
	NBR	-	-	-	-	-	1	1	10	9
	SBL/T/R	164	20	127	56	222	16	38	31	64
Toronto street & Simcoe Street (signalized)	EBL	17	13	10	25	23	15	17	27	30
	EBT	73	16	21	35	49	20	39	46	68
	WBL	25	24	8	46	31	25	22	46	46
	WBT/R	76	79	76	89	82	79	80	95	98
	NBL	30	5	7	21	23	3	2	15	12
	NBT	95	159	126	133	151	129	128	133	131

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
	NBR	38	45	44	51	55	45	42	50	60
	SBL	111	17	12	71	64	23	19	86	76
	SBT/R	111	92	113	135	123	91	116	132	121
Bradford Street & Simcoe Street/North Site Access (signalized)	EBL/T/R	81	65	83	108	88	69	79	107	95
	WBL	33	23	31	38	39	19	24	33	36
	WBT/R	33	11	3	24	11	10	9	20	18
	NBL	15	-	-	-	-	2	2	8	9
	NBT	157	15	31	35	74	19	20	42	39
	NBR	8	14	14	19	18	14	14	18	18
	SBL	15	-	-	-	-	13	16	22	24
	SBT/R	57	29	69	68	104	14	17	25	33
Bradford Street & Victoria Street (signalized)	EBL/T/R	99	35	102	91	110	11	20	22	39
	WBL	9	5	12	14	17	4	7	12	16
	WBT/R	106	25	90	78	147	9	13	18	24
	NBL	15	-	-	-	-	4	8	13	21

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
	NBT/R	159	21	30	52	65	19	25	38	45
	SBL	15	-	-	-	-	8	6	18	17
	SBT/R	83	57	84	111	87	15	28	29	63
Essa Road/Bradford Street & Tiffin Street (signalized)	EBL	47	36	21	74	60	17	37	41	74
	EBT/R	154	166	165	172	170	49	160	115	166
	WBL	23	25	27	36	37	25	28	36	36
	WBT	36	33	42	56	59	29	39	53	61
	NBL	15	-	-	-	-	14	17	28	29
	NBT/R	45	49	53	64	58	38	47	54	57
	SBL	15	-	-	-	-	20	32	36	35
	SBT	40	51	50	56	54	32	55	49	64
	SBR	40	4	2	21	9	8	9	20	21
GO Station East Access &	EBT	153	168	145	203	215	41	60	74	109
	EBR	40	25	17	58	50	17	52	45	52

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
Lakeshore Drive (signalized)	WBL	70	33	13	85	47	20	37	57	37
	WBT	137	142	141	145	147	142	136	168	180
	NBL	39	25	37	43	53	27	33	44	48
	NBR	39	16	21	30	40	12	14	23	29
GO Station West Access/ Lakeshore Drive & Tiffin Street (signalized)	EBL	35	32	33	50	48	35	44	54	44
	EBT/R	49	52	52	59	59	40	58	67	67
	WBL	23	-	-	-	-	-	-	-	-
	WBT	113	75	99	143	170	134	134	142	144
	WBR	55	53	52	77	79	62	62	65	63
	NBL	96	19	21	44	51	25	20	67	51
	NBT/R	96	-	-	-	-	-	-	-	-
	SBL	75	52	115	83	119	75	112	109	115
	SBT/R	110	116	43	120	116	98	25	152	77
	WBL/R	123	84	130	156	136	45	126	97	131
	NBT/R	89	19	38	44	85	26	95	67	105

Intersection	Movement	Storage or Link Length (m)	Future Background				Future Total			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
Essa Road & Gowan Street (signalized)	SBL	23	-	-	-	-	13	17	23	19
	SBT	23	18	23	31	32	15	29	37	41

The results indicate that all study area intersections are expected to operate well at a LOS D or better except for the following three intersections:

- Toronto Street & Simcoe Street during the PM peak hour (LOS F);
- Essa Road/Bradford Street & Tiffin Street during the PM peak hour (LOS E); and
- GO Station West Access/Lakeshore Drive & Tiffin Street during the AM and PM peak hours (LOS E and F respectively).

Similar to the previous horizon year operational analyses, the following same three intersections show improvements in the future total scenario compared to the future background.

- Essa Road/Bradford Street & Tiffin Street (PM peak hour);
- GO Station East Access & Lakeshore Drive (AM and PM peak hours); and
- GO Station West Access/ Lakeshore Drive & Tiffin Street (PM peak hour).

Most study area intersections are expected to operate with excess capacity (i.e., v/c ratio <0.85) during the AM peak hour except for Toronto Street & Simcoe Street (v/c ratio 0.95), GO Station East Access & Lakeshore Drive (v/c ratio 0.98) and GO Station West Access/Lakeshore Drive & Tiffin Street (v/c ratio 1.06). The following intersections are expected to operate above capacity during the PM peak hour:

- High Street & Dunlop Street West (1.15 v/c ratio);
- Toronto Street & Simcoe Street (1.29 v/c ratio);
- Essa Road/Bradford Street & Tiffin Street (1.21 v/c ratio);
- GO Station East Access & Lakeshore Drive (1.07 v/c ratio); and
- GO Station West Access/Lakeshore Drive & Tiffin Street (1.58 v/c ratio).

By the 2051 horizon year, the planned improvements do not provide enough capacity at intersections along Bradford Street, Tiffin Street and Lakeshore Drive, to maintain a v/c ratio under 1.00. Additional intersection capacity improvements are recommended by the 2051 horizon year for all three intersections along Tiffin Street and Lakeshore Drive. The recommended additional mitigation measures for the ultimate 2051 scenario are analysed and discussed in the following section 6.4.

While the results indicate the need for additional mitigation measures due to capacity needs at High Street & Dunlop Street West and Toronto Street & Simcoe Street intersections, these intersections are located in the downtown area with limited available rights-of-way and is constrained by the surrounding developments. For example, the existing right-of-way along Dunlop Street West will not accommodate additional auxiliary turn lanes; as further widening would result in impact to adjacent developments and pedestrian facilities. Similarly, on High Street, dual-northbound left-turn lanes would be beneficial; however, the turning lanes could not be shadowed on the southbound approach without severely impacting the surrounding developments. It is typical that if dual left turn is provided in one direction, it would be mirrored in the opposite flow at the intersection.

Additionally, due to the limited right-of-way at the Toronto Street & Simcoe Street intersection, mitigation measures such as additional auxiliary turn-lanes could not be easily implemented without impacting the adjacent developments and pedestrian facilities. The addition of auxiliary turn lanes at Toronto Street & Simcoe Street intersection may encourage traffic to use Lakeshore Drive rather than Bradford Street. Compared to Lakeshore Drive, Bradford Street has more lane capacity to facilitate north-south traffic movement. For the aforementioned reasons and to minimize the footprints of the High Street & Dunlop Street West and Toronto Street & Simcoe Street intersections, no further mitigation measures are being considered at either intersection.

The following individual movements north of Tiffin Street are expected to operate with long delays (LOS E or F) and/or a high v/c ratio of 0.85 or more:

- High Street & Dunlop Street West during the PM peak hour;
 - Westbound left/through (LOS E) (de facto left turn lane)
 - Northbound left turn (LOS F and 1.14 v/c ratio)
 - Southbound through/left/right (all LOS F and 1.03 v/c ratio).
- Toronto Street & Simcoe Street during the AM peak hour; and
 - Westbound left turn (LOS E and 0.98 v/c ratio)
- Toronto Street & Simcoe Street during the PM peak hour.
 - Westbound left turn (LOS F and 1.37 v/c ratio)
 - Southbound through (LOS F and 1.22 v/c ratio)

Additionally, the following movements at intersections along Tiffin Street are expected to operate with long delays and/or a high v/c ratio of 0.85 or more:

- Essa Road/Bradford Street & Tiffin Street during PM peak hour;
 - Eastbound through/right (0.95 v/c ratio)
 - Southbound left turn (LOS F and 1.23 v/c ratio)
 - Westbound left turn (LOS F and 1.14 v/c ratio)
 - Northbound through/right (LOS E and 1.03 v/c ratio)
- GO Station East Access & Lakeshore Drive during the AM peak hour;
 - Northbound left turn (LOS E and 0.97 v/c ratio)
- GO Station East Access & Lakeshore Drive during the PM peak hour;
 - Eastbound through (LOS E and 1.06 v/c ratio)
 - Northbound left turn (LOS F and 1.09 v/c ratio)
- GO Station West Access/Lakeshore Drive & Tiffin Street during the AM peak hour;
 - Eastbound left turn (LOS F and 1.11 v/c ratio)
 - Westbound through (LOS E)
 - Westbound right turn (LOS E and 1.01 v/c ratio)
 - Southbound left turn (0.97 v/c ratio)
- GO Station West Access/Lakeshore Drive & Tiffin Street during the PM peak hour; and
 - Eastbound left turn (LOS F and 1.63 v/c ratio)
 - Westbound through (LOS E)
 - Northbound left turn (LOS F and 0.89 v/c ratio)
 - Southbound left turn (LOS E and 1.48 v/c ratio)
- Essa Road & Gowan Street during the PM peak hour.
 - Southbound left turn (LOS E and 1.02 v/c ratio)

The reported 95th percentile queue lengths at the following intersections are expected to extend to their upstream intersection and/or exceed their available storage:

- High Street & Dunlop Street West during AM and PM peak hours;
 - Westbound left/through extends past upstream intersection at Toronto Street

- Toronto Street & Simcoe Street during AM and PM peak hours;
- Westbound through/right extends past upstream intersection at Mary Street
- Northbound through extends past upstream intersection at City of Barrie Marina/Private Access
 - Essa Road/Bradford Street & Tiffin Street during PM peak hour;
- Eastbound through/right extends past upstream intersection at Short Street (PM peak hour)
 - GO Station West Access/Lakeshore Drive & Tiffin Street during AM and PM peak hours;
- Southbound left turn extends past upstream parking lot intersection and 34/40 metres beyond available storage during AM/PM respectively

The reported queue lengths for a number of turning movements are expected to slightly exceed their available storage lengths (19 movements for a maximum of four (4) vehicles).

6.4. 2051 Operational Analysis – 2051 Ultimate Scenario

The 2051 ultimate scenario was conducted using the same volumes as the previous 2051 future total scenario. However, the 2051 ultimate scenario includes additional mitigation measures and focuses on only two intersections of interest, Essa Road/Bradford Street & Tiffin Street and GO Station West Access/ Lakeshore Drive & Tiffin Street as outlined by the City.

It should be noted that the 2051 ultimate scenario does not consider the road widening to 6 + 1 lanes on Tiffin Street between Bradford Street/Essa Road and Lakeshore Drive as outlined in the TMP. The City indicated that the planned 6 + 1 lanes road widening along the Tiffin Street corridor between Bradford Street/Essa Road and Lakeshore Drive is only a placeholder. Therefore, within this section of Tiffin Street, the road was widened to match the 4 + 1 lane configuration on Tiffin Street between Ferndale Drive to Bradford Street/Essa Road. This change results in a reduction of one through lane per direction from the previous 2051 future total scenario.

The section 6.3 findings indicated that the traffic operations at the intersections of interest were over capacity and require additional mitigation measures beyond those planned by the City. As such, dual southbound left-turn lanes were added to both Essa Road/Bradford Street & Tiffin Street and GO Station West Access/ Lakeshore Drive & Tiffin Street intersections. Finally, at Essa Road/Bradford Street & Tiffin Street intersection, the southbound right-turn auxiliary lane from the previous 2051 scenario was reverted to a shared southbound through/right lane as it was not as impactful as adding an additional left-turn lane. Cycle lengths and splits were optimized for the new lane configuration. **Figure 8** shows the new lane configuration for the 2051 ultimate scenario at both intersections.



Figure 8: 2051 Ultimate Scenario Lane Configuration

Table 13 shows the operational analysis for the 2051 horizon year while **Table 14** shows the queue analysis. Full Synchro and SimTraffic reports are provided in **Appendix B** and **Appendix C** respectively. The 2051 future total scenario is also provided in the tables for easy comparison.

Table 13: 2051 Ultimate Scenario Operational Analysis

Intersection	Movement	2051 Future Total						2051 Future Ultimate					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
Essa Road/Bradford Street & Tiffin Street (signalized)	EBL	0.29	B	14	0.34	C	28	0.51	B	19	0.33	C	28
	EBT/R	0.61	C	23	0.95	D	49	0.62	C	24	0.95	D	49
	WBL	0.74	C	21	1.14	F	122	0.92	D	49	0.95	E	61
	WBT	0.36	B	17	0.31	B	15	0.70	C	26	0.55	B	18
	NBL	0.40	B	18	0.75	C	34	0.54	C	22	0.87	D	51
	NBT/R	0.72	C	30	1.03	E	73	0.68	C	31	0.95	D	50
	SBL	0.69	C	32	1.23	F	153	0.33	C	20	0.89	D	46
	SBT	0.55	C	26	0.71	C	31	0.60	C	27	0.92	D	46
	SBR	0.05	C	22	0.10	C	23	-	-	-	-	-	-
	Overall	0.66	C	24	1.21	E	60	0.81	C	28	0.95	D	45
GO Station West Access/ Lakeshore Drive & Tiffin Street (signalized)	EBL	1.11	F	139	1.63	F	350	0.87	D	49	0.95	E	59
	EBT/R	0.40	D	35	0.64	D	44	0.45	C	20	0.66	C	24
	WBL	-	-	-	-	-	-	-	-	-	-	-	-
	WBT	0.85	E	61	0.79	E	61	0.64	C	32	0.56	C	31
	WBR	1.01	E	56	0.73	B	17	1.07	E	76	0.70	A	8

Intersection	Movement	2051 Future Total						2051 Future Ultimate					
		AM Peak			PM Peak			AM Peak			PM Peak		
		v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
	NBL	0.48	D	53	0.89	F	144	0.44	D	36	0.48	D	45
	NBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	SBL	0.97	D	47	1.48	F	249	0.68	B	20	0.96	D	41
	SBT/R	0.13	B	12	0.17	B	12	0.13	B	14	0.17	C	26
	Overall	1.06	D	54	1.58	F	123	0.93	D	42	1.01	C	29

Table 14: 2051 Queue Analysis

Intersection	Movement	Storage or Link Length (m)	2051 Future Total				2051 Future Ultimate			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
Essa Road/Bradford Street & Tiffin	EBL	47	17	37	41	74	10	26	33	67
	EBT/R	154	49	160	115	166	80	152	176	190
	WBL	23	25	28	36	36	26	29	34	33

Intersection	Movement	Storage or Link Length (m)	2051 Future Total				2051 Future Ultimate			
			Average Queue (m)		95 th Percentile Queue (m)		Average Queue (m)		95 th Percentile Queue (m)	
			AM	PM	AM	PM	AM	PM	AM	PM
Street (signalized)	WBT	36	29	39	53	61	40	44	55	58
	NBL	15	14	17	28	29	10	15	25	30
	NBT/R	45	38	47	54	57	29	38	59	69
	SBL	15	20	32	36	35	13	42	31	46
	SBT	40	32	55	49	64	37	49	57	64
	SBR	40	8	9	20	21	-	-	-	-
GO Station West Access/ Lakeshore Drive & Tiffin Street (signalized)	EBL	35	35	44	54	44	20	33	47	58
	EBT/R	49	40	58	67	67	26	43	57	76
	WBL	23	-	-	-	-	-	-	-	-
	WBT	113	134	134	142	144	133	134	144	155
	WBR	55	62	62	65	63	42	46	90	89
	NBL	96	25	20	67	51	37	34	95	90
	NBT/R	96	-	-	-	-	-	-	-	-
	SBL	75	75	112	109	115	55	66	116	120
	SBT/R	110	98	25	152	77	97	115	155	123

The 2051 ultimate scenario results indicate that both the intersections of interest are expected to operate acceptably with LOS D or better and v/c ratios under 1.00 during both peak hours, except for at GO Station West Access/ Lakeshore Drive & Tiffin Street during the PM peak hour where the v/c ratio is 1.01. However, none of the individual movement at GO Station West Access/ Lakeshore Drive & Tiffin Street during the PM peak hour are expected to be overcapacity.

Due to the reduced eastbound and westbound through lane capacity at Essa Road/Bradford Street & Tiffin Street and the removal of the southbound right-turn auxiliary lane, the results indicate that during the AM peak hour, the intersection is expected to operate with more delay and a higher v/c ratio in the ultimate scenario compared to the previous 2051 future total scenario. Otherwise, both intersections show improvements in v/c ratio and delay compared to the previous 2051 future total scenario.

The queues results indicate that during the AM and PM peak hours at both Essa Road/Bradford Street & Tiffin Street and GO Station West Access/ Lakeshore Drive & Tiffin Street, the expected queues are similar or slightly longer compared to the previous 2051 future total scenario. However, the longer queues are due to the reduced number of lanes for the eastbound and westbound through movements and the removal of the southbound right-turn auxiliary lane at Essa Road/Bradford Street & Tiffin Street.

Overall, the dual southbound left-turn lanes at both Essa Road/Bradford Street & Tiffin Street and GO Station West Access/ Lakeshore Drive & Tiffin Street intersections in addition to the planned road widening along Bradford Street, Essa Road Tiffin Street and Lakeshore Drive are expected to result in an acceptable LOS D or better. With the added dual southbound left-turn lanes, the intersection capacity issues found in the 2051 future total scenario are significantly improved. With the exception of the GO Station West Access/ Lakeshore Drive & Tiffin Street intersection during the PM peak hour, all intersection v/c ratios are expected to be 0.95 or less.

7. 2051 Operational Analysis – VISSIM Analysis

Additional microsimulation analysis of the 2051 horizon was conducted for two reasons. First, to confirm and model with finer detail the results of the Synchro/SimTraffic analysis for both Future Background and the Future Ultimate proposed improvements developed based on those results. This proposed improvement scenario is described as “Future Ultimate Scenario – Intersection” in Section 7.

The second was to model the performance of a proposed scenario that contemplates the conversion of GO Station West Access/Lakeshore Drive & Tiffin Street and Essa Road/Bradford Street & Tiffin Street into multi-lane roundabouts. This proposed improvement scenario is described as “Future Ultimate Scenario – Roundabout”.

This microsimulation analysis was conducted using VISSIM, and as described above, modelled three scenarios in total:

- Future Background
- Future Ultimate Scenario – Intersection
- Future Ultimate Scenario – Roundabout

Calibration and validation of VISSIM modelled roundabout performance was completed using ARCADY. Each set of modelled results provides movement’s delay, level of service, 95th percentile queueing, and a GEH statistic analysis that compares simulated throughput to assigned demand, to ensure the model is

processing the demand as intended. Additionally, the results are compared to their applicable Synchro/SimTraffic counterpart.

Both Future Ultimate Scenario's proposed geometry are presented below.

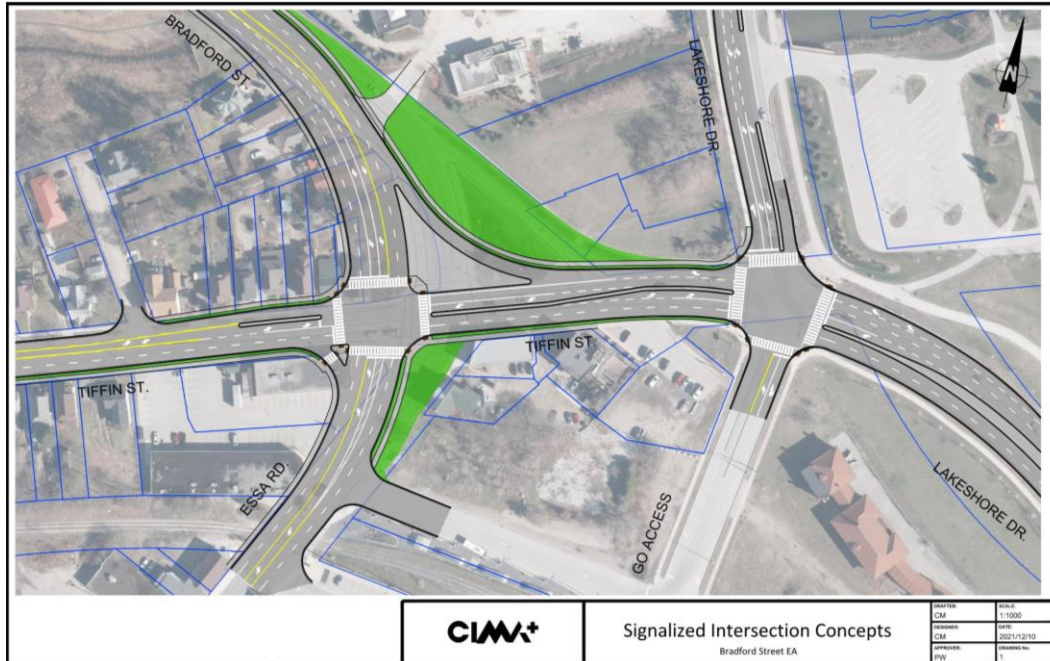


Figure 9: Future Ultimate Scenario – Intersection Geometry

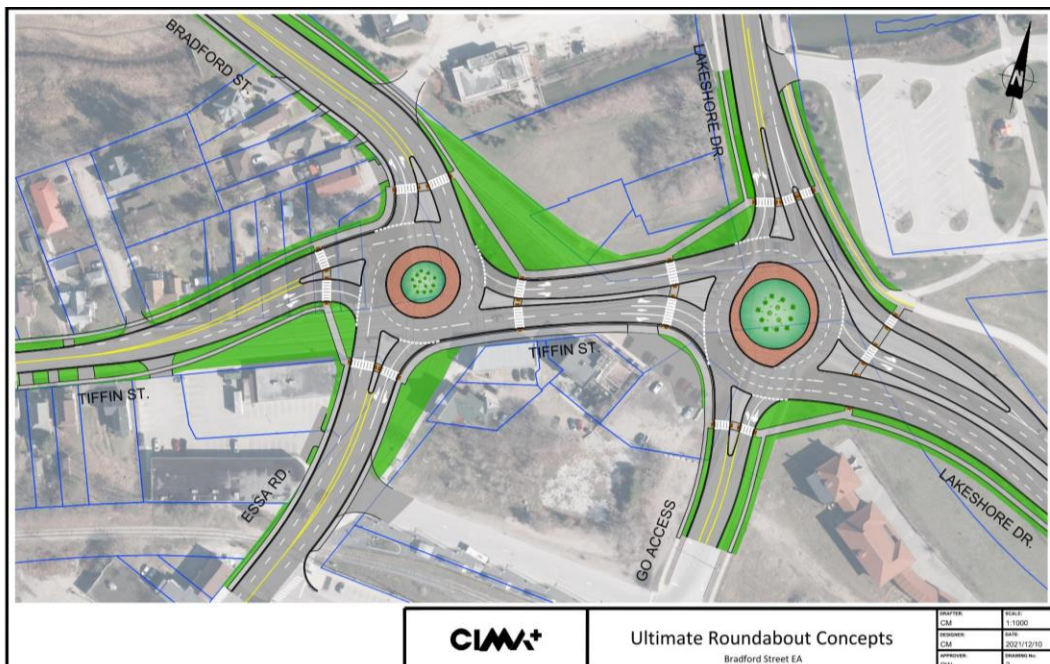


Figure 10: Future Ultimate Scenario – Roundabout Geometry

7.1. Microsimulation Model Development

All microsimulation analysis were completed using PTV VISSIM 2021. VISSIM was selected for microsimulation due to its ability to model car dynamics, gap acceptance and network congestion with a higher level of sensitivity compared to SimTraffic. Existing road sections were coded using Bing Maps base map to ensure spatial accuracy of the network. For proposed condition geometry, design drawings for each alternative were scaled and inserted into the base map.

For Future Background and Future Ultimate Scenario – Intersection, signal timings from their corresponding Synchro models were used to maintain an equivalent comparison between models. For Future Ultimate Scenario – Roundabout, timings were adjusted as necessary to best accommodate the altered arrival rate of traffic.

All scenarios are based on 2051 Future Horizon demand. In addition, all scenarios model the study area's bus routes and assume that the existing bus schedule (number of busses and frequency) will be maintained.

A snapshot of the model geometry and boundaries are shown in **Figure 11** through **Figure 13** and the model parameters are summarized in **Table 15**.

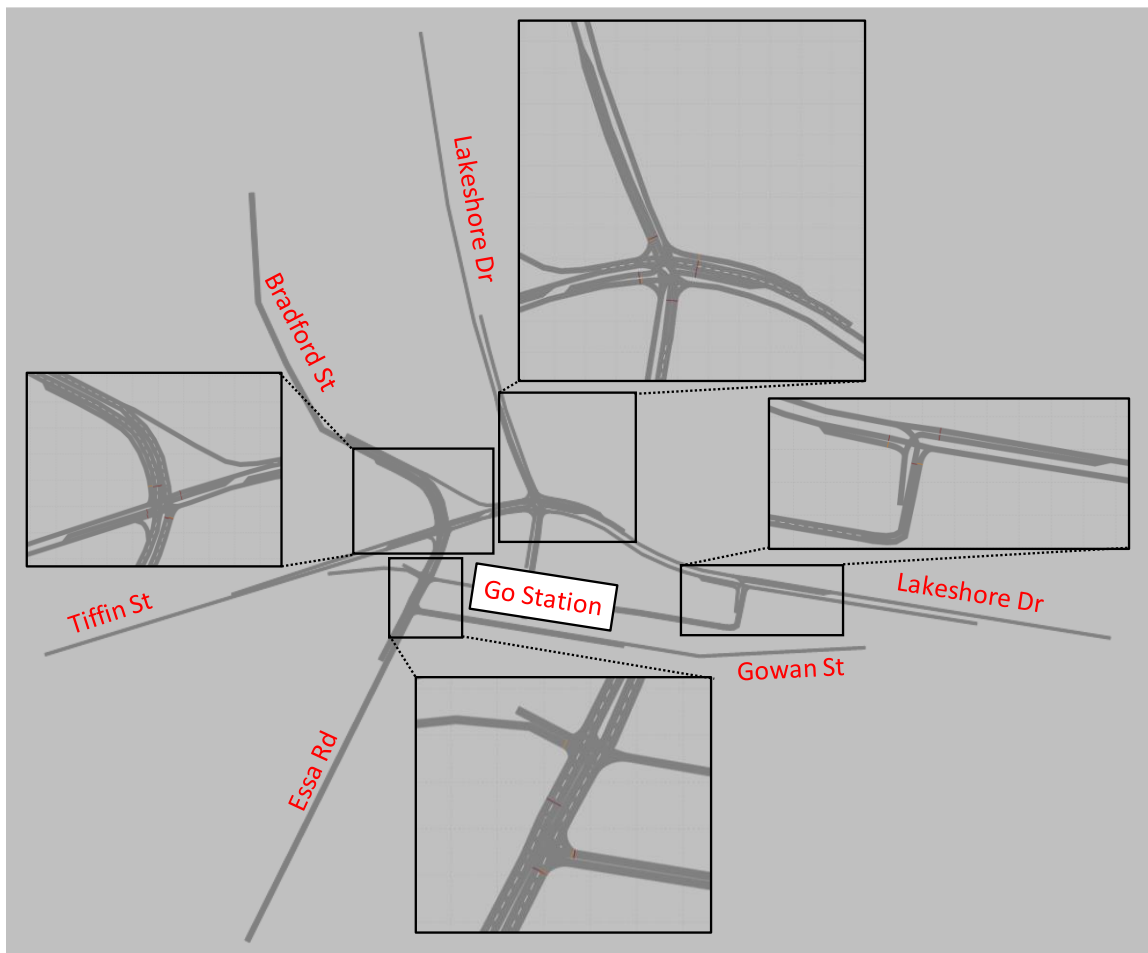


Figure 11: Overview of the Microsimulation Model – Future Background

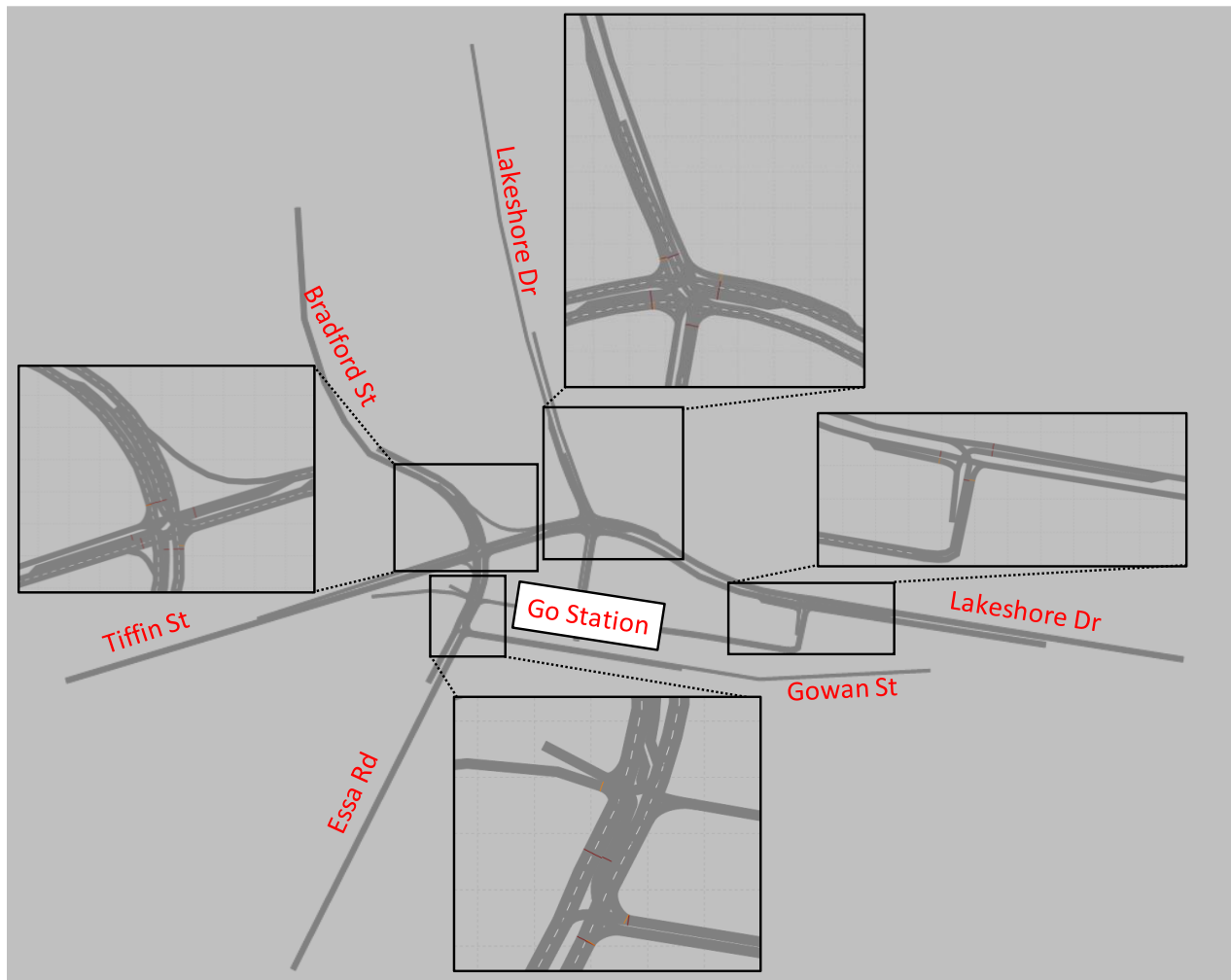


Figure 12: Overview of the Microsimulation Model – Future Ultimate Scenario - Intersection

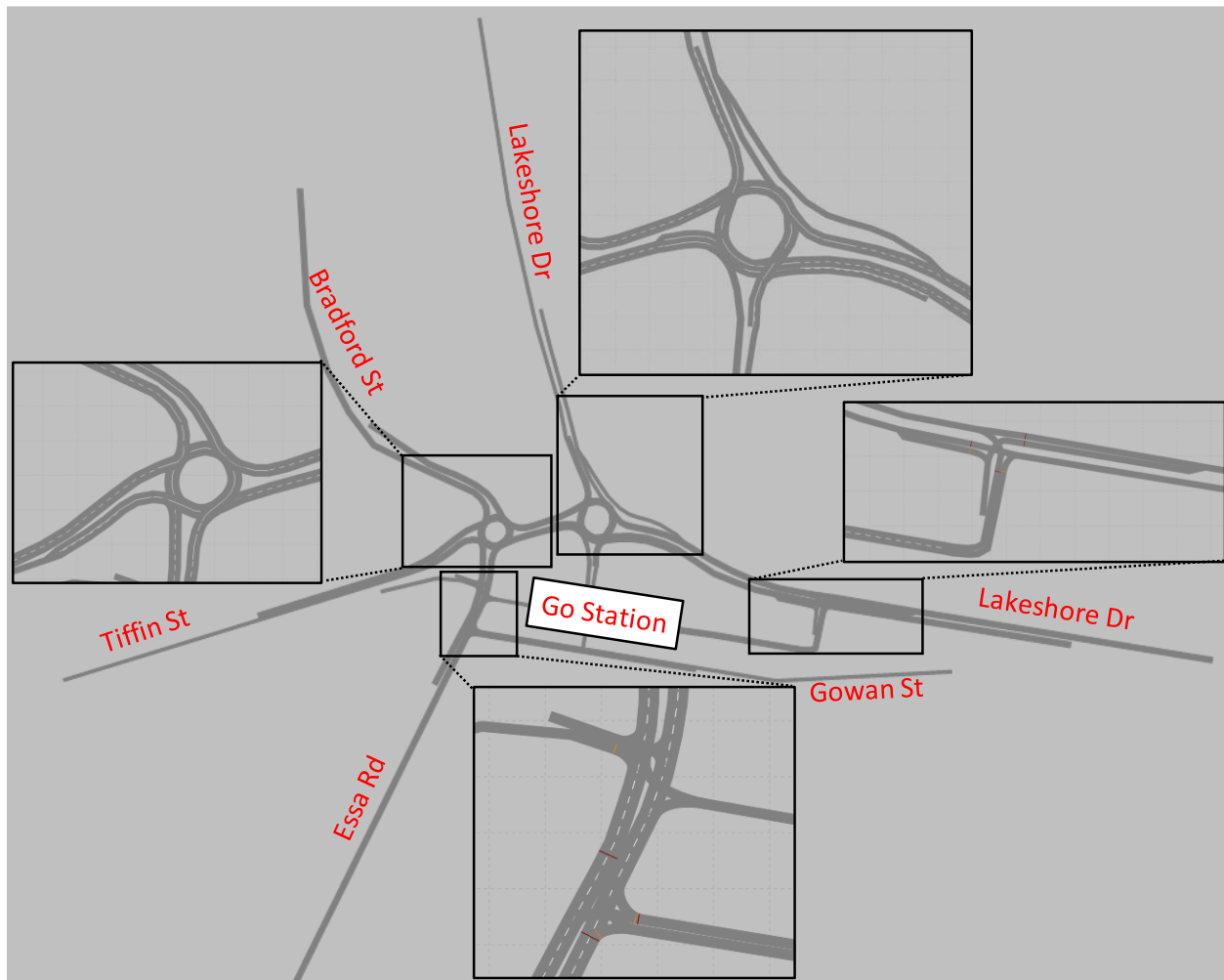


Figure 13: Overview of the Microsimulation Model – Future Ultimate Scenario – Roundabout

Table 15: Key Parameters of the Microsimulation Model

Model Component	Notes
Network Elements / Parameters	
Lane Configurations & Widths	As per existing geometry, and as per proposed design drawings, where applicable.
Turn Lanes/ Storage	Left and right turn lanes as per existing condition or proposed design drawings, where applicable.
Vehicle Types	Passenger cars, trucks and busses.
Vehicle Features	Vehicle length, width, acceleration/deceleration rates, and maximum/desired speeds (Default).
Road Types	Arterial roadways.

Model Component	Notes
Speed	As per existing conditions posted speeds, and where applicable, a 30km/hr advisory speed within roundabout sections.
Traffic Signal Timing	Signalized intersections timings as per Synchro modelled timing plans under Future Background and Future Ultimate Scenario – Intersection. Future Ultimate Scenario – Roundabout timings determined based on iterative microsimulation.
Stop Signs/ Yield Signs	Roundabouts as per existing condition or proposed design drawings, where applicable.
Driving Behaviour	Motorized Roadway (Default).
Bus Routing	Existing bus stop locations, routing and frequencies.
Traffic Demand Elements	
Static Routing	Based on the demand developed for the 2051 Future Horizon (See Figure 7).
Calibration Elements	
Evaluation Nodes	At each intersection - capturing queues, delay and volume.
Traffic Demand	2051 Future Horizon Demand was used as the input, and model throughput volumes are compared to assigned volumes to ensure model accuracy (GEH Comparison).
VISSIM Setup and Details	
Simulation Time	30-minute (1800 s) seed period and 1-hour (3600 s) recording period for each peak hour
Simulation Runs	10 randomly seeded replications for each peak hour.
Traffic Assignment	Static assignment

The following sections discuss the results of the three VISSIM models simulated according to the above parameters.

7.2. 2051 Future Background VISSIM Analysis

The modelled results of the 2051 Future Background VISSIM analysis are presented below and is followed by an associated discussion of: the results overall, comparison to the model's Synchro/SimTraffic counterpart results, critical movements in detail, and GEH statistic values.

Critical movements defined as and flagged in red when:

- LOS E or worse
- 95th percentile queues extending to an upstream intersection or out of the modelled VISSIM network

Table 16: 2051 Future Background: VISSIM Analysis

Intersection	Movement	Storage Length*	2051 Future Background					
			AM Peak Hour			PM Peak Hour		
			Delay (s)	LOS	95th Percentile Queue (m)	Delay (s)	LOS	95th Percentile Queue (m)
Essa Road & Gowan Street (signalized)	WBL/R	-	134.7	F	420	1086.3	F	617
	NBT/R	-	43.5	D	70	288.5	F	442
	SBL/T	-	11.0	B	34	14.9	B	38
	Total	-	44.0	D	-	303.3	F	-
Essa Road & Private Access/ South GO Station Access (unsignalized)	EBL/R	-	122.4	F	22	271.3	F	56
	NBL/T/R	-	23.1	C	51	40.4	E	53
	SBL/T/R	-	15.7	C	12	18.5	C	24
	Total	-	16.5	C	-	30.3	D	-
Essa Road/Bradford Street & Tiffin Street (signalized)	EBL	65	354.8	F	18	423.3	F	11
	EBT/R	-	387.6	F	566	466.2	F	561
	WBL	35	38.1	D	37	46.1	D	77
	WBT	-	17.3	B	79	18.6	B	120
	WBR	120	0.5	A	0	0.4	A	0
	NBL/T/R	-	61.9	E	80	75.5	E	80
	SBL/T	-	107.3	F	63	1228.8	F	558
	SBR	115	6.7	A	0	635.8	F	2
	Total	-	120.9	F	-	327.8	F	-
GO Station West Access/ Lakeshore Drive & Tiffin Street (signalized)	EBL	45	64.3	E	131	71.4	E	132
	EBT/R	-	42.3	D	132	44.2	D	135
	WBL	35	0.0	A	0	0.0	A	0
	WBT	-	59.5	E	248	69.4	E	296
	WBR	75	20.3	C	240	24.1	C	269
	NBL	-	45.6	D	23	48.8	D	23
	NBT/R	-	0.0	A	0	0.0	A	0
	SBL	120	46.7	D	390	157.2	F	645
	SBT/R	-	22.7	C	3	127.2	F	3
	Total	-	39.5	D	-	79.0	E	-
GO Station East Access & Lakeshore Drive (signalized)	EBT	-	15.6	B	222	15.6	B	252
	EBR	40	12.2	B	0	12.5	B	0
	WBL	100	71.4	E	5	81.9	F	0
	WBT	-	57.3	E	496	72.8	E	497
	NBL	65	56.2	E	44	63.3	E	49
	NBR	65	23.9	C	7	27.0	C	10
	Total	-	37.8	D	-	43.3	D	-

*Storage length for VISSIM simulation is measured from the stop bar to a lane width of 2.7 m, and therefore differs from the Synchro modelled storage which measures from the stop bar to the end of the full lane width/beginning of taper.

The VISSIM analysis results overall concur with the conclusions raised by the Synchro and SimTraffic analysis in **Section 6.3**. The conclusion being that the network operates overcapacity, with the critical (based on exceeding Synchro LOS D and $v/c > 1.00$) intersections being Essa Road/Bradford Street & Tiffin Street as well as GO Station West Access/Lakeshore Drive & Tiffin Street. Similarly, the VISSIM analysis identifies these two locations as critical, but also identifies additional intersections as operating poorly. The reason for this is due to upstream queueing effects, discussed in detail below.

Due to the nature of microsimulation, the poor performance of the two critical intersections leads to extensive queueing on their approaches, which has upstream effects elsewhere in the network. These upstream effects alter the performance of surrounding intersections by metering traffic flows (providing an inaccurate arrival rate compared to free-flow arrival rates, further discussed as part of the GEH statistic analysis) and prevents vehicles at upstream intersections from completing their movements once queueing from the critical intersections reaches the departure lanes of the intersections.

Overall, due to these upstream effects, a direct comparison of Synchro HCM and VISSIM Delay/LOS results identifies discrepancies in which the VISSIM analysis under or overstates performance comparatively. Instead, to understand if the models are behaving similarly, SimTraffic queue results can be used to compare to the VISSIM results, as they are both microsimulation-based output, and would experience similar upstream dynamics.

An example of this sort of upstream effect is presented below, with extensive queueing from the eastbound approach of GO Station West Access/Lakeshore Drive & Tiffin Street preventing northbound right turn movements at Essa Road/Bradford Street & Tiffin Street from completing, leading to queueing that prevents westbound right turns from Essa Road & Gowan Street from completing.

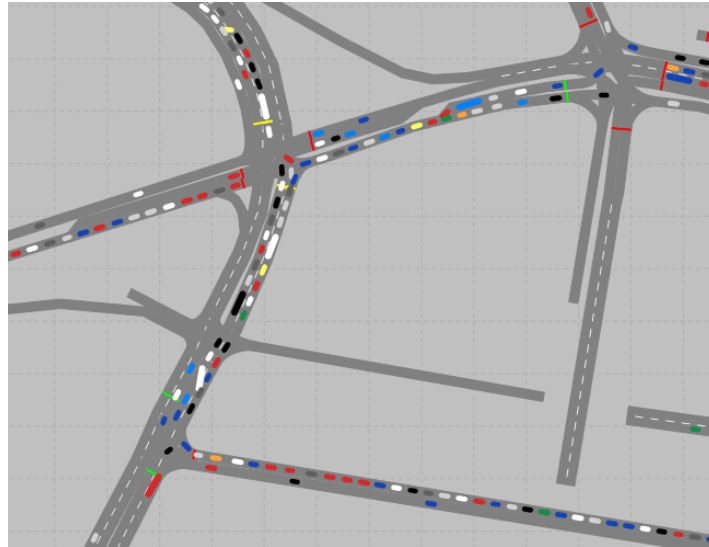


Figure 14: 2051 Future Background PM Peak Hour VISSIM Simulation – Upstream Queueing Effects

The following movements from this simulation are critical, or require additional discussion to reconcile with the Synchro results:

- **Essa Road & Gowan Street**

- Westbound left/right (AM and PM peak hour): Upstream queueing from the northbound approach of Essa Road/Bradford Street & Tiffin Street prevents westbound right vehicles from completing their movement as they would under free-flow conditions, leading to a LOS F. During the PM Peak hour, the 95th percentile queues extend outside of the modelled network, meaning that the presented queue value should be interpreted as being beyond 175m east of Bayview Drive.
- Northbound through/right (PM peak hour): Upstream queueing from the northbound approach of Essa Road/Bradford Street & Tiffin Street prevents northbound through vehicles from completing their movement as they would under free-flow conditions, leading to a LOS F.
 - **Essa Road & Private Access/South GO Station**
- Eastbound left/right (AM and PM peak hour): Queueing in both directions on Essa Road prevents left turning traffic from finding gaps quickly, leading to a LOS F.
- Northbound left/through/right (PM peak hour): Upstream queueing from the northbound approach of Essa Road/Bradford Street & Tiffin Street prevents northbound through vehicles from completing their movement as they would under free-flow conditions, leading to a LOS E.
 - **Essa Road/Bradford Street & Tiffin Street**
- Eastbound left (AM and PM peak hour): long queues generated by the eastbound through and right turn movement meter access to the eastbound left turn lane, leading to a LOS F.
- Eastbound through/right (AM and PM peak hour): the movement operates overcapacity (identified via the 2051 Future Background Synchro analysis), and also experiences additional delays due to upstream queueing from the eastbound approach of GO Station West Access/ Lakeshore Drive & Tiffin Street preventing eastbound through vehicles from completing their movement, and queueing along Essa Road preventing eastbound right vehicles from completing their movement. All of these factors contribute to a LOS F and queues that extend outside of the network. Since queues extend outside of the network, the full extent is unknown, and instead the presented queue value should be interpreted as being beyond Anne Street South.
- Westbound through (PM peak hour): Metering of arriving vehicles by upstream intersections allows the movement to operate better than what would be expected by the Synchro analysis (LOS F in 2051 Future Background Synchro, LOS B in VISSIM). This behavior is confirmed by comparing the VISSIM modelled hourly throughput value of 357 vehicles versus the assigned demand of 453 vehicles. However, due to the upstream intersections, vehicles arrive in platoons, causing queues to extend into the upstream intersection, GO Station West Access/ Lakeshore Drive & Tiffin Street before clearing.
- Northbound left/through/right (AM and PM peak hour): A combination of overcapacity operation (also present in the 2051 Future Background Synchro results, LOS F for both peak hours) and upstream effects from the eastbound approach of GO Station West Access/ Lakeshore Drive & Tiffin Street preventing northbound right turning vehicles from completing their movement leads to queueing that extends into the upstream intersection of Essa Road & Private Access/ South GO Station Access. Additionally, while performance is noted as a LOS E, the actual delay a vehicle would experience is higher, as the delay measurement is only taken from the upstream intersection to the stop bar, and vehicles would experience delays before reaching the upstream intersection which are influenced by the long queues generated by the northbound approach.

- Southbound left/through (AM and PM peak hour): A combination of overcapacity operation (also present in the 2051 Future Background Synchro results, LOS F for both peak hours) and upstream effects from the eastbound approach of GO Station West Access/ Lakeshore Drive & Tiffin Street preventing southbound left turning vehicles from completing their movement leads to a LOS F under both peak hours and extensive queueing under the PM peak hour.
- Southbound right (PM peak hour): Extensive queueing from the southbound left/through movement meters access to the southbound right turn lane, leading to a LOS F.
 - **GO Station West Access/ Lakeshore Drive & Tiffin Street**
- Eastbound left (AM and PM peak hour): Poor performance due to overcapacity operation leads to extensive queueing that extends into Essa Road/Bradford Street & Tiffin Street. Additionally, while performance is noted as a LOS E, the actual delay a vehicle would experience is higher, as the delay measurement is only taken from the upstream intersection to the stop bar, and vehicles would experience delays before reaching the upstream intersection which are influenced by the long queues generated by the eastbound approach.
- Eastbound through/right (AM and PM peak hour): Metering of arriving vehicles by upstream intersections allows the movement to operate better than what would be expected by the Synchro analysis (for both peak hours: LOS F in 2051 Future Background Synchro, LOS D in VISSIM). Due to the eastbound left queues and vehicles arriving in platoons from the upstream signalized intersection, queues extend into Essa Road/Bradford Street & Tiffin Street before clearing. However, if these were removed, queueing and LOS would likely still be critical, as identified by the Synchro analysis.
- Westbound through (AM and PM peak hour): Poor performance due to overcapacity operation leads to a LOS E, and queueing into the upstream intersection during the PM peak hour. This performance is also identified in the Synchro and SimTraffic (queueing) analysis.
- Westbound right (PM peak hour): Poor performance of the westbound through generates queues that extend beyond the westbound right turn auxiliary lane, leading to an overall westbound queue that extends into the upstream intersection.
- Southbound left (PM peak hour): Poor performance due to overcapacity operation leads to a LOS F and queueing beyond the modelled network limits. Accordingly, queues should be considered to be beyond John Street. This performance is expected, based on the Synchro results.
- Southbound through/right (PM peak hour): LOS F is due to extensive queueing generated by the poorly performing southbound left turn, metering access for all southbound movements. This performance is not predicted by the Synchro analysis (LOS B), however the SimTraffic results identify queues that align with this performance (queues that are equivalent to the southbound left and extend out of the modelled network).
 - **GO Station East Access & Lakeshore Drive**
- Westbound left (AM and PM peak hour): Critical performance is due to metered access resulting from extensive queueing generated by the poorly performing westbound through. This performance is not predicted by the Synchro analysis (LOS C/D), however the SimTraffic results identify queues that align with this performance (westbound through queues that extend out of the modelled network).
- Westbound through (AM and PM peak hour): Poor performance due to overcapacity operation leads to a LOS E and queueing out of the modelled network. Accordingly, queues should be

considered to be beyond 500 m upstream of the intersection. This performance is also predicted by the Synchro and SimTraffic analysis.

- Northbound left (AM and PM peak hour): Poor performance due to overcapacity operation leads to a LOS E.

Based on the number of critical movements and extensive queues, the operation of the Future Background network is considered unmanageable, a conclusion that concurs with the previously completed Synchro/SimTraffic analysis.

7.2.1. 2051 Future Background - GEH Statistics

To confirm that the modelled volumes are consistent with observed volumes, a GEH analysis was completed. The GEH Statistic is an empirical formula like the chi-squared test that is used in traffic modelling to compare two sets of traffic volumes. GEH is widely used as an acceptance criterion for travel demand forecasting and model calibration.

$$GEH = \sqrt{\frac{2(M - C)^2}{M + C}}$$

Where, M is the hourly simulated volume from the model, and C is the hourly demand from traffic counts.

According to the FHWA guidelines for microsimulation modelling, a GEH value of less than 5.0 for at least 85% of individual links are considered a good match between the simulated and observed hourly volumes. **Table 17** presents the GEH for the observed volumes vs. average simulated volumes of 10 runs, with values above 5.0 highlighted.

