

City of Burlington

Downtown Burlington Micro-Level Traffic Operations

Review of the Preferred Land Use Scenario

Final Report

April 2020

B001112

Submitted by **CIMA Canada Inc.**

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Project # B001112**

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1 Introduction

CIMA+, as a subconsultant to SGL, was retained by the City of Burlington (the “City”) to conduct a micro-level traffic analysis in support of the Scoped Re-Examination of the Adopted Official Plan for Downtown Burlington. The objective of this report is to assess the impacts of the preferred land use scenario (as directed by the re-examined Official Plan) on the traffic operations at key intersections within the downtown area while considering the City’s proposed active transportation improvements.

1.1 Background

CIMA+ previously prepared a scoped traffic study, completed in September 2018, that analyzed the impact of seven (7) proposed, five (5) approved and two (2) in-stream developments within the Downtown. The horizon years consisted of 2020 and 2025, on an area network consisting of 14 intersections.

Since the submission of the September 2018 report, the City initiated a new planning study (current study) to re-visit the land use assumptions of the adopted Official Plan (April 2018). The traffic analysis requirement of this study was completed in two (2) phases.

In Phase 1, the traffic model from the 2018 scoped traffic study was updated to include a new planning horizon year (2031) and an expanded geographical study area (a total of 30 intersections). The future year traffic volumes were estimated by applying an organic growth rate to the existing traffic volumes while considering the generated traffic volumes from five (5) approved developments. The outcomes of the analysis were made available to the project team at the early stages of the study and were considered as a valuable benchmark reflecting the future traffic operations within the study area¹.

The adopted traffic projection approach in Phase 1 was not sensitive to changes in land use assumptions and did not account for future changes in travel demand patterns. Therefore, in Phase 2, the traffic impacts of the preferred land use scenario (as provided by SGL) were assessed following a more detailed traffic projection approach while using the Halton Region EMME Model and the updated Synchro model. The City’s proposed active transportation improvements were also considered in the Phase 2 analysis. The details of these traffic analyses and other complementary reviews are discussed in the subsequent sections of the report.

¹ Downtown Burlington Traffic Overview, Final Report, October 2019, Prepared by CIMA+

1.2 Study Area

The study area is located within the downtown urban growth center and includes variety of land uses such as commercial employment, retail and services, residential, recreational, and tourism. Figure 1 shows the study area that is evaluated in this report.

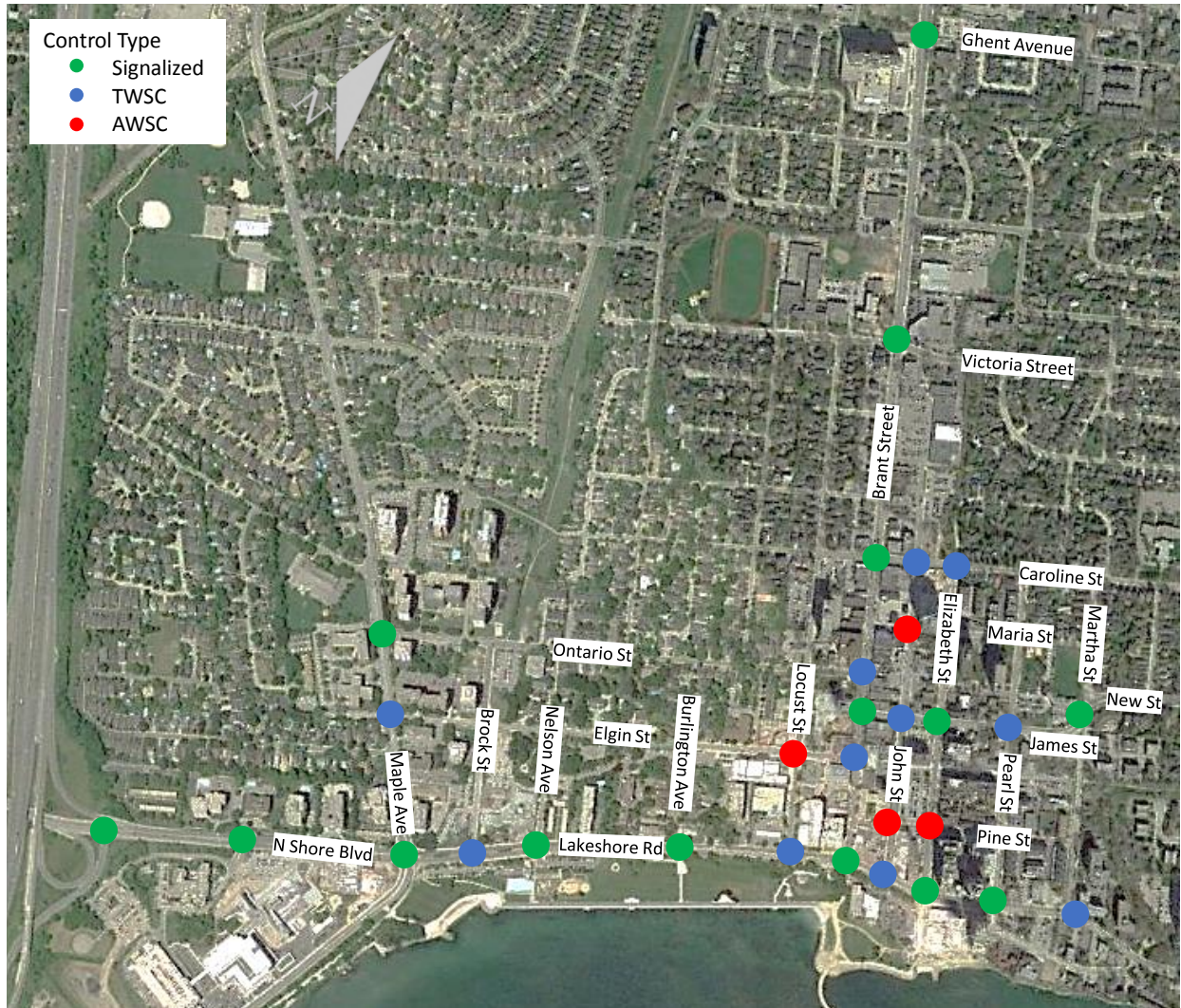


Figure 1: Study Area

The study area includes 15 signalized intersections, 11 two-way stop-controlled intersections (TWSC), and 4 all-way stop-controlled (AWSC), as shown in Table 1. Turning movement counts (TMCs) at the study intersections were previously collected and provided by the City of Burlington on the dates shown in the table (details are provided in Appendix A). These TMCs were used to calibrate the EMME model as well as to calculate Peak Hour Factors (PHFs), however, were not directly used in the

Synchro modelling as turning movement volumes from EMME were extracted for the future 2031 horizon.

Table 1: Study Intersections

#	Intersection	Traffic Control	TMC Collection Date
1	Brant Street and Caroline Street	Signalized	June 27, 2017
2	Brant Street and James Street	Signalized	June 27, 2017
3	Brant Street and Lakeshore Road	Signalized	June 27, 2017
4	Elizabeth Street and James Street	Signalized	June 27, 2017
5	Lakeshore Road and Elizabeth Street	Signalized	June 27, 2017
6	Lakeshore Road and Pearl Street	Signalized	June 27, 2017
7	Caroline Street and John Street	TWSC	June 19, 2018
8	Maria Street and John Street	AWSC	June 19, 2018
9	John Street and James Street	TWSC	June 25, 2015
10	Lakeshore Road and John Street	TWSC	June 19, 2018
11	Caroline Street and Elizabeth Street	TWSC	Oct. 20, 2015
12	James Street and Pearl Street	TWSC	June 27, 2017
13	Lakeshore Road and Martha Street	TWSC	June 27, 2017
14	Brant Street and Elgin Street	TWSC	June 27, 2017
15	Brant Street and Ontario Street	TWSC	June 27, 2017
16	Brant Street & Ghent Avenue	Signalized	Oct. 4, 2017
17	Brant Street & Victoria Avenue	Signalized	June 27, 2017
18	Martha Street & James Street/New Street	Signalized	Nov. 1, 2017
19	Lakeshore Road & Locust Street	TWSC	June 27, 2017
20	Lakeshore Road & Burlington Avenue	Signalized	June 19, 2019
21	Lakeshore Road & Nelson Avenue	Signalized	June 19, 2019
22	Lakeshore Road & Brock Avenue	TWSC	June 19, 2019
23	Lakeshore Road & Maple Avenue	Signalized	May 2, 2018
24	N Shore Blvd. E & Joseph Brant Hospital entrance	Signalized	May 9, 2018
25	N Shore Blvd. E & QEW East ramp terminal	Signalized	April 11, 2016
26	Maple Avenue & Elgin Street	TWSC	June 27, 2017
27	Maple Avenue & Ontario Street	Signalized	June 27, 2017
28	Pine Street & John Street	AWSC	June 27, 2017
29	Elgin Street & Locust Street	AWSC	June 27, 2017
30	Pine Street & Elizabeth Street	AWSC	June 27, 2017

Street characteristics are summarized as follows:

- Brant Street is a 2-lane minor north-south arterial road with sidewalk and on-street parking on both sides of the road. The speed limit is 50 km/h. It extends in the north-south direction and provides access between the downtown area and QEW / Highway 403.

- Lakeshore Road is a 4-lane major east-west arterial road connecting the City of Burlington and Town of Oakville. The speed limit is 50 km/hr. Within the study area, there are 2 lanes in the westbound direction, 1 lane in the eastbound direction, and 1 shared centre lane for left turn maneuvers.
- Caroline Street is an east-west 2-lane collector road with a speed limit of 40 km/h. Within the study area, it has an urban cross-section, sidewalk on both sides, and on-street parking on the south side.
- James Street is an east-west 2-lane minor arterial road with a speed limit of 50 km/h. Within the study area, it has an urban cross-section, sidewalk on both sides of the roadway and typically has on-street parking on the south side.
- John Street is a north-south 2-lane collector road with a speed limit of 50 km/h. Within the study area, it has an urban cross-section, sidewalks and on-street parking on both sides of the road.
- Elizabeth Street is a north-south 2-lane collector road with a speed limit of 50 km/h. Within the study area, it has an urban cross-section, sidewalks on both sides, on-street parking on the west side.
- Pearl Street is a north-south 2-lane collector road with a posted speed limit of 40 km/h, sidewalks on both sides, on-street parking is permitted.
- Martha Street is a north-south collector road with a speed limit of 50 km/h. Within the study area, it has an urban cross-section, sidewalk on both sides, and a few parking spaces on the west side south of the Pine Street.
- Maria Street is an east-west 2-lane local road with a posted speed limit of 40 km/h. Within the study area, it has an urban cross-section with sidewalks on both sides and parking restrictions east of the Pearl Street.
- Elgin Street is an east-west 2-lane (shared with bicycles) collector road with a posted speed limit of 40km/h. Within the study area, it has an urban cross-section with sidewalks on both sides of the roadway and on-street parking on the south side.
- Ontario Street is an east-west 2-lane collector road with a posted speed limit of 40 km/h. Within the study area, it has urban cross-section with sidewalks on both sides and on-street parking on the north side.
- Ghent Avenue is an east-west 4-lane collector road West of the Brant Street and 2-lane local road East of the Brant Street, with a posted speed limit of 40 km/h. Within the study area, it has an urban cross-section with sidewalks and on-street parking on both sides of the roadway.
- Victoria Avenue is an east-west 2-lane local road with a posted speed limit of 40 km/h. Within the study area, it has an urban cross-section with sidewalks on both sides of the roadway and on-street parking on the north side.
- Locust Street is a north-south 2-lane collector road with a speed limit of 50 km/h. Within the study area, it has urban cross-section with sidewalks on both sides with parking available on east side of the street.

- Burlington Avenue is a north-south 2-lane local road with a speed limit of 50 km/h. Within the study area, it has urban cross-section with sidewalks on both sides with no on-street parking available.
- Nelson Avenue is a north-south 2-lane local road with a speed limit of 50 km/h. Within the study area, it has urban cross-section with sidewalks on both sides and on-street parking available on the west side of the street.
- Brock Avenue is a north-south 2-lane local road with a speed limit of 50 km/h. Within the study area, it has urban cross-section with sidewalks on both sides and on-street parking available on the west side of the street.
- Maple Avenue is a 4-lane minor north-south arterial road with sidewalk on both sides of the road. The speed limit is 50 km/h. It extends in the north-south direction and provides access to the downtown area.
- Northshore Boulevard is a 4-lane east-west minor arterial road with access to QEW and the Joseph Brant Hospital with sidewalks on both side of the street, within the study area. The posted speed limit is 50 km/h.
- Pine Street is an east-west 2-lane local road with a speed limit of 50 km/h. Within the study area, it has an urban cross-section, sidewalk on both sides of the roadway and on-street parking on the north side.
- New Street is an east-west 2-lane minor arterial road with a speed limit of 50 km/h. Within the study area, it has an urban cross-section, sidewalk on both sides of the roadway, no on-street parking and a bike lane on the north side and a sharrow on the south side.

2 EMME Macro Modeling

The Halton Region Travel Demand Model¹ was last updated in 2016 using the 2011 Transportation Tomorrow Survey (TTS) data and is consistent with the University of Toronto Travel Modelling Group network coding standard. The Region's EMME model follows a standard 4-stage travel demand modelling approach (trip generation, trip distribution, mode choice, and traffic assignment) and covers the geographic limit of all constituent municipalities including the City of Burlington (Figure 2). The model was developed for only the PM peak hour but is available for different horizons (i.e., 2011, 2016, 2021, 2026, 2031).

¹ Travel demand models (also known as macro models) are mathematical tools that are developed by transportation professionals to forecast the number of vehicles or people that will use a specific transportation facility in the future. These models are ubiquitously used by consulting firms as well as local and provincial municipalities to identify possible future deficiencies in the transportation system. The models are also useful in evaluating the impacts of alternative transportation solutions for development of long-range transportation plans.

The road network, travel demand matrices, and relevant modelling macros were obtained from the Halton Region in EMME format and input to CIMA's EMME 4 modelling system.

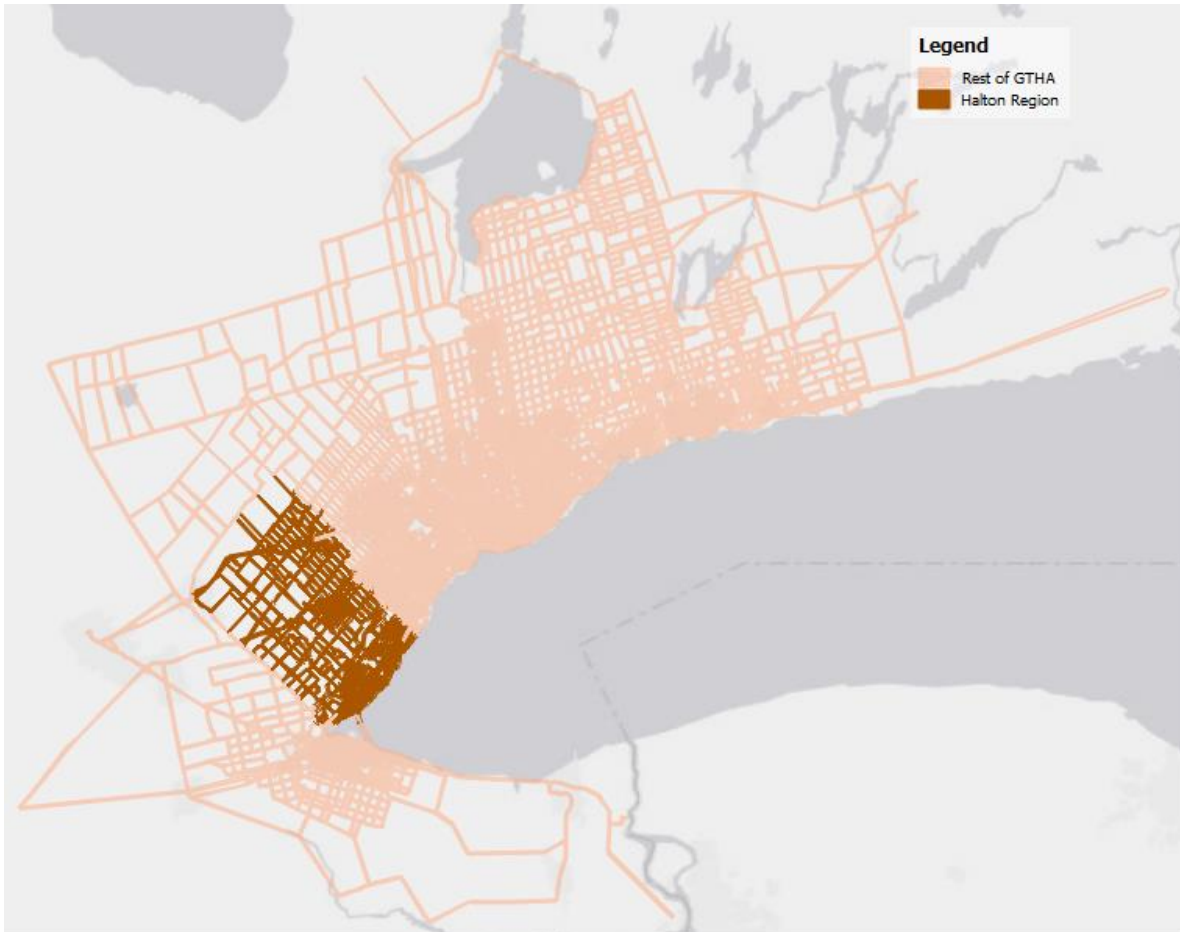


Figure 2: Extent of Region's EMME Model

2.1 Model Review and Corrections

Both base year (2011) and future year (2031) networks for the study area were reviewed to ensure the model reflects the road network accurately. Additional links, nodes, and turns were coded into the model to include all study intersections. The link and turn parameters (such as number of lanes and turning restrictions) were verified and matched against the existing road conditions (using the Street View feature of the Google Map). Since the Halton Region zoning system is adequately refined within the Burlington downtown area, no adjustment was made to the traffic zones and connectors. Figure 3 provides the overview of the traffic zones that pertain to the study area.

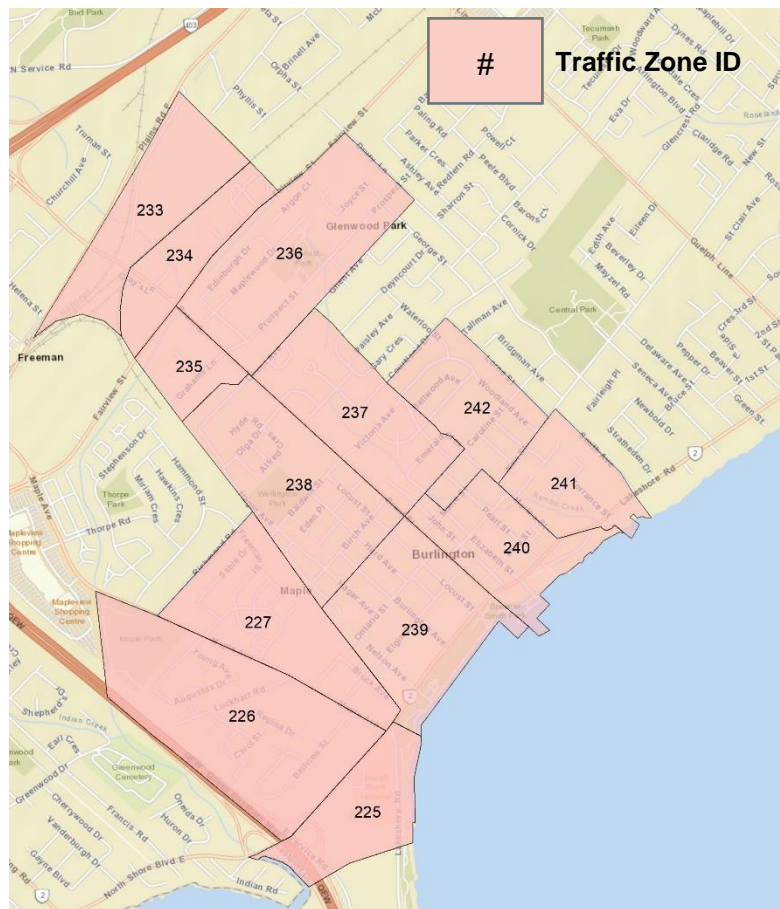


Figure 3: Study Area – Halton Traffic Zones

2.2 Model Calibration

2.2.1 Initial Base Year Model

Once the basic corrections and adjustments to the base year (2011) model were completed, initial assignment runs were undertaken and compared with the existing traffic counts within the study area. The traffic counts were collected between 2015 and 2018; therefore, the volumes were reduced with a factor of 0.5% per annum to reflect the 2011 traffic conditions.

PM peak hour traffic counts representing the 2011 traffic conditions were ultimately used to review and improve the model calibration. Figure 4 indicates the location of the traffic counts in the study area (a total of 21 count stations) that were used for the model calibration. The focus of the counts used was on the Lakeshore Road and Brant Street, as their operations are of the most interest in the review of downtown traffic operations.

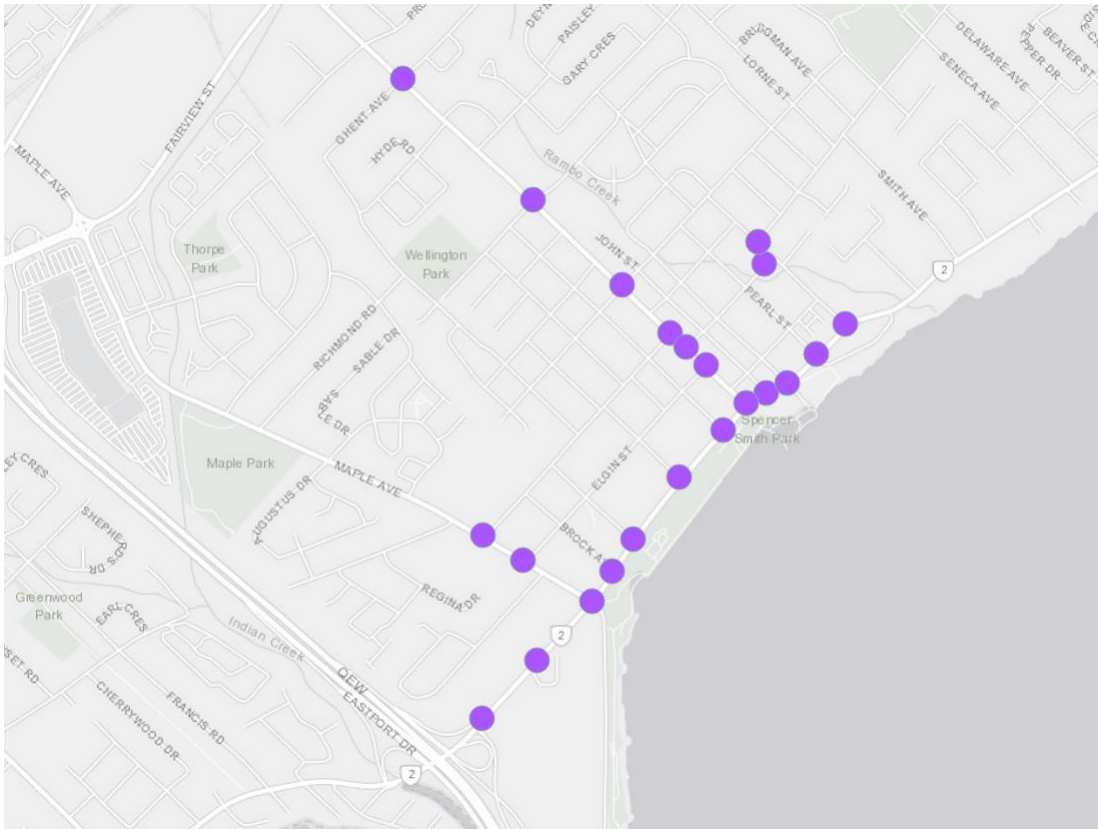


Figure 4: Location of Traffic Counts used in the calibration Process

The initial model assignment results for the base year were compared with the actual counts. Figure 5 illustrates the model errors in the form of the difference between the observed and estimated traffic volumes for the PM peak hour. The color and thickness of the directional links are determined based on the numeric values of the modeling error. The model overestimation is indicated by the red spectrum and the model underestimation is shown by the green spectrum.

This figure confirms that the existing calibration of the Region's model is reasonable. However, the model forecasts along the following road segments is slightly erroneous:

- James Street between Martha Street and Brant Street: The model is currently overestimating the WB traffic. The estimation error is in the range of 300-500 vehicle per hour.
- Lakeshore Road between Brant Street and Maple Avenue: The model is currently underestimating the WB traffic. The estimation error is in the range of 300-500 vehicle per hour.
- Northshore Boulevard East between Maple Avenue and QEW: The model is currently overestimating the WB traffic. The estimation error is in the range of 300-500 vehicle per hour.

- Maple Avenue between Ontario Street and Lakeshore Road: The model is currently overestimating the SB traffic. The estimation error is in the range of 500-650 vehicle per hour.



Figure 5: Comparison of Assigned Volumes with Traffic Counts, Initial Assignment

This assigned/actual volume comparison is also shown graphically in Figure 6 with a comparison stratified by link volume. The comparison shows a R^2 values of 0.81 for the PM peak period.

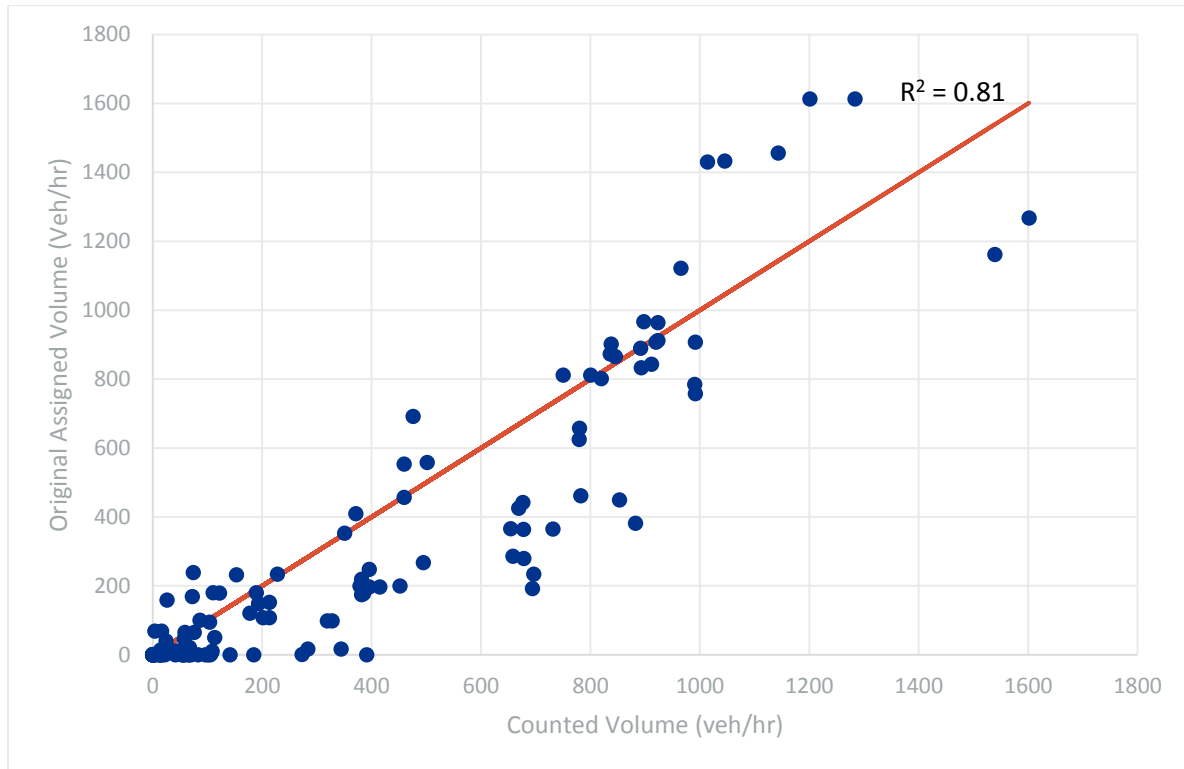


Figure 6: Initial Assignment Quality

2.2.2 Adjusted Base Year Model

In general, the initial calibration is reasonable and would be acceptable if the project were of a more strategic nature. However, this project requires a finer level of analysis both for the purpose of forecasting traffic volumes as well as subsequently providing input to traffic operation analysis. Therefore, a standard matrix adjustment process was followed and the base year O-D matrix was adjusted to better match the individual traffic counts in the immediate study area. Additionally, a manual adjustment was applied on the link volumes which compared to the observed volumes were systematically underestimated by the EMME model, to further improve the calibration.

The adjusted O-D matrix was assigned to the base year road network and the updated traffic volumes were calculated. Figure 7 illustrate the comparison between assigned and observed volumes on the network (model errors - colour coded plus the numerical difference) after applying the O-D matrix adjustments. This figure confirms the

successful calibration of the model as the maximum model error within the study area is lower than 300 vehicle per hour which is deemed as appropriate for planning studies.



Figure 7: Comparison of Assigned Volumes with Traffic Counts, Adjusted Assignment

Similarly, Figure 8 shows the same assignment /traffic count comparison in a graphical format. For the PM peak period, the R^2 value of 0.95 is improved from the 0.81 value in the initial matrix.

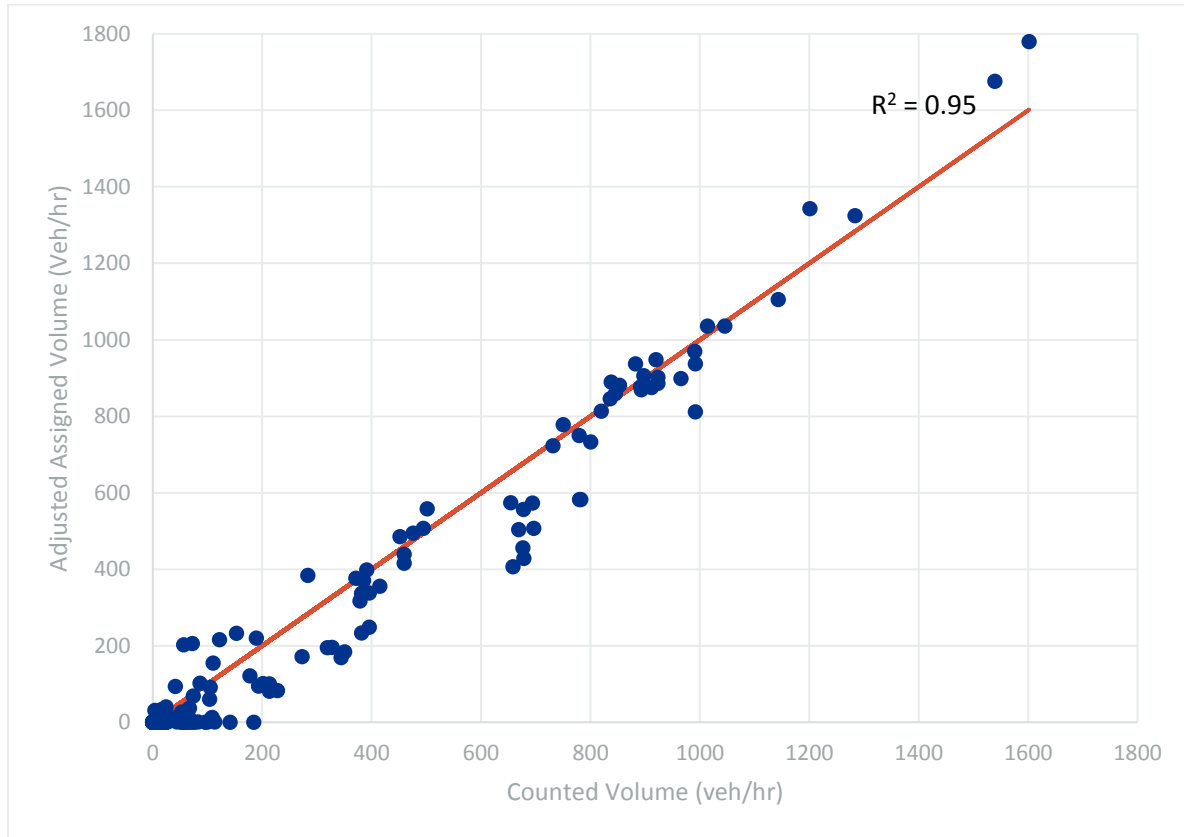


Figure 8: Adjusted Assignment Quality

This indicates a remarkably good calibration between observed and assigned traffic volumes for the study area. This degree of fit was achieved after a number of iterations of O-D adjustments.