Table 17: GEH Statistics – 2051 Future Background

Intersection	Movement	2051 Future Background					
		AM Peak Hour			PM Peak Hour		
		Demand	Simulated Volume	GEH	Demand	Simulated Volume	GEH
Essa Road & Gowan Street (signalized)	WBL	8	8	0.00	11	4	2.56
	WBR	357	349	0.43	520	233	14.79
	NBT	374	381	0.36	476	493	0.77
	NBR	11	10	0.31	18	18	0.00
	SBL	288	280	0.47	407	267	7.63
	SBT	400	391	0.45	542	363	8.41
Essa Road & Private Access/ South GO Station Access (unsignalized)	EBL	14	13	0.27	7	6	0.39
	EBR	20	22	0.44	36	35	0.17
	NBL	23	23	0.00	29	21	1.60
	NBT	725	703	0.82	989	706	9.72
	NBR	0	3	2.45	0	3	2.45
	SBL	0	6	3.46	0	6	3.46

Intersection	Movement	2051 Future Background					
		AM Peak Hour			PM Peak Hour		
		Demand	Simulated Volume	GEH	Demand	Simulated Volume	GEH
	SBT	714	650	2.45	949	597	12.66
	SBR	8	7	0.37	2	1	0.82
Essa Road/Bradford Street & Tiffin Street (signalized)	EBL	117	82	3.51	80	42	4.87
	EBT	527	357	8.09	717	347	16.04
	EBR	154	109	3.92	170	84	7.63
	WBL	233	181	3.61	275	220	3.50
	WBT	455	360	4.71	453	357	4.77
	WBR	295	315	1.15	223	185	2.66
	NBL	125	118	0.64	177	124	4.32
	NBT	378	359	0.99	510	355	7.45
	NBR	252	236	1.02	335	230	6.25
	SBL	109	111	0.19	287	130	10.87
	SBT	370	371	0.05	545	290	12.48
	SBR	68	67	0.12	119	60	6.24
GO Station West Access/ Lakeshore Drive & Tiffin Street (signalized)	EBL	197	173	1.76	287	163	8.27
	EBT	592	514	3.32	970	541	15.61
	EBR	34	29	0.89	32	19	2.57
	WBL	0	0	0.00	0	0	0.00
	WBT	703	537	6.67	621	555	2.72
	WBR	1308	996	9.19	1026	907	3.83
	NBL	34	37	0.50	32	37	0.85
	NBT	0	0	0.00	0	0	0.00
	NBR	0	0	0.00	0	0	0.00
	SBL	823	825	0.07	1392	887	14.96
	SBT	0	0	0.00	0	0	0.00
	SBR	190	200	0.72	244	162	5.76
GO Station East Access & Lakeshore Drive (signalized)	EBT	1234	1168	1.90	2060	1259	19.66
	EBR	183	171	0.90	300	178	7.89
	WBL	103	76	2.85	36	30	1.04
	WBT	1840	1349	12.30	1474	1276	5.34
	NBL	170	169	0.08	175	172	0.23
	NBR	113	108	0.48	117	111	0.56

As can be seen from the above GEH statistics, a number of movements operate above what is considered a 'good match' based on the FHWA guidelines. This is an indication of a network operating overcapacity, with upstream effects metering arrivals, and poor performance preventing vehicles from

making their assigned movement within the simulation period. This conclusion is supported by the VISSIM performance metrics.

7.3. 2051 Ultimate Scenario – Intersection VISSIM Analysis

The modelled results of the 2051 Ultimate Scenario - Intersection VISSIM analysis are presented below and is followed by an associated discussion of: the results overall, comparison to the model's Synchro/SimTraffic counterpart results, critical movements in detail, and GEH statistic values.

Critical movements defined as and flagged in red when:

- LOS E or worse
- 95th percentile queues extending to an upstream intersection or out of the modelled VISSIM network

Table 18: 2051 Ultimate Scenario - Intersection: VISSIM Analysis

Intersection	Movement	Storage Length*	2051 Ultimate Scenario – Intersection					
			AM Peak Hour			PM Peak Hour		
			Delay (s)	LOS	95th Percentile Queue (m)	Delay (s)	LOS	95th Percentile Queue (m)
Essa Road & Gowan Street (signalized)	WBL/R	-	17.9	B	16	91.3	F	363
	NBT/R	-	16.0	B	21	34.9	C	49
	SBL	15	9.9	A	38	15.9	B	41
	SBT	-	7.0	A	36	7.9	A	40
	Total	-	10.4	B	-	35.0	D	-
Essa Road & Private Access/ South GO Station Access (unsignalized)	EBL/R	-	36.4	E	1	224.7	F	20
	NBL/T/R	-	6.3	A	0	39.8	E	50
	SBL	8	12.5	B	15	23.2	C	81
	SBT/R	-	5.1	A	12	18.2	C	74
	Total	-	4.4	A	-	19.3	C	-
Essa Road/Bradford Street & Tiffin Street (signalized)	EBL	65	19.6	B	13	45.6	D	16
	EBT/R	-	22.8	C	38	63.3	E	176
	WBL	50	21.6	C	26	129.0	F	159
	WBT	-	14.6	B	58	30.9	C	133
	WBR	100	0.7	A	0	2.4	A	0
	NBL/T/R	-	29.0	C	53	36.1	D	69
	SBL	80	38.7	D	16	74.1	E	56
	SBT/R	-	21.3	C	32	45.7	D	129

Intersection	Movement	Storage Length*	2051 Ultimate Scenario – Intersection					
			AM Peak Hour			PM Peak Hour		
			Delay (s)	LOS	95th Percentile Queue (m)	Delay (s)	LOS	95th Percentile Queue (m)
	Total	-	22.5	C	-	55.9	E	-
GO Station West Access/ Lakeshore Drive & Tiffin Street (signalized)	EBL	40	34.4	C	33	76.1	E	148
	EBT/R	-	16.0	B	39	25.8	C	148
	WBL	30	0.0	A	0	0.0	A	0
	WBT	-	63.2	E	302	139.3	F	305
	WBR	75	41.5	D	305	36.1	D	307
	NBL	-	44.3	D	23	79.9	E	24
	NBTR	-	0.0	A	0	0.0	A	0
	SBL	105	21.9	C	48	79.5	E	644
	SBT/R	-	7.6	A	4	122.1	F	617
	Total	-	34.8	C	-	66.9	E	-
GO Station East Access & Lakeshore Drive (signalized)	EBT	-	8.3	A	50	9.9	A	108
	EBR	40	4.8	A	1	7.8	A	1
	WBL	100	28.2	C	4	67.5	E	1
	WBT	-	46.1	D	382	83.0	F	496
	NBL	65	47.0	D	37	62.2	E	47
	NBR	65	9.2	A	1	14.3	B	3
	Total	-	29.3	C	-	38.5	D	-

*Storage length for VISSIM simulation is measured from the stop bar to a lane width of 2.7 m, and therefore differs from the Synchro modelled storage which measures from the stop bar to the end of the full lane width/beginning of taper.

The VISSIM analysis results overall differ to an extent with the operation predicted by Synchro but align with the SimTraffic performance presented in **Section 6.4**. The conclusion being that the network operation is greatly improved, but some movements still operate overcapacity, with long queues causing upstream effects at surrounding intersections. A detailed discussion of how upstream effects alter the performance of a micro-simulated network can be found following the presented VISSIM performance metrics in **Section 7.2**.

The following movements from this simulation are critical, or require additional discussion to reconcile with the Synchro results:

- **Essa Road & Gowan Street**
 - Westbound left/right (PM peak hour): Upstream queueing from the northbound approach of Essa Road/Bradford Street & Tiffin Street prevents westbound right vehicles from completing their movement as they would under free-flow conditions, leading to a LOS F.
- **Essa Road & Private Access/South GO Station**

- Eastbound left/right (AM and PM peak hour): Queueing in both directions on Essa Road prevents left turning traffic from finding gaps quickly, leading to a LOS E during the AM peak hour and LOS F during the PM peak hour.
- Northbound left/through/right (PM peak hour): Upstream queueing from the northbound approach of Essa Road/Bradford Street & Tiffin Street prevents northbound through vehicles from completing their movement as they would under free-flow conditions, leading to a LOS E.
 - **Essa Road/Bradford Street & Tiffin Street**
- Eastbound through/right (PM peak hour): the movement operates overcapacity, differing slightly from the Synchro predicted performance (LOS D vs VISSIM LOS E). This is due to the movement experiencing additional delays due to upstream queueing from the eastbound approach of GO Station West Access/ Lakeshore Drive & Tiffin Street preventing eastbound through vehicles from completing their movement, and queueing along Essa Road preventing eastbound right vehicles from completing their movement. The reported 95th percentile VISSIM queues of 176 m are similar to the reported 95th percentile SimTraffic queues of 190 m, indicating consistent performance.
- Westbound left (PM peak hour): the movement is critical due to a combination of factors: at capacity performance (Synchro indicates a v/c ratio of 0.95, LOS E), queueing on Essa Road preventing westbound left turning traffic from completing their movement, and platoons of arrivals due to the close proximity upstream signalized intersection. This leads to a LOS F and queues that extend into GO Station West Access/ Lakeshore Drive & Tiffin Street
- Westbound through (PM peak hour): Due to the poor performance of the westbound left and platoons of arrivals from the close proximity upstream intersection, the westbound through experiences queues that extend into the upstream intersection before clearing.
- Southbound left (PM peak hour): A combination of high-volume operation (Synchro predicts a LOS of D) and upstream effects from the eastbound approach of GO Station West Access/ Lakeshore Drive & Tiffin Street preventing southbound left turning vehicles from completing their movement leads to a LOS E during the PM peak hour. However, the 95th percentile queues remain within the storage length, and can be considered manageable.
 - **GO Station West Access/ Lakeshore Drive & Tiffin Street**
- Eastbound left (PM peak hour): Poor performance due to overcapacity operation leads to queueing that extends into Essa Road/Bradford Street & Tiffin Street. The VISSIM LOS of E is in line with the Synchro LOS of E.
- Eastbound through/right (PM peak hour): Queues extend into Essa Road/Bradford Street & Tiffin Street due to queueing from the eastbound left lane storage into the general-purpose lanes. VISSIM LOS of C is acceptable and in line with the Synchro LOS of C.
- Westbound through (AM and PM peak hour): Upstream queueing from the westbound approach of Essa Road/Bradford Street & Tiffin Street prevents westbound through vehicles from completing their movement. This leads to a LOS E and F during the AM and PM peak hour respectively, and queues extending into the upstream intersection during the PM peak hour.
- Westbound right (PM peak hour): Poor performance of the westbound through generates queues that extend beyond the westbound right turn auxiliary lane, leading to an overall westbound queue that extends into the upstream intersection.

- Northbound left (PM peak hour): Upstream queueing from the westbound approach of Essa Road/Bradford Street & Tiffin Street prevents northbound left movements from completing their movement. This reduces performance to a LOS of E during the PM peak hour.
- Southbound left (PM peak hour): Even though the southbound left performance is greatly improved by the implementation of a dual left turn, with delay reduced by half compared to the 2051 Future Background VISSIM results, any queueing causes shockwaves upstream along the southbound Lakeshore Drive because the road is at or above capacity for what a single lane can accommodate. Synchro estimates that the southbound saturated flow rate is 1568 vehicles per hour, compared to the 2051 Horizon southbound demand of 1636 vehicles per hour under PM peak hour conditions. Accordingly, any slowdown in traffic causes long queues that affect delays for southbound movements. SimTraffic results also indicate queues that extend outside of the network, confirming this explanation.

Synchro confirms that no further geometric improvement is required to the southbound left lanes, outputting a LOS D for this movement, with Synchro assuming all vehicles arrive at the stop bar without upstream delay.

Finally, as the VISSIM queues are outside of the modelled network, queues should be considered to be beyond John Street.

- Southbound through/right (PM peak hour): LOS F is due to extensive queueing caused by the over-capacity southbound one lane cross-section, metering access for all southbound movements. Synchro does not take this dynamic into account, which yields a LOS of C. However, SimTraffic results also indicate queues that extend outside of the network. Based on the observed simulation, no further geometric improvements at the intersection are required, arrivals are the constraint.

- **GO Station East Access & Lakeshore Drive**

- Westbound left (PM peak hour): LOS F is due to metered access resulting from extensive queueing along Lakeshore Drive westbound.
- Westbound through (PM peak hour): Alterations to the signal timing plan improve performance, however queueing from the westbound approach at GO Station West Access/ Lakeshore Drive & Tiffin Street extends into the intersection and prevents the westbound through vehicles from completing their movement, exacerbating queues and delays. Queues extend beyond the modelled network and should be considered to be beyond 500 m upstream of the intersection.
- Northbound left (PM peak hour): LOS E is due to overcapacity operation and queueing from the westbound approach at GO Station West Access/ Lakeshore Drive & Tiffin Street which extends into the intersection and prevents northbound left turning traffic from completing their movement.

Despite overcapacity movements, the proposed intersection does improve performance relative to the 2051 Future Background condition.

7.3.1. 2051 Ultimate Scenario – Intersection GEH Statistics

To confirm that the modelled volumes are consistent with observed volumes, a GEH analysis was completed. The GEH Statistic is an empirical formula like the chi-squared test that is used in traffic modelling to compare two sets of traffic volumes. GEH is widely used as an acceptance criterion for travel demand forecasting and model calibration.

$$GEH = \sqrt{\frac{2(M - C)^2}{M + C}}$$

Where, M is the hourly simulated volume from the model, and C is the hourly demand from traffic counts.

According to the FHWA guidelines for microsimulation modelling, a GEH value of less than 5.0 for at least 85% of individual links are considered a good match between the simulated and observed hourly volumes. **Table 19** presents the GEH for the observed volumes vs. average simulated volumes of 10 runs, with values above 5.0 highlighted.

Table 19: GEH Statistics – 2051 Ultimate Scenario – Intersection

Intersection	Movement	2051 Ultimate Scenario – Intersection					
		AM Peak Hour			PM Peak Hour		
		Observed Volume	SIM AVG	GEH	Observed Volume	SIM AVG	GEH
Essa Road & Gowan Street (signalized)	WBL	8	8	0.00	11	11	0.00
	WBR	357	356	0.05	520	507	0.57
	NBT	374	383	0.46	476	482	0.27
	NBR	11	10	0.31	18	18	0.00
	SBL	288	313	1.44	407	418	0.54
	SBT	400	442	2.05	542	574	1.35
Essa Road & Private Access/ South GO Station Access (unsignalized)	EBL	14	14	0.00	7	8	0.37
	EBR	20	23	0.65	36	37	0.17
	NBL	23	24	0.21	29	27	0.38
	NBT	725	712	0.48	989	960	0.93
	NBR	0	3	2.45	0	3	2.45
	SBL	0	5	3.16	0	5	3.16
	SBT	714	733	0.71	949	955	0.19
	SBR	8	7	0.37	2	2	0.00
Essa Road/Bradford Street & Tiffin Street (signalized)	EBL	117	113	0.37	80	79	0.11
	EBT	527	515	0.53	717	698	0.71
	EBR	154	158	0.32	170	173	0.23
	WBL	233	218	1.00	275	240	2.18
	WBT	455	432	1.09	453	395	2.82
	WBR	295	260	2.10	223	205	1.23
	NBL	125	120	0.45	177	167	0.76
	NBT	378	365	0.67	510	482	1.26
	NBR	252	239	0.83	335	314	1.17

Intersection	Movement	2051 Ultimate Scenario – Intersection					
		AM Peak Hour			PM Peak Hour		
		Observed Volume	SIM AVG	GEH	Observed Volume	SIM AVG	GEH
	SBL	109	109	0.00	287	277	0.60
	SBT	370	368	0.10	545	551	0.26
	SBR	68	67	0.12	119	116	0.28
GO Station West Access/ Lakeshore Drive & Tiffin Street (signalized)	EBL	197	206	0.63	287	282	0.30
	EBT	592	621	1.18	970	968	0.06
	EBR	34	35	0.17	32	31	0.18
	WBL	0	0	0.00	0	0	0.00
	WBT	703	691	0.45	621	583	1.55
	WBR	1308	1305	0.08	1026	984	1.32
	NBL	34	38	0.67	32	37	0.85
	NBT	0	0	0.00	0	0	0.00
	NBR	0	0	0.00	0	0	0.00
	SBL	823	832	0.31	1392	1232	4.42
	SBT	0	0	0.00	0	0	0.00
	SBR	190	199	0.65	244	219	1.64
GO Station East Access & Lakeshore Drive (signalized)	EBT	1234	1269	0.99	2060	1934	2.82
	EBR	183	184	0.00	300	273	0.00
	WBL	103	107	0.00	36	35	0.00
	WBT	1840	1830	0.23	1474	1414	1.58
	NBL	170	166	0.31	175	169	0.46
	NBR	113	107	0.57	117	111	0.56

As can be seen from the above GEH statistics, all movements have values within what is considered a 'good match' based on the FHWA guidelines. This further confirms the overall performance improvement associated with the proposed geometric changes, as it demonstrates that vehicle traffic is getting processed within the recorded peak hour.

7.4. 2051 Ultimate Scenario – Roundabout VISSIM Analysis

ARCADY is a specialized roundabout modeling software that relies on empirical data to assess the performance of roundabouts, as opposed to the VISSIM methodology which uses microsimulation and gap acceptance to determine performance.

However, because ARCADY is specialized exclusively to roundabouts, and is not a microsimulation, it cannot model the effect of altered arrival rates due to intersection performance or upstream effects due to poor performance elsewhere in the network.

To address this limitation and ensure that a full understanding of how the proposed roundabouts will affect the entire study area, roundabout performance was initially modelled in ARCADY, and the results

were used to calibrate VISSIM performance. The key VISSIM parameter to be edited was the gap acceptance time and was adjusted to calibrate 95th percentile VISSIM queues to their ARCADY counterpart. This calibration represents drivers becoming more aggressive in looking for gaps when a roundabout approaches capacity, which is observed behavior that serves as the basis for the ARCADY calculations but cannot be modelled via a gap acceptance time that does not dynamically change based on congestion.

The calibrated VISSIM results and ARCADY results for 2051 Ultimate Scenario – Roundabout are presented below and are followed by an associated discussion of: the results overall, comparison between the VISSIM and ARCADY results, discussion of critical movements in detail, and VISSIM GEH statistic values.

Critical movements defined as and flagged in red when:

- LOS E or worse
- 95th percentile queues extending to an upstream intersection or out of the modelled VISSIM network

Table 20: 2051 Ultimate Scenario - Roundabout: VISSIM Analysis

Intersection	Movement	Storage Length*	2051 Roundabouts					
			AM Peak Hour			PM Peak Hour		
			Delay (s)	LOS	95th Percentile Queue (m)	Delay (s)	LOS	95th Percentile Queue (m)
Essa Road & Gowan Street (signalized)	WBL/R	-	47.7	D	30	32.3	C	52
	NBT/R	-	6.6	A	12	24.6	C	37
	SBL/T	-	4.8	A	17	8.3	A	44
	Total	-	6.8	A	-	13.5	B	-
Essa Road & Private Access/ South GO Station Access (unsignalized)	EBL/R	-	13.3	B	1	17.3	C	1
	NBL/T/R	-	3.2	A	0	5.4	A	0
	SBL/T/R	-	11.0	B	0	15.2	C	16
	Total	-	1.3	A	-	4.5	A	-
Essa Road/Bradford Street & Tiffin Street (roundabout)	EBL/T/R	-	4.3	A	7	15.4	C	53
	WBL/T/R	-	5.2	A	10	6.9	A	11
	NBL/T/R	-	4.1	A	7	11.3	B	40
	SBL/T/R	-	4.8	A	6	12.4	B	39
	Total	-	3.3	A	-	8.5	A	-
GO Station West Access/ Lakeshore Drive & Tiffin	EBL/T/R	-	3.5	A	3	10.6	B	31
	WBL/T	-	11.5	B	0	5.4	A	2
	WBR	170	18.9	C	261	10.3	B	129
	NBL/T/R	-	14.5	B	0	32.0	D	1

Intersection	Movement	Storage Length*	2051 Roundabouts					
			AM Peak Hour			PM Peak Hour		
			Delay (s)	LOS	95th Percentile Queue (m)	Delay (s)	LOS	95th Percentile Queue (m)
Street (roundabout)	SBL/T/R	-	8.8	A	30	41.8	E	630
	Total	-	11.3	B	-	20.2	C	-
GO Station East Access & Lakeshore Drive (signalized)	EBT	-	8.6	A	42	10.6	B	155
	EBR	40	4.0	A	1	8.4	A	2
	WBL	100	14.4	B	4	29.9	C	1
	WBT	-	9.7	A	79	6.0	A	38
	NBL	65	32.8	C	29	44.1	D	38
	NBR	65	8.6	A	1	15.0	B	3
	Total	-	10.2	B	-	10.5	B	-

*Storage length for VISSIM simulation is measured from the stop bar to a lane width of 2.7 m, and therefore differs from the Synchro modelled storage which measures from the stop bar to the end of the full lane width/beginning of taper.

Table 21: 2051 Ultimate Scenario - Roundabout: ARCADY Analysis

Intersection	Movement	2051 Ultimate Scenario - Roundabout							
		AM Peak Hour				PM Peak Hour			
		V/C	Delay (s)	LOS	95th Percentile Queue (m)**	V/C	Delay (s)	LOS	95th Percentile Queue (m)**
Essa Road/Bradford Street & Tiffin Street (roundabout)	EBL/T/R	0.53	4.5	A	11	0.79	12.9	B	125
	WBL/T/R	0.62	5.4	A	16	0.64	6.2	A	19
	NBL/T/R	0.51	4.5	A	12	0.83	15.0	B	167
	SBL/T/R	0.38	3.7	A	21	0.69	7.8	A	26
	Total	-	4.6	A	-	-	10.6	B	-
GO Station West Access/ Lakeshore Drive & Tiffin Street (roundabout)	EBL/T/R	0.41	2.8	A	22	0.84	13.2	B	169
	WBL/T*	0.71	11.6	B	65	0.66	10.2	B	32
	NBL/T/R	0.04	4.2	A	4	0.22	29.4	D	8
	SBL/T/R	0.63	5.5	A	18	0.98	47.6	E	740
	Total	-	8.1	A	-	-	24.5	C	-

*ARCADY does not include volume assumed to take a bypass/channelization in the calculation of results.

** ARCADY outputs queues in passenger car lengths, converted to meters assuming 7.5 m per vehicle.

Table 22: 2051 Ultimate Scenario - Roundabout: ARCADY VISSIM Comparison

Intersection	Movement	AM Peak Hour	PM Peak Hour
--------------	----------	--------------	--------------

		ARCADY		VISSIM		ARCADY		VISSIM	
		LOS	95th Percentile Queue	LOS	95th Percentile Queue	LOS	95th Percentile Queue	LOS	95th Percentile Queue
Essa Road/Bradford Street & Tiffin Street (roundabout)	EBL/T/R	A	11	A	7	B	125	C	53
	WBL/T/R	A	16	A	10	A	19	A	11
	NBL/T/R	A	12	A	7	B	167	B	40
	SBL/T/R	A	21	A	6	A	26	B	39
	Total	A	-	A	-	B	-	A	-
GO Station West Access/ Lakeshore Drive & Tiffin Street (roundabout)	EBL/T/R	A	22	A	3	B	169	B	31
	WBL/T	B	65	B	0	B	32	A	2
	WBR	-	-	C	261	-	-	B	129
	NBL/T/R	A	4	B	0	D	8	D	1
	SBL/T/R	A	18	A	30	E	740	E	630
	Total	A	-	B	-	C	-	C	-

Given the previously stated differences between the VISSIM and ARCADY modelling methodologies, differences in the modelled results are inevitable. However, the overall conclusion of both models is the same – roundabout performance is good, with the exception of the southbound approach at GO Station West Access/ Lakeshore Drive & Tiffin Street. As proof of good calibration, all LOS measurements recorded in both models are the same or within one letter grade when compared to their counterpart. Additionally, the network’s critical queue (southbound approach at GO Station West Access/ Lakeshore Drive & Tiffin Street) is reflected in both models.

As discussed in **Section 7.4**, geometric improvements to the southbound approach at GO Station West Access/ Lakeshore Drive & Tiffin Street reveal that even when the approach itself can handle the assigned demand in theory (2051 Ultimate Scenario – Intersection Synchro LOS D during PM peak hour, see **Section 6.4**), the single southbound lane road that leads up to the approach has more assigned demand than its estimated saturation flow rate, leading to large shockwaves of queues resulting from typical temporary queueing that clears within a reasonable time period. These large shockwaves meter access to the approach and generate the long queues and delays recorded for southbound movements. ARCADY however does not include this limitation in its calculation, and so it is reasonable to assume that if this arrival rate bottleneck were relieved, the intersection would continue to operate with a LOS E, but based on the roundabout’s capacity, instead of the approaching roadway’s capacity. Additionally, queues would change from being outside of the modelled network with an unknown max length (as modelled by VISSIM, beyond John Street) to being a 95th percentile queue of 740 m.

Discrepancies in queueing between the ARCADY and VISSIM models on the:

- Northbound approach at Essa Road/Bradford Street & Tiffin Street
- Eastbound approach at GO Station West Access/ Lakeshore Drive & Tiffin Street
- Westbound left/through approach at GO Station West Access/ Lakeshore Drive & Tiffin Street

Can likely be attributed to the upstream VISSIM network altering the arrival rate of vehicles, which impacts performance and is not an operational characteristic that ARCADY accounts for. Further

evidence of this is that the LOS between the two models is the same or within one letter grade of each other. This shows that vehicles are processing through the roundabout at approximately the same rate.

The VISSIM analysis illustrates that the strong performance of the proposed roundabouts minimizes queueing and eliminates upstream effects that lead to poor performance of the surrounding intersections. Accordingly, the surrounding (non-roundabout) intersections operate with a LOS D or better. The roundabouts themselves operate with a LOS C or better, with the exception of the southbound approach at GO Station West Access/ Lakeshore Drive & Tiffin Street.

Between the three VISSIM modelled alternatives, the proposed roundabouts result in the best overall network LOS and a single critical movement. Accordingly, this alternative is preferred on an operational basis.

7.4.1. 2051 Ultimate Scenario – Roundabout GEH Statistics

To confirm that the modelled volumes are consistent with observed volumes, a GEH analysis was completed. The GEH Statistic is an empirical formula like the chi-squared test that is used in traffic modelling to compare two sets of traffic volumes. GEH is widely used as an acceptance criterion for travel demand forecasting and model calibration.

$$GEH = \sqrt{\frac{2(M - C)^2}{M + C}}$$

Where, M is the hourly simulated volume from the model, and C is the hourly demand from traffic counts.

According to the FHWA guidelines for microsimulation modelling, a GEH value of less than 5.0 for at least 85% of individual links are considered a good match between the simulated and observed hourly volumes. **Table 23** presents the GEH for the observed volumes vs. average simulated volumes of 10 runs, with values above 5.0 highlighted.

Table 23: GEH Statistics – 2051 Ultimate Scenario – Roundabout

Intersection	Movement	2051 Roundabouts					
		AM Peak Hour			PM Peak Hour		
		Observed Volume	SIM AVG	GEH	Observed Volume	SIM AVG	GEH
Essa Road & Gowan Street (signalized)	WBL	8	7	0.37	11	11	0.00
	WBR	357	351	0.32	520	505	0.66
	NBT	374	386	0.62	476	490	0.64
	NBR	11	11	0.00	18	19	0.23
	SBL	288	313	1.44	407	429	1.08
	SBT	400	443	2.09	542	582	1.69
Essa Road & Private	EBL	14	12	0.55	7	7	0.00
	EBR	20	21	0.22	36	36	0.00

Intersection	Movement	2051 Roundabouts					
		AM Peak Hour			PM Peak Hour		
		Observed Volume	SIM AVG	GEH	Observed Volume	SIM AVG	GEH
Access/South GO Station Access (unsignalized)	NBL	23	22	0.21	29	26	0.57
	NBT	725	714	0.41	989	966	0.74
	NBR	0	3	2.45	0	3	2.45
	SBL	0	5	3.16	0	5	3.16
	SBT	714	734	0.74	949	975	0.84
	SBR	8	8	0.00	2	2	0.00
Essa Road/Bradford Street & Tiffin Street (roundabout)	EBL	117	114	0.28	80	81	0.11
	EBT	527	509	0.79	717	696	0.79
	EBR	154	156	0.16	170	174	0.30
	WBL	233	220	0.86	275	260	0.92
	WBT	455	425	1.43	453	429	1.14
	WBR	295	281	0.82	223	212	0.75
	NBL	125	118	0.64	177	166	0.84
	NBT	378	369	0.47	510	486	1.08
	NBR	252	240	0.77	335	320	0.83
	SBL	109	111	0.19	287	291	0.24
	SBT	370	439	3.43	545	666	4.92
	SBR	68	69	0.12	119	117	0.18
GO Station West Access/Lakeshore Drive & Tiffin Street (roundabout)	EBL	197	203	0.42	287	291	0.24
	EBT	592	621	1.18	970	986	0.51
	EBR	34	35	0.17	32	31	0.18
	WBL	0	0	0.00	0	0	0.00
	WBT	703	690	0.49	621	617	0.16
	WBR	1308	1310	0.06	1026	1025	0.03
	NBL	34	37	0.50	32	36	0.69
	NBT	0	0	0.00	0	0	0.00
	NBR	0	0	0.00	0	0	0.00
	SBL	823	831	0.28	1392	1398	0.16
	SBT	0	0	0.00	0	0	0.00
	SBR	190	197	0.50	244	249	0.32
GO Station East Access & Lakeshore	EBT	1234	1266	0.91	2060	2098	0.83
	EBR	183	185	0.15	300	295	0.29
	WBL	103	105	0.20	36	36	0.00
	WBT	1840	1818	0.51	1474	1466	0.21

Intersection	Movement	2051 Roundabouts					
		AM Peak Hour			PM Peak Hour		
		Observed Volume	SIM AVG	GEH	Observed Volume	SIM AVG	GEH
Drive (signalized)	NBL	170	170	0.00	175	173	0.15
	NBR	113	106	0.67	117	109	0.75

As can be seen from the above GEH statistics, all movements have values within what is considered a 'good match' based on the FHWA guidelines. This further confirms the overall performance improvement associated with the proposed roundabouts, as it demonstrates that vehicle traffic is getting processed within the recorded peak hour. The average GEH value of 0.65 is lower than the 2051 Ultimate Scenario – Intersection average GEH value of 0.73. This is further evidence that the overall network performance of the proposed roundabouts is better, as assigned demand is being processed more accurately than the proposed intersection scenario, which is a sign of lower delay in drivers completing their desired movement.

8. Conclusions

A traffic operational analysis of the Barrie waterfront area was conducted in Synchro and SimTraffic to investigate traffic operations for the existing conditions and three future horizons considering the additional volumes generated by the expanded Allandale GO Station and the approved developments in the study area. Based on the observations generated from this analysis, further microsimulation analysis was conducted using VISSIM to investigate the performance of proposed future alternatives.

The following main observations were made:

- Under the existing conditions, the traffic operation at all signalized intersections is within the acceptable range (LOS D or better).
- Under the existing conditions, at GO Station West Access/Lakeshore Drive & Tiffin Street intersection, only the southbound left turn 95th percentile queue length extends to the upstream intersection during the PM peak hour.
- Under the 2031 future conditions, all study area intersections are expected to operate well at a LOS D or better except for the GO Station West Access/Lakeshore Drive & Tiffin Street intersection during the PM peak hour (LOS E). However, Toronto Street & Simcoe Street and GO Station West Access/Lakeshore Drive & Tiffin Street intersections are expected to operate over capacity;
- Under the 2031 future conditions, the 95th percentile queue length extends to the upstream intersection for six intersection approaches compared to only one in the existing conditions;
- The 4+1 lane improvements planned for Tiffin Street in the City's TMP are recommended by the 2031 horizon year;
- The 4+1 lane improvements planned for Bradford Street in the City's TMP are recommended by the 2041 horizon year;
- Under the 2041 future conditions, all study area intersections are expected to operate well at a LOS D or better except for the GO Station West Access/Lakeshore Drive & Tiffin Street intersection during the PM peak hour (LOS E) and Toronto Street & Simcoe Street during the PM peak hour (LOS E);
- Under the 2041 future conditions, the 95th percentile queue length extends to the upstream intersection for five intersection approaches compared to six in the 2031 future conditions;
- Under the 2051 future conditions, all study area intersections are expected to operate well at a LOS D or better except for the GO Station West Access/Lakeshore Drive & Tiffin Street intersection during the AM and PM peak hour (LOS E and F respectively), Toronto Street & Simcoe Street during the PM peak hour (LOS F) and Essa Road/Bradford Street & Tiffin Street during the PM peak hour (LOS E);
- Under the 2051 future conditions, the 95th percentile queue length extends to the upstream intersection for five intersection approaches;
- At High Street & Dunlop Street West, the critical movement is the westbound left/through during both peak hours;
- At Toronto Street & Simcoe Street, the critical movement is the westbound left turn during both peak hours;
- At Essa Road/Bradford Street & Tiffin Street, the critical movements are the westbound left turn and the southbound left turn during the PM peak hour;

- At GO Station East Access & Lakeshore Drive, the critical movement is the northbound left turn during both peak hours;
- At GO Station West Access/Lakeshore Drive & Tiffin Street, the critical movements are the eastbound left turn and the southbound left turn during both peak hours; and
- Recommend dual southbound left-turn lanes at both Essa Road/Bradford Street & Tiffin Street and GO Station West Access/ Lakeshore Drive & Tiffin Street intersections to address the 2041 and 2051 future total capacity issues.
- Recommend microsimulation analysis to investigate the performance of the recommended intersection geometric improvements, and a proposed roundabout alternative.

Overall, beginning in the 2031 horizon year, the future planned road network is expected to experience capacity constraints as a result of the expanded Allandale GO Station and planned developments. The operational impacts identified in this study can be somewhat mitigated by monitoring traffic for opportunities for signal optimization and implementing new signal phasing. Further monitoring is recommended to ensure that traffic operations across the waterfront area remains within an acceptable range, and to identify further corrective measures as required.

More detailed analysis of the Tiffin Street/Bradford Street/Essa Road, Tiffin Street/Lakeshore Drive/East GO Access, Lakeshore Drive/West GO Access, and Essa Road/Gowan Street intersections was required to develop alternative solutions to address the traffic issues identified in this report was undertaken based on the above stated conclusions. This detailed analysis was conducted using VISSIM, with ARCADY being used to calibrate the VISSIM model when roundabouts were being simulated.

The result was three models, 2051 Future Background, and two proposed alternatives:

- 2051 Future Background: based on the 2051 Future Background demand and geometry presented in Section 6.3.
- 2051 Ultimate Scenario – Intersection: alterations to the intersection of Essa Road/Bradford Street & Tiffin Street and GO Station West Access/ Lakeshore Drive & Tiffin Street to add additional capacity in the form of southbound dual left lanes, based on the recommendations identified by the Synchro and SimTraffic analysis.
- 2051 Ultimate Scenario – Roundabout: conversion of the intersection of Essa Road/Bradford Street & Tiffin Street and GO Station West Access/Lakeshore Drive & Tiffin Street to two lane roundabouts.

Based on the VISSIM results, the operationally preferred alternative is the 2051 Ultimate Scenario – Roundabout which alleviates all critical movements with one exception that operates at a LOS E. The 2051 Ultimate Scenario – Intersection is an improvement compared to the 2051 Future Background scenario; however, it continues to result in extensive study area queueing and multiple LOS E and F movements.

A

Appendix A: Turning Movement Counts & Signal Timing Plans

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 6:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Barrie

Site #: 1807000006

Intersection: Essa Rd & Gowan St

TFR File #: 1

Count date: 20-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Essa Rd runs N/S

North Leg Total: 859

North Entering: 365

North Peds: 3

Peds Cross: $\bowtie$

Heavys	0	0	0	0
Trucks	0	20	2	22
Cars	0	207	136	343
Totals	0	227	138	



Heavys 0

Trucks 20

Cars 474

Totals 494

East Leg Total: 329

East Entering: 186

East Peds: 9

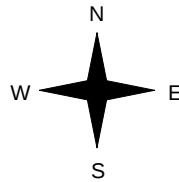
Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	0	0	0



Private lot

Heavys	Trucks	Cars	Totals
0	0	0	0
0	0	0	0
0	0	1	1
0	0	1	



Essa Rd

Essa Rd

Cars	Trucks	Heavys	Totals
179	3	0	182
0	0	0	0
4	0	0	4
183	3	0	

Gowan St



Cars	Trucks	Heavys	Totals
140	3	0	143

Peds Cross: $\bowtie$

West Peds: 1

West Entering: 1

West Leg Total: 1

Cars	212
Trucks	20
Heavys	0
Totals	232



Cars	0	295	4	299
Trucks	0	17	1	18
Heavys	0	0	0	0
Totals	0	312	5	

Peds Cross: $\bowtie$

South Peds: 2

South Entering: 317

South Leg Total: 549

Comments

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 6:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Barrie

Site #: 1807000008

Intersection: Essa Rd & Tiffin St

TFR File #: 1

Count date: 20-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Essa Rd runs N/S

North Leg Total: 661

North Entering: 282

North Peds: 2

Peds Cross: $\bowtie$

	Heavys	Trucks	Cars	Totals
North	0	0	0	0
West	1	16	0	17
East	34	198	33	265
Totals	35	214	33	



	Heavys	Trucks	Cars	Totals
North	0	10	369	379

East Leg Total: 612

East Entering: 281

East Peds: 7

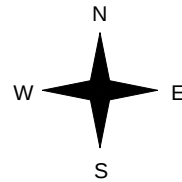
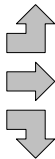
Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	7	270	277



Tiffin St

Heavys	Trucks	Cars	Totals
0	1	59	60
0	1	196	197
0	7	60	67
0	9	315	



Essa Rd



Cars	Trucks	Heavys	Totals
1	0	0	1
182	5	0	187
84	9	0	93
267	14	0	

Tiffin St



Cars	Trucks	Heavys	Totals
330	1	0	331

Peds Cross: $\bowtie$

West Peds: 1

West Entering: 324

West Leg Total: 601

	Cars	Trucks	Heavys	Totals
West	342	32	0	374
North	54	1	0	55
East	309	9	0	318
South	101	0	0	101
Totals	464	10	0	



Peds Cross: $\bowtie$

South Peds: 1

South Entering: 474

South Leg Total: 848

Comments

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 6:00:00

To: 9:00:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Barrie

Site #: 1807000010

Intersection: Lakeshore Dr & GO Access

TFR File #: 1

Count date: 20-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Lakeshore Dr runs W/E

East Leg Total: 1552

East Entering: 927

East Peds: 0

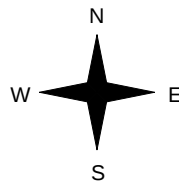
Peds Cross: X

Heavys	Trucks	Cars	Totals
0	5	922	927



Lakeshore Dr

Heavys	Trucks	Cars	Totals
0	10	613	623
0	0	1	1
0	10	614	



GO Access

Cars	Trucks	Heavys	Totals
919	5	0	924
3	0	0	3
922	5	0	



Lakeshore Dr

Cars	Trucks	Heavys	Totals
615	10	0	625

Peds Cross: X
West Peds: 0
West Entering: 624
West Leg Total: 1551

Cars	4
Trucks	0
Heavys	0
Totals	4



Cars	3	2	5
Trucks	0	0	0
Heavys	0	0	0
Totals	3	2	

Peds Cross: X
South Peds: 0
South Entering: 5
South Leg Total: 9

Comments

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 6:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Barrie
Site #: 1807000009
Intersection: Lakeshore Dr & Tiffin St
TFR File #: 1
Count date: 20-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Lakeshore Dr runs W/E

North Leg Total: 1223

North Entering: 485

North Peds: 2

Peds Cross: $\bowtie$

Heavys	0	0	0	0
Trucks	3	0	6	9
Cars	90	1	385	476
Totals	93	1	391	



Heavys	0
Trucks	5
Cars	733
Totals	738

East Leg Total: 1548
 East Entering: 939
 East Peds: 4
 Peds Cross: $\bowtie$

Heavys	0
Trucks	18
Cars	385
Totals	403

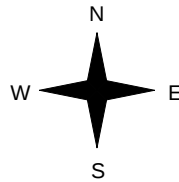
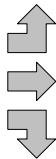


Tiffin St



Lakeshore Dr

Heavys	0
Trucks	1
Cars	93
Totals	94
Heavys	0
Trucks	0
Cars	216
Totals	216
Heavys	0
Trucks	0
Cars	5
Totals	5
Heavys	0
Trucks	1
Cars	314
Totals	314



Cars	640
Trucks	4
Heavys	0
Totals	644
Cars	292
Trucks	2
Heavys	0
Totals	294
Cars	1
Trucks	0
Heavys	0
Totals	1
Cars	933
Trucks	6
Heavys	0
Totals	939

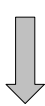
Lakeshore Dr



Cars	603
Trucks	6
Heavys	0
Totals	609

Peds Cross: $\bowtie$
 West Peds: 0
 West Entering: 315
 West Leg Total: 718

Cars	7
Trucks	0
Heavys	0
Totals	7



Cars	3
Trucks	13
Heavys	0
Totals	16
Cars	0
Trucks	0
Heavys	0
Totals	0
Cars	2
Trucks	0
Heavys	0
Totals	2
Cars	5
Trucks	0
Heavys	0
Totals	5

Peds Cross: $\bowtie$
 South Peds: 1
 South Entering: 18
 South Leg Total: 25

Comments



Turning Movement Count (3 . DUNLOP ST & HIGH ST / BRADFORD ST)

Start Time	N Approach HIGH ST						E Approach DUNLOP ST						S Approach BRADFORD ST						W Approach DUNLOP ST						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	1	3	0	0	2	4	4	47	14	0	5	65	24	5	10	0	5	39	13	27	3	0	0	43	151		
07:15:00	4	2	3	0	3	9	0	35	16	0	3	51	18	3	7	0	3	28	15	30	5	0	2	50	138		
07:30:00	2	7	3	0	2	12	2	56	16	0	3	74	22	7	16	0	4	45	18	46	1	0	1	65	196		
07:45:00	2	9	3	0	2	14	4	63	20	0	5	87	24	10	11	0	6	45	20	59	2	0	0	81	227	712	
08:00:00	4	9	2	0	5	15	3	48	12	0	2	63	32	11	18	0	3	61	20	64	3	0	3	87	226	787	
08:15:00	2	8	2	0	5	12	2	48	17	0	4	67	34	16	17	0	2	67	22	73	2	0	4	97	243	892	
08:30:00	3	8	1	0	2	12	2	59	26	0	5	87	30	15	16	0	3	61	25	66	4	0	6	95	255	951	
08:45:00	4	9	1	0	6	14	3	57	23	0	5	83	41	13	17	0	6	71	38	86	4	0	3	128	296	1020	
09:00:00	1	9	5	0	2	15	6	63	16	0	3	85	31	14	23	0	2	68	27	92	4	0	4	123	291	1085	
09:15:00	1	8	2	0	2	11	3	64	17	0	5	84	29	15	25	0	5	69	32	75	4	0	8	111	275	1117	
09:30:00	1	14	1	0	6	16	3	69	15	0	5	87	34	16	15	0	4	65	31	62	4	0	5	97	265	1127	
09:45:00	1	13	2	0	6	16	1	57	23	0	5	81	28	6	20	0	6	54	18	75	4	0	6	97	248	1079	
BREAK																											
15:00:00	1	12	2	0	2	15	6	80	24	0	5	110	39	23	35	0	4	97	22	100	3	0	3	125	347		
15:15:00	6	14	5	0	8	25	8	85	16	0	4	109	33	22	23	0	7	78	21	86	2	0	3	109	321		
15:30:00	4	15	3	0	5	22	2	85	32	0	1	119	42	17	30	0	4	89	17	93	2	0	4	112	342		
15:45:00	1	12	2	0	6	15	7	89	30	0	4	126	38	14	30	0	8	82	28	110	0	0	3	138	361	1371	
16:00:00	3	12	3	0	9	18	1	71	27	0	6	99	44	27	41	0	5	112	23	102	2	0	6	127	356	1380	
16:15:00	5	13	7	0	11	25	6	76	21	0	2	103	47	31	36	0	5	114	24	107	2	0	5	133	375	1434	
16:30:00	2	22	1	0	5	25	5	82	31	0	3	118	35	28	39	0	11	102	25	94	0	0	2	119	364	1456	
16:45:00	3	21	4	0	14	28	5	68	37	0	2	110	44	26	27	0	6	97	26	123	4	0	7	153	388	1483	
17:00:00	5	26	1	0	9	32	7	102	25	0	0	134	40	25	45	0	3	110	21	102	0	0	10	123	399	1526	
17:15:00	3	25	1	0	7	29	2	77	27	0	4	106	41	22	29	0	6	92	32	92	2	0	4	126	353	1504	
17:30:00	4	10	4	0	11	18	6	64	22	0	0	92	42	18	31	0	4	91	21	98	7	0	2	126	327	1467	
17:45:00	1	11	5	0	6	17	3	83	11	0	2	97	36	25	24	0	14	85	20	96	1	0	6	117	316	1395	
18:00:00	7	7	3	0	5	17	7	58	24	0	3	89	32	13	30	0	4	75	25	79	4	0	3	108	289	1285	
18:15:00	6	5	3	0	6	14	1	56	17	0	4	74	29	14	27	0	2	70	24	97	1	0	2	122	280	1212	
18:30:00	4	5	1	0	5	10	8	69	14	0	1	91	33	19	17	0	1	69	11	78	5	0	3	94	264	1149	
18:45:00	3	9	2	0	6	14	8	69	17	0	1	94	25	19	21	0	2	65	15	77	3	0	4	95	268	1101	
Grand Total	84	318	72	0	158	474	115	1880	590	0	92	2585	947	474	680	0	135	2101	634	2289	78	0	109	3001	8161	-	
Approach%	17.7%	67.1%	15.2%	0%	-	-	4.4%	72.7%	22.8%	0%	-	-	45.1%	22.6%	32.4%	0%	-	-	21.1%	76.3%	2.6%	0%	-	-	-	-	

June 04, 2021

File: T07-SI

Brett Gratrix
City of Barrie
70 Collier Street
Barrie, ON L4M 4T5

Dear Mr. Gratrix,

RE: **Traffic Signal Timings**

With respect to your inquiry on May 6, 2021, attached are the Signal Timings for the following intersections:

- Toronto Street & Grand Harbour Condo Entrance (Address of 2 Toronto Street)
- Simcoe Street & Toronto Street
- Bradford Street/ High Street & Dunlop Street
- Bradford Street & Simcoe Street
- Bradford Street & Victoria Street
- Bradford Street/ Essa Road & Tiffin Street
- Essa Road & Gowan Street
- Lakeshore Drive & Tiffin Street
- Lakeshore Drive & Go Station East Access

Signalized Intersections within the City of Barrie function as a semi-actuated; meaning the signals remain green on the major road/ main street until a vehicle is detected on the minor road/ side street or a pedestrian pushes the pushbutton to activate the pedestrian phase.

Vehicles on the minor road/side street are detected by electromagnetic wires, which are embedded in the pavement on the side street near the painted stop bar. Vehicle presence only on the side street would result in a possible green time of between the minimum and maximum times, as noted, depending on vehicle demand detected.

Pedestrians must push the pedestrian push button to be detected. Pedestrian "Walk" and "Flashing Don't Walk" times on the side street, as noted, would be used in the event that the pedestrian push button was activated.

If you require any further information please feel free to contact me at (705) 739-4220 ext. 4937.

Sincerely,

A handwritten signature in blue ink that reads "Stephen Salis".

Stephen Salis, C.E.T.
Transportation Systems Technologist



Turning Movement Count Diagram

Intersection: Bradford Street and John Street

Municipality: Barrie, Ontario

Intersection ID:

Date: Tuesday October 17 2017

AM Peak Hour: 8:00 to 9:00

Bradford Street									
North Total 712					East Total 55				
North Entering 264	Cyclists	0	0	0	East Entering 25				
North Receiving 448	Truck	1	11	0	East Receiving 30				
North Peds 0	Cars	13	237	2	East Peds 9				
		↙	↓	↘					
John Street	0	1	16	↗	↖	3	0	1	
	0	1	10	→	←	9	1	0	
	0	1	11	↘	↙	11	0	0	
		↙	↑	↘					
West Total 78					South Total 729				
West Entering 40		0	21	1	South Entering 458				
West Receiving 38		0	0	0	South Receiving 271				
West Peds 2					South Peds 1				

MD Peak Hour: 12:15 to 13:15

Bradford Street									
North Total 698					East Total 59				
North Entering 313	Cyclists	0	1	0	East Entering 25				
North Receiving 385	Truck	2	10	0	East Receiving 34				
North Peds 1	Cars	18	279	3	East Peds 10				
John Street		←	↓	↘					
	1	0	16	↗	↖	6	0	0	
	1	1	5	→	←	9	1	0	
						9	0	0	
West Total 80		13	343	23	South Total 711				
West Entering 37		0	18	0	South Entering 399				
West Receiving 43		0	1	1	South Receiving 312				
West Peds 5					South Peds 3				

PM Peak Hour: 16:30 to 17:30

Bradford Street									
North Total 1099					East Total 47				
North Entering 576	Cyclists	0	1	0	East Entering 6				
North Receiving 523	Truck	0	11	0	East Receiving 41				
North Peds 0	Cars	19	540	5	East Peds 3				
John Street		←	↓	↘					
	0	0	34	↗	↖	1	0	1	
	0	0	13	→	←	1	0	0	
	0	0	45	↘	↙	3	0	0	
West Total 142		27	476	23	South Total 1140				
West Entering 92		1	10	0	South Entering 540				
West Receiving 50		2	1	0	South Receiving 600				
West Peds 4					South Peds 0				

Total 8-Hour Count

Bradford Street									
North Total 6098					East Total 433				
North Entering 2852	Cyclists	2	8	0	East Entering 187				
North Receiving 3246	Truck	6	102	1	East Receiving 246				
North Peds 6	Cars	156	2544	33	East Peds 41				
John Street		←	↓	↘					
	2	1	140	↗	↖	34	2	2	
	3	2	77	→	←	67	4	1	
	1	3	150	↘	↙	77	0	0	
					↖	↗	↘		
West Total 756					137	2945	124	South Total 6221	
West Entering 379					2	115	5	South Entering 3336	
West Receiving 377					2	5	1	South Receiving 2885	
West Peds 25					South Peds 18				



Turning Movement Count Diagram

Intersection: Bradford Street and Victoria Street

Municipality: Barrie, Ontario

Intersection ID:

Date: Tuesday October 17 2017

AM Peak Hour: 8:00 to 9:00

Bradford Street									
North Total 708					East Total 85				
North Entering 284	Cyclists	0	0	0	East Entering 45				
North Receiving 424	Truck	1	11	0	East Receiving 40				
North Peds 4	Cars	21	233	18	East Peds 3				
Victoria Street					Victoria Street				
0	0	8	↖		↗	17	0	0	
0	1	13	→		←	20	0	1	
0	1	9	↘		↙	7	0	0	
West Total 86					9	380	8	South Total 679	
West Entering 32					2	19	0	South Entering 418	
West Receiving 54					0	0	0	South Receiving 261	
West Peds 4								South Peds 1	

MD Peak Hour: 12:15 to 13:15

Bradford Street									
North Total 713					East Total 151				
North Entering 327	Cyclists	0	0	0	East Entering 75				
North Receiving 386	Truck	0	12	2	East Receiving 76				
North Peds 5	Cars	23	265	25	East Peds 6				
Victoria Street	0	0	14	↗	↖	28	1	0	
	1	1	29	→	←	28	0	0	
	0	1	9	↘	↙	18	0	0	
West Total 126		20	326	15	South Total 686				
West Entering 55		0	14	1	South Entering 381				
West Receiving 71		0	3	2	South Receiving 305				
West Peds 5					South Peds 2				

PM Peak Hour: 16:30 to 17:30

Bradford Street										
North Total 1086					East Total 131					
North Entering 583	Cyclists	0	1	0	East Entering 65					
North Receiving 503	Truck	1	15	0	East Receiving 66					
North Peds 6	Cars	17	531	18	East Peds 2					
Victoria Street	1	0	26	↗	↖ 19 0 0					
	1	0	26	→	← 28 0 1					
	0	0	24	↘	↙ 17 0 0					
West Total 147					22	444	21	South Total 1088		
West Entering 78					0	12	0	South Entering 500		
West Receiving 69					0	1	0	South Receiving 588		
West Peds 5								South Peds 5		

Total 8-Hour Count

Bradford Street									
North Total 6084					East Total 994				
North Entering 2890	Cyclists	2	7	0	East Entering 507				
North Receiving 3194	Truck	4	113	2	East Receiving 487				
North Peds 37	Cars	126	2496	140	East Peds 22				
Victoria Street					Victoria Street				
1	1	116	↖		↖	162	6	1	
4	3	204	→		←	202	1	7	
1	3	94	↘		↘	127	0	1	
West Total 906					South Total 6020				
West Entering 427		134	↖	↗	South Entering 3178				
West Receiving 479		3	107	4	South Receiving 2842				
West Peds 40		0	10	5	South Peds 27				

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 12:00:00

To: 14:00:00

One Hour Peak

From: 12:15:00

To: 13:15:00

Municipality: Barrie

Site #: 1807000006

Intersection: Essa Rd & Gowan St

TFR File #: 1

Count date: 20-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Essa Rd runs N/S

North Leg Total: 968

North Entering: 452

North Peds: 8

Peds Cross: 8

Heavys	0	0	0	0
Trucks	0	11	1	12
Cars	0	321	119	440
Totals	0	332	120	

Heavys 0

Trucks 18

Cars 498

Totals 516

East Leg Total: 313

East Entering: 188

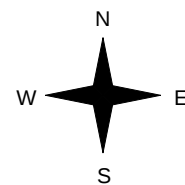
East Peds: 5

Peds Cross: 5

Heavys	Trucks	Cars	Totals
0	0	0	0

Private lot

Heavys	Trucks	Cars	Totals
0	0	0	0
0	0	0	0
0	0	2	2
0	0	2	



Essa Rd

Cars	Trucks	Heavys	Totals
178	1	0	179
0	0	0	0
9	0	0	9
187	1	0	

Gowan St



Cars	Trucks	Heavys	Totals
124	1	0	125

Peds Cross: 8

West Peds: 7

West Entering: 2

West Leg Total: 2

Cars	332	Cars	0	320	5	325
Trucks	11	Trucks	0	17	0	17
Heavys	0	Heavys	0	0	0	0
Totals	343	Totals	0	337	5	

Peds Cross: 5

South Peds: 4

South Entering: 342

South Leg Total: 685

Comments

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 12:00:00

To: 14:00:00

One Hour Peak

From: 12:15:00

To: 13:15:00

Municipality: Barrie

Site #: 1807000008

Intersection: Essa Rd & Tiffin St

TFR File #: 1

Count date: 20-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Essa Rd runs N/S

North Leg Total: 707

North Entering: 337

North Peds: 3

Peds Cross: $\bowtie$

Heavys	0	0	0	0
Trucks	1	12	1	14
Cars	39	249	35	323
Totals	40	261	36	



Heavys	0
Trucks	10
Cars	360
Totals	370

East Leg Total: 615

East Entering: 281

East Peds: 5

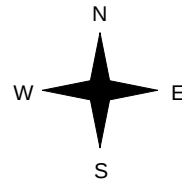
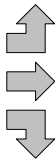
Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	10	238	248



Tiffin St

Heavys	Trucks	Cars	Totals
0	2	35	37
0	6	185	191
0	3	55	58
0	11	275	



Essa Rd



Cars	Trucks	Heavys	Totals
1	0	0	1
149	6	0	155
119	6	0	125
269	12	0	



Tiffin St



Cars	Trucks	Heavys	Totals
325	9	0	334

Peds Cross: $\bowtie$

West Peds: 4

West Entering: 286

West Leg Total: 534

Cars	423
Trucks	21
Heavys	0
Totals	444



Cars	50	324	105	479
Trucks	3	8	2	13
Heavys	0	0	0	0
Totals	53	332	107	

Peds Cross: $\bowtie$

South Peds: 1

South Entering: 492

South Leg Total: 936

Comments

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 12:00:00

To: 14:00:00

One Hour Peak

From: 13:00:00

To: 14:00:00

Municipality: Barrie
Site #: 1807000010
Intersection: Lakeshore Dr & GO Access
TFR File #: 1
Count date: 20-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Lakeshore Dr runs W/E

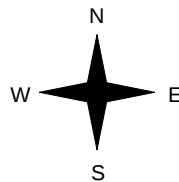
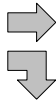
East Leg Total: 1333
 East Entering: 639
 East Peds: 0
 Peds Cross: X

Heavys	Trucks	Cars	Totals
0	10	630	640



Lakeshore Dr

Heavys	Trucks	Cars	Totals
0	14	679	693
0	0	0	0
0	14	679	



GO Access

Cars	Trucks	Heavys	Totals
629	10	0	639
0	0	0	0
629	10	0	



Lakeshore Dr

Cars	Trucks	Heavys	Totals
680	14	0	694

Peds Cross: X
 South Peds: 0
 South Entering: 2
 South Leg Total: 2

Peds Cross: X
 West Peds: 2
 West Entering: 693
 West Leg Total: 1333

Cars	0
Trucks	0
Heavys	0
Totals	0

Cars	1	1	2
Trucks	0	0	0
Heavys	0	0	0
Totals	1	1	

Comments

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 12:00:00

To: 14:00:00

One Hour Peak

From: 13:00:00

To: 14:00:00

Municipality: Barrie
Site #: 1807000009
Intersection: Lakeshore Dr & Tiffin St
TFR File #: 1
Count date: 20-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Lakeshore Dr runs W/E

North Leg Total: 1152

North Entering: 593

North Peds: 2

Peds Cross: $\bowtie$

	Heavys	Trucks	Cars	Totals
North	0	0	0	0
East	3	0	5	8
South	108	6	471	585
Totals	111	6	476	



	Heavys	Trucks	Cars	Totals
North	0	7	552	559
East	0	0	0	0
South	0	0	0	0
Totals	0	7	552	559

East Leg Total: 1334

East Entering: 639

East Peds: 2

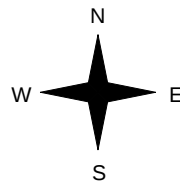
Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	21	315	336



Lakeshore Dr

Heavys	Trucks	Cars	Totals
0	1	126	127
0	7	209	216
0	0	3	3
0	8	338	



Tiffin St



Cars	Trucks	Heavys	Totals
426	5	0	431
203	5	0	208
0	0	0	0
629	10	0	

Lakeshore Dr



Cars	Trucks	Heavys	Totals
683	12	0	695

Peds Cross: $\bowtie$

West Peds: 0

West Entering: 346

West Leg Total: 682

Cars	Trucks	Heavys	Totals
9	0	0	9
4	13	0	17
0	0	0	0
17	1	3	



Cars	Trucks	Heavys	Totals
4	0	3	7
13	1	0	14
0	0	0	0
17	1	3	

Peds Cross: $\bowtie$

South Peds: 0

South Entering: 21

South Leg Total: 30

Comments



Turning Movement Count
Location Name: DUNLOP ST & HIGH ST / BRADFORD ST
Date: Thu, Apr 25, 2019 Deployment Lead: David Chu

Crozier & Associates

Totals %	1%	3.9%	0.9%	0%	5.8%	1.4%	23%	7.2%	0%	31.7%	11.6%	5.8%	8.3%	0%	25.7%	7.8%	28%	1%	0%	36.8%	-	-
Heavy	0	0	0	0	-	0	6	2	0	-	1	0	0	0	-	0	3	0	0	-	-	-
Heavy %	0%	0%	0%	0%	-	0%	0.3%	0.3%	0%	-	0.1%	0%	0%	0%	-	0%	0.1%	0%	0%	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Toronto Street & Grand Harbour Condo Entrance – FREE PLAN (NO COORDINATION)

Roadway	Direction	Vehicular Indications				Pedestrian Indications	
		Minimum Green	Maximum Green	Amber	All Red	Walk	Flashing Don't Walk
Toronto Street (main street)	Northbound	60	60	4	2	48	12
Toronto Street (main street)	Southbound	60	60	4	2	48	12
Condo Entrance (side street)	Eastbound	10	24	4	2	10	14
Marina Entrance (side street)	Westbound	10	10	4	2	10	14

NOTE: All times are recorded in seconds, based on full demand.

Simcoe Street & Toronto Street – FREE PLAN (NO COORDINATION)

Roadway	Direction	Vehicular Indications				Pedestrian Indications	
		Minimum Green	Maximum Green	Amber	All Red	Walk	Flashing Don't Walk
Simcoe Street (main street)	Advanced Westbound Left Turn	7	20	3	1	N/A	N/A
Simcoe Street (main street)	Eastbound	30	30	4	2	16	14
Simcoe Street (main street)	Westbound	30	30	4	2	16	14
Toronto Street (side street)	Advanced Northbound Left Turn	7	10	3	1	N/A	N/A
Toronto Street (side street)	Advanced Southbound Left Turn	7	10	3	1	N/A	N/A
Toronto Street (side street)	Northbound	10	30	4	2	12	16
Toronto Street (side street)	Southbound	10	30	4	2	12	16

NOTE: All times are recorded in seconds, based on full demand.

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Barrie

Site #: 1807000006

Intersection: Essa Rd & Gowan St

TFR File #: 1

Count date: 20-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Essa Rd runs N/S

North Leg Total: 1287

North Entering: 597

North Peds: 3

Peds Cross: $\bowtie$

Heavys	0	0	0	0
Trucks	0	13	2	15
Cars	1	372	209	582
Totals	1	385	211	



Heavys	0
Trucks	11
Cars	679
Totals	690

East Leg Total: 511

East Entering: 290

East Peds: 10

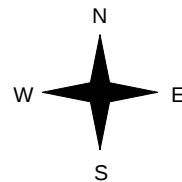
Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	0	1	1



Private lot

Heavys	Trucks	Cars	Totals
0	0	0	0
0	0	1	1
0	0	0	0
0	0	1	



Essa Rd



Cars	Trucks	Heavys	Totals
283	1	0	284
0	0	0	0
6	0	0	6
289	1	0	

Gowan St



Cars	Trucks	Heavys	Totals
219	2	0	221

Peds Cross: $\bowtie$

West Peds: 9

West Entering: 1

West Leg Total: 2

Cars	378
Trucks	13
Heavys	0
Totals	391



Cars	0	396	9	405
Trucks	0	10	0	10
Heavys	0	0	0	0
Totals	0	406	9	

Peds Cross: $\bowtie$

South Peds: 4

South Entering: 415

South Leg Total: 806

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Barrie

Site #: 1807000008

Intersection: Essa Rd & Tiffin St

TFR File #: 1

Count date: 20-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Essa Rd runs N/S

North Leg Total: 1045

North Entering: 577

North Peds: 4

Peds Cross: $\times$

Heavys	0	0	0	0
Trucks	1	15	0	16
Cars	61	380	120	561
Totals	62	395	120	



Heavys 0

Trucks 3

Cars 465

Totals 468

East Leg Total: 871

East Entering: 291

East Peds: 6

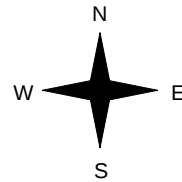
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
0	6	312	318



Tiffin St

Heavys	Trucks	Cars	Totals
0	1	40	41
0	4	311	315
0	3	76	79
0	8	427	



Essa Rd



Cars	Trucks	Heavys	Totals
0	0	0	0
174	3	0	177
106	8	0	114
280	11	0	

Tiffin St



Cars	Trucks	Heavys	Totals
576	4	0	580

Peds Cross: $\times$

West Peds: 2

West Entering: 435

West Leg Total: 753

Cars	562
Trucks	26
Heavys	0
Totals	588



Cars	77	425	145	647
Trucks	2	2	0	4
Heavys	0	0	0	0
Totals	79	427	145	

Peds Cross: $\times$

South Peds: 6

South Entering: 651

South Leg Total: 1239

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Barrie

Site #: 1807000010

Intersection: Lakeshore Dr & GO Access

TFR File #: 1

Count date: 20-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Lakeshore Dr runs W/E

East Leg Total: 1796

East Entering: 744

East Peds: 2

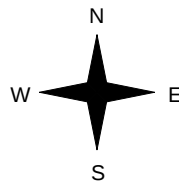
Peds Cross: 8

Heavys	Trucks	Cars	Totals
0	1	742	743



Lakeshore Dr

Heavys	Trucks	Cars	Totals
0	4	1044	1048
0	0	3	3
0	4	1047	



GO Access

Cars	Trucks	Heavys	Totals
740	1	0	741
3	0	0	3
743	1	0	



Lakeshore Dr



Cars	Trucks	Heavys	Totals
1048	4	0	1052

Peds Cross: 8
West Peds: 5
West Entering: 1051
West Leg Total: 1794

Cars	6
Trucks	0
Heavys	0
Totals	6



Cars	2	4	6
Trucks	0	0	0
Heavys	0	0	0
Totals	2	4	

Peds Cross: 2
South Peds: 1
South Entering: 6
South Leg Total: 12

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Barrie

Site #: 1807000009

Intersection: Lakeshore Dr & Tiffin St

TFR File #: 1

Count date: 20-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Lakeshore Dr runs W/E

North Leg Total: 1402

North Entering: 755

North Peds: 7

Peds Cross: $\bowtie$

Heavys	0	0	0	0
Trucks	1	0	1	2
Cars	107	21	625	753
Totals	108	21	626	

Heavys 0

Trucks 2

Cars 645

Totals 647

East Leg Total: 1807

East Entering: 758

East Peds: 3

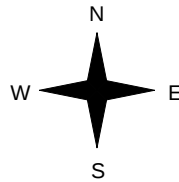
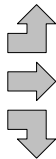
Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	16	364	380



Lakeshore Dr

Heavys	Trucks	Cars	Totals
0	1	140	141
0	2	419	421
0	0	15	15
0	3	574	



Tiffin St



Cars	Trucks	Heavys	Totals
504	1	0	505
251	0	0	251
2	0	0	2
757	1	0	



Lakeshore Dr



Cars	Trucks	Heavys	Totals
1046	3	0	1049

Peds Cross: $\bowtie$

West Peds: 0

West Entering: 577

West Leg Total: 957

Cars	38
Trucks	0
Heavys	0
Totals	38



Cars	6	1	2	9
Trucks	15	0	0	15
Heavys	0	0	0	0
Totals	21	1	2	

Peds Cross: $\bowtie$

South Peds: 3

South Entering: 24

South Leg Total: 62

Comments



Peak Hour: 08:45 AM - 09:45 AM Weather: Scattered Clouds (0.78 °C)

Start Time	N Approach HIGH ST						E Approach DUNLOP ST						S Approach BRADFORD ST						W Approach DUNLOP ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:45:00	4	9	1	0	6	14	3	57	23	0	5	83	41	13	17	0	6	71	38	86	4	0	3	128	296
09:00:00	1	9	5	0	2	15	6	63	16	0	3	85	31	14	23	0	2	68	27	92	4	0	4	123	291
09:15:00	1	8	2	0	2	11	3	64	17	0	5	84	29	15	25	0	5	69	32	75	4	0	8	111	275
09:30:00	1	14	1	0	6	16	3	69	15	0	5	87	34	16	15	0	4	65	31	62	4	0	5	97	265
Grand Total	7	40	9	0	16	56	15	253	71	0	18	339	135	58	80	0	17	273	128	315	16	0	20	459	1127
Approach%	12.5%	71.4%	16.1%	0%	-	-	4.4%	74.6%	20.9%	0%	-	-	49.5%	21.2%	29.3%	0%	-	-	27.9%	68.6%	3.5%	0%	-	-	-
Totals %	0.6%	3.5%	0.8%	0%	5%	5%	1.3%	22.4%	6.3%	0%	30.1%	30.1%	12%	5.1%	7.1%	0%	24.2%	24.2%	11.4%	28%	1.4%	0%	40.7%	40.7%	-
PHF	0.44	0.71	0.45	0	0.88	0.88	0.63	0.92	0.77	0	0.97	0.97	0.82	0.91	0.8	0	0.96	0.96	0.84	0.86	1	0	0.9	0.9	-
Heavy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	-
Heavy %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.6%	0%	0%	0%	0.4%	-
Lights	7	40	9	0	56	56	14	240	67	0	321	321	132	58	77	0	267	267	126	298	16	0	440	440	-
Lights %	100%	100%	100%	0%	100%	100%	93.3%	94.9%	94.4%	0%	94.7%	94.7%	97.8%	100%	96.3%	0%	97.8%	97.8%	98.4%	94.6%	100%	0%	95.9%	95.9%	-
Mediums	0	0	0	0	0	0	1	13	4	0	18	18	3	0	3	0	6	6	2	15	0	0	17	17	-
Mediums %	0%	0%	0%	0%	0%	0%	6.7%	5.1%	5.6%	0%	5.3%	5.3%	2.2%	0%	3.8%	0%	2.2%	2.2%	1.6%	4.8%	0%	0%	3.7%	3.7%	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.6%	0%	0%	0%	0.4%	-
Pedestrians	-	-	-	-	16	-	-	-	-	-	18	-	-	-	-	-	17	-	-	-	-	-	20	-	-
Pedestrians%	-	-	-	-	22.5%	-	-	-	-	-	25.4%	-	-	-	-	-	23.9%	-	-	-	-	-	28.2%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Bradford Street/ High Street & Dunlop Street – FREE PLAN (NO COORDINATION)

Roadway	Direction	Vehicular Indications				Pedestrian Indications	
		Minimum Green	Maximum Green	Amber	All Red	Walk	Flashing Don't Walk
Dunlop Street (main street)	Advanced Westbound Left Turn	7	7	3	1	N/A	N/A
Dunlop Street (main street)	Eastbound	24	24	4	2	12	12
Dunlop Street (main street)	Westbound	24	24	4	2	12	12
Bradford Street (side street)	Advanced Northbound Left Turn	7	7	3	1	N/A	N/A
Bradford Street (side street)	Northbound	10	24	4	2	9	12
High Street (side street)	Southbound	10	24	4	2	9	12

NOTE: All times are recorded in seconds, based on full demand.

Bradford Street/ High Street & Dunlop Street – AM WEEKDAY PLAN (6:30AM – 9:00AM)

Roadway	Direction	Split Timings (Including Amber + All Red)
Dunlop Street (main street)	Advanced Westbound Left Turn	10
Dunlop Street (main street)	Eastbound	32
Bradford Street (side street)	Westbound	42
Bradford Street (side street)	Advanced Northbound Left Turn	10
High Street (side street)	Northbound	33
Dunlop Street (main street)	Southbound	23
Total Cycle Length		75

NOTE: All times are recorded in seconds, based on full demand.

Refer to the FREE PLAN for the Walk and Flashing Don't Walk Timings

Ontario Traffic Inc.

Total Count Diagram

Municipality: Barrie
Site #: 1807000006
Intersection: Essa Rd & Gowan St
TFR File #: 1
Count date: 20-Feb-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Essa Rd runs N/S

North Leg Total: 7330
 North Entering: 3489
 North Peds: 30
 Peds Cross: $\bowtie$

	Heavys	Trucks	Cars	Totals
North	0	0	0	0
East	0	106	10	116
South	4	2204	1165	3373
Totals	4	2310	1175	

Heavys 0
 Trucks 124
 Cars 3717
 Totals 3841

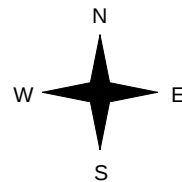
East Leg Total: 2848
 East Entering: 1615
 East Peds: 61
 Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	0	8	8



Private lot

Heavys	Trucks	Cars	Totals
0	0	4	4
0	0	2	2
0	0	7	7
0	0	13	



Essa Rd



Cars	Trucks	Heavys	Totals
1541	12	0	1553
0	0	0	0
62	0	0	62
1603	12	0	

Gowan St



Cars	Trucks	Heavys	Totals
1222	11	0	1233

Peds Cross: $\bowtie$
 West Peds: 74
 West Entering: 13
 West Leg Total: 21

Cars	Trucks	Heavys	Totals
2273	106	0	2379



Cars	Trucks	Heavys	Totals
4	0	0	4
2172	112	0	2284
55	1	0	56
2231	113	0	

Peds Cross: $\bowtie$
 South Peds: 29
 South Entering: 2344
 South Leg Total: 4723

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Barrie
Site #: 1807000008
Intersection: Essa Rd & Tiffin St
TFR File #: 1
Count date: 20-Feb-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Essa Rd runs N/S

North Leg Total: 5509
 North Entering: 2849
 North Peds: 12
 Peds Cross: $\bowtie$

	Heavys	Trucks	Cars	Totals
0	0	0	0	0
10	98	3	111	
280	2014	444	2738	
Totals	290	2112	447	

Heavys 0
 Trucks 71
 Cars 2589
 Totals 2660

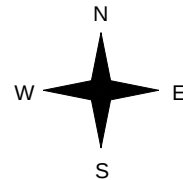
East Leg Total: 5089
 East Entering: 2188
 East Peds: 29
 Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	71	2080	2151



Tiffin St

Heavys	Trucks	Cars	Totals
0	11	260	271
0	30	1602	1632
0	35	512	547
0	76	2374	



Essa Rd



Cars	Trucks	Heavys	Totals
12	0	0	12
1330	52	0	1382
735	59	0	794
2077	111	0	

Tiffin St



Cars	Trucks	Heavys	Totals
2862	39	0	2901

Peds Cross: $\bowtie$
 West Peds: 32
 West Entering: 2450
 West Leg Total: 4601

Cars	Trucks	Heavys	Totals
3261	192	0	3453



Cars	Trucks	Heavys	Totals
470	9	0	479
2317	60	0	2377
816	6	0	822
3603	75	0	

Peds Cross: $\bowtie$
 South Peds: 22
 South Entering: 3678
 South Leg Total: 7131

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Barrie
Site #: 1807000010
Intersection: Lakeshore Dr & GO Access
TFR File #: 1
Count date: 20-Feb-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Lakeshore Dr runs W/E

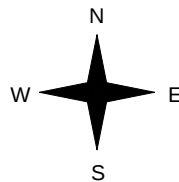
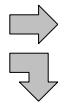
East Leg Total: 10677
 East Entering: 5311
 East Peds: 3
 Peds Cross: 8

Heavys	Trucks	Cars	Totals
0	46	5341	5387



Lakeshore Dr

Heavys	Trucks	Cars	Totals
0	58	5281	5339
0	0	13	13
0	58	5294	



GO Access



Cars	26
Trucks	0
Heavys	0
Totals	26

Cars	89	27	116
Trucks	0	0	0
Heavys	0	0	0
Totals	89	27	

Cars	Trucks	Heavys	Totals
5252	46	0	5298
13	0	0	13
5265	46	0	



Lakeshore Dr

Cars	Trucks	Heavys	Totals
5308	58	0	5366

Peds Cross: 8
 West Peds: 16
 West Entering: 5352
 West Leg Total: 10739

Peds Cross: 2
 South Peds: 2
 South Entering: 116
 South Leg Total: 142

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Barrie
Site #: 1807000009
Intersection: Lakeshore Dr & Tiffin St
TFR File #: 1
Count date: 20-Feb-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Lakeshore Dr runs W/E

North Leg Total: 8581
 North Entering: 4264
 North Peds: 12
 Peds Cross: $\bowtie$

	Heavys	Trucks	Cars	Totals
0	0	0	0	0
16	0	21	37	
755	111	3361	4227	
771	111	3382		

	Heavys	Trucks	Cars	Totals
0	0	29	4288	
4317				

East Leg Total: 10700
 East Entering: 5361
 East Peds: 21
 Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	152	2681	2833

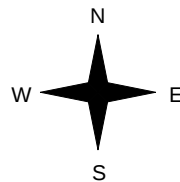


Lakeshore Dr

Heavys	Trucks	Cars	Totals
0	5	816	821
0	32	1910	1942
0	0	102	102
0	37	2828	



Tiffin St



Cars	Trucks	Heavys	Totals
3430	21	0	3451
1880	25	0	1905
5	0	0	5
5315	46	0	

Lakeshore Dr



Cars	Trucks	Heavys	Totals
5286	53	0	5339



Tiffin St

Peds Cross: $\bowtie$
 West Peds: 6
 West Entering: 2865
 West Leg Total: 5698

Cars	Trucks	Heavys	Totals
218	0	0	218



Cars	Trucks	Heavys	Totals
46	111	0	157
42	3	0	45
15	0	0	15
103	114	0	

Peds Cross: $\bowtie$
 South Peds: 10
 South Entering: 217
 South Leg Total: 435

Comments



Peak Hour: 04:15 PM - 05:15 PM Weather: Clear Sky (16.45 °C)

Start Time	N Approach HIGH ST						E Approach DUNLOP ST						S Approach BRADFORD ST						W Approach DUNLOP ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:15:00	5	13	7	0	11	25	6	76	21	0	2	103	47	31	36	0	5	114	24	107	2	0	5	133	375
16:30:00	2	22	1	0	5	25	5	82	31	0	3	118	35	28	39	0	11	102	25	94	0	0	2	119	364
16:45:00	3	21	4	0	14	28	5	68	37	0	2	110	44	26	27	0	6	97	26	123	4	0	7	153	388
17:00:00	5	26	1	0	9	32	7	102	25	0	0	134	40	25	45	0	3	110	21	102	0	0	10	123	399
Grand Total	15	82	13	0	39	110	23	328	114	0	7	465	166	110	147	0	25	423	96	426	6	0	24	528	1526
Approach%	13.6%	74.5%	11.8%	0%	-	-	4.9%	70.5%	24.5%	0%	-	-	39.2%	26%	34.8%	0%	-	-	18.2%	80.7%	1.1%	0%	-	-	-
Totals %	1%	5.4%	0.9%	0%	7.2%	1.5%	21.5%	7.5%	0%	30.5%	10.9%	7.2%	9.6%	0%	27.7%	6.3%	27.9%	0.4%	0%	34.6%	-	-	-	-	-
PHF	0.75	0.79	0.46	0	0.86	0.82	0.8	0.77	0	0.87	0.88	0.89	0.82	0	0.93	0.92	0.87	0.38	0	0.86	-	-	-	-	-
Heavy	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Heavy %	0%	0%	0%	0%	0%	0%	0%	0.3%	0.9%	0%	0.4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Lights	15	82	13	0	110	23	312	113	0	448	166	109	147	0	422	94	415	6	0	515	-	-	-	-	-
Lights %	100%	100%	100%	0%	100%	100%	95.1%	99.1%	0%	96.3%	100%	99.1%	100%	0%	99.8%	97.9%	97.4%	100%	0%	97.5%	-	-	-	-	-
Mediums	0	0	0	0	0	0	0	15	0	0	15	0	1	0	0	1	2	11	0	0	13	-	-	-	-
Mediums %	0%	0%	0%	0%	0%	0%	0%	4.6%	0%	0%	3.2%	0%	0.9%	0%	0%	0.2%	2.1%	2.6%	0%	0%	2.5%	-	-	-	-
Articulated Trucks	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0.3%	0.9%	0%	0.4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Pedestrians	-	-	-	-	39	-	-	-	-	7	-	-	-	-	25	-	-	-	-	24	-	-	-	-	-
Pedestrians%	-	-	-	-	41.1%	-	-	-	-	7.4%	-	-	-	-	26.3%	-	-	-	-	25.3%	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-

Bradford Street/ High Street & Dunlop Street – NOON WEEKDAY PLAN (9:00AM – 3:30PM)

Roadway	Direction	Split Timings (Including Amber + All Red)
Dunlop Street (main street)	Advanced Westbound Left Turn	20
Dunlop Street (main street)	Eastbound	36
Bradford Street (side street)	Westbound	56
Bradford Street (side street)	Advanced Northbound Left Turn	11
High Street (side street)	Northbound	34
Dunlop Street (main street)	Southbound	23
Total Cycle Length		90

NOTE: All times are recorded in seconds, based on full demand.

Refer to the FREE PLAN for the Walk and Flashing Don't Walk Timings

Bradford Street/ High Street & Dunlop Street – PM WEEKDAY PLAN (3:30PM – 9:30PM)

Roadway	Direction	Split Timings (Including Amber + All Red)
Dunlop Street (main street)	Advanced Westbound Left Turn	20
Dunlop Street (main street)	Eastbound	37
Bradford Street (side street)	Westbound	57
Bradford Street (side street)	Advanced Northbound Left Turn	10
High Street (side street)	Northbound	33
Dunlop Street (main street)	Southbound	23
Total Cycle Length		90

NOTE: All times are recorded in seconds, based on full demand.

Refer to the FREE PLAN for the Walk and Flashing Don't Walk Timings

Ontario Traffic Inc.

Traffic Count Summary

Intersection: Essa Rd & Gowan St

Count Date: 20-Feb-18

Municipality: Barrie

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
6:00:00	0	0	0	0	0	0	6:00:00	0	0	0	0	0
7:00:00	134	129	0	263	1	359	7:00:00	0	84	12	96	0
8:00:00	152	211	0	363	2	562	8:00:00	0	193	6	199	0
9:00:00	138	227	0	365	3	682	9:00:00	0	312	5	317	2
12:00:00	0	0	0	0	0	0	12:00:00	0	0	0	0	0
13:00:00	123	333	0	456	7	779	13:00:00	0	316	7	323	5
14:00:00	119	315	0	434	4	764	14:00:00	0	324	6	330	8
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	141	354	2	497	8	841	16:00:00	3	338	3	344	10
17:00:00	210	369	2	581	2	958	17:00:00	0	366	11	377	4
18:00:00	158	372	0	530	3	888	18:00:00	1	351	6	358	0
Totals:	1175	2310	4	3489	30	5833		4	2284	56	2344	29

East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
6:00:00	0	0	0	0	0	0	6:00:00	0	0	0	0	0
7:00:00	6	0	59	65	6	65	7:00:00	0	0	0	0	5
8:00:00	4	0	134	138	5	140	8:00:00	1	0	1	2	0
9:00:00	4	0	182	186	9	187	9:00:00	0	0	1	1	1
12:00:00	0	0	0	0	0	0	12:00:00	0	0	0	0	0
13:00:00	8	0	172	180	4	182	13:00:00	0	0	2	2	5
14:00:00	11	0	191	202	10	203	14:00:00	0	0	1	1	15
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	6	0	254	260	5	263	16:00:00	1	0	2	3	22
17:00:00	3	0	277	280	15	281	17:00:00	1	0	0	1	13
18:00:00	20	0	284	304	7	307	18:00:00	1	2	0	3	13
Totals:	62	0	1553	1615	61	1628		4	2	7	13	74

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	7	7	9	20	23	25	10	26

Ontario Traffic Inc.

Traffic Count Summary

Intersection: Essa Rd & Tiffin St

Count Date: 20-Feb-18

Municipality: Barrie

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
6:00:00	0	0	0	0	0	0	6:00:00	0	0	0	0	0
7:00:00	23	161	8	192	1	324	7:00:00	30	76	26	132	0
8:00:00	30	220	30	280	0	582	8:00:00	44	197	61	302	0
9:00:00	33	214	35	282	2	756	9:00:00	55	318	101	474	1
12:00:00	0	0	0	0	0	0	12:00:00	0	0	0	0	0
13:00:00	36	277	40	353	3	826	13:00:00	58	303	112	473	0
14:00:00	54	249	36	339	2	819	14:00:00	52	314	114	480	2
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	69	286	41	396	0	964	16:00:00	77	361	130	568	11
17:00:00	111	356	58	525	3	1136	17:00:00	86	405	120	611	4
18:00:00	91	349	42	482	1	1120	18:00:00	77	403	158	638	4
Totals:	447	2112	290	2849	12	6527		479	2377	822	3678	22

East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
6:00:00	0	0	0	0	0	0	6:00:00	0	0	0	0	0
7:00:00	59	136	1	196	2	326	7:00:00	5	72	53	130	0
8:00:00	79	192	1	272	1	523	8:00:00	18	171	62	251	1
9:00:00	93	187	1	281	7	605	9:00:00	60	197	67	324	1
12:00:00	0	0	0	0	0	0	12:00:00	0	0	0	0	0
13:00:00	123	153	1	277	3	564	13:00:00	43	194	50	287	7
14:00:00	102	167	2	271	8	567	14:00:00	32	183	81	296	3
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	113	189	4	306	2	682	16:00:00	38	261	77	376	11
17:00:00	116	191	1	308	3	718	17:00:00	37	290	83	410	6
18:00:00	109	167	1	277	3	653	18:00:00	38	264	74	376	3

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	201	289	353	363	321	423	450	416

Ontario Traffic Inc.

Traffic Count Summary

Intersection: Lakeshore Dr & GO Access						Count Date: 20-Feb-18		Municipality: Barrie					
North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
6:00:00	0	0	0	0	0	0	6:00:00	0	0	0	0	0	
7:00:00	0	0	0	0	0	43	7:00:00	37	0	6	43	0	
8:00:00	0	0	0	0	0	25	8:00:00	20	0	5	25	0	
9:00:00	0	0	0	0	0	6	9:00:00	4	0	2	6	0	
12:00:00	0	0	0	0	0	0	12:00:00	0	0	0	0	0	
13:00:00	0	0	0	0	0	6	13:00:00	2	0	4	6	0	
14:00:00	0	0	0	0	0	2	14:00:00	1	0	1	2	0	
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	0	0	0	0	0	1	16:00:00	0	0	1	1	1	
17:00:00	0	0	0	0	0	5	17:00:00	3	0	2	5	1	
18:00:00	0	0	0	0	0	28	18:00:00	22	0	6	28	0	
Totals:						116	89 0 27 116 2						
East Approach Totals						East/West Total Approaches	West Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
6:00:00	0	0	0	0	0	0	6:00:00	0	0	0	0	0	
7:00:00	3	315	0	318	0	544	7:00:00	0	225	1	226	1	
8:00:00	0	690	0	690	0	1189	8:00:00	0	494	5	499	0	
9:00:00	3	931	0	934	0	1547	9:00:00	0	612	1	613	0	
12:00:00	0	0	0	0	0	0	12:00:00	0	0	0	0	0	
13:00:00	0	581	0	581	0	1207	13:00:00	0	626	0	626	0	
14:00:00	0	639	0	639	0	1332	14:00:00	0	693	0	693	2	
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	0	668	0	668	0	1498	16:00:00	0	829	1	830	3	
17:00:00	2	776	0	778	0	1774	17:00:00	0	995	1	996	5	
18:00:00	5	698	0	703	3	1572	18:00:00	0	865	4	869	5	
Totals:						10663	0 5339 13 5352 16						
Calculated Values for Traffic Crossing Major Street													
Hours Ending:	7:00	8:00	9:00	13:00			14:00	16:00	17:00	18:00			
Crossing Values:	38	20	4	2			3	3	8	30			

Ontario Traffic Inc.

Traffic Count Summary

Intersection: Lakeshore Dr & Tiffin St						Count Date: 20-Feb-18		Municipality: Barrie					
North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
6:00:00	0	0	0	0	0	0	6:00:00	0	0	0	0	0	
7:00:00	158	36	46	240	0	276	7:00:00	20	15	1	36	3	
8:00:00	319	21	76	416	0	443	8:00:00	18	8	1	27	0	
9:00:00	391	1	93	485	2	503	9:00:00	16	0	2	18	1	
12:00:00	0	0	0	0	0	0	12:00:00	0	0	0	0	0	
13:00:00	396	11	125	532	0	555	13:00:00	18	1	4	23	0	
14:00:00	476	6	111	593	2	614	14:00:00	17	1	3	21	0	
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	515	4	114	633	1	654	16:00:00	18	1	2	21	1	
17:00:00	601	7	119	727	4	747	17:00:00	20	0	0	20	4	
18:00:00	526	25	87	638	3	689	18:00:00	30	19	2	51	1	
Totals:	3382	111	771	4264	12	4481		157	45	15	217	10	
East Approach Totals						East/West Total Approaches	West Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
6:00:00	0	0	0	0	0	0	6:00:00	0	0	0	0	0	
7:00:00	0	177	168	345	1	466	7:00:00	17	67	37	121	1	
8:00:00	0	273	423	696	0	947	8:00:00	52	178	21	251	2	
9:00:00	1	294	644	939	4	1254	9:00:00	94	216	5	315	0	
12:00:00	0	0	0	0	0	0	12:00:00	0	0	0	0	0	
13:00:00	0	203	379	582	0	929	13:00:00	126	218	3	347	0	
14:00:00	0	208	431	639	2	985	14:00:00	127	216	3	346	0	
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	0	246	418	664	2	1125	16:00:00	143	315	3	461	1	
17:00:00	1	273	498	772	5	1293	17:00:00	125	393	3	521	1	
18:00:00	3	231	490	724	7	1227	18:00:00	137	339	27	503	1	
Totals:	5	1905	3451	5361	21	8226		821	1942	102	2865	6	
Calculated Values for Traffic Crossing Major Street													
Hours Ending:	7:00	8:00	9:00	13:00			14:00	16:00	17:00	18:00			
Crossing Values:	216	360	412	425			501	540	634	589			

Peak Hour: 08:45 AM - 09:45 AM Weather: Scattered Clouds (0.78 °C)



Bradford Street & Simcoe Street – FREE PLAN (NO COORDINATION)

Roadway	Direction	Vehicular Indications				Pedestrian Indications	
		Minimum Green	Maximum Green	Amber	All Red	Walk	Flashing Don't Walk
Bradford Street (main street)	Northbound	30	30	4	2	16	14
Bradford Street (main street)	Southbound	30	30	4	2	16	14
Simcoe Street (side street)	Westbound	10	30	4	2	10	15

NOTE: All times are recorded in seconds, based on full demand.

Bradford Street & Victoria Street – FREE PLAN (NO COORDINATION)

Roadway	Direction	Vehicular Indications				Pedestrian Indications	
		Minimum Green	Maximum Green	Amber	All Red	Walk	Flashing Don't Walk
Bradford Street (main street)	Northbound	34	34	4	2	24	10
Bradford Street (main street)	Southbound	34	34	4	2	24	10
Victoria Street (side street)	Eastbound	10	24	4	2	10	9
Victoria Street (side street)	Westbound	10	24	4	2	10	9

NOTE: All times are recorded in seconds, based on full demand.

[illegible]

Count Date: 20-Feb-18 Site #: 1807000006

[illegible]

Count Date: 20-Feb-18 Site #: 1807000008

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Heavys - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
6:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15:00	5	5	24	24	1	1	0	0	2	2	0	0	0	0	0	0	0	0	0	0
6:30:00	9	4	69	45	4	3	0	0	4	2	0	0	0	0	0	0	0	0	0	0
6:45:00	19	10	114	45	4	0	0	0	6	2	0	0	0	0	0	0	0	0	1	1
7:00:00	23	4	152	38	8	4	0	0	9	3	0	0	0	0	0	0	0	0	1	0
7:15:00	34	11	194	42	11	3	1	1	11	2	0	0	0	0	0	0	0	0	1	0
7:30:00	36	2	234	40	19	8	1	0	16	5	0	0	0	0	0	0	0	0	1	0
7:45:00	43	7	289	55	23	4	1	0	17	1	1	1	0	0	0	0	0	0	1	0
8:00:00	52	9	360	71	36	13	1	0	21	4	2	1	0	0	0	0	0	0	1	0
8:15:00	58	6	427	67	48	12	1	0	24	3	3	1	0	0	0	0	0	0	2	1
8:30:00	66	8	472	45	55	7	1	0	29	5	3	0	0	0	0	0	0	0	2	0
8:45:00	77	11	512	40	64	9	1	0	31	2	3	0	0	0	0	0	0	0	2	0
9:00:00	85	8	558	46	70	6	1	0	37	6	3	0	0	0	0	0	0	0	3	1
9:00:46	85	0	558	0	70	0	1	0	37	0	3	0	0	0	0	0	0	0	3	0
12:00:00	85	0	558	0	70	0	1	0	37	0	3	0	0	0	0	0	0	0	3	0
12:15:00	99	14	627	69	78	8	1	0	40	3	4	1	0	0	0	0	0	0	3	0
12:30:00	103	4	690	63	92	14	2	1	44	4	4	0	0	0	0	0	0	0	3	0
12:45:00	111	8	758	68	101	9	2	0	46	2	4	0	0	0	0	0	0	0	5	2
13:00:00	120	9	822	64	108	7	2	0	50	4	5	1	0	0	0	0	0	0	6	1
13:15:00	134	14	876	54	117	9	2	0	52	2	5	0	0	0	0	0	0	0	6	0
13:30:00	145	11	948	72	125	8	3	1	55	3	5	0	0	0	0	0	0	0	8	2
13:45:00	153	8	1013	65	127	2	3	0	56	1	6	1	0	0	0	0	0	0	8	0
14:00:00	173	20	1060	47	141	14	3	0	61	5	8	2	0	0	0	0	0	0	8	0
14:01:24	173	0	1060	0	141	0	3	0	61	0	8	0	0	0	0	0	0	0	8	0
15:00:00	173	0	1060	0	141	0	3	0	61	0	8	0	0	0	0	0	0	0	8	0
15:15:00	197	24	1123	63	152	11	3	0	61	0	8	0	0	0	0	0	0	0	8	0
15:30:00	205	8	1204	81	162	10	3	0	65	4										

[illegible]

Count Date: 20-Feb-18 Site #: 1807000010

[illegible]

[illegible]

Count Date: 20-Feb-18 Site #: 1807000009

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Heavys - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
6:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15:00	22	22	9	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30:00	53	31	14	5	19	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45:00	106	53	33	19	29	10	1	1	0	0	0	0	0	0	0	0	0	0	0	0
7:00:00	156	50	36	3	44	15	2	1	0	0	2	2	0	0	0	0	0	0	0	0
7:15:00	229	73	51	15	56	12	2	0	0	0	2	0	0	0	0	0	0	0	0	0
7:30:00	295	66	51	0	68	12	2	0	0	0	2	0	0	0	0	0	0	0	0	0
7:45:00	380	85	51	0	95	27	2	0	0	0	3	1	0	0	0	0	0	0	0	0
8:00:00	473	93	57	6	119	24	4	2	0	0	3	0	0	0	0	0	0	0	0	0
8:15:00	585	112	57	0	139	20	5	1	0	0	3	0	0	0	0	0	0	0	1	1
8:30:00	685	100	58	1	161	22	6	1	0	0	4	1	0	0	0	0	0	0	1	0
8:45:00	774	89	58	0	183	22	8	2	0	0	4	0	0	0	0	0	0	0	1	0
9:00:00	858	84	58	0	209	26	10	2	0	0	6	2	0	0	0	0	0	0	2	1
9:01:55	858	0	58	0	209	0	10	0	0	0	6	0	0	0	0	0	0	0	2	0
12:00:00	858	0	58	0	209	0	10	0	0	0	6	0	0	0	0	0	0	0	2	0
12:15:00	977	119	60	2	232	23	10	0	0	0	6	0	0	0	0	0	0	0	2	0
12:30:00	1089	112	63	3	273	41	10	0	0	0	6	0	0	0	0	0	0	0	2	0
12:45:00	1179	90	65	2	303	30	10	0	0	0	6	0	0	0	0	0	0	0	2	0
13:00:00	1254	75	69	4	334	31	10	0	0	0	6	0	0	0	0	0	0	0	2	0
13:15:00	1379	125	69	0	364	30	11	1	0	0	6	0	0	0	0	0	0	0	3	1
13:30:00	1507	128	71	2	399	35	14	3	0	0	6	0	0	0	0	0	0	0	3	0
13:45:00	1613	106	73	2	419	20	14	0	0	0	7	1	0	0	0	0	0	0	3	0
14:00:00	1725	112	75	2	442	23	15	1	0	0	9	2	0	0	0	0	0	0	4	1
14:02:12	1725	0	75	0	442	0	15	0	0	0	9	0	0	0	0	0	0	0	4	0
15:00:00	1725	0	75	0	442	0	15	0	0	0	9	0	0	0	0	0	0	0	4	0
15:15:00	1859	134	76	1	469	27	16	1	0	0	9	0	0	0	0	0	0	0	4	0
15:30:00	1965	106	76	0	495	26	16													

Peak Hour: 04:15 PM - 05:15 PM Weather: Clear Sky (16.45 °C)



Bradford Street/ Essa Road & Tiffin Street – FREE PLAN (NO COORDINATION)

Roadway	Direction	Vehicular Indications				Pedestrian Indications	
		Minimum Green	Maximum Green	Amber	All Red	Walk	Flashing Don't Walk
Bradford Street (main street)	Advanced Southbound Left Turn	7	12	3	1	N/A	N/A
Essa Road (main street)	Northbound	40	40	4	2	28	12
Bradford Street (main street)	Southbound	40	0	4	2	28	12
Tiffin Street (side street)	Advanced Westbound Left Turn	7	10	3	1	N/A	N/A
Tiffin Street (side street)	Eastbound	10	24	4	2	10	15
Tiffin Street (side street)	Westbound	10	24	4	2	10	15

NOTE: All times are recorded in seconds, based on full demand.

Bradford Street/ Essa Road & Tiffin Street – AM WEEKDAY PLAN (5:00AM – 9:00AM)

Roadway	Direction	Split Timings (Including Amber + All Red)
Bradford Street (main street)	Advanced Southbound Left Turn	N/A -Inactive
Essa Road (main street)	Northbound	47
Bradford Street (main street)	Southbound	47
Tiffin Street (side street)	Advanced Westbound Left Turn	11
Tiffin Street (side street)	Eastbound	32
Tiffin Street (side street)	Westbound	43
Total Cycle Length		90

NOTE: All times are recorded in seconds, based on full demand.

Refer to the FREE PLAN for the Walk and Flashing Don't Walk Timings

Ontario Traffic Inc.

Count Date: 20-Feb-18	Site #: 1807000006
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Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Heavys - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
6:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15:00	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30:00	1	1	0	0	20	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45:00	2	1	0	0	41	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00:00	6	4	0	0	59	18	0	0	0	0	0	0	0	0	0	0	0	0	6	6
7:15:00	10	4	0	0	81	22	0	0	0	0	0	0	0	0	0	0	0	0	7	1
7:30:00	10	0	0	0	110	29	0	0	0	0	0	0	0	0	0	0	0	0	8	1
7:45:00	10	0	0	0	145	35	0	0	0	0	1	1	0	0	0	0	0	0	9	1
8:00:00	10	0	0	0	191	46	0	0	0	0	2	1	0	0	0	0	0	0	11	2
8:15:00	10	0	0	0	235	44	0	0	0	0	2	0	0	0	0	0	0	0	12	1
8:30:00	11	1	0	0	273	38	0	0	0	0	2	0	0	0	0	0	0	0	14	2
8:45:00	12	1	0	0	318	45	0	0	0	0	2	0	0	0	0	0	0	0	17	3
9:00:00	14	2	0	0	370	52	0	0	0	0	5	3	0	0	0	0	0	0	20	3
9:00:43	14	0	0	0	370	0	0	0	0	0	5	0	0	0	0	0	0	0	20	0
12:00:00	14	0	0	0	370	0	0	0	0	0	5	0	0	0	0	0	0	0	20	0
12:15:00	17	3	0	0	413	43	0	0	0	0	5	0	0	0	0	0	0	0	21	1
12:30:00	19	2	0	0	466	53	0	0	0	0	5	0	0	0	0	0	0	0	21	0
12:45:00	22	3	0	0	499	33	0	0	0	0	5	0	0	0	0	0	0	0	23	2
13:00:00	22	0	0	0	541	42	0	0	0	0	6	1	0	0	0	0	0	0	24	1
13:15:00	26	4	0	0	591	50	0	0	0	0	6	0	0	0	0	0	0	0	26	2
13:30:00	26	0	0	0	630	39	0	0	0	0	7	1	0	0	0	0	0	0	29	3
13:45:00	30	4	0	0	678	48	0	0	0	0	7	0	0	0	0	0	0	0	32	3
14:00:00	33	3	0	0	731	53	0	0	0	0	7	0	0	0	0	0	0	0	34	2
14:01:50	33	0	0	0	731	0	0	0	0	0	7	0	0	0	0	0	0	0	34	0
15:00:00	33	0	0	0	731	0	0	0	0	0	7	0	0	0	0	0	0	0	34	0
15:15:00	36	3	0	0	797	66	0	0	0	0	7	0	0	0	0	0	0	0	35	1
15:30:00	36	0	0	0	863	66	0	0	0	0	8	1	0	0	0	0	0	0	36	1
15:45:00	37	1	0	0	926	63	0	0	0	0	10	2	0	0	0	0	0	0	39	3
16:00:00	39	2	0	0	981	55	0	0	0	0	11	1	0	0	0	0	0	0	39	0
16:15:00	41	2	0	0	1055	74	0	0	0	0	11	0	0	0	0	0	0	0	42	3
16:30:00	42	1	0	0	1112	57	0	0	0	0	11	0	0	0	0	0	0	0	46	4
16:45:00	42	0	0	0	1189	77	0	0	0	0	11	0	0	0	0	0	0	0	51	5
17:00:00	42	0	0	0	1257	68	0	0	0	0	12	1	0	0	0	0	0	0	54	3
17:15:00	48	6	0	0	1338	81	0	0	0	0	12	0	0	0	0	0	0	0	56	2
17:30:00	48	0	0	0	1395	57	0	0	0	0	12	0	0	0	0	0	0	0	56	0
17:45:00	59	11	0	0	1487	92	0	0	0	0	12	0	0	0	0	0	0	0	59	3
18:00:00	62	3	0	0	1541	54	0	0	0	0	12	0	0	0	0	0	0	0	61	2
18:15:00	62	0	0	0	1541	0	0	0	0	0	12	0	0	0	0	0	0	0	61	0
18:17:06	62	0	0	0	1541	0	0	0	0	0	12	0	0	0	0	0	0	0	61	0

Ontario Traffic Inc.