While, the calibration looks good on a comparison of volumes alone, the degree to which O-D matrix was adjusted is also crucial. Hence, a comparison of O-D Matrix pre and post adjustment was made to highlight whether the O-D adjustment significantly impacted the travel patterns throughout the model. Figure 9 showcases the trip frequency comparison between the before and after adjustment conditions. Additionally, Figure 10 showcases the trip adjustment factor, which compares the trip frequency for each O-D pair between the original O-D Matrix and adjusted O-D Matrix. As expected, the applied O-D matrix adjustments did not result in major changes in the underlying travel pattern within the model boundaries.

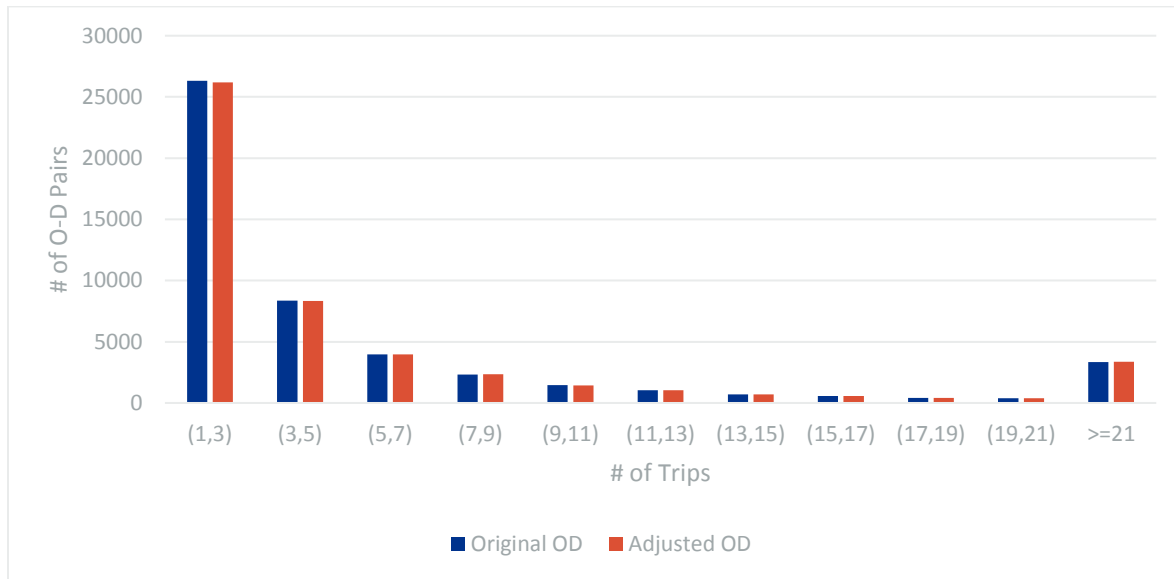


Figure 9: Trip Frequency Comparison Before & After O-D Adjustment

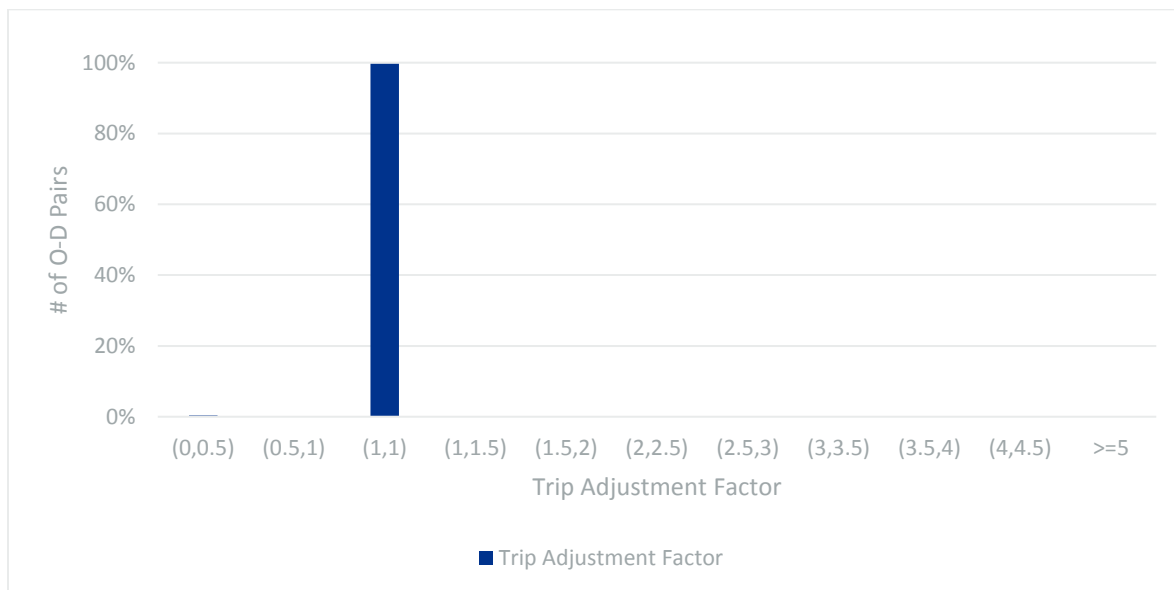


Figure 10: Trip Adjustment Ratio (Adjusted # of Trips/Initial # of Trips)

Lastly, a comparison showing the trip lengths before and after adjustment is useful in determining the impact of adjustment on the inherent travel pattern, which is shown in Figure 11. As noticeable, the adjustments made to the matrix were not excessive when considering O-D trip length.

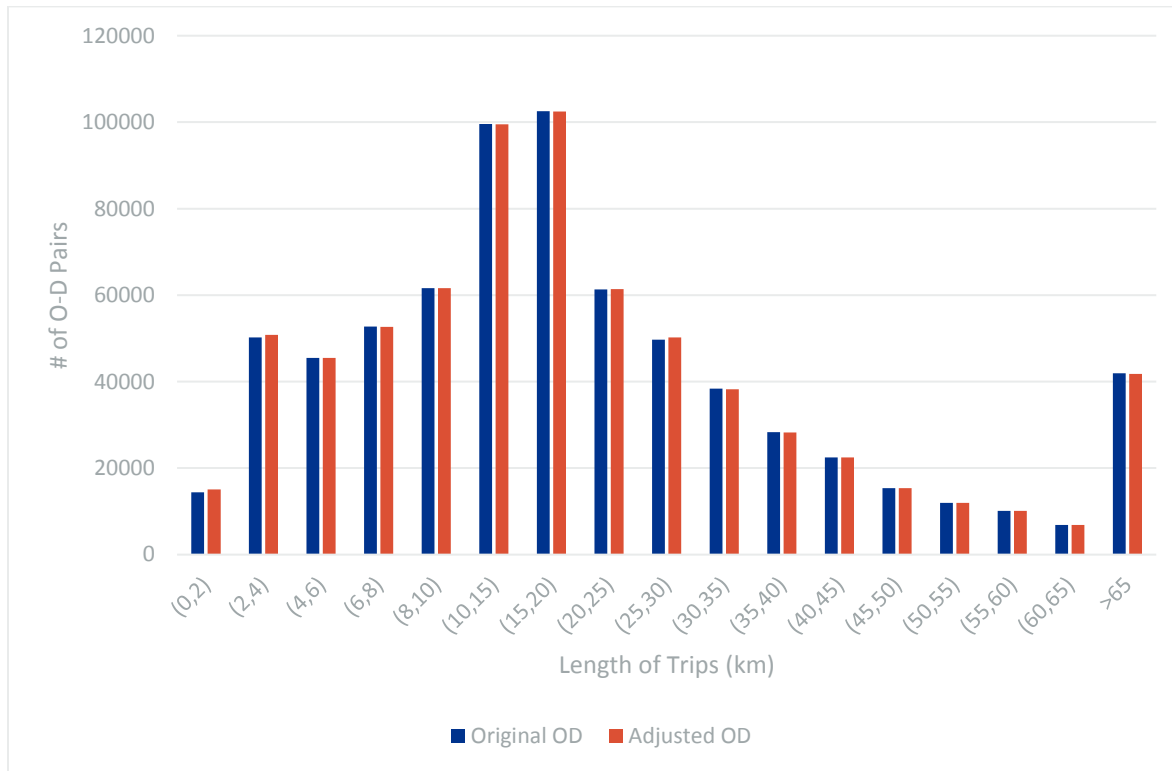


Figure 11: Trip Length Comparison of Adjusted and Initial O-D Matrix

Based on the aforementioned comparisons, it can be concluded that the applied O-D adjustments did not change the individual pairs in the matrix to any great extent; and there it can be concluded that the improved calibration is a good starting point for continuing with the forecasting exercise.

2.3 Travel Demand Forecasts

2.3.1 Preferred Land Use Assumptions

The population and employment forecasts included in the Region's 2031 EMME model were adopted to project future traffic volumes within the study area. It is noteworthy that the Region has already adjusted its 2031 population numbers at a zonal level to achieve the total population of 780,000 and compensate for the Census Undercount¹. The 2031 land use assumptions that were considered for this modelling assignment are detailed in Table 2.

¹ "In the 2011 Census (which is the basis of the current Region's Travel Demand model), some people were not enumerated. The Census Undercount for Ontario has been estimated at 2.97%. All major municipalities, as well as the Province of Ontario, now use postcensal population numbers for their planning, because that most closely matches the actual population for which cities provide services" (Halton Model Calibration and Validation Report – 2016).

**Table 2: 2031 Population and Employment Assumptions
(Downtown Burlington TAZs)**

TAZ	Population	Employment
225	0	843
226	3,183	646
227	4,495	1,079
233	14	545
234	47	454
235	189	446
236	2,165	295
237	1,294	1,244
238	2,819	1,501
239	3,314	2,452
240	2,361	2,781
241	2,297	471
242	1,104	125
Total	23,282	12,882

2.3.2 Travel Demand Adjustments

Modifications made to the base year (2011) networks noted in Section 2.2 above, were similarly applied to the future year (2031) network. In addition, as the base year trip matrix had been adjusted in order to better reflect the traffic counts, the same adjustment had to be made to the future year matrices. The trip adjustment values were obtained by subtracting the initial base year matrix from the adjusted base year matrix. This difference matrix was then applied to the future year matrices.

2.3.3 Traffic Assignment

Finally, the forecasted O-D matrix was assigned to the network and the link/turn traffic volumes were calculated. The assigned turning movement volumes at the study intersections were extracted from the EMME model and were imported into the Synchro model to complete the traffic operations analysis. The traffic assignment results for the future year (2031) PM peak hour are shown in Figure 12.

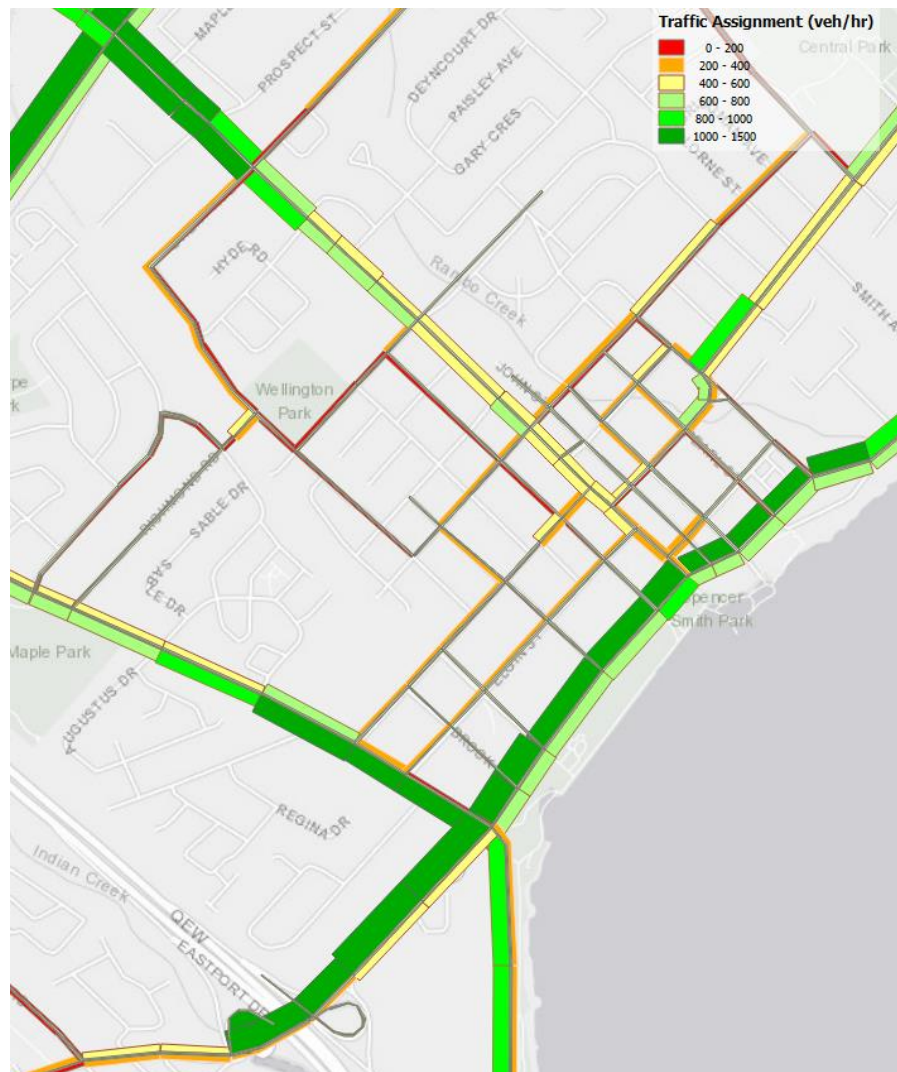


Figure 12: Traffic Assignment Results – Future Horizon 2031, PM Peak Hour

3 Active Transportation Requirements

To better understand the City's Active Transportation (AT) policies and recommendations and further determine their potential impacts on the downtown traffic operations, the following documents were reviewed by CIMA+:

- Taking a Closer Look at the Downtown: Preliminary Preferred Concept (SGL, January 2020)
- City of Burlington Pedestrian Charter (May 2009)
- City of Burlington Cycling Master Plan Update (Draft - January 2020)

The details of the AT policy review are documented in a separate technical memorandum (Appendix B). The relevant AT recommendations along with their potential implications on the subsequent Synchro analysis are summarized in Table 3.

It should be noted that additional network improvements approved by Council in December 2019 including: implementation of all-way stop control at the intersection of Caroline Street and John Street as well as the future installation of new pedestrian crossovers throughout the Brant Street corridor at Pine Street, Elgin Street and Maria Street have not been considered as part of this operational analysis.

Similarly, the preliminary preferred concept includes an extension of John Street, northerly to Victoria Avenue. Although the preferred concept was presented to Council in January, 2020 and included provision of this extension, the detailed function, alignment, and design of the transportation connection has not yet been confirmed. The ultimate design of this future corridor will be determined through a comprehensive block planning exercise for the lands bounded by Brant Street, Victoria Avenue, Rambo Creek and Caroline Street.

In regards to the Mid-Brant Precinct, this analysis acknowledges the presence of the newly constructed Elgin Street Promenade and the future multi-use trail that is envisioned to be constructed along the west side of Rambo Creek. While it is expected that the extension of the Elgin Street Promenade and future multi-use trail will enhance walkability within the Study Area, these pedestrian improvements were not considered as part of the operational analysis as detailed design elements have yet to be confirmed.

Table 3: AT Recommendations in Downtown Burlington & Corresponding Synchro Parameters

Location	Segment	AT Recommendation	Minimum Requirements	Synchro Assumptions
Lakeshore Precinct	Martha St. to Brant St.	Buffered Bike Lanes: Potential reduction of vehicular lane widths Intersection improvements at Martha St.	Minimum Required ROW: 2.0 m (per direction)	Reduce the lane width to 3.0 m
	Locust St. to Burlington St.	Buffered Bike Lanes: Potential reduction of vehicular lane widths	Minimum Required ROW: 2.0 (per direction)	Reduce the lane width to 3.2 m
	Burlington St. to Maple Ave.	Buffered Bike Lanes: Potential reduction of vehicular lane widths Intersection improvements at Maple Ave.	Minimum Required ROW: 2.0 m (per direction) Green left-turn bike box	Reduce the lane width to 3.2 m Increase signal lost time by 1 sec/cycle at Maple Ave. to accommodate the bike box.
	North Shore Blvd. E.	Protected Bike Lanes: Potential reduction of vehicular lane widths	Minimum Required ROW: 2.3 m (per direction)	Reduce the lane width to 3.0 m
Brant Main Street Precinct	Lakeshore Rd. to Caroline St.	Intersection improvements at James St. crosswalk widening for bi-directional MUP	Minimum Crosswalk width: 5.0 m Bike Signal	Increase crosswalk width to min 5.0 m
Mid Brant Precinct	Caroline St. to Victoria St.	Buffered Bike Lanes Potential reduction of vehicular lane widths	Minimum Required ROW: 2.0 m (per direction)	Reduce the lane width to 3.0 m

Location	Segment	AT Recommendation	Minimum Requirements	Synchro Assumptions
Upper Brant Precinct	Ghent Ave. and Victoria Ave.	Protected Bikeway: Potential reduction of vehicular lane widths Intersection improvements at Victoria St. as well as Ghent Ave.	Minimum Required ROW: 2.3 m (per direction) 2.0 m stop bar offset Left turn bike-boxes required	Reduce the lane width to 3.0 m Increase signal lost time by 1 sec/cycle at Victoria Ave. as well as Ghent Ave.
Local Street Bikeways	Martha St. at New St.	Intersection Improvements	Green left-turn bike box	Increase signal lost time by 1 sec/cycle
	James St. at Elizabeth St.	Intersection Improvements	Green left-turn bike box	Increase signal lost time by 1 sec/cycle
	Locust St. and Elgin St.	Intersection Improvements	Green left-turn bike box	Increase signal lost time by 1 sec/cycle
Maple Avenue	Ontario St. and Lakeshore Rd.	Protected Bikeway: Potential reduction of vehicular lanes width to provide additional space for protected bikeway Intersection improvements at all signalized intersections	Minimum Required ROW: 2.3 m (per direction) 2.0m stop bar offset Left turn bike-boxes required	Reduce the lane width to 3.0 m Increase signal lost time by 1 sec/cycle at Lakeshore Rd. as well as Ontario Rd.

4 Synchro Traffic Analysis

Capacity analysis of the study intersections was undertaken using the Synchro/SimTraffic software version 10. This software package follows the Highway Capacity Manual (HCM) approach to evaluate the operational performance of signalized and un-signalized intersections.

To determine the performance of signalized intersections, five performance measures were identified: (1) control delay, (2) average queue, (3) 95th percentile queue lengths, (3) volume to capacity (v/c), and (5) level of service (LOS). 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 Halton Region TIS Guidelines, more congested turning movements were identified considering the following criteria:

- A volume to capacity (v/c) ratio of 0.85 or higher for signalized intersections;
- Excessive delays, indicated by LOS “E” or worse for both signalized and un-signalized intersections; and
- 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.

While a turning movement may be identified as critical, its important to note that constrained movements are typical of urban areas, such as Downtown centres, where there is a mix of auto, transit, cyclist and pedestrian traffic. Road users in such environments generally have an increased tolerance for higher levels of traffic congestion.

The HCM definition of LOS for signalized and unsignalized intersections is detailed below in Table 4.

Table 4: HCM Level of Service

LOS	Delay (s)	
	Signalized Intersection	Unsignalized Intersection
A	≤10 sec	≤10 sec
B	10–20 sec	10–15 sec
C	20–35 sec	15–25 sec
D	35–55 sec	25–35 sec
E	55–80 sec	35–50 sec
F	>80 sec	>50 sec

4.1 Scenarios

4.1.1 Baseline Scenario – 2031 (Scenario 0)

The 2031 model which was prepared in the first phase of this study is considered as the baseline scenario. In this scenario a background growth rate was applied to all existing year turning movement volumes (0.5% per annum), signal timing plans were optimized, and the signal coordination along the Lakeshore Road corridor was optimally

maintained. The results of this scenario were used as the baseline to quantify the impacts of the preferred land use scenarios under the 2031 traffic conditions. The results of this scenario are not provided in the body of the report but can be found in Appendix C.

The existing lane configurations for the study intersections were assumed to remain unchanged for all scenarios examined in this study (Figure 13).

4.1.2 Preferred Land Use Scenario with AT Improvements – 2031 (Scenario 1)

The Synchro model developed for the first phase of this study (2031 - PM Peak Model) was adopted to review the traffic impacts of the preferred land use scenario. The model was updated with the new traffic volumes exported from the 2031 EMME model and the identified future active transportation improvements. The analysis of signalized intersections was completed considering the current signal timing plans optimized to account for the changes in traffic volume (as the result of changes in land use assumptions within the Downtown area). The results of this scenario are presented in Section 4.2.1.

4.1.2.1 Traffic Volumes

For this scenario, the PM 2031 traffic volumes were extracted from the calibrated EMME model. The EMME turning volumes were further treated for missing values as a few study intersections (all minor intersections) were not included in the Region's demand model. Figure 14 and Figure 15 show the estimated 2031-PM peak hour traffic volumes for this scenario.

4.1.3 Preferred Land Use Scenario with AT Improvements and Approved Developments – 2031 (Scenario 2)

The impact of the five (5) approved developments in Downtown Burlington, which are anticipated to be completed prior to 2025, was not captured in the Region's EMME model. Therefore, an additional scenario was defined and the generated traffic volumes from these developments were added to the EMME traffic volumes. Again, the analysis of signalized intersections was completed considering the current signal timing plans optimized to account for the increased traffic volume (as the result of change in land use assumptions and new developments). The results of this scenario are presented in Section 4.2.2.

4.1.3.1 Traffic Volumes

For this scenario, the PM 2031 traffic volumes were estimated in two steps. First the adjusted EMME turning volumes were adopted from the Scenario 1. Then, the generated volumes from the approved developments and their distribution across the study area were determined based on the information provided in relevant traffic impact studies. The summation of these two components formed the total traffic volumes. The generated traffic volumes from the approved developments were determined as follows:

- **Location 1 (Bridgewater)** is a mixed-used development at the southeast corner of the intersection of Elizabeth Street and Lakeshore Road. The development includes three buildings, a 22-storey condominium building with 100 residential units and 1170 square metres of commercial space, a 7–storey condominium building with 50 residential units and 750 square metres of commercial space, and an 8-storey hotel with 130 rooms and 855 square metres of commercial space.
- **Location 2 (Saxony)** is a 7-storey mixed-use residential building with ground floor commercial at the northwest corner of the intersection of Elgin Street and Locust Street.
- **Location 3 (Berkeley)** is a mixed-use development with three connected buildings (an 8-storey office building, a 17-storey residential building and a 6-storey parking garage) occupying the block bounded by Caroline Street, Maria Street, John Street and Elizabeth Street.
- **Location 4 (421-431 Brant St.)** is a 23-storey mixed-use building with 177 residential units, 1327 square metres of office space and 967 square metres of commercial retail space at the northeast corner of intersection of Brant Street and James Street. Vehicular access is provided via John Street, north of James Street. The trip generation for this development was taken from the TIS report entitled '421 - 431 Brant Street Transportation Impact Study, Parking Study and TDM Options Report', dated December 2016.
- **Location 5 (374 Martha Street)** is a 26-storey condominium building with 240 units and 423 square metres commercial space at the northwest corner of the intersection of Martha Street and Lakeshore Road. Vehicular access is provided via Martha Street. The trip generation for this development was taken from the TIS report entitled '374 Martha Street Traffic Impact Study' dated August 2014.

The total trip generation numbers are summarized in Table 5. These trips were distributed according to the methodology detailed in their associated TIS reports. The summary of the distribution methodology for each development is provided in the Phase 1 traffic analysis report¹. Figure 14 and Figure 15 show the estimated 2031-PM peak hour traffic volumes for this scenario (numbers reported in parenthesis). These volumes

¹ Downtown Burlington Traffic Overview, Final Report, October 2019, Prepared by CIMA+

consist of EMME turning volumes as well as the traffic generated from the approved developments.

Table 5: Trip Generation - Approved Developments

Development	Weekday AM Peak Hour			Weekday PM Peak Hour		
	In	Out	Total	In	Out	Total
<i>Bridgewater</i>	56	90	104	104	67	171
<i>Saxony</i>	10	24	34	26	18	44
<i>Berkeley</i>	249	162	411	244	319	563
<i>421-431 Brant</i>	42	73	115	71	68	139
<i>374 Martha</i>	17	63	80	60	40	100

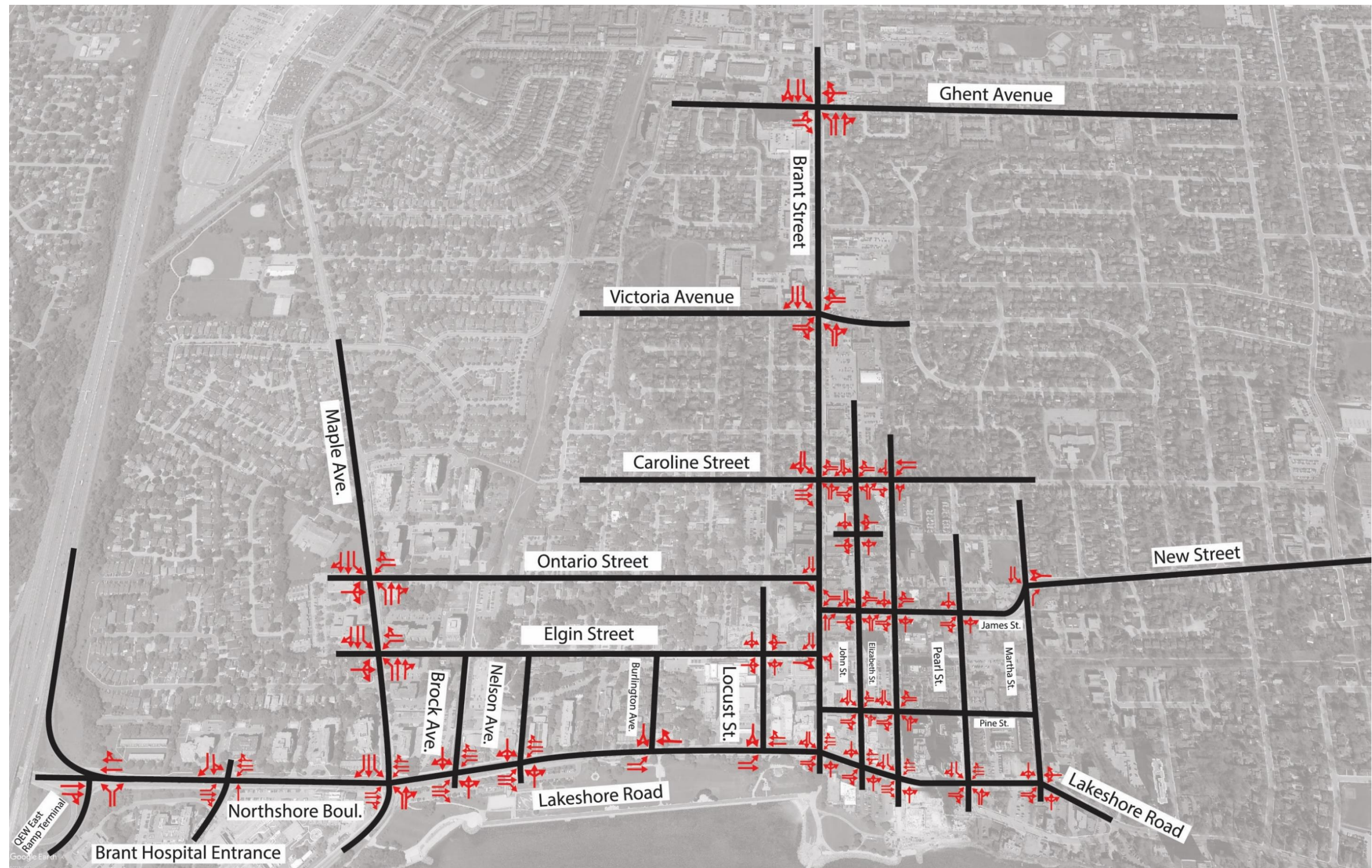


Figure 13: Lane Configuration at Study Intersections

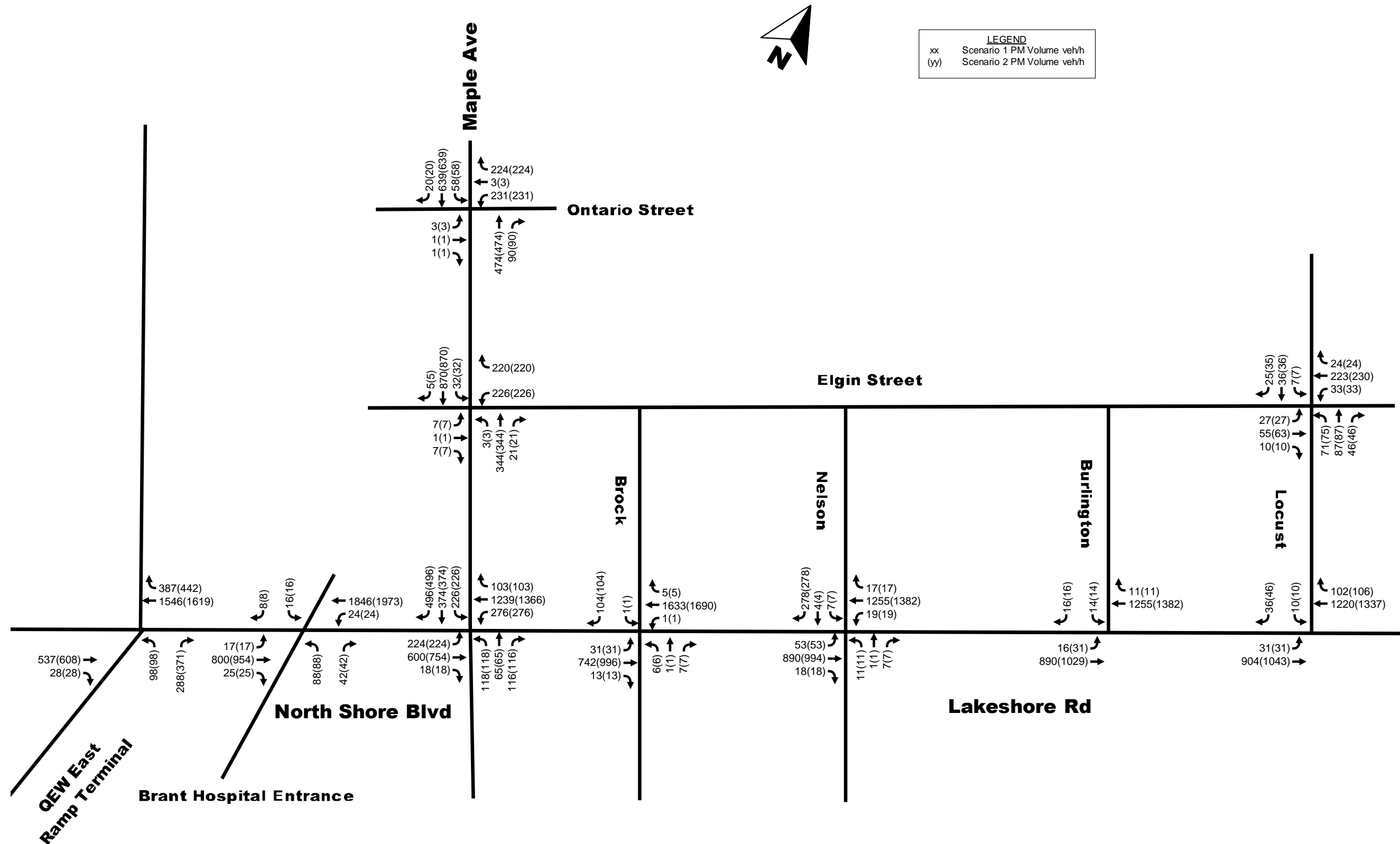


Figure 14: Projected Traffic Volumes for Scenario 1 and Scenario 2 – 2031, PM Peak Hour (Section A)

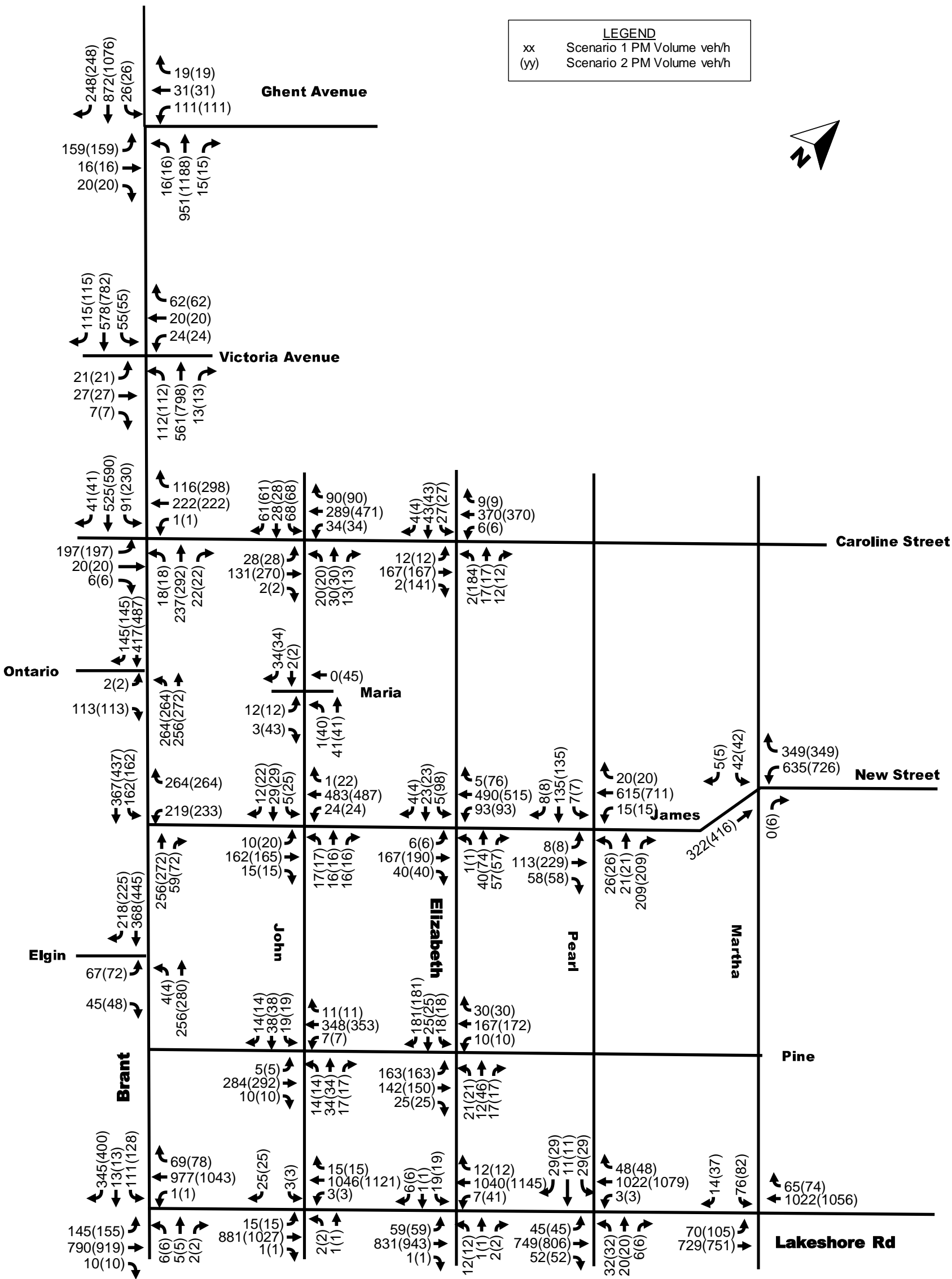


Figure 15: Projected Traffic Volumes for Scenario 1 and Scenario 2 – 2031, PM Peak Hour (Section B)

4.2 Results

4.2.1 Preferred Land Use Scenario with AT Improvements – 2031 (Scenario 1)

Table 6 and Table 7 summarize the 2031 traffic operations (Preferred Land Use with AT Improvements – Scenario 1) for signalized and unsignalized intersections, respectively. The complete Synchro/SimTraffic reports are provided in Appendix D for future reference.