Count Date: 20-Feb-18	Site #: 1807000008
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Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Heavys - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
6:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15:00	11	11	16	16	0	0	2	2	0	0	0	0	0	0	0	0	0	0	1	1
6:30:00	25	14	43	27	1	1	3	1	1	1	0	0	0	0	0	0	0	0	1	0
6:45:00	35	10	89	46	1	0	4	1	1	0	0	0	0	0	0	0	0	0	2	1
7:00:00	53	18	132	43	1	0	6	2	4	3	0	0	0	0	0	0	0	0	2	0
7:15:00	68	15	161	29	1	0	10	4	5	1	0	0	0	0	0	0	0	0	2	0
7:30:00	81	13	205	44	2	1	10	0	7	2	0	0	0	0	0	0	0	0	3	1
7:45:00	104	23	256	51	2	0	11	1	8	1	0	0	0	0	0	0	0	0	3	0
8:00:00	126	22	319	63	2	0	12	1	9	1	0	0	0	0	0	0	0	0	3	0
8:15:00	144	18	370	51	2	0	14	2	10	1	0	0	0	0	0	0	0	0	8	5
8:30:00	162	18	405	35	3	1	17	3	12	2	0	0	0	0	0	0	0	0	10	2
8:45:00	185	23	452	47	3	0	18	1	13	1	0	0	0	0	0	0	0	0	10	0
9:00:00	210	25	501	49	3	0	21	3	14	1	0	0	0	0	0	0	0	0	10	0
9:00:46	210	0	501	0	3	0	21	0	14	0	0	0	0	0	0	0	0	0	10	0
12:00:00	210	0	501	0	3	0	21	0	14	0	0	0	0	0	0	0	0	0	10	0
12:15:00	231	21	535	34	3	0	23	2	17	3	0	0	0	0	0	0	0	0	10	0
12:30:00	266	35	573	38	4	1	23	0	18	1	0	0	0	0	0	0	0	0	10	0
12:45:00	297	31	615	42	4	0	25	2	20	2	0	0	0	0	0	0	0	0	11	1
13:00:00	327	30	646	31	4	0	27	2	22	2	0	0	0	0	0	0	0	0	13	2
13:15:00	350	23	684	38	4	0	29	2	23	1	0	0	0	0	0	0	0	0	15	2
13:30:00	385	35	732	48	4	0	29	0	25	2	0	0	0	0	0	0	0	0	20	5
13:45:00	397	12	768	36	6	2	31	2	28	3	0	0	0	0	0	0	0	0	21	1
14:00:00	422	25	805	37	6	0	34	3	30	2	0	0	0	0	0	0	0	0	21	0
14:01:24	422	0	805	0	6	0	34	0	30	0	0	0	0	0	0	0	0	0	21	0
15:00:00	422	0	805	0	6	0	34	0	30	0	0	0	0	0	0	0	0	0	21	0
15:15:00	453	31	844	39	7	1	36	2	31	1	0	0	0	0	0	0	0	0	21	0
15:30:00	476	23	890	46	7	0	37	1	36	5	0	0	0	0	0	0	0	0	22	1
15:45:00	501	25	933	43	9	2	39	2	39	3	0	0	0	0	0	0	0	0	23	1
16:00:00	528	27	982	49	10	1	41	2	42	3	0	0	0	0	0	0	0	0	23	0
16:15:00	561	33	1032	50	11	1	44	3	43	1	0	0	0	0	0	0	0	0	23	0
16:30:00	585	24	1083	51	11	0	45	1	47	4	0	0	0	0	0	0	0	0	23	0
16:45:00	613	28	1126	43	11	0	48	3	47	0	0	0	0	0	0	0	0	0	26	3
17:00:00	635	22	1167	41	11	0	50	2	48	1	0	0	0	0	0	0	0	0	26	0
17:15:00	664	29	1213	46	11	0	53	3	49	1	0	0	0	0	0	0	0	0	28	2
17:30:00	691	27	1257	44	11	0	53	0	50	1	0	0	0	0	0	0	0	0	29	1
17:45:00	713	22	1295	38	11	0	56	3	51	1	0	0	0	0	0	0	0	0	29	0
18:00:00	735	22	1330	35	12	1	59	3	52	1	0	0	0	0	0	0	0	0	29	0
18:15:00	735	0	1330	0	12	0	59	0	52	0	0	0	0	0	0	0	0	0	29	0
18:17:24	735	0	1330	0	12	0	59	0	52	0	0	0	0	0	0	0	0	0	29	0

[illegible]

Count Date: 20-Feb-18 Site #: 1807000009

Bradford Street/ Essa Road & Tiffin Street – NOON WEEKDAY PLAN (9:00AM – 3:30PM)

Roadway	Direction	Split Timings (Including Amber + All Red)
Bradford Street (main street)	Advanced Southbound Left Turn	N/A -Inactive
Essa Road (main street)	Northbound	53
Bradford Street (main street)	Southbound	53
Tiffin Street (side street)	Advanced Westbound Left Turn	14
Tiffin Street (side street)	Eastbound	33
Tiffin Street (side street)	Westbound	47
Total Cycle Length		100

NOTE: All times are recorded in seconds, based on full demand.

Refer to the FREE PLAN for the Walk and Flashing Don't Walk Timings

Bradford Street/ Essa Road & Tiffin Street – PM WEEKDAY PLAN (3:30PM – 9:00PM)

Roadway	Direction	Split Timings (Including Amber + All Red)
Bradford Street (main street)	Advanced Southbound Left Turn	11
Essa Road (main street)	Northbound	46
Bradford Street (main street)	Southbound	57
Tiffin Street (side street)	Advanced Westbound Left Turn	12
Tiffin Street (side street)	Eastbound	31
Tiffin Street (side street)	Westbound	43
Total Cycle Length		100

NOTE: All times are recorded in seconds, based on full demand.

Refer to the FREE PLAN for the Walk and Flashing Don't Walk Timings

[illegible]

Count Date: 20-Feb-18 Site #: 1807000006

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
6:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15:00	0	0	14	14	2	2	0	0	5	5	0	0	0	0	0	0	0	0	0	0
6:30:00	0	0	26	12	6	4	0	0	10	5	0	0	0	0	0	0	0	0	0	0
6:45:00	0	0	44	18	8	2	0	0	16	6	0	0	0	0	0	0	0	0	0	0
7:00:00	0	0	66	22	12	4	0	0	18	2	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	103	37	16	4	0	0	22	4	0	0	0	0	0	0	0	0	0	0
7:30:00	0	0	136	33	17	1	0	0	26	4	0	0	0	0	0	0	0	0	0	0
7:45:00	0	0	185	49	17	0	0	0	29	3	0	0	0	0	0	0	0	0	0	0
8:00:00	0	0	246	61	18	1	0	0	31	2	0	0	0	0	0	0	0	0	0	0
8:15:00	0	0	310	64	19	1	0	0	34	3	0	0	0	0	0	0	0	0	0	0
8:30:00	0	0	377	67	19	0	0	0	38	4	0	0	0	0	0	0	0	0	0	0
8:45:00	0	0	453	76	20	1	0	0	43	5	0	0	0	0	0	0	0	0	1	1
9:00:00	0	0	541	88	22	2	0	0	48	5	1	1	0	0	0	0	0	0	2	1
9:00:43	0	0	541	0	22	0	0	0	48	0	1	0	0	0	0	0	0	0	2	0
12:00:00	0	0	541	0	22	0	0	0	48	0	1	0	0	0	0	0	0	0	2	0
12:15:00	0	0	607	66	24	2	0	0	54	6	1	0	0	0	0	0	0	0	3	1
12:30:00	0	0	687	80	26	2	0	0	56	2	1	0	0	0	0	0	0	0	4	1
12:45:00	0	0	753	66	27	1	0	0	60	4	1	0	0	0	0	0	0	0	6	2
13:00:00	0	0	842	89	29	2	0	0	63	3	1	0	0	0	0	0	0	0	7	1
13:15:00	0	0	927	85	29	0	0	0	71	8	1	0	0	0	0	0	0	0	7	0
13:30:00	0	0	1000	73	30	1	0	0	71	0	1	0	0	0	0	0	0	0	9	2
13:45:00	0	0	1067	67	30	0	0	0	78	7	1	0	0	0	0	0	0	0	10	1
14:00:00	0	0	1147	80	35	5	0	0	82	4	1	0	0	0	0	0	0	0	15	5
14:01:50	0	0	1147	0	35	0	0	0	82	0	1	0	0	0	0	0	0	0	15	0
15:00:00	0	0	1147	0	35	0	0	0	82	0	1	0	0	0	0	0	0	0	15	0
15:15:00	0	0	1229	82	35	0	0	0	85	3	1	0	0	0	0	0	0	0	16	1
15:30:00	0	0	1295	66	35	0	0	0	88	3	1	0	0	0	0	0	0	0	2	

[illegible]

Count Date: 20-Feb-18 Site #: 1807000008

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
6:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15:00	3	3	8	8	3	3	0	0	3	3	0	0	0	0	0	0	0	0	0	0
6:30:00	6	3	25	17	8	5	1	1	6	3	1	1	0	0	0	0	0	0	0	0
6:45:00	18	12	44	19	16	8	1	0	8	2	1	0	0	0	0	0	0	0	0	0
7:00:00	29	11	66	22	25	9	1	0	10	2	1	0	0	0	0	0	0	0	0	0
7:15:00	39	10	100	34	35	10	1	0	11	1	1	0	0	0	0	0	0	0	0	0
7:30:00	51	12	131	31	50	15	1	0	14	3	1	0	0	0	0	0	0	0	0	0
7:45:00	58	7	184	53	66	16	1	0	16	2	1	0	0	0	0	0	0	0	0	0
8:00:00	71	13	256	72	86	20	3	2	17	1	1	0	0	0	0	0	0	0	0	0
8:15:00	85	14	329	73	110	24	3	0	18	1	1	0	0	0	0	0	0	0	0	0
8:30:00	96	11	396	67	128	18	3	0	20	2	1	0	0	0	0	0	0	0	1	1
8:45:00	111	15	475	79	154	26	3	0	24	4	1	0	0	0	0	0	0	0	1	0
9:00:00	125	14	565	90	187	33	4	1	26	2	1	0	0	0	0	0	0	0	1	0
9:00:46	125	0	565	0	187	0	4	0	26	0	1	0	0	0	0	0	0	0	1	0
12:00:00	125	0	565	0	187	0	4	0	26	0	1	0	0	0	0	0	0	0	1	0
12:15:00	143	18	628	63	219	32	4	0	28	2	2	1	0	0	0	0	0	0	1	0
12:30:00	155	12	711	83	243	24	5	1	30	2	2	0	0	0	0	0	0	0	1	0
12:45:00	166	11	778	67	269	26	5	0	32	2	3	1	0	0	0	0	0	0	1	0
13:00:00	181	15	861	83	296	27	6	1	33	1	4	1	0	0	0	0	0	0	1	0
13:15:00	193	12	952	91	324	28	7	1	36	3	4	0	0	0	0	0	0	0	2	1
13:30:00	205	12	1013	61	351	27	7	0	39	3	4	0	0	0	0	0	0	0	2	0
13:45:00	216	11	1084	71	382	31	7	0	43	4	4	0	0	0	0	0	0	0	3	1
14:00:00	232	16	1163	79	409	27	7	0	45	2	5	1	0	0	0	0	0	0	3	0
14:01:24	232	0	1163	0	409	0	7	0	45	0	5	0	0	0	0	0	0	0	3	0
15:00:00	232	0	1163	0	409	0	7	0	45	0	5	0	0	0	0	0	0	0	3	0
15:15:00	248	16	1262	99	435	26	7	0	47	2	5	0	0	0	0	0	0	0	5	2
15:30:00	273	25	1337	75	47															

Ontario Traffic Inc.

Count Date: 20-Feb-18	Site #: 1807000010
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Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
6:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15:00	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30:00	16	5	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45:00	29	13	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00:00	37	8	0	0	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	54	17	0	0	11	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	57	3	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	57	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00:00	57	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15:00	60	3	0	0	12	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30:00	60	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45:00	60	0	0	0	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00:00	61	1	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:01:44	61	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00:00	61	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15:00	61	0	0	0	15	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30:00	63	2	0	0	16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45:00	63	0	0	0	17	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00:00	63	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15:00	63	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30:00	64	1	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45:00	64	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00:00	64	0	0	0	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00:36	64	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00:00	64	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15:00	64	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30:00	64	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45:00	64	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
16:00:00	64	0	0	0	19	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
16:15:00	66	2	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
16:30:00	67	1	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
16:45:00	67	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
17:00:00	67	0	0	0	21	2	0	0	0	0	0	0	0	0	0	0	0	0	2	1
17:15:00	68	1	0	0	22	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0
17:30:00	69	1	0	0	23	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0
17:45:00	86	17	0	0	26	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0
18:00:00	89	3	0	0	27	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0
18:15:00	89	0	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
18:15:43	89	0	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0

Ontario Traffic Inc.

Count Date: 20-Feb-18	Site #: 1807000009
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Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
6:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15:00	1	1	2	2	0	0	4	4	0	0	0	0	0	0	0	0	0	0	1	1
6:30:00	4	3	4	2	0	0	6	2	0	0	0	0	0	0	0	0	0	0	2	1
6:45:00	6	2	12	8	0	0	9	3	0	0	0	0	0	0	0	0	0	0	3	1
7:00:00	8	2	15	3	1	1	12	3	0	0	0	0	0	0	0	0	0	0	3	0
7:15:00	12	4	18	3	2	1	19	7	0	0	0	0	0	0	0	0	0	0	3	0
7:30:00	12	0	22	4	2	0	20	1	1	1	0	0	0	0	0	0	0	0	3	0
7:45:00	12	0	22	0	2	0	23	3	1	0	0	0	0	0	0	0	0	0	3	0
8:00:00	12	0	22	0	2	0	26	3	1	0	0	0	0	0	0	0	0	0	3	0
8:15:00	12	0	22	0	2	0	30	4	1	0	0	0	0	0	0	0	0	0	3	0
8:30:00	14	2	22	0	3	1	33	3	1	0	0	0	0	0	0	0	0	0	3	0
8:45:00	15	1	22	0	4	1	38	5	1	0	0	0	0	0	0	0	0	0	4	1
9:00:00	15	0	22	0	4	0	39	1	1	0	0	0	0	0	0	0	0	0	4	0
9:01:55	15	0	22	0	4	0	39	0	1	0	0	0	0	0	0	0	0	0	4	0
12:00:00	15	0	22	0	4	0	39	0	1	0	0	0	0	0	0	0	0	0	4	0
12:15:00	15	0	22	0	5	1	43	4	1	0	0	0	0	0	0	0	0	0	4	0
12:30:00	15	0	22	0	5	0	45	2	1	0	0	0	0	0	0	0	0	0	4	0
12:45:00	16	1	22	0	5	0	50	5	1	0	0	0	0	0	0	0	0	0	4	0
13:00:00	18	2	23	1	8	3	54	4	1	0	0	0	0	0	0	0	0	0	4	0
13:15:00	18	0	23	0	8	0	59	5	1	0	0	0	0	0	0	0	0	0	4	0
13:30:00	19	1	23	0	10	2	60	1	1	0	0	0	0	0	0	0	0	0	4	0
13:45:00	21	2	23	0	11	1	64	4	1	0	0	0	0	0	0	0	0	0	4	0
14:00:00	22	1	23	0	11	0	67	3	2	1	0	0	0	0	0	0	0	0	4	0
14:02:12	22	0	23	0	11	0	67	0	2	0	0	0	0	0	0	0	0	0	4	0
15:00:00	22	0	23	0	11	0	67	0	2	0	0	0	0	0	0	0	0	0	4	0
15:15:00	24	2	23	0	11	0	70	3	3	1	0	0	0	0	0	0	0	0	4	0
15:30:00	25	1	23	0	11	0	71	1	3	0	0	0	0	0	0	0	0	0	4	0
15:45:00	25	0	23	0																

Essa Road & Gowan Street – FREE PLAN (NO COORDINATION)

Roadway	Direction	Vehicular Indications				Pedestrian Indications	
		Minimum Green	Maximum Green	Amber	All Red	Walk	Flashing Don't Walk
Bradford Street (main street)	Advanced Southbound Left Turn	7	10	3	1	N/A	N/A
Essa Road (main street)	Northbound	80	80	4	2	65	15
Bradford Street (main street)	Southbound	80	80	4	2	65	15
Tiffin Street (side street)	Westbound	10	25	4	2	10	15

NOTE: All times are recorded in seconds, based on full demand.

Lakeshore Drive & Tiffin Street – FREE PLAN (NO COORDINATION)

Roadway	Direction	Vehicular Indications				Pedestrian Indications	
		Minimum Green	Maximum Green	Amber	All Red	Walk	Flashing Don't Walk
Tiffin Street (main street)	Advanced Eastbound Left Turn	7	10	3	1	N/A	N/A
Tiffin Street (main street)	Eastbound	30	30	4	2	16	14
Tiffin Street (main street)	Westbound	30	30	4	2	16	14
Lakeshore Drive (side street)	Advanced Southbound Left Turn	7	10	3	1	N/A	N/A
Lakeshore Drive (side street)	Northbound	10	35	4	2	12	17
Lakeshore Drive (side street)	Southbound	10	35	4	2	12	17

NOTE: All times are recorded in seconds, based on full demand.

Ontario Traffic Inc.

Count Date: 20-Feb-18	Site #: 1807000006
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[illegible]

[illegible]

Count Date: 20-Feb-18 Site #: 1807000008

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Heavys - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
6:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15:00	0	0	12	12	17	17	0	0	0	0	1	1	0	0	0	0	0	0	0	0
6:30:00	0	0	29	17	31	14	1	1	0	0	1	0	0	0	0	0	0	0	0	0
6:45:00	2	2	51	22	43	12	1	0	0	0	3	2	0	0	0	0	0	0	0	0
7:00:00	4	2	71	20	49	6	1	0	1	1	4	1	0	0	0	0	0	0	0	0
7:15:00	5	1	109	38	62	13	2	1	3	2	5	1	0	0	0	0	0	0	0	0
7:30:00	8	3	148	39	73	11	2	0	6	3	6	1	0	0	0	0	0	0	0	0
7:45:00	12	4	188	40	88	15	2	0	6	0	7	1	0	0	0	0	0	0	0	0
8:00:00	21	9	235	47	107	19	2	0	8	2	8	1	0	0	0	0	0	0	1	1
8:15:00	31	10	290	55	118	11	3	1	8	0	9	1	0	0	0	0	0	0	2	1
8:30:00	47	16	330	40	133	15	3	0	8	0	13	4	0	0	0	0	0	0	2	0
8:45:00	63	16	377	47	149	16	3	0	9	1	14	1	0	0	0	0	0	0	2	0
9:00:00	80	17	431	54	167	18	3	0	9	0	15	1	0	0	0	0	0	0	2	0
9:00:46	80	0	431	0	167	0	3	0	9	0	15	0	0	0	0	0	0	0	2	0
12:00:00	80	0	431	0	167	0	3	0	9	0	15	0	0	0	0	0	0	0	2	0
12:15:00	92	12	477	46	180	13	5	2	9	0	16	1	0	0	0	0	0	0	5	3
12:30:00	101	9	531	54	192	12	6	1	13	4	16	0	0	0	0	0	0	0	6	1
12:45:00	111	10	581	50	202	10	6	0	14	1	18	2	0	0	0	0	0	0	8	2
13:00:00	119	8	620	39	214	12	7	1	14	0	18	0	0	0	0	0	0	0	9	1
13:15:00	127	8	662	42	235	21	7	0	15	1	19	1	0	0	0	0	0	0	9	0
13:30:00	133	6	707	45	249	14	7	0	17	2	20	1	0	0	0	0	0	0	9	0
13:45:00	142	9	753	46	270	21	8	1	18	1	21	1	0	0	0	0	0	0	12	3
14:00:00	150	8	798	45	289	19	8	0	19	1	24	3	0	0	0	0	0	0	12	0
14:01:24	150	0	798	0	289	0	8	0	19	0	24	0	0	0	0	0	0	0	12	0
15:00:00	150	0	798	0	289	0	8	0	19	0	24	0	0	0	0	0	0	0	12	0
15:15:00	158	8	866	68	308	19	9	1	20	1	26	2	0	0	0	0	0	0	14	2
15:30:00	169	11	924	58	321	13														

[illegible]

Count Date: 20-Feb-18 Site #: 1807000009

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Heavys - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
6:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15:00	0	0	13	13	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30:00	5	5	28	15	14	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45:00	11	6	48	20	28	14	0	0	0	0	0	0	0	0	0	0	0	0	1	1
7:00:00	16	5	67	19	37	9	1	1	0	0	0	0	0	0	0	0	0	0	1	0
7:15:00	22	6	99	32	57	20	1	0	3	3	0	0	0	0	0	0	0	0	3	2
7:30:00	35	13	140	41	58	1	1	0	6	3	0	0	0	0	0	0	0	0	3	0
7:45:00	54	19	186	46	58	0	1	0	6	0	0	0	0	0	0	0	0	0	3	0
8:00:00	68	14	237	51	58	0	1	0	8	2	0	0	0	0	0	0	0	0	3	0
8:15:00	94	26	292	55	58	0	1	0	8	0	0	0	0	0	0	0	0	0	3	0
8:30:00	109	15	345	53	60	2	1	0	8	0	0	0	0	0	0	0	0	0	3	0
8:45:00	134	25	398	53	62	2	2	1	8	0	0	0	0	0	0	0	0	0	3	0
9:00:00	161	27	453	55	63	1	2	0	8	0	0	0	0	0	0	0	0	0	3	0
9:01:55	161	0	453	0	63	0	2	0	8	0	0	0	0	0	0	0	0	0	3	0
12:00:00	161	0	453	0	63	0	2	0	8	0	0	0	0	0	0	0	0	0	3	0
12:15:00	187	26	512	59	64	1	2	0	9	1	0	0	0	0	0	0	0	0	3	0
12:30:00	225	38	560	48	64	0	2	0	14	5	0	0	0	0	0	0	0	0	3	0
12:45:00	257	32	616	56	64	0	2	0	16	2	0	0	0	0	0	0	0	0	3	0
13:00:00	286	29	663	47	66	2	3	1	16	0	0	0	0	0	0	0	0	0	3	0
13:15:00	312	26	715	52	66	0	3	0	18	2	0	0	0	0	0	0	0	0	3	0
13:30:00	342	30	767	52	68	2	4	1	20	2	0	0	0	0	0	0	0	0	3	0
13:45:00	378	36	818	51	69	1	4	0	21	1	0	0	0	0	0	0	0	0	3	0
14:00:00	412	34	872	54	69	0	4	0	23	2	0	0	0	0	0	0	0	0	3	0
14:02:12	412	0	872	0	69	0	4	0	23	0	0	0	0	0	0	0	0	0	3	0
15:00:00	412	0	872	0	69	0	4	0	23	0	0	0	0	0	0	0	0	0	3	0
15:15:00	438	26	961	89	70	1	4	0	23	0	0	0	0	0	0	0	0	0	3	0
15:30:00	477	39	1029	68	71	1	4	0	25	2	0	0	0							

Lakeshore Drive & Go Station East Access – FREE PLAN (NO COORDINATION)

		Vehicular Indications				Pedestrian Indications	
Roadway	Direction	Minimum Green	Maximum Green	Amber	All Red	Walk	Flashing Don't Walk
Lakeshore Drive (main street)	Advanced Westbound Left Turn	7	12	3	1	N/A	N/A
Lakeshore Drive (main street)	Eastbound	64	64	4	2	53	11
Lakeshore Drive (main street)	Westbound	64	4	4	2	53	11
Go Station East Access (side street)	Northbound	10	34	4	2	8	11

NOTE: All times are recorded in seconds, based on full demand.

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 10:00:00

To: 14:00:00

One Hour Peak

From: 13:00:00

To: 14:00:00

Municipality: Barrie

Site #: 1807000001

Intersection: Essa Rd & Gowan St

TFR File #: 1

Count date: 17-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Essa Rd runs N/S

North Leg Total: 1023

North Entering: 419

North Peds: 2

Peds Cross: $\bowtie$

Heavys	0	0	0	0
Trucks	0	8	0	8
Cars	0	297	114	411
Totals	0	305	114	



Heavys	0
Trucks	8
Cars	596
Totals	604

East Leg Total: 354

East Entering: 233

East Peds: 3

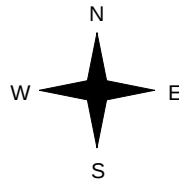
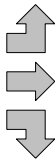
Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	0	0	0



Private lot

Heavys	Trucks	Cars	Totals
0	0	0	0
0	0	0	0
0	0	2	2
0	0	2	



Essa Rd

Essa Rd

Cars	Trucks	Heavys	Totals
223	0	0	223
0	0	0	0
10	0	0	10
233	0	0	

Gowan St



Cars	Trucks	Heavys	Totals
121	0	0	121

Peds Cross: $\bowtie$

West Peds: 7

West Entering: 2

West Leg Total: 2

Cars	309	Cars	0	373	7	380
Trucks	8	Trucks	0	8	0	8
Heavys	0	Heavys	0	0	0	0
Totals	317	Totals	0	381	7	



Peds Cross: $\bowtie$

South Peds: 4

South Entering: 388

South Leg Total: 705

Comments

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 10:00:00

To: 14:00:00

One Hour Peak

From: 13:00:00

To: 14:00:00

Municipality: Barrie

Site #: 1807000003

Intersection: Essa Rd & Tiffin St

TFR File #: 1

Count date: 17-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Essa Rd runs N/S

North Leg Total: 659

North Entering: 291

North Peds: 0

Peds Cross: $\nlessgtr$

Heavys	0	0	0	0
Trucks	0	8	0	8
Cars	38	200	45	283
Totals	38	208	45	



Heavys 0

Trucks 4

Cars 364

Totals 368

East Leg Total: 712

East Entering: 290

East Peds: 3

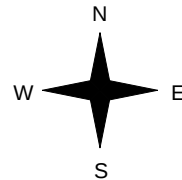
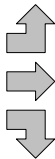
Peds Cross: $\nlessgtr$

Heavys	Trucks	Cars	Totals
0	3	227	230



Tiffin St

Heavys	Trucks	Cars	Totals
0	1	25	26
0	3	203	206
0	2	54	56
0	6	282	



Essa Rd



Cars	Trucks	Heavys	Totals
4	0	0	4
131	3	0	134
146	6	0	152
281	9	0	

Tiffin St



Cars	Trucks	Heavys	Totals
419	3	0	422

Peds Cross: $\nlessgtr$

West Peds: 5

West Entering: 288

West Leg Total: 518

Cars	400	Cars	58	335	171	564
Trucks	16	Trucks	0	3	0	3
Heavys	0	Heavys	0	0	0	0
Totals	416	Totals	58	338	171	



Peds Cross: $\nlessgtr$

South Peds: 3

South Entering: 567

South Leg Total: 983

Comments

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 10:00:00

To: 14:00:00

One Hour Peak

From: 13:00:00

To: 14:00:00

Municipality: Barrie

Site #: 1807000005

Intersection: Lakeshore Dr & GO Access

TFR File #: 1

Count date: 17-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Lakeshore Dr runs W/E

East Leg Total: 1368

East Entering: 633

East Peds: 1

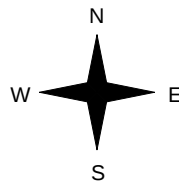
Peds Cross: 8

Heavys	Trucks	Cars	Totals
0	4	632	636



Lakeshore Dr

Heavys	Trucks	Cars	Totals
0	4	726	730
0	0	2	2
0	4	728	



GO Access

Cars	Trucks	Heavys	Totals
628	4	0	632
1	0	0	1
629	4	0	



Lakeshore Dr

Cars	Trucks	Heavys	Totals
731	4	0	735

Peds Cross: 8
West Peds: 9
West Entering: 732
West Leg Total: 1368

Cars	3
Trucks	0
Heavys	0
Totals	3



Cars	4	5	9
Trucks	0	0	0
Heavys	0	0	0
Totals	4	5	

Peds Cross: 1
South Peds: 1
South Entering: 9
South Leg Total: 12

Comments

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 10:00:00

To: 14:00:00

One Hour Peak

From: 13:00:00

To: 14:00:00

Municipality: Barrie

Site #: 1807000004

Intersection: Lakeshore Dr & Tiffin St

TFR File #: 1

Count date: 17-Feb-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Lakeshore Dr runs W/E

North Leg Total: 1236

North Entering: 621

North Peds: 2

Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
0	0	0	0
0	0	2	2
145	8	466	619
145	8	468	



Heavys 0

Trucks 2

Cars 613

Totals 615

East Leg Total: 1381

East Entering: 649

East Peds: 8

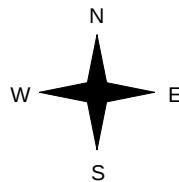
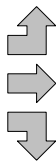
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
0	15	339	354



Lakeshore Dr

Heavys	Trucks	Cars	Totals
0	0	157	157
0	3	255	258
0	0	6	6
0	3	418	



Tiffin St



Cars	Trucks	Heavys	Totals
455	2	0	457
186	1	0	187
5	0	0	5
646	3	0	

Lakeshore Dr



Cars	Trucks	Heavys	Totals
727	5	0	732

Peds Cross: $\times$

West Peds: 0

West Entering: 421

West Leg Total: 775

Cars	Trucks	Heavys	Totals
19	0	0	19



Cars	Trucks	Heavys	Totals
8	14	0	22
1	0	0	1
6	0	0	6
15	14	0	

Peds Cross: $\times$

South Peds: 6

South Entering: 29

South Leg Total: 48

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Barrie
Site #: 1807000001
Intersection: Essa Rd & Gowan St
TFR File #: 1
Count date: 17-Feb-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Essa Rd runs N/S

North Leg Total: 3697
 North Entering: 1611
 North Peds: 6
 Peds Cross: $\bowtie$

	Heavys	Trucks	Cars	Totals
North	0	0	0	0
East	0	34	1	35
South	1	1143	432	1576
Totals	1	1177	433	

	Heavys	Trucks	Cars	Totals
North	0	39	2047	2086
East	0	0	0	0
South	0	0	0	0
Totals	0	39	2047	2086

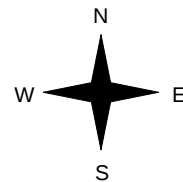
East Leg Total: 1209
 East Entering: 752
 East Peds: 32
 Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	0	3	3



Private lot

Heavys	Trucks	Cars	Totals
0	0	0	0
0	0	0	0
0	0	4	4
0	0	4	4



Essa Rd



Cars	Trucks	Heavys	Totals
722	3	0	725
0	0	0	0
27	0	0	27
749	3	0	

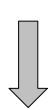
Gowan St



Cars	Trucks	Heavys	Totals
456	1	0	457

Peds Cross: $\bowtie$
 West Peds: 28
 West Entering: 4
 West Leg Total: 7

Cars	Trucks	Heavys	Totals
1174	34	0	1208



Cars	Trucks	Heavys	Totals
2	0	0	2
1325	36	0	1361
24	0	0	24
1351	36	0	

Peds Cross: $\bowtie$
 South Peds: 17
 South Entering: 1387
 South Leg Total: 2595

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Barrie
Site #: 1807000003
Intersection: Essa Rd & Tiffin St
TFR File #: 1
Count date: 17-Feb-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Essa Rd runs N/S

North Leg Total: 2394
 North Entering: 1108
 North Peds: 6
 Peds Cross: $\bowtie$

	Heavys	Trucks	Cars	Totals
North	0	0	0	0
East	1	36	0	37
South	119	802	150	1071
Totals	120	838	150	

	Heavys	Trucks	Cars	Totals
North	0	17	1269	1286
East	0	17	1269	1286
South	0	17	1269	1286
Totals	0	17	1269	1286

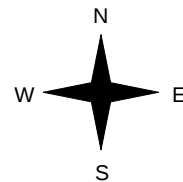
East Leg Total: 2602
 East Entering: 1116
 East Peds: 14
 Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	16	960	976



Tiffin St

Heavys	Trucks	Cars	Totals
0	2	112	114
0	11	770	781
0	9	210	219
0	22	1092	



Essa Rd



Cars	Trucks	Heavys	Totals
15	0	0	15
580	13	0	593
485	23	0	508
1080	36	0	

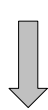
Tiffin St



Cars	Trucks	Heavys	Totals
1472	14	0	1486

Peds Cross: $\bowtie$
 West Peds: 13
 West Entering: 1114
 West Leg Total: 2090

	Cars	Trucks	Heavys	Totals
West	1497	68	0	1565
East	261	2	0	263
South	1142	15	0	1157
Totals	552	3	0	555



	Cars	Trucks	Heavys	Totals
West	261	2	0	263
East	1142	15	0	1157
South	552	3	0	555
Totals	1955	20	0	

Peds Cross: $\bowtie$
 South Peds: 9
 South Entering: 1975
 South Leg Total: 3540

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Barrie
Site #: 1807000005
Intersection: Lakeshore Dr & GO Access
TFR File #: 1
Count date: 17-Feb-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Lakeshore Dr runs W/E

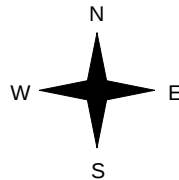
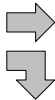
East Leg Total: 4871
 East Entering: 2373
 East Peds: 10
 Peds Cross: 8

Heavys	Trucks	Cars	Totals
0	13	2385	2398



Lakeshore Dr

Heavys	Trucks	Cars	Totals
0	19	2453	2472
0	0	13	13
0	19	2466	



GO Access

Cars	Trucks	Heavys	Totals
------	--------	--------	--------

2352	13	0	2365
8	0	0	8
2360	13	0	

Lakeshore Dr

Cars	Trucks	Heavys	Totals
2479	19	0	2498

Peds Cross: 8
 West Peds: 24
 West Entering: 2485
 West Leg Total: 4883

Cars	21
Trucks	0
Heavys	0
Totals	21



Cars	33	26	59
Trucks	0	0	0
Heavys	0	0	0
Totals	33	26	

Peds Cross: 3
 South Peds: 3
 South Entering: 59
 South Leg Total: 80

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Barrie
Site #: 1807000004
Intersection: Lakeshore Dr & Tiffin St
TFR File #: 1
Count date: 17-Feb-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Lakeshore Dr runs W/E

North Leg Total: 4310
 North Entering: 2131
 North Peds: 16
 Peds Cross: $\bowtie$

	Heavys	Trucks	Cars	Totals
0	0	0	0	0
0	0	7	7	7
488	39	1597	2124	
488	39	1604		

	Heavys	Trucks	Cars	Totals
0	0	7	2172	2179

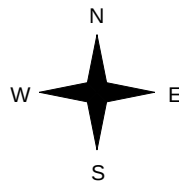
East Leg Total: 4907
 East Entering: 2414
 East Peds: 29
 Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	60	1297	1357



Lakeshore Dr

Heavys	Trucks	Cars	Totals
0	2	555	557
0	13	866	879
0	0	30	30
0	15	1451	



Tiffin St

Cars	Trucks	Heavys	Totals
1605	5	0	1610
788	7	0	795
9	0	0	9
2402	12	0	

Lakeshore Dr



Cars	Trucks	Heavys	Totals
2473	20	0	2493

Peds Cross: $\bowtie$
 West Peds: 7
 West Entering: 1466
 West Leg Total: 2823

	Cars	Trucks	Heavys	Totals
78	0	0	78	
21	53	0	74	
12	0	0	12	
10	0	0	10	
43	53	0		

Peds Cross: $\bowtie$
 South Peds: 22
 South Entering: 96
 South Leg Total: 174

Comments

Ontario Traffic Inc.

Traffic Count Summary

Intersection: Essa Rd & Gowan St

Count Date: 17-Feb-18

Municipality: Barrie

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
10:00:00	0	0	0	0	0	0	10:00:00	0	0	0	0	0
11:00:00	104	283	1	388	2	702	11:00:00	0	308	6	314	5
12:00:00	111	297	0	408	1	714	12:00:00	0	302	4	306	6
13:00:00	104	292	0	396	1	775	13:00:00	2	370	7	379	2
14:00:00	114	305	0	419	2	807	14:00:00	0	381	7	388	4

East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
10:00:00	0	0	0	0	0	0	10:00:00	0	0	0	0	0
11:00:00	4	0	131	135	5	136	11:00:00	0	0	1	1	10
12:00:00	8	0	158	166	12	166	12:00:00	0	0	0	0	7
13:00:00	5	0	213	218	12	219	13:00:00	0	0	1	1	4
14:00:00	10	0	223	233	3	235	14:00:00	0	0	2	2	7

Calculated Values for Traffic Crossing Major Street

Hours Ending:	0:00	0:00	0:00	10:00	11:00	12:00	13:00	14:00
Crossing Values:	0	0	0	0	11	15	8	16

Ontario Traffic Inc.

Traffic Count Summary

Intersection: Essa Rd & Tiffin St

Count Date: 17-Feb-18

Municipality: Barrie

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
10:00:00	0	0	0	0	0	0	10:00:00	0	0	0	0	0
11:00:00	22	209	25	256	1	670	11:00:00	50	245	119	414	4
12:00:00	36	224	34	294	3	739	12:00:00	74	262	109	445	0
13:00:00	47	197	23	267	2	816	13:00:00	81	312	156	549	2
14:00:00	45	208	38	291	0	858	14:00:00	58	338	171	567	3

Ontario Traffic Inc.

Traffic Count Summary

Intersection: Lakeshore Dr & GO Access						Count Date: 17-Feb-18		Municipality: Barrie					
North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
10:00:00	0	0	0	0	0	0	10:00:00	0	0	0	0	0	
11:00:00	0	0	0	0	0	22	11:00:00	13	0	9	22	0	
12:00:00	0	0	0	0	0	19	12:00:00	12	0	7	19	1	
13:00:00	0	0	0	0	0	9	13:00:00	4	0	5	9	1	
14:00:00	0	0	0	0	0	9	14:00:00	4	0	5	9	1	

Ontario Traffic Inc.

Traffic Count Summary

Intersection: Lakeshore Dr & Tiffin St

Count Date: 17-Feb-18

Municipality: Barrie

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
10:00:00	0	0	0	0	0	0	10:00:00	0	0	0	0	0
11:00:00	335	15	111	461	5	488	11:00:00	18	8	1	27	8
12:00:00	384	10	107	501	4	520	12:00:00	15	2	2	19	2
13:00:00	417	6	125	548	5	569	13:00:00	19	1	1	21	6
14:00:00	468	8	145	621	2	650	14:00:00	22	1	6	29	6
						</						

Calculated Values for Traffic Crossing Major Street

Hours Ending:	0:00	0:00	0:00	10:00	11:00	12:00	13:00	14:00
Crossing Values:	0	0	0	0	380	416	451	506

[illegible]

Count Date: 17-Feb-18 Site #: 1807000001

[illegible]

[illegible]

Count Date: 17-Feb-18 Site #: 1807000003

[illegible]

[illegible]

Count Date: 17-Feb-18 Site #: 1807000005

[illegible]

[illegible]

Count Date: 17-Feb-18 Site #: 1807000004

[illegible]

[illegible]

Count Date: 17-Feb-18 Site #: 1807000001

[illegible]

[illegible]

Count Date: 17-Feb-18 Site #: 1807000003

[illegible]

[illegible]

Count Date: 17-Feb-18 Site #: 1807000005

[illegible]

[illegible]

Count Date: 17-Feb-18 Site #: 1807000004

[illegible]

[illegible]

Count Date: 17-Feb-18 **Site #:** 1807000001

[illegible]

[illegible]

Count Date: 17-Feb-18 Site #: 1807000003

[illegible]

[illegible]

Count Date: 17-Feb-18 Site #: 1807000005

[illegible]

[illegible]

Count Date: 17-Feb-18 Site #: 1807000004

[illegible]

Ontario Traffic Inc.

Count Date: 17-Feb-18 Site #: 1807000001

[illegible]

[illegible]

Count Date: 17-Feb-18 Site #: 1807000003

[illegible]

[illegible]

Count Date: 17-Feb-18 Site #: 1807000005

[illegible]

Ontario Traffic Inc.

Count Date: 17-Feb-18 Site #: 1807000004

[illegible]

B

Appendix B: Synchro Outputs

HCM Signalized Intersection Capacity Analysis

1: High St & Dunlop St W

Existing

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔	↔	↔	↔	↔		↔	
Traffic Volume (vph)	17	334	136	75	268	16	85	62	143	10	42	7
Future Volume (vph)	17	334	136	75	268	16	85	62	143	10	42	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0	6.0	3.0	6.0	6.0		6.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes		0.99			1.00	0.96	1.00	1.00	0.97		0.99	
Flpb, ped/bikes		1.00			1.00	1.00	0.99	1.00	1.00		1.00	
Frt		0.96			1.00	0.85	1.00	1.00	0.85		0.98	
Flt Protected		1.00			0.99	1.00	0.95	1.00	1.00		0.99	
Satd. Flow (prot)		3402			3561	1553	1785	1900	1573		1821	
Flt Permitted		0.94			0.73	1.00	0.70	1.00	1.00		0.90	
Satd. Flow (perm)		3198			2618	1553	1312	1900	1573		1657	
Peak-hour factor, PHF	1.00	0.86	0.84	0.77	0.92	0.63	0.80	0.91	0.82	0.44	0.71	0.45
Adj. Flow (vph)	17	388	162	97	291	25	106	68	174	23	59	16
RTOR Reduction (vph)	0	44	0	0	0	12	0	0	125	0	10	0
Lane Group Flow (vph)	0	523	0	0	388	13	106	68	49	0	88	0
Confl. Peds. (#/hr)	16		17	17		16	20		18	18		20
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		2		1	6		7	4			8	
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)		28.5			28.5	28.5	15.9	15.9	15.9		7.7	
Effective Green, g (s)		28.5			28.5	28.5	15.9	15.9	15.9		7.7	
Actuated g/C Ratio		0.51			0.51	0.51	0.28	0.28	0.28		0.14	
Clearance Time (s)		6.0			6.0	6.0	3.0	6.0	6.0		6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1616			1322	784	413	535	443		226	
v/s Ratio Prot							c0.02	0.04				
v/s Ratio Perm		c0.16			0.15	0.01	0.05		0.03		c0.05	
v/c Ratio		0.32			0.29	0.02	0.26	0.13	0.11		0.39	
Uniform Delay, d1		8.3			8.1	7.0	15.5	15.1	15.0		22.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.5			0.1	0.0	0.3	0.1	0.1		1.1	
Delay (s)		8.8			8.2	7.0	15.9	15.2	15.1		23.3	
Level of Service		A			A	A	B	B	B		C	
Approach Delay (s)		8.8			8.2			15.4			23.3	
Approach LOS		A			A			B			C	
Intersection Summary												
HCM 2000 Control Delay			11.2									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			56.4									Sum of lost time (s) 18.0
Intersection Capacity Utilization			69.1%									ICU Level of Service C
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Toronto St & Simcoe St

Existing

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	109	13	244	116	10	8	333	408	16	262	54
Future Volume (vph)	33	109	13	244	116	10	8	333	408	16	262	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1790	3236		1787	3258		1805	1863	1547	1800	1821	
Flt Permitted	0.67	1.00		0.61	1.00		0.36	1.00	1.00	0.28	1.00	
Satd. Flow (perm)	1253	3236		1146	3258		687	1863	1547	536	1821	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	118	14	265	126	11	9	362	443	17	285	59
RTOR Reduction (vph)	0	8	0	0	5	0	0	0	262	0	7	0
Lane Group Flow (vph)	36	124	0	265	132	0	9	362	181	17	337	0
Confl. Peds. (#/hr)	7					7			23	23		
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		2		1	6		7	4		3	8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	31.0	31.0		45.9	45.9		23.0	21.8	21.8	25.2	22.9	
Effective Green, g (s)	31.0	31.0		45.9	45.9		23.0	21.8	21.8	25.2	22.9	
Actuated g/C Ratio	0.36	0.36		0.54	0.54		0.27	0.26	0.26	0.30	0.27	
Clearance Time (s)	6.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	456	1180		708	1759		201	477	396	193	490	
v/s Ratio Prot		0.04		c0.05	0.04		0.00	c0.19		c0.00	0.18	
v/s Ratio Perm	0.03			c0.15			0.01		0.12	0.02		
v/c Ratio	0.08	0.10		0.37	0.08		0.04	0.76	0.46	0.09	0.69	
Uniform Delay, d1	17.7	17.8		10.6	9.4		23.1	29.2	26.6	22.0	27.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.2		0.3	0.0		0.1	6.8	0.8	0.2	4.0	
Delay (s)	18.0	18.0		11.0	9.4		23.2	36.0	27.5	22.2	31.8	
Level of Service	B	B		B	A		C	D	C	C	C	
Approach Delay (s)		18.0			10.4			31.2			31.4	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay	25.2			HCM 2000 Level of Service					C			
HCM 2000 Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	85.0			Sum of lost time (s)					18.0			
Intersection Capacity Utilization	85.6%			ICU Level of Service					E			
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Bradford St & Simcoe St

Existing
Timing Plan: AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (vph)	136	25	281	151	29	260
Future Volume (vph)	136	25	281	151	29	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	1.00	1.00	0.95	1.00		0.95
Frpb, ped/bikes	1.00	0.98	1.00	0.98		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		0.99
Satd. Flow (prot)	1787	1590	3610	1582		3588
Flt Permitted	0.95	1.00	1.00	1.00		0.90
Satd. Flow (perm)	1787	1590	3610	1582		3231
Peak-hour factor, PHF	0.87	0.85	0.88	0.74	0.75	0.82
Adj. Flow (vph)	156	29	319	204	39	317
RTOR Reduction (vph)	0	24	0	79	0	0
Lane Group Flow (vph)	156	5	319	125	0	356
Confl. Peds. (#/hr)	3	5		16	16	
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Actuated Green, G (s)	8.8	8.8	33.1	33.1		33.1
Effective Green, g (s)	8.8	8.8	33.1	33.1		33.1
Actuated g/C Ratio	0.16	0.16	0.61	0.61		0.61
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	291	259	2216	971		1984
v/s Ratio Prot	c0.09		0.09			
v/s Ratio Perm		0.00		0.08		c0.11
v/c Ratio	0.54	0.02	0.14	0.13		0.18
Uniform Delay, d1	20.7	18.9	4.4	4.4		4.5
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	1.9	0.0	0.1	0.3		0.2
Delay (s)	22.6	19.0	4.5	4.6		4.7
Level of Service	C	B	A	A		A
Approach Delay (s)	22.0		4.6			4.7
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			7.7		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.25			
Actuated Cycle Length (s)			53.9		Sum of lost time (s)	12.0
Intersection Capacity Utilization			60.0%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

6: Bradford St & Victoria St

Existing

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	15	10	8	23	19	10	428	9	32	262	46
Future Volume (vph)	9	15	10	8	23	19	10	428	9	32	262	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		1.00		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.96		1.00	0.93			1.00			0.98	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1678		1803	1757			3413			3357	
Flt Permitted		0.89		0.73	1.00			0.95			0.89	
Satd. Flow (perm)		1518		1391	1757			3232			2997	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	16	11	9	25	21	11	465	10	35	285	50
RTOR Reduction (vph)	0	10	0	0	19	0	0	2	0	0	12	0
Lane Group Flow (vph)	0	27	0	9	27	0	0	484	0	0	358	0
Confl. Peds. (#/hr)	4		1	1		4	4		3	3		4
Heavy Vehicles (%)	0%	8%	11%	0%	0%	0%	22%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.0		6.0	6.0			40.1			40.1	
Effective Green, g (s)		6.0		6.0	6.0			40.1			40.1	
Actuated g/C Ratio		0.10		0.10	0.10			0.69			0.69	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		156		143	181			2230			2068	
v/s Ratio Prot					0.02							
v/s Ratio Perm		c0.02		0.01				c0.15			0.12	
v/c Ratio		0.17		0.06	0.15			0.22			0.17	
Uniform Delay, d1		23.8		23.5	23.7			3.3			3.2	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.5		0.2	0.4			0.2			0.2	
Delay (s)		24.3		23.7	24.1			3.5			3.3	
Level of Service		C		C	C			A			A	
Approach Delay (s)		24.3			24.0			3.5			3.3	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			5.4			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.21									
Actuated Cycle Length (s)			58.1			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			53.4%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Essa Rd./Bradford St. & Tiffin St.

Existing
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	215	73	102	204	0	61	354	113	36	235	38
Future Volume (vph)	66	215	73	102	204	0	61	354	113	36	235	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	1.00
Frt	1.00	0.96		1.00	1.00			0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (prot)	1770	1770		1641	1845			3398			3354	1568
Flt Permitted	0.62	1.00		0.57	1.00			0.85			0.80	1.00
Satd. Flow (perm)	1149	1770		977	1845			2913			2711	1568
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.79	0.79	0.79
Adj. Flow (vph)	73	239	81	113	227	0	72	416	133	46	297	48
RTOR Reduction (vph)	0	11	0	0	0	0	0	30	0	0	0	34
Lane Group Flow (vph)	73	309	0	113	227	0	0	591	0	0	343	14
Heavy Vehicles (%)	2%	1%	10%	10%	3%	0%	2%	3%	0%	0%	8%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6	6	6
Actuated Green, G (s)	25.1	25.1		25.1	25.1			15.9			15.9	15.9
Effective Green, g (s)	25.1	25.1		25.1	25.1			15.9			15.9	15.9
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.30			0.30	0.30
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	544	838		462	873			873			813	470
v/s Ratio Prot		c0.17			0.12							
v/s Ratio Perm	0.06			0.12				c0.20			0.13	0.01
v/c Ratio	0.13	0.37		0.24	0.26			0.68			0.42	0.03
Uniform Delay, d1	7.8	8.9		8.3	8.4			16.3			14.9	13.1
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	0.5	1.3		1.3	0.7			2.1			0.4	0.0
Delay (s)	8.4	10.2		9.6	9.1			18.4			15.2	13.1
Level of Service	A	B		A	A			B			B	B
Approach Delay (s)		9.8			9.3			18.4			15.0	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			53.0			Sum of lost time (s)			15.0			
Intersection Capacity Utilization			83.5%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: Go Station East Access & Lakeshore Dr.

Existing
Timing Plan: AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	681	1	3	1023	3	2
Future Volume (vph)	681	1	3	1023	3	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Lane Util. Factor	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)	1881	1615	1805	1881	1805	1615
Flt Permitted	1.00	1.00	0.33	1.00	0.95	1.00
Satd. Flow (perm)	1881	1615	634	1881	1805	1615
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.31	0.31
Adj. Flow (vph)	740	1	3	1066	10	6
RTOR Reduction (vph)	0	0	0	0	0	6
Lane Group Flow (vph)	740	1	3	1066	10	0
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	91.9	91.9	97.3	97.3	4.5	4.5
Effective Green, g (s)	91.9	91.9	97.3	97.3	4.5	4.5
Actuated g/C Ratio	0.81	0.81	0.86	0.86	0.04	0.04
Clearance Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1532	1315	561	1622	72	64
v/s Ratio Prot	0.39		0.00	c0.57	c0.01	
v/s Ratio Perm		0.00	0.00			0.00
v/c Ratio	0.48	0.00	0.01	0.66	0.14	0.00
Uniform Delay, d1	3.2	1.9	1.8	2.5	52.3	52.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.0	0.0	2.1	0.9	0.0
Delay (s)	4.3	1.9	1.8	4.6	53.2	52.0
Level of Service	A	A	A	A	D	D
Approach Delay (s)	4.3			4.6	52.7	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			4.9		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.67			
Actuated Cycle Length (s)			112.8		Sum of lost time (s)	16.0
Intersection Capacity Utilization			71.3%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

12: Go Station West Access & Tiffin St. & Lakeshore Dr.

Existing
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	240	5	1	321	704	17	0	2	439	1	102
Future Volume (vph)	103	240	5	1	321	704	17	0	2	439	1	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0	6.0	6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1894		1805	3574	1599	1003	1615		1770	1571	
Flt Permitted	0.47	1.00		0.60	1.00	1.00	0.68	1.00		0.61	1.00	
Satd. Flow (perm)	876	1894		1139	3574	1599	722	1615		1145	1571	
Peak-hour factor, PHF	0.95	0.95	0.95	0.98	0.98	0.98	0.64	0.64	0.64	0.91	0.91	0.91
Adj. Flow (vph)	108	253	5	1	328	718	27	0	3	482	1	112
RTOR Reduction (vph)	0	1	0	0	0	497	0	0	0	0	58	0
Lane Group Flow (vph)	108	257	0	1	328	221	27	3	0	482	55	0
Heavy Vehicles (%)	1%	0%	0%	0%	1%	1%	80%	0%	0%	2%	0%	3%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	44.0	44.0		33.0	33.0	33.0	17.4	17.4		51.4	51.4	
Effective Green, g (s)	44.0	44.0		33.0	33.0	33.0	17.4	17.4		51.4	51.4	
Actuated g/C Ratio	0.41	0.41		0.31	0.31	0.31	0.16	0.16		0.48	0.48	
Clearance Time (s)	4.0	6.0		6.0	6.0	6.0	6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	418	775		349	1098	491	116	261		722	751	
v/s Ratio Prot	0.02	c0.14			0.09			0.00		c0.19	0.03	
v/s Ratio Perm	0.09			0.00		c0.14	0.04			c0.13		
v/c Ratio	0.26	0.33		0.00	0.30	0.45	0.23	0.01		0.67	0.07	
Uniform Delay, d1	20.1	21.7		25.8	28.4	29.9	39.2	37.8		20.2	15.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.2		0.0	0.7	3.0	1.0	0.0		2.3	0.2	
Delay (s)	20.4	22.8		25.8	29.1	32.9	40.2	37.8		22.5	15.3	
Level of Service	C	C		C	C	C	D	D		C	B	
Approach Delay (s)		22.1			31.7			40.0			21.2	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			27.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			107.4			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			96.0%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Essa Rd. & Gowan St.

Existing
Timing Plan: AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	199	341	5	153	252
Future Volume (vph)	4	199	341	5	153	252
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0			6.0
Lane Util. Factor	1.00		0.95			0.95
Frt	0.87		1.00			1.00
Flt Protected	1.00		1.00			0.98
Satd. Flow (prot)	1615		3424			3343
Flt Permitted	1.00		1.00			0.67
Satd. Flow (perm)	1615		3424			2290
Peak-hour factor, PHF	0.82	0.82	0.83	0.83	0.96	0.96
Adj. Flow (vph)	5	243	411	6	159	262
RTOR Reduction (vph)	220	0	0	0	0	0
Lane Group Flow (vph)	28	0	417	0	0	422
Heavy Vehicles (%)	0%	2%	5%	20%	1%	9%
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	10.9		91.0			91.0
Effective Green, g (s)	10.9		91.0			91.0
Actuated g/C Ratio	0.10		0.80			0.80
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		0.2			0.2
Lane Grp Cap (vph)	154		2735			1829
v/s Ratio Prot	c0.02		0.12			
v/s Ratio Perm						c0.18
v/c Ratio	0.18		0.15			0.23
Uniform Delay, d1	47.4		2.6			2.8
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.6		0.1			0.1
Delay (s)	48.0		2.7			2.9
Level of Service	D		A			A
Approach Delay (s)	48.0		2.7			2.9
Approach LOS	D		A			A
Intersection Summary						
HCM 2000 Control Delay			13.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.23			
Actuated Cycle Length (s)			113.9		Sum of lost time (s)	16.0
Intersection Capacity Utilization			151.9%		ICU Level of Service	H
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

1: High St & Dunlop St W

2021 Existing
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	452	102	121	348	24	156	117	176	14	87	16
Future Volume (vph)	6	452	102	121	348	24	156	117	176	14	87	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes		0.99			1.00	0.91	1.00	1.00	0.98		0.99	
Flpb, ped/bikes		1.00			1.00	1.00	0.99	1.00	1.00		1.00	
Frt		0.97			1.00	0.85	1.00	1.00	0.85		0.98	
Flt Protected		1.00			0.99	1.00	0.95	1.00	1.00		0.99	
Satd. Flow (prot)		3487			3544	1472	1793	1900	1582		1835	
Flt Permitted		0.94			0.65	1.00	0.39	1.00	1.00		0.92	
Satd. Flow (perm)		3269			2340	1472	730	1900	1582		1702	
Peak-hour factor, PHF	0.38	0.87	0.92	0.77	0.80	0.82	0.82	0.89	0.88	0.46	0.79	0.75
Adj. Flow (vph)	16	520	111	157	435	29	190	131	200	30	110	21
RTOR Reduction (vph)	0	12	0	0	0	11	0	0	142	0	7	0
Lane Group Flow (vph)	0	635	0	0	592	18	190	131	58	0	154	0
Confl. Peds. (#/hr)	39		25	25		39	24		7	7		24
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		2		1	6		7	4			8	
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)		51.0			51.0	51.0	23.1	23.1	23.1		13.1	
Effective Green, g (s)		53.0			53.0	53.0	22.1	25.1	25.1		15.1	
Actuated g/C Ratio		0.62			0.62	0.62	0.26	0.29	0.29		0.18	
Clearance Time (s)		6.0			6.0	6.0	3.0	6.0	6.0		6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		2012			1440	906	261	553	461		298	
v/s Ratio Prot							c0.05	0.07				
v/s Ratio Perm		0.19			c0.25	0.01	c0.14		0.04		0.09	
v/c Ratio		0.32			0.41	0.02	0.73	0.24	0.13		0.52	
Uniform Delay, d1		7.9			8.5	6.4	29.3	23.2	22.4		32.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.4			0.2	0.0	9.7	0.2	0.1		1.5	
Delay (s)		8.3			8.7	6.5	39.0	23.4	22.6		33.7	
Level of Service		A			A	A	D	C	C		C	
Approach Delay (s)		8.3			8.6			28.8			33.7	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			16.0									
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			86.1									
Intersection Capacity Utilization			65.8%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Bradford St & Simcoe St

2021 Existing
Timing Plan: PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	207	54	438	190	22	317
Future Volume (vph)	207	54	438	190	22	317
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	1.00	0.95	1.00		0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.98		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1805	1592	3610	1576		3595
Flt Permitted	0.95	1.00	1.00	1.00		0.91
Satd. Flow (perm)	1805	1592	3610	1576		3275
Peak-hour factor, PHF	0.78	0.63	0.90	0.85	0.81	0.92
Adj. Flow (vph)	265	86	487	224	27	345
RTOR Reduction (vph)	0	62	0	78	0	0
Lane Group Flow (vph)	265	24	487	146	0	372
Confl. Peds. (#/hr)	6	3		22	22	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Actuated Green, G (s)	13.5	13.5	30.1	30.1		30.1
Effective Green, g (s)	15.5	15.5	32.1	32.1		32.1
Actuated g/C Ratio	0.28	0.28	0.58	0.58		0.58
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	503	443	2084	909		1890
v/s Ratio Prot	c0.15		c0.13			
v/s Ratio Perm		0.02		0.09		0.11
v/c Ratio	0.53	0.05	0.23	0.16		0.20
Uniform Delay, d1	16.9	14.7	5.7	5.5		5.6
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	1.0	0.1	0.3	0.4		0.2
Delay (s)	17.9	14.7	6.0	5.9		5.8
Level of Service	B	B	A	A		A
Approach Delay (s)	17.2		6.0			5.8
Approach LOS	B		A			A
Intersection Summary						
HCM 2000 Control Delay			8.7		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.33			
Actuated Cycle Length (s)			55.6		Sum of lost time (s)	8.0
Intersection Capacity Utilization			56.7%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

4: Toronto St & Simcoe St

2021 Existing
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	164	21	387	188	19	3	333	373	18	377	67
Future Volume (vph)	49	164	21	387	188	19	3	333	373	18	377	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	0.98	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1760	3387		1801	3388		1805	1881	1546	1801	1857	
Flt Permitted	0.61	1.00		0.55	1.00		0.16	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	1133	3387		1044	3388		300	1881	1546	512	1857	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	178	23	421	204	21	3	362	405	20	410	73
RTOR Reduction (vph)	0	10	0	0	7	0	0	0	230	0	6	0
Lane Group Flow (vph)	53	191	0	421	218	0	3	362	175	20	477	0
Confl. Peds. (#/hr)	22		4	4		22			22	22		
Heavy Vehicles (%)	0%	5%	0%	0%	5%	0%	0%	1%	1%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		2		1	6		7	4		3	8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	30.4	30.4		48.7	48.7		27.6	26.3	26.3	30.0	27.5	
Effective Green, g (s)	32.4	32.4		47.7	50.7		25.6	28.3	28.3	28.0	29.5	
Actuated g/C Ratio	0.35	0.35		0.52	0.55		0.28	0.31	0.31	0.30	0.32	
Clearance Time (s)	6.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	396	1186		655	1856		87	575	472	175	592	
v/s Ratio Prot		0.06		c0.10	0.06		0.00	0.19		c0.00	c0.26	
v/s Ratio Perm	0.05			c0.23			0.01		0.11	0.03		
v/c Ratio	0.13	0.16		0.64	0.12		0.03	0.63	0.37	0.11	0.81	
Uniform Delay, d1	20.5	20.7		14.3	10.1		26.0	27.6	25.1	23.7	28.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.3		2.2	0.0		0.2	2.2	0.5	0.3	7.9	
Delay (s)	21.2	21.0		16.5	10.1		26.1	29.8	25.6	24.0	36.7	
Level of Service	C	C		B	B		C	C	C	C	D	
Approach Delay (s)		21.0			14.3			27.6			36.2	
Approach LOS		C			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			24.8			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			92.5			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			83.9%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Bradford St & Victoria St

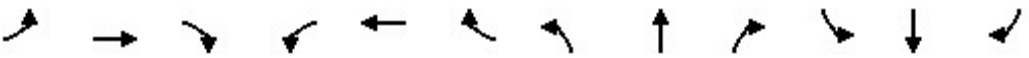
2021 Existing
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	29	27	19	32	21	25	500	24	20	598	19
Future Volume (vph)	29	29	27	19	32	21	25	500	24	20	598	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.96		1.00	0.94			0.99			1.00	
Flt Protected		0.98		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1777		1798	1775			3480			3481	
Flt Permitted		0.87		0.79	1.00			0.91			0.93	
Satd. Flow (perm)		1574		1488	1775			3184			3245	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	32	29	21	35	23	27	543	26	22	650	21
RTOR Reduction (vph)	0	24	0	0	19	0	0	3	0	0	3	0
Lane Group Flow (vph)	0	69	0	21	39	0	0	593	0	0	690	0
Confl. Peds. (#/hr)	6		5	5		6	5		2	2		5
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.1		8.1	8.1			37.1			37.1	
Effective Green, g (s)		10.1		10.1	10.1			39.1			39.1	
Actuated g/C Ratio		0.18		0.18	0.18			0.68			0.68	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		277		262	313			2176			2218	
v/s Ratio Prot					0.02							
v/s Ratio Perm		c0.04		0.01				0.19			c0.21	
v/c Ratio		0.25		0.08	0.12			0.27			0.31	
Uniform Delay, d1		20.3		19.7	19.8			3.5			3.6	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.5		0.1	0.2			0.3			0.4	
Delay (s)		20.8		19.8	20.0			3.8			4.0	
Level of Service		C		B	C			A			A	
Approach Delay (s)		20.8			20.0			3.8			4.0	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			5.9									
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			57.2									
Intersection Capacity Utilization			52.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Essa Rd./Bradford St. & Tiffin St.

2021 Existing
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	344	87	127	193	0	89	479	163	131	437	68
Future Volume (vph)	45	344	87	127	193	0	89	479	163	131	437	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	1.00
Frt	1.00	0.97		1.00	1.00			0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (prot)	1752	1813		1687	1863			3433			3462	1599
Flt Permitted	0.61	1.00		0.36	1.00			0.78			0.60	1.00
Satd. Flow (perm)	1134	1813		644	1863			2683			2108	1599
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.94	0.94	0.94	0.88	0.88	0.88
Adj. Flow (vph)	47	362	92	138	210	0	95	510	173	149	497	77
RTOR Reduction (vph)	0	9	0	0	0	0	0	27	0	0	0	44
Lane Group Flow (vph)	47	445	0	138	210	0	0	751	0	0	646	33
Heavy Vehicles (%)	3%	1%	4%	7%	2%	0%	3%	1%	0%	0%	4%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6	6	6
Actuated Green, G (s)	25.3	25.3		25.3	25.3			24.2			24.2	24.2
Effective Green, g (s)	27.3	27.3		27.3	27.3			26.2			26.2	26.2
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.43			0.43	0.43
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	503	804		285	826			1143			898	681
v/s Ratio Prot		c0.25			0.11							
v/s Ratio Perm	0.04			0.21				0.28			c0.31	0.02
v/c Ratio	0.09	0.55		0.48	0.25			0.66			0.72	0.05
Uniform Delay, d1	9.9	12.6		12.1	10.7			14.1			14.6	10.3
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	0.4	2.7		5.8	0.7			1.4			2.8	0.0
Delay (s)	10.3	15.3		17.9	11.5			15.4			17.4	10.4
Level of Service	B	B		B	B			B			B	B
Approach Delay (s)		14.9			14.0			15.4			16.6	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			15.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			61.5			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			93.6%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: Go Station East Access & Lakeshore Dr.

2021 Existing
Timing Plan: PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	1145	3	3	826	2	4
Future Volume (vph)	1145	3	3	826	2	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	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)	1900	1615	1805	1900	1805	1615
Flt Permitted	1.00	1.00	0.17	1.00	0.95	1.00
Satd. Flow (perm)	1900	1615	329	1900	1805	1615
Peak-hour factor, PHF	0.98	0.98	0.96	0.96	0.75	0.75
Adj. Flow (vph)	1168	3	3	860	3	5
RTOR Reduction (vph)	0	0	0	0	0	5
Lane Group Flow (vph)	1168	3	3	860	3	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	92.8	92.8	98.2	98.2	2.7	2.7
Effective Green, g (s)	94.8	94.8	98.2	100.2	3.7	3.7
Actuated g/C Ratio	0.85	0.85	0.88	0.90	0.03	0.03
Clearance Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1609	1368	307	1701	59	53
v/s Ratio Prot	c0.61		0.00	c0.45	c0.00	
v/s Ratio Perm		0.00	0.01			0.00
v/c Ratio	0.73	0.00	0.01	0.51	0.05	0.00
Uniform Delay, d1	3.4	1.3	5.3	1.1	52.4	52.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9	0.0	0.0	1.1	0.4	0.0
Delay (s)	6.3	1.3	5.3	2.2	52.8	52.3
Level of Service	A	A	A	A	D	D
Approach Delay (s)	6.3			2.2	52.5	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			4.7		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			111.9		Sum of lost time (s)	14.0
Intersection Capacity Utilization			75.3%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

12: Go Station West Access & Tiffin St. & Lakeshore Dr.

2021 Existing
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	461	16	2	274	552	23	1	2	685	23	118
Future Volume (vph)	154	461	16	2	274	552	23	1	2	685	23	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.89		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1891		1805	3610	1599	1031	1686		1805	1648	
Flt Permitted	0.46	1.00		0.41	1.00	1.00	0.66	1.00		0.63	1.00	
Satd. Flow (perm)	876	1891		784	3610	1599	720	1686		1205	1648	
Peak-hour factor, PHF	0.99	0.99	0.99	0.95	0.95	0.67	0.67	0.67	0.67	0.96	0.96	0.96
Adj. Flow (vph)	156	466	16	2	288	824	34	1	3	714	24	123
RTOR Reduction (vph)	0	1	0	0	0	574	0	0	0	0	62	0
Lane Group Flow (vph)	156	481	0	2	288	250	34	4	0	714	85	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	75%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	44.0	44.0		30.6	30.6	30.6	21.0	21.0		51.4	51.4	
Effective Green, g (s)	44.0	46.0		32.6	32.6	32.6	23.0	23.0		51.4	53.4	
Actuated g/C Ratio	0.41	0.43		0.30	0.30	0.30	0.21	0.21		0.48	0.50	
Clearance Time (s)	4.0	6.0		6.0	6.0	6.0	6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	440	809		237	1095	485	154	361		724	819	
v/s Ratio Prot	0.03	c0.25			0.08			0.00		c0.24	0.05	
v/s Ratio Perm	0.11			0.00		0.16	0.05			c0.23		
v/c Ratio	0.35	0.59		0.01	0.26	0.52	0.22	0.01		0.99	0.10	
Uniform Delay, d1	20.7	23.5		26.1	28.3	30.9	34.8	33.2		25.8	14.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	3.2		0.1	0.6	3.9	0.7	0.0		29.7	0.3	
Delay (s)	21.2	26.7		26.2	28.9	34.8	35.5	33.3		55.6	14.6	
Level of Service	C	C		C	C	C	D	C		E	B	
Approach Delay (s)		25.4			33.2			35.3			48.6	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			36.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			107.4			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			104.8%			ICU Level of Service				G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Essa Rd. & Gowan St.

2021 Existing
Timing Plan: PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	7	310	444	10	234	426
Future Volume (vph)	7	310	444	10	234	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	1.00		0.95			0.95
Frt	0.87		1.00			1.00
Flt Protected	1.00		1.00			0.98
Satd. Flow (prot)	1631		3495			3342
Flt Permitted	1.00		1.00			0.65
Satd. Flow (perm)	1631		3495			2198
Peak-hour factor, PHF	0.77	0.77	0.86	0.86	0.86	0.86
Adj. Flow (vph)	9	403	516	12	272	495
RTOR Reduction (vph)	354	0	1	0	0	0
Lane Group Flow (vph)	58	0	527	0	0	767
Heavy Vehicles (%)	0%	1%	3%	0%	10%	4%
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	12.1		91.1			91.1
Effective Green, g (s)	14.1		93.1			93.1
Actuated g/C Ratio	0.12		0.81			0.81
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		0.2			0.2
Lane Grp Cap (vph)	199		2824			1776
v/s Ratio Prot	c0.04		0.15			
v/s Ratio Perm						c0.35
v/c Ratio	0.29		0.19			0.43
Uniform Delay, d1	46.0		2.5			3.3
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.8		0.1			0.2
Delay (s)	46.8		2.6			3.4
Level of Service	D		A			A
Approach Delay (s)	46.8		2.6			3.4
Approach LOS	D		A			A
Intersection Summary						
HCM 2000 Control Delay			13.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.43			
Actuated Cycle Length (s)			115.2		Sum of lost time (s)	12.0
Intersection Capacity Utilization			162.9%		ICU Level of Service	H
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

1: High St & Dunlop St W

2031 Future Total

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	428	202	118	343	20	187	82	201	13	56	9
Future Volume (vph)	22	428	202	118	343	20	187	82	201	13	56	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes		0.99			1.00	0.96	1.00	1.00	0.97		0.99	
Flpb, ped/bikes		1.00			1.00	1.00	0.99	1.00	1.00		1.00	
Frt		0.95			1.00	0.85	1.00	1.00	0.85		0.98	
Flt Protected		1.00			0.99	1.00	0.95	1.00	1.00		0.99	
Satd. Flow (prot)		3385			3554	1552	1793	1900	1572		1824	
Flt Permitted		0.93			0.60	1.00	0.49	1.00	1.00		0.90	
Satd. Flow (perm)		3161			2176	1552	932	1900	1572		1665	
Peak-hour factor, PHF	1.00	0.86	0.84	0.77	0.92	0.63	0.80	0.91	0.82	0.44	0.71	0.45
Adj. Flow (vph)	22	498	240	153	373	32	234	90	245	30	79	20
RTOR Reduction (vph)	0	59	0	0	0	17	0	0	147	0	10	0
Lane Group Flow (vph)	0	701	0	0	526	15	234	90	98	0	119	0
Confl. Peds. (#/hr)	16		17	17		16	20		18	18		20
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		2		1	6		7	4			8	
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)		25.4			25.4	25.4	21.6	21.6	21.6		8.5	
Effective Green, g (s)		27.4			27.4	27.4	20.6	23.6	23.6		10.5	
Actuated g/C Ratio		0.46			0.46	0.46	0.35	0.40	0.40		0.18	
Clearance Time (s)		6.0			6.0	6.0	3.0	6.0	6.0		6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1467			1010	720	458	760	628		296	
v/s Ratio Prot							c0.08	0.05				
v/s Ratio Perm		0.22			c0.24	0.01	c0.10		0.06		0.07	
v/c Ratio		0.48			0.52	0.02	0.51	0.12	0.16		0.40	
Uniform Delay, d1		10.9			11.2	8.5	14.8	11.1	11.3		21.5	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2		1.1			0.5	0.0	1.0	0.1	0.1		0.9	
Delay (s)		12.0			11.6	8.6	15.8	11.2	11.4		22.4	
Level of Service		B			B	A	B	B	B		C	
Approach Delay (s)		12.0			11.5			13.2			22.4	
Approach LOS		B			B			B			C	
Intersection Summary												
HCM 2000 Control Delay		12.9			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		59.0			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		67.2%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Toronto St & Simcoe St

2031 Future Total

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	160	17	322	158	13	10	426	522	20	345	74
Future Volume (vph)	62	160	17	322	158	13	10	426	522	20	345	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1792	3241		1787	3260		1805	1863	1548	1803	1820	
Flt Permitted	0.63	1.00		0.56	1.00		0.22	1.00	1.00	0.16	1.00	
Satd. Flow (perm)	1197	3241		1045	3260		414	1863	1548	307	1820	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	174	18	350	172	14	11	463	567	22	375	80
RTOR Reduction (vph)	0	8	0	0	6	0	0	0	287	0	9	0
Lane Group Flow (vph)	67	184	0	350	180	0	11	463	280	22	446	0
Confl. Peds. (#/hr)	7					7			23	23		
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		2		1	6		7	4		3	8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	30.4	30.4		40.5	40.5		25.6	24.4	24.4	28.2	25.7	
Effective Green, g (s)	32.4	32.4		39.5	42.5		23.6	26.4	26.4	26.2	27.7	
Actuated g/C Ratio	0.39	0.39		0.48	0.52		0.29	0.32	0.32	0.32	0.34	
Clearance Time (s)	6.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	470	1274		555	1681		121	596	495	124	611	
v/s Ratio Prot		0.06		c0.05	0.06		0.00	c0.25		c0.00	0.25	
v/s Ratio Perm	0.06			c0.26			0.03		0.18	0.05		
v/c Ratio	0.14	0.14		0.63	0.11		0.09	0.78	0.57	0.18	0.73	
Uniform Delay, d1	16.1	16.1		15.6	10.2		26.4	25.3	23.2	21.1	24.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.2		2.3	0.0		0.3	6.3	1.5	0.7	4.5	
Delay (s)	16.7	16.3		17.9	10.3		26.8	31.6	24.7	21.8	28.5	
Level of Service	B	B		B	B		C	C	C	C	C	
Approach Delay (s)		16.4			15.3			27.8			28.2	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			23.7			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			82.4			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			82.9%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: Bradford St & Site North Access/Simcoe St

2031 Future Total
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↕	↔	↔	↕	
Traffic Volume (vph)	46	10	10	184	9	67	13	344	213	42	306	42
Future Volume (vph)	46	10	10	184	9	67	13	344	213	42	306	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00	1.00	0.99	1.00	
Frt		0.98		1.00	0.87		1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.97		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1763		1784	1620		1770	3610	1579	1794	3543	
Flt Permitted		0.74		0.72	1.00		0.50	1.00	1.00	0.52	1.00	
Satd. Flow (perm)		1346		1359	1620		927	3610	1579	975	3543	
Peak-hour factor, PHF	0.92	0.92	0.92	0.87	0.92	0.85	0.92	0.88	0.74	0.75	0.82	0.92
Adj. Flow (vph)	50	11	11	211	10	79	14	391	288	56	373	46
RTOR Reduction (vph)	0	8	0	0	49	0	0	0	88	0	8	0
Lane Group Flow (vph)	0	64	0	211	40	0	14	391	200	56	411	0
Confl. Peds. (#/hr)				3		5			16	16		
Heavy Vehicles (%)	2%	2%	2%	1%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		7.1		23.2	23.2		32.0	32.0	32.0	32.0	32.0	
Effective Green, g (s)		6.6		25.2	25.2		34.0	34.0	34.0	34.0	34.0	
Actuated g/C Ratio		0.10		0.37	0.37		0.51	0.51	0.51	0.51	0.51	
Clearance Time (s)		4.5		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		132		595	607		469	1826	798	493	1792	
v/s Ratio Prot				c0.07	0.02			0.11			0.12	
v/s Ratio Perm		0.05		c0.06			0.02		c0.13	0.06		
v/c Ratio		0.48		0.35	0.07		0.03	0.21	0.25	0.11	0.23	
Uniform Delay, d1		28.7		15.1	13.5		8.3	9.2	9.4	8.7	9.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.8		0.4	0.0		0.1	0.3	0.8	0.5	0.3	
Delay (s)		31.5		15.4	13.5		8.4	9.5	10.1	9.2	9.6	
Level of Service		C		B	B		A	A	B	A	A	
Approach Delay (s)		31.5			14.9			9.7			9.5	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			11.7			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			67.2			Sum of lost time (s)			13.0			
Intersection Capacity Utilization			65.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Bradford St & Victoria St

2031 Future Total

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	19	13	10	29	24	13	496	12	64	304	104
Future Volume (vph)	12	19	13	10	29	24	13	496	12	64	304	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99		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	
Frt		0.96		1.00	0.93		1.00	1.00		1.00	0.96	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1680		1803	1760		1477	3428		1803	3287	
Flt Permitted		0.89		0.73	1.00		0.50	1.00		0.45	1.00	
Satd. Flow (perm)		1521		1378	1760		770	3428		845	3287	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	21	14	11	32	26	14	539	13	70	330	113
RTOR Reduction (vph)	0	12	0	0	22	0	0	2	0	0	31	0
Lane Group Flow (vph)	0	36	0	11	36	0	14	550	0	70	412	0
Confl. Peds. (#/hr)	4		1	1		4	4		3	3		4
Heavy Vehicles (%)	0%	8%	11%	0%	0%	0%	22%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.0		6.0	6.0		40.1	40.1		40.1	40.1	
Effective Green, g (s)		8.0		8.0	8.0		42.1	42.1		42.1	42.1	
Actuated g/C Ratio		0.14		0.14	0.14		0.72	0.72		0.72	0.72	
Clearance Time (s)		6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		209		189	242		557	2483		612	2381	
v/s Ratio Prot					0.02			c0.16			0.13	
v/s Ratio Perm		c0.02		0.01			0.02			0.08		
v/c Ratio		0.17		0.06	0.15		0.03	0.22		0.11	0.17	
Uniform Delay, d1		22.1		21.8	22.0		2.2	2.6		2.4	2.5	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4		0.1	0.3		0.1	0.2		0.4	0.2	
Delay (s)		22.5		21.9	22.3		2.3	2.8		2.8	2.7	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		22.5			22.3			2.8			2.7	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			4.7									
HCM 2000 Volume to Capacity ratio			0.21									
Actuated Cycle Length (s)			58.1									
Intersection Capacity Utilization			69.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Essa Rd./Bradford St. & Tiffin St.

2031 Future Total
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	394	114	176	341	0	93	427	190	84	269	51
Future Volume (vph)	87	394	114	176	341	0	93	427	190	84	269	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3361		1641	3505		1770	3353		1543	3343	1568
Flt Permitted	0.52	1.00		0.40	1.00		0.55	1.00		0.20	1.00	1.00
Satd. Flow (perm)	968	3361		685	3505		1018	3353		323	3343	1568
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.79	0.79	0.79
Adj. Flow (vph)	97	438	127	196	379	0	109	502	224	106	341	65
RTOR Reduction (vph)	0	36	0	0	0	0	0	75	0	0	0	38
Lane Group Flow (vph)	97	529	0	196	379	0	109	651	0	106	341	27
Heavy Vehicles (%)	2%	2%	10%	10%	3%	0%	2%	3%	2%	17%	8%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6	6	6
Actuated Green, G (s)	28.4	28.4		28.4	28.4		17.1	17.1		25.4	25.4	25.4
Effective Green, g (s)	30.4	30.4		30.4	30.4		19.1	19.1		24.4	27.4	27.4
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.29	0.29		0.37	0.42	0.42
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		3.0	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
Lane Grp Cap (vph)	447	1552		316	1619		295	973		199	1392	652
v/s Ratio Prot		0.16			0.11			0.19		0.03	0.10	
v/s Ratio Perm	0.10			0.29			0.11			0.16		0.02
v/c Ratio	0.22	0.34		0.62	0.23		0.37	0.67		0.53	0.24	0.04
Uniform Delay, d1	10.6	11.3		13.3	10.7		18.6	20.6		15.4	12.5	11.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.1	0.6		8.8	0.3		0.8	1.8		2.7	0.1	0.0
Delay (s)	11.7	11.9		22.2	11.0		19.3	22.3		18.1	12.6	11.4
Level of Service	B	B		C	B		B	C		B	B	B
Approach Delay (s)		11.9			14.8			21.9			13.6	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay			16.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			65.8			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			77.0%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: Go Station East Access & Lakeshore Dr.

2031 Future Total
Timing Plan: AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑
Traffic Volume (vph)	916	136	76	1367	126	84
Future Volume (vph)	916	136	76	1367	126	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
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)	3574	1615	1805	3574	1805	1615
Flt Permitted	1.00	1.00	0.19	1.00	0.95	1.00
Satd. Flow (perm)	3574	1615	358	3574	1805	1615
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.31	0.31
Adj. Flow (vph)	996	148	79	1424	406	271
RTOR Reduction (vph)	0	58	0	0	0	152
Lane Group Flow (vph)	996	90	79	1424	406	119
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	46.5	46.5	56.0	56.0	24.0	24.0
Effective Green, g (s)	48.5	48.5	56.0	58.0	25.0	25.0
Actuated g/C Ratio	0.53	0.53	0.62	0.64	0.27	0.27
Clearance Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1904	860	307	2277	495	443
v/s Ratio Prot	0.28		0.02	c0.40	c0.22	
v/s Ratio Perm		0.06	0.14			0.07
v/c Ratio	0.52	0.10	0.26	0.63	0.82	0.27
Uniform Delay, d1	13.8	10.5	9.0	9.9	30.9	25.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.2	0.4	1.3	10.5	0.3
Delay (s)	14.8	10.8	9.4	11.3	41.4	26.2
Level of Service	B	B	A	B	D	C
Approach Delay (s)	14.3			11.2	35.3	
Approach LOS	B			B	D	
Intersection Summary						
HCM 2000 Control Delay			17.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.74			
Actuated Cycle Length (s)			91.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			60.8%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

12: Go Station West Access & Tiffin St. & Lakeshore Dr.

2031 Future Total
Timing Plan: AM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		  			 								
Traffic Volume (vph)	146	440	34	0	522	971	34	0	0	611	0	141	
Future Volume (vph)	146	440	34	0	522	971	34	0	0	611	0	141	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0			4.0	4.0		
Lane Util. Factor	1.00	0.91			0.95	1.00	1.00			1.00	1.00		
Frt	1.00	0.99			1.00	0.85	1.00			1.00	0.85		
Flt Protected	0.95	1.00			1.00	1.00	0.95			0.95	1.00		
Satd. Flow (prot)	1787	4786			3574	1599	902			1770	1568		
Flt Permitted	0.29	1.00			1.00	1.00	0.66			0.62	1.00		
Satd. Flow (perm)	551	4786			3574	1599	626			1147	1568		
Peak-hour factor, PHF	0.95	0.95	0.95	0.98	0.98	0.98	0.64	0.64	0.64	0.91	0.91	0.91	
Adj. Flow (vph)	154	463	36	0	533	991	53	0	0	671	0	155	
RTOR Reduction (vph)	0	9	0	0	0	659	0	0	0	0	81	0	
Lane Group Flow (vph)	154	490	0	0	533	332	53	0	0	671	74	0	
Heavy Vehicles (%)	1%	0%	100%	100%	1%	1%	100%	100%	100%	2%	100%	3%	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm			pm+pt	NA		
Protected Phases	5	2			6			8		7	4		
Permitted Phases	2			6		6	8			4			
Actuated Green, G (s)	41.0	41.0			30.0	30.0	17.4			44.4	44.4		
Effective Green, g (s)	41.0	43.0			32.0	32.0	19.4			44.4	46.4		
Actuated g/C Ratio	0.42	0.44			0.33	0.33	0.20			0.46	0.48		
Clearance Time (s)	4.0	6.0			6.0	6.0	6.0			4.0	6.0		
Vehicle Extension (s)	3.0	0.2			0.2	0.2	3.0			3.0	3.0		
Lane Grp Cap (vph)	320	2112			1174	525	124			669	746		
v/s Ratio Prot	c0.03	0.10			0.15					c0.24	0.05		
v/s Ratio Perm	0.17					c0.21	0.08			c0.22			
v/c Ratio	0.48	0.23			0.45	0.63	0.43			1.00	0.10		
Uniform Delay, d1	18.8	16.9			25.8	27.7	34.1			24.9	14.0		
Progression Factor	1.00	1.00			1.00	1.00	1.00			1.00	1.00		
Incremental Delay, d2	1.1	0.3			1.3	5.7	2.4			35.5	0.3		
Delay (s)	19.9	17.2			27.1	33.4	36.5			60.4	14.3		
Level of Service	B	B			C	C	D			E	B		
Approach Delay (s)		17.8			31.2			36.5			51.7		
Approach LOS		B			C			D			D		
Intersection Summary													
HCM 2000 Control Delay			34.0									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.83										
Actuated Cycle Length (s)			97.4									Sum of lost time (s)	16.0
Intersection Capacity Utilization			100.5%									ICU Level of Service	G
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

13: Essa Rd. & Gowan St.

2031 Future Total
Timing Plan: AM Peak Hour

										
Movement	WBL	WBR	NBT	NBR	SBL	SBT				
Lane Configurations										
Traffic Volume (vph)	6	265	422	8	214	316				
Future Volume (vph)	6	265	422	8	214	316				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Total Lost time (s)	4.0		4.0		4.0	4.0				
Lane Util. Factor	1.00		0.95		1.00	0.95				
Frt	0.87		1.00		1.00	1.00				
Flt Protected	1.00		1.00		0.95	1.00				
Satd. Flow (prot)	1616		3419		1787	3312				
Flt Permitted	1.00		1.00		0.43	1.00				
Satd. Flow (perm)	1616		3419		807	3312				
Peak-hour factor, PHF	0.82	0.82	0.83	0.83	0.96	0.96				
Adj. Flow (vph)	7	323	508	10	223	329				
RTOR Reduction (vph)	285	0	1	0	0	0				
Lane Group Flow (vph)	45	0	517	0	223	329				
Heavy Vehicles (%)	0%	2%	5%	20%	1%	9%				
Turn Type	Prot		NA		pm+pt	NA				
Protected Phases	8		2		1	6				
Permitted Phases					6					
Actuated Green, G (s)	11.5		81.1		92.1	92.1				
Effective Green, g (s)	13.5		83.1		92.1	94.1				
Actuated g/C Ratio	0.12		0.72		0.80	0.81				
Clearance Time (s)	6.0		6.0		4.0	6.0				
Vehicle Extension (s)	3.0		0.2		3.0	0.2				
Lane Grp Cap (vph)	188		2457		702	2696				
v/s Ratio Prot	c0.03		0.15		c0.02	0.10				
v/s Ratio Perm					c0.23					
v/c Ratio	0.24		0.21		0.32	0.12				
Uniform Delay, d1	46.4		5.4		2.9	2.2				
Progression Factor	1.00		1.00		1.00	1.00				
Incremental Delay, d2	0.7		0.2		0.3	0.1				
Delay (s)	47.0		5.6		3.2	2.3				
Level of Service	D		A		A	A				
Approach Delay (s)	47.0		5.6			2.7				
Approach LOS	D		A			A				
Intersection Summary										
HCM 2000 Control Delay			14.2		HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio			0.31							
Actuated Cycle Length (s)			115.6		Sum of lost time (s)		12.0			
Intersection Capacity Utilization			80.3%		ICU Level of Service		D			
Analysis Period (min)			15							
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis

1: High St & Dunlop St W

2031 Future Total

Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	579	204	171	445	31	272	154	244	18	118	20
Future Volume (vph)	8	579	204	171	445	31	272	154	244	18	118	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes		0.99			1.00	0.96	1.00	1.00	0.97		0.99	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00		1.00	
Frt		0.96			1.00	0.85	1.00	1.00	0.85		0.98	
Flt Protected		1.00			0.98	1.00	0.95	1.00	1.00		0.99	
Satd. Flow (prot)		3417			3551	1547	1799	1900	1568		1825	
Flt Permitted		0.95			0.54	1.00	0.35	1.00	1.00		0.92	
Satd. Flow (perm)		3243			1930	1547	669	1900	1568		1695	
Peak-hour factor, PHF	1.00	0.86	0.84	0.77	0.92	0.63	0.80	0.91	0.82	0.44	0.71	0.45
Adj. Flow (vph)	8	673	243	222	484	49	340	169	298	41	166	44
RTOR Reduction (vph)	0	39	0	0	0	26	0	0	173	0	11	0
Lane Group Flow (vph)	0	885	0	0	706	23	340	169	125	0	240	0
Confl. Peds. (#/hr)	16		17	17		16	20		18	18		20
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		2		1	6		7	4			8	
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)		29.0			29.0	29.0	26.1	26.1	26.1		14.0	
Effective Green, g (s)		31.0			31.0	31.0	25.1	28.1	28.1		16.0	
Actuated g/C Ratio		0.46			0.46	0.46	0.37	0.42	0.42		0.24	
Clearance Time (s)		6.0			6.0	6.0	3.0	6.0	6.0		6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1498			891	714	386	795	656		404	
v/s Ratio Prot							c0.11	0.09				
v/s Ratio Perm		0.27			c0.37	0.01	c0.22		0.08		0.14	
v/c Ratio		0.59			1.17dl	0.03	0.88	0.21	0.19		0.59	
Uniform Delay, d1		13.4			15.3	9.9	19.0	12.4	12.3		22.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2		1.7			4.9	0.0	20.2	0.1	0.1		2.4	
Delay (s)		15.1			20.2	9.9	39.2	12.6	12.5		25.0	
Level of Service		B			C	A	D	B	B		C	
Approach Delay (s)		15.1			19.5			23.7			25.0	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			19.8									
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			67.1									
Intersection Capacity Utilization			84.0%									
Analysis Period (min)			15									
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Toronto St & Simcoe St

2031 Future Total

Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	230	32	510	256	24	4	426	477	23	508	96
Future Volume (vph)	83	230	32	510	256	24	4	426	477	23	508	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1792	3229		1787	3256		1805	1863	1543	1803	1824	
Flt Permitted	0.57	1.00		0.48	1.00		0.13	1.00	1.00	0.20	1.00	
Satd. Flow (perm)	1069	3229		894	3256		248	1863	1543	383	1824	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	250	35	554	278	26	4	463	518	25	552	104
RTOR Reduction (vph)	0	11	0	0	7	0	0	0	225	0	6	0
Lane Group Flow (vph)	90	274	0	554	297	0	4	463	293	25	650	0
Confl. Peds. (#/hr)	7					7			23	23		
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		2		1	6		7	4		3	8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	30.1	30.1		47.1	47.1		33.0	31.7	31.7	35.6	33.0	
Effective Green, g (s)	32.1	32.1		46.1	49.1		31.0	33.7	33.7	33.6	35.0	
Actuated g/C Ratio	0.33	0.33		0.48	0.51		0.32	0.35	0.35	0.35	0.36	
Clearance Time (s)	6.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	355	1075		547	1658		84	651	539	157	662	
v/s Ratio Prot		0.08		c0.14	0.09		0.00	0.25		c0.00	c0.36	
v/s Ratio Perm	0.08			c0.35			0.02		0.19	0.05		
v/c Ratio	0.25	0.26		1.01	0.18		0.05	0.71	0.54	0.16	0.98	
Uniform Delay, d1	23.4	23.4		23.1	12.8		25.9	27.1	25.2	22.7	30.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	0.6		41.7	0.1		0.2	3.7	1.1	0.5	30.1	
Delay (s)	25.1	24.0		64.8	12.8		26.2	30.8	26.3	23.1	60.5	
Level of Service	C	C		E	B		C	C	C	C	E	
Approach Delay (s)		24.3			46.4			28.4			59.2	
Approach LOS		C			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			40.4			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			96.4			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			95.8%			ICU Level of Service			F			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: Bradford St & Site North Access/Simcoe St

2031 Future Total
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	56	11	15	270	8	99	12	516	273	43	383	65
Future Volume (vph)	56	11	15	270	8	99	12	516	273	43	383	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.98		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.98		1.00	0.86		1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.97		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1757		1784	1608		1770	3610	1578	1796	3529	
Flt Permitted		0.72		0.70	1.00		0.41	1.00	1.00	0.39	1.00	
Satd. Flow (perm)		1307		1323	1608		770	3610	1578	728	3529	
Peak-hour factor, PHF	0.92	0.92	0.92	0.87	0.92	0.85	0.92	0.88	0.74	0.75	0.82	0.92
Adj. Flow (vph)	61	12	16	310	9	116	13	586	369	57	467	71
RTOR Reduction (vph)	0	10	0	0	69	0	0	0	79	0	11	0
Lane Group Flow (vph)	0	79	0	310	56	0	13	586	290	57	527	0
Confl. Peds. (#/hr)				3		5			16	16		
Heavy Vehicles (%)	2%	2%	2%	1%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		8.1		26.9	26.9		32.2	32.2	32.2	32.2	32.2	
Effective Green, g (s)		7.6		28.9	28.9		34.2	34.2	34.2	34.2	34.2	
Actuated g/C Ratio		0.11		0.41	0.41		0.48	0.48	0.48	0.48	0.48	
Clearance Time (s)		4.5		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		139		643	653		370	1736	759	350	1697	
v/s Ratio Prot				c0.11	0.03			0.16			0.15	
v/s Ratio Perm		0.06		c0.09			0.02		c0.18	0.08		
v/c Ratio		0.57		0.48	0.09		0.04	0.34	0.38	0.16	0.31	
Uniform Delay, d1		30.2		15.4	13.0		9.7	11.4	11.7	10.4	11.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		5.3		0.6	0.1		0.2	0.5	1.5	1.0	0.5	
Delay (s)		35.5		16.0	13.0		9.9	12.0	13.2	11.4	11.7	
Level of Service		D		B	B		A	B	B	B	B	
Approach Delay (s)		35.5			15.1			12.4			11.7	
Approach LOS		D			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.8			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			71.1			Sum of lost time (s)			13.0			
Intersection Capacity Utilization			65.4%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

6: Bradford St & Victoria St

2031 Future Total

Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	37	37	35	24	41	27	32	579	31	26	693	24
Future Volume (vph)	37	37	35	24	41	27	32	579	31	26	693	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		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	1.00	
Frt		0.96		1.00	0.94		1.00	0.99		1.00	0.99	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1673		1804	1777		1478	3416		1803	3418	
Flt Permitted		0.86		0.72	1.00		0.34	1.00		0.40	1.00	
Satd. Flow (perm)		1469		1367	1777		535	3416		750	3418	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	40	38	26	45	29	35	629	34	28	753	26
RTOR Reduction (vph)	0	31	0	0	24	0	0	4	0	0	3	0
Lane Group Flow (vph)	0	87	0	26	50	0	35	659	0	28	776	0
Confl. Peds. (#/hr)	4		1	1		4	4		3	3		4
Heavy Vehicles (%)	0%	8%	11%	0%	0%	0%	22%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.4		8.4	8.4		37.1	37.1		37.1	37.1	
Effective Green, g (s)		10.4		10.4	10.4		39.1	39.1		39.1	39.1	
Actuated g/C Ratio		0.18		0.18	0.18		0.68	0.68		0.68	0.68	
Clearance Time (s)		6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		265		247	321		363	2322		510	2324	
v/s Ratio Prot					0.03			0.19			c0.23	
v/s Ratio Perm		c0.06		0.02			0.07			0.04		
v/c Ratio		0.33		0.11	0.16		0.10	0.28		0.05	0.33	
Uniform Delay, d1		20.5		19.7	19.9		3.2	3.6		3.1	3.8	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.7		0.2	0.2		0.5	0.3		0.2	0.4	
Delay (s)		21.2		19.9	20.1		3.7	4.0		3.3	4.2	
Level of Service		C		B	C		A	A		A	A	
Approach Delay (s)		21.2			20.0			3.9			4.2	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			6.2									
HCM 2000 Volume to Capacity ratio			0.33									
Actuated Cycle Length (s)			57.5									
Intersection Capacity Utilization			47.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Essa Rd./Bradford St. & Tiffin St.

2031 Future Total
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	535	126	207	339	0	131	577	251	216	511	89
Future Volume (vph)	59	535	126	207	339	0	131	577	251	216	511	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.5	4.0		4.5	4.0		5.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3387		1641	3505		1770	3355		1543	3343	1568
Flt Permitted	0.53	1.00		0.14	1.00		0.32	1.00		0.13	1.00	1.00
Satd. Flow (perm)	984	3387		238	3505		600	3355		204	3343	1568
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.79	0.79	0.79
Adj. Flow (vph)	66	594	140	230	377	0	154	679	295	273	647	113
RTOR Reduction (vph)	0	20	0	0	0	0	0	49	0	0	0	73
Lane Group Flow (vph)	66	714	0	230	377	0	154	925	0	273	647	40
Heavy Vehicles (%)	2%	2%	10%	10%	3%	0%	2%	3%	2%	17%	8%	3%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6	6	6
Actuated Green, G (s)	25.0	25.0		41.0	41.0		37.5	27.9		46.9	33.3	33.3
Effective Green, g (s)	27.0	27.0		40.5	43.0		36.5	29.9		45.9	35.3	35.3
Actuated g/C Ratio	0.27	0.27		0.41	0.43		0.37	0.30		0.46	0.35	0.35
Clearance Time (s)	6.0	6.0		4.0	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
Lane Grp Cap (vph)	265	915		257	1508		325	1004		281	1181	554
v/s Ratio Prot		0.21		c0.10	0.11		0.04	0.28		c0.14	0.19	
v/s Ratio Perm	0.07			c0.26			0.13			c0.31		0.03
v/c Ratio	0.25	0.78		0.89	0.25		0.47	0.92		0.97	0.55	0.07
Uniform Delay, d1	28.5	33.7		23.5	18.2		22.2	33.9		27.7	25.9	21.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.2	6.5		30.1	0.4		1.1	13.3		45.6	0.5	0.1
Delay (s)	30.8	40.2		53.5	18.6		23.3	47.2		73.4	26.4	21.5
Level of Service	C	D		D	B		C	D		E	C	C
Approach Delay (s)		39.5			31.8			43.9			38.3	
Approach LOS		D			C			D			D	
Intersection Summary												
HCM 2000 Control Delay		39.2			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.93										
Actuated Cycle Length (s)		99.9			Sum of lost time (s)			17.5				
Intersection Capacity Utilization		90.1%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: Go Station East Access & Lakeshore Dr.

2031 Future Total
Timing Plan: PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↑
Traffic Volume (vph)	1530	223	27	1094	130	87
Future Volume (vph)	1530	223	27	1094	130	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
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)	3574	1615	1805	3574	1805	1615
Flt Permitted	1.00	1.00	0.07	1.00	0.95	1.00
Satd. Flow (perm)	3574	1615	131	3574	1805	1615
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.31	0.31
Adj. Flow (vph)	1663	242	28	1140	419	281
RTOR Reduction (vph)	0	54	0	0	0	113
Lane Group Flow (vph)	1663	188	28	1140	419	168
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	53.8	53.8	60.5	60.5	24.0	24.0
Effective Green, g (s)	55.8	55.8	60.5	62.5	25.0	25.0
Actuated g/C Ratio	0.58	0.58	0.63	0.65	0.26	0.26
Clearance Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2088	943	130	2339	472	422
v/s Ratio Prot	c0.47		0.01	c0.32	c0.23	
v/s Ratio Perm		0.12	0.13			0.10
v/c Ratio	0.80	0.20	0.22	0.49	0.89	0.40
Uniform Delay, d1	15.4	9.3	14.5	8.4	33.9	29.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	0.5	0.8	0.7	18.0	0.6
Delay (s)	18.7	9.8	15.3	9.1	51.9	29.7
Level of Service	B	A	B	A	D	C
Approach Delay (s)	17.6			9.3	43.0	
Approach LOS	B			A	D	
Intersection Summary						
HCM 2000 Control Delay			19.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			95.5		Sum of lost time (s)	14.0
Intersection Capacity Utilization			57.3%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

12: Go Station West Access & Tiffin St. & Lakeshore Dr.