The following observations can be made from Table 6:

- **The traffic operations for the majority of movements at the signalized intersections are within the acceptable range (LOS D or better).** Exceptions with constrained movements include the intersections of:
 - Lakeshore Road & Elizabeth Street;
 - Lakeshore Road & Pearl Street;
 - Lakeshore Road & Burlington Avenue;
 - Lakeshore Road & Nelson Avenue;
 - Lakeshore Road & Maple Avenue; and
 - QEW East Ramp Entrance & North Shore Boulevard.
- Lakeshore Road & Elizabeth Street intersection operates at an overall LOS of A with a V/C ratio of 0.55 and the constrained movement during this peak period is the northbound left-turn/through/right-turn movement with an LOS E.
- Lakeshore Road & Pearl Street intersection operates at an overall LOS of A with a V/C ratio of 0.60 and the constrained movement during this peak period is the northbound left-turn/through movement with an LOS of E.
- Lakeshore Road & Burlington Avenue intersection operates at an overall LOS of C and a V/C ratio of 0.92 and the constrained movement during this peak period is the westbound through/right-turn movement with a V/C ratio of 0.99.
- Lakeshore Road & Nelson Avenue intersection operates at an overall LOS of C and a V/C ratio of 0.85 and the constrained movement during this peak period is the southbound left-turn/through/right-turn movement with a LOS of E and a V/C ratio of 0.92.
- Lakeshore Road & Maple Avenue intersection operates at an overall LOS of E with a V/C ratio of 1.05 and the constrained movements during this peak period are the eastbound left-turn movement with an LOS of F and V/C ratio of 1.07, the westbound through movement with an LOS of F and a V/C ratio of 1.09, the northbound left-turn movement with a LOS of E and V/C 0.85, and the southbound movements with the left-turn having an LOS of E and a V/C ratio of 0.87, the through movement having a LOS of E and V/C ratio of 0.87 and the right-turn movement having an LOS of F and a V/C ratio of 0.98.

- QEW East Ramp Entrance & North Shore Boulevard intersection operates at an overall LOS of B and a V/C ratio of 0.85 and the constrained movements during this peak period are the westbound through/right-turn movement with a V/C ratio of 0.88 and the northbound left-turn with a LOS of E.
- In a number of cases, the 95th percentile queues along the Lakeshore Road extend to the upstream intersection. This is due to the heavy westbound volumes along this corridor during the PM peak period.

Table 6: 2031 PM Peak Intersection Performance Summary – Preferred Land Use with AT Improvements (Scenario 1 - Signalized)

Movement	Volume	Delay (s)	LOS	V/C	PM Peak		
					Ave Queue (m)	95th % Queue (m)	Storage (m)
Brant Street and Caroline Street							
EBL	197	34.7	C	0.79	25	45	45
EBT	20	14.1	B	0.03	11	66	75
EBR	6	14	B	0.01	3	11	15
WBL	1	23	C	0.00	0	0	20
WBT/R	338	44.8	D	0.82	38	56	200
NBL	18	20.3	C	0.13	4	14	30
NBT/R	259	23.7	C	0.45	21	47	240
SBL	91	17.1	B	0.29	34	118	340
SBT/R	566	24.8	C	0.79	124	274	340
TOTAL	1496	29.9	C	0.85	-	-	-
Brant Street and James Street							
WBL	219	30.1	C	0.61	37	56	45
WBR	264	25.1	C	0.22	28	52	100
NBT	256	10.8	B	0.33	36	71	220
NBR	59	8.6	A	0.07	7	19	10
SBL	162	11.7	B	0.38	20	30	25
SBT	367	11.6	B	0.40	36	58	230
TOTAL	1327	16.9	B	0.46	-	-	-
Brant Street and Lakeshore Road							
EBL	145	26.8	C	0.60	36	72	50
EBT/R	800	24	C	0.76	88	99	65
WBL	1	6.7	A	0.02	0	5	25
WBT/R	1046	11.6	B	0.59	59	70	110
NBL/T/R	13	39.9	D	0.14	4	11	80
SBL	111	44.7	D	0.52	88	169	220
SBT/R	358	52.5	D	0.72	22	30	15
TOTAL	2474	23.9	C	0.74	-	-	-

Movement	PM Peak						
	Volume	Delay (s)	LOS	V/C	Ave Queue (m)	95th % Queue (m)	Storage (m)
Elizabeth Street and James Street							
EBL	6	3	A	0.01	1	7	15
EBT/R	207	3.6	A	0.18	12	29	105
WBL	93	3.5	A	0.12	10	29	40
WBT/R	495	5	A	0.42	37	85	260
NBL/T/R	98	40.2	D	0.51	15	32	155
SBL/T/R	32	37.1	D	0.19	7	21	240
TOTAL	931	10.2	B	0.43	-	-	-
Lakeshore Road and Elizabeth Street							
EBL	59	1.5	A	0.20	6	17	80
EBT	831	2.1	A	0.58	21	40	100
EBR	1	1.2	A	0.00	0	0	30
WBL	7	1.3	A	0.05	4	27	90
WBT/R	1088	1.7	A	0.39	107	114	15
NBL/T/R	58	55.4	E	0.56	22	59	25
SBL	29	50.4	D	0.28	6	17	80
SBT/R	40	48.7	D	0.14	5	21	80
TOTAL	2113	3.5	A	0.55	-	-	-
Lakeshore Road and Pearl Street							
EBL	45	1.7	A	0.18	5	14	50
EBT/R	801	2.8	A	0.61	22	64	90
WBL	3	2	A	0.02	1	7	20
WBT/R	1070	3.3	A	0.41	102	111	285
NBL/T	52	55.7	E	0.57	46	118	270
NBR	6	47.8	D	0.01	3	12	15
SBL	29	50.6	D	0.28	7	15	15
SBT/R	40	48.8	D	0.14	11	27	95
TOTAL	2046	7.1	A	0.60	-	-	-
Brant Street & Ghent Avenue							
EBL/T	175	45.3	D	0.79	52	158	300
EBR	20	26.1	C	0.02	6	20	25
WBL/T/R	161	44	D	0.76	42	131	500
NBL	16	7.8	A	0.17	5	15	45
NBT/R	966	9.7	A	0.55	27	49	285
SBL	26	9.3	A	0.14	7	24	30
SBT/R	1120	14.8	B	0.69	124	237	125
TOTAL	2484	17.5	B	0.71	-	-	-

Movement	PM Peak						
	Volume	Delay (s)	LOS	V/C	Ave Queue (m)	95th % Queue (m)	Storage (m)
Brant Street & Victoria Avenue							
EBL	21	36.9	D	0.19	5	15	20
EBT/R	34	37	D	0.24	13	45	180
WBL	24	37	D	0.20	9	25	30
WBT/R	82	37.2	D	0.25	26	104	340
NBL	112	8.6	A	0.46	13	28	15
NBT/R	574	7.8	A	0.54	39	82	340
SBL	55	2.2	A	0.14	7	17	50
SBT	578	2.9	A	0.5	92	400	185
SBR	115	0.4	A	0.11	5	16	60
TOTAL	1595	8.9	A	0.50	-	-	-
Lakeshore Road & Burlington Avenue							
EBL	16	6.4	A	0.30	4	21	75
EBT	890	6.4	A	0.68	74	185	205
WBT/R	1266	29.5	C	0.99	86	122	265
SBL/R	30	53.4	D	0.15	13	34	150
TOTAL	2202	20.3	C	0.92	-	-	-
Lakeshore Road & Nelson Avenue							
EBL	53	15.5	B	0.39	10	30	30
EBT	890	20.1	C	0.82	80	105	200
EBR	18	6.9	A	0.02	1	5	200
WBL	19	5.3	A	0.17	7	26	25
WBT/R	1272	7.1	A	0.64	67	96	205
NBL/T/R	19	34.6	C	0.06	5	18	10
SBL/T/R	289	70.6	E	0.92	65	107	170
TOTAL	2560	20.3	C	0.85	-	-	-
Lakeshore Road & Maple Avenue							
EBL	224	128.7	F	1.07	46	89	170
EBT/R	618	30.1	C	0.67	86	175	240
WBL	276	36.2	D	0.81	32	48	30
WBT	1342	80.8	F	1.09	108	148	190
NBL	118	65.9	E	0.85	25	52	120
NBT/R	181	37.1	D	0.39	38	95	500
SBL	226	59.8	E	0.87	49	78	60
SBT	374	58	E	0.87	97	199	345
SBR	496	84.8	F	0.98	88	171	345
TOTAL	3359	65.9	E	1.05	-	-	-

Movement	Volume	Delay (s)	LOS	PM Peak			
				V/C	Ave Queue (m)	95th % Queue (m)	Storage (m)
North Shore Blvd. E & Brant Hospital Entrance							
EBL	17	20.1	C	0.36	4	11	55
EBT/R	825	8.2	A	0.39	32	75	210
WBL	24	3.3	A	0.07	3	11	70
WBT/R	1846	6.4	A	0.82	32	59	240
NBL	88	54.5	D	0.64	21	39	100
NBR	42	43.6	D	0.05	8	26	100
SBL/T	16	44.1	D	0.11	6	18	20
SBR	8	43.3	D	0.01	3	10	20
TOTAL	2866	10.4	B	0.82	-	-	-
North Shore Blvd. E & QEW East Ramp Entrance							
EBT/R	565	3.8	A	0.26	29	159	280
WBT/R	1933	7.6	A	0.88	18	43	320
NBL	98	57.8	E	0.63	31	114	680
NBR	288	49.5	D	0.21	18	150	680
TOTAL	2884	12.7	B	0.85	-	-	-
Maple Avenue & Ontario Street							
EBL/T/R	5	22.9	C	0.04	1	6	10
WBL	231	41.5	D	0.73	28	51	45
WBT/R	227	51.3	D	0.19	18	41	390
NBT/R	564	10	B	0.35	21	38	30
SBL	58	9.5	A	0.18	9	22	345
SBT/R	659	10.2	B	0.37	34	90	70
TOTAL	1744	19.4	B	0.48	-	-	-
Martha Street & New Street							
WBL	635	4.8	A	0.53	102	386	550
WBR	349	3.4	A	0.35	10	31	30
NBR	322	2.8	A	0.25	7	18	260
SBL	42	42.7	D	0.45	11	22	20
SBT	5	39.3	D	0.07	4	18	190
TOTAL	1353	5.4	A	0.52	-	-	-

The following observations can be made from Table 7:

- **The traffic operations at almost all unsignalized intersections is within the acceptable range (LOS D or better).** The only exceptions, which are anticipated to experience an overall intersection LOS F are:

- Lakeshore Road & John Street;
 - Lakeshore Road & Martha; and
 - Pine Street & Elizabeth Street.
- There are also a number of intersections at which some movements from the minor streets operate at a poor level of service (E or F) during the PM peak hours. It is noteworthy that these movements have relatively lower traffic volumes compared to the adjacent main street and therefore, increased levels of delay are expected:
 - James Street & Pearl Street;
 - Lakeshore Road & Locust Street;
 - Lakeshore Road & Brock Avenue; and
 - Maple Avenue & Elgin Street.
 - The reported 95th percentile queue lengths for only 6 turning movements slightly exceed their available storage lengths.

The traffic operations at the study intersections for future 2031 traffic conditions are reflective of an urban environment such as the downtown area. It should also be noted that reported traffic conditions are reflective of the PM peak hour which represents “worst case” traffic conditions.

Finally, traffic signal warrants were conducted for all unsignalized intersections to confirm whether signalization is appropriate. The results of the warrant analysis under Scenario 1 traffic volumes are presented in Section 5.

Table 7: 2031 PM Peak Intersection Performance Summary – Preferred Land Use with AT Improvements (Scenario 1 - Unsignalized)

Movement	PM Peak							
	Volume	Delay (s)	LOS	V/C	Ave Queue (m)	95th % Queue (m)	Storage (m)	
	Caroline Street and John Street							
	EBL	28	8.3	A	0.04	3	9	20
	EBT/R	133	0	A	0.10	0	0	45
	WBL	34	7.8	A	0.05	1	5	35
	WBT/R	379	0	A	0.26	5	22	50
	NBL/T/R	66	22.7	C	0.35	8	18	90
	SBL/T	96	22.1	C	0.46	12	21	145
	SBR	61	0.0	A	0.00	9	17	40
TOTAL	797	7.7	A	-	-	-	-	
Maria Street and John Street								

Movement	PM Peak						
	Volume	Delay (s)	LOS	V/C	Ave Queue (m)	95th % Queue (m)	Storage (m)
EBL/T/R	15	7.4	A	-	4	12	50
WBL/T/R	0	7.1	A	-	0	0	40
NBL/T/R	42	7.3	A	-	6	14	130
SBL/T/R	36	6.6	A	-	6	13	90
TOTAL	93	7.0	A	-	-	-	-
John Street and James Street							
EBL/T/R	187	1	A	0.03	1	9	50
WBL	24	8	A	0.02	1	7	20
WBT/R	484	0	A	0.31	13	44	45
NBL/T/R	65	27.4	D	0.36	17	57	100
SBL/T/R	71	20.2	C	0.21	13	40	130
TOTAL	831	4.0	A	-	-	-	-
Lakeshore Road and John Street							
EBL	15	15.3	C	0.80	2	8	10
EBT/R	897	0.0	A	0.74	9	34	50
WBL/T/R	1064	0.7	A	0.45	38	50	45
NBL/T/R	3	875.5	F	0.97	1	6	15
SBL/T/R	28	NR	F	7.93	7	18	60
TOTAL	2007	NR	F	-	-	-	-
Caroline Street and Elizabeth Street							
EBT/R	181	0.6	A	0.01	2	9	45
WBL	6	7.6	A	0.01	0	2	15
WBT	379	0	A	0.24	1	8	110
NBL/T/R	31	12.3	B	0.09	7	16	240
SBT/R	74	17.6	C	0.23	10	18	200
TOTAL	671	3.0	A	-	-	-	-
James Street and Pearl Street							
EBL	8	9.0	A	0.01	1	5	45
EBT/R	171	0.0	A	0.13	0	2	100
WBL	15	8.0	A	0.01	1	5	50
WBT/R	635	0.0	A	0.43	13	68	135
NBL/T/R	256	58.0	F	0.92	33	100	155
SBL/T/R	150	85.0	F	0.91	30	86	245
TOTAL	1235	25.0	C	-	-	-	-
Lakeshore Road and Martha Street							
EBL	70	12	B	0.15	6	16	50
EBT	729	0	A	0.46	11	59	95

Movement	PM Peak						
	Volume	Delay (s)	LOS	V/C	Ave Queue (m)	95th % Queue (m)	Storage (m)
WBT/R	1087	0	A	0.70	697	811	110
SBL/R	90	NR	F	3.80	24	71	280
TOTAL	1976	NR	F	-	-	-	-
Brant Street and Elgin Street							
EBL/R	112	14	B	0.25	16	45	75
NBL/T	260	0.0	A	0.01	23	101	90
SBT	368	0.0	A	0.24	13	51	50
SBR	218	0.0	A	0.15	6	19	20
TOTAL	958	2	A	-	-	-	-
Brant Street and Ontario Street							
EBL/R	115	13.8	B	0.24	48	188	75
NBL/R	520	8.3	A	0.35	37	57	45
SBT/R	562	0	A	0.40	59	169	70
TOTAL	1197	5	A	-	-	-	-
Lakeshore Road & Locust Street							
EBL	31	11.7	B	0.07	13	53	170
EBT	904	0.0	A	0.58	79	137	168
WBT/R	1322	0.0	A	0.48	83	135	75
SBL/R	46	66.0	F	0.60	11	25	140
TOTAL	2303	2	A	-	-	-	-
Lakeshore Road & Brock Avenue							
EBL	31	19.9	C	0.14	7	19	25
EBT	742	0.0	A	0.45	24	79	80
EBR	13	0.0	A	0.01	9	57	80
WBL	1	9.7	A	0.01	0	6	30
WBT/R	1638	0.0	A	0.77	87	126	90
NBL/T/R	14	35.6	E	0.21	5	14	20
SBL/T/R	105	21.8	C	0.36	28	50	185
TOTAL	2544	1.5	A	-	-	-	-
Maple Avenue & Elgin Street							
EBL/T/R	15	62.0	F	0.33	3	12	10
WBL	226	178.0	F	1.26	27	47	40
WBT/R	220	12.1	B	0.37	22	75	135
NBL	3	9.6	A	0.01	0	3	45
NBT/R	365	0.0	A	0.15	0	5	45
SBL	32	8.3	A	0.05	2	8	115
SBT/R	875	0.0	A	0.37	8	50	115

Movement	PM Peak						
	Volume	Delay (s)	LOS	V/C	Ave Queue (m)	95th % Queue (m)	Storage (m)
TOTAL	1736	29.9	D	-	-	-	-
Pine Street & John Street							
EBL/T/R	299	14.1	B	-	19	31	50
WBL/T/R	366	25.7	D	-	18	30	40
NBL/T/R	65	11.1	B	-	10	19	50
SBL/T/R	71	11.1	B	-	10	18	50
TOTAL	801	20	C	-	-	-	-
Elgin Street & Locust Street							
EBL/T/R	92	10.3	B	-	18	68	170
WBL/T/R	280	13.7	B	-	15	24	75
NBL/T/R	204	12.2	B	-	17	45	145
SBL/T/R	68	9.7	A	-	13	46	120
TOTAL	644	12	B	-	-	-	-
Pine Street & Elizabeth Street							
EBL/T/R	330	101	F	-	15	26	40
WBL/T/R	207	17.6	C	-	13	22	100
NBL/T/R	50	12.4	B	-	7	14	85
SBL/T/R	224	23.8	C	-	14	23	155
TOTAL	811	57	F	-	-	-	-

4.2.2 Preferred Land Use Scenario with AT Improvements and Approved Developments – 2031 (Scenario 2)

Table 8 and Table 9 summarize the 2031 traffic operations (Preferred Land Use with AT Improvements and Approved Developments – Scenario 2) for signalized and unsignalized intersections, respectively. The complete Synchro/SimTraffic reports are provided in Appendix E for future reference.

The following observations can be made from Table 8:

- **The traffic operations for the majority of movements at the signalized intersections are within the acceptable range (LOS D or better).** Exceptions with constrained movements include the intersections of:
 - Brant Street & Caroline Street;
 - Brant Street & Lakeshore Road;
 - Elizabeth Street & James Street;
 - Lakeshore Road & Pearl Street;

- Lakeshore Road & Burlington Avenue;
 - Lakeshore Road & Nelson Avenue;
 - Lakeshore Road & Maple Avenue; and
 - QEW East Ramp Entrance & North Shore Boulevard.
- Brant Street & Caroline Street intersection operates at an overall LOS of E with a V/C ratio of 1.04 and the constrained movements during this peak period are the eastbound left-turn with LOS of E and V/C 0.95, westbound through/right-turn with LOS E and V/C 1.01, southbound left-turn with LOS E and V/C 0.92, and southbound through/right-turn movement with a V/C ratio of 0.97.
 - Brant Street & Lakeshore Road intersection operates at an overall LOS of C with a V/C ratio of 0.91 and the constrained movements during this peak period are the eastbound through/right-turn with V/C 0.96 and southbound through/right-turn movement with LOS E and V/C ratio of 0.83.
 - Elizabeth Street & James Street intersection operates at an overall LOS of B with a V/C ratio of 0.73 and the constrained movement during this peak period is the southbound through/left-turn/right-turn movement with LOS E and V/C ratio of 0.89.
 - Lakeshore Road & Pearl Street intersection operates at an overall LOS of A with a V/C ratio of 0.64 and the constrained movement during this peak period is the northbound left-turn/through movement with a LOS of E.
 - Lakeshore Road & Burlington Avenue intersection operates at an overall LOS of D and a V/C ratio of 1.21 and the constrained movements during this peak period are the eastbound left-turn with LOS F and V/C 1.32 and westbound through/right-turn movement with LOS E and V/C ratio of 1.09.
 - Lakeshore Road & Nelson Avenue intersection operates at an overall LOS of C and a V/C ratio of 0.92 and the constrained movements during this peak period are the eastbound through movement with a V/C ratio of 0.92 and the southbound left-turn/through/right-turn movement with a LOS of E and a V/C ratio of 0.95.
 - Lakeshore Road & Maple Avenue intersection operates at an overall LOS of F with a V/C ratio of 1.10 and the constrained movements during this peak period are the eastbound left-turn movement with an LOS of F and V/C ratio of 1.19, eastbound through/right-turn with V/C 0.86, westbound left-turn with LOS E and V/C 0.95, westbound through/right-turn movement with an LOS of F and a V/C ratio of 1.16, northbound left-turn movement with a LOS of E and southbound movements with the left-turn having an LOS of E and a V/C ratio of 0.86, through movement having a LOS of E and V.C ratio of 0.85, and the right-turn movement having an LOS of F and a V/C ratio of 1.00.
 - QEW East Ramp Entrance & North Shore Boulevard intersection operates at an overall LOS of B and a V/C ratio of 0.93 and the constrained movements during this peak period are the westbound through/right-turn movement with a V/C ratio of 0.96 and the northbound right-turn with a LOS of E.

In a number of cases, the 95th percentile queues along the Lakeshore Road extend to the upstream intersection. This is due to the heavy westbound and eastbound volumes along this corridor during the PM peak period.

Table 8: 2031 PM Peak Intersection Performance Summary – Preferred Land Use with AT Improvements (Scenario 2 - Signalized)

Movement	PM Peak						
	Volume	Delay (s)	LOS	V/C	Ave Queue (m)	95th % Queue (m)	Storage (m)
Brant Street and Caroline Street							
EBL	197	65.1	E	0.95	28	46	45
EBT	20	12	B	0.03	4	16	75
EBR	6	11.8	B	0.01	1	7	15
WBL	1	18.7	B	0.00	0	5	20
WBT/R	520	70.1	E	1.01	48	51	200
NBL	18	34.2	C	0.28	5	19	30
NBT/R	314	39.2	D	0.73	44	85	240
SBL	230	60.3	E	0.92	43	104	340
SBT/R	631	51.7	D	0.97	148	291	340
TOTAL	1937	56.4	E	1.04	-	-	-
Brant Street and James Street							
WBL	233	29.7	C	0.62	36	56	45
WBR	264	24.4	C	0.22	27	48	100
NBT	272	11.7	B	0.36	31	58	220
NBR	72	9.3	A	0.09	10	23	10
SBL	162	12.9	B	0.39	19	31	25
SBT	437	13.5	B	0.49	41	58	230
TOTAL	1440	17.3	B	0.52	-	-	-
Brant Street and Lakeshore Road							
EBL	155	43.8	D	0.77	36	71	50
EBT/R	929	43.1	D	0.96	90	94	65
WBL	1	10.1	B	0.06	0	1	25
WBT/R	1121	16.5	B	0.68	61	73	110
NBL/T/R	13	34.9	C	0.09	3	10	80
SBL	128	39.7	D	0.49	129	172	220
SBT/R	413	57	E	0.83	24	24	15
TOTAL	2760	33.7	C	0.91	-	-	-
Elizabeth Street and James Street							
EBL	6	6.1	A	0.03	1	7	15

Movement	PM Peak						
	Volume	Delay (s)	LOS	V/C	Ave Queue (m)	95th % Queue (m)	Storage (m)
EBT/R	230	7.3	A	0.23	15	31	105
WBL	93	6.5	A	0.15	15	42	40
WBT/R	591	11.5	B	0.68	46	85	260
NBL/T/R	132	32	C	0.49	21	56	155
SBL/T/R	125	60.4	E	0.89	20	37	240
TOTAL	1177	19.1	B	0.73	-	-	-
Lakeshore Road and Elizabeth Street							
EBL	59	1.7	A	0.22	5	14	80
EBT	943	2.3	A	0.65	24	42	100
EBR	1	1.2	A	0.00	0	0	30
WBL	41	3.9	A	0.37	25	68	90
WBT/R	1157	1.9	A	0.43	107	113	15
NBL/T/R	15	53.6	D	0.26	27	73	25
SBL	19	54.2	D	0.29	6	18	80
SBT/R	7	51.5	D	0.04	6	21	80
TOTAL	2242	3.6	A	0.62	-	-	-
Lakeshore Road and Pearl Street							
EBL	45	1.5	A	0.19	5	20	50
EBT/R	858	2.7	A	0.65	22	51	90
WBL	3	2	A	0.02	2	11	20
WBT/R	1127	3.4	A	0.43	102	110	285
NBL/T	52	55.4	E	0.56	63	201	270
NBR	6	47.7	D	0.01	2	11	15
SBL	29	50.4	D	0.28	7	15	15
SBT/R	40	48.7	D	0.14	10	24	95
TOTAL	2160	6.9	A	0.64	-	-	-
Brant Street & Ghent Avenue							
EBL/T	175	46.5	D	0.80	33	57	300
EBR	20	26.3	C	0.02	7	23	25
WBL/T/R	161	45.4	D	0.77	28	53	500
NBL	16	9.2	A	0.25	6	19	45
NBT/R	1203	10.3	B	0.68	32	54	285
SBL	26	11	B	0.20	8	27	30
SBT/R	1324	18.2	B	0.81	266	273	125
TOTAL	2925	18.7	B	0.8	-	-	-
Brant Street & Victoria Avenue							

Movement	PM Peak						
	Volume	Delay (s)	LOS	V/C	Ave Queue (m)	95th % Queue (m)	Storage (m)
EBL	21	36.9	D	0.19	5	15	20
EBT/R	34	37	D	0.24	7	19	180
WBL	24	37	D	0.20	6	16	30
WBT/R	82	37.2	D	0.25	12	25	340
NBL	112	16	B	0.67	17	29	15
NBT/R	811	12.8	B	0.76	60	113	340
SBL	55	3.3	A	0.23	10	29	50
SBT	782	4.4	A	0.68	68	255	185
SBR	115	1.6	A	0.11	10	36	60
TOTAL	2036	11.4	B	0.69	-	-	-
Lakeshore Road & Burlington Avenue							
EBL	31	215	F	1.32	24	80	75
EBT	1029	8.5	A	0.79	155	214	205
WBT/R	1393	61.2	E	1.09	93	99	265
SBL/R	30	53.4	D	0.15	8	18	150
TOTAL	2483	43.4	D	1.21	-	-	-
Lakeshore Road & Nelson Avenue							
EBL	53	18.8	B	0.48	12	33	30
EBT	994	28.3	C	0.92	88	103	200
EBR	18	6.5	A	0.02	2	8	200
WBL	19	5.7	A	0.29	9	27	25
WBT/R	1399	7.4	A	0.69	71	80	205
NBL/T/R	19	34.9	C	0.06	4	12	10
SBL/T/R	289	78.2	E	0.95	68	109	170
TOTAL	2791	23.7	C	0.92	-	-	-
Lakeshore Road & Maple Avenue							
EBL	224	169	F	1.19	153	189	170
EBT/R	772	38.3	D	0.86	242	278	240
WBL	276	75.8	E	0.95	35	45	30
WBT/R	1469	110	F	1.16	116	122	190
NBL	118	60	E	0.82	33	65	120
NBT/R	181	36.6	D	0.39	29	56	500
SBL	226	57.2	E	0.86	46	76	60
SBT	374	55.5	E	0.85	75	139	345
SBR	496	89.3	F	1.00	96	169	345
TOTAL	3640	81.1	F	1.10	-	-	-

Movement	PM Peak						
	Volume	Delay (s)	LOS	V/C	Ave Queue (m)	95th % Queue (m)	Storage (m)
North Shore Blvd. E & Brant Hospital Entrance							
EBL	17	27.8	C	0.44	23	85	55
EBT/R	979	8.3	A	0.46	93	151	210
WBL	24	3.1	A	0.08	5	19	70
WBT/R	1973	8.8	A	0.88	39	67	240
NBL	88	54.5	D	0.64	20	36	100
NBR	42	43.6	D	0.05	8	19	100
SBL/T	16	44.1	D	0.11	4	13	20
SBR	8	43.3	D	0.01	2	9	20
TOTAL	3147	11.7	B	0.87	-	-	-
North Shore Blvd. E & QEW East Ramp Entrance							
EBT/R	636	4.5	A	0.30	114	355	280
WBT/R	2061	13.4	B	0.96	19	40	320
NBL	469	52.1	D	0.55	28	73	680
NBR	371	66.4	E	0.76	78	256	680
TOTAL	3537	18.9	B	0.93	-	-	-
Maple Avenue & Ontario Street							
EBL/T/R	5	22.9	C	0.04	1	5	10
WBL	231	41.4	D	0.73	28	48	45
WBT/R	227	51.3	D	0.19	16	34	390
NBT/R	564	10	B	0.35	22	36	30
SBL	58	9.5	A	0.18	9	23	345
SBT/R	659	10.2	B	0.37	27	46	70
TOTAL	1744	19.4	B	0.48	23	41	-
Martha Street & New Street							
WBL	726	5.7	A	0.6	64	187	550
WBR	349	3.5	A	0.36	13	34	30
NBR	416	3.2	A	0.32	8	21	260
SBL	42	42.7	D	0.45	10	20	20
SBT	0	0	A	0.00	0	0	190
TOTAL	1533	5.6	A	0.59	-	-	-

The following observations can be made from Table 9:

- **The traffic operations at almost all unsignalized intersections is within the acceptable range (LOS D or better).** The only exceptions, which have the overall intersection LOS as F are:
 - James Street & Pearl Street
 - Lakeshore Road & John Street;
 - Lakeshore Road & Martha; and
 - Pine Street & Elizabeth Street.
- There are also a number of intersections at which some movements from the minor streets operate at a poor level of service (E or F) during the PM peak hours. It is noteworthy that these movements have relatively lower traffic volumes compared to the adjacent main street and therefore the lower level of service experienced by the side street is acceptable:
 - Caroline Street & John Street;
 - John Street & James Street;
 - Caroline Street & Elizabeth Street;
 - Lakeshore Road & Locust Street;
 - Lakeshore Road & Brock Avenue; and
 - Maple Avenue & Elgin Street.
- The reported 95th percentile queue lengths for only 7 turning movements exceed their available storage lengths.

The traffic operations at the study intersections for the future 2031 traffic condition are reflective of an urban environment such as the downtown area. It should also be noted that reported traffic conditions are only reflective of the PM peak hour.

Finally, traffic signal warrants were conducted for all unsignalized intersections to confirm whether signalization is appropriate. The results of the warrant analysis under the Scenario 2 traffic volumes are also presented in Section 5.

Table 9: 2031 PM Peak Intersection Performance Summary – Preferred Land Use with AT Improvements (Scenario 2 - Unsignalized)

Movement	Volume	Delay (s)	LOS	PM Peak			
				V/C	Ave Queue (m)	95th % Queue (m)	Storage (m)
Caroline Street and John Street							
EBL	28	9	A	0.05	2	9	20
EBT/R	133	0	A	0.21	5	24	45
WBL	34	8.2	A	0.05	41	58	35
WBT/R	379	0	A	0.38	16	36	50
NBL/T/R	66	61.3	F	0.67	5	18	90
SBL/T	96	123	F	1.04	81	186	145
SBR	61	0.0	A	0.00	29	49	40
TOTAL	797	20.6	C	-	-	-	-
Maria Street and John Street							
EBL/T/R	15	7.5	A	-	8	17	50
WBL/T/R	0	7.6	A	-	7	14	40
NBL/T/R	42	8	A	-	9	16	130
SBL/T/R	36	6.9	A	-	6	13	90
TOTAL	93	7.5	A	-	-	-	-
John Street and James Street							
EBL/T/R	187	1.9	A	0.05	3	13	50
WBL	24	8	A	0.02	2	9	20
WBT/R	484	0	A	0.33	11	40	45
NBL/T/R	65	35.5	E	0.44	11	23	100
SBL/T/R	71	30.3	D	0.44	11	21	130
TOTAL	831	6.0	A	-	-	-	-
Lakeshore Road and John Street							
EBL	15	16.5	C	0.09	2	9	10
EBT/R	897	0	A	0.87	13	41	50
WBL/T/R	1064	2.4	A	0.04	39	50	45
NBL/T/R	3	NR	F	NR	2	9	15
SBL/T/R	28	NR	F	NR	8	21	60
TOTAL	2007	NR	F	NR	-	-	-
Caroline Street and Elizabeth Street							
EBT/R	181	0.4	A	0.01	1	8	45
WBL	6	8.2	A	0.01	1	5	15
WBT	379	0	A	0.24	22	55	110
NBL/T/R	31	82.1	F	0.96	97	220	240

Movement	PM Peak						
	Volume	Delay (s)	LOS	V/C	Ave Queue (m)	95th % Queue (m)	Storage (m)
SBT/R	74	22.2	C	0.29	11	21	200
TOTAL	671	6.4	A	NR	-	-	-
James Street and Pearl Street							
EBL	8	9.6	A	0.02	1	7	45
EBT/R	171	0	A	0.21	0	3	100
WBL	15	8	A	0.02	1	5	50
WBT/R	635	0	A	0.50	6	44	135
NBL/T/R	256	NR	F	NR	28	63	155
SBL/T/R	150	240	F	1.32	23	49	245
TOTAL	1235	NR	F	NR	-	-	-
Lakeshore Road and Martha Street							
EBL	70	13.4	B	0.24	9	22	50
EBT	729	0	A	0.47	13	62	95
WBT/R	1087	0	A	0.73	709	718	110
SBL/R	90	NR	F	6.52	26	58	280
TOTAL	1976	NR	F	NR	-	-	-
Brant Street and Elgin Street							
EBL/R	112	15.7	C	0.3	11	23	75
NBL/T	260	0.3	A	0.01	2	15	90
SBT	368	0	A	0.28	30	77	50
SBR	218	0	A	0.16	10	25	20
TOTAL	958	1.9	A	-	-	-	-
Brant Street and Ontario Street							
EBL/R	115	15.4	C	0.28	26	66	75
NBL/R	520	9.3	A	0.39	36	50	45
SBT/R	562	0	A	0.44	83	198	70
TOTAL	1197	5.5	A	-	-	-	-
Lakeshore Road & Locust Street							
EBL	31	12.4	B	0.08	14	55	170
EBT	904	0	A	0.67	102	108	168
WBT/R	1322	0	A	0.53	95	116	75
SBL/R	46	980	F	2.62	11	24	140
TOTAL	2303	19.7	C	-	-	-	-
Lakeshore Road & Brock Avenue							
EBL	31	21.4	C	0.15	7	20	25
EBT	742	0	A	0.60	36	93	80

Movement	Volume	Delay (s)	LOS	V/C	PM Peak		
					Ave Queue (m)	95th % Queue (m)	Storage (m)
EBR	13	0	A	0.01	2	22	80
WBL	1	12	B	0.01	0	6	30
WBT/R	1638	0	A	0.80	94	98	90
NBL/T/R	14	70.7	F	0.38	20	49	20
SBL/T/R	105	41.7	E	0.56	31	50	185
TOTAL	2544	2.4	A	-	-	-	-
Maple Avenue & Elgin Street							
EBL/T/R	15	61.8	F	0.33	2	8	10
WBL	226	186	F	1.25	25	45	40
WBT/R	220	12.1	B	0.37	26	88	135
NBL	3	9.6	A	0.00	0	2	45
NBT/R	365	0	A	0.15	0	2	45
SBL	32	8.3	A	0.05	2	6	115
SBT/R	875	0	A	0.37	0	5	115
TOTAL	1736	26.4	D	-	-	-	-
Pine Street & John Street							
EBL/T/R	299	14.6	B	-	20	30	50
WBL/T/R	366	27.1	D	-	17	28	40
NBL/T/R	65	11.2	B	-	10	21	50
SBL/T/R	71	11.2	B	-	10	18	50
TOTAL	801	19.7	C	-	-	-	-
Elgin Street & Locust Street							
EBL/T/R	92	10.8	B	-	10	15	170
WBL/T/R	280	14.5	B	-	16	24	75
NBL/T/R	204	12.7	B	-	12	19	145
SBL/T/R	68	10	A	-	9	16	120
TOTAL	644	12.9	B	-	-	-	-
Pine Street & Elizabeth Street							
EBL/T/R	330	134	F	-	15	25	40
WBL/T/R	207	19.7	C	-	15	24	100
NBL/T/R	50	14	B	-	10	17	85
SBL/T/R	224	26.7	D	-	14	24	155
TOTAL	811	67.7	F	-	-	-	-

4.3 Comparison of Results

The impacts of the Preferred Land Use Scenario with AT Improvements (Scenario 1) and the Preferred Land Use Scenario with AT Improvements and New Developments (Scenario 2) on the traffic operations of the study intersections are outlined below in Figure 16-a and Figure 16-b. In these figures, the traffic operations at study intersections are compared for 3 scenarios (Baseline – Scenario 0, Preferred Land Use with AT Improvements – Scenario 1, and Preferred Land Use with AT Improvements and New Developments – Scenario 2). The information in blue boxes represent the performance measures associated with the Baseline Scenario and the information in green boxes represent the performance measures associated with the Preferred Land Use Scenarios. There are two sets of information provided in the green boxes. The information outside of the parenthesis represents the Preferred Land Use with AT Improvement Scenario (Scenario 1) and the information inside the parenthesis represents the Preferred Land Use with AT Improvement and New Developments Scenario (Scenario 2). For each intersection and during PM peak period, 2 measures are provided. The numbers in the top boxes indicate the intersection delay and the letters in the bottom boxes indicate the LOS categories (LOS E and LOS F are highlighted in red).

4.3.1 Preferred Land Use with AT Improvements Vs. Baseline

According to Figure 16-a and Figure 16-b, **the increase in delay and LOS for majority of study intersections is relatively minimal.** The only exceptions are:

- Lakeshore Road and Maple Avenue Intersection with increase in the overall delay during the PM peak hour (change from LOS D to LOS E) due to the increase in westbound through movement volume on Lakeshore Road and southbound left-turn movement volume on Maple Avenue. The increase in traffic volumes causes the westbound through movement to reach capacity which in turn results in an increase in the overall intersection delay.
- Lakeshore Road and Martha Street Intersection: Increase in the overall delay during the PM peak hour (change from LOS B to LOS F) due to the increase in the through movement volumes on Lakeshore Road. Under this scenario, there will be less gaps available for turning movements from Martha Street, which results in constrained movements at this intersection. **It is noteworthy that Martha Street has a significantly lower traffic volume compared to Lakeshore Road. Therefore, the movement of mainline traffic takes priority over minor street turning movements.**
- Elizabeth Street and Pine Street Intersection: Increase in the overall delay during the PM peak hour (change from LOS A to LOS F) due to the increase in the through movement volumes on the east-west approaches. Under this scenario, there will be less gaps available in traffic for the north-south approaches, which are the constrained movements at this intersection.

4.3.2 Preferred Land Use with AT Improvements and New Developments Vs. Baseline

According to Figure 16-a and Figure 16-b, **the increase in delay and LOS for majority of study intersections is still relatively minimal.** The exceptions are:

- Lakeshore Road and Maple Avenue Intersection with increase in the overall delay during the PM peak hour (change from LOS D to LOS F) due to the significant increase in the westbound through movement volume on the Lakeshore Road and southbound left-turn movement volume on the Maple Avenue. The increase in traffic volumes causes the westbound through movement to reach capacity which in turn results in an increase in the overall intersection delay.
- Lakeshore Road and Martha Street Intersection: Increase in the overall delay during the PM peak hour (change from LOS B to LOS F) due to the increase in the through movement volumes on Lakeshore Road. Under this scenario, there will be less gaps available for turning movements from Martha Street, which results in constrained movements at this intersection. **It is noteworthy that Martha Street has a significantly lower traffic volume compared to Lakeshore Road. Therefore, the movement of mainline traffic takes priority over minor street turning movements.**
- Elizabeth Street and Pine Street Intersection: Increase in the overall delay during the PM peak hour (change from LOS A to LOS F) due to the increase in the through movement volumes on the east-west approaches. Under this scenario, there will be less gaps available in traffic for the north-south approaches, which are the constrained movements at this intersection.
- Brant Street and Caroline Street Intersection: Increase in the overall delay during the PM peak hour (change from LOS C to LOS F) due to the traffic volume increase in the southbound approach (through and left-turn movements), eastbound approach (through movement), and westbound approach (through and right-turn movements). The increase in traffic volumes causes the above movements to operate near capacity which in turn results in an increase in the overall intersection delay.
- James Street and Pearl Street Intersection: Increase in the overall delay during the PM peak hour (change from LOS C to LOS F) due to the increase in the through movement volumes on the north-south approaches, which are the constrained movements at this intersection. **It is noteworthy that side street (i.e., Pearl Street) turning movement counts have relatively low traffic volumes compared to the main street (i.e., James Street) and therefore their operations are of lower priority.**

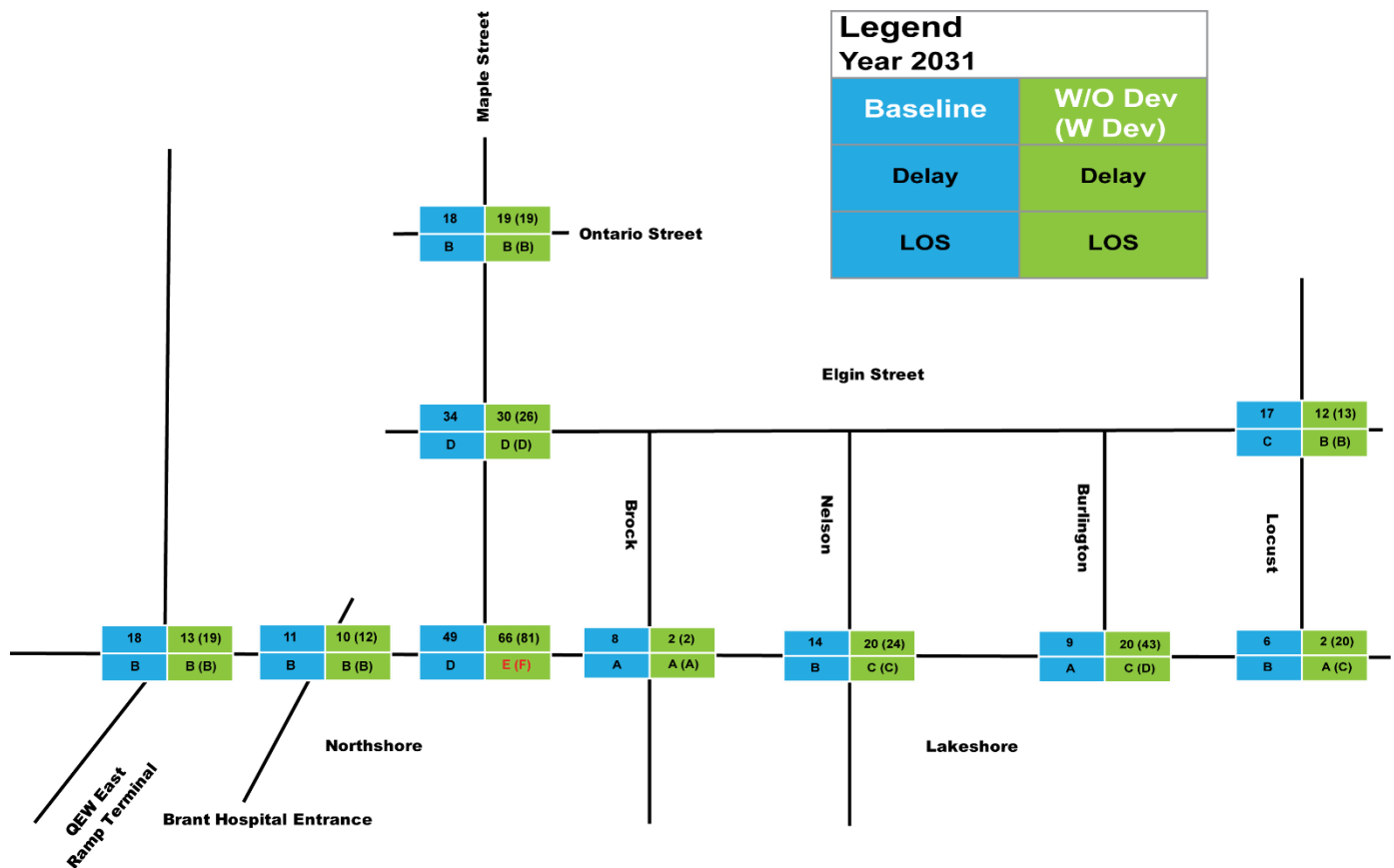


Figure 16-a: Change in Traffic Operation across the Study Network (Section A)
(2031-Baseline Vs. 2031-Preferred Land Use with AT Improvements)



5 Signal Warrants for Unsignalized Intersections

The need for the installation of traffic signal at the un-signalized intersections was reviewed following industry standard methodology (Ontario Traffic Manual Book 12: Traffic Signals). According to OTM guidelines, the signal justification for future conditions is based on the use of Justification 7 which considers an analysis using average hour volumes rather than eight-hour volumes. Due to the increased uncertainty generated by the use of average values, the OTM Book 12 methodology increases the required thresholds for traffic signals by 20% (i.e., 120%).

The calculated compliance rates for the study intersections are presented in Figure 17 and indicate that upgraded traffic control is not expected to be warranted at the unsignalized intersections within the study area. It should be noted that in a recent study conducted by CIMA+ the recommendation to signalize the intersection of James Street and John Street has been made based upon safety reasons, not traffic volumes.

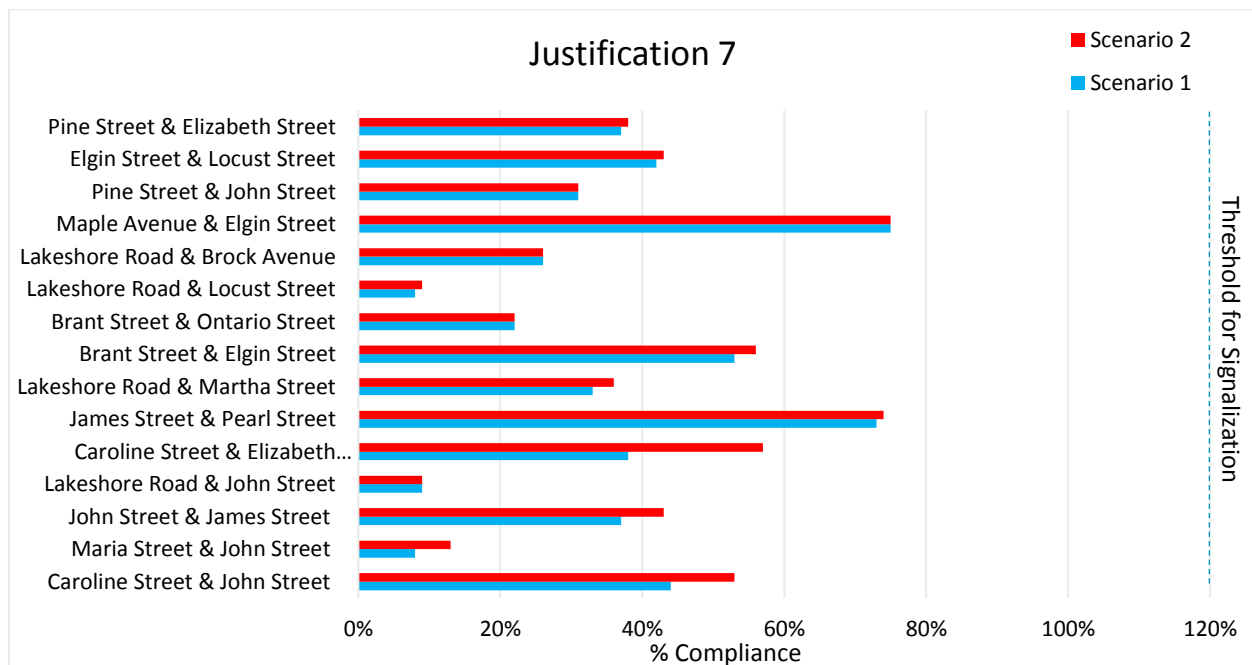


Figure 17: Traffic Signal Justification for the Un-Signalized Intersections

5.1 Recommendations

Based on the operational performance of the study intersections under the 2031 Preferred Land Use scenarios, the following network improvements are recommended:

- Geometric improvements – extension of storage lanes at the following intersections:

- Lakeshore Road at Elizabeth Street: The left turn storage lane for the SB approach extended to provide 80 meters of storage length;
 - Maple Avenue at Lakeshore Road/North Shore Boulevard: The left turn storage lanes for the SB and WB approaches extended to provide 80 meters and 50 meters of storage, respectively;
 - North Shore Boulevard at Joseph Brant Hospital: The left turn storage lane for the EB approach can be extended to provide 85 meters of storage length.
 - In order to accommodate the City's AT recommendations, as per the City of Burlington Cycling Master Plan – 2020 and City of Burlington Pedestrian Charter – 2009, the lane width along certain sections of the Lakeshore Road, Brant Street, and Maple Avenue is required to be reduced to 3.0 meters. Moreover, the traffic signal timings at a number of signalized intersections need to be optimised to account for the impacts of the recommended AT facilities (e.g., stop bar set backs, green left-turn bike boxes). The details of the recommended AT improvements can be found in Table 3 and Appendix B.
- Implementation of coordinate traffic signal operations throughout the North Shore Boulevard and Lakeshore Road corridors.

6 Conclusions

The traffic impact analysis has confirmed that future traffic demands associated with the preferred land use scenario (inclusive of the five approved high-density developments) can be accommodated satisfactorily within the existing transportation system. While recommendations to extend storage lengths have been made, it is noted that there are physical constraints that may limit the ability to implement the recommended geometric improvements, namely the permeable, fine grid street pattern that is made up of short blocks. While the physical geometry may restrict the ability to implement adequate storage lengths to accommodate vehicular demands, this geometry lends itself to walking and cycling, and is preferred from a transit perspective.



Appendix A: Traffic Data

Brant St @ Victoria Ave

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington

Site #: 0000000003

Intersection: Brant St & Victoria Ave

TFR File #: 3

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 1174

North Entering: 640

North Peds: 92

Peds Cross: \times

Cyclists	2	3	0	5
Trucks	2	13	1	16
Cars	112	463	44	619
Totals	116	479	45	



Cyclists 1

Trucks 19

Cars 514

Totals 534

East Leg Total: 184

East Entering: 94

East Peds: 70

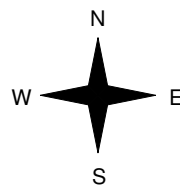
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
4	6	178	188



Baldwin St

Cyclists	Trucks	Cars	Totals
0	1	89	90
0	0	29	29
0	1	24	25
0	2	142	



Brant St

Cars	Trucks	Cyclists	Totals
38	3	1	42
42	1	2	45
7	0	0	7
87	4	3	

Victoria Ave



Cars	Trucks	Cyclists	Totals
86	4	0	90

Peds Cross: \times

West Peds: 37

West Entering: 144

West Leg Total: 332

Cars	494
Trucks	14
Cyclists	3
Totals	511



Cars	24	387	13	424
Trucks	3	15	3	21
Cyclists	0	0	0	0
Totals	27	402	16	

Peds Cross: \times

South Peds: 38

South Entering: 445

South Leg Total: 956

Comments

Brant St @ Victoria Ave

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Burlington

Site #: 0000000003

Intersection: Brant St & Victoria Ave

TFR File #: 3

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 1457

North Entering: 697

North Peds: 2

Peds Cross: \times

Cyclists	0	5	0	5
Trucks	0	7	0	7
Cars	49	585	51	685
Totals	49	597	51	



Cyclists	4
Trucks	11
Cars	745
Totals	760

East Leg Total: 187

East Entering: 99

East Peds: 26

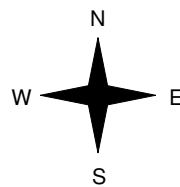
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
3	0	73	76



Baldwin St

Cyclists	Trucks	Cars	Totals
0	1	37	38
8	0	17	25
4	0	3	7
12	1	57	



Brant St

Cars	Trucks	Cyclists	Totals
54	2	1	57
16	0	3	19
23	0	0	23
93	2	4	

Victoria Ave



Cars	Trucks	Cyclists	Totals
80	0	8	88

Peds Cross: \times

West Peds: 25

West Entering: 70

West Leg Total: 146

Cars	611	Cars	8	654	12	674
Trucks	7	Trucks	0	8	0	8
Cyclists	9	Cyclists	0	3	0	3
Totals	627	Totals	8	665	12	



Peds Cross: \times

South Peds: 24

South Entering: 685

South Leg Total: 1312

Comments

Brant St @ Victoria Ave

Total Count Diagram

Municipality: Burlington
Site #: 0000000003
Intersection: Brant St & Victoria Ave
TFR File #: 3
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Brant St runs N/S

North Leg Total: 4847
 North Entering: 2420
 North Peds: 133
 Peds Cross: \nlessgtr

	Cyclists	Trucks	Cars	Totals
North	3	20	1	24
East	6	48	2	56
South	265	1893	182	2340
Totals	274	1961	185	

	Cyclists	Trucks	Cars	Totals
North	24	56	2347	2427

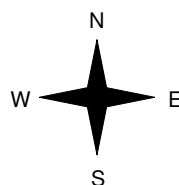
East Leg Total: 668
 East Entering: 358
 East Peds: 171
 Peds Cross: \nlessgtr

	Cyclists	Trucks	Cars	Totals
West	16	13	406	435



Baldwin St

	Cyclists	Trucks	Cars	Totals
North	4	3	185	192
East	15	1	64	80
South	4	1	31	36
Totals	23	5	280	



Brant St

	Cars	Trucks	Cyclists	Totals
North	202	8	3	213
East	85	1	12	98
South	47	0	0	47
Totals	334	9	15	

Victoria Ave



	Cars	Trucks	Cyclists	Totals
West	288	6	16	310

Peds Cross: \nlessgtr
 West Peds: 82
 West Entering: 308
 West Leg Total: 743

	Cars	Trucks	Cyclists	Totals
West	1971	49	24	2044

	Cars	Trucks	Cyclists	Totals
West	56	6	1	63
East	1960	45	17	2022
South	42	3	0	45
Totals	2058	54	18	

Peds Cross: \nlessgtr
 South Peds: 98
 South Entering: 2130
 South Leg Total: 4174

Comments

Intersection Name: Brant St @ South Ramp		TS ID: 163	Group NO:	IP address: 172.22.71.2
Controller Make: Econolite	Model: ACS/3	Firmware Rev. No:		

CP # 1, 2,3,4& 10	Phase:	1	2	3	4	5	6	7	8
Coord Phase	:		X				X		
Vehicle Recall	:								
Pedestrian Recall *(3-3, 5-2)	:		X				X		
Recall to MAX Time	:								
Phase Omit	:								
Special Function Outputs	:								

Coordinator Pattern #	Prefer.	Phase							
		1	2	3	4	5	6	7	8
	1								
	2								

X - select "." deselect

TIME BASE: ACTION PLAN, DAY PLAN	* - 5 - 2, - 5 - 3, - 5 - 4
---	------------------------------------

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	1	06:00	1	1
1	1	2	09:00	2	1
1	1	3	15:15	3	1
1	1	2	19:00	2	1
1	1	10	21:30	254	1
2	2	4	07:00	4	1
2	2	1	08:30	1	1
2	2	4	17:30	4	1
2	2	10	23:00	254	1
3	3	4	07:30	4	1
3	3	1	12:00	1	1
3	3	4	17:30	4	1
3	3	10	22:00	254	1

Schedule 1 = Day Plan 1

Schedule 2 = Day Plan 2

Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)

Day Plan 2 (Saturday)

Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

TIME BASE DATA - TIME OF YEAR EVENTS	* - 5 - 5
---	------------------

Events	Exception Day		MON/ MON	DOW/ DOM	WOM/ Year	Day Plan
New Year's Day	1	Fixed	01	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	04	6	1	3
Victoria Day	4	Float	05	2	3	3
Canada Day	5	Fixed	07	1	0	3
Civic Day	6	Float	08	2	1	3
Labour Day	7	Float	09	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Intersection Name: Brant St @ Balwin /Victoria Ave		TS ID: 144	Line No: 1	Model: ACS/3	IP address: 172.22.62.2	Controller Make: Econolite		
Type of Operation: 8 Phase Semi-Actuated								
*-Start from Main Menu								
No	Date			Description	Prepared by MA			
	Y	M	D					
1	2017	7	20	Controller upgrade (Phase 4 & 8 are tied together)				
PHASE DESCRIPTION								
Ph1				Ph5				
Ph2	NB - Brant St			Ph6	SB - Brant St			
Ph3				Ph7				
Ph4	EB/WB- Baldwin St/ Victoria Ave			Ph8				
PHASE IN USE/EXCLUSIVE PED (MM) *- 1 - 2								
Phase:	1	2	3	4	5	6	7	8
Phase in Use		X		X		X		
Exclusive PED								
CONTROLLER TIMING DATA - VEHICLE TIMING *- 2 - 1								
Timing Plan: 1	Phase:							
Minimum Green	1	2	3	4	5	6	7	8
		8		8		8		
Walk		25		15		25		
Ped. Clearance		9		10		9		
Pedestrian Carry Over								
Vehicle Extension		3		3		3		
MAX 1		35		20		35		
MAX 2		35		20		35		
Yellow Change		4		4		4		
Red Clearance		2		2		2		
Phase Minimum:	1	41	1	32	1	41	1	1
PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS *- 2 - 8								
Phase:	1	2	3	4	5	6	7	8
Lock Detector								
Vehicle Recall								
Pedestrian Recall		X				X		
MAX Recall		X				X		
Min Recall								

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN										* - 3 - 2, - 3 - 3			
Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)								
					1	2	3	4	5	6	7	8	
1	90	82	1	1		56		34		56			
2	100	27	1	2		67		33		67			
3	90	36	1	3		56		34		56			
4	85	32	1	4		50		35		50			
10	0	0	1	10		0		0		0			
TIME BASE: ACTION PLAN, DAY PLAN										* - 5 - 2, - 5 - 3, -5 - 4			
Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	Schedule 1 = Day Plan 1 Schedule 2 = Day Plan 2 Schedule 3 = Day Plan 3 Day Plan 1 (Weekday) Day Plan 2 (Saturday) Day Plan 3 (Sunday, Holidays) Action Plan 10 = free (254)							
1	1	1	07:30	1	1								
1	1	2	09:30	2	1								
1	1	3	15:30	3	1								
1	1	4	19:00	4	1								
1	1	10	22:00	254	1								
2	2	4	07:30	4	1								
2	2	1	09:30	1	1								
2	2	4	16:00	4	1								
2	2	10	23:00	254	1								
3	3	4	08:30	4	1								
3	3	1	10:30	1	1								
3	3	4	17:00	4	1								
3	3	10	20:30	254	1								

Special Programming:

TIME BASE DATA - TIME OF YEAR EVENTS										* - 5 - 5			
--------------------------------------	--	--	--	--	--	--	--	--	--	-----------	--	--	--

Events	Exception Day		MON/ MON	DOW/ DOW	WOM/ Year	Day Plan
New Year's Day	1	Fixed	1	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Fixed	XX	XX	XX	3
Victoria Day	4	Float	5	2	3	3
Canada Day	5	Fixed	7	1	0	3
Civic Day	6	Float	8	2	1	3
Labour Day	7	Float	9	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Intersection Name: Brant St @ Ghent Ave		TS ID: 142	Group NO:	IP address: 172.22.64.2
Controller Make: Econolite	Model: ACS/3	Firmware Rev. No:		

CP # 1, 2,3,4& 10	Phase:	1	2	3	4	5	6	7	8
Coord Phase	:		X				X		
Vehicle Recall	:								
Pedestrian Recall *(3-3, 5-2)	:		X				X		
Recall to MAX Time	:								
Phase Omit	:								
Special Function Outputs	:								

Coordinator Pattern #	Prefer.	Phase							
		1	2	3	4	5	6	7	8
	1								
	2								

X - select "." deselect

TIME BASE: ACTION PLAN, DAY PLAN	* - 5 - 2, - 5 - 3, - 5 - 4
---	------------------------------------

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	1	07:30	1	1
1	1	2	09:30	2	1
1	1	3	15:30	3	1
1	1	4	19:00	4	1
1	1	10	22:00	254	1
2	2	4	07:30	4	1
2	2	1	09:30	1	1
2	2	4	16:00	4	1
2	2	10	23:00	254	1
3	3	4	08:30	4	1
3	3	1	10:30	1	1
3	3	4	17:00	4	1
3	3	10	20:30	254	1

Schedule 1 = Day Plan 1

Schedule 2 = Day Plan 2

Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)

Day Plan 2 (Saturday)

Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

TIME BASE DATA - TIME OF YEAR EVENTS	* - 5 - 5
---	------------------

Events	Exception Day	MON/ MON	DOW/ DOM	WOM/ Year	Day Plan
New Year's Day	1 Fixed	01	1	0	3
Family Day	2 Float	2	2	3	3
Good Friday	3 Float	04	6	1	3
Victoria Day	4 Float	05	2	3	3
Canada Day	5 Fixed	07	1	0	3
Civic Day	6 Float	08	2	1	3
Labour Day	7 Float	09	2	1	3
Thanksgiving	8 Float	10	2	2	3
Christmas Day	9 Fixed	12	25	0	3