2031 Future Total
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 							
Traffic Volume (vph)	213	720	32	0	461	762	32	0	0	1034	0	181
Future Volume (vph)	213	720	32	0	461	762	32	0	0	1034	0	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	0.91			0.95	1.00	1.00			1.00	1.00	
Frt	1.00	0.99			1.00	0.85	1.00			1.00	0.85	
Flt Protected	0.95	1.00			1.00	1.00	0.95			0.95	1.00	
Satd. Flow (prot)	1787	4941			3574	1599	902			1770	1568	
Flt Permitted	0.22	1.00			1.00	1.00	0.55			0.76	1.00	
Satd. Flow (perm)	422	4941			3574	1599	519			1410	1568	
Peak-hour factor, PHF	0.95	0.95	0.95	0.98	0.98	0.98	0.64	0.64	0.64	0.91	0.91	0.91
Adj. Flow (vph)	224	758	34	0	470	778	50	0	0	1136	0	199
RTOR Reduction (vph)	0	3	0	0	0	608	0	0	0	0	72	0
Lane Group Flow (vph)	224	789	0	0	470	170	50	0	0	1136	127	0
Heavy Vehicles (%)	1%	0%	100%	100%	1%	1%	100%	100%	100%	2%	100%	3%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm			pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	43.0	43.0			30.0	30.0	16.9			93.2	91.2	
Effective Green, g (s)	43.0	45.0			32.0	32.0	18.9			93.2	93.2	
Actuated g/C Ratio	0.29	0.31			0.22	0.22	0.13			0.64	0.64	
Clearance Time (s)	4.0	6.0			6.0	6.0	6.0			4.0	6.0	
Vehicle Extension (s)	3.0	0.2			0.2	0.2	3.0			3.0	3.0	
Lane Grp Cap (vph)	208	1520			782	349	67			1071	999	
v/s Ratio Prot	c0.07	0.16			0.13					c0.51	0.08	
v/s Ratio Perm	c0.25					0.11	0.10			c0.17		
v/c Ratio	1.08	0.52			0.60	0.49	0.75			1.06	0.13	
Uniform Delay, d1	49.0	41.7			51.4	49.9	61.3			24.8	10.5	
Progression Factor	1.00	1.00			1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	84.3	1.3			3.4	4.8	35.8			45.1	0.3	
Delay (s)	133.3	43.0			54.8	54.7	97.2			69.9	10.7	
Level of Service	F	D			D	D	F			E	B	
Approach Delay (s)		62.9			54.8			97.2			61.1	
Approach LOS		E			D			F			E	
Intersection Summary												
HCM 2000 Control Delay			59.9				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.10									
Actuated Cycle Length (s)			146.2				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			124.0%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Essa Rd. & Gowan St.

2031 Future Total
Timing Plan: PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	8	386	538	13	302	518
Future Volume (vph)	8	386	538	13	302	518
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frt	0.87		1.00		1.00	1.00
Flt Protected	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1615		3414		1787	3312
Flt Permitted	1.00		1.00		0.25	1.00
Satd. Flow (perm)	1615		3414		468	3312
Peak-hour factor, PHF	0.82	0.82	0.83	0.83	0.96	0.96
Adj. Flow (vph)	10	471	648	16	315	540
RTOR Reduction (vph)	222	0	2	0	0	0
Lane Group Flow (vph)	259	0	662	0	315	540
Heavy Vehicles (%)	0%	2%	5%	20%	1%	9%
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	27.0		28.0		41.0	41.0
Effective Green, g (s)	29.0		30.0		41.0	43.0
Actuated g/C Ratio	0.36		0.38		0.51	0.54
Clearance Time (s)	6.0		6.0		4.0	6.0
Vehicle Extension (s)	3.0		0.2		3.0	0.2
Lane Grp Cap (vph)	585		1280		388	1780
v/s Ratio Prot	c0.16		0.19		c0.09	0.16
v/s Ratio Perm					c0.32	
v/c Ratio	0.44		0.52		0.81	0.30
Uniform Delay, d1	19.4		19.4		13.1	10.2
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5		1.5		12.2	0.4
Delay (s)	19.9		20.9		25.3	10.7
Level of Service	B		C		C	B
Approach Delay (s)	19.9		20.9			16.0
Approach LOS	B		C			B
Intersection Summary						
HCM 2000 Control Delay			18.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			74.4%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

1: High St & Dunlop St W

2041 Future Total

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	522	265	157	418	24	209	121	296	16	80	11
Future Volume (vph)	27	522	265	157	418	24	209	121	296	16	80	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes		0.99			1.00	0.96	1.00	1.00	0.97		1.00	
Flpb, ped/bikes		1.00			1.00	1.00	0.99	1.00	1.00		1.00	
Frt		0.95			1.00	0.85	1.00	1.00	0.85		0.98	
Flt Protected		1.00			0.98	1.00	0.95	1.00	1.00		0.99	
Satd. Flow (prot)		3374			3552	1549	1795	1900	1570		1831	
Flt Permitted		0.93			0.54	1.00	0.46	1.00	1.00		0.91	
Satd. Flow (perm)		3126			1931	1549	870	1900	1570		1684	
Peak-hour factor, PHF	1.00	0.86	0.84	0.77	0.92	0.63	0.80	0.91	0.82	0.44	0.71	0.45
Adj. Flow (vph)	27	607	315	204	454	38	261	133	361	36	113	24
RTOR Reduction (vph)	0	67	0	0	0	20	0	0	191	0	8	0
Lane Group Flow (vph)	0	882	0	0	658	18	261	133	170	0	165	0
Confl. Peds. (#/hr)	16		17	17		16	20		18	18		20
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		2		1	6		7	4			8	
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)		28.2			28.2	28.2	23.4	23.4	23.4		12.3	
Effective Green, g (s)		30.2			30.2	30.2	22.4	25.4	25.4		14.3	
Actuated g/C Ratio		0.47			0.47	0.47	0.35	0.40	0.40		0.22	
Clearance Time (s)		6.0			6.0	6.0	3.0	6.0	6.0		6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1484			916	735	409	758	627		378	
v/s Ratio Prot							c0.07	0.07				
v/s Ratio Perm		0.28			c0.34	0.01	c0.15		0.11		0.10	
v/c Ratio		0.59			1.07dl	0.02	0.64	0.18	0.27		0.44	
Uniform Delay, d1		12.2			13.3	8.9	16.3	12.3	12.9		21.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2		1.8			2.7	0.0	3.3	0.1	0.2		0.8	
Delay (s)		14.0			16.0	8.9	19.6	12.4	13.1		22.0	
Level of Service		B			B	A	B	B	B		C	
Approach Delay (s)		14.0			15.6			15.2			22.0	
Approach LOS		B			B			B			C	
Intersection Summary												
HCM 2000 Control Delay		15.3			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.74										
Actuated Cycle Length (s)		63.6			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		73.1%			ICU Level of Service			D				
Analysis Period (min)		15										
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Toronto St & Simcoe St

2041 Future Total

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	281	21	390	230	16	12	519	636	24	418	124
Future Volume (vph)	156	281	21	390	230	16	12	519	636	24	418	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1792	3251		1787	3263		1805	1863	1547	1804	1807	
Flt Permitted	0.59	1.00		0.46	1.00		0.15	1.00	1.00	0.14	1.00	
Satd. Flow (perm)	1108	3251		862	3263		278	1863	1547	266	1807	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	170	305	23	424	250	17	13	564	691	26	454	135
RTOR Reduction (vph)	0	6	0	0	5	0	0	0	274	0	11	0
Lane Group Flow (vph)	170	322	0	424	262	0	13	564	417	26	578	0
Confl. Peds. (#/hr)	7					7			23	23		
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		2		1	6		7	4		3	8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	30.2	30.2		40.2	40.2		29.6	28.3	28.3	32.2	29.6	
Effective Green, g (s)	32.2	32.2		39.2	42.2		27.6	30.3	30.3	30.2	31.6	
Actuated g/C Ratio	0.37	0.37		0.46	0.49		0.32	0.35	0.35	0.35	0.37	
Clearance Time (s)	6.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	414	1215		456	1599		94	655	544	121	663	
v/s Ratio Prot		0.10		c0.06	0.08		0.00	0.30		c0.00	c0.32	
v/s Ratio Perm	0.15			c0.36			0.04		0.27	0.07		
v/c Ratio	0.41	0.26		0.93	0.16		0.14	0.86	0.77	0.21	0.87	
Uniform Delay, d1	19.9	18.7		21.8	12.2		26.9	25.9	24.8	21.5	25.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.0	0.5		25.3	0.0		0.7	11.2	6.4	0.9	12.0	
Delay (s)	22.9	19.3		47.1	12.2		27.6	37.2	31.1	22.4	37.4	
Level of Service	C	B		D	B		C	D	C	C	D	
Approach Delay (s)		20.5			33.6			33.8			36.8	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			32.2			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			86.1			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			89.5%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Bradford St & Site North Access/Simcoe St

2041 Future Total
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↕	↔	↔	↕	
Traffic Volume (vph)	46	10	10	212	9	149	13	390	250	105	302	42
Future Volume (vph)	46	10	10	212	9	149	13	390	250	105	302	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.98		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00	1.00	0.99	1.00	
Frt		0.98		1.00	0.86		1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.97		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1763		1784	1604		1770	3610	1578	1795	3542	
Flt Permitted		0.68		0.72	1.00		0.50	1.00	1.00	0.48	1.00	
Satd. Flow (perm)		1244		1357	1604		929	3610	1578	905	3542	
Peak-hour factor, PHF	0.92	0.92	0.92	0.87	0.92	0.85	0.92	0.88	0.74	0.75	0.82	0.92
Adj. Flow (vph)	50	11	11	244	10	175	14	443	338	140	368	46
RTOR Reduction (vph)	0	8	0	0	108	0	0	0	93	0	9	0
Lane Group Flow (vph)	0	64	0	244	77	0	14	443	245	140	405	0
Confl. Peds. (#/hr)				3		5			16	16		
Heavy Vehicles (%)	2%	2%	2%	1%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		7.4		24.3	24.3		32.0	32.0	32.0	32.0	32.0	
Effective Green, g (s)		6.9		26.3	26.3		34.0	34.0	34.0	34.0	34.0	
Actuated g/C Ratio		0.10		0.39	0.39		0.50	0.50	0.50	0.50	0.50	
Clearance Time (s)		4.5		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		125		612	617		462	1797	785	450	1763	
v/s Ratio Prot				c0.08	0.05			0.12			0.11	
v/s Ratio Perm		0.05		c0.07			0.02		c0.16	0.15		
v/c Ratio		0.51		0.40	0.13		0.03	0.25	0.31	0.31	0.23	
Uniform Delay, d1		29.1		15.1	13.6		8.7	9.8	10.2	10.2	9.7	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		3.5		0.4	0.1		0.1	0.3	1.0	1.8	0.3	
Delay (s)		32.6		15.6	13.7		8.9	10.1	11.2	12.0	10.0	
Level of Service		C		B	B		A	B	B	B	B	
Approach Delay (s)		32.6			14.7			10.6			10.5	
Approach LOS		C			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			12.4			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.38									
Actuated Cycle Length (s)			68.3			Sum of lost time (s)			13.0			
Intersection Capacity Utilization			81.3%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

6: Bradford St & Victoria St

2041 Future Total

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	23	16	12	35	29	16	490	15	66	432	102
Future Volume (vph)	15	23	16	12	35	29	16	490	15	66	432	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		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	1.00	
Frt		0.96		1.00	0.93		1.00	1.00		1.00	0.97	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1679		1803	1757		1477	3426		1803	3325	
Flt Permitted		0.88		0.72	1.00		0.43	1.00		0.45	1.00	
Satd. Flow (perm)		1505		1365	1757		673	3426		848	3325	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	25	17	13	38	32	17	533	16	72	470	111
RTOR Reduction (vph)	0	15	0	0	28	0	0	2	0	0	20	0
Lane Group Flow (vph)	0	43	0	13	42	0	17	547	0	72	561	0
Confl. Peds. (#/hr)	4		1	1		4	4		3	3		4
Heavy Vehicles (%)	0%	8%	11%	0%	0%	0%	22%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.9		5.9	5.9		39.8	39.8		39.8	39.8	
Effective Green, g (s)		7.9		7.9	7.9		41.8	41.8		41.8	41.8	
Actuated g/C Ratio		0.14		0.14	0.14		0.72	0.72		0.72	0.72	
Clearance Time (s)		6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		206		186	240		487	2481		614	2408	
v/s Ratio Prot					0.02			0.16			c0.17	
v/s Ratio Perm		c0.03		0.01			0.03			0.08		
v/c Ratio		0.21		0.07	0.18		0.03	0.22		0.12	0.23	
Uniform Delay, d1		22.1		21.7	22.0		2.2	2.6		2.4	2.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.5		0.2	0.4		0.1	0.2		0.4	0.2	
Delay (s)		22.6		21.9	22.4		2.4	2.8		2.8	2.9	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		22.6			22.3			2.8			2.9	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			4.9									A
HCM 2000 Volume to Capacity ratio			0.23									
Actuated Cycle Length (s)			57.7								8.0	
Intersection Capacity Utilization			71.4%								C	
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Essa Rd./Bradford St. & Tiffin St.

2041 Future Total
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	106	478	139	212	413	0	113	422	229	100	398	62
Future Volume (vph)	106	478	139	212	413	0	113	422	229	100	398	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3361		1641	3505		1770	3331		1543	3343	1568
Flt Permitted	0.47	1.00		0.34	1.00		0.47	1.00		0.19	1.00	1.00
Satd. Flow (perm)	867	3361		579	3505		870	3331		312	3343	1568
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.79	0.79	0.79
Adj. Flow (vph)	118	531	154	236	459	0	133	496	269	127	504	78
RTOR Reduction (vph)	0	34	0	0	0	0	0	98	0	0	0	47
Lane Group Flow (vph)	118	651	0	236	459	0	133	667	0	127	504	31
Heavy Vehicles (%)	2%	2%	10%	10%	3%	0%	2%	3%	2%	17%	8%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6	6	6
Actuated Green, G (s)	33.4	33.4		33.4	33.4		17.8	17.8		26.1	26.1	26.1
Effective Green, g (s)	35.4	35.4		35.4	35.4		19.8	19.8		25.1	28.1	28.1
Actuated g/C Ratio	0.50	0.50		0.50	0.50		0.28	0.28		0.35	0.39	0.39
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		3.0	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
Lane Grp Cap (vph)	429	1664		286	1735		240	922		183	1313	616
v/s Ratio Prot		0.19			0.13			c0.20		c0.04	0.15	
v/s Ratio Perm	0.14			c0.41			0.15			0.20		0.02
v/c Ratio	0.28	0.39		0.83	0.26		0.55	0.72		0.69	0.38	0.05
Uniform Delay, d1	10.6	11.3		15.4	10.5		22.1	23.4		18.2	15.5	13.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.6	0.7		23.0	0.4		2.8	2.8		10.8	0.2	0.0
Delay (s)	12.1	12.0		38.4	10.9		24.8	26.2		29.0	15.7	13.5
Level of Service	B	B		D	B		C	C		C	B	B
Approach Delay (s)		12.0			20.2			26.0			17.8	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			19.2			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			71.5			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			78.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: Go Station East Access & Lakeshore Dr.

2041 Future Total
Timing Plan: AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑
Traffic Volume (vph)	1117	166	93	1666	154	102
Future Volume (vph)	1117	166	93	1666	154	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
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)	3574	1615	1805	3574	1805	1615
Flt Permitted	1.00	1.00	0.11	1.00	0.95	1.00
Satd. Flow (perm)	3574	1615	218	3574	1805	1615
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.31	0.31
Adj. Flow (vph)	1214	180	97	1735	497	329
RTOR Reduction (vph)	0	60	0	0	0	127
Lane Group Flow (vph)	1214	120	97	1735	497	202
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	46.4	46.4	55.9	55.9	27.6	27.6
Effective Green, g (s)	48.4	48.4	55.9	57.9	28.6	28.6
Actuated g/C Ratio	0.51	0.51	0.59	0.61	0.30	0.30
Clearance Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1830	827	221	2189	546	488
v/s Ratio Prot	0.34		0.03	c0.49	c0.28	
v/s Ratio Perm		0.07	0.23			0.13
v/c Ratio	0.66	0.14	0.44	0.79	0.91	0.41
Uniform Delay, d1	17.0	12.1	12.7	13.8	31.7	26.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.4	1.4	3.0	19.4	0.6
Delay (s)	18.9	12.5	14.1	16.8	51.1	26.8
Level of Service	B	B	B	B	D	C
Approach Delay (s)	18.1			16.7	41.4	
Approach LOS	B			B	D	
Intersection Summary						
HCM 2000 Control Delay			22.2		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.89			
Actuated Cycle Length (s)			94.5		Sum of lost time (s)	14.0
Intersection Capacity Utilization			61.3%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

12: Go Station West Access & Tiffin St. & Lakeshore Dr.

2041 Future Total
Timing Plan: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	178	536	34	0	636	1184	34	0	0	745	0	172
Future Volume (vph)	178	536	34	0	636	1184	34	0	0	745	0	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	2.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	0.91			0.95	1.00	1.00			1.00	1.00	
Frt	1.00	0.99			1.00	0.85	1.00			1.00	0.85	
Flt Protected	0.95	1.00			1.00	1.00	0.95			0.95	1.00	
Satd. Flow (prot)	1787	4849			3574	1599	902			1770	1568	
Flt Permitted	0.24	1.00			1.00	1.00	0.64			0.65	1.00	
Satd. Flow (perm)	460	4849			3574	1599	607			1203	1568	
Peak-hour factor, PHF	0.95	0.95	0.95	0.98	0.98	0.98	0.64	0.64	0.64	0.91	0.91	0.91
Adj. Flow (vph)	187	564	36	0	649	1208	53	0	0	819	0	189
RTOR Reduction (vph)	0	5	0	0	0	291	0	0	0	0	93	0
Lane Group Flow (vph)	187	595	0	0	649	917	53	0	0	819	96	0
Heavy Vehicles (%)	1%	0%	100%	100%	1%	1%	100%	100%	100%	2%	100%	3%
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Perm			pm+pt	NA	
Protected Phases	5	2			6	7		8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	62.0	62.0			51.0	96.0	23.2			72.2	72.2	
Effective Green, g (s)	62.0	64.0			53.0	100.0	25.2			72.2	74.2	
Actuated g/C Ratio	0.42	0.44			0.36	0.68	0.17			0.49	0.51	
Clearance Time (s)	4.0	6.0			6.0	4.0	6.0			4.0	6.0	
Vehicle Extension (s)	3.0	0.2			0.2	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	258	2122			1295	1093	104			768	795	
v/s Ratio Prot	c0.03	0.12			0.18	c0.27				c0.33	0.06	
v/s Ratio Perm	0.27					0.30	0.09			c0.20		
v/c Ratio	0.72	0.28			0.50	0.84	0.51			1.07	0.12	
Uniform Delay, d1	34.5	26.3			36.3	17.1	54.9			34.5	18.9	
Progression Factor	1.00	1.00			1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	9.7	0.3			1.4	5.8	3.9			51.7	0.3	
Delay (s)	44.1	26.7			37.7	22.9	58.8			86.1	19.2	
Level of Service	D	C			D	C	E			F	B	
Approach Delay (s)		30.8			28.1			58.8			73.6	
Approach LOS		C			C			E			E	
Intersection Summary												
HCM 2000 Control Delay			41.5									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			146.2							16.0		
Intersection Capacity Utilization			107.9%									ICU Level of Service G
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Essa Rd. & Gowan St.

2041 Future Total
Timing Plan: AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T		L	T
Traffic Volume (vph)	7	323	417	10	261	432
Future Volume (vph)	7	323	417	10	261	432
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frt	0.87		1.00		1.00	1.00
Flt Protected	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1616		3415		1787	3312
Flt Permitted	1.00		1.00		0.43	1.00
Satd. Flow (perm)	1616		3415		807	3312
Peak-hour factor, PHF	0.82	0.82	0.83	0.83	0.96	0.96
Adj. Flow (vph)	9	394	502	12	272	450
RTOR Reduction (vph)	347	0	1	0	0	0
Lane Group Flow (vph)	56	0	513	0	272	450
Heavy Vehicles (%)	0%	2%	5%	20%	1%	9%
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	12.1		80.6		93.1	93.1
Effective Green, g (s)	14.1		82.6		93.1	95.1
Actuated g/C Ratio	0.12		0.70		0.79	0.81
Clearance Time (s)	6.0		6.0		4.0	6.0
Vehicle Extension (s)	3.0		0.2		3.0	0.2
Lane Grp Cap (vph)	194		2406		712	2687
v/s Ratio Prot	c0.03		0.15		c0.03	0.14
v/s Ratio Perm					c0.28	
v/c Ratio	0.29		0.21		0.38	0.17
Uniform Delay, d1	47.0		6.0		3.2	2.4
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.8		0.2		0.3	0.1
Delay (s)	47.8		6.2		3.5	2.5
Level of Service	D		A		A	A
Approach Delay (s)	47.8		6.2			2.9
Approach LOS	D		A			A
Intersection Summary						
HCM 2000 Control Delay			15.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.37			
Actuated Cycle Length (s)			117.2		Sum of lost time (s)	12.0
Intersection Capacity Utilization			86.5%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

1: High St & Dunlop St W

2041 Future Total

Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	706	262	243	542	38	310	205	321	22	170	24
Future Volume (vph)	10	706	262	243	542	38	310	205	321	22	170	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes		0.99			1.00	0.94	1.00	1.00	0.96		0.99	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00		1.00	
Frt		0.96			1.00	0.85	1.00	1.00	0.85		0.98	
Flt Protected		1.00			0.98	1.00	0.95	1.00	1.00		0.99	
Satd. Flow (prot)		3402			3548	1521	1805	1900	1548		1826	
Flt Permitted		0.94			0.51	1.00	0.21	1.00	1.00		0.91	
Satd. Flow (perm)		3215			1835	1521	402	1900	1548		1683	
Peak-hour factor, PHF	1.00	0.86	0.84	0.77	0.92	0.63	0.80	0.91	0.82	0.44	0.71	0.45
Adj. Flow (vph)	10	821	312	316	589	60	388	225	391	50	239	53
RTOR Reduction (vph)	0	28	0	0	0	28	0	0	114	0	5	0
Lane Group Flow (vph)	0	1115	0	0	905	33	388	225	277	0	337	0
Confl. Peds. (#/hr)	16		17	17		16	20		18	18		20
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		2		1	6		7	4			8	
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)		56.6			56.6	56.6	48.6	48.6	48.6		23.6	
Effective Green, g (s)		58.6			58.6	58.6	47.6	50.6	50.6		25.6	
Actuated g/C Ratio		0.50			0.50	0.50	0.41	0.43	0.43		0.22	
Clearance Time (s)		6.0			6.0	6.0	3.0	6.0	6.0		6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1607			917	760	414	820	668		367	
v/s Ratio Prot							c0.17	0.12				
v/s Ratio Perm		0.35			c0.49	0.02	c0.21		0.18		0.20	
v/c Ratio		0.69			2.36dl	0.04	0.94	0.27	0.41		0.92	
Uniform Delay, d1		22.4			28.9	15.0	28.9	21.5	23.0		44.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2		2.5			26.3	0.0	28.6	0.2	0.4		26.9	
Delay (s)		24.9			55.2	15.0	57.5	21.6	23.5		71.7	
Level of Service		C			E	B	E	C	C		E	
Approach Delay (s)		24.9			52.7			36.2			71.7	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			40.6									
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			117.2									
Intersection Capacity Utilization			94.3%									
Analysis Period (min)			15									
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Toronto St & Simcoe St

2041 Future Total

Timing Plan: PM Peak Hour

																
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations																
Traffic Volume (vph)	157	326	38	613	389	29	5	519	581	28	609	190				
Future Volume (vph)	157	326	38	613	389	29	5	519	581	28	609	190				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900				
Total Lost time (s)	1.0	4.0		4.0	4.0		4.0	4.0	1.0	4.0	4.0					
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00					
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00					
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00					
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.96					
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00					
Satd. Flow (prot)	1797	3237		1787	3260		1805	1863	1553	1805	1805					
Flt Permitted	0.49	1.00		0.30	1.00		0.07	1.00	1.00	0.15	1.00					
Satd. Flow (perm)	926	3237		556	3260		137	1863	1553	289	1805					
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92				
Adj. Flow (vph)	171	354	41	666	423	32	5	564	632	30	662	207				
RTOR Reduction (vph)	0	6	0	0	4	0	0	0	83	0	8	0				
Lane Group Flow (vph)	171	389	0	666	451	0	5	564	549	30	861	0				
Confl. Peds. (#/hr)	7					7			23	23						
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%				
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA					
Protected Phases	5	2		1	6		7	4	1	3	8					
Permitted Phases	2			6			4		4	8						
Actuated Green, G (s)	41.2	31.1		70.1	57.0		57.6	56.3	92.3	63.2	59.1					
Effective Green, g (s)	45.2	33.1		69.1	59.0		55.6	58.3	96.3	61.2	61.1					
Actuated g/C Ratio	0.31	0.23		0.47	0.41		0.38	0.40	0.66	0.42	0.42					
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	3.0	3.0	6.0					
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0					
Lane Grp Cap (vph)	360	736		560	1321		55	746	1027	153	757					
v/s Ratio Prot	0.04	0.12		c0.29	0.14		0.00	0.30	0.14	c0.00	c0.48					
v/s Ratio Perm	0.11			c0.28			0.03		0.21	0.08						
v/c Ratio	0.47	0.53		1.19	0.34		0.09	0.76	0.53	0.20	1.14					
Uniform Delay, d1	38.2	49.3		31.1	29.8		36.9	37.5	12.9	30.1	42.2					
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00					
Incremental Delay, d2	1.0	2.7		102.0	0.2		0.7	4.4	0.5	0.6	77.8					
Delay (s)	39.2	52.0		133.2	30.0		37.6	41.9	13.4	30.8	120.0					
Level of Service	D	D		F	C		D	D	B	C	F					
Approach Delay (s)		48.2			91.3			26.9			117.0					
Approach LOS		D			F			C			F					
Intersection Summary																
HCM 2000 Control Delay	70.5			HCM 2000 Level of Service					E							
HCM 2000 Volume to Capacity ratio	1.16															
Actuated Cycle Length (s)	145.5			Sum of lost time (s)					16.0							
Intersection Capacity Utilization	112.6%			ICU Level of Service					H							
Analysis Period (min)	15															
c Critical Lane Group																

HCM Signalized Intersection Capacity Analysis

4: Bradford St & Site North Access/Simcoe St

2041 Future Total
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	56	11	15	323	8	154	12	545	306	144	378	65
Future Volume (vph)	56	11	15	323	8	154	12	545	306	144	378	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.98		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.98		1.00	0.86		1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.97		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1757		1784	1601		1770	3610	1577	1797	3528	
Flt Permitted		0.68		0.70	1.00		0.41	1.00	1.00	0.36	1.00	
Satd. Flow (perm)		1239		1321	1601		766	3610	1577	681	3528	
Peak-hour factor, PHF	0.92	0.92	0.92	0.87	0.92	0.85	0.92	0.88	0.74	0.75	0.82	0.92
Adj. Flow (vph)	61	12	16	371	9	181	13	619	414	192	461	71
RTOR Reduction (vph)	0	10	0	0	61	0	0	0	87	0	12	0
Lane Group Flow (vph)	0	79	0	371	129	0	13	619	327	192	520	0
Confl. Peds. (#/hr)				3		5			16	16		
Heavy Vehicles (%)	2%	2%	2%	1%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		8.5		29.4	29.4		32.3	32.3	32.3	32.3	32.3	
Effective Green, g (s)		8.0		31.4	31.4		34.3	34.3	34.3	34.3	34.3	
Actuated g/C Ratio		0.11		0.43	0.43		0.47	0.47	0.47	0.47	0.47	
Clearance Time (s)		4.5		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		134		678	682		356	1680	733	316	1641	
v/s Ratio Prot				c0.14	0.08			0.17			0.15	
v/s Ratio Perm		0.06		c0.10			0.02		0.21	c0.28		
v/c Ratio		0.59		0.55	0.19		0.04	0.37	0.45	0.61	0.32	
Uniform Delay, d1		31.3		15.6	13.2		10.7	12.7	13.3	14.7	12.4	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		6.8		0.9	0.1		0.2	0.6	2.0	8.4	0.5	
Delay (s)		38.1		16.5	13.3		10.9	13.3	15.3	23.1	12.9	
Level of Service		D		B	B		B	B	B	C	B	
Approach Delay (s)		38.1			15.4			14.1			15.6	
Approach LOS		D			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			15.7			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			73.7			Sum of lost time (s)			13.0			
Intersection Capacity Utilization			87.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Bradford St & Victoria St

2041 Future Total

Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	45	43	29	50	33	39	737	38	32	777	29
Future Volume (vph)	45	45	43	29	50	33	39	737	38	32	777	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		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	1.00	
Frt		0.96		1.00	0.94		1.00	0.99		1.00	0.99	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1672		1804	1775		1478	3417		1804	3416	
Flt Permitted		0.86		0.66	1.00		0.30	1.00		0.32	1.00	
Satd. Flow (perm)		1455		1252	1775		471	3417		601	3416	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	49	47	32	54	36	42	801	41	35	845	32
RTOR Reduction (vph)	0	32	0	0	29	0	0	4	0	0	3	0
Lane Group Flow (vph)	0	113	0	32	61	0	42	838	0	35	874	0
Confl. Peds. (#/hr)	4		1	1		4	4		3	3		4
Heavy Vehicles (%)	0%	8%	11%	0%	0%	0%	22%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.9		8.9	8.9		37.1	37.1		37.1	37.1	
Effective Green, g (s)		10.9		10.9	10.9		39.1	39.1		39.1	39.1	
Actuated g/C Ratio		0.19		0.19	0.19		0.67	0.67		0.67	0.67	
Clearance Time (s)		6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		273		235	333		317	2303		405	2302	
v/s Ratio Prot					0.03			0.25			c0.26	
v/s Ratio Perm		c0.08		0.03			0.09			0.06		
v/c Ratio		0.42		0.14	0.18		0.13	0.36		0.09	0.38	
Uniform Delay, d1		20.7		19.6	19.8		3.4	4.1		3.3	4.1	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0		0.3	0.3		0.9	0.4		0.4	0.5	
Delay (s)		21.8		19.9	20.1		4.2	4.5		3.7	4.6	
Level of Service		C		B	C		A	A		A	A	
Approach Delay (s)		21.8			20.0			4.5			4.6	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			6.7									
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			58.0									
Intersection Capacity Utilization			53.3%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Essa Rd./Bradford St. & Tiffin St.

2041 Future Total
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	650	154	250	411	0	160	570	304	261	598	108
Future Volume (vph)	72	650	154	250	411	0	160	570	304	261	598	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.5	4.0		4.5	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3387		1641	3505		1770	3333		1543	3343	1568
Flt Permitted	0.49	1.00		0.14	1.00		0.24	1.00		0.14	1.00	1.00
Satd. Flow (perm)	910	3387		238	3505		444	3333		220	3343	1568
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.79	0.79	0.79
Adj. Flow (vph)	80	722	171	278	457	0	188	671	358	330	757	137
RTOR Reduction (vph)	0	20	0	0	0	0	0	70	0	0	0	91
Lane Group Flow (vph)	80	873	0	278	457	0	188	959	0	330	757	46
Heavy Vehicles (%)	2%	2%	10%	10%	3%	0%	2%	3%	2%	17%	8%	3%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6	6	6
Actuated Green, G (s)	25.0	25.0		42.5	42.5		35.3	25.5		45.5	31.7	31.7
Effective Green, g (s)	27.0	27.0		42.0	44.5		34.3	27.5		45.5	33.7	33.7
Actuated g/C Ratio	0.27	0.27		0.42	0.44		0.34	0.28		0.46	0.34	0.34
Clearance Time (s)	6.0	6.0		4.0	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
Lane Grp Cap (vph)	245	914		282	1559		275	916		311	1126	528
v/s Ratio Prot		0.26		c0.13	0.13		0.06	0.29		c0.17	0.23	
v/s Ratio Perm	0.09			c0.29			0.17			c0.31		0.03
v/c Ratio	0.33	0.95		0.99	0.29		0.68	1.05		1.06	0.67	0.09
Uniform Delay, d1	29.2	35.9		26.9	17.7		24.7	36.2		28.5	28.4	22.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.5	20.6		49.3	0.5		6.9	42.7		68.1	1.6	0.1
Delay (s)	32.7	56.5		76.1	18.2		31.5	78.9		96.6	30.0	22.7
Level of Service	C	E		E	B		C	E		F	C	C
Approach Delay (s)		54.6			40.1			71.6			47.1	
Approach LOS		D			D			E			D	
Intersection Summary												
HCM 2000 Control Delay		54.8										
HCM 2000 Volume to Capacity ratio		1.04										
Actuated Cycle Length (s)		100.0								17.0		
Intersection Capacity Utilization		93.3%								F		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: Go Station East Access & Lakeshore Dr.

2041 Future Total
Timing Plan: PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑
Traffic Volume (vph)	1865	272	33	1334	158	106
Future Volume (vph)	1865	272	33	1334	158	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
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)	3574	1615	1805	3574	1805	1615
Flt Permitted	1.00	1.00	0.06	1.00	0.95	1.00
Satd. Flow (perm)	3574	1615	112	3574	1805	1615
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.31	0.31
Adj. Flow (vph)	2027	296	34	1390	510	342
RTOR Reduction (vph)	0	45	0	0	0	83
Lane Group Flow (vph)	2027	251	34	1390	510	259
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	63.7	63.7	71.8	71.8	35.5	35.5
Effective Green, g (s)	65.7	65.7	71.8	73.8	36.5	36.5
Actuated g/C Ratio	0.56	0.56	0.61	0.62	0.31	0.31
Clearance Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1984	896	126	2229	556	498
v/s Ratio Prot	c0.57		0.01	c0.39	c0.28	
v/s Ratio Perm		0.16	0.15			0.16
v/c Ratio	1.02	0.28	0.27	0.62	0.92	0.52
Uniform Delay, d1	26.3	13.8	26.8	13.7	39.4	33.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.9	0.8	1.2	1.3	20.0	1.0
Delay (s)	52.2	14.6	27.9	15.0	59.4	34.7
Level of Service	D	B	C	B	E	C
Approach Delay (s)	47.4			15.3	49.5	
Approach LOS	D			B	D	
Intersection Summary						
HCM 2000 Control Delay			37.9		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.00			
Actuated Cycle Length (s)			118.3		Sum of lost time (s)	14.0
Intersection Capacity Utilization			67.0%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

12: Go Station West Access & Tiffin St. & Lakeshore Dr.

2041 Future Total
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	260	878	32	0	562	929	32	0	0	1260	0	221
Future Volume (vph)	260	878	32	0	562	929	32	0	0	1260	0	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	2.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	0.91			0.95	1.00	1.00			1.00	1.00	
Frt	1.00	0.99			1.00	0.85	1.00			1.00	0.85	
Flt Protected	0.95	1.00			1.00	1.00	0.95			0.95	1.00	
Satd. Flow (prot)	1787	4983			3574	1599	902			1770	1568	
Flt Permitted	0.15	1.00			1.00	1.00	0.46			0.76	1.00	
Satd. Flow (perm)	287	4983			3574	1599	439			1410	1568	
Peak-hour factor, PHF	0.95	0.95	0.95	0.98	0.98	0.98	0.64	0.64	0.64	0.91	0.91	0.91
Adj. Flow (vph)	274	924	34	0	573	948	50	0	0	1385	0	243
RTOR Reduction (vph)	0	3	0	0	0	246	0	0	0	0	93	0
Lane Group Flow (vph)	274	955	0	0	573	702	50	0	0	1385	150	0
Heavy Vehicles (%)	1%	0%	100%	100%	1%	1%	100%	100%	100%	2%	100%	3%
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Perm			pm+pt	NA	
Protected Phases	5	2			6	7		8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	46.0	46.0			31.0	97.4	17.8			90.2	88.2	
Effective Green, g (s)	46.0	48.0			33.0	101.4	19.8			90.2	90.2	
Actuated g/C Ratio	0.31	0.33			0.23	0.69	0.14			0.62	0.62	
Clearance Time (s)	4.0	6.0			6.0	4.0	6.0			4.0	6.0	
Vehicle Extension (s)	3.0	0.2			0.2	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	203	1636			806	1109	59			1033	967	
v/s Ratio Prot	c0.10	0.19			0.16	0.30				c0.61	0.10	
v/s Ratio Perm	c0.32					0.14	0.11			c0.22		
v/c Ratio	1.35	0.58			0.71	0.63	0.85			1.34	0.16	
Uniform Delay, d1	44.2	40.8			52.2	12.2	61.7			26.1	11.9	
Progression Factor	1.00	1.00			1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	186.3	1.5			5.3	1.2	64.8			159.9	0.3	
Delay (s)	230.5	42.3			57.5	13.4	126.6			186.0	12.2	
Level of Service	F	D			E	B	F			F	B	
Approach Delay (s)		84.2			30.0			126.6			160.1	
Approach LOS		F			C			F			F	
Intersection Summary												
HCM 2000 Control Delay			93.9				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.39									
Actuated Cycle Length (s)			146.2				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			136.5%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Essa Rd. & Gowan St.

2041 Future Total
Timing Plan: PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T		T	T
Traffic Volume (vph)	10	471	531	16	368	595
Future Volume (vph)	10	471	531	16	368	595
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frt	0.87		1.00		1.00	1.00
Flt Protected	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1615		3409		1787	3312
Flt Permitted	1.00		1.00		0.25	1.00
Satd. Flow (perm)	1615		3409		473	3312
Peak-hour factor, PHF	0.82	0.82	0.83	0.83	0.96	0.96
Adj. Flow (vph)	12	574	640	19	383	620
RTOR Reduction (vph)	224	0	3	0	0	0
Lane Group Flow (vph)	362	0	657	0	383	620
Heavy Vehicles (%)	0%	2%	5%	20%	1%	9%
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	27.0		28.0		41.0	41.0
Effective Green, g (s)	29.0		30.0		41.0	43.0
Actuated g/C Ratio	0.36		0.38		0.51	0.54
Clearance Time (s)	6.0		6.0		4.0	6.0
Vehicle Extension (s)	3.0		0.2		3.0	0.2
Lane Grp Cap (vph)	585		1278		390	1780
v/s Ratio Prot	c0.22		0.19		c0.11	0.19
v/s Ratio Perm					c0.39	
v/c Ratio	0.62		0.51		0.98	0.35
Uniform Delay, d1	21.0		19.4		15.9	10.5
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	2.0		1.5		40.6	0.5
Delay (s)	22.9		20.8		56.5	11.1
Level of Service	C		C		E	B
Approach Delay (s)	22.9		20.8			28.4
Approach LOS	C		C			C
Intersection Summary						
HCM 2000 Control Delay			24.8		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			83.4%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

1: High St & Dunlop St W

2051 Future Total

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	577	287	169	462	27	223	131	319	18	87	12
Future Volume (vph)	30	577	287	169	462	27	223	131	319	18	87	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes		0.99			1.00	0.96	1.00	1.00	0.97		1.00	
Flpb, ped/bikes		1.00			1.00	1.00	0.99	1.00	1.00		1.00	
Frt		0.95			1.00	0.85	1.00	1.00	0.85		0.98	
Flt Protected		1.00			0.99	1.00	0.95	1.00	1.00		0.99	
Satd. Flow (prot)		3376			3553	1548	1796	1900	1569		1830	
Flt Permitted		0.92			0.53	1.00	0.44	1.00	1.00		0.90	
Satd. Flow (perm)		3112			1903	1548	826	1900	1569		1670	
Peak-hour factor, PHF	1.00	0.86	0.84	0.77	0.92	0.63	0.80	0.91	0.82	0.44	0.71	0.45
Adj. Flow (vph)	30	671	342	219	502	43	279	144	389	41	123	27
RTOR Reduction (vph)	0	64	0	0	0	22	0	0	186	0	9	0
Lane Group Flow (vph)	0	979	0	0	721	21	279	144	203	0	182	0
Confl. Peds. (#/hr)	16		17	17		16	20		18	18		20
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		2		1	6		7	4			8	
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)		30.1			30.1	30.1	22.8	22.8	22.8		12.7	
Effective Green, g (s)		32.1			32.1	32.1	21.8	24.8	24.8		14.7	
Actuated g/C Ratio		0.49			0.49	0.49	0.34	0.38	0.38		0.23	
Clearance Time (s)		6.0			6.0	6.0	3.0	6.0	6.0		6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1539			941	765	368	726	599		378	
v/s Ratio Prot							c0.07	0.08				
v/s Ratio Perm		0.31			c0.38	0.01	c0.18		0.13		0.11	
v/c Ratio		0.64			1.26dl	0.03	0.76	0.20	0.34		0.48	
Uniform Delay, d1		12.1			13.3	8.4	19.4	13.4	14.2		21.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2		2.0			3.8	0.0	8.7	0.1	0.3		1.0	
Delay (s)		14.1			17.1	8.4	28.1	13.5	14.6		22.8	
Level of Service		B			B	A	C	B	B		C	
Approach Delay (s)		14.1			16.6			19.0			22.8	
Approach LOS		B			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			16.8				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			64.9				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			77.6%				ICU Level of Service			D		
Analysis Period (min)			15									
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Toronto St & Simcoe St

2051 Future Total

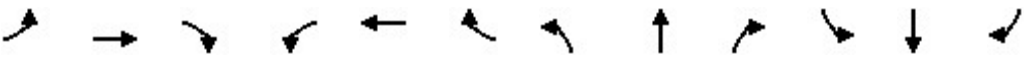
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	299	23	430	249	18	13	573	703	27	461	133
Future Volume (vph)	161	299	23	430	249	18	13	573	703	27	461	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	4.0		4.0	4.0		4.0	4.0	1.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	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	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1797	3251		1787	3261		1805	1863	1558	1805	1808	
Flt Permitted	0.57	1.00		0.42	1.00		0.12	1.00	1.00	0.11	1.00	
Satd. Flow (perm)	1085	3251		797	3261		236	1863	1558	218	1808	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	175	325	25	467	271	20	14	623	764	29	501	145
RTOR Reduction (vph)	0	5	0	0	5	0	0	0	193	0	10	0
Lane Group Flow (vph)	175	345	0	467	286	0	14	623	571	29	636	0
Confl. Peds. (#/hr)	7					7			23	23		
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6		7	4	1	3	8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	37.7	31.1		46.1	36.5		34.5	33.2	45.2	39.9	35.9	
Effective Green, g (s)	41.7	33.1		45.1	38.5		32.5	35.2	49.2	37.9	37.9	
Actuated g/C Ratio	0.42	0.34		0.46	0.39		0.33	0.36	0.50	0.39	0.39	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	3.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	522	1094		476	1277		82	667	779	132	697	
v/s Ratio Prot	0.03	0.11		c0.11	0.09		0.00	0.33	0.10	c0.01	c0.35	
v/s Ratio Perm	0.11			c0.34			0.06		0.26	0.08		
v/c Ratio	0.34	0.32		0.98	0.22		0.17	0.93	0.73	0.22	0.91	
Uniform Delay, d1	18.1	24.2		24.3	19.9		33.6	30.4	19.4	23.8	28.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.8		36.2	0.1		1.0	20.2	3.6	0.8	16.3	
Delay (s)	18.4	24.9		60.5	20.0		34.6	50.6	22.9	24.6	45.0	
Level of Service	B	C		E	C		C	D	C	C	D	
Approach Delay (s)		22.8			45.0			35.4			44.1	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			37.3			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			98.3			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			91.2%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Bradford St & Site North Access/Simcoe St

2051 Future Total
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↕	↔	↔	↕	
Traffic Volume (vph)	46	10	10	234	9	153	13	356	275	110	271	42
Future Volume (vph)	46	10	10	234	9	153	13	356	275	110	271	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.98		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00	1.00	0.99	1.00	
Frt		0.98		1.00	0.86		1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.97		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1763		1784	1603		1770	3610	1578	1794	3535	
Flt Permitted		0.68		0.72	1.00		0.52	1.00	1.00	0.50	1.00	
Satd. Flow (perm)		1239		1356	1603		975	3610	1578	950	3535	
Peak-hour factor, PHF	0.92	0.92	0.92	0.87	0.92	0.85	0.92	0.88	0.74	0.75	0.82	0.92
Adj. Flow (vph)	50	11	11	269	10	180	14	405	372	147	330	46
RTOR Reduction (vph)	0	8	0	0	110	0	0	0	113	0	10	0
Lane Group Flow (vph)	0	64	0	269	80	0	14	405	259	147	366	0
Confl. Peds. (#/hr)				3		5			16	16		
Heavy Vehicles (%)	2%	2%	2%	1%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		7.4		25.0	25.0		32.0	32.0	32.0	32.0	32.0	
Effective Green, g (s)		6.9		27.0	27.0		34.0	34.0	34.0	34.0	34.0	
Actuated g/C Ratio		0.10		0.39	0.39		0.49	0.49	0.49	0.49	0.49	
Clearance Time (s)		4.5		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		123		624	627		480	1778	777	468	1741	
v/s Ratio Prot				c0.09	0.05			0.11			0.10	
v/s Ratio Perm		0.05		c0.07			0.01		c0.16	0.15		
v/c Ratio		0.52		0.43	0.13		0.03	0.23	0.33	0.31	0.21	
Uniform Delay, d1		29.5		15.2	13.5		9.0	10.0	10.6	10.5	9.9	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		3.7		0.5	0.1		0.1	0.3	1.2	1.8	0.3	
Delay (s)		33.1		15.7	13.6		9.1	10.3	11.8	12.3	10.2	
Level of Service		C		B	B		A	B	B	B	B	
Approach Delay (s)		33.1			14.8			11.0			10.8	
Approach LOS		C			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			12.7			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			69.0			Sum of lost time (s)			13.0			
Intersection Capacity Utilization			82.4%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Bradford St & Victoria St

2051 Future Total

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	25	18	13	39	32	18	518	17	73	400	113
Future Volume (vph)	17	25	18	13	39	32	18	518	17	73	400	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99		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	
Frt		0.96		1.00	0.93		1.00	1.00		1.00	0.97	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1675		1804	1758		1477	3425		1803	3307	
Flt Permitted		0.88		0.91	1.00		0.44	1.00		0.43	1.00	
Satd. Flow (perm)		1494		1731	1758		689	3425		822	3307	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	27	20	14	42	35	20	563	18	79	435	123
RTOR Reduction (vph)	0	17	0	0	30	0	0	2	0	0	25	0
Lane Group Flow (vph)	0	48	0	14	47	0	20	579	0	79	533	0
Confl. Peds. (#/hr)	4		1	1		4	4		3	3		4
Heavy Vehicles (%)	0%	8%	11%	0%	0%	0%	22%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8		5.8	5.8		38.8	38.8		38.8	38.8	
Effective Green, g (s)		7.8		7.8	7.8		40.8	40.8		40.8	40.8	
Actuated g/C Ratio		0.14		0.14	0.14		0.72	0.72		0.72	0.72	
Clearance Time (s)		6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		205		238	242		496	2468		592	2383	
v/s Ratio Prot					0.03			c0.17			0.16	
v/s Ratio Perm		c0.03		0.01			0.03			0.10		
v/c Ratio		0.23		0.06	0.19		0.04	0.23		0.13	0.22	
Uniform Delay, d1		21.7		21.2	21.6		2.3	2.7		2.4	2.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.6		0.1	0.4		0.2	0.2		0.5	0.2	
Delay (s)		22.3		21.3	22.0		2.4	2.9		2.9	2.8	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		22.3			21.9			2.9			2.9	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			5.0									
HCM 2000 Volume to Capacity ratio			0.23									
Actuated Cycle Length (s)			56.6									
Intersection Capacity Utilization			76.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Essa Rd./Bradford St. & Tiffin St.

2051 Future Total
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	527	154	233	455	0	125	378	252	109	370	68
Future Volume (vph)	117	527	154	233	455	0	125	378	252	109	370	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	4.0		2.0	4.0		2.0	4.0		5.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3360		1641	3505		1770	3308		1543	3343	1568
Flt Permitted	0.46	1.00		0.21	1.00		0.36	1.00		0.24	1.00	1.00
Satd. Flow (perm)	853	3360		368	3505		668	3308		382	3343	1568
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.79	0.79	0.79
Adj. Flow (vph)	130	586	171	259	506	0	147	445	296	138	468	86
RTOR Reduction (vph)	0	33	0	0	0	0	0	146	0	0	0	64
Lane Group Flow (vph)	130	724	0	259	506	0	147	595	0	138	468	22
Heavy Vehicles (%)	2%	2%	10%	10%	3%	0%	2%	3%	2%	17%	8%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6	6	6
Actuated Green, G (s)	30.2	25.9		37.6	29.6		24.6	17.8		25.0	18.0	18.0
Effective Green, g (s)	34.2	27.9		39.9	31.6		28.6	19.8		23.0	20.0	20.0
Actuated g/C Ratio	0.43	0.35		0.51	0.40		0.36	0.25		0.29	0.25	0.25
Clearance Time (s)	4.0	6.0		4.0	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
Lane Grp Cap (vph)	444	1191		348	1407		365	832		200	849	398
v/s Ratio Prot	0.02	c0.22		c0.09	0.14		0.04	c0.18		c0.05	0.14	
v/s Ratio Perm	0.10			0.28			0.10			0.15		0.01
v/c Ratio	0.29	0.61		0.74	0.36		0.40	0.72		0.69	0.55	0.05
Uniform Delay, d1	13.6	20.9		13.0	16.5		17.6	26.9		22.7	25.5	22.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	2.3		8.4	0.7		0.7	2.9		9.5	0.8	0.1
Delay (s)	13.9	23.2		21.4	17.2		18.3	29.8		32.3	26.2	22.3
Level of Service	B	C		C	B		B	C		C	C	C
Approach Delay (s)		21.9			18.6			27.9			26.9	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			23.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			78.7			Sum of lost time (s)			15.0			
Intersection Capacity Utilization			71.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: Go Station East Access & Lakeshore Dr.

2051 Future Total
Timing Plan: AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑
Traffic Volume (vph)	1234	183	103	1840	170	113
Future Volume (vph)	1234	183	103	1840	170	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
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)	3574	1615	1805	3574	1805	1615
Flt Permitted	1.00	1.00	0.08	1.00	0.95	1.00
Satd. Flow (perm)	3574	1615	151	3574	1805	1615
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.31	0.31
Adj. Flow (vph)	1341	199	107	1917	548	365
RTOR Reduction (vph)	0	62	0	0	0	118
Lane Group Flow (vph)	1341	137	107	1917	548	247
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	46.2	46.2	55.8	55.8	29.0	29.0
Effective Green, g (s)	48.2	48.2	55.8	57.8	30.0	30.0
Actuated g/C Ratio	0.50	0.50	0.58	0.60	0.31	0.31
Clearance Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1798	812	184	2156	565	505
v/s Ratio Prot	0.38		0.03	c0.54	c0.30	
v/s Ratio Perm		0.09	0.30			0.15
v/c Ratio	0.75	0.17	0.58	0.89	0.97	0.49
Uniform Delay, d1	18.9	12.9	15.7	16.3	32.5	26.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9	0.5	4.6	6.0	29.9	0.7
Delay (s)	21.8	13.4	20.3	22.2	62.4	27.4
Level of Service	C	B	C	C	E	C
Approach Delay (s)	20.7			22.1	48.4	
Approach LOS	C			C	D	
Intersection Summary						
HCM 2000 Control Delay			27.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.98			
Actuated Cycle Length (s)			95.8		Sum of lost time (s)	14.0
Intersection Capacity Utilization			66.9%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

12: Go Station West Access & Tiffin St. & Lakeshore Dr.