Elgin St @ Locust St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington

Site #: 0000000008

Intersection: Elgin St & Locust St

TFR File #: 8

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Elgin St runs W/E

North Leg Total: 204

North Entering: 94

North Peds: 32

Peds Cross: \times

Cyclists	0	0	0	0
Trucks	0	0	1	1
Cars	14	67	12	93
Totals	14	67	13	



Cyclists 1

Trucks 2

Cars 107

Totals 110

East Leg Total: 276

East Entering: 102

East Peds: 43

Peds Cross: \times

Cyclists	Trucks	Cars	Totals
0	3	69	72

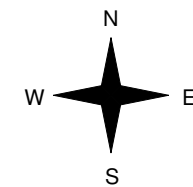


Elgin St

Cyclists	Trucks	Cars	Totals
1	1	31	33
2	1	119	122
0	0	37	37
3	2	187	



Locust St



Locust St

Cars	Trucks	Cyclists	Totals
10	0	0	10
43	2	0	45
46	0	1	47
99	2	1	

Elgin St



Cars	Trucks	Cyclists	Totals
169	3	2	174

Peds Cross: \times

West Peds: 42

West Entering: 192

West Leg Total: 264

Cars 150

Trucks 0

Cyclists 1

Totals 151



Cars 12 66 38 116

Trucks 1 1 1 3

Cyclists 0 0 0 0

Totals 13 67 39

Peds Cross: \times

South Peds: 41

South Entering: 119

South Leg Total: 270

Comments

Elgin St @ Locust St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Burlington

Site #: 0000000008

Intersection: Elgin St & Locust St

TFR File #: 8

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Elgin St runs W/E

North Leg Total: 198

North Entering: 69

North Peds: 30

Peds Cross: 8

Cyclists	0	1	0	1
Trucks	0	0	0	0
Cars	24	37	7	68
Totals	24	38	7	



Cyclists 2

Trucks 0

Cars 127

Totals 129

East Leg Total: 456

East Entering: 355

East Peds: 40

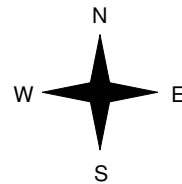
Peds Cross: 8

Cyclists	Trucks	Cars	Totals
8	0	383	391



Elgin St

Cyclists	Trucks	Cars	Totals
0	0	25	25
5	1	45	51
0	0	9	9
5	1	79	



Locust St

Cars	Trucks	Cyclists	Totals
22	0	1	23
293	0	8	301
31	0	0	31
346	0	9	



Elgin St



Cars	Trucks	Cyclists	Totals
93	2	6	101

Peds Cross: 8

West Peds: 33

West Entering: 85

West Leg Total: 476

Cars	77
Trucks	0
Cyclists	1
Totals	78



Cars	66	80	41	187
Trucks	0	0	1	1
Cyclists	0	1	1	2
Totals	66	81	43	

Peds Cross: 8

South Peds: 73

South Entering: 190

South Leg Total: 268

Comments

Elgin St @ Locust St

Total Count Diagram

Municipality: Burlington
Site #: 0000000008
Intersection: Elgin St & Locust St
TFR File #: 8
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Non-Signalized Intersection ****

Major Road: Elgin St runs W/E

North Leg Total: 655
 North Entering: 277
 North Peds: 93
 Peds Cross: \times

	Cyclists	Trucks	Cars	Totals
0	2	1	3	
0	0	2	2	
64	181	27	272	
Totals	64	183	30	

Cyclists 7
 Trucks 5
 Cars 366
 Totals 378

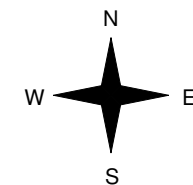
East Leg Total: 1286
 East Entering: 778
 East Peds: 117
 Peds Cross: \times

Cyclists	Trucks	Cars	Totals
13	6	771	790



Elgin St

Cyclists	Trucks	Cars	Totals
2	1	84	87
14	2	302	318
0	0	87	87
16	3	473	



Locust St

Cars	Trucks	Cyclists	Totals
46	1	2	49
591	5	13	609
115	1	4	120
752	7	19	

Elgin St



Cars	Trucks	Cyclists	Totals
484	6	18	508

Peds Cross: \times
 West Peds: 107
 West Entering: 492
 West Leg Total: 1282

	Cars	Trucks	Cyclists	Totals
383	1	6	390	
116	1	0	117	
236	3	3	242	
155	2	3	160	
507	6	6		

Peds Cross: \times
 South Peds: 195
 South Entering: 519
 South Leg Total: 909

Comments

James St @ Elizabeth St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington
Site #: 0000000010
Intersection: James St & Elizabeth St
TFR File #: 10
Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: James St runs W/E

North Leg Total: 41
 North Entering: 22
 North Peds: 7
 Peds Cross: \bowtie

Cyclists	0	0	0	0
Trucks	0	0	0	0
Cars	8	9	5	22
Totals	8	9	5	



Cyclists	0
Trucks	2
Cars	17
Totals	19

East Leg Total: 489
 East Entering: 191
 East Peds: 6
 Peds Cross: \bowtie

Cyclists	4
Trucks	7
Cars	162
Totals	173

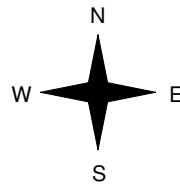


Elizabeth St

Cars	1	0	0	1
Trucks	152	6	4	162
Cyclists	26	2	0	28
Totals	179	8	4	



James St



Cyclists	0
Trucks	2
Cars	4
Totals	6
Cyclists	0
Trucks	12
Cars	248
Totals	260
Cyclists	0
Trucks	4
Cars	26
Totals	30
Cyclists	0
Trucks	18
Cars	278
Totals	296



Elizabeth St

James St



Cars	286
Trucks <td>12</td>	12
Cyclists <td>0</td>	0
Totals	298

Peds Cross: \bowtie
 West Peds: 17
 West Entering: 296
 West Leg Total: 469

Cars	61
Trucks	6
Cyclists	0
Totals	67



Cars	2	12	33	47
Trucks	1	0	0	1
Cyclists	0	0	0	0
Totals	3	12	33	

Peds Cross: \bowtie
 South Peds: 2
 South Entering: 48
 South Leg Total: 115

Comments

James St @ Elizabeth St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Burlington

Site #: 0000000010

Intersection: James St & Elizabeth St

TFR File #: 10

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: James St runs W/E

North Leg Total: 80

North Entering: 31

North Peds: 13

Peds Cross: 8

Cyclists	0	2	0	2
Trucks	0	0	0	0
Cars	4	20	5	29
Totals	4	22	5	



Cyclists 1

Trucks 0

Cars 48

Totals 49

East Leg Total: 952

East Entering: 718

East Peds: 13

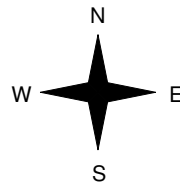
Peds Cross: 8

Cyclists	Trucks	Cars	Totals
5	7	644	656



James St

Cyclists	Trucks	Cars	Totals
0	0	6	6
3	5	168	176
0	2	36	38
3	7	210	



Elizabeth St

Elizabeth St

Cars	Trucks	Cyclists	Totals
5	0	0	5
616	7	3	626
86	1	0	87
707	8	3	



James St



Cars	Trucks	Cyclists	Totals
225	6	3	234

Peds Cross: 8

West Peds: 7

West Entering: 220

West Leg Total: 876

Cars	142
Trucks	3
Cyclists	2
Totals	147



Cars	24	37	52	113
Trucks	0	0	1	1
Cyclists	2	1	0	3
Totals	26	38	53	

Peds Cross: 8

South Peds: 16

South Entering: 117

South Leg Total: 264

Comments

James St @ Elizabeth St

Total Count Diagram

Municipality: Burlington
Site #: 0000000010
Intersection: James St & Elizabeth St
TFR File #: 10
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: James St runs W/E

North Leg Total: 223
 North Entering: 109
 North Peds: 37
 Peds Cross: \bowtie

	Cyclists	1	2	1	4
Trucks	0	1	0	1	
Cars	26	61	17	104	
Totals	27	64	18		

	Cyclists	3
Trucks	2	
Cars	109	
Totals	114	

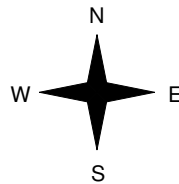
East Leg Total: 2589
 East Entering: 1601
 East Peds: 52
 Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
12	28	1428	1468



James St

Cyclists	Trucks	Cars	Totals
1	2	15	18
10	32	784	826
2	11	114	127
13	45	913	



Elizabeth St

Cars	Trucks	Cyclists	Totals
18	0	0	18
1350	27	9	1386
192	5	0	197
1560	32	9	

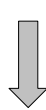
James St



Cars	Trucks	Cyclists	Totals
941	34	13	988

Peds Cross: \bowtie
 West Peds: 47
 West Entering: 971
 West Leg Total: 2439

	Cars	367
Trucks	17	
Cyclists	4	
Totals	388	



	Cars	52	76	140	268
Trucks	1	0	2	3	
Cyclists	2	2	2	6	
Totals	55	78	144		

Peds Cross: \bowtie
 South Peds: 40
 South Entering: 277
 South Leg Total: 665

Comments

James St @ Pearl St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington

Site #: 0000000011

Intersection: James St & Pearl St

TFR File #: 11

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: James St runs W/E

North Leg Total: 76

North Entering: 46

North Peds: 10

Peds Cross: \times

Cyclists	1	0	0	1
Trucks	0	0	0	0
Cars	4	27	14	45
Totals	5	27	14	



Cyclists 0

Trucks 1

Cars 29

Totals 30

East Leg Total: 566

East Entering: 274

East Peds: 4

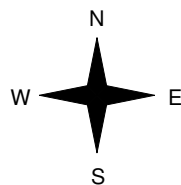
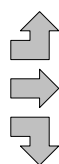
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
5	8	182	195



James St

Cyclists	Trucks	Cars	Totals
0	0	9	9
0	11	243	254
0	1	29	30
0	12	281	



Pearl St

Cars	Trucks	Cyclists	Totals
9	0	0	9
175	8	4	187
78	0	0	78
262	8	4	

James St



Cars	Trucks	Cyclists	Totals
281	11	0	292

Peds Cross: \times

West Peds: 10

West Entering: 293

West Leg Total: 488

Cars	134
Trucks	1
Cyclists	0
Totals	135



Cars	3	11	24	38
Trucks	0	1	0	1
Cyclists	0	0	0	0
Totals	3	12	24	

Peds Cross: \times

South Peds: 2

South Entering: 39

South Leg Total: 174

Comments

James St @ Pearl St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Burlington

Site #: 0000000011

Intersection: James St & Pearl St

TFR File #: 11

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: James St runs W/E

North Leg Total: 111

North Entering: 43

North Peds: 14

Peds Cross: \times

Cyclists	0	1	0	1
Trucks	0	0	1	1
Cars	8	27	6	41
Totals	8	28	7	



Cyclists 0

Trucks 1

Cars 67

Totals 68

East Leg Total: 1067

East Entering: 804

East Peds: 3

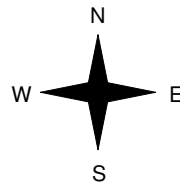
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
1	7	713	721



James St

Cyclists	Trucks	Cars	Totals
0	0	8	8
3	7	199	209
0	1	17	18
3	8	224	



Pearl St

Cars	Trucks	Cyclists	Totals
19	0	0	19
678	7	1	686
99	0	0	99
796	7	1	

James St



Cars	Trucks	Cyclists	Totals
251	8	4	263

Peds Cross: \times

West Peds: 9

West Entering: 235

West Leg Total: 956

Cars	143	Cars	27	40	46	113
Trucks	1	Trucks	0	1	0	1
Cyclists	1	Cyclists	0	0	1	1
Totals	145	Totals	27	41	47	



Peds Cross: \times

South Peds: 6

South Entering: 115

South Leg Total: 260

Comments

James St @ Pearl St

Total Count Diagram

Municipality: Burlington
Site #: 0000000011
Intersection: James St & Pearl St
TFR File #: 11
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Non-Signalized Intersection ****

Major Road: James St runs W/E

North Leg Total: 346
 North Entering: 182
 North Peds: 36
 Peds Cross: \nless

Cyclists	1	4	1	6
Trucks	0	1	1	2
Cars	30	97	47	174
Totals	31	102	49	



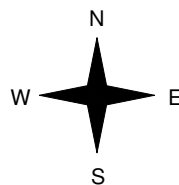
Cyclists	1
Trucks	3
Cars	160
Totals	164

East Leg Total: 2930
 East Entering: 1876
 East Peds: 17
 Peds Cross: \nless

Cyclists	Trucks	Cars	Totals
10	32	1579	1621



James St



Cyclists	Trucks	Cars	Totals
1	1	34	36
12	31	835	878
0	2	79	81
13	34	948	



Pearl St



Cars	Trucks	Cyclists	Totals
42	0	0	42
1498	32	9	1539
295	0	0	295
1835	32	9	

James St



Cars	Trucks	Cyclists	Totals
1007	32	15	1054

Peds Cross: \nless
 West Peds: 37
 West Entering: 995
 West Leg Total: 2616

Cars	471
Trucks	3
Cyclists	4
Totals	478



Cars	51	84	125	260
Trucks	0	2	0	2
Cyclists	0	0	2	2
Totals	51	86	127	

Peds Cross: \nless
 South Peds: 22
 South Entering: 264
 South Leg Total: 742

Comments

Lakeshore Rd @ Elizabeth St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Burlington

Site #: 0000000014

Intersection: Lakeshore Rd & Elizabeth St

TFR File #: 14

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Lakeshore Rd runs W/E

North Leg Total: 77

North Entering: 46

North Peds: 14

Peds Cross: \times

Cyclists	2	0	0	2
Trucks	3	0	2	5
Cars	27	0	12	39
Totals	32	0	14	



Cyclists 1

Trucks 0

Cars 30

Totals 31

East Leg Total: 1556

East Entering: 558

East Peds: 5

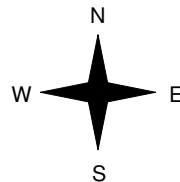
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
10	19	555	584



Lakeshore Rd

Cyclists	Trucks	Cars	Totals
0	0	23	23
7	35	942	984
0	0	0	0
7	35	965	



Elizabeth St

Cars	Trucks	Cyclists	Totals
7	0	0	7
525	16	8	549
1	1	0	2
533	17	8	



Lakeshore Rd



Cars	Trucks	Cyclists	Totals
954	37	7	998

Peds Cross: \times

West Peds: 3

West Entering: 1007

West Leg Total: 1591

Cars	1
Trucks	1
Cyclists	0
Totals	2



Cars	3	0	0	3
Trucks	0	0	0	0
Cyclists	0	1	0	1
Totals	3	1	0	

Peds Cross: \times

South Peds: 5

South Entering: 4

South Leg Total: 6

Comments

Lakeshore Rd @ Elizabeth St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Burlington

Site #: 0000000014

Intersection: Lakeshore Rd & Elizabeth St

TFR File #: 14

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Lakeshore Rd runs W/E

North Leg Total: 219

North Entering: 112

North Peds: 42

Peds Cross: \bowtie

Cyclists	3	0	0	3
Trucks	1	0	3	4
Cars	70	1	34	105
Totals	74	1	37	

Cyclists 0

Trucks 2

Cars 105

Totals 107

East Leg Total: 1751

East Entering: 924

East Peds: 5

Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
12	12	927	951

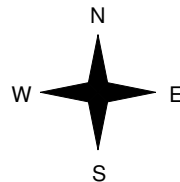


Lakeshore Rd

Cyclists	Trucks	Cars	Totals
0	1	54	55
3	3	782	788
1	0	0	1
4	4	836	



Elizabeth St



Cars	Trucks	Cyclists	Totals
50	1	0	51
847	11	8	866
5	0	2	7
902	12	10	



Lakeshore Rd



Cars	Trucks	Cyclists	Totals
818	6	3	827

Peds Cross: \bowtie

West Peds: 14

West Entering: 844

West Leg Total: 1795

Cars	6	Cars	10	1	2	13
Trucks	0	Trucks	0	0	0	0
Cyclists	3	Cyclists	1	0	0	1
Totals	9	Totals	11	1	2	



Peds Cross: \bowtie

South Peds: 12

South Entering: 14

South Leg Total: 23

Comments

Lakeshore Rd @ Elizabeth St

Total Count Diagram

Municipality: Burlington
Site #: 0000000014
Intersection: Lakeshore Rd & Elizabeth St
TFR File #: 14
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Lakeshore Rd runs W/E

North Leg Total: 596
 North Entering: 351
 North Peds: 115
 Peds Cross: \nlessgtr

Cyclists	6	2	0	8
Trucks	9	0	11	20
Cars	217	3	103	323
Totals	232	5	114	

Cyclists	1
Trucks	5
Cars	239
Totals	245

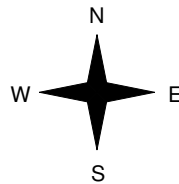
East Leg Total: 6377
 East Entering: 2895
 East Peds: 24
 Peds Cross: \nlessgtr

Cyclists	Trucks	Cars	Totals
29	69	2943	3041



Lakeshore Rd

Cyclists	Trucks	Cars	Totals
0	3	133	136
13	75	3269	3357
1	1	6	8
14	79	3408	



Elizabeth St

Cars	Trucks	Cyclists	Totals
99	2	0	101
2699	59	22	2780
11	1	2	14
2809	62	24	



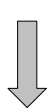
Lakeshore Rd



Cars	Trucks	Cyclists	Totals
3382	87	13	3482

Peds Cross: \nlessgtr
 West Peds: 37
 West Entering: 3501
 West Leg Total: 6542

Cars	20
Trucks	2
Cyclists	5
Totals	27



Cars	27	7	10	44
Trucks	1	0	1	2
Cyclists	1	1	0	2
Totals	29	8	11	

Peds Cross: \nlessgtr
 South Peds: 31
 South Entering: 48
 South Leg Total: 75

Comments

Lakeshore Rd @ Locust St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Burlington
Site #: 0000000009
Intersection: Lakeshore Rd & Locust St
TFR File #: 9
Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Lakeshore Rd runs W/E

North Leg Total: 114

North Entering: 22

North Peds: 15

Peds Cross: \times

	Cyclists	Trucks	Cars	Totals
0	0	1	5	6
0	1	21	21	22
16	5	21	21	21
16	6	21	21	21



Cyclists 1

Trucks 4

Cars 87

Totals 92

East Leg Total: 1795

East Entering: 708

East Peds: 11

Peds Cross: \times

Cyclists	Trucks	Cars	Totals
10	20	652	682

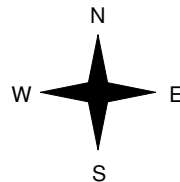


Lakeshore Rd

Cyclists	Trucks	Cars	Totals
0	0	50	50
7	45	1029	1081
7	45	1079	1081



Locust St



Cars	Trucks	Cyclists	Totals
37	4	1	42
636	20	10	666
673	24	11	666



Lakeshore Rd



Cars	Trucks	Cyclists	Totals
1034	46	7	1087

Peds Cross: \times
 West Peds: 0
 West Entering: 1131
 West Leg Total: 1813

Comments

Lakeshore Rd @ Locust St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Burlington

Site #: 0000000009

Intersection: Lakeshore Rd & Locust St

TFR File #: 9

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Lakeshore Rd runs W/E

North Leg Total: 151

North Entering: 59

North Peds: 47

Peds Cross: \times

	Cyclists	Trucks	Cars	Totals
0	0	0	0	0
0	0	0	0	0
57	2	59	59	59
Totals	57	2		

	Cyclists	Trucks	Cars	Totals
2	0	90	92	92
0	0	0	0	0
90	2	92	92	92
Totals	92	0		

East Leg Total: 2091

East Entering: 1178

East Peds: 16

Peds Cross: \times

Cyclists	Trucks	Cars	Totals
11	18	1143	1172

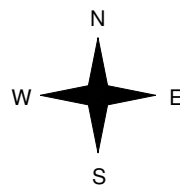


Lakeshore Rd

Cyclists	Trucks	Cars	Totals
2	0	27	29
3	10	898	911
5	10	925	925



Locust St



Cars	Trucks	Cyclists	Totals
63	0	0	63
1086	18	11	1115
1149	18	11	1178



Lakeshore Rd



Cars	Trucks	Cyclists	Totals
900	10	3	913

Peds Cross: \times

West Peds: 0

West Entering: 940

West Leg Total: 2112

Comments

Lakeshore Rd @ Locust St

Total Count Diagram

Municipality: Burlington
Site #: 0000000009
Intersection: Lakeshore Rd & Locust St
TFR File #: 9
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Non-Signalized Intersection ****

Major Road: Lakeshore Rd runs W/E

North Leg Total: 562
 North Entering: 206
 North Peds: 92
 Peds Cross: \times

	Cyclists	Trucks	Cars	Totals
North	2	1	176	179
East	0	1	26	27
South	2	2	202	204
West	2	2	202	204



Cyclists 3
 Trucks 7
 Cars 346
 Totals 356

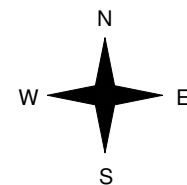
East Leg Total: 7435
 East Entering: 3631
 East Peds: 52
 Peds Cross: \times

Cyclists	Trucks	Cars	Totals
30	80	3498	3608



Lakeshore Rd

Cyclists	Trucks	Cars	Totals
2	2	150	154
15	107	3655	3777
17	109	3805	



Locust St



Cars	Trucks	Cyclists	Totals
196	5	1	202
3322	79	28	3429
3518	84	29	

Lakeshore Rd



Cars	Trucks	Cyclists	Totals
3681	108	15	3804

Peds Cross: \times
 West Peds: 0
 West Entering: 3931
 West Leg Total: 7539

Comments

Lakeshore Rd @ Martha St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Burlington

Site #: 0000000016

Intersection: Lakeshore Rd & Martha St

TFR File #: 16

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Lakeshore Rd runs W/E

North Leg Total: 61

North Entering: 30

North Peds: 14

Peds Cross: \times

Cyclists	1	0	0	1
Trucks	1	0	1	2
Cars	14	0	13	27
Totals	16	0	14	



Cyclists 0

Trucks 1

Cars 30

Totals 31

East Leg Total: 1451

East Entering: 509

East Peds: 0

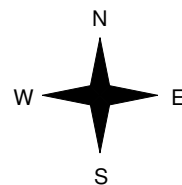
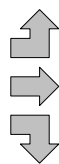
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
7	16	499	522



Lakeshore Rd

Cyclists	Trucks	Cars	Totals
0	1	27	28
5	35	888	928
0	0	3	3
5	36	918	



Driveway

Cars	Trucks	Cyclists	Totals
3	0	0	3
485	15	6	506
0	0	0	0
488	15	6	

Lakeshore Rd



Cars	Trucks	Cyclists	Totals
901	36	5	942

Peds Cross: \times

West Peds: 4

West Entering: 959

West Leg Total: 1481

Cars	3
Trucks	0
Cyclists	0
Totals	3



Cars	0	0	0	0
Trucks	0	0	0	0
Cyclists	0	0	0	0
Totals	0	0	0	0

Peds Cross: \times

South Peds: 1

South Entering: 0

South Leg Total: 3

Comments

Lakeshore Rd @ Martha St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Burlington

Site #: 0000000016

Intersection: Lakeshore Rd & Martha St

TFR File #: 16

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Lakeshore Rd runs W/E

North Leg Total: 103

North Entering: 25

North Peds: 20

Peds Cross: \times

Cyclists	3	0	0	3
Trucks	1	0	0	1
Cars	9	0	12	21
Totals	13	0	12	



Cyclists	0
Trucks	2
Cars	76
Totals	78

East Leg Total: 1604

East Entering: 864

East Peds: 0

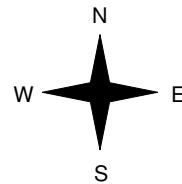
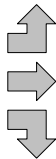
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
8	12	829	849



Lakeshore Rd

Cyclists	Trucks	Cars	Totals
0	2	46	48
6	6	714	726
0	0	0	0
6	8	760	



Driveway

Cars	Trucks	Cyclists	Totals
30	0	0	30
818	11	5	834
0	0	0	0
848	11	5	



Lakeshore Rd



Cars	Trucks	Cyclists	Totals
728	6	6	740

Peds Cross: \times
West Peds: 4
West Entering: 774
West Leg Total: 1623

Cars	0
Trucks	0
Cyclists	0
Totals	0



Cars	2	0	2	4
Trucks	0	0	0	0
Cyclists	0	0	0	0
Totals	2	0	2	

Peds Cross: \times
South Peds: 2
South Entering: 4
South Leg Total: 4

Comments

Lakeshore Rd @ Martha St

Total Count Diagram

Municipality: Burlington
Site #: 0000000016
Intersection: Lakeshore Rd & Martha St
TFR File #: 16
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Non-Signalized Intersection ****

Major Road: Lakeshore Rd runs W/E

North Leg Total: 325
 North Entering: 112
 North Peds: 65
 Peds Cross: \nlessgtr

	Cyclists	Trucks	Cars	Totals
North	5	0	0	5
East	2	0	1	3
South	54	1	49	104
Totals	61	1	50	



	Cyclists	Trucks	Cars	Totals
North	1	5	207	213

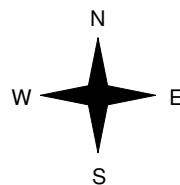
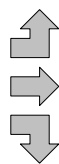
East Leg Total: 5904
 East Entering: 2696
 East Peds: 0
 Peds Cross: \nlessgtr

Cyclists	Trucks	Cars	Totals
20	54	2613	2687



Lakeshore Rd

Cyclists	Trucks	Cars	Totals
1	3	135	139
12	75	3066	3153
0	0	7	7
13	78	3208	



Driveway

Cars	Trucks	Cyclists	Totals
72	2	0	74
2555	52	15	2622
0	0	0	0
2627	54	15	

Lakeshore Rd



Cars	Trucks	Cyclists	Totals
3120	76	12	3208

Peds Cross: \nlessgtr
 West Peds: 9
 West Entering: 3299
 West Leg Total: 5986

	Cars	Trucks	Cyclists	Totals
West	8	0	0	8



	Cars	Trucks	Cyclists	Totals
South	4	0	0	4
East	0	0	0	0
North	5	0	0	5
Totals	9	0	0	

Peds Cross: \nlessgtr
 South Peds: 5
 South Entering: 9
 South Leg Total: 17

Comments

Lakeshore Rd @ Pearl St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Burlington
Site #: 0000000015
Intersection: Lakeshore Rd & Pearl St
TFR File #: 15
Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Lakeshore Rd runs W/E

North Leg Total: 81
 North Entering: 38
 North Peds: 17
 Peds Cross: \times

Cyclists	1	0	0	1
Trucks	0	0	1	1
Cars	27	1	8	36
Totals	28	1	9	



Cyclists	0
Trucks	0
Cars	43
Totals	43

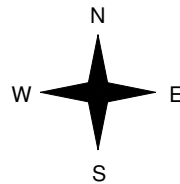
East Leg Total: 1496
 East Entering: 530
 East Peds: 6
 Peds Cross: \times

Cyclists	Trucks	Cars	Totals
7	16	523	546



Lakeshore Rd

Cyclists	Trucks	Cars	Totals
0	0	29	29
7	32	917	956
1	1	16	18
8	33	962	



Old Lakeshore Rd

Cars	Trucks	Cyclists	Totals
14	0	0	14
494	15	6	515
1	0	0	1
509	15	6	



Lakeshore Rd



Cars	Trucks	Cyclists	Totals
926	33	7	966

Peds Cross: \times
 West Peds: 2
 West Entering: 1003
 West Leg Total: 1549

Cars	18
Trucks	1
Cyclists	1
Totals	20



Cars	2	0	1	3
Trucks	1	0	0	1
Cyclists	0	0	0	0
Totals	3	0	1	

Peds Cross: \times
 South Peds: 2
 South Entering: 4
 South Leg Total: 24

Comments

Lakeshore Rd @ Pearl St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Burlington

Site #: 0000000015

Intersection: Lakeshore Rd & Pearl St

TFR File #: 15

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Lakeshore Rd runs W/E

North Leg Total: 213

North Entering: 107

North Peds: 26

Peds Cross: \bowtie

Cyclists	0	1	2	3
Trucks	0	0	1	1
Cars	70	9	24	103
Totals	70	10	27	



Cyclists 0

Trucks 2

Cars 104

Totals 106

East Leg Total: 1630

East Entering: 862

East Peds: 12

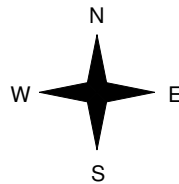
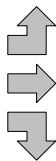
Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
9	11	894	914



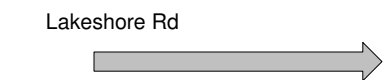
Lakeshore Rd

Cyclists	Trucks	Cars	Totals
0	1	41	42
3	5	727	735
0	0	49	49
3	6	817	



Old Lakeshore Rd

Cars	Trucks	Cyclists	Totals
44	1	0	45
797	10	7	814
2	0	1	3
843	11	8	



Lakeshore Rd

Cars	Trucks	Cyclists	Totals
757	6	5	768

Peds Cross: \bowtie

West Peds: 8

West Entering: 826

West Leg Total: 1740

Cars	60	Cars	27	19	6	52
Trucks	0	Trucks	1	0	0	1
Cyclists	2	Cyclists	2	0	0	2
Totals	62	Totals	30	19	6	



Peds Cross: \bowtie

South Peds: 9

South Entering: 55

South Leg Total: 117

Comments

Lakeshore Rd @ Pearl St

Total Count Diagram

Municipality: Burlington
Site #: 0000000015
Intersection: Lakeshore Rd & Pearl St
TFR File #: 15
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Lakeshore Rd runs W/E

North Leg Total: 583
 North Entering: 300
 North Peds: 81
 Peds Cross: \bowtie

Cyclists	2	2	2	6
Trucks	3	0	2	5
Cars	198	18	73	289
Totals	203	20	77	



Cyclists	0
Trucks	4
Cars	279
Totals	283

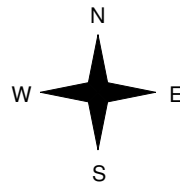
East Leg Total: 6012
 East Entering: 2711
 East Peds: 29
 Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
23	54	2765	2842



Lakeshore Rd

Cyclists	Trucks	Cars	Totals
0	3	133	136
13	74	3125	3212
1	1	112	114
14	78	3370	



Old Lakeshore Rd

Cars	Trucks	Cyclists	Totals
120	1	0	121
2513	49	19	2581
8	0	1	9
2641	50	20	



Lakeshore Rd



Cars	Trucks	Cyclists	Totals
3210	76	15	3301

Peds Cross: \bowtie
 West Peds: 16
 West Entering: 3462
 West Leg Total: 6304

Cars	138
Trucks	1
Cyclists	4
Totals	143



Cars	54	26	12	92
Trucks	2	0	0	2
Cyclists	2	0	0	2
Totals	58	26	12	

Peds Cross: \bowtie
 South Peds: 13
 South Entering: 96
 South Leg Total: 239

Comments

Intersection Name: Lakeshore Rd @ Burlington Ave		TS ID: 130.	Group NO:	IP address: 172.22.40.2
Controller Make: Econolite	Model: ACS/3	Firmware Rev. No:		

Type of Operation 4 Phase Semi-Actuated					
Revision					
NO	Date			Description	Prepared by
	Y	M	D		
2	2015	3	3	Implement timings in Centracs	MA

*- Start From Main Menu

PHASE DESCRIPTION			
Ph1			
Ph2	EB/WB - Lakeshore Rd		
Ph3			
Ph4	NB/SB -Burlington Ave		
Ph5			
Ph6			
Ph7			
Ph8			

CONFIGURATION (PHASE SEQ): PHASE IN USE /EXCLUSIVE PED (MM)	* - 1 - 2
---	-----------

Phase:	1	2	3	4	5	6	7	8
Phase in Use	:		X		X			
Bicycle Min Green	:							
Exclusive PED	:							

CONTROLLER TIMING DATA - VEHICLE TIMINGS (4 available)	* - 2 - 1
--	-----------

Timing Plan:	1	Phase:	1	2	3	4	5	6	7	8
Minimum Green	:			8		8				
Bicycle Min Green	:									
Conditional Service Min. Green	:									
Walk	:			25		10				
Walk 2	:									
Walk MAX	:									
Ped. Clearance	:			15		14				
Ped. Clearance 2	:									
Ped. Clearance MAX	:									
Pedestrians Carry Over	:									
Vehicle Extension	:			3		3				
Vehicle Extension 2	:									
MAX 1	:			50		20				
MAX 2	:			50		20				
MAX 3	:									
Yellow Change	:			4		4				
Red Clearance	:			2		2				

PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS	* - 2 - 8
---	-----------

Phase:	1	2	3	4	5	6	7	8
Lock Detector	:							
Vehicle Recall	:							
Pedestrian Recall	:		X					
MAX Recall	:		X					
Soft Recall	:							
NO REST	:							

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN	* - 3 - 2, - 3 - 3
--	--------------------

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)							
					1	2	3	4	5	6	7	8
1	110	40	1	1		77		33				
2	90	54	1	2		57		33				
3	120	63	1	3		87		33				
10	0	0	1	10		0		0				

CP # 1, 2, 10

Phase:	1	2	3	4	5	6	7	8
Coord Phase	:	X						
Vehicle Recall	:							
Pedestrian Recall *(3-3, 5-2)	:	X						
Recall to MAX Time	:							
Phase Omit	:							
Special Function Outputs	:							

Coordinator Pattern #	Prefer.	Phase							
		1	2	3	4	5	6	7	8
1									
2									

X - select "." deselect

TIME BASE: ACTION PLAN, DAY PLAN

* - 5 - 2, - 5 - 3, - 5 - 4

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	1	07:00	1	1
1	1	2	09:00	2	1
1	1	10	09:30	254	1
1	1	3	15:30	3	1
1	1	10	19:00	254	1
2	2	10	07:00	254	1
3	3	10	08:30	254	1

Schedule 1 = Day Plan 1

Schedule 2 = Day Plan 2

Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)

Day Plan 2 (Saturday)

Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

TIME BASE DATA - TIME OF YEAR EVENTS

* - 5 - 5

Events	Exception Day	MON/ MON	DOW/ DOM	WOM/ Year	Day Plan
New Year's Day	1 Fixed	01	1	0	3
Family Day	2 Float	2	2	3	3
Good Friday	3 Float	04	6	1	3
Victoria Day	4 Float	05	2	3	3
Canada Day	5 Fixed	07	1	0	3
Civic Day	6 Float	08	2	1	3
Labour Day	7 Float	09	2	1	3
Thanksgiving	8 Float	10	2	2	3
Christmas Day	9 Fixed	12	25	0	3

Intersection Name: Lakeshore @ Maple		TS ID: 132	Line No: 1	Model: ACS/3	IP address: 172.22.38.2	Controller Make: Econolite		
Type of Operation: 8 Phase Semi-Actuated								
*-Start from Main Menu								
No	Date			Description	Prepared by EN			
	Y	M	D					
6	2016	11	2	Revert back to original timings				
PHASE DESCRIPTION								
Ph1	WBLT- Lakeshore Road			Ph5	EBLT - Lakeshore Road			
Ph2	EB - Lakeshore Road			Ph6	WB - Lakeshore Road			
Ph3	SBLT - Maple Avenue			Ph7	NBLT - Maple Avenue			
Ph4	NB - Maple Avenue			Ph8	SB - Maple Avenue			
PHASE IN USE/EXCLUSIVE PED (MM) *- 1 - 2								
Phase:	1	2	3	4	5	6	7	8
Phase in Use	X	X	X	X	X	X	X	X
Exclusive PED								
CONTROLLER TIMING DATA - VEHICLE TIMING *- 2 - 1								
Phase:								
Timing Plan: 1	1	2	3	4	5	6	7	8
Minimum Green	6	8	6	8	6	8	6	8
Walk		12		8		12		8
Ped. Clearance		19		24		19		24
Pedestrian Carry Over								
Vehicle Extension	3	3	3	3	3	3	3	3
MAX 1	12	35	12	25	12	35	12	25
MAX 2	12	35	12	25	12	35	12	25
Yellow Change	3	4	3	4	3	4	3	4
Red Clearance	0	2	0	3	0	2	0	3
Phase Minimum:	10	38	10	40	10	38	10	40
PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS *- 2 - 8								
Phase:	1	2	3	4	5	6	7	8
Lock Detector								
Vehicle Recall								
Pedestrian Recall		X				X		
MAX Recall		X				X		
Min Recall								
COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN *- 3 - 2, - 3 - 3								

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)							
					1	2	3	4	5	6	7	8
1	110	25	1	1	10	48	10	42	18	40	10	42
2	100	10	1	2	10	38	10	42	10	38	10	42
3	120	110	1	3	15	49	12	44	15	49	12	44
4	100	44	1	4	10	38	10	42	10	38	10	42
10	0	0	1	10	0	0	0	0	0	0	0	0
TIME BASE: ACTION PLAN, DAY PLAN												
* - 5 - 2, - 5 - 3, - 5 - 4												
Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	Schedule 1 = Day Plan 1 Schedule 2 = Day Plan 2 Schedule 3 = Day Plan 3 Day Plan 1 (Weekday) Day Plan 2 (Saturday) Day Plan 3 (Sunday, Holidays) Action Plan 10 = free (254)						
1	1	1	07:00	1	1							
1	1	2	09:00	2	1							
1	1	3	15:30	3	1							
1	1	4	19:00	4	1							
1	1	10	22:00	254	1							
2	2	1	07:00	1	1							
2	2	10	23:00	254	1							
3	3	1	08:30	1	1							
3	3	10	22:00	254	1							

Special Programming:

TIME BASE DATA - TIME OF YEAR EVENTS	* - 5 - 5
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Events	Exception Day		MON/ MON	DOW/ DOW	WOM/ Year	Day Plan
New Year's Day	1	Fixed	1	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	4	6	1	3
Victoria Day	4	Float	5	2	3	3
Canada Day	5	Fixed	7	1	0	3
Civic Day	6	Float	8	2	1	3
Labour Day	7	Float	9	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Intersection Name: Lakeshore Rd @ Nelson Ave		TS ID: 131	Group NO:	IP address: 172.22.39.2
Controller Make: Econolite	Model: ACS/3	Firmware Rev. No:		

CP # 1, 2, 10	Phase:	1	2	3	4	5	6	7	8
Coord Phase	:		X						
Vehicle Recall	:								
Pedestrian Recall *(3-3, 5-2)	:		X						
Recall to MAX Time	:								
Phase Omit	:								
Special Function Outputs	:								

Coordinator Pattern #	Prefer.	Phase							
		1	2	3	4	5	6	7	8
	1								
	2								

X - select "." deselect

TIME BASE: ACTION PLAN, DAY PLAN	* - 5 - 2, - 5 - 3, - 5 - 4
---	------------------------------------

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	4	06:30	4	1
1	1	1	07:00	1	1
1	1	2	09:00	2	1
1	1	3	15:30	3	1
1	1	4	19:00	4	1
1	1	10	22:00	254	1
2	2	1	07:00	1	1
2	2	10	23:00	254	1
3	3	1	8:30	1	1
3	3	10	22:00	254	1

Schedule 1 = Day Plan 1

Schedule 2 = Day Plan 2

Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)

Day Plan 2 (Saturday)

Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

TIME BASE DATA - TIME OF YEAR EVENTS	* - 5 - 5
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Events	Exception Day		MON/ MON	DOW/ DOM	WOM/ Year	Day Plan
New Year's Day	1	Fixed	01	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	04	6	1	3
Victoria Day	4	Float	05	2	3	3
Canada Day	5	Fixed	07	1	0	3
Civic Day	6	Float	08	2	1	3
Labour Day	7	Float	09	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Maple Ave @ Elgin St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Burlington

Site #: 0000000017

Intersection: Maple Ave & Elgin St

TFR File #: 17

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Maple Ave runs N/S

North Leg Total: 760

North Entering: 341

North Peds: 3

Peds Cross: \nlessgtr

Cyclists	0	0	0	0
Trucks	0	11	1	12
Cars	2	283	44	329
Totals	2	294	45	



Cyclists 1

Trucks 17

Cars 401

Totals 419

East Leg Total: 209

East Entering: 55

East Peds: 20

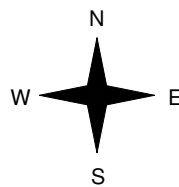
Peds Cross: \nlessgtr

Cyclists	Trucks	Cars	Totals
0	0	2	2



Parking

Cyclists	Trucks	Cars	Totals
0	0	9	9
0	0	1	1
1	0	4	5
1	0	14	



Maple Ave

Cars	Trucks	Cyclists	Totals
17	1	0	18
0	0	0	0
35	1	1	37
52	2	1	

Elgin St



Cars	Trucks	Cyclists	Totals
150	3	1	154

Peds Cross: \nlessgtr

West Peds: 0

West Entering: 15

West Leg Total: 17

Cars	322	Cars	0	375	105	480
Trucks	12	Trucks	0	16	2	18
Cyclists	2	Cyclists	0	1	1	2
Totals	336	Totals	0	392	108	



Peds Cross: \nlessgtr

South Peds: 1

South Entering: 500

South Leg Total: 836

Comments

Maple Ave @ Elgin St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Burlington

Site #: 0000000017

Intersection: Maple Ave & Elgin St

TFR File #: 17

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Maple Ave runs N/S

North Leg Total: 1224

North Entering: 754

North Peds: 7

Peds Cross: \nlessgtr

Cyclists	1	2	0	3
Trucks	0	9	0	9
Cars	4	708	30	742
Totals	5	719	30	



Cyclists 9

Trucks 6

Cars 455

Totals 470

East Leg Total: 346

East Entering: 292

East Peds: 11

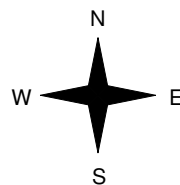
Peds Cross: \nlessgtr

Cyclists	Trucks	Cars	Totals
1	0	7	8



Parking

Cyclists	Trucks	Cars	Totals
0	0	7	7
0	0	1	1
0	1	6	7
0	1	14	



Maple Ave

Cars	Trucks	Cyclists	Totals
81	0	0	81
0	0	0	0
209	1	1	211
290	1	1	

Elgin St



Cars	Trucks	Cyclists	Totals
51	1	2	54

Peds Cross: \nlessgtr

West Peds: 0

West Entering: 15

West Leg Total: 23

Cars	923
Trucks	11
Cyclists	3
Totals	937



Cars	3	367	20	390
Trucks	0	6	1	7
Cyclists	0	9	2	11
Totals	3	382	23	

Peds Cross: \nlessgtr

South Peds: 1

South Entering: 408

South Leg Total: 1345

Comments

Maple Ave @ Elgin St

Total Count Diagram

Municipality: Burlington
Site #: 0000000017
Intersection: Maple Ave & Elgin St
TFR File #: 17
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Non-Signalized Intersection ****

Major Road: Maple Ave runs N/S

North Leg Total: 3603
 North Entering: 1993
 North Peds: 18
 Peds Cross: \nless

	Cyclists	Trucks	Cars	Totals
1	5	0	6	11
0	46	2	48	48
8	1803	128	1939	1939
Totals	9	1854	130	



	Cyclists	Trucks	Cars	Totals
14	42	1554	1610	1610

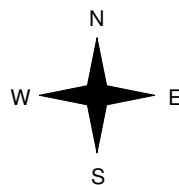
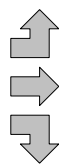
East Leg Total: 939
 East Entering: 584
 East Peds: 79
 Peds Cross: \nless

Cyclists	Trucks	Cars	Totals
1	0	17	18



Parking

Cyclists	Trucks	Cars	Totals
0	0	27	27
1	0	2	3
1	1	17	19
2	1	46	



Maple Ave

Cars	Trucks	Cyclists	Totals
163	3	0	166
2	0	0	2
412	2	2	416
577	5	2	

Elgin St



Cars	Trucks	Cyclists	Totals
341	6	8	355

Peds Cross: \nless
 West Peds: 0
 West Entering: 49
 West Leg Total: 67

	Cars	Trucks	Cyclists	Totals
2232	49	8	2289	2289



	Cars	Trucks	Cyclists	Totals
7	1364	211	1582	1582
0	39	4	43	43
0	14	7	21	21
Totals	7	1417	222	

Peds Cross: \nless
 South Peds: 3
 South Entering: 1646
 South Leg Total: 3935

Comments

Maple Ave @ Ontario St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Burlington

Site #: 0000000018

Intersection: Maple Ave & Ontario St

TFR File #: 18

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Maple Ave runs N/S

North Leg Total: 748

North Entering: 362

North Peds: 22

Peds Cross: \times

Cyclists	0	1	0	1
Trucks	0	12	2	14
Cars	3	247	97	347
Totals	3	260	99	



Cyclists 2

Trucks 18

Cars 366

Totals 386

East Leg Total: 410

East Entering: 170

East Peds: 11

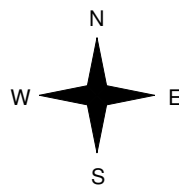
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
0	0	6	6



Parking

Cyclists	Trucks	Cars	Totals
0	0	8	8
0	0	2	2
0	0	1	1
0	0	11	



Maple Ave

Cars	Trucks	Cyclists	Totals
95	4	0	99
2	0	0	2
69	0	0	69
166	4	0	

Ontario St



Cars	Trucks	Cyclists	Totals
236	4	0	240

Peds Cross: \times

West Peds: 15

West Entering: 11

West Leg Total: 17

Cars	317	Cars	1	263	137	401
Trucks	12	Trucks	0	14	2	16
Cyclists	1	Cyclists	0	2	0	2
Totals	330	Totals	1	279	139	



Peds Cross: \times

South Peds: 7

South Entering: 419

South Leg Total: 749

Comments

Maple Ave @ Ontario St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Burlington

Site #: 0000000018

Intersection: Maple Ave & Ontario St

TFR File #: 18

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Maple Ave runs N/S

North Leg Total: 1279

North Entering: 699

North Peds: 19

Peds Cross: \times

Cyclists	0	2	0	2
Trucks	2	5	0	7
Cars	17	532	141	690
Totals	19	539	141	



Cyclists 7

Trucks 7

Cars 566

Totals 580

East Leg Total: 617

East Entering: 403

East Peds: 13

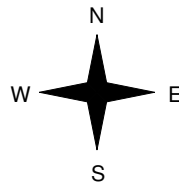
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
0	2	20	22



Parking

Cyclists	Trucks	Cars	Totals
0	0	3	3
0	0	1	1
0	1	0	1
0	1	4	



Maple Ave



Cars	Trucks	Cyclists	Totals
181	1	2	184
3	0	0	3
214	1	1	216
398	2	3	

Ontario St



Cars	Trucks	Cyclists	Totals
212	0	2	214

Peds Cross: \times

West Peds: 17

West Entering: 5

West Leg Total: 27

Cars	746
Trucks	7
Cyclists	3
Totals	756



Cars	0	382	70	452
Trucks	0	6	0	6
Cyclists	0	5	2	7
Totals	0	393	72	

Peds Cross: \times

South Peds: 14

South Entering: 465

South Leg Total: 1221

Comments

Maple Ave @ Ontario St

Total Count Diagram

Municipality: Burlington
Site #: 0000000018
Intersection: Maple Ave & Ontario St
TFR File #: 18
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Maple Ave runs N/S

North Leg Total: 3818
 North Entering: 2017
 North Peds: 66
 Peds Cross: \bowtie

	Cyclists	0	7	1	8
Trucks	3	41	5	49	
Cars	26	1484	450	1960	
Totals	29	1532	456		



	Cyclists	14
Trucks	45	
Cars	1742	
Totals	1801	

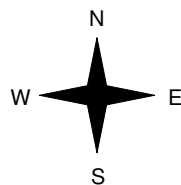
East Leg Total: 1792
 East Entering: 995
 East Peds: 61
 Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
0	3	37	40



Parking

Cyclists	Trucks	Cars	Totals
0	0	16	16
0	0	7	7
0	1	3	4
0	1	26	



Maple Ave

Cars	Trucks	Cyclists	Totals
496	7	2	505
7	0	0	7
477	5	1	483
980	12	3	

Ontario St



Cars	Trucks	Cyclists	Totals
785	9	3	797

Peds Cross: \bowtie
 West Peds: 51
 West Entering: 27
 West Leg Total: 67

	Cars	1964
Trucks	47	
Cyclists	8	
Totals	2019	



	Cars	4	1230	328	1562
Trucks	0	38	4	42	
Cyclists	0	12	2	14	
Totals	4	1280	334		

Peds Cross: \bowtie
 South Peds: 28
 South Entering: 1618
 South Leg Total: 3637

Comments

Intersection Name: Maple Avenue @ Ontario St	TS ID: 137	Line No: 3	Model: ACS/3	IP address: 172.22.53.2	Controller Make: Econolite
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Type of Operation: 8 Phase Semi-Actuated

*-Start from Main Menu

No	Date			Description	Prepared by BP
	Y	M	D		
1					
2	2017	8	30	Upgraded controller to 8 phase	

PHASE DESCRIPTION

Ph1		Ph5	
Ph2	NB - Maple Avenue	Ph6	SB - Maple Avenue
Ph3		Ph7	
Ph4	EB - Ontario Street	Ph8	WB - Ontario Street

CONFIGURATION (PHASE SEQ): PHASE IN USE/EXCLUSIVE PED (MM)

*- 1 - 2

Phase:	1	2	3	4	5	6	7	8
Phase in Use		X		X		X		X
Exclusive PED								

CONTROLLER TIMING DATA - VEHICLE TIMING

*- 2 - 1

	Phase:							
Timing Plan: 1	1	2	3	4	5	6	7	8
Minimum Green		8		8		8		8
Walk		20		8		20		8
Ped. Clearance		7		16		7		16
Pedestrian Carry Over								
Vehicle Extension		3		5		3		5
MAX 1		35		25		35		25
MAX 2		35		25		35		25
Yellow Change		4		4		4		4
Red Clearance		3		3		3		3
Phase Minimum:	1	35	1	32	1	35	1	32

PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS

*- 2 - 8

Phase:	1	2	3	4	5	6	7	8
Lock Detector								
Vehicle Recall								
Pedestrian Recall		X				X		
MAX Recall		X				X		
Min Recall								

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN													* - 3 - 2, - 3 - 3	
Coordinator	Cycle	Offset (sec)	Timing Plan	Split	Phases (sec)									
					1	2	3	4	5	6	7	8		
3	80	65	1	3		46		34		46		34		
10	0	0	1	10		0		0		0		0		
TIME BASE: ACTION PLAN, DAY PLAN													* - 5 - 2, - 5 - 3, -5 - 4	
Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	Schedule 1 = Day Plan 1 Schedule 2 = Day Plan 2 Schedule 3 = Day Plan 3 Day Plan 1 (Weekday) Day Plan 2 (Saturday) Day Plan 3 (Sunday, Holidays) Action Plan 10 = free (254)								
1	1	10	00:00	254	1									
1	1	3	15:30	3	1									
1	1	10	18:00	254	1									
2	2	3	08:00	3	1									
2	2	10	19:00	254	1									
3	3	3	09:00	3	1									
3	3	10	19:00	254	1									

TIME BASE DATA - TIME OF YEAR EVENTS * - 5 - 5

Intersection Name: New St @ Martha St		TS ID: 214	Line No: 2	Model: ACS/3	IP address: 172.22.157.1	Controller Make: Econolite		
Type of Operation: 8 Phase Semi-Actuated								
*-Start from Main Menu								
No	Date			Description	Prepared by BP			
	Y	M	D					
3	2016	9	20	Timings reverted back to orginial				
PHASE DESCRIPTION								
Ph1				Ph5				
Ph2	EB - New Street			Ph6	WB - New Street			
Ph3				Ph7				
Ph4				Ph8	SB - Martha Street			
PHASE IN USE/EXCLUSIVE PED (MM) *- 1 - 2								
Phase:	1	2	3	4	5	6	7	8
Phase in Use		X				X		X
Exclusive PED								
CONTROLLER TIMING DATA - VEHICLE TIMING *- 2 - 1								
Phase:								
Timing Plan: 1	1	2	3	4	5	6	7	8
Minimum Green		8				8		8
Walk		25				25		8
Ped. Clearance		7				7		12
Pedestrian Carry Over								
Vehicle Extension		3				3		3
MAX 1		35				35		25
MAX 2		35				35		25
Yellow Change		4				4		3
Red Clearance		2				2		2
Phase Minimum:	1	39	1	1	1	39	1	26
PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS *- 2 - 8								
Phase:	1	2	3	4	5	6	7	8
Lock Detector								
Vehicle Recall								
Pedestrian Recall		X				X		
MAX Recall		X				X		
Min Recall								
COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN *- 3 - 2, - 3 - 3								

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)							
					1	2	3	4	5	6	7	8
1	70	41	1	1		40				40		30
2	70	41	1	2		40				40		30
3	90	42	1	3		60				60		30
4	70	58	1	4		40				40		30
10	0	0	1	10		0				0		0
TIME BASE: ACTION PLAN, DAY PLAN * - 5 - 2, - 5 - 3, -5 - 4												
Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	Schedule 1 = Day Plan 1 Schedule 2 = Day Plan 2 Schedule 3 = Day Plan 3 Day Plan 1 (Weekday) Day Plan 2 (Saturday) Day Plan 3 (Sunday, Holidays) Action Plan 10 = free (254)						
1	1	4	06:00	4	1							
1	1	1	07:30	1	1							
1	1	2	09:00	2	1							
1	1	3	15:30	3	1							
1	1	4	19:00	4	1							
1	1	10	21:00	254	1							
2	2	2	08:00	2	1							
2	2	10	21:00	254	1							
3	3	4	08:00	4	1							
3	3	10	21:30	254	1							

Special Programming:

TIME BASE DATA - TIME OF YEAR EVENTS * - 5 - 5
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Events	Exception Day		MON/ MON	DOW/ DOW	WOM/ Year	Day Plan
New Year's Day	1	Fixed	1	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	4	6	1	3
Victoria Day	4	Float	5	2	3	3
Canada Day	5	Fixed	7	1	0	3
Civic Day	6	Float	8	2	1	3
Labour Day	7	Float	9	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Intersection Name: Northshore Blvd @ JBH		TS ID: 133	Line No: 1	Model: ACS/3	IP address: 172.22.37.2	Controller Make: Econolite		
Type of Operation: 8 Phase Semi-Actuated								
*-Start from Main Menu								
No	Date			Description	Prepared by BP			
	Y	M	D					
5	2016	10	18	Timing reverted back to orginial (removal of max recall for Side street)				
PHASE DESCRIPTION								
Ph1	WBLT- Northshore Blvd			Ph5				
Ph2	EB - Northshore Blvd			Ph6	WB - Northshore Blvd			
Ph3				Ph7				
Ph4	NB - JBH			Ph8	SB - Private Driveway Entrance			
PHASE IN USE/EXCLUSIVE PED (MM) *- 1 - 2								
Phase:	1	2	3	4	5	6	7	8
Phase in Use	<u>X</u>	<u>X</u>	<u></u>	<u>X</u>	<u></u>	<u>X</u>	<u></u>	<u>X</u>
Exclusive PED	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>
CONTROLLER TIMING DATA - VEHICLE TIMING *- 2 - 1								
Phase:								
Timing Plan: 1	1	2	3	4	5	6	7	8
Minimum Green	6	8		8		8		8
Walk		10		12		10		12
Ped. Clearance		15		18		15		18
Pedestrian Carry Over								
Vehicle Extension	3	3		3		3		3
MAX 1	10	35		25		35		25
MAX 2	10	35		25		35		25
Yellow Change	4	4		4		4		4
Red Clearance	0	2		3		2		3
Phase Minimum:	11	32	1	38	1	32	1	38
PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS *- 2 - 8								
Phase:	1	2	3	4	5	6	7	8
Lock Detector								
Vehicle Recall								
Pedestrian Recall		X				X		
MAX Recall		X				X		
Min Recall								

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN												* - 3 - 2, - 3 - 3	
Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)								
					1	2	3	4	5	6	7	8	
1	110	5	1	1	11	59		40		70		40	
2	100	94	1	2	11	49		40		60		40	
3	120	116	1	3	11	69		40		80		40	
4	90	7	1	4	13	38		39		38		39	
10	0	0	1	10	0	0		0		0		0	
TIME BASE: ACTION PLAN, DAY PLAN												* - 5 - 2, - 5 - 3, -5 - 4	
Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	Schedule 1 = Day Plan 1 Schedule 2 = Day Plan 2 Schedule 3 = Day Plan 3 Day Plan 1 (Weekday) Day Plan 2 (Saturday) Day Plan 3 (Sunday, Holidays) Action Plan 10 = free (254)							
1	1	4	06:30	4	1								
1	1	1	07:00	1	1								
1	1	2	09:00	2	1								
1	1	3	15:30	3	1								
1	1	4	19:00	4	1								
1	1	10	22:00	254	1								
2	2	1	07:00	4	1								
2	2	10	23:00	254	1								
3	3	1	8:30	1	1								
3	3	10	22:00	254	1								

Special Programming:

TIME BASE DATA - TIME OF YEAR EVENTS * - 5 - 5

Events	Exception Day		MON/ MON	DOW/ DOW	WOM/ Year	Day Plan
New Year's Day	1	Fixed	1	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	4	6	1	3
Victoria Day	4	Float	5	2	3	3
Canada Day	5	Fixed	7	1	0	3
Civic Day	6	Float	8	2	1	3
Labour Day	7	Float	9	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Intersection Name:		TS ID:	Line No:	Model:	IP address:	Controller Make:		
Northshore @ QEW East ramp		134	3	ACS/3	172.22.36.2	Econolite		
Type of Operation: 8 Phase Semi-Actuated								
*-Start from Main Menu								
No	Date			Description	Prepared by EN			
	Y	M	D					
4	2018	8	29	Original timing plan				
PHASE DESCRIPTION								
Ph1				Ph5				
Ph2	EB - Northshore Blvd			Ph6	WB - Northshore Blvd			
Ph3				Ph7				
Ph4	NB - QEW East Ramp			Ph8				
PHASE IN USE/EXCLUSIVE PED (MM) *- 1 - 2								
Phase:	1	2	3	4	5	6	7	8
Phase in Use		X		X		X		
Exclusive PED								
CONTROLLER TIMING DATA - VEHICLE TIMING *- 2 - 1								
Phase:								
Timing Plan: 1	1	2	3	4	5	6	7	8
Minimum Green		8		8		8		
Walk		30				30		
Ped. Clearance		7				7		
Pedestrian Carry Over								
Vehicle Extension		3		3		3		
MAX 1		40		25		40		
MAX 2		40		25		40		
Yellow Change		4		4		4		
Red Clearance		2		3		2		
Phase Minimum:	1	44	1	8	1	44	1	1
PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS *- 2 - 8								
Phase:	1	2	3	4	5	6	7	8
Lock Detector								
Vehicle Recall								
Pedestrian Recall		X				X		
MAX Recall		X				X		
Min Recall								

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN													* - 3 - 2, - 3 - 3			
Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)											
					1	2	3	4	5	6	7	8				
1	95	87	1	1		65		30		65						
2	100	88	1	2		75		25		75						
3	120	108	1	3		95		25		95						
4	90	76	1	4		67		23		67						
10	0	0	1	10		0		0		0						
TIME BASE: ACTION PLAN, DAY PLAN															* - 5 - 2, - 5 - 3, - 5 - 4	
Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	Schedule 1 = Day Plan 1 Schedule 2 = Day Plan 2 Schedule 3 = Day Plan 3 Day Plan 1 (Weekday) Day Plan 2 (Saturday) Day Plan 3 (Sunday, Holidays) Action Plan 10 = free (254)										
1	1	4	06:30	4	1											
1	1	1	07:00	1	1											
1	1	2	09:00	2	1											
1	1	3	15:30	3	1											
1	1	4	19:00	4	1											
1	1	10	22:00	254	1											
2	2	1	07:00	1	1											
2	2	10	23:00	254	1											
3	3	1	8:30	1	1											
3	3	10	22:00	254	1											

Special Programming:

TIME BASE DATA - TIME OF YEAR EVENTS	* - 5 - 5
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Events	Exception Day		MON/ MON	DOW/ DOW	WOM/ Year	Day Plan
New Year's Day	1	Fixed	1	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	4	6	1	3
Victoria Day	4	Float	5	2	3	3
Canada Day	5	Fixed	7	1	0	3
Civic Day	6	Float	8	2	1	3
Labour Day	7	Float	9	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Brant St & Ghent Ave

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington

Site #: 0000200274

Intersection: Brant St & Ghent Ave

TFR File #: 1

Count date: 4-Oct-2017

Weather conditions:

Sunny

Person(s) who counted:

Mira

** Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 1686

North Entering: 872

North Peds: 6

Peds Cross: \times

Cyclists	0	12	0	12
Trucks	4	64	0	68
Cars	99	675	18	792
Totals	103	751	18	



Cyclists 3

Trucks 65

Cars 746

Totals 814

East Leg Total: 132

East Entering: 73

East Peds: 16

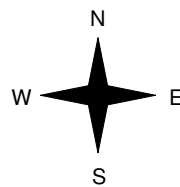
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
1	6	118	125



Ghent Ave

Cyclists	Trucks	Cars	Totals
1	5	125	131
0	1	32	33
0	1	20	21
1	7	177	



Brant St

Cars	Trucks	Cyclists	Totals
41	3	0	44
12	0	0	12
15	1	1	17
68	4	1	

Ghent Ave



Cars	Trucks	Cyclists	Totals
58	1	0	59

Peds Cross: \times

West Peds: 15

West Entering: 185

West Leg Total: 310

Cars 710

Trucks 66

Cyclists 13

Totals 789



Cars 7 580 8 595

Trucks 2 57 0 59

Cyclists 1 2 0 3

Totals 10 639 8

Peds Cross: \times

South Peds: 26

South Entering: 657

South Leg Total: 1446

Comments

Brant St & Ghent Ave

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 11:45:00

To: 12:45:00

Municipality: Burlington
Site #: 0000200274
Intersection: Brant St & Ghent Ave
TFR File #: 1
Count date: 4-Oct-2017

Weather conditions:

Sunny

Person(s) who counted:

Mira

** Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 1758

North Entering: 867

North Peds: 6

Peds Cross: \times

Cyclists	0	1	0	1
Trucks	8	51	2	61
Cars	120	652	33	805
Totals	128	704	35	



Cyclists 9

Trucks 68

Cars 814

Totals 891

East Leg Total: 146

East Entering: 76

East Peds: 11

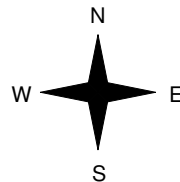
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
1	10	159	170



Ghent Ave

Cyclists	Trucks	Cars	Totals
1	4	93	98
1	0	19	20
1	0	12	13
3	4	124	



Brant St

Cars	Trucks	Cyclists	Totals
33	3	0	36
21	0	1	22
18	0	0	18
72	3	1	

Ghent Ave



Cars	Trucks	Cyclists	Totals
64	3	3	70

Peds Cross: \times

West Peds: 15

West Entering: 131

West Leg Total: 301

Cars	682
Trucks	51
Cyclists	2
Totals	735



Cars	18	688	12	718
Trucks	2	61	1	64
Cyclists	0	8	2	10
Totals	20	757	15	

Peds Cross: \times

South Peds: 14

South Entering: 792

South Leg Total: 1527

Comments

Brant St & Ghent Ave

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Burlington

Site #: 0000200274

Intersection: Brant St & Ghent Ave

TFR File #: 1

Count date: 4-Oct-2017

Weather conditions:

Sunny

Person(s) who counted:

Mira

** Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 1888

North Entering: 952

North Peds: 7

Peds Cross: \times

Cyclists	2	8	0	10
Trucks	17	48	2	67
Cars	190	652	33	875
Totals	209	708	35	



Cyclists	6
Trucks	81
Cars	849
Totals	936

East Leg Total: 164

East Entering: 90

East Peds: 16

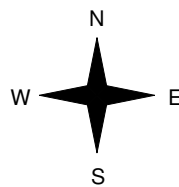
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
4	19	246	269



Ghent Ave

Cyclists	Trucks	Cars	Totals
0	17	123	140
0	0	25	25
0	2	17	19
0	19	165	



Brant St

Cars	Trucks	Cyclists	Totals
21	1	0	22
42	2	1	45
22	1	0	23
85	4	1	

Ghent Ave



Cars	Trucks	Cyclists	Totals
70	2	2	74

Peds Cross: \times

West Peds: 23

West Entering: 184

West Leg Total: 453

Cars	691	Cars	14	705	12	731
Trucks	51	Trucks	0	63	0	63
Cyclists	8	Cyclists	1	6	2	9
Totals	750	Totals	15	774	14	



Peds Cross: \times

South Peds: 12

South Entering: 803

South Leg Total: 1553

Comments

Brant St & Ghent Ave

Total Count Diagram

Municipality: Burlington
Site #: 0000200274
Intersection: Brant St & Ghent Ave
TFR File #: 1
Count date: 4-Oct-2017

Weather conditions:
 Sunny
Person(s) who counted:
 Mira

**** Signalized Intersection ****

Major Road: Brant St runs N/S

North Leg Total: 13075
 North Entering: 6541
 North Peds: 45
 Peds Cross: \bowtie

	Cyclists	Trucks	Cars	Totals
8	44	0	52	
57	395	14	466	
1030	4791	202	6023	
Totals	1095	5230	216	



	Cyclists	Trucks	Cars	Totals
48	491	5995	6534	

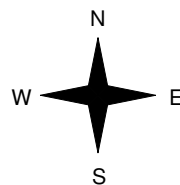
East Leg Total: 1072
 East Entering: 576
 East Peds: 121
 Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
13	72	1356	1441