2051 Future Total
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	592	34	0	703	1308	34	0	0	823	0	190
Future Volume (vph)	197	592	34	0	703	1308	34	0	0	823	0	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	2.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	0.91			0.95	1.00	1.00			1.00	1.00	
Frt	1.00	0.99			1.00	0.85	1.00			1.00	0.85	
Flt Protected	0.95	1.00			1.00	1.00	0.95			0.95	1.00	
Satd. Flow (prot)	1787	4878			3574	1599	902			1770	1568	
Flt Permitted	0.12	1.00			1.00	1.00	0.63			0.65	1.00	
Satd. Flow (perm)	221	4878			3574	1599	596			1203	1568	
Peak-hour factor, PHF	0.95	0.95	0.95	0.98	0.98	0.98	0.64	0.64	0.64	0.91	0.91	0.91
Adj. Flow (vph)	207	623	36	0	717	1335	53	0	0	904	0	209
RTOR Reduction (vph)	0	5	0	0	0	301	0	0	0	0	83	0
Lane Group Flow (vph)	207	654	0	0	717	1034	53	0	0	904	126	0
Heavy Vehicles (%)	1%	0%	100%	100%	1%	1%	100%	100%	100%	2%	100%	3%
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Perm			pm+pt	NA	
Protected Phases	5	2			6	7		8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	44.0	44.0			30.0	83.0	23.2			80.2	80.2	
Effective Green, g (s)	44.0	46.0			32.0	87.0	25.2			80.2	82.2	
Actuated g/C Ratio	0.32	0.34			0.23	0.64	0.19			0.59	0.60	
Clearance Time (s)	4.0	6.0			6.0	4.0	6.0			4.0	6.0	
Vehicle Extension (s)	3.0	0.2			0.2	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	186	1647			839	1021	110			929	946	
v/s Ratio Prot	c0.08	0.13			0.20	c0.41				0.38	0.08	
v/s Ratio Perm	c0.28					0.24	0.09			c0.19		
v/c Ratio	1.11	0.40			0.85	1.01	0.48			0.97	0.13	
Uniform Delay, d1	39.6	34.5			49.9	24.6	49.7			24.2	11.6	
Progression Factor	1.00	1.00			1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	99.5	0.7			10.8	31.5	3.3			23.0	0.3	
Delay (s)	139.2	35.2			60.7	56.1	53.0			47.2	11.9	
Level of Service	F	D			E	E	D			D	B	
Approach Delay (s)		60.1			57.7			53.0			40.6	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			53.5		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			136.2		Sum of lost time (s)					16.0		
Intersection Capacity Utilization			112.3%		ICU Level of Service					H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Essa Rd. & Gowan St.

2051 Future Total
Timing Plan: AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T		T	T
Traffic Volume (vph)	8	357	374	11	288	400
Future Volume (vph)	8	357	374	11	288	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frt	0.87		1.00		1.00	1.00
Flt Protected	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1616		3410		1787	3312
Flt Permitted	1.00		1.00		0.45	1.00
Satd. Flow (perm)	1616		3410		853	3312
Peak-hour factor, PHF	0.82	0.82	0.83	0.83	0.96	0.96
Adj. Flow (vph)	10	435	451	13	300	417
RTOR Reduction (vph)	381	0	1	0	0	0
Lane Group Flow (vph)	64	0	463	0	300	417
Heavy Vehicles (%)	0%	2%	5%	20%	1%	9%
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	12.5		80.4		93.1	93.1
Effective Green, g (s)	14.5		82.4		93.1	95.1
Actuated g/C Ratio	0.12		0.70		0.79	0.81
Clearance Time (s)	6.0		6.0		4.0	6.0
Vehicle Extension (s)	3.0		0.2		3.0	0.2
Lane Grp Cap (vph)	199		2389		744	2678
v/s Ratio Prot	c0.04		0.14		c0.03	0.13
v/s Ratio Perm					c0.29	
v/c Ratio	0.32		0.19		0.40	0.16
Uniform Delay, d1	47.0		6.1		3.3	2.5
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.9		0.2		0.4	0.1
Delay (s)	48.0		6.3		3.6	2.6
Level of Service	D		A		A	A
Approach Delay (s)	48.0		6.3			3.0
Approach LOS	D		A			A
Intersection Summary						
HCM 2000 Control Delay			16.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.40			
Actuated Cycle Length (s)			117.6		Sum of lost time (s)	12.0
Intersection Capacity Utilization			90.2%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

1: High St & Dunlop St W

2051 Future Total

Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	780	279	263	599	42	336	224	350	24	184	27
Future Volume (vph)	11	780	279	263	599	42	336	224	350	24	184	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes		0.99			1.00	0.95	1.00	1.00	0.97		0.99	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00		1.00	
Frt		0.96			1.00	0.85	1.00	1.00	0.85		0.98	
Flt Protected		1.00			0.98	1.00	0.95	1.00	1.00		0.99	
Satd. Flow (prot)		3412			3547	1536	1805	1900	1559		1828	
Flt Permitted		0.94			0.53	1.00	0.20	1.00	1.00		0.91	
Satd. Flow (perm)		3221			1895	1536	380	1900	1559		1672	
Peak-hour factor, PHF	1.00	0.86	0.84	0.77	0.92	0.63	0.80	0.91	0.82	0.44	0.71	0.45
Adj. Flow (vph)	11	907	332	342	651	67	420	246	427	55	259	60
RTOR Reduction (vph)	0	34	0	0	0	34	0	0	132	0	8	0
Lane Group Flow (vph)	0	1216	0	0	993	33	420	246	295	0	366	0
Confl. Peds. (#/hr)	16		17	17		16	20		18	18		20
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		2		1	6		7	4			8	
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)		42.2			42.2	42.2	35.0	35.0	35.0		17.0	
Effective Green, g (s)		44.2			44.2	44.2	34.0	37.0	37.0		19.0	
Actuated g/C Ratio		0.50			0.50	0.50	0.38	0.41	0.41		0.21	
Clearance Time (s)		6.0			6.0	6.0	3.0	6.0	6.0		6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1596			939	761	368	788	646		356	
v/s Ratio Prot							c0.18	0.13				
v/s Ratio Perm		0.38			c0.52	0.02	c0.26		0.19		0.22	
v/c Ratio		0.76			3.23dl	0.04	1.14	0.31	0.46		1.03	
Uniform Delay, d1		18.2			22.5	11.6	23.4	17.5	18.8		35.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2		3.5			45.8	0.0	91.1	0.2	0.5		55.2	
Delay (s)		21.7			68.3	11.6	114.5	17.8	19.4		90.3	
Level of Service		C			E	B	F	B	B		F	
Approach Delay (s)		21.7			64.7			55.6			90.3	
Approach LOS		C			E			E			F	
Intersection Summary												
HCM 2000 Control Delay		50.4			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		1.15										
Actuated Cycle Length (s)		89.2			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		100.9%			ICU Level of Service			G				
Analysis Period (min)		15										
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Toronto St & Simcoe St

2051 Future Total

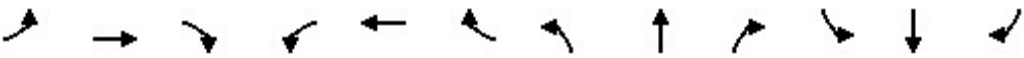
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	165	353	41	676	420	32	6	573	642	31	671	201
Future Volume (vph)	165	353	41	676	420	32	6	573	642	31	671	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1798	3236		1787	3259		1805	1863	1552	1805	1807	
Flt Permitted	0.47	1.00		0.26	1.00		0.07	1.00	1.00	0.09	1.00	
Satd. Flow (perm)	894	3236		488	3259		136	1863	1552	178	1807	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	384	45	735	457	35	7	623	698	34	729	218
RTOR Reduction (vph)	0	6	0	0	4	0	0	0	78	0	7	0
Lane Group Flow (vph)	179	423	0	735	488	0	7	623	620	34	940	0
Confl. Peds. (#/hr)	7					7			23	23		
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6		7	4	1	3	8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	41.6	31.0		70.0	56.4		58.4	57.0	93.0	65.6	61.2	
Effective Green, g (s)	39.6	33.0		69.0	58.4		56.4	59.0	91.0	64.6	63.2	
Actuated g/C Ratio	0.27	0.22		0.47	0.40		0.38	0.40	0.62	0.44	0.43	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	3.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	298	723		536	1289		56	744	956	128	773	
v/s Ratio Prot	0.04	0.13		c0.33	0.15		0.00	0.33	0.15	c0.01	c0.52	
v/s Ratio Perm	0.12			c0.32			0.05		0.25	0.11		
v/c Ratio	0.60	0.58		1.37	0.38		0.12	0.84	0.65	0.27	1.22	
Uniform Delay, d1	44.1	51.2		34.3	31.7		37.5	40.0	18.1	31.6	42.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.4	3.4		178.7	0.2		1.0	8.2	1.5	1.1	109.0	
Delay (s)	47.5	54.6		213.0	31.9		38.5	48.1	19.6	32.7	151.2	
Level of Service	D	D		F	C		D	D	B	C	F	
Approach Delay (s)		52.5			140.4			33.1			147.1	
Approach LOS		D			F			C			F	
Intersection Summary												
HCM 2000 Control Delay			94.7			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			1.29									
Actuated Cycle Length (s)			147.6			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			120.0%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Bradford St & Site North Access/Simcoe St

2051 Future Total
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↕	↔	↔	↕	
Traffic Volume (vph)	56	11	15	357	8	163	12	492	337	148	340	65
Future Volume (vph)	56	11	15	357	8	163	12	492	337	148	340	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.98		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00	1.00	0.99	1.00	
Frt		0.98		1.00	0.86		1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.97		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1757		1784	1601		1770	3610	1577	1796	3521	
Flt Permitted		0.68		0.70	1.00		0.44	1.00	1.00	0.39	1.00	
Satd. Flow (perm)		1228		1320	1601		813	3610	1577	739	3521	
Peak-hour factor, PHF	0.92	0.92	0.92	0.87	0.92	0.85	0.92	0.88	0.74	0.75	0.82	0.92
Adj. Flow (vph)	61	12	16	410	9	192	13	559	455	197	415	71
RTOR Reduction (vph)	0	10	0	0	75	0	0	0	107	0	13	0
Lane Group Flow (vph)	0	79	0	410	126	0	13	559	348	197	473	0
Confl. Peds. (#/hr)				3		5			16	16		
Heavy Vehicles (%)	2%	2%	2%	1%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		8.6		30.9	30.9		32.3	32.3	32.3	32.3	32.3	
Effective Green, g (s)		8.1		32.9	32.9		34.3	34.3	34.3	34.3	34.3	
Actuated g/C Ratio		0.11		0.44	0.44		0.46	0.46	0.46	0.46	0.46	
Clearance Time (s)		4.5		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		132		699	700		370	1646	719	337	1605	
v/s Ratio Prot				c0.15	0.08			0.15			0.13	
v/s Ratio Perm		0.06		c0.10			0.02		0.22	c0.27		
v/c Ratio		0.60		0.59	0.18		0.04	0.34	0.48	0.58	0.29	
Uniform Delay, d1		32.0		15.7	12.9		11.3	13.2	14.3	15.2	12.8	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		7.2		1.3	0.1		0.2	0.6	2.3	7.2	0.5	
Delay (s)		39.2		17.0	13.0		11.5	13.7	16.6	22.4	13.3	
Level of Service		D		B	B		B	B	B	C	B	
Approach Delay (s)		39.2			15.7			15.0			15.9	
Approach LOS		D			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.3			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			75.2			Sum of lost time (s)			13.0			
Intersection Capacity Utilization			88.6%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

6: Bradford St & Victoria St

2051 Future Total

Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕		↕	↕	
Traffic Volume (vph)	50	50	47	32	55	36	43	677	42	35	705	32
Future Volume (vph)	50	50	47	32	55	36	43	677	42	35	705	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		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	1.00	
Frt		0.96		1.00	0.94		1.00	0.99		1.00	0.99	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1674		1804	1777		1478	3413		1803	3412	
Flt Permitted		0.85		0.63	1.00		0.33	1.00		0.34	1.00	
Satd. Flow (perm)		1447		1201	1777		517	3413		646	3412	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	54	51	35	60	39	47	736	46	38	766	35
RTOR Reduction (vph)	0	32	0	0	32	0	0	5	0	0	4	0
Lane Group Flow (vph)	0	127	0	35	67	0	47	777	0	38	797	0
Confl. Peds. (#/hr)	4		1	1		4	4		3	3		4
Heavy Vehicles (%)	0%	8%	11%	0%	0%	0%	22%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.2		9.2	9.2		37.2	37.2		37.2	37.2	
Effective Green, g (s)		11.2		11.2	11.2		39.2	39.2		39.2	39.2	
Actuated g/C Ratio		0.19		0.19	0.19		0.67	0.67		0.67	0.67	
Clearance Time (s)		6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		277		230	340		347	2290		433	2290	
v/s Ratio Prot					0.04			0.23			c0.23	
v/s Ratio Perm		c0.09		0.03			0.09			0.06		
v/c Ratio		0.46		0.15	0.20		0.14	0.34		0.09	0.35	
Uniform Delay, d1		20.9		19.6	19.8		3.5	4.1		3.4	4.1	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.2		0.3	0.3		0.8	0.4		0.4	0.4	
Delay (s)		22.1		20.0	20.1		4.3	4.5		3.8	4.5	
Level of Service		C		B	C		A	A		A	A	
Approach Delay (s)		22.1			20.1			4.5			4.5	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.0									A
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			58.4								8.0	
Intersection Capacity Utilization			57.4%								B	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Essa Rd./Bradford St. & Tiffin St.

2051 Future Total
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	717	170	275	453	0	177	510	335	287	545	119
Future Volume (vph)	80	717	170	275	453	0	177	510	335	287	545	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.5	4.0		4.5	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3387		1641	3505		1770	3309		1543	3343	1568
Flt Permitted	0.47	1.00		0.14	1.00		0.22	1.00		0.17	1.00	1.00
Satd. Flow (perm)	870	3387		238	3505		405	3309		270	3343	1568
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.79	0.79	0.79
Adj. Flow (vph)	89	797	189	306	503	0	208	600	394	363	690	151
RTOR Reduction (vph)	0	23	0	0	0	0	0	122	0	0	0	107
Lane Group Flow (vph)	89	963	0	306	503	0	208	872	0	363	690	44
Heavy Vehicles (%)	2%	2%	10%	10%	3%	0%	2%	3%	2%	17%	8%	3%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6	6	6
Actuated Green, G (s)	25.0	25.0		40.0	40.0		30.9	21.0		37.1	24.1	24.1
Effective Green, g (s)	27.0	27.0		39.5	42.0		29.9	23.0		37.1	26.1	26.1
Actuated g/C Ratio	0.30	0.30		0.44	0.47		0.33	0.26		0.41	0.29	0.29
Clearance Time (s)	6.0	6.0		4.0	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
Lane Grp Cap (vph)	261	1016		268	1635		277	845		295	969	454
v/s Ratio Prot		0.28		c0.13	0.14		0.08	0.26		c0.18	0.21	
v/s Ratio Perm	0.10			c0.37			0.17			c0.33		0.03
v/c Ratio	0.34	0.95		1.14	0.31		0.75	1.03		1.23	0.71	0.10
Uniform Delay, d1	24.6	30.8		23.2	14.9		23.4	33.5		23.5	28.6	23.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.5	18.1		98.8	0.5		10.9	39.4		129.8	2.5	0.1
Delay (s)	28.1	48.9		122.0	15.4		34.3	72.9		153.2	31.1	23.4
Level of Service	C	D		F	B		C	E		F	C	C
Approach Delay (s)		47.2			55.7			66.2			67.0	
Approach LOS		D			E			E			E	
Intersection Summary												
HCM 2000 Control Delay			59.7			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.21									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			17.0			
Intersection Capacity Utilization			95.0%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: Go Station East Access & Lakeshore Dr.

2051 Future Total
Timing Plan: PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑
Traffic Volume (vph)	2060	300	36	1474	175	117
Future Volume (vph)	2060	300	36	1474	175	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
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)	3574	1615	1805	3574	1805	1615
Flt Permitted	1.00	1.00	0.05	1.00	0.95	1.00
Satd. Flow (perm)	3574	1615	86	3574	1805	1615
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.31	0.31
Adj. Flow (vph)	2239	326	38	1535	565	377
RTOR Reduction (vph)	0	40	0	0	0	65
Lane Group Flow (vph)	2239	286	38	1535	565	312
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	84.2	84.2	93.8	93.8	41.0	41.0
Effective Green, g (s)	86.2	86.2	93.8	95.8	42.0	42.0
Actuated g/C Ratio	0.59	0.59	0.64	0.66	0.29	0.29
Clearance Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2113	954	121	2348	519	465
v/s Ratio Prot	c0.63		0.01	c0.43	c0.31	
v/s Ratio Perm		0.18	0.19			0.19
v/c Ratio	1.06	0.30	0.31	0.65	1.09	0.67
Uniform Delay, d1	29.8	14.8	34.3	15.0	51.9	45.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	37.6	0.8	1.5	1.4	65.7	3.8
Delay (s)	67.4	15.6	35.8	16.5	117.6	49.6
Level of Service	E	B	D	B	F	D
Approach Delay (s)	60.8			16.9	90.4	
Approach LOS	E			B	F	
Intersection Summary						
HCM 2000 Control Delay			52.7		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.07			
Actuated Cycle Length (s)			145.8		Sum of lost time (s)	14.0
Intersection Capacity Utilization			73.3%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

12: Go Station West Access & Tiffin St. & Lakeshore Dr.

2051 Future Total
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 							
Traffic Volume (vph)	287	970	32	0	621	1026	32	0	0	1392	0	244
Future Volume (vph)	287	970	32	0	621	1026	32	0	0	1392	0	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	0.91			0.95	1.00	1.00			1.00	1.00	
Frt	1.00	1.00			1.00	0.85	1.00			1.00	0.85	
Flt Protected	0.95	1.00			1.00	1.00	0.95			0.95	1.00	
Satd. Flow (prot)	1787	5001			3574	1599	902			1770	1568	
Flt Permitted	0.11	1.00			1.00	1.00	0.43			0.76	1.00	
Satd. Flow (perm)	215	5001			3574	1599	404			1410	1568	
Peak-hour factor, PHF	0.95	0.95	0.95	0.98	0.98	0.98	0.64	0.64	0.64	0.91	0.91	0.91
Adj. Flow (vph)	302	1021	34	0	634	1047	50	0	0	1530	0	268
RTOR Reduction (vph)	0	3	0	0	0	269	0	0	0	0	103	0
Lane Group Flow (vph)	302	1052	0	0	634	778	50	0	0	1530	165	0
Heavy Vehicles (%)	1%	0%	100%	100%	1%	1%	100%	100%	100%	2%	100%	3%
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Perm			pm+pt	NA	
Protected Phases	5	2			6	7		8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	46.0	46.0			31.0	96.8	18.4			90.2	88.2	
Effective Green, g (s)	46.0	48.0			33.0	96.8	20.4			90.2	90.2	
Actuated g/C Ratio	0.31	0.33			0.23	0.66	0.14			0.62	0.62	
Clearance Time (s)	4.0	6.0			6.0	4.0	6.0			4.0	6.0	
Vehicle Extension (s)	3.0	0.2			0.2	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	185	1641			806	1058	56			1031	967	
v/s Ratio Prot	c0.12	0.21			0.18	0.33				c0.67	0.11	
v/s Ratio Perm	c0.39					0.16	0.12			c0.25		
v/c Ratio	1.63	0.64			0.79	0.74	0.89			1.48	0.17	
Uniform Delay, d1	42.4	41.8			53.3	16.3	61.8			26.0	12.0	
Progression Factor	1.00	1.00			1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	307.8	1.9			7.6	2.7	81.8			223.0	0.4	
Delay (s)	350.2	43.7			60.9	18.9	143.7			249.1	12.4	
Level of Service	F	D			E	B	F			F	B	
Approach Delay (s)		111.9			34.8		143.7				213.8	
Approach LOS		F			C		F				F	
Intersection Summary												
HCM 2000 Control Delay		123.2			HCM 2000 Level of Service		F					
HCM 2000 Volume to Capacity ratio		1.58										
Actuated Cycle Length (s)		146.2			Sum of lost time (s)		16.0					
Intersection Capacity Utilization		143.8%			ICU Level of Service		H					
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Essa Rd. & Gowan St.

2051 Future Total
Timing Plan: PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T		T	T
Traffic Volume (vph)	11	520	476	18	407	542
Future Volume (vph)	11	520	476	18	407	542
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frt	0.87		0.99		1.00	1.00
Flt Protected	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1615		3401		1787	3312
Flt Permitted	1.00		1.00		0.29	1.00
Satd. Flow (perm)	1615		3401		539	3312
Peak-hour factor, PHF	0.82	0.82	0.83	0.83	0.96	0.96
Adj. Flow (vph)	13	634	573	22	424	565
RTOR Reduction (vph)	240	0	3	0	0	0
Lane Group Flow (vph)	407	0	592	0	424	565
Heavy Vehicles (%)	0%	2%	5%	20%	1%	9%
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	27.0		28.0		41.0	41.0
Effective Green, g (s)	29.0		30.0		41.0	43.0
Actuated g/C Ratio	0.36		0.38		0.51	0.54
Clearance Time (s)	6.0		6.0		4.0	6.0
Vehicle Extension (s)	3.0		0.2		3.0	0.2
Lane Grp Cap (vph)	585		1275		416	1780
v/s Ratio Prot	c0.25		0.17		c0.11	0.17
v/s Ratio Perm					c0.41	
v/c Ratio	0.70		0.46		1.02	0.32
Uniform Delay, d1	21.7		18.9		16.8	10.3
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	3.6		1.2		49.1	0.5
Delay (s)	25.3		20.1		65.9	10.8
Level of Service	C		C		E	B
Approach Delay (s)	25.3		20.1			34.4
Approach LOS	C		C			C
Intersection Summary						
HCM 2000 Control Delay			28.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.89			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			88.7%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2051 Future Total-Add'l Imprv

1: High St & Dunlop St W

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	577	287	169	462	27	223	131	319	18	87	12
Future Volume (vph)	30	577	287	169	462	27	223	131	319	18	87	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.97	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3566	1573	1804	3610	1547	3469	1900	1568	1779	1837	
Flt Permitted		0.92	1.00	0.23	1.00	1.00	0.38	1.00	1.00	0.67	1.00	
Satd. Flow (perm)		3280	1573	441	3610	1547	1371	1900	1568	1246	1837	
Peak-hour factor, PHF	1.00	0.86	0.84	0.77	0.92	0.63	0.80	0.91	0.82	0.44	0.71	0.45
Adj. Flow (vph)	30	671	342	219	502	43	279	144	389	41	123	27
RTOR Reduction (vph)	0	0	121	0	0	19	0	0	234	0	12	0
Lane Group Flow (vph)	0	701	221	219	502	24	279	144	155	41	138	0
Confl. Peds. (#/hr)	16		17	17		16	20		18	18		20
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		2		1	6		7	4			8	
Permitted Phases	2		2	6		6	4		4	8		
Actuated Green, G (s)		24.2	24.2	35.6	35.6	35.6	20.5	20.5	20.5	9.0	9.0	
Effective Green, g (s)		26.2	24.2	34.6	37.6	37.6	19.5	22.5	22.5	11.0	11.0	
Actuated g/C Ratio		0.38	0.36	0.51	0.55	0.55	0.29	0.33	0.33	0.16	0.16	
Clearance Time (s)		6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	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)		1261	558	372	1993	854	623	627	518	201	296	
v/s Ratio Prot				c0.06	0.14		c0.05	0.08			c0.08	
v/s Ratio Perm		0.21	0.14	c0.24		0.02	0.08		0.10	0.03		
v/c Ratio		0.56	0.40	0.59	0.25	0.03	0.45	0.23	0.30	0.20	0.47	
Uniform Delay, d1		16.4	16.5	10.6	7.9	6.9	19.1	16.5	16.9	24.8	25.9	
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		1.8	2.1	2.4	0.1	0.0	0.5	0.2	0.3	0.5	1.2	
Delay (s)		18.2	18.6	13.0	8.0	6.9	19.6	16.7	17.3	25.3	27.1	
Level of Service		B	B	B	A	A	B	B	B	C	C	
Approach Delay (s)		18.3			9.4			18.0			26.7	
Approach LOS		B			A			B			C	
Intersection Summary												
HCM 2000 Control Delay			16.3									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			68.1									Sum of lost time (s) 16.0
Intersection Capacity Utilization			65.0%									ICU Level of Service C
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Toronto St & Simcoe St

2051 Future Total-Add'l Imprv

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	299	23	430	249	18	13	573	703	27	461	133
Future Volume (vph)	161	299	23	430	249	18	13	573	703	27	461	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	6.0
Lane Util. Factor	1.00	0.95		0.97	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		1.00	1.00	0.97	1.00	1.00	1.00
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	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1799	3251		3467	3262		1805	1863	1556	1804	1863	1615
Flt Permitted	0.55	1.00		0.50	1.00		0.21	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	1047	3251		1829	3262		395	1863	1556	262	1863	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	175	325	25	467	271	20	14	623	764	29	501	145
RTOR Reduction (vph)	0	6	0	0	6	0	0	0	256	0	0	71
Lane Group Flow (vph)	175	344	0	467	285	0	14	623	508	29	501	74
Confl. Peds. (#/hr)	7					7			23	23		
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4	1	3	8	
Permitted Phases	2			6			4		4	8		8
Actuated Green, G (s)	37.1	30.1		37.1	30.1		30.0	28.7	35.7	32.6	30.0	30.0
Effective Green, g (s)	35.1	32.1		35.1	32.1		28.0	30.7	33.7	30.6	32.0	30.0
Actuated g/C Ratio	0.41	0.37		0.41	0.37		0.32	0.36	0.39	0.35	0.37	0.35
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	3.0	3.0	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	1207		856	1211		132	661	606	121	690	560
v/s Ratio Prot	0.03	0.11		0.04	0.09		0.00	c0.33	c0.06	c0.00	0.27	
v/s Ratio Perm	0.12			c0.18			0.03		0.27	0.08		0.05
v/c Ratio	0.37	0.28		0.55	0.24		0.11	0.94	0.84	0.24	0.73	0.13
Uniform Delay, d1	16.9	19.1		18.2	18.7		25.0	27.0	23.9	22.0	23.4	19.3
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	0.5	0.6		0.7	0.1		0.4	21.9	9.9	1.0	3.8	0.1
Delay (s)	17.4	19.7		18.9	18.8		25.4	48.9	33.7	23.0	27.2	19.4
Level of Service	B	B		B	B		C	D	C	C	C	B
Approach Delay (s)		18.9			18.9			40.4			25.4	
Approach LOS		B			B			D			C	
Intersection Summary												
HCM 2000 Control Delay			29.2			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			86.4			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			86.5%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

6: Bradford St & Victoria St

2051 Future Total-Add'l Imprv

Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	25	18	13	39	32	18	518	17	73	400	113
Future Volume (vph)	17	25	18	13	39	32	18	518	17	73	400	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99		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	
Frt		0.96		1.00	0.93		1.00	1.00		1.00	0.97	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1675		1804	1758		1477	3425		1803	3307	
Flt Permitted		0.88		0.91	1.00		0.44	1.00		0.43	1.00	
Satd. Flow (perm)		1494		1731	1758		689	3425		822	3307	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	27	20	14	42	35	20	563	18	79	435	123
RTOR Reduction (vph)	0	17	0	0	30	0	0	2	0	0	25	0
Lane Group Flow (vph)	0	48	0	14	47	0	20	579	0	79	533	0
Confl. Peds. (#/hr)	4		1	1		4	4		3	3		4
Heavy Vehicles (%)	0%	8%	11%	0%	0%	0%	22%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.8		5.8	5.8		38.8	38.8		38.8	38.8	
Effective Green, g (s)		7.8		7.8	7.8		40.8	40.8		40.8	40.8	
Actuated g/C Ratio		0.14		0.14	0.14		0.72	0.72		0.72	0.72	
Clearance Time (s)		6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		205		238	242		496	2468		592	2383	
v/s Ratio Prot					0.03			c0.17			0.16	
v/s Ratio Perm		c0.03		0.01			0.03			0.10		
v/c Ratio		0.23		0.06	0.19		0.04	0.23		0.13	0.22	
Uniform Delay, d1		21.7		21.2	21.6		2.3	2.7		2.4	2.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.6		0.1	0.4		0.2	0.2		0.5	0.2	
Delay (s)		22.3		21.3	22.0		2.4	2.9		2.9	2.8	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		22.3			21.9			2.9			2.9	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			5.0									A
HCM 2000 Volume to Capacity ratio			0.23									
Actuated Cycle Length (s)			56.6								8.0	
Intersection Capacity Utilization			76.9%								D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Essa Rd./Bradford St. & Tiffin St.

2051 Future Total-Add'l Imprv
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	527	154	233	455	0	125	378	252	109	370	68
Future Volume (vph)	117	527	154	233	455	0	125	378	252	109	370	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		0.97	0.95	
Frt	1.00	0.97		1.00	1.00		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3360		1641	1845		1770	3308		2993	3288	
Flt Permitted	0.27	1.00		0.19	1.00		0.29	1.00		0.20	1.00	
Satd. Flow (perm)	496	3360		320	1845		531	3308		643	3288	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.79	0.79	0.79
Adj. Flow (vph)	130	586	171	259	506	0	147	445	296	138	468	86
RTOR Reduction (vph)	0	33	0	0	0	0	0	143	0	0	19	0
Lane Group Flow (vph)	130	724	0	259	506	0	147	598	0	138	535	0
Heavy Vehicles (%)	2%	2%	10%	10%	3%	0%	2%	3%	2%	17%	8%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	30.2	25.8		37.4	29.4		25.8	19.2		26.6	19.6	
Effective Green, g (s)	30.2	27.8		37.4	31.4		25.8	21.2		26.6	21.6	
Actuated g/C Ratio	0.38	0.35		0.47	0.39		0.32	0.26		0.33	0.27	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	257	1167		281	724		273	876		419	887	
v/s Ratio Prot	0.03	0.22		c0.09	0.27		c0.04	c0.18		0.03	0.16	
v/s Ratio Perm	0.16			c0.34			0.13			0.08		
v/c Ratio	0.51	0.62		0.92	0.70		0.54	0.68		0.33	0.60	
Uniform Delay, d1	17.7	21.7		15.7	20.3		20.4	26.4		19.8	25.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	2.5		33.6	5.5		2.0	4.3		0.5	1.2	
Delay (s)	19.2	24.2		49.3	25.9		22.4	30.7		20.2	26.6	
Level of Service	B	C		D	C		C	C		C	C	
Approach Delay (s)		23.5			33.8			29.3			25.4	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			70.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: Go Station East Access & Lakeshore Dr.

2051 Future Total-Add'l Imprv
Timing Plan: AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑
Traffic Volume (vph)	1234	183	103	1840	170	113
Future Volume (vph)	1234	183	103	1840	170	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	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)	3574	1615	1805	3574	3502	1615
Flt Permitted	1.00	1.00	0.11	1.00	0.95	1.00
Satd. Flow (perm)	3574	1615	216	3574	3502	1615
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.31	0.31
Adj. Flow (vph)	1341	199	107	1917	548	365
RTOR Reduction (vph)	0	55	0	0	0	131
Lane Group Flow (vph)	1341	144	107	1917	548	234
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	53.5	53.5	63.4	63.4	20.6	20.6
Effective Green, g (s)	55.5	55.5	63.4	65.4	21.6	21.6
Actuated g/C Ratio	0.58	0.58	0.67	0.69	0.23	0.23
Clearance Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2087	943	242	2460	796	367
v/s Ratio Prot	0.38		0.03	c0.54	c0.16	
v/s Ratio Perm		0.09	0.27			0.14
v/c Ratio	0.64	0.15	0.44	0.78	0.69	0.64
Uniform Delay, d1	13.1	9.0	10.3	9.9	33.6	33.2
Progression Factor	1.58	2.10	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.3	1.3	2.5	2.5	3.6
Delay (s)	22.0	19.2	11.6	12.5	36.1	36.8
Level of Service	C	B	B	B	D	D
Approach Delay (s)	21.7			12.4	36.4	
Approach LOS	C			B	D	
Intersection Summary						
HCM 2000 Control Delay			20.5		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.81			
Actuated Cycle Length (s)			95.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			65.9%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

12: Go Station West Access & Tiffin St. & Lakeshore Dr.

2051 Future Total-Add'l Imprv
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	592	34	0	703	1308	34	0	0	823	0	190
Future Volume (vph)	197	592	34	0	703	1308	34	0	0	823	0	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00			0.97	1.00	
Frt	1.00	0.99			1.00	0.85	1.00			1.00	0.85	
Flt Protected	0.95	1.00			1.00	1.00	0.95			0.95	1.00	
Satd. Flow (prot)	1787	3395			3574	1599	902			3433	1568	
Flt Permitted	0.17	1.00			1.00	1.00	0.63			0.62	1.00	
Satd. Flow (perm)	322	3395			3574	1599	596			2225	1568	
Peak-hour factor, PHF	0.95	0.95	0.95	0.98	0.98	0.98	0.64	0.64	0.64	0.91	0.91	0.91
Adj. Flow (vph)	207	623	36	0	717	1335	53	0	0	904	0	209
RTOR Reduction (vph)	0	5	0	0	0	425	0	0	0	0	107	0
Lane Group Flow (vph)	207	654	0	0	717	910	53	0	0	904	102	0
Heavy Vehicles (%)	1%	0%	100%	100%	1%	1%	100%	100%	100%	2%	100%	3%
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Perm			pm+pt	NA	
Protected Phases	5	2			6	7		8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	38.6	38.6			27.6	50.6	17.4			44.4	44.4	
Effective Green, g (s)	38.6	40.6			29.6	50.6	19.4			44.4	46.4	
Actuated g/C Ratio	0.41	0.43			0.31	0.53	0.20			0.47	0.49	
Clearance Time (s)	4.0	6.0			6.0	4.0	6.0			4.0	6.0	
Vehicle Extension (s)	3.0	0.2			0.2	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	238	1450			1113	851	121			1332	765	
v/s Ratio Prot	c0.06	0.19			0.20	c0.26				0.16	0.07	
v/s Ratio Perm	0.29					0.31	0.09			c0.15		
v/c Ratio	0.87	0.45			0.64	1.07	0.44			0.68	0.13	
Uniform Delay, d1	21.9	19.3			28.2	22.2	33.0			18.4	13.3	
Progression Factor	1.00	1.00			1.08	1.35	1.00			1.00	1.00	
Incremental Delay, d2	26.9	1.0			1.9	45.9	2.5			1.4	0.4	
Delay (s)	48.8	20.3			32.3	75.7	35.6			19.8	13.7	
Level of Service	D	C			C	E	D			B	B	
Approach Delay (s)		27.1			60.6			35.6			18.7	
Approach LOS		C			E			D			B	
Intersection Summary												
HCM 2000 Control Delay			41.7				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			95.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			98.6%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: High St & Dunlop St W

2051 Future Total-Add'l Imprv

Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	780	279	263	599	42	336	224	350	24	184	27
Future Volume (vph)	11	780	279	263	599	42	336	224	350	24	184	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.95	1.00	1.00	0.97	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3572	1569	1804	3610	1541	3502	1900	1564	1779	1833	
Flt Permitted		0.94	1.00	0.15	1.00	1.00	0.95	1.00	1.00	0.61	1.00	
Satd. Flow (perm)		3376	1569	281	3610	1541	3502	1900	1564	1135	1833	
Peak-hour factor, PHF	1.00	0.86	0.84	0.77	0.92	0.63	0.80	0.91	0.82	0.44	0.71	0.45
Adj. Flow (vph)	11	907	332	342	651	67	420	246	427	55	259	60
RTOR Reduction (vph)	0	0	88	0	0	33	0	0	218	0	11	0
Lane Group Flow (vph)	0	918	244	342	651	34	420	246	209	55	308	0
Confl. Peds. (#/hr)	16		17	17		16	20		18	18		20
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Perm	NA	
Protected Phases		2		1	6		7	4			8	
Permitted Phases	2		2	6		6			4	8		
Actuated Green, G (s)		24.0	24.0	38.0	38.0	38.0	10.0	28.7	28.7	15.7	15.7	
Effective Green, g (s)		26.0	24.0	37.0	40.0	40.0	9.0	30.7	30.7	17.7	17.7	
Actuated g/C Ratio		0.33	0.30	0.47	0.51	0.51	0.11	0.39	0.39	0.22	0.22	
Clearance Time (s)		6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	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)		1115	478	325	1834	783	400	741	610	255	412	
v/s Ratio Prot				c0.13	0.18		c0.12	0.13			c0.17	
v/s Ratio Perm		0.27	0.16	c0.36		0.02			0.13	0.05		
v/c Ratio		0.82	0.51	1.05	0.35	0.04	1.05	0.33	0.34	0.22	0.75	
Uniform Delay, d1		24.2	22.5	19.3	11.6	9.7	34.9	16.8	16.9	24.8	28.4	
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		6.9	3.9	64.3	0.1	0.0	58.7	0.3	0.3	0.4	7.3	
Delay (s)		31.2	26.4	83.6	11.7	9.8	93.6	17.1	17.2	25.3	35.7	
Level of Service		C	C	F	B	A	F	B	B	C	D	
Approach Delay (s)		29.9			34.8			46.5			34.2	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			36.5									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			78.7									Sum of lost time (s) 16.0
Intersection Capacity Utilization			77.9%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Toronto St & Simcoe St

2051 Future Total-Add'l Imprv

Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	353	41	676	420	32	6	573	642	31	671	201
Future Volume (vph)	165	353	41	676	420	32	6	573	642	31	671	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	6.0
Lane Util. Factor	1.00	0.95		0.97	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		1.00	1.00	0.97	1.00	1.00	1.00
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	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1799	3236		3467	3260		1805	1863	1555	1805	1863	1615
Flt Permitted	0.47	1.00		0.95	1.00		0.08	1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)	894	3236		3467	3260		161	1863	1555	161	1863	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	384	45	735	457	35	7	623	698	34	729	218
RTOR Reduction (vph)	0	7	0	0	4	0	0	0	98	0	0	61
Lane Group Flow (vph)	179	422	0	735	488	0	7	623	600	34	729	157
Confl. Peds. (#/hr)	7					7			23	23		
Heavy Vehicles (%)	0%	10%	8%	1%	10%	0%	0%	2%	1%	0%	2%	0%
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4	1	3	8	
Permitted Phases	2						4		4	8		8
Actuated Green, G (s)	41.4	30.0		28.0	46.6		49.6	48.2	76.2	55.0	50.9	50.9
Effective Green, g (s)	39.4	32.0		27.0	48.6		47.6	50.2	74.2	53.0	52.9	50.9
Actuated g/C Ratio	0.31	0.25		0.21	0.38		0.37	0.39	0.58	0.41	0.41	0.40
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	3.0	3.0	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)	347	807		729	1234		64	728	899	106	768	640
v/s Ratio Prot	0.04	c0.13		c0.21	0.15		0.00	0.33	0.14	c0.01	c0.39	
v/s Ratio Perm	0.12						0.04		0.25	0.12		0.10
v/c Ratio	0.52	0.52		1.01	0.40		0.11	0.86	0.67	0.32	0.95	0.25
Uniform Delay, d1	34.2	41.6		50.7	29.1		32.8	35.7	18.6	29.0	36.4	25.9
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	1.3	2.4		35.4	0.2		0.8	9.7	1.9	1.8	20.8	0.2
Delay (s)	35.5	44.0		86.0	29.3		33.5	45.4	20.5	30.8	57.2	26.1
Level of Service	D	D		F	C		C	D	C	C	E	C
Approach Delay (s)		41.5			63.3			32.2			49.3	
Approach LOS		D			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			46.8			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			128.3			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			89.6%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Essa Rd./Bradford St. & Tiffin St.

2051 Future Total-Add'l Imprv

Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	717	170	275	453	0	177	510	335	287	545	119
Future Volume (vph)	80	717	170	275	453	0	177	510	335	287	545	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.5	4.0		4.5	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		0.97	0.95	
Frt	1.00	0.97		1.00	1.00		1.00	0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3387		1641	1845		1770	3309		2993	3280	
Flt Permitted	0.48	1.00		0.14	1.00		0.18	1.00		0.18	1.00	
Satd. Flow (perm)	892	3387		238	1845		331	3309		560	3280	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.79	0.79	0.79
Adj. Flow (vph)	89	797	189	306	503	0	208	600	394	363	690	151
RTOR Reduction (vph)	0	23	0	0	0	0	0	122	0	0	20	0
Lane Group Flow (vph)	89	963	0	306	503	0	208	872	0	363	821	0
Heavy Vehicles (%)	2%	2%	10%	10%	3%	0%	2%	3%	2%	17%	8%	3%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6	6	
Actuated Green, G (s)	25.0	25.0		43.0	43.0		31.5	23.0		30.5	22.5	
Effective Green, g (s)	27.0	27.0		42.5	45.0		30.5	25.0		30.5	24.5	
Actuated g/C Ratio	0.30	0.30		0.47	0.50		0.34	0.28		0.34	0.27	
Clearance Time (s)	6.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	267	1016		322	922		240	919		406	892	
v/s Ratio Prot		0.28		c0.14	0.27		0.08	c0.26		c0.08	0.25	
v/s Ratio Perm	0.10			c0.31			0.22			0.22		
v/c Ratio	0.33	0.95		0.95	0.55		0.87	0.95		0.89	0.92	
Uniform Delay, d1	24.5	30.8		23.8	15.5		24.3	31.9		24.9	31.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.3	18.1		37.0	2.3		26.3	18.3		21.3	14.2	
Delay (s)	27.8	48.9		60.8	17.8		50.6	50.2		46.2	46.0	
Level of Service	C	D		E	B		D	D		D	D	
Approach Delay (s)		47.2			34.1			50.2			46.1	
Approach LOS		D			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			45.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			17.0			
Intersection Capacity Utilization			90.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 11: Go Station East Access & Lakeshore Dr.

2051 Future Total-Add'l Imprv
Timing Plan: PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↗
Traffic Volume (vph)	2060	300	36	1474	175	117
Future Volume (vph)	2060	300	36	1474	175	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	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)	3574	1615	1805	3574	3502	1615
Flt Permitted	1.00	1.00	0.05	1.00	0.95	1.00
Satd. Flow (perm)	3574	1615	101	3574	3502	1615
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.31	0.31
Adj. Flow (vph)	2239	326	38	1535	565	377
RTOR Reduction (vph)	0	46	0	0	0	86
Lane Group Flow (vph)	2239	280	38	1535	565	291
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	71.6	71.6	79.7	79.7	23.5	23.5
Effective Green, g (s)	73.6	73.6	79.7	81.7	24.5	24.5
Actuated g/C Ratio	0.64	0.64	0.70	0.72	0.21	0.21
Clearance Time (s)	6.0	6.0	4.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2303	1040	131	2556	751	346
v/s Ratio Prot	c0.63		0.01	c0.43	0.16	
v/s Ratio Perm		0.17	0.19			c0.18
v/c Ratio	0.97	0.27	0.29	0.60	0.75	0.84
Uniform Delay, d1	19.3	8.7	28.2	8.1	42.0	43.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.3	0.6	1.2	1.1	4.3	16.7
Delay (s)	32.6	9.4	29.5	9.2	46.3	59.7
Level of Service	C	A	C	A	D	E
Approach Delay (s)	29.6			9.7	51.7	
Approach LOS	C			A	D	
Intersection Summary						
HCM 2000 Control Delay			27.5		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.95			
Actuated Cycle Length (s)			114.2		Sum of lost time (s)	14.0
Intersection Capacity Utilization			71.9%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

12: Go Station West Access & Tiffin St. & Lakeshore Dr.

2051 Future Total-Add'l Imprv
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 					 		
Traffic Volume (vph)	287	970	32	0	621	1026	32	0	0	1392	0	244
Future Volume (vph)	287	970	32	0	621	1026	32	0	0	1392	0	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00			0.97	1.00	
Frt	1.00	1.00			1.00	0.85	1.00			1.00	0.85	
Flt Protected	0.95	1.00			1.00	1.00	0.95			0.95	1.00	
Satd. Flow (prot)	1787	3480			3574	1599	902			3433	1568	
Flt Permitted	0.22	1.00			1.00	1.00	0.95			0.95	1.00	
Satd. Flow (perm)	418	3480			3574	1599	902			3433	1568	
Peak-hour factor, PHF	0.95	0.95	0.95	0.98	0.98	0.98	0.64	0.64	0.64	0.91	0.91	0.91
Adj. Flow (vph)	302	1021	34	0	634	1047	50	0	0	1530	0	268
RTOR Reduction (vph)	0	2	0	0	0	198	0	0	0	0	185	0
Lane Group Flow (vph)	302	1053	0	0	634	849	50	0	0	1530	83	0
Heavy Vehicles (%)	1%	0%	100%	100%	1%	1%	100%	100%	100%	2%	100%	3%
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Prot			pm+pt	NA	
Protected Phases	5	2			6	7	3	8		7	4	
Permitted Phases	2			6		6				4		
Actuated Green, G (s)	44.3	44.3			30.2	77.2	9.8			47.0	29.2	
Effective Green, g (s)	44.3	46.3			32.2	77.2	11.8			47.0	31.2	
Actuated g/C Ratio	0.44	0.46			0.32	0.76	0.12			0.46	0.31	
Clearance Time (s)	4.0	6.0			6.0	4.0	6.0			4.0	6.0	
Vehicle Extension (s)	3.0	0.2			0.2	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	319	1590			1136	1218	105			1592	482	
v/s Ratio Prot	c0.09	0.30			0.18	0.32	0.06			c0.45	0.05	
v/s Ratio Perm	c0.32					0.21						
v/c Ratio	0.95	0.66			0.56	0.70	0.48			0.96	0.17	
Uniform Delay, d1	23.3	21.4			28.7	6.1	41.9			26.3	25.6	
Progression Factor	1.00	1.00			1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	36.1	2.2			2.0	1.8	3.4			14.4	0.8	
Delay (s)	59.4	23.6			30.6	7.9	45.2			40.6	26.4	
Level of Service	E	C			C	A	D			D	C	
Approach Delay (s)		31.6			16.5			45.2			38.5	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			29.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			101.3				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			109.2%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

C

Appendix C: SimTraffic Outputs

Intersection: 1: High St & Dunlop St W

Movement	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	LT	TR	LT	T	R	L	T	LTR
Maximum Queue (m)	39.3	37.9	45.5	35.5	10.4	31.1	26.4	22.7
Average Queue (m)	19.2	13.2	23.9	6.4	2.3	12.0	9.2	7.2
95th Queue (m)	32.3	25.9	39.8	20.7	8.8	25.0	20.7	16.8
Link Distance (m)	272.0	272.0	193.0	193.0		49.6	49.6	164.1
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)					17.0			
Storage Blk Time (%)				1	0			
Queuing Penalty (veh)				0	0			

Intersection: 2: Toronto St & Simcoe St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (m)	19.8	23.5	16.1	32.2	56.6	17.4	22.7	131.3	45.5	11.4	79.2
Average Queue (m)	4.5	5.7	4.9	22.5	14.6	3.5	2.1	59.7	37.3	3.5	37.6
95th Queue (m)	13.1	15.9	12.8	35.5	39.1	11.1	12.2	109.7	55.1	10.2	64.6
Link Distance (m)		72.7	72.7		75.5	75.5		123.0		111.0	111.0
Upstream Blk Time (%)					0			1			0
Queuing Penalty (veh)					0			0			0
Storage Bay Dist (m)	17.0			25.0			30.0		38.0		
Storage Blk Time (%)	0	2		7	1			24	3		
Queuing Penalty (veh)	0	1		4	3			98	11		

Intersection: 3: Chekley St & Simcoe St

Movement	EB	EB	WB	NB
Directions Served	T	TR	LT	LR
Maximum Queue (m)	1.7	1.8	14.9	13.6
Average Queue (m)	0.1	0.2	1.3	3.1
95th Queue (m)	1.2	2.0	7.6	10.5
Link Distance (m)	32.5	32.5	72.7	58.5
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Bradford St & Simcoe St

Movement	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	T	T	R	LT	T
Maximum Queue (m)	32.6	11.7	23.5	47.2	15.5	22.6	25.6
Average Queue (m)	16.6	4.5	6.8	17.6	12.3	9.6	10.6
95th Queue (m)	28.8	12.0	18.1	37.3	18.9	19.6	20.8
Link Distance (m)	32.5	32.5	405.2	405.2		58.7	58.7
Upstream Blk Time (%)	0						
Queuing Penalty (veh)	0						
Storage Bay Dist (m)					8.0		
Storage Blk Time (%)				13	7		
Queuing Penalty (veh)				19	9		

Intersection: 5: Bradford St & Vespra St

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (m)	14.8	16.2	16.2	4.2	18.7	3.2
Average Queue (m)	8.4	6.9	1.5	0.1	3.4	0.1
95th Queue (m)	14.3	14.6	8.4	2.3	11.9	2.3
Link Distance (m)	140.2	79.9	82.9	82.9	405.2	405.2
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 6: Bradford St & Victoria St

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	TR	LT	TR	LT	TR
Maximum Queue (m)	14.4	10.3	20.9	29.6	37.1	26.3	22.9
Average Queue (m)	6.6	1.7	7.1	8.1	15.0	8.6	9.7
95th Queue (m)	14.6	7.6	15.9	21.7	32.1	20.3	20.1
Link Distance (m)	100.9		108.2	158.7	158.7	82.9	82.9
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)		9.0					
Storage Blk Time (%)		3	11				
Queuing Penalty (veh)		1	1				

Intersection: 7: Bradford St & John St

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	LT	TR	LT
Maximum Queue (m)	20.0	16.6	9.9	1.6	3.5
Average Queue (m)	8.0	6.2	1.3	0.1	0.1
95th Queue (m)	17.1	14.6	6.6	1.1	1.8
Link Distance (m)	153.2	57.9	128.5	128.5	158.7
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	LT	TR	LT	T	R
Maximum Queue (m)	27.9	51.1	32.2	44.9	44.1	38.2	40.6	29.6	17.3
Average Queue (m)	8.6	21.5	16.2	20.4	19.4	14.7	20.4	11.2	4.7
95th Queue (m)	20.0	39.4	30.1	42.1	35.4	29.5	34.7	22.4	13.3
Link Distance (m)		159.0		41.1	51.4	51.4	46.4	46.4	46.4
Upstream Blk Time (%)			0	1	0	0	0		
Queuing Penalty (veh)			0	4	0	0	0		
Storage Bay Dist (m)	47.0		23.0						
Storage Blk Time (%)		0	2	5					
Queuing Penalty (veh)		0	3	5					

Intersection: 11: Go Station East Access & Lakeshore Dr.