Ghent Ave

Cyclists	Trucks	Cars	Totals
3	48	823	874
4	8	167	179
2	4	128	134
9	60	1118	



Brant St

Cars	Trucks	Cyclists	Totals
213	15	2	230
211	5	2	218
121	6	1	128
545	26	5	

Ghent Ave



Cars	Trucks	Cyclists	Totals
460	26	10	496

Peds Cross: \bowtie
 West Peds: 141
 West Entering: 1187
 West Leg Total: 2628

	Cars	Trucks	Cyclists	Totals
5040	405	47	5492	



	Cars	Trucks	Cyclists	Totals
115	4959	91	5165	
10	428	4	442	
3	43	6	52	
Totals	128	5430	101	

Peds Cross: \bowtie
 South Peds: 127
 South Entering: 5659
 South Leg Total: 11151

Comments

Brant St & Ghent Ave Traffic Count Summary

Intersection: Brant St & Ghent Ave

Count Date: 4-Oct-2017

Municipality: Burlington

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds		Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	12	405	61	478	7	939	8:00:00	7	451	3	461	23
9:00:00	18	751	103	872	6	1529	9:00:00	10	639	8	657	26
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	36	688	101	825	10	1550	12:00:00	12	702	11	725	11
13:00:00	33	668	133	834	6	1609	13:00:00	19	740	16	775	18
14:00:00	21	649	143	813	1	1544	14:00:00	15	700	16	731	8
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	30	622	154	806	5	1643	16:00:00	35	784	18	837	13
17:00:00	34	690	197	921	7	1733	17:00:00	16	782	14	812	13
18:00:00	32	757	203	992	3	1653	18:00:00	14	632	15	661	15
Totals:	216	5230	1095	6541	45	12200		128	5430	101	5659	127

East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds		Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	6	6	30	42	18	191	8:00:00	113	27	9	149	31
9:00:00	17	12	44	73	16	258	9:00:00	131	33	21	185	15
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	14	20	41	75	13	209	12:00:00	92	23	19	134	24
13:00:00	18	22	36	76	9	198	13:00:00	96	13	13	122	11
14:00:00	17	27	24	68	14	197	14:00:00	92	21	16	129	11
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	16	29	16	61	16	206	16:00:00	104	21	20	145	18
17:00:00	22	43	24	89	19	262	17:00:00	129	25	19	173	20
18:00:00	18	59	15	92	16	242	18:00:00	117	16	17	150	11
Totals:	128	218	230	576	121	1763		874	179	134	1187	141

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	176	213	150	160	145	167	214	212

Pine St @ Elizabeth St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington

Site #: 0000000013

Intersection: Elizabeth St & Pine St

TFR File #: 13

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Elizabeth St runs N/S

North Leg Total: 131

North Entering: 68

North Peds: 22

Peds Cross: \times

Cyclists	1	0	0	1
Trucks	3	1	1	5
Cars	7	43	12	62
Totals	11	44	13	



Cyclists 0

Trucks 2

Cars 61

Totals 63

East Leg Total: 80

East Entering: 36

East Peds: 4

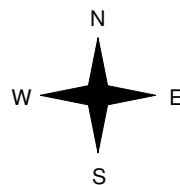
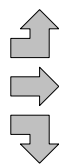
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
2	3	20	25



Pine St

Cyclists	Trucks	Cars	Totals
0	0	17	17
1	0	23	24
0	3	1	4
1	3	41	



Elizabeth St

Cars	Trucks	Cyclists	Totals
11	0	0	11
13	0	1	14
9	0	2	11
33	0	3	

Pine St



Cars	Trucks	Cyclists	Totals
40	1	3	44

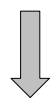
Peds Cross: \times

West Peds: 6

West Entering: 45

West Leg Total: 70

Cars	53
Trucks	4
Cyclists	2
Totals	59



Cars	0	33	5	38
Trucks	0	2	0	2
Cyclists	0	0	2	2
Totals	0	35	7	

Peds Cross: \times

South Peds: 6

South Entering: 42

South Leg Total: 101

Comments

Pine St @ Elizabeth St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Burlington

Site #: 0000000013

Intersection: Elizabeth St & Pine St

TFR File #: 13

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Elizabeth St runs N/S

North Leg Total: 250

North Entering: 126

North Peds: 34

Peds Cross: \times

Cyclists	0	1	0	1
Trucks	1	2	0	3
Cars	18	87	17	122
Totals	19	90	17	



Cyclists 1

Trucks 1

Cars 122

Totals 124

East Leg Total: 149

East Entering: 80

East Peds: 44

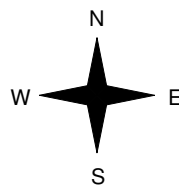
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
2	3	74	79



Pine St

Cyclists	Trucks	Cars	Totals
0	0	20	20
1	0	34	35
0	3	21	24
1	3	75	



Elizabeth St

Cars	Trucks	Cyclists	Totals
28	0	1	29
36	1	2	39
9	0	3	12
73	1	6	

Pine St



Cars	Trucks	Cyclists	Totals
67	0	2	69

Peds Cross: \times

West Peds: 29

West Entering: 79

West Leg Total: 158

Cars	117	Cars	20	74	16	110
Trucks	5	Trucks	1	1	0	2
Cyclists	4	Cyclists	0	0	1	1
Totals	126	Totals	21	75	17	



Peds Cross: \times

South Peds: 71

South Entering: 113

South Leg Total: 239

Comments

Pine St @ Elizabeth St

Total Count Diagram

Municipality: Burlington
Site #: 0000000013
Intersection: Elizabeth St & Pine St
TFR File #: 13
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Non-Signalized Intersection ****

Major Road: Elizabeth St runs N/S

North Leg Total: 659
 North Entering: 360
 North Peds: 114
 Peds Cross: \bowtie

	1	2	0	3
Cyclists	1	2	0	3
Trucks	7	8	2	17
Cars	45	253	42	340
Totals	53	263	44	



	4
Cyclists	4
Trucks	4
Cars	291
Totals	299

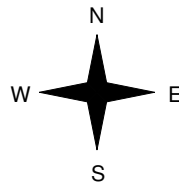
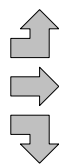
East Leg Total: 400
 East Entering: 220
 East Peds: 116
 Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
8	9	174	191



Pine St

Cyclists	Trucks	Cars	Totals
2	0	52	54
5	1	90	96
0	13	45	58
7	14	187	



Elizabeth St

Cars	Trucks	Cyclists	Totals
69	0	1	70
94	1	7	102
41	0	7	48
204	1	15	

Pine St



Cars	Trucks	Cyclists	Totals
168	4	8	180

Peds Cross: \bowtie
 West Peds: 68
 West Entering: 208
 West Leg Total: 399

	339
Cars	339
Trucks	21
Cyclists	9
Totals	369



	35	170	36	241
Cars	35	170	36	241
Trucks	1	4	1	6
Cyclists	0	1	3	4
Totals	36	175	40	

Peds Cross: \bowtie
 South Peds: 127
 South Entering: 251
 South Leg Total: 620

Comments

Pine St @ John St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington
Site #: 0000000012
Intersection: Pine St & John St
TFR File #: 12
Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Pine St runs W/E

North Leg Total: 67

North Entering: 39

North Peds: 12

Peds Cross: \times

Cyclists	0	0	1	1
Trucks	0	7	2	9
Cars	8	13	8	29
Totals	8	20	11	



Cyclists 1

Trucks 13

Cars 14

Totals 28

East Leg Total: 68

East Entering: 25

East Peds: 2

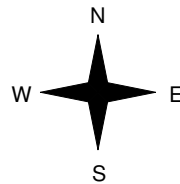
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
2	1	27	30



Pine St

Cyclists	Trucks	Cars	Totals
0	0	5	5
0	1	25	26
0	0	2	2
0	1	32	



John St

Cars	Trucks	Cyclists	Totals
3	2	0	5
16	1	2	19
1	0	0	1
20	3	2	

Pine St



Cars	Trucks	Cyclists	Totals
39	3	1	43

Peds Cross: \times

West Peds: 13

West Entering: 33

West Leg Total: 63

Cars	16
Trucks	7
Cyclists	0
Totals	23



Cars	3	6	6	15
Trucks	0	11	0	11
Cyclists	0	1	0	1
Totals	3	18	6	

Peds Cross: \times

South Peds: 23

South Entering: 27

South Leg Total: 50

Comments

Pine St @ John St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Burlington

Site #: 0000000012

Intersection: Pine St & John St

TFR File #: 12

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Pine St runs W/E

North Leg Total: 116

North Entering: 67

North Peds: 30

Peds Cross: \times

Cyclists	0	0	1	1
Trucks	0	5	3	8
Cars	13	31	14	58
Totals	13	36	18	



Cyclists 2

Trucks 11

Cars 36

Totals 49

East Leg Total: 159

East Entering: 80

East Peds: 50

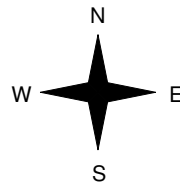
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
2	2	83	87



Pine St

Cyclists	Trucks	Cars	Totals
0	0	5	5
0	0	45	45
0	2	7	9
0	2	57	



John St

Cars	Trucks	Cyclists	Totals
10	1	1	12
57	2	2	61
7	0	0	7
74	3	3	

Pine St



Cars	Trucks	Cyclists	Totals
75	3	1	79

Peds Cross: \times

West Peds: 36

West Entering: 59

West Leg Total: 146

Cars	45
Trucks	7
Cyclists	0
Totals	52



Cars	13	21	16	50
Trucks	0	10	0	10
Cyclists	0	1	0	1
Totals	13	32	16	

Peds Cross: \times

South Peds: 66

South Entering: 61

South Leg Total: 113

Comments

Pine St @ John St

Total Count Diagram

Municipality: Burlington
Site #: 0000000012
Intersection: Pine St & John St
TFR File #: 12
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Non-Signalized Intersection ****

Major Road: Pine St runs W/E

North Leg Total: 316
 North Entering: 178
 North Peds: 84
 Peds Cross: \bowtie

	Cyclists	Trucks	Cars	Totals
Westbound	2	0	3	5
Eastbound	0	21	11	32
Southbound	38	70	33	141
Totals	40	91	47	



	Cyclists	Trucks	Cars	Totals
Northbound	4	45	89	138

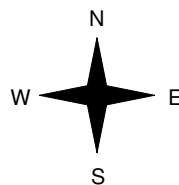
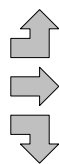
East Leg Total: 397
 East Entering: 194
 East Peds: 80
 Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
11	4	199	214



Pine St

Cyclists	Trucks	Cars	Totals
0	0	18	18
5	2	114	121
0	2	16	18
5	4	148	



Cars	Trucks	Cyclists	Totals
23	5	2	30
135	4	9	148
15	0	1	16
173	9	12	

Pine St



Cars	Trucks	Cyclists	Totals
180	14	9	203

Peds Cross: \bowtie
 West Peds: 70
 West Entering: 157
 West Leg Total: 371

	Cars	Trucks	Cyclists	Totals
Westbound	101	23	1	125



	Cars	Trucks	Cyclists	Totals
Westbound	26	0	0	26
Eastbound	48	40	2	90
Southbound	33	1	1	35
Totals	107	41	3	

Peds Cross: \bowtie
 South Peds: 149
 South Entering: 151
 South Leg Total: 276

Comments

New St & Martha St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington

Site #: 0000201108

Intersection: New St & Martha St

TFR File #: 1

Count date: 1-Nov-2017

Weather conditions:

Cloudy

Person(s) who counted:

Zoran

** Signalized Intersection **

Major Road: New St runs W/E

North Leg Total: 61

North Entering: 15

North Peds: 4

Peds Cross: \bowtie

Cyclists	0	0	0	0
Trucks	0	0	0	0
Cars	5	0	10	15
Totals	5	0	10	



Cyclists 0

Trucks 1

Cars 45

Totals 46

East Leg Total: 724

East Entering: 328

East Peds: 0

Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
0	25	262	287

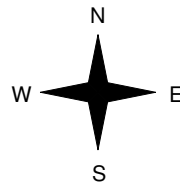


New St

Cyclists	Trucks	Cars	Totals
0	0	0	0
2	33	351	386
0	0	2	2
2	33	353	



Martha St



Martha St

Cars	Trucks	Cyclists	Totals
45	1	0	46
257	25	0	282
0	0	0	0
302	26	0	

New St



Cars	Trucks	Cyclists	Totals
361	33	2	396

Peds Cross: \bowtie

West Peds: 3

West Entering: 388

West Leg Total: 675

Cars	2
Trucks	0
Cyclists	0
Totals	2



Cars	0	0	0	0
Trucks	0	0	0	0
Cyclists	0	0	0	0
Totals	0	0	0	

Peds Cross: \bowtie

South Peds: 7

South Entering: 0

South Leg Total: 2

Comments

New St & Martha St

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 12:30:00

To: 13:30:00

Municipality: Burlington

Site #: 0000201108

Intersection: New St & Martha St

TFR File #: 1

Count date: 1-Nov-2017

Weather conditions:

Cloudy

Person(s) who counted:

Zoran

** Signalized Intersection **

Major Road: New St runs W/E

North Leg Total: 68

North Entering: 7

North Peds: 4

Peds Cross: \bowtie

Cyclists	0	0	0	0
Trucks	0	0	0	0
Cars	1	0	6	7
Totals	1	0	6	



Cyclists 1

Trucks 2

Cars 58

Totals 61

East Leg Total: 695

East Entering: 394

East Peds: 3

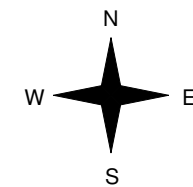
Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
0	30	304	334



New St

Cyclists	Trucks	Cars	Totals
0	0	0	0
1	24	270	295
0	0	0	0
1	24	270	



Martha St

Cars	Trucks	Cyclists	Totals
58	2	1	61
303	30	0	333
0	0	0	0
361	32	1	



New St



Cars	Trucks	Cyclists	Totals
276	24	1	301

Peds Cross: \bowtie

West Peds: 4

West Entering: 295

West Leg Total: 629

Cars	0
Trucks	0
Cyclists	0
Totals	0



Cars	0	0	0	0
Trucks	0	0	0	0
Cyclists	0	0	0	0
Totals	0	0	0	

Peds Cross: \bowtie

South Peds: 5

South Entering: 0

South Leg Total: 0

Comments

New St & Martha St

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: Burlington

Site #: 0000201108

Intersection: New St & Martha St

TFR File #: 1

Count date: 1-Nov-2017

Weather conditions:

Cloudy

Person(s) who counted:

Zoran

** Signalized Intersection **

Major Road: New St runs W/E

North Leg Total: 95

North Entering: 17

North Peds: 5

Peds Cross: \bowtie

Cyclists	0	0	0	0
Trucks	1	0	0	1
Cars	4	0	12	16
Totals	5	0	12	



Cyclists 2

Trucks 2

Cars 74

Totals 78

East Leg Total: 1284

East Entering: 879

East Peds: 0

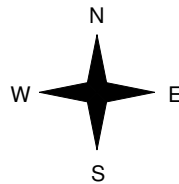
Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
4	62	740	806



New St

Cyclists	Trucks	Cars	Totals
0	0	0	0
1	25	367	393
0	0	0	0
1	25	367	



Martha St

Cars	Trucks	Cyclists	Totals
74	2	2	78
736	61	4	801
0	0	0	0
810	63	6	

New St



Cars	Trucks	Cyclists	Totals
379	25	1	405

Peds Cross: \bowtie

West Peds: 5

West Entering: 393

West Leg Total: 1199

Cars	0
Trucks	0
Cyclists	0
Totals	0



Cars	0	0	0	0
Trucks	0	0	0	0
Cyclists	0	0	0	0
Totals	0	0	0	0

Peds Cross: \bowtie

South Peds: 6

South Entering: 0

South Leg Total: 0

Comments

New St & Martha St

Total Count Diagram

Municipality: Burlington
Site #: 0000201108
Intersection: New St & Martha St
TFR File #: 1
Count date: 1-Nov-2017

Weather conditions:
 Cloudy
Person(s) who counted:
 Zoran

**** Signalized Intersection ****

Major Road: New St runs W/E

North Leg Total: 606
 North Entering: 92
 North Peds: 22
 Peds Cross: \times

Cyclists	1	0	0	1
Trucks	3	0	5	8
Cars	19	0	64	83
Totals	23	0	69	

Cyclists	7
Trucks	26
Cars	481
Totals	514

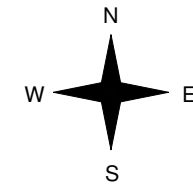
East Leg Total: 6525
 East Entering: 3940
 East Peds: 7
 Peds Cross: \times

Cyclists	Trucks	Cars	Totals
7	279	3163	3449



New St

Cyclists	Trucks	Cars	Totals
0	0	0	0
6	189	2321	2516
0	0	4	4
6	189	2325	



Martha St

Cars	Trucks	Cyclists	Totals
481	26	7	514
3144	276	6	3426
0	0	0	0
3625	302	13	

New St



Cars	Trucks	Cyclists	Totals
2385	194	6	2585

Peds Cross: \times
 West Peds: 32
 West Entering: 2520
 West Leg Total: 5969

Cars	4
Trucks	0
Cyclists	0
Totals	4



Cars	0	0	0	0
Trucks	0	0	0	0
Cyclists	0	0	0	0
Totals	0	0	0	

Peds Cross: \times
 South Peds: 47
 South Entering: 0
 South Leg Total: 4

Comments

New St & Martha St Traffic Count Summary

Intersection: New St & Martha St

Count Date: 1-Nov-2017

Municipality: Burlington

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds		Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	4	0	1	5	3	5	8:00:00	0	0	0	0	6
9:00:00	10	0	5	15	4	15	9:00:00	0	0	0	0	7
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	14	0	3	17	2	17	12:00:00	0	0	0	0	3
13:00:00	6	0	0	6	2	6	13:00:00	0	0	0	0	5
14:00:00	5	0	3	8	3	8	14:00:00	0	0	0	0	10
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	7	0	2	9	0	9	16:00:00	0	0	0	0	8
17:00:00	13	0	3	16	1	16	17:00:00	0	0	0	0	3
18:00:00	10	0	6	16	7	16	18:00:00	0	0	0	0	5
Totals:	69	0	23	92	22	92		0	0	0	0	47

East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds		Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	158	34	192	3	498	8:00:00	0	306	0	306	4
9:00:00	0	282	46	328	0	716	9:00:00	0	386	2	388	3
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	0	314	60	374	1	646	12:00:00	0	272	0	272	3
13:00:00	0	351	65	416	1	688	13:00:00	0	272	0	272	1
14:00:00	0	322	59	381	2	672	14:00:00	0	291	0	291	4
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	0	491	91	582	0	893	16:00:00	0	309	2	311	6
17:00:00	0	773	77	850	0	1198	17:00:00	0	348	0	348	6
18:00:00	0	735	82	817	0	1149	18:00:00	0	332	0	332	5
Totals:	0	3426	514	3940	7	6460		0	2516	4	2520	32

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00		14:00	16:00	17:00	18:00
Crossing Values:	11	13	18	8		11	13	19	15

Lakeshore Road @ Maple Ave

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Burlington

Site #: 0000201174

Intersection: Lakeshore Road & Maple Ave

TFR File #: 1

Count date: 2-May-2018

Weather conditions:

Sunny

Person(s) who counted:

Nik

Mira

** Signalized Intersection **

Major Road: Lakeshore Road runs W/E

North Leg Total: 1005

North Entering: 436

North Peds: 35

Peds Cross: \times

Cyclists	0	7	1	8
Trucks	8	3	6	17
Cars	276	92	43	411
Totals	284	102	50	



Cyclists 1

Trucks 46

Cars 522

Totals 569

East Leg Total: 2026

East Entering: 817

East Peds: 61

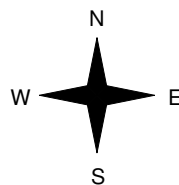
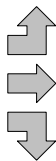
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
6	29	909	944



Lakeshore Road

Cyclists	Trucks	Cars	Totals
0	23	306	329
5	95	743	843
2	11	92	105
7	129	1141	



Maple Ave

Cars	Trucks	Cyclists	Totals
52	7	1	60
608	15	6	629
119	8	1	128
779	30	8	

Lakeshore Road



Cars	Trucks	Cyclists	Totals
1067	134	8	1209

Peds Cross: \times

West Peds: 15

West Entering: 1277

West Leg Total: 2221

Cars	303	Cars	25	164	281	470
Trucks	22	Trucks	6	16	33	55
Cyclists	10	Cyclists	0	0	2	2
Totals	335	Totals	31	180	316	



Peds Cross: \times

South Peds: 35

South Entering: 527

South Leg Total: 862

Comments

Lakeshore Road @ Maple Ave

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 11:15:00

To: 12:15:00

Municipality: Burlington

Site #: 0000201174

Intersection: Lakeshore Road & Maple Ave

TFR File #: 1

Count date: 2-May-2018

Weather conditions:

Sunny

Person(s) who counted:

Nik

Mira

** Signalized Intersection **

Major Road: Lakeshore Road runs W/E

North Leg Total: 803

North Entering: 398

North Peds: 30

Peds Cross: \times

Cyclists	2	8	1	11
Trucks	2	5	4	11
Cars	185	78	113	376
Totals	189	91	118	



Cyclists 9

Trucks 33

Cars 363

Totals 405

East Leg Total: 1772

East Entering: 863

East Peds: 32

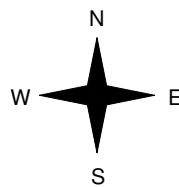
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
12	36	795	843



Lakeshore Road

Cyclists	Trucks	Cars	Totals
0	16	177	193
5	48	530	583
0	8	69	77
5	72	776	



Maple Ave

Cars	Trucks	Cyclists	Totals
98	5	1	104
556	22	9	587
162	6	4	172
816	33	14	



Lakeshore Road



Cars	Trucks	Cyclists	Totals
826	69	14	909

Peds Cross: \times

West Peds: 33

West Entering: 853

West Leg Total: 1696

Cars	309
Trucks	19
Cyclists	12
Totals	340



Cars	54	88	183	325
Trucks	12	12	17	41
Cyclists	1	8	8	17
Totals	67	108	208	

Peds Cross: \times

South Peds: 35

South Entering: 383

South Leg Total: 723

Comments

Lakeshore Road @ Maple Ave

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: Burlington

Site #: 0000201174

Intersection: Lakeshore Road & Maple Ave

TFR File #: 1

Count date: 2-May-2018

Weather conditions:

Sunny

Person(s) who counted:

Nik

Mira

** Signalized Intersection **

Major Road: Lakeshore Road runs W/E

North Leg Total: 1288

North Entering: 914

North Peds: 16

Peds Cross: \bowtie

Cyclists	2	15	0	17
Trucks	2	2	4	8
Cars	562	225	102	889
Totals	566	242	106	



Cyclists 4

Trucks 18

Cars 352

Totals 374

East Leg Total: 2351

East Entering: 1329

East Peds: 47

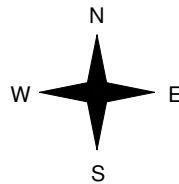
Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
16	23	1691	1730



Lakeshore Road

Cyclists	Trucks	Cars	Totals
0	9	200	209
6	56	673	735
0	15	67	82
6	80	940	



Maple Ave

Cars	Trucks	Cyclists	Totals
30	4	0	34
1042	10	14	1066
221	5	3	229
1293	19	17	



Lakeshore Road



Cars	Trucks	Cyclists	Totals
936	77	9	1022

Peds Cross: \bowtie

West Peds: 23

West Entering: 1026

West Leg Total: 2756

Cars	513	Cars	87	122	161	370
Trucks	22	Trucks	11	5	17	33
Cyclists	18	Cyclists	0	4	3	7
Totals	553	Totals	98	131	181	



Peds Cross: \bowtie

South Peds: 30

South Entering: 410

South Leg Total: 963

Comments

Lakeshore Road @ Maple Ave

Total Count Diagram

Municipality: Burlington
Site #: 0000201174
Intersection: Lakeshore Road & Maple Ave
TFR File #: 1
Count date: 2-May-2018

Weather conditions:
 Sunny
Person(s) who counted:
 Nik
 Mira

**** Signalized Intersection ****

Major Road: Lakeshore Road runs W/E

North Leg Total: 7555
 North Entering: 4246
 North Peds: 208
 Peds Cross: \nlessgtr

Cyclists	12	73	6	91
Trucks	60	27	38	125
Cars	2392	945	693	4030
Totals	2464	1045	737	



Cyclists	33
Trucks	241
Cars	3035
Totals	3309

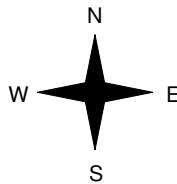
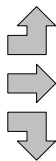
East Leg Total: 15546
 East Entering: 7759
 East Peds: 353
 Peds Cross: \nlessgtr

Cyclists	Trucks	Cars	Totals
110	288	8451	8849



Lakeshore Road

Cyclists	Trucks	Cars	Totals
0	126	1577	1703
42	504	4657	5203
5	81	543	629
47	711	6777	



Maple Ave



Cars	Trucks	Cyclists	Totals
522	39	3	564
5535	147	91	5773
1328	58	36	1422
7385	244	130	

Lakeshore Road



Cars	Trucks	Cyclists	Totals
6959	743	85	7787

Peds Cross: \nlessgtr
 West Peds: 227
 West Entering: 7535
 West Leg Total: 16384

Cars	2816
Trucks	166
Cyclists	114
Totals	3096



Cars	524	936	1609	3069
Trucks	81	76	201	358
Cyclists	7	30	37	74
Totals	612	1042	1847	

Peds Cross: \nlessgtr
 South Peds: 276
 South Entering: 3501
 South Leg Total: 6597

Comments

Lakeshore Road @ Maple Ave

Traffic Count Summary

Intersection: Lakeshore Road & Maple Ave

Count Date: 2-May-2018

Municipality: Burlington

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds		Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	47	86	214	347	21	963	8:00:00	25	179	412	616	17
9:00:00	55	102	279	436	41	945	9:00:00	34	175	300	509	44
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	117	87	186	390	28	769	12:00:00	66	104	209	379	34
13:00:00	91	110	188	389	22	773	13:00:00	71	107	206	384	34
14:00:00	92	102	175	369	22	705	14:00:00	66	97	173	336	32
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	114	130	357	601	31	1026	16:00:00	117	139	169	425	50
17:00:00	117	211	519	847	15	1294	17:00:00	124	116	207	447	42
18:00:00	104	217	546	867	28	1272	18:00:00	109	125	171	405	23
Totals:	737	1045	2464	4246	208	7747		612	1042	1847	3501	276

East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds		Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	98	465	38	601	31	1821	8:00:00	334	800	86	1220	26
9:00:00	128	635	64	827	68	2074	9:00:00	329	825	93	1247	18
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	181	558	93	832	32	1687	12:00:00	184	584	87	855	27
13:00:00	165	568	96	829	41	1611	13:00:00	153	549	80	782	31
14:00:00	176	599	114	889	53	1615	14:00:00	155	493	78	726	33
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	205	920	86	1211	42	2016	16:00:00	162	590	53	805	38
17:00:00	226	980	39	1245	37	2174	17:00:00	188	667	74	929	40
18:00:00	243	1048	34	1325	49	2296	18:00:00	198	695	78	971	14
Totals:	1422	5773	564	7759	353	15294		1703	5203	629	7535	227

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	308	350	346	344	346	450	529	493

North Shore Blvd @ QEW East Ramp

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington

Site #: 0000201394

Intersection: North Shore Blvd & QEW E Ramp

TFR File #: 7

Count date: 11-Apr-2016

Weather conditions:

Overcast/Wet

Person(s) who counted:

Rick W

** Signalized Intersection **

Major Road: North Shore Blvd runs W/E

North Leg Total: 257

North Entering: 0

North Peds: 0

Peds Cross: 0

Cyclists	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	0



Cyclists	0
Trucks	1
Cars	256
Totals	257

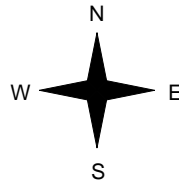
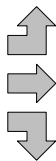
East Leg Total:	2268
East Entering:	882
East Peds:	0
Peds Cross:	0

Cyclists	Trucks	Cars	Totals
0	16	818	834



North Shore Blvd

Cyclists	Trucks	Cars	Totals
0	0	0	0
0	19	480	499
0	1	69	70
0	20	549	



QEW On Ramp

Cars	Trucks	Cyclists	Totals
256	1	0	257
610	15	0	625
0	0	0	0
866	16	0	



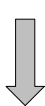
North Shore Blvd



Cars	Trucks	Cyclists	Totals
1349	37	0	1386

Peds Cross: 0
West Peds: 0
West Entering: 569
West Leg Total: 1403

Cars	69	Cars	208	0	869	1077
Trucks	1	Trucks	1	0	18	19
Cyclists	0	Cyclists	0	0	0	0
Totals	70	Totals	209	0	887	



QEW On/Off Ramp

Peds Cross: 0
South Peds: 0
South Entering: 1096
South Leg Total: 1166

Comments

North Shore Blvd @ QEW East Ramp

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 12:45:00

To: 13:45:00

Municipality: Burlington

Site #: 0000201394

Intersection: North Shore Blvd & QEW E Ramp

TFR File #: 7

Count date: 11-Apr-2016

Weather conditions:

Overcast/Wet

Person(s) who counted:

Rick W

** Signalized Intersection **

Major Road: North Shore Blvd runs W/E

North Leg Total: 167

North Entering: 0

North Peds: 1

Peds Cross: \times

Cyclists	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	0



Cyclists	0
Trucks	7
Cars	160
Totals	167

East Leg Total: 1297

East Entering: 675

East Peds: 1

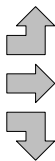
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
0	18	570	588

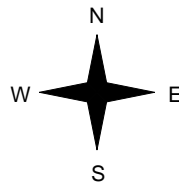


North Shore Blvd

Cyclists	Trucks	Cars	Totals
0	0	0	0
0	7	334	341
0	1	54	55
0	8	388	



QEW On/Off Ramp



Cars	Trucks	Cyclists	Totals
160	7	0	167
491	17	0	508
0	0	0	0
651	24	0	



North Shore Blvd



Cars	Trucks	Cyclists	Totals
604	18	0	622

Peds Cross: \times

West Peds: 1

West Entering: 396

West Leg Total: 984

Cars	54	Cars	79	0	270	349
Trucks	1	Trucks	1	0	11	12
Cyclists	0	Cyclists	0	0	0	0
Totals	55	Totals	80	0	281	



Peds Cross: \times

South Peds: 0

South Entering: 361

South Leg Total: 416

Comments

North Shore Blvd @ QEW East Ramp

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 17:00:00

To: 18:00:00

Municipality: Burlington

Site #: 0000201394

Intersection: North Shore Blvd & QEW E Ramp

TFR File #: 7

Count date: 11-Apr-2016

Weather conditions:

Overcast/Wet

Person(s) who counted:

Rick W

** Signalized Intersection **

Major Road: North Shore Blvd runs W/E

North Leg Total: 285

North Entering: 0

North Peds: 1

Peds Cross: \times

Cyclists	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	0



Cyclists	0
Trucks	5
Cars	280
Totals	285

East Leg Total: 2183

East Entering: 1436

East Peds: 0

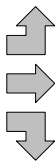
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
1	23	1246	1270

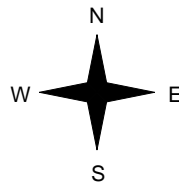


North Shore Blvd

Cyclists	Trucks	Cars	Totals
0	0	0	0
0	11	351	362
0	3	63	66
0	14	414	



QEW On/Off Ramp



QEW On Ramp

Cars	Trucks	Cyclists	Totals
280	5	0	285
1128	22	1	1151
0	0	0	0
1408	27	1	



North Shore Blvd



Cars	Trucks	Cyclists	Totals
726	21	0	747

Peds Cross: \times

West Peds: 0

West Entering: 428

West Leg Total: 1698

Cars	63	Cars	118	0	375	493
Trucks	3	Trucks	1	0	10	11
Cyclists	0	Cyclists	0	0	0	0
Totals	66	Totals	119	0	385	



Peds Cross: \times

South Peds: 0

South Entering: 504

South Leg Total: 570

Comments

North Shore Blvd @ QEW East Ramp

Total Count Diagram

Municipality: Burlington
Site #: 0000201394
Intersection: North Shore Blvd & QEW E Ramp
TFR File #: 7
Count date: 11-Apr-2016

Weather conditions:
 Overcast/Wet
Person(s) who counted:
 Rick W

**** Signalized Intersection ****

Major Road: North Shore Blvd runs W/E

North Leg Total: 1623
 North Entering: 0
 North Peds: 4
 Peds Cross: ∇

Cyclists	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	0



Cyclists	0
Trucks	58
Cars	1565
Totals	1623

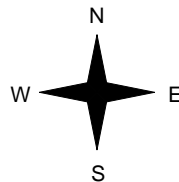
East Leg Total: 12831
 East Entering: 6492
 East Peds: 1
 Peds Cross: ∇