Movement	EB	WB	WB	NB	NB
Directions Served	T	L	T	L	R
Maximum Queue (m)	45.1	8.1	77.9	5.0	7.9
Average Queue (m)	4.6	0.6	8.8	0.7	0.6
95th Queue (m)	24.1	4.3	47.6	4.4	4.0
Link Distance (m)	153.2		136.5	39.4	39.4
Upstream Blk Time (%)			0		
Queuing Penalty (veh)			0		
Storage Bay Dist (m)		70.0			
Storage Blk Time (%)	0		1		
Queuing Penalty (veh)	0		0		

Intersection: 12: Go Station West Access & Tiffin St. & Lakeshore Dr.

Movement	EB	EB	WB	WB	WB	WB	B18	NB	NB	SB	SB
Directions Served	L	TR	L	T	T	R	T	L	TR	L	TR
Maximum Queue (m)	42.0	53.3	2.8	91.3	125.4	62.5	65.0	34.2	4.7	82.1	103.9
Average Queue (m)	19.3	31.0	0.2	35.6	37.2	46.3	6.2	8.2	0.5	54.0	15.0
95th Queue (m)	36.1	51.5	1.8	70.5	107.2	73.0	49.2	23.9	3.0	81.4	52.5
Link Distance (m)		48.8		112.4	112.4		153.2	95.8	95.8		109.8
Upstream Blk Time (%)		2		0	4		0				0
Queuing Penalty (veh)		7		0	18		1				0
Storage Bay Dist (m)	35.0		23.0			55.0				75.0	
Storage Blk Time (%)	2	7		20	0	13				2	
Queuing Penalty (veh)	4	7		0	1	21				2	

Intersection: 13: Essa Rd. & Gowan St.

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	LT	T
Maximum Queue (m)	43.9	33.8	20.0	28.4	22.5
Average Queue (m)	16.8	10.5	4.8	16.7	7.6
95th Queue (m)	31.7	24.9	15.0	29.2	19.7
Link Distance (m)	123.1	88.7	88.7	22.8	22.8
Upstream Blk Time (%)				3	1
Queuing Penalty (veh)				7	1
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 17: Tiffin St.

Movement	EB	WB
Directions Served	T	T
Maximum Queue (m)	32.2	27.2
Average Queue (m)	2.5	2.1
95th Queue (m)	15.7	12.8
Link Distance (m)	41.1	48.8
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 1: High St & Dunlop St W

Movement	EB	EB	WB	WB	WB	NB	NB	B19	SB
Directions Served	LT	TR	LT	T	R	L	T	T	LTR
Maximum Queue (m)	46.8	39.0	64.2	49.6	10.1	51.3	43.6	3.1	40.2
Average Queue (m)	23.5	14.9	35.7	13.4	2.5	24.0	17.8	0.1	17.5
95th Queue (m)	39.5	30.3	56.7	37.3	9.0	41.5	33.0	2.2	33.4
Link Distance (m)	272.0	272.0	193.0	193.0		49.6	49.6	59.2	164.1
Upstream Blk Time (%)						1	0		
Queuing Penalty (veh)						1	0		
Storage Bay Dist (m)					17.0				
Storage Blk Time (%)				2	0				
Queuing Penalty (veh)				0	0				

Intersection: 2: Bradford St & Simcoe St

Movement	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	T	T	R	LT	T
Maximum Queue (m)	35.0	16.2	36.3	57.2	15.5	29.0	24.2
Average Queue (m)	23.1	6.5	12.2	24.6	13.7	11.8	11.7
95th Queue (m)	36.8	14.7	25.0	45.9	18.5	22.8	22.8
Link Distance (m)	33.0	33.0	404.7	404.7		59.2	59.2
Upstream Blk Time (%)	2						
Queuing Penalty (veh)	3						
Storage Bay Dist (m)					8.0		
Storage Blk Time (%)				20	9		
Queuing Penalty (veh)				38	20		

Intersection: 4: Toronto St & Simcoe St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (m)	21.2	24.7	24.3	32.3	79.2	58.7	5.2	82.9	59.4	31.1	104.2
Average Queue (m)	6.0	7.9	9.8	28.4	35.8	7.9	0.5	45.2	25.6	4.3	56.6
95th Queue (m)	15.0	19.9	20.8	37.4	76.3	28.8	3.7	72.1	47.0	19.7	91.0
Link Distance (m)		73.4	73.4		75.5	75.5		123.0		111.3	111.3
Upstream Blk Time (%)					1	0				0	0
Queuing Penalty (veh)					0	0				0	0
Storage Bay Dist (m)	17.0			25.0			30.0		38.0		
Storage Blk Time (%)	1	2		17	2			23	2		
Queuing Penalty (veh)	1	1		16	6			85	5		

Intersection: 5: Bradford St & Vespra St

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (m)	26.4	13.2	21.8	11.0	11.5	8.5
Average Queue (m)	12.2	7.3	4.4	0.6	1.8	0.3
95th Queue (m)	21.2	14.2	14.8	4.6	8.0	3.5
Link Distance (m)	140.2	79.9	82.9	82.9	404.7	404.7
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 6: Bradford St & Victoria St

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	TR	LT	TR	LT	TR
Maximum Queue (m)	24.4	15.8	22.2	37.4	44.5	41.7	44.3
Average Queue (m)	11.4	4.6	7.9	14.9	20.6	18.4	19.3
95th Queue (m)	20.8	13.3	17.7	30.1	39.0	33.0	36.2
Link Distance (m)	100.9		108.2	158.7	158.7	82.9	82.9
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)		9.0					
Storage Blk Time (%)		9	14				
Queuing Penalty (veh)		5	3				

Intersection: 7: Bradford St & John St

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LT	LT	TR
Maximum Queue (m)	28.0	9.1	18.2	4.3	1.3
Average Queue (m)	12.4	1.5	3.4	0.2	0.0
95th Queue (m)	21.7	6.9	12.3	2.6	0.9
Link Distance (m)	153.2	57.9	128.5	158.7	158.7
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	LT	TR	LT	T	R
Maximum Queue (m)	54.4	138.8	30.5	53.0	50.3	50.4	56.8	50.5	22.4
Average Queue (m)	15.8	67.5	24.6	31.5	27.2	24.4	42.9	24.8	7.2
95th Queue (m)	47.4	134.2	35.4	55.4	44.7	42.8	59.3	44.3	17.2
Link Distance (m)		159.0		41.1	51.4	51.4	46.4	46.4	46.4
Upstream Blk Time (%)		4		15	0	0	13	1	
Queuing Penalty (veh)		0		41	1	0	27	1	
Storage Bay Dist (m)	47.0		23.0						
Storage Blk Time (%)		23	28	16					
Queuing Penalty (veh)		10	54	20					

Intersection: 11: Go Station East Access & Lakeshore Dr.

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (m)	73.5	1.8	7.2	47.0	8.4	7.9
Average Queue (m)	12.2	0.1	0.5	5.4	0.5	0.9
95th Queue (m)	51.3	1.5	4.0	26.9	3.6	5.0
Link Distance (m)	153.2			136.5	39.4	39.4
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		40.0	70.0			
Storage Blk Time (%)	1			0		
Queuing Penalty (veh)	0			0		

Intersection: 12: Go Station West Access & Tiffin St. & Lakeshore Dr.

Movement	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	T	R	L	TR	L	TR
Maximum Queue (m)	42.5	54.9	13.0	61.1	74.5	62.2	38.4	4.8	82.4	114.4
Average Queue (m)	27.0	43.2	0.8	25.6	16.7	35.9	12.0	0.3	77.9	79.4
95th Queue (m)	45.0	57.8	5.9	48.6	49.9	62.0	29.7	2.1	92.3	156.6
Link Distance (m)		48.8		112.4	112.4		95.8	95.8		109.8
Upstream Blk Time (%)		8								13
Queuing Penalty (veh)		27								0
Storage Bay Dist (m)	35.0		23.0			55.0			75.0	
Storage Blk Time (%)	3	23		14		3			23	
Queuing Penalty (veh)	13	35		0		4			32	

Intersection: 13: Essa Rd. & Gowan St.

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	LT	T
Maximum Queue (m)	84.7	36.0	24.4	34.9	28.5
Average Queue (m)	28.4	14.3	6.1	22.7	13.9
95th Queue (m)	58.8	29.6	18.0	33.4	29.4
Link Distance (m)	123.1	88.7	88.7	22.8	22.8
Upstream Blk Time (%)	0			12	3
Queuing Penalty (veh)	0			38	9
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 25: Property Access/Go Station South Access & Essa Rd.

Movement	EB	NB	NB	SB	SB
Directions Served	LTR	LT	TR	LT	TR
Maximum Queue (m)	14.1	22.1	14.5	38.9	29.9
Average Queue (m)	4.8	3.3	0.8	8.2	3.8
95th Queue (m)	12.6	13.2	6.6	25.1	16.9
Link Distance (m)	25.8	22.8	22.8	51.4	51.4
Upstream Blk Time (%)		0	0	0	0
Queuing Penalty (veh)		1	0	0	0
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

Zone wide Queuing Penalty: 499

Intersection: 1: High St & Dunlop St W

Movement	EB	EB	WB	WB	WB	NB	NB	B19	SB
Directions Served	LT	TR	LT	T	R	L	T	T	LTR
Maximum Queue (m)	48.6	46.1	63.4	49.6	20.5	22.4	57.1	2.6	25.5
Average Queue (m)	27.4	22.0	37.3	15.8	3.3	17.8	19.0	0.1	10.3
95th Queue (m)	44.0	38.5	58.6	41.8	12.2	24.9	45.3	1.8	20.2
Link Distance (m)	271.7	271.7	193.1	193.1			48.0	57.2	164.1
Upstream Blk Time (%)							1		
Queuing Penalty (veh)							2		
Storage Bay Dist (m)					17.0	15.0			
Storage Blk Time (%)				3	0	22	8		
Queuing Penalty (veh)				1	0	18	15		

Intersection: 2: Toronto St & Simcoe St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (m)	21.1	32.2	28.9	32.3	80.1	29.5	31.5	135.0	45.5	14.0	99.0
Average Queue (m)	6.8	7.8	8.8	26.5	28.3	6.1	3.5	104.6	43.4	4.0	52.1
95th Queue (m)	15.9	21.5	20.6	37.8	67.7	18.1	16.8	162.4	53.2	10.8	85.9
Link Distance (m)		72.7	72.7		75.5	75.5		123.0		111.0	111.0
Upstream Blk Time (%)					0			24			0
Queuing Penalty (veh)					0			0			0
Storage Bay Dist (m)	17.0			25.0			30.0		38.0		
Storage Blk Time (%)	1	3		17	1			36	11		
Queuing Penalty (veh)	1	2		13	3			193	50		

Intersection: 4: Bradford St & Site North Access/Simcoe St

Movement	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	89.2	34.9	19.5	13.7	41.1	47.7	15.5	18.3	27.8	29.7
Average Queue (m)	79.3	18.3	6.7	1.9	13.1	16.4	13.2	6.9	10.4	13.9
95th Queue (m)	94.2	31.7	14.5	8.2	29.3	35.1	17.5	15.8	22.8	25.6
Link Distance (m)	81.2	30.8	30.8		156.6	156.6			57.2	57.2
Upstream Blk Time (%)	84	2	0							
Queuing Penalty (veh)	0	2	0							
Storage Bay Dist (m)				15.0			8.0	15.0		
Storage Blk Time (%)				0	5	12	10	2	3	
Queuing Penalty (veh)				0	1	26	17	3	1	

Intersection: 6: Bradford St & Victoria St

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	21.0	13.8	17.2	21.0	37.9	43.9	21.6	33.0	31.2
Average Queue (m)	7.8	2.6	8.1	4.1	13.8	15.5	7.6	11.1	11.3
95th Queue (m)	17.4	9.7	15.9	14.8	29.9	33.9	17.2	26.0	23.6
Link Distance (m)	99.1		106.4		158.7	158.7		82.8	82.8
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		9.0		15.0			15.0		
Storage Blk Time (%)		5	11	1	5		2	3	
Queuing Penalty (veh)		3	1	4	1		2	2	

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	T	L	T	TR	L	T	T
Maximum Queue (m)	35.3	48.7	36.6	31.0	47.8	40.7	22.4	45.9	45.7	31.6	43.8	37.3
Average Queue (m)	11.4	23.9	12.8	21.5	18.7	18.3	12.1	24.2	25.9	13.4	17.8	12.4
95th Queue (m)	25.2	40.1	27.6	34.1	42.5	36.9	25.0	43.0	43.3	27.3	34.1	27.0
Link Distance (m)		153.7	153.7		36.0	36.0		44.6	44.6		40.1	40.1
Upstream Blk Time (%)				0	3	1		1	1		0	0
Queuing Penalty (veh)				0	8	3		2	2		1	0
Storage Bay Dist (m)	47.0			23.0			15.0			25.0		
Storage Blk Time (%)		0		15	2		4	18		2	2	0
Queuing Penalty (veh)		0		26	3		8	17		2	2	0

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	SB
Directions Served	R
Maximum Queue (m)	28.0
Average Queue (m)	6.4
95th Queue (m)	17.4
Link Distance (m)	
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (m)	89.0
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 11: Go Station East Access & Lakeshore Dr.

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	R
Maximum Queue (m)	63.6	66.4	47.3	72.0	143.8	154.0	41.0	22.9
Average Queue (m)	29.3	32.0	12.2	13.8	139.9	142.2	22.4	9.5
95th Queue (m)	52.2	55.6	33.6	42.7	146.5	147.9	38.9	18.2
Link Distance (m)	153.1	153.1			136.2	136.2	36.4	36.4
Upstream Blk Time (%)					28	87	3	
Queuing Penalty (veh)					0	0	0	
Storage Bay Dist (m)			40.0	70.0				
Storage Blk Time (%)		4	0	0	5			
Queuing Penalty (veh)		5	0	0	4			

Intersection: 12: Go Station West Access & Tiffin St. & Lakeshore Dr.

Movement	EB	EB	EB	EB	WB	WB	WB	B18	B18	NB	SB	SB
Directions Served	L	T	T	TR	T	T	R	T	T	L	L	TR
Maximum Queue (m)	38.4	42.0	39.4	44.4	56.4	144.1	62.5	145.5	157.8	44.5	82.4	117.8
Average Queue (m)	20.4	18.5	19.6	21.6	27.1	134.8	62.5	22.9	151.6	13.2	73.7	60.1
95th Queue (m)	33.6	35.1	33.4	39.0	47.8	139.5	62.5	103.0	158.9	32.9	94.5	141.5
Link Distance (m)		47.2	47.2	47.2	112.7	112.7		153.1	153.1	88.9		106.5
Upstream Blk Time (%)	0	0	0	0		69		0	5			9
Queuing Penalty (veh)	0	1	0	0		517		0	37			0
Storage Bay Dist (m)	35.0						55.0				75.0	
Storage Blk Time (%)	2	1			14	1	71				17	0
Queuing Penalty (veh)	2	1			0	7	184				24	0

Intersection: 13: Essa Rd. & Gowan St.

Movement	WB	NB	NB	SB	SB	SB
Directions Served	LR	T	TR	L	T	T
Maximum Queue (m)	54.6	37.0	25.2	18.0	30.8	23.2
Average Queue (m)	21.3	14.4	8.1	13.0	8.2	6.9
95th Queue (m)	37.7	30.4	20.5	20.1	25.1	21.6
Link Distance (m)	121.2	89.3	89.3		23.3	23.3
Upstream Blk Time (%)				0	1	1
Queuing Penalty (veh)				0	3	2
Storage Bay Dist (m)				10.0		
Storage Blk Time (%)				15	3	
Queuing Penalty (veh)				23	7	

Zone Summary

Zone wide Queuing Penalty: 1251

Intersection: 1: High St & Dunlop St W

Movement	EB	EB	WB	WB	WB	NB	NB	B19	SB
Directions Served	LT	TR	LT	T	R	L	T	T	LTR
Maximum Queue (m)	59.5	55.3	110.7	101.1	24.0	22.4	73.1	17.1	43.9
Average Queue (m)	35.6	27.4	68.0	49.3	5.9	20.8	38.4	0.9	20.3
95th Queue (m)	52.9	46.9	101.0	88.9	19.2	25.5	71.4	7.3	37.9
Link Distance (m)	271.7	271.7	193.1	193.1			48.0	57.2	164.1
Upstream Blk Time (%)							7		
Queuing Penalty (veh)							23		
Storage Bay Dist (m)					17.0	15.0			
Storage Blk Time (%)				12	0	34	15		
Queuing Penalty (veh)				4	0	52	40		

Intersection: 2: Toronto St & Simcoe St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (m)	24.0	42.3	36.2	32.4	89.3	79.4	25.8	137.3	45.5	116.6	122.4
Average Queue (m)	11.1	15.9	15.6	31.7	72.3	21.2	1.4	111.7	43.8	60.3	106.0
95th Queue (m)	22.4	34.3	29.8	33.9	100.6	60.9	10.6	158.5	53.3	149.1	137.1
Link Distance (m)		72.7	72.7		75.5	75.5		123.0		111.0	111.0
Upstream Blk Time (%)					27	1		30		14	54
Queuing Penalty (veh)					0	0		0		0	0
Storage Bay Dist (m)	17.0			25.0			30.0		38.0		
Storage Blk Time (%)	4	10		50	3			44	12		
Queuing Penalty (veh)	4	8		64	17			211	50		

Intersection: 4: Bradford St & Site North Access/Simcoe St

Movement	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	89.3	37.8	28.0	22.1	51.8	60.2	15.5	18.8	36.8	41.6
Average Queue (m)	81.6	25.5	9.2	2.3	21.8	24.1	14.5	6.7	11.1	19.7
95th Queue (m)	85.6	38.1	19.5	10.1	41.9	50.4	17.1	15.8	25.7	33.9
Link Distance (m)	81.2	30.8	30.8		156.6	156.6			57.2	57.2
Upstream Blk Time (%)	98	6	0							0
Queuing Penalty (veh)	0	11	0							0
Storage Bay Dist (m)				15.0			8.0	15.0		
Storage Blk Time (%)				0	13	18	15	2	3	
Queuing Penalty (veh)				0	2	49	38	4	1	

Intersection: 6: Bradford St & Victoria St

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	56.6	15.9	28.2	21.8	52.3	58.1	21.0	62.6	64.4
Average Queue (m)	19.0	5.8	10.6	7.6	19.7	22.9	5.3	27.4	25.1
95th Queue (m)	47.3	14.7	21.4	19.7	38.7	44.6	16.4	57.9	55.5
Link Distance (m)	99.1		106.4		158.7	158.7		82.8	82.8
Upstream Blk Time (%)	2							4	4
Queuing Penalty (veh)	0							15	14
Storage Bay Dist (m)		9.0		15.0			15.0		
Storage Blk Time (%)		15	18	3	8		1	18	
Queuing Penalty (veh)		10	4	9	3		2	5	

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	T	L	T	TR	L	T	T
Maximum Queue (m)	54.5	162.8	161.4	30.4	54.9	44.7	22.4	54.7	53.5	33.7	65.3	53.4
Average Queue (m)	31.6	139.3	136.2	27.2	34.4	26.8	16.6	47.6	46.0	31.9	54.0	34.7
95th Queue (m)	69.0	202.8	206.1	35.8	60.0	46.7	28.9	52.1	50.4	34.7	64.7	59.2
Link Distance (m)		153.7	153.7		36.0	36.0		44.6	44.6		40.0	40.0
Upstream Blk Time (%)		58	47	0	26	6		40	43	0	75	10
Queuing Penalty (veh)		0	0	0	70	18		178	193	0	203	28
Storage Bay Dist (m)	47.0			23.0			15.0			25.0		
Storage Blk Time (%)	0	77		45	8		12	61		75	19	
Queuing Penalty (veh)	1	45		76	16		35	79		190	40	

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	SB
Directions Served	R
Maximum Queue (m)	24.9
Average Queue (m)	8.8
95th Queue (m)	20.3
Link Distance (m)	40.0
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Go Station East Access & Lakeshore Dr.

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	R
Maximum Queue (m)	79.1	86.8	47.5	52.5	144.2	151.9	40.6	24.8
Average Queue (m)	38.1	42.7	16.5	6.8	137.2	141.9	22.5	10.2
95th Queue (m)	65.3	71.6	42.9	27.8	159.9	148.0	40.0	19.8
Link Distance (m)	153.1	153.1			136.2	136.2	36.4	36.4
Upstream Blk Time (%)					27	91	2	0
Queuing Penalty (veh)					0	0	0	0
Storage Bay Dist (m)			40.0	70.0				
Storage Blk Time (%)		5	0		6			
Queuing Penalty (veh)		10	0		2			

Intersection: 12: Go Station West Access & Tiffin St. & Lakeshore Dr.

Movement	EB	EB	EB	EB	WB	WB	WB	B18	B18	NB	SB	SB
Directions Served	L	T	T	TR	T	T	R	T	T	L	L	TR
Maximum Queue (m)	42.4	67.9	57.0	59.2	101.1	144.8	62.5	164.9	159.7	62.4	120.0	112.4
Average Queue (m)	41.5	56.3	46.7	48.0	50.9	135.1	62.5	59.0	154.2	23.4	111.1	32.5
95th Queue (m)	45.3	67.3	56.9	56.9	85.2	140.1	62.5	175.5	158.4	54.3	116.5	96.8
Link Distance (m)		47.2	47.2	47.2	112.7	112.7		153.1	153.1	88.9	106.2	106.2
Upstream Blk Time (%)	2	57	29	35	0	85		1	11	1	44	3
Queuing Penalty (veh)	0	191	96	118	3	519		8	69	0	0	0
Storage Bay Dist (m)	35.0						55.0					
Storage Blk Time (%)	75	15			43	4	84					
Queuing Penalty (veh)	180	33			0	33	193					

Intersection: 13: Essa Rd. & Gowan St.

Movement	WB	NB	NB	SB	SB	SB
Directions Served	LR	T	TR	L	T	T
Maximum Queue (m)	134.7	98.6	96.6	19.6	37.0	29.9
Average Queue (m)	114.5	65.0	56.9	16.4	27.7	21.2
95th Queue (m)	156.8	101.2	95.9	21.3	42.6	32.1
Link Distance (m)	121.2	89.3	89.3		23.3	23.3
Upstream Blk Time (%)	66	7	5	0	30	13
Queuing Penalty (veh)	0	0	0	0	118	51
Storage Bay Dist (m)				10.0		
Storage Blk Time (%)				57	19	
Queuing Penalty (veh)				148	56	

Zone Summary

Zone wide Queuing Penalty: 3641

Intersection: 1: High St & Dunlop St W

Movement	EB	EB	WB	WB	WB	NB	NB	B19	SB
Directions Served	LT	TR	LT	T	R	L	T	T	LTR
Maximum Queue (m)	54.6	56.5	100.8	86.9	22.0	22.4	62.2	1.2	31.3
Average Queue (m)	31.0	26.9	57.3	37.9	3.2	18.3	23.8	0.0	13.1
95th Queue (m)	49.9	49.3	91.1	78.7	12.9	25.3	49.2	0.9	25.8
Link Distance (m)	271.7	271.7	193.1	193.1			48.0	57.2	164.1
Upstream Blk Time (%)							1		
Queuing Penalty (veh)							3		
Storage Bay Dist (m)					17.0	15.0			
Storage Blk Time (%)				7	0	25	9		
Queuing Penalty (veh)				2	0	30	20		

Intersection: 2: Toronto St & Simcoe St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (m)	24.4	51.7	39.4	32.4	87.6	79.8	25.8	135.5	45.5	95.9	116.2
Average Queue (m)	17.1	19.9	16.6	30.6	59.4	24.7	3.3	128.8	45.2	13.9	73.1
95th Queue (m)	27.4	44.5	32.2	36.4	101.2	69.3	15.8	133.2	49.1	63.3	114.6
Link Distance (m)		72.7	72.7		75.5	75.5		123.0		111.0	111.0
Upstream Blk Time (%)		0			18	1		56		1	5
Queuing Penalty (veh)		0			0	0		0		0	0
Storage Bay Dist (m)	17.0			25.0			30.0		38.0		
Storage Blk Time (%)	11	9		45	4		0	40	29		
Queuing Penalty (veh)	16	14		52	16		0	262	156		

Intersection: 4: Bradford St & Site North Access/Simcoe St

Movement	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	88.0	32.8	30.3	8.1	32.3	60.0	15.5	21.4	30.4	31.2
Average Queue (m)	81.4	22.4	11.7	1.4	13.7	20.4	13.9	12.7	10.2	14.3
95th Queue (m)	95.0	34.3	22.6	6.2	27.7	43.4	17.7	21.1	23.7	26.1
Link Distance (m)	81.2	30.8	30.8		156.6	156.6			57.2	57.2
Upstream Blk Time (%)	93	2	0							
Queuing Penalty (veh)	0	4	0							
Storage Bay Dist (m)				15.0			8.0	15.0		
Storage Blk Time (%)				0	7	17	13	9	3	
Queuing Penalty (veh)				0	1	42	25	14	3	

Intersection: 6: Bradford St & Victoria St

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	21.7	15.3	20.6	17.2	32.4	37.4	19.8	32.6	33.5
Average Queue (m)	8.5	3.2	9.3	3.3	10.7	15.7	8.4	13.6	14.8
95th Queue (m)	18.1	10.8	18.6	12.2	25.7	32.1	17.6	27.3	28.3
Link Distance (m)	99.1		106.4		158.7	158.7		82.8	82.8
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		9.0		15.0			15.0		
Storage Blk Time (%)		5	13	1	3		3	4	
Queuing Penalty (veh)		3	2	3	1		6	3	

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	T	L	T	TR	L	T	T
Maximum Queue (m)	51.5	101.8	81.5	32.4	52.2	45.5	22.4	51.3	48.4	32.3	54.2	47.7
Average Queue (m)	24.3	50.0	34.9	26.1	29.2	22.7	14.6	33.7	37.9	21.9	30.8	19.9
95th Queue (m)	55.1	94.8	75.9	35.9	56.1	42.8	27.3	54.7	54.5	37.3	51.5	37.1
Link Distance (m)		153.7	153.7		36.0	36.0		44.6	44.6		40.1	40.1
Upstream Blk Time (%)		0		1	17	3		6	17		9	1
Queuing Penalty (veh)		0		0	52	8		22	62		25	2
Storage Bay Dist (m)	47.0			23.0			15.0			25.0		
Storage Blk Time (%)	0	20		36	3		10	30		15	8	1
Queuing Penalty (veh)	1	22		75	6		21	34		31	8	1

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	SB
Directions Served	R
Maximum Queue (m)	36.0
Average Queue (m)	8.2
95th Queue (m)	22.1
Link Distance (m)	
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (m)	89.0
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 11: Go Station East Access & Lakeshore Dr.

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	R
Maximum Queue (m)	76.6	85.3	47.5	54.1	146.4	148.0	41.0	26.8
Average Queue (m)	38.4	42.7	16.1	14.5	136.9	141.5	24.6	11.3
95th Queue (m)	66.3	73.5	42.1	43.9	157.1	145.1	41.4	21.8
Link Distance (m)	153.1	153.1			136.2	136.2	36.4	36.4
Upstream Blk Time (%)					24	84	3	
Queuing Penalty (veh)					0	0	0	
Storage Bay Dist (m)			40.0	70.0				
Storage Blk Time (%)		7	0		4			
Queuing Penalty (veh)		11	0		4			

Intersection: 12: Go Station West Access & Tiffin St. & Lakeshore Dr.

Movement	EB	EB	EB	EB	WB	WB	WB	B18	B18	NB	SB	SB
Directions Served	L	T	T	TR	T	T	R	T	T	L	L	TR
Maximum Queue (m)	42.6	64.8	50.4	52.8	66.0	144.5	62.5	125.7	157.0	57.8	82.4	118.9
Average Queue (m)	41.0	54.6	37.7	38.7	36.6	134.7	62.5	17.0	153.0	17.8	82.0	110.0
95th Queue (m)	48.0	68.8	56.2	56.5	60.3	139.1	62.5	83.6	162.6	43.6	83.6	128.6
Link Distance (m)		47.2	47.2	47.2	112.7	112.7		153.1	153.1	88.9		106.5
Upstream Blk Time (%)	3	63	4	6		67			7			42
Queuing Penalty (veh)	0	171	10	17		610			64			0
Storage Bay Dist (m)	35.0						55.0				75.0	
Storage Blk Time (%)	83	10			28	1	68				45	0
Queuing Penalty (veh)	148	18			0	8	218				77	1

Intersection: 13: Essa Rd. & Gowan St.

Movement	WB	NB	NB	SB	SB	SB
Directions Served	LR	T	TR	L	T	T
Maximum Queue (m)	99.8	42.5	45.7	17.4	35.8	27.1
Average Queue (m)	47.2	19.3	15.0	14.5	13.4	12.3
95th Queue (m)	116.6	38.9	37.4	20.4	33.5	28.1
Link Distance (m)	121.2	89.3	89.3		23.3	23.3
Upstream Blk Time (%)	16			0	3	3
Queuing Penalty (veh)	0			0	12	9
Storage Bay Dist (m)				10.0		
Storage Blk Time (%)				22	6	
Queuing Penalty (veh)				49	15	

Zone Summary

Zone wide Queuing Penalty: 2489

Intersection: 1: High St & Dunlop St W

Movement	EB	EB	WB	WB	WB	NB	NB	B19	SB
Directions Served	LT	TR	LT	T	R	L	T	T	LTR
Maximum Queue (m)	86.1	84.1	197.7	184.7	24.5	22.4	73.1	40.0	69.4
Average Queue (m)	53.6	49.4	146.7	131.4	5.0	21.4	54.3	4.3	36.1
95th Queue (m)	80.7	78.7	220.6	210.7	19.1	24.9	84.1	23.1	60.2
Link Distance (m)	271.7	271.7	193.1	193.1			48.0	57.2	164.1
Upstream Blk Time (%)			20	7			20	0	
Queuing Penalty (veh)			0	0			75	1	
Storage Bay Dist (m)					17.0	15.0			
Storage Blk Time (%)				31	0	50	25		
Queuing Penalty (veh)				12	0	103	79		

Intersection: 2: Toronto St & Simcoe St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (m)	24.5	72.8	71.7	32.4	84.9	82.4	14.4	138.0	45.5	114.2	121.7
Average Queue (m)	17.7	36.3	31.9	20.8	78.5	35.7	2.1	128.2	43.2	22.1	113.0
95th Queue (m)	29.5	66.7	57.4	45.5	84.0	83.1	10.5	133.7	56.5	86.8	130.3
Link Distance (m)		72.7	72.7		75.5	75.5		123.0		111.0	111.0
Upstream Blk Time (%)		0	0		90	9		41		3	49
Queuing Penalty (veh)		1	1		0	0		0		0	0
Storage Bay Dist (m)	17.0			25.0			30.0		38.0		
Storage Blk Time (%)	11	29		29	62			38	10		
Queuing Penalty (veh)	18	46		57	383			224	53		

Intersection: 4: Bradford St & Site North Access/Simcoe St

Movement	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	88.7	35.5	27.9	16.2	54.0	66.8	15.5	22.4	55.1	49.6
Average Queue (m)	82.1	24.2	9.4	1.9	20.8	23.2	14.4	16.7	18.6	20.5
95th Queue (m)	86.7	37.1	19.8	9.0	39.8	46.9	18.0	25.0	40.2	37.4
Link Distance (m)	81.2	30.8	30.8		156.6	156.6			57.2	57.2
Upstream Blk Time (%)	99	4	0						0	0
Queuing Penalty (veh)	0	10	0						1	0
Storage Bay Dist (m)				15.0			8.0	15.0		
Storage Blk Time (%)				0	13	18	16	23	5	
Queuing Penalty (veh)				1	2	55	42	43	7	

Intersection: 6: Bradford St & Victoria St

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	37.8	16.2	30.5	22.4	53.7	60.7	22.0	45.8	41.4
Average Queue (m)	17.1	6.6	11.7	8.3	21.6	27.2	4.9	22.7	20.8
95th Queue (m)	30.5	16.1	23.9	21.1	43.7	50.8	14.7	40.4	36.7
Link Distance (m)	99.1		106.4		158.7	158.7		82.8	82.8
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		9.0		15.0			15.0		
Storage Blk Time (%)		13	18	4	8		0	14	
Queuing Penalty (veh)		11	5	16	3		1	4	

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	T	L	T	TR	L	T	T
Maximum Queue (m)	54.5	166.5	168.8	32.4	57.1	46.1	22.4	58.9	53.7	32.5	65.0	55.5
Average Queue (m)	34.3	158.1	157.4	28.7	40.0	30.8	17.0	48.3	46.8	31.8	55.7	39.9
95th Queue (m)	73.0	166.2	173.6	34.3	61.5	50.8	29.1	53.6	51.3	33.9	63.5	62.0
Link Distance (m)		153.7	153.7		36.0	36.0		44.6	44.6		40.0	40.0
Upstream Blk Time (%)		78	66	0	30	12		47	56		73	15
Queuing Penalty (veh)		0	0	0	99	38		232	276		236	48
Storage Bay Dist (m)	47.0			23.0			15.0			25.0		
Storage Blk Time (%)	1	88		49	9		14	64		77	20	
Queuing Penalty (veh)	3	63		100	22		40	103		229	51	

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	SB
Directions Served	R
Maximum Queue (m)	25.7
Average Queue (m)	9.6
95th Queue (m)	20.0
Link Distance (m)	40.0
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Go Station East Access & Lakeshore Dr.

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	R
Maximum Queue (m)	94.5	99.9	47.5	41.4	128.1	140.7	41.0	26.9
Average Queue (m)	42.2	46.7	18.5	7.7	69.6	94.9	27.5	11.7
95th Queue (m)	73.6	80.9	45.9	24.0	161.1	169.7	44.9	23.1
Link Distance (m)	153.1	153.1			136.2	136.2	36.4	36.4
Upstream Blk Time (%)					6	25	5	0
Queuing Penalty (veh)					0	0	0	0
Storage Bay Dist (m)			40.0	70.0				
Storage Blk Time (%)		6	0	0	1			
Queuing Penalty (veh)		17	0	0	0			

Intersection: 12: Go Station West Access & Tiffin St. & Lakeshore Dr.

Movement	EB	EB	EB	EB	WB	WB	WB	B18	B18	NB	SB	SB
Directions Served	L	T	T	TR	T	T	R	T	T	L	L	TR
Maximum Queue (m)	42.5	66.9	54.8	56.3	132.1	139.4	62.5	103.8	146.4	60.5	115.8	109.2
Average Queue (m)	41.9	57.5	46.8	47.7	82.7	121.3	61.3	12.5	77.8	20.1	111.2	30.2
95th Queue (m)	44.7	67.0	55.4	55.7	124.5	161.3	71.1	66.7	184.0	49.9	113.6	89.3
Link Distance (m)		47.2	47.2	47.2	112.7	112.7		153.1	153.1	88.9	106.2	106.2
Upstream Blk Time (%)	5	70	25	37	4	29		0	3	1	46	3
Queuing Penalty (veh)	0	282	102	149	29	213		0	21	0	0	0
Storage Bay Dist (m)	35.0						55.0					
Storage Blk Time (%)	83	18			64	22	17					
Queuing Penalty (veh)	241	47			0	207	48					

Intersection: 13: Essa Rd. & Gowan St.

Movement	WB	NB	NB	SB	SB	SB
Directions Served	LR	T	TR	L	T	T
Maximum Queue (m)	138.6	101.0	104.8	18.0	38.3	32.7
Average Queue (m)	127.3	90.8	89.6	16.8	30.0	23.7
95th Queue (m)	133.6	109.6	111.0	18.9	39.7	31.2
Link Distance (m)	121.2	89.3	89.3		23.3	23.3
Upstream Blk Time (%)	97	49	63	0	32	18
Queuing Penalty (veh)	0	0	0	0	161	87
Storage Bay Dist (m)				10.0		
Storage Blk Time (%)				62	15	
Queuing Penalty (veh)				185	57	

Zone Summary

Zone wide Queuing Penalty: 4644

Intersection: 1: High St & Dunlop St W

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	LT	TR	LT	T	R	L	T	R	LTR
Maximum Queue (m)	66.8	65.0	116.1	97.7	22.8	22.4	62.4	14.6	35.1
Average Queue (m)	35.0	31.6	70.1	50.3	4.3	19.1	26.2	0.5	15.6
95th Queue (m)	55.7	55.7	110.3	96.4	15.4	25.6	53.6	10.3	30.6
Link Distance (m)	271.7	271.7	193.1	193.1			48.0	48.0	164.1
Upstream Blk Time (%)							2	0	
Queuing Penalty (veh)							6	0	
Storage Bay Dist (m)					17.0	15.0			
Storage Blk Time (%)				11	0	30	13		
Queuing Penalty (veh)				3	0	39	30		

Intersection: 2: Toronto St & Simcoe St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (m)	24.4	55.8	45.7	32.4	88.2	82.4	31.5	139.4	45.5	91.2	118.2
Average Queue (m)	15.1	20.4	17.4	25.4	79.2	45.9	2.9	128.5	45.1	22.6	91.0
95th Queue (m)	26.8	45.5	34.7	46.2	85.3	94.6	14.8	133.4	50.0	86.3	132.1
Link Distance (m)		72.7	72.7		75.5	75.5		123.0		111.0	111.0
Upstream Blk Time (%)		0			91	14		51		2	20
Queuing Penalty (veh)		0			0	0		0		0	0
Storage Bay Dist (m)	17.0			25.0			30.0		38.0		
Storage Blk Time (%)	6	10		46	53			45	14		
Queuing Penalty (veh)	9	16		57	228			323	82		

Intersection: 4: Bradford St & Site North Access/Simcoe St

Movement	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	87.2	33.3	28.0	12.4	42.0	58.0	15.5	21.4	30.5	28.4
Average Queue (m)	68.9	19.2	9.9	2.3	13.5	19.1	14.0	12.8	8.9	13.6
95th Queue (m)	106.6	33.0	20.4	8.4	29.6	42.3	18.1	21.5	21.0	24.6
Link Distance (m)	81.2	30.8	30.8		156.6	156.6			57.2	57.2
Upstream Blk Time (%)	52	2	0							
Queuing Penalty (veh)	0	3	0							
Storage Bay Dist (m)				15.0			8.0	15.0		
Storage Blk Time (%)				0	6	15	15	10	1	
Queuing Penalty (veh)				0	1	42	26	14	2	

Intersection: 6: Bradford St & Victoria St

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	26.5	15.3	19.3	21.2	38.6	42.8	22.0	36.1	37.6
Average Queue (m)	10.6	3.5	9.1	3.5	11.7	19.0	8.2	13.1	14.7
95th Queue (m)	22.4	11.7	17.7	13.0	27.1	37.6	18.3	28.3	29.1
Link Distance (m)	99.1		106.4		158.7	158.7		82.8	82.8
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		9.0		15.0			15.0		
Storage Blk Time (%)		6	15	1	3		2	5	
Queuing Penalty (veh)		4	2	3	1		4	4	

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	T	L	T	TR	L	T	T
Maximum Queue (m)	54.4	105.0	109.8	30.4	50.8	44.2	22.4	49.4	46.3	33.0	52.5	44.5
Average Queue (m)	16.8	48.5	47.7	24.9	28.5	26.4	14.2	33.5	37.9	19.7	31.6	24.6
95th Queue (m)	41.1	99.6	115.2	36.1	52.5	46.8	27.5	54.0	54.2	35.8	49.4	45.2
Link Distance (m)		153.7	153.7		36.0	36.0		44.6	44.6		40.1	40.1
Upstream Blk Time (%)		5	9	6	18	5		8	18	0	17	12
Queuing Penalty (veh)		0	0	0	61	18		31	65	0	38	26
Storage Bay Dist (m)	47.0			23.0			15.0			25.0		
Storage Blk Time (%)	0	8		26	5		8	34		12	25	12
Queuing Penalty (veh)	0	9		59	13		16	42		22	27	8

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	SB
Directions Served	R
Maximum Queue (m)	28.6
Average Queue (m)	8.1
95th Queue (m)	19.6
Link Distance (m)	
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (m)	89.0
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 11: Go Station East Access & Lakeshore Dr.

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	R
Maximum Queue (m)	75.9	84.2	47.5	77.4	147.9	150.0	41.0	29.6
Average Queue (m)	37.7	40.6	17.2	19.9	135.1	141.8	27.0	12.1
95th Queue (m)	67.2	73.7	44.8	57.0	167.5	146.2	44.0	22.6
Link Distance (m)	153.1	153.1			136.2	136.2	36.4	36.4
Upstream Blk Time (%)					16	70	5	0
Queuing Penalty (veh)					0	0	0	0
Storage Bay Dist (m)			40.0	70.0				
Storage Blk Time (%)		7	0	0	5			
Queuing Penalty (veh)		13	0	0	5			

Intersection: 12: Go Station West Access & Tiffin St. & Lakeshore Dr.

Movement	EB	EB	EB	EB	WB	WB	WB	B18	B18	NB	SB	SB
Directions Served	L	T	T	TR	T	T	R	T	T	L	L	TR
Maximum Queue (m)	42.5	61.5	53.2	51.3	116.0	145.2	62.5	133.0	156.5	78.6	82.4	117.3
Average Queue (m)	34.9	40.2	36.1	38.6	67.5	134.4	62.3	19.1	128.8	25.2	75.2	97.6
95th Queue (m)	54.2	67.0	59.2	59.5	118.5	141.7	65.4	87.8	188.4	66.6	109.2	152.8
Link Distance (m)		47.2	47.2	47.2	112.7	112.7		153.1	153.1	88.9		106.5
Upstream Blk Time (%)	1	13	4	9	9	39		0	2	5		26
Queuing Penalty (veh)	0	38	13	26	90	387		0	25	0		0
Storage Bay Dist (m)	35.0						55.0				75.0	
Storage Blk Time (%)	34	10			54	14	33				23	8
Queuing Penalty (veh)	66	20			0	182	116				45	63

Intersection: 13: Essa Rd. & Gowan St.

Movement	WB	NB	NB	SB	SB	SB
Directions Served	LR	T	TR	L	T	T
Maximum Queue (m)	114.0	63.0	64.3	18.9	36.2	27.1
Average Queue (m)	44.7	26.4	22.3	13.4	15.2	12.3
95th Queue (m)	96.9	66.5	63.6	22.7	36.8	28.6
Link Distance (m)	121.2	89.3	89.3		23.3	23.3
Upstream Blk Time (%)	9	9	9	0	5	3
Queuing Penalty (veh)	0	0	0	0	18	9
Storage Bay Dist (m)				10.0		
Storage Blk Time (%)				22	6	
Queuing Penalty (veh)				44	17	

Zone Summary

Zone wide Queuing Penalty: 2513

Intersection: 1: High St & Dunlop St W

Movement	EB	EB	WB	WB	WB	NB	NB	NB	B19	SB
Directions Served	LT	TR	LT	T	R	L	T	R	T	LTR
Maximum Queue (m)	94.5	106.7	197.7	197.7	24.5	22.4	72.7	9.6	19.3	66.5
Average Queue (m)	53.9	50.6	197.6	197.4	6.1	21.6	49.0	0.6	1.8	38.0
95th Queue (m)	83.0	88.1	198.7	199.1	21.3	24.0	79.4	9.2	10.7	64.3
Link Distance (m)	271.7	271.7	193.1	193.1			48.0	48.0	57.2	164.1
Upstream Blk Time (%)			97	71			15	0		
Queuing Penalty (veh)			0	0			53	0		
Storage Bay Dist (m)					17.0	15.0				
Storage Blk Time (%)				24	0	48	23			
Queuing Penalty (veh)				10	0	107	77			

Intersection: 2: Toronto St & Simcoe St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (m)	24.5	74.5	65.6	32.4	86.4	83.2	21.2	134.2	45.5	112.4	124.5
Average Queue (m)	16.9	38.8	34.8	21.8	79.5	48.6	2.2	128.2	41.8	19.4	116.4
95th Queue (m)	30.3	67.9	59.5	46.0	84.6	97.5	11.9	131.3	60.1	76.2	120.7
Link Distance (m)		72.7	72.7		75.5	75.5		123.0		111.0	111.0
Upstream Blk Time (%)		1	0		88	15		45		1	61
Queuing Penalty (veh)		2	1		0	0		0		0	0
Storage Bay Dist (m)	17.0			25.0			30.0		38.0		
Storage Blk Time (%)	12	32		33	62			42	10		
Queuing Penalty (veh)	21	53		70	421			271	55		

Intersection: 4: Bradford St & Site North Access/Simcoe St

Movement	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	88.0	33.5	22.1	14.8	44.9	57.1	15.5	22.4	43.5	43.7
Average Queue (m)	79.1	23.6	8.8	2.4	18.4	19.5	14.3	16.0	14.1	16.8
95th Queue (m)	95.3	35.8	17.6	9.3	36.3	39.1	17.5	23.9	33.3	31.4
Link Distance (m)	81.2	30.8	30.8		156.6	156.6			57.2	57.2
Upstream Blk Time (%)	90	4	0						0	0
Queuing Penalty (veh)	0	10	0						0	0
Storage Bay Dist (m)				15.0			8.0	15.0		
Storage Blk Time (%)				0	11	17	17	19	2	
Queuing Penalty (veh)				0	1	56	41	32	3	

Intersection: 6: Bradford St & Victoria St

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	49.6	15.6	28.9	23.1	45.7	53.5	21.8	63.7	58.6
Average Queue (m)	19.8	7.1	12.7	8.0	16.8	25.0	5.9	27.6	24.6
95th Queue (m)	39.4	16.0	24.0	20.5	36.0	44.7	17.2	62.7	59.3
Link Distance (m)	99.1		106.4		158.7	158.7		82.8	82.8
Upstream Blk Time (%)								5	5
Queuing Penalty (veh)								20	17
Storage Bay Dist (m)		9.0		15.0			15.0		
Storage Blk Time (%)		19	23	3	6		1	20	
Queuing Penalty (veh)		17	7	12	3		2	7	

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	T	L	T	TR	L	T	T
Maximum Queue (m)	54.5	169.8	166.2	31.1	54.9	45.7	22.4	58.4	53.5	36.5	65.1	52.8
Average Queue (m)	37.1	159.6	160.1	28.2	38.8	29.2	17.3	46.8	46.3	31.9	55.0	28.9
95th Queue (m)	74.2	164.7	166.1	35.5	61.0	52.0	29.2	57.0	50.6	34.9	63.7	56.3
Link Distance (m)		153.7	153.7		36.0	36.0		44.6	44.6		40.0	40.0
Upstream Blk Time (%)		83	71	0	25	9		38	59	0	79	8
Queuing Penalty (veh)		0	0	0	92	34		187	293	0	250	25
Storage Bay Dist (m)	47.0			23.0			15.0			25.0		
Storage Blk Time (%)	1	89		43	6		14	60		80	20	
Queuing Penalty (veh)	3	71		97	17		36	106		218	58	

Intersection: 10: Essa Rd./Bradford St. & Tiffin St.

Movement	SB
Directions Served	R
Maximum Queue (m)	28.4
Average Queue (m)	9.4
95th Queue (m)	21.4
Link Distance (m)	40.0
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Go Station East Access & Lakeshore Dr.

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	R
Maximum Queue (m)	119.3	131.0	47.5	64.9	143.0	150.5	41.0	35.2
Average Queue (m)	54.6	60.4	21.2	11.0	130.8	136.1	32.9	14.2
95th Queue (m)	100.4	109.2	51.5	36.7	177.9	171.2	48.2	28.5
Link Distance (m)	153.1	153.1			136.2	136.2	36.4	36.4
Upstream Blk Time (%)					18	61	17	0
Queuing Penalty (veh)					0	0	0	0
Storage Bay Dist (m)			40.0	70.0				
Storage Blk Time (%)		11	0		5			
Queuing Penalty (veh)		33	0		2			

Intersection: 12: Go Station West Access & Tiffin St. & Lakeshore Dr.

Movement	EB	EB	EB	EB	WB	WB	WB	B18	B18	NB	SB	SB
Directions Served	L	T	T	TR	T	T	R	T	T	L	L	TR
Maximum Queue (m)	42.5	68.2	58.3	58.9	133.1	141.4	62.5	146.9	156.5	61.3	120.5	111.9
Average Queue (m)	42.1	57.7	46.6	48.0	89.8	133.6	62.4	19.9	136.4	20.2	111.5	25.0
95th Queue (m)	43.5	67.2	57.5	55.4	136.3	144.1	63.0	91.5	188.7	51.3	115.2	76.8
Link Distance (m)		47.2	47.2	47.2	112.7	112.7		153.1	153.1	88.9	106.2	106.2
Upstream Blk Time (%)	3	76	26	37	7	43		0	6		46	1
Queuing Penalty (veh)	0	337	118	164	58	356		0	52		0	0
Storage Bay Dist (m)	35.0						55.0					
Storage Blk Time (%)	87	16			65	26	20					
Queuing Penalty (veh)	282	47			0	272	62					

Intersection: 13: Essa Rd. & Gowan St.

Movement	WB	NB	NB	SB	SB	SB
Directions Served	LR	T	TR	L	T	T
Maximum Queue (m)	136.1	103.9	106.4	18.3	37.6	32.2
Average Queue (m)	126.4	93.2	94.9	16.9	29.1	22.1
95th Queue (m)	130.7	104.5	102.9	19.1	41.0	32.1
Link Distance (m)	121.2	89.3	89.3		23.3	23.3
Upstream Blk Time (%)	97	65	82	0	32	13
Queuing Penalty (veh)	0	0	0	0	156	62
Storage Bay Dist (m)				10.0		
Storage Blk Time (%)				61	11	
Queuing Penalty (veh)				164	46	

Zone Summary

Zone wide Queuing Penalty: 5068