Cyclists	Trucks	Cars	Totals
3	158	5570	5731



North Shore Blvd

Cyclists	Trucks	Cars	Totals
0	0	0	0
3	98	2725	2826
0	16	466	482
3	114	3191	



QEW On Ramp

QEW On/Off Ramp

Cars	Trucks	Cyclists	Totals
1565	58	0	1623
4729	137	3	4869
0	0	0	0
6294	195	3	

North Shore Blvd



Cars	Trucks	Cyclists	Totals
6146	190	3	6339

Peds Cross: ∇
 West Peds: 1
 West Entering: 3308
 West Leg Total: 9039

Cars	466
Trucks	16
Cyclists	0
Totals	482



Cars	841	0	3421	4262
Trucks	21	0	92	113
Cyclists	0	0	0	0
Totals	862	0	3513	

Peds Cross: ∇
 South Peds: 7
 South Entering: 4375
 South Leg Total: 4857

Comments

North Shore Blvd @ QEW East Ramp

Annual Average Daily Traffic Diagram

Total Factor = Monthly Factor(1.02) x Daily Factor(1.02) x 24 Hour Factor(1.85) = 1.924740

Municipality: Burlington
Site #: 0000201394
Intersection: North Shore Blvd & QEW E Ramp
TFR File #: 7
Count date: 11-Apr-2016

Weather conditions:
 Overcast/Wet
Person(s) who counted:
 Rick W

**** Signalized Intersection ****

Major Road: North Shore Blvd runs W/E

North Leg Total: 3124
 North Entering: 0
 North Peds: 8
 Peds Cross: \times

Cyclists	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	0



Cyclists	0
Trucks	112
Cars	3012
Totals	3124

East Leg Total: 24696
 East Entering: 12495
 East Peds: 2
 Peds Cross: \times

Cyclists	Trucks	Cars	Totals
6	304	10721	11031

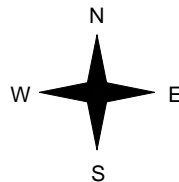


North Shore Blvd

Cyclists	Trucks	Cars	Totals
0	0	0	0
6	189	5245	5439
0	31	897	928
6	219	6142	



QEW On/Off Ramp



Cars	Trucks	Cyclists	Totals
3012	112	0	3124
9102	264	6	9372
0	0	0	0
12114	375	6	



North Shore Blvd



Cars	Trucks	Cyclists	Totals
11829	366	6	12201

Peds Cross: \times
 West Peds: 2
 West Entering: 6367
 West Leg Total: 17398

Cars	897
Trucks	31
Cyclists	0
Totals	928



Cars	1619	0	6585	8203
Trucks	40	0	177	217
Cyclists	0	0	0	0
Totals	1659	0	6762	

Peds Cross: \times
 South Peds: 13
 South Entering: 8421
 South Leg Total: 9348

Comments

Northshore Blvd @ J.B. Hospital

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Burlington

Site #: 0000202689

Intersection: Northshore Blvd & J.B. Hospital

TFR File #: 1

Count date: 9-May-2018

Weather conditions:

Sunny

Person(s) who counted:

Nik

** Signalized Intersection **

Major Road: Northshore Blvd runs W/E

North Leg Total: 42

North Entering: 24

North Peds: 11

Peds Cross: \times

Cyclists	0	0	0	0
Trucks	0	0	0	0
Cars	13	0	11	24
Totals	13	0	11	



Cyclists	0
Trucks	0
Cars	18
Totals	18

East Leg Total: 2386

East Entering: 955

East Peds: 6

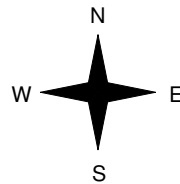
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
10	30	940	980



Northshore Blvd

Cyclists	Trucks	Cars	Totals
0	0	10	10
8	44	1337	1389
0	1	198	199
8	45	1545	



Residential Building

Cars	Trucks	Cyclists	Totals
7	0	0	7
859	30	10	899
48	1	0	49
914	31	10	



Northshore Blvd



Cars	Trucks	Cyclists	Totals
1377	46	8	1431

Peds Cross: \times

West Peds: 3

West Entering: 1598

West Leg Total: 2578

Cars	246
Trucks	2
Cyclists	0
Totals	248



Cars	68	1	29	98
Trucks	0	0	2	2
Cyclists	0	0	0	0
Totals	68	1	31	

Peds Cross: \times

South Peds: 4

South Entering: 100

South Leg Total: 348

Comments

Northshore Blvd @ J.B. Hospital

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 13:00:00

To: 14:00:00

Municipality: Burlington

Site #: 0000202689

Intersection: Northshore Blvd & J.B. Hospital

TFR File #: 1

Count date: 9-May-2018

Weather conditions:

Sunny

Person(s) who counted:

Nik

** Signalized Intersection **

Major Road: Northshore Blvd runs W/E

North Leg Total: 53

North Entering: 16

North Peds: 10

Peds Cross: \times

Cyclists	0	0	0	0
Trucks	0	0	0	0
Cars	2	0	14	16
Totals	2	0	14	



Cyclists 1

Trucks 0

Cars 36

Totals 37

East Leg Total: 1720

East Entering: 941

East Peds: 4

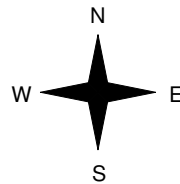
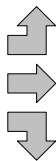
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
13	31	874	918



Northshore Blvd

Cyclists	Trucks	Cars	Totals
0	0	12	12
7	30	687	724
0	0	50	50
7	30	749	



Residential Building

Cars	Trucks	Cyclists	Totals
24	0	1	25
820	30	13	863
53	0	0	53
897	30	14	



Northshore Blvd



Cars	Trucks	Cyclists	Totals
742	30	7	779

Peds Cross: \times

West Peds: 5

West Entering: 786

West Leg Total: 1704

Cars	103
Trucks	0
Cyclists	0
Totals	103



Cars	52	0	41	93
Trucks	1	0	0	1
Cyclists	0	0	0	0
Totals	53	0	41	

Peds Cross: \times

South Peds: 6

South Entering: 94

South Leg Total: 197

Comments

Northshore Blvd @ J.B. Hospital

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Burlington

Site #: 0000202689

Intersection: Northshore Blvd & J.B. Hospital

TFR File #: 1

Count date: 9-May-2018

Weather conditions:

Sunny

Person(s) who counted:

Nik

** Signalized Intersection **

Major Road: Northshore Blvd runs W/E

North Leg Total: 55

North Entering: 23

North Peds: 0

Peds Cross: \times

Cyclists	0	0	0	0
Trucks	1	0	0	1
Cars	7	0	15	22
Totals	8	0	15	



Cyclists 0

Trucks 0

Cars 32

Totals 32

East Leg Total: 2634

East Entering: 1595

East Peds: 5

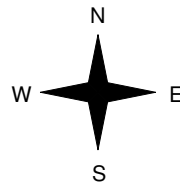
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
20	23	1617	1660



Northshore Blvd

Cyclists	Trucks	Cars	Totals
0	0	16	16
9	8	955	972
0	2	37	39
9	10	1008	



Residential Building

Cars	Trucks	Cyclists	Totals
16	0	0	16
1508	20	18	1546
33	0	0	33
1557	20	18	



Northshore Blvd



Cars	Trucks	Cyclists	Totals
1022	8	9	1039

Peds Cross: \times

West Peds: 5

West Entering: 1027

West Leg Total: 2687

Cars	70
Trucks	2
Cyclists	0
Totals	72



Cars	102	0	52	154
Trucks	2	0	0	2
Cyclists	2	0	0	2
Totals	106	0	52	

Peds Cross: \times

South Peds: 5

South Entering: 158

South Leg Total: 230

Comments

Northshore Blvd @ J.B. Hospital

Total Count Diagram

Municipality: Burlington

Site #: 0000202689

Intersection: Northshore Blvd & J.B. Hospital

TFR File #: 1

Count date: 9-May-2018

Weather conditions:

Sunny

Person(s) who counted:

Nik

**** Signalized Intersection ****

Major Road: Northshore Blvd runs W/E

North Leg Total: 365

North Entering: 155

North Peds: 51

Peds Cross: \bowtie

Cyclists	0	1	0	1
Trucks	3	0	1	4
Cars	47	0	103	150
Totals	50	1	104	



Cyclists	2
Trucks	4
Cars	204
Totals	210

East Leg Total: 16634

East Entering: 8638

East Peds: 59

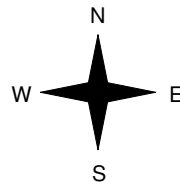
Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
110	273	8598	8981



Northshore Blvd

Cyclists	Trucks	Cars	Totals
0	1	80	81
91	201	7243	7535
0	11	704	715
91	213	8027	



Residential Building

Cars	Trucks	Cyclists	Totals
123	3	2	128
7819	258	105	8182
322	6	0	328
8264	267	107	



Northshore Blvd



Cars	Trucks	Cyclists	Totals
7696	209	91	7996

Peds Cross: \bowtie

West Peds: 61

West Entering: 8331

West Leg Total: 17312

Cars	1026
Trucks	17
Cyclists	1
Totals	1044



Cars	732	1	350	1083
Trucks	12	0	7	19
Cyclists	5	0	0	5
Totals	749	1	357	

Peds Cross: \bowtie

South Peds: 46

South Entering: 1107

South Leg Total: 2151

Comments

Northshore Blvd @ J.B. Hospital

Traffic Count Summary

Intersection: Northshore Blvd & J.B. Hospital

Count Date: 9-May-2018

Municipality: Burlington

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds		Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	8	1	11	20	8	131	8:00:00	83	0	28	111	1
9:00:00	12	0	15	27	7	111	9:00:00	45	1	38	84	4
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	22	0	7	29	8	121	12:00:00	49	0	43	92	12
13:00:00	13	0	2	15	12	123	13:00:00	49	0	59	108	2
14:00:00	14	0	2	16	10	110	14:00:00	53	0	41	94	6
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	13	0	1	14	2	249	16:00:00	182	0	53	235	11
17:00:00	11	0	9	20	4	278	17:00:00	210	0	48	258	7
18:00:00	11	0	3	14	0	139	18:00:00	78	0	47	125	3
Totals:	104	1	50	155	51	1262		749	1	357	1107	46

East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds		Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	30	739	7	776	8	2224	8:00:00	4	1200	244	1448	6
9:00:00	48	843	7	898	7	2454	9:00:00	8	1380	168	1556	3
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	37	717	17	771	16	1553	12:00:00	16	711	55	782	13
13:00:00	49	793	15	857	10	1694	13:00:00	4	780	53	837	5
14:00:00	53	863	25	941	4	1727	14:00:00	12	724	50	786	5
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	54	1304	24	1382	9	2317	16:00:00	14	864	57	935	16
17:00:00	29	1399	18	1446	1	2442	17:00:00	10	932	54	996	9
18:00:00	28	1524	15	1567	4	2558	18:00:00	13	944	34	991	4
Totals:	328	8182	128	8638	59	16969		81	7535	715	8331	61

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	106	68	100	77	76	220	231	97

Brant St @ Blairholm Ave

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington
Site #: 0000000002
Intersection: Brant St & Blairholm Ave
TFR File #: 2
Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 1321
 North Entering: 715
 North Peds: 9
 Peds Cross: \times

	Cyclists	0	10	0	10
Trucks	0	16	2	18	
Cars	0	651	36	687	
Totals	0	677	38		

	Cyclists	2
Trucks	18	
Cars	586	
Totals	606	

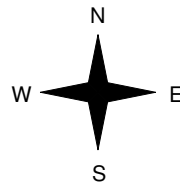
East Leg Total: 153
 East Entering: 99
 East Peds: 28
 Peds Cross: \times

Cyclists	Trucks	Cars	Totals
0	0	0	0



Driveway

Cyclists	Trucks	Cars	Totals
0	0	22	22
0	0	4	4
0	1	6	7
0	1	32	



Brant St



Cars	Trucks	Cyclists	Totals
67	2	0	69
0	0	0	0
29	1	0	30
96	3	0	



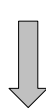
Blairholm Ave



Cars	Trucks	Cyclists	Totals
51	3	0	54

Peds Cross: \times
 West Peds: 90
 West Entering: 33
 West Leg Total: 33

	Cars	686
Trucks	18	
Cyclists	10	
Totals	714	



	Cars	0	497	11	508
Trucks	0	16	1	17	
Cyclists	0	2	0	2	
Totals	0	515	12		

Peds Cross: \times
 South Peds: 52
 South Entering: 527
 South Leg Total: 1241

Comments

Brant St @ Blairholm Ave

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:00:00

To: 17:00:00

Municipality: Burlington

Site #: 0000000002

Intersection: Brant St & Blairholm Ave

TFR File #: 2

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 1582

North Entering: 713

North Peds: 6

Peds Cross: \times

Cyclists	0	6	0	6
Trucks	0	8	1	9
Cars	0	652	46	698
Totals	0	666	47	



Cyclists 9

Trucks 14

Cars 846

Totals 869

East Leg Total: 156

East Entering: 86

East Peds: 22

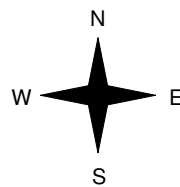
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
0	0	0	0



Driveway

Cyclists	Trucks	Cars	Totals
0	0	42	42
0	0	10	10
0	0	34	34
0	0	86	



Brant St

Cars	Trucks	Cyclists	Totals
66	2	0	68
0	0	0	0
18	0	0	18
84	2	0	

Blairholm Ave



Cars	Trucks	Cyclists	Totals
69	1	0	70

Peds Cross: \times

West Peds: 31

West Entering: 86

West Leg Total: 86

Cars 704

Trucks 8

Cyclists 6

Totals 718



Cars 0 738 13 751

Trucks 0 12 0 12

Cyclists 0 9 0 9

Totals 0 759 13

Peds Cross: \times

South Peds: 11

South Entering: 772

South Leg Total: 1490

Comments

Brant St @ Blairholm Ave

Total Count Diagram

Municipality: Burlington
Site #: 0000000002
Intersection: Brant St & Blairholm Ave
TFR File #: 2
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Brant St runs N/S

North Leg Total: 5294
 North Entering: 2573
 North Peds: 26
 Peds Cross: \times

	Cyclists	Trucks	Cars	Totals
0	31	1	32	
0	55	3	58	
0	2337	146	2483	
0	2423	150		



	Cyclists	Trucks	Cars	Totals
21	55	2645	2721	

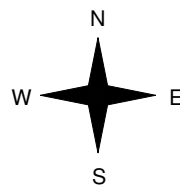
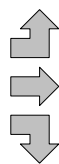
East Leg Total: 558
 East Entering: 341
 East Peds: 89
 Peds Cross: \times

Cyclists	Trucks	Cars	Totals
0	0	0	0



Driveway

Cyclists	Trucks	Cars	Totals
0	0	95	95
0	0	18	18
0	2	53	55
0	2	166	



Brant St

Cars	Trucks	Cyclists	Totals
247	5	1	253
0	0	0	0
85	2	1	88
332	7	2	

Blairholm Ave



Cars	Trucks	Cyclists	Totals
209	5	3	217

Peds Cross: \times
 West Peds: 167
 West Entering: 168
 West Leg Total: 168

Cars	Trucks	Cyclists	Totals
2475	59	32	2566



Cars	Trucks	Cyclists	Totals
0	50	0	50
2303	2	20	2325
2348	2	22	
0	2373	49	

Peds Cross: \times
 South Peds: 96
 South Entering: 2422
 South Leg Total: 4988

Comments

Brant St @ Caroline St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington
Site #: 0000000004
Intersection: Brant St & Caroline St
TFR File #: 4
Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 850

North Entering: 435

North Peds: 16

Peds Cross: \times

Cyclists	1	3	0	4
Trucks	0	12	3	15
Cars	54	289	73	416
Totals	55	304	76	



Cyclists 0

Trucks 19

Cars 396

Totals 415

East Leg Total: 379

East Entering: 173

East Peds: 37

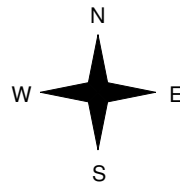
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
1	0	124	125



Caroline St

Cyclists	Trucks	Cars	Totals
0	1	124	125
2	1	106	109
1	0	21	22
3	2	251	



Brant St

Cars	Trucks	Cyclists	Totals
78	4	0	82
64	0	0	64
26	1	0	27
168	5	0	

Caroline St



Cars	Trucks	Cyclists	Totals
200	4	2	206

Peds Cross: \times

West Peds: 28

West Entering: 256

West Leg Total: 381

Cars	336
Trucks	13
Cyclists	4
Totals	353



Cars	6	194	21	221
Trucks	0	14	0	14
Cyclists	0	0	0	0
Totals	6	208	21	

Peds Cross: \times

South Peds: 38

South Entering: 235

South Leg Total: 588

Comments

Brant St @ Caroline St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Burlington
Site #: 0000000004
Intersection: Brant St & Caroline St
TFR File #: 4
Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 1122

North Entering: 516

North Peds: 31

Peds Cross: \bowtie

Cyclists	0	7	0	7
Trucks	0	9	0	9
Cars	50	375	75	500
Totals	50	391	75	

Cyclists	5
Trucks	5
Cars	596
Totals	606

East Leg Total: 517

East Entering: 320

East Peds: 68

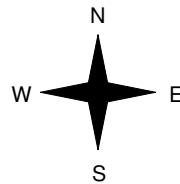
Peds Cross: \bowtie

Cyclists	Trucks	Cars	Totals
4	0	216	220



Caroline St

Cyclists	Trucks	Cars	Totals
0	0	161	161
2	0	104	106
0	0	14	14
2	0	279	



Brant St

Cars	Trucks	Cyclists	Totals
116	0	0	116
149	0	4	153
50	1	0	51
315	1	4	

Caroline St



Cars	Trucks	Cyclists	Totals
195	0	2	197

Peds Cross: \bowtie

West Peds: 51

West Entering: 281

West Leg Total: 501

Cars	439	Cars	17	319	16	352
Trucks	10	Trucks	0	5	0	5
Cyclists	7	Cyclists	0	5	0	5
Totals	456	Totals	17	329	16	



Peds Cross: \bowtie

South Peds: 28

South Entering: 362

South Leg Total: 818

Comments

Brant St @ Caroline St

Total Count Diagram

Municipality: Burlington
Site #: 0000000004
Intersection: Brant St & Caroline St
TFR File #: 4
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Brant St runs N/S

North Leg Total: 3630
 North Entering: 1718
 North Peds: 74
 Peds Cross: \times

	Cyclists	Trucks	Cars	Totals
North	2	21	1	24
East	1	44	8	53
South	192	1190	259	1641
Totals	195	1255	268	

	Cyclists	Trucks	Cars	Totals
North	11	49	1852	1912

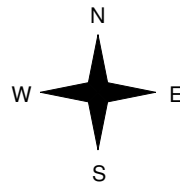
East Leg Total: 1568
 East Entering: 871
 East Peds: 211
 Peds Cross: \times

Cyclists	Trucks	Cars	Totals
9	2	607	618



Caroline St

Cyclists	Trucks	Cars	Totals
1	3	507	511
5	3	354	362
2	3	61	66
8	9	922	



Brant St

Cars	Trucks	Cyclists	Totals
353	5	1	359
373	1	7	381
126	5	0	131
852	11	8	

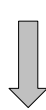
Caroline St



Cars	Trucks	Cyclists	Totals
677	13	7	697

Peds Cross: \times
 West Peds: 129
 West Entering: 939
 West Leg Total: 1557

	Cars	Trucks	Cyclists	Totals
West	1377	52	23	1452



	Cars	Trucks	Cyclists	Totals
West	42	0	0	42
East	992	41	9	1042
South	64	2	1	67
Totals	1098	43	10	

Peds Cross: \times
 South Peds: 118
 South Entering: 1151
 South Leg Total: 2603

Comments

Brant St @ Elgin St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington

Site #: 0000000006

Intersection: Brant St & Elgin St

TFR File #: 6

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 657

North Entering: 312

North Peds: 1

Peds Cross: 

Cyclists	1	4	5
Trucks	3	6	9
Cars	88	210	298
Totals	92	220	



Cyclists	1
Trucks	14
Cars	330
Totals	345

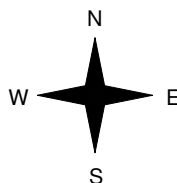
Cyclists	Trucks	Cars	Totals
1	4	99	104



Brant St



Elgin St



Cyclists	Trucks	Cars	Totals
0	2	112	114
0	1	46	47
0	3	158	



Brant St



Peds Cross: 

West Peds: 27

West Entering: 161

West Leg Total: 265

Cars	256	Cars	11	218	229
Trucks	7	Trucks	1	12	13
Cyclists	4	Cyclists	0	1	1
Totals	267	Totals	12	231	



Peds Cross: 

South Peds: 61

South Entering: 243

South Leg Total: 510

Comments

Brant St @ Elgin St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Burlington

Site #: 0000000006

Intersection: Brant St & Elgin St

TFR File #: 6

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 1031

North Entering: 689

North Peds: 7

Peds Cross: 

Cyclists	2	6	8
Trucks	0	3	3
Cars	288	390	678
Totals	290	399	



Cyclists	6
Trucks	2
Cars	334
Totals	342

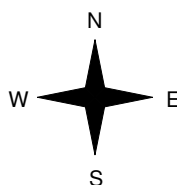
Cyclists	Trucks	Cars	Totals
2	0	345	347



Brant St



Elgin St



Cyclists	Trucks	Cars	Totals
4	1	57	62



Cyclists	Trucks	Cars	Totals
2	0	40	42
6	1	97	



Brant St



Peds Cross: 

West Peds: 49

West Entering: 104

West Leg Total: 451

Cars	430	Cars	57	277	334
Trucks	3	Trucks	0	1	1
Cyclists	8	Cyclists	0	2	2
Totals	441	Totals	57	280	



Peds Cross: 

South Peds: 82

South Entering: 337

South Leg Total: 778

Comments

Brant St @ Elgin St

Total Count Diagram

Municipality: Burlington

Site #: 0000000006

Intersection: Brant St & Elgin St

TFR File #: 6

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam


**** Non-Signalized Intersection ****

Major Road: Brant St runs N/S

North Leg Total: 3089

North Entering: 1817

North Peds: 20

Peds Cross: 

Cyclists	8	18	26
Trucks	6	22	28
Cars	651	1112	1763
Totals	665	1152	



Cyclists	18
Trucks	25
Cars	1229
Totals	1272

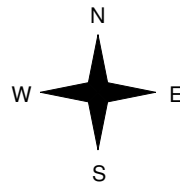
Cyclists	Trucks	Cars	Totals
10	7	743	760



Brant St



Elgin St




Cyclists	Trucks	Cars	Totals
8	3	314	325
2	2	158	162
10	5	472	



Brant St



Peds Cross: 

West Peds: 155

West Entering: 487

West Leg Total: 1247

Cars	1270
Trucks	24
Cyclists	20
Totals	1314



Cars	92	915	1007
Trucks	1	22	23
Cyclists	2	10	12
Totals	95	947	

Peds Cross: 

South Peds: 259

South Entering: 1042

South Leg Total: 2356

Comments

Brant St @ Hwy 403 EB Off Ramp

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Burlington

Site #: 0000000001

Intersection: Brant St & Hwy 403 EB Off Ramp

TFR File #: 1

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 2350

North Entering: 1302

North Peds: 0

Peds Cross: \nlessgtr

Cyclists	0	1	0	1
Trucks	0	31	0	31
Cars	0	1270	0	1270
Totals	0	1302	0	



Cyclists 0

Trucks 34

Cars 1014

Totals 1048

East Leg Total: 314

East Entering: 0

East Peds: 0

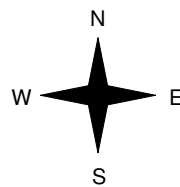
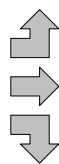
Peds Cross: \nlessgtr

Cyclists	Trucks	Cars	Totals
0	0	0	0



Hwy 403 EB Off Ramp

Cyclists	Trucks	Cars	Totals
0	2	160	162
0	0	0	0
0	5	197	202
0	7	357	



Brant St

Cars	Trucks	Cyclists	Totals
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	

QEW EB On Ramp



Cars	Trucks	Cyclists	Totals
304	10	0	314

Peds Cross: \nlessgtr

West Peds: 6

West Entering: 364

West Leg Total: 364

Cars	1467
Trucks	36
Cyclists	1
Totals	1504



Cars	0	854	304	1158
Trucks	0	32	10	42
Cyclists	0	0	0	0
Totals	0	886	314	

Peds Cross: \nlessgtr

South Peds: 0

South Entering: 1200

South Leg Total: 2704

Comments

Brant St @ Hwy 403 EB Off Ramp

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Burlington

Site #: 0000000001

Intersection: Brant St & Hwy 403 EB Off Ramp

TFR File #: 1

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 3571

North Entering: 1479

North Peds: 0

Peds Cross: 0

Cyclists	0	5	0	5
Trucks	0	18	0	18
Cars	0	1456	0	1456
Totals	0	1479	0	

Cyclists 0

Trucks 24

Cars 2068

Totals 2092

East Leg Total: 476

East Entering: 0

East Peds: 0

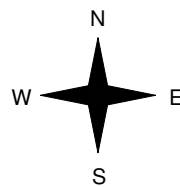
Peds Cross: 0

Cyclists	Trucks	Cars	Totals
0	0	0	0



Hwy 403 EB Off Ramp

Cyclists	Trucks	Cars	Totals
0	5	275	280
0	0	0	0
0	3	202	205
0	8	477	



Brant St

Cars	Trucks	Cyclists	Totals
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	

QEW EB On Ramp



Cars	Trucks	Cyclists	Totals
467	9	0	476

Peds Cross: 0

West Peds: 11

West Entering: 485

West Leg Total: 485

Cars 1658

Trucks 21

Cyclists 5

Totals 1684



Cars 0 1793 467 2260

Trucks 0 19 9 28

Cyclists 0 0 0 0

Totals 0 1812 476

Peds Cross: 0

South Peds: 0

South Entering: 2288

South Leg Total: 3972

Comments

Brant St @ Hwy 403 EB Off Ramp

Total Count Diagram

Municipality: Burlington
Site #: 0000000001
Intersection: Brant St & Hwy 403 EB Off Ramp
TFR File #: 1
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Brant St runs N/S

North Leg Total: 11295
 North Entering: 5452
 North Peds: 0
 Peds Cross: \nless

	Cyclists	0	11	0	11
Trucks	0	125	0	125	
Cars	0	5316	0	5316	
Totals	0	5452	0		



	Cyclists	6
Trucks	131	
Cars	5706	
Totals	5843	

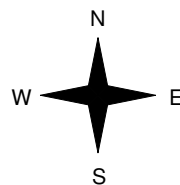
East Leg Total: 1509
 East Entering: 0
 East Peds: 0
 Peds Cross: \nless

Cyclists	Trucks	Cars	Totals
0	0	0	0



Hwy 403 EB Off Ramp

Cyclists	Trucks	Cars	Totals
0	17	831	848
0	0	0	0
0	14	781	795
0	31	1612	



Brant St

Cars	Trucks	Cyclists	Totals
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	

QEW EB On Ramp



Cars	Trucks	Cyclists	Totals
1464	45	0	1509

Peds Cross: \nless
 West Peds: 30
 West Entering: 1643
 West Leg Total: 1643

	Cars	6097
Trucks	139	
Cyclists	11	
Totals	6247	



Cars	0	4875	1464	6339
Trucks	0	114	45	159
Cyclists	0	6	0	6
Totals	0	4995	1509	

Peds Cross: \nless
 South Peds: 0
 South Entering: 6504
 South Leg Total: 12751

Comments

Brant St @ Lakeshore Rd

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Burlington
Site #: 0000000007
Intersection: Lakeshore Rd & Brant St
TFR File #: 7
Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Lakeshore Rd runs W/E

North Leg Total: 423

North Entering: 236

North Peds: 11

Peds Cross: \times

Cyclists	5	2	1	8
Trucks	7	0	1	8
Cars	142	3	75	220
Totals	154	5	77	



Cyclists 2

Trucks 8

Cars 177

Totals 187

East Leg Total: 1623

East Entering: 603

East Peds: 6

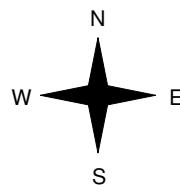
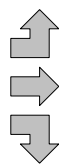
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
12	24	676	712



Lakeshore Rd

Cyclists	Trucks	Cars	Totals
1	4	121	126
5	36	901	942
0	0	6	6
6	40	1028	



Hotel

Cars	Trucks	Cyclists	Totals
45	4	0	49
528	17	7	552
1	0	1	2
574	21	8	



Lakeshore Rd



Cars	Trucks	Cyclists	Totals
976	37	7	1020

Peds Cross: \times

West Peds: 7

West Entering: 1074

West Leg Total: 1786

Cars	10
Trucks	0
Cyclists	3
Totals	13



Cars	6	11	0	17
Trucks	0	0	0	0
Cyclists	0	1	1	2
Totals	6	12	1	

Peds Cross: \times

South Peds: 2

South Entering: 19

South Leg Total: 32

Comments

Brant St @ Lakeshore Rd

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Burlington

Site #: 0000000007

Intersection: Lakeshore Rd & Brant St

TFR File #: 7

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Lakeshore Rd runs W/E

North Leg Total: 638

North Entering: 382

North Peds: 36

Peds Cross: \times

Cyclists	2	1	0	3
Trucks	1	0	0	1
Cars	269	11	98	378
Totals	272	12	98	



Cyclists 1

Trucks 2

Cars 253

Totals 256

East Leg Total: 1866

East Entering: 995

East Peds: 55

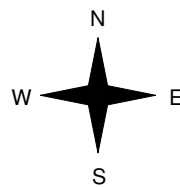
Peds Cross: \times

Cyclists	Trucks	Cars	Totals
7	16	1137	1160



Lakeshore Rd

Cyclists	Trucks	Cars	Totals
0	0	139	139
3	9	759	771
0	0	9	9
3	9	907	



Hotel

Cars	Trucks	Cyclists	Totals
110	2	0	112
862	15	5	882
1	0	0	1
973	17	5	

Lakeshore Rd



Cars	Trucks	Cyclists	Totals
858	9	4	871

Peds Cross: \times

West Peds: 50

West Entering: 919

West Leg Total: 2079

Cars	21
Trucks	0
Cyclists	1
Totals	22



Cars	6	4	1	11
Trucks	0	0	0	0
Cyclists	0	1	1	2
Totals	6	5	2	

Peds Cross: \times

South Peds: 15

South Entering: 13

South Leg Total: 35

Comments

Brant St @ Lakeshore Rd

Total Count Diagram

Municipality: Burlington
Site #: 0000000007
Intersection: Lakeshore Rd & Brant St
TFR File #: 7
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Lakeshore Rd runs W/E

North Leg Total: 2043
 North Entering: 1164
 North Peds: 90
 Peds Cross: \nlessgtr

	Cyclists	10	4	1	15
Trucks	16	0	4	20	
Cars	772	27	330	1129	
Totals	798	31	335		



	Cyclists	9
Trucks	20	
Cars	850	
Totals	879	

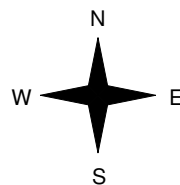
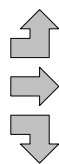
East Leg Total: 6695
 East Entering: 3126
 East Peds: 129
 Peds Cross: \nlessgtr

Cyclists	Trucks	Cars	Totals
25	81	3496	3602



Lakeshore Rd

Cyclists	Trucks	Cars	Totals
2	8	508	518
12	93	3120	3225
0	0	35	35
14	101	3663	



Brant St

Hotel

Cars	Trucks	Cyclists	Totals
322	11	0	333
2706	65	15	2786
4	0	3	7
3032	76	18	



Lakeshore Rd



Cars	Trucks	Cyclists	Totals
3452	97	20	3569

Peds Cross: \nlessgtr
 West Peds: 128
 West Entering: 3778
 West Leg Total: 7380

	Cars	66
Trucks	0	
Cyclists	7	
Totals	73	



Cars	18	20	2	40
Trucks	0	1	0	1
Cyclists	0	7	7	14
Totals	18	28	9	

Peds Cross: \nlessgtr
 South Peds: 38
 South Entering: 55
 South Leg Total: 128

Comments

Brant St @ Ontario St

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington

Site #: 0000000005

Intersection: Brant St & Ontario St

TFR File #: 5

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam


** Non-Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 558

North Entering: 323

North Peds: 5

Peds Cross: 

Cyclists	0	4	4
Trucks	1	11	12
Cars	40	267	307
Totals	41	282	



Cyclists	3
Trucks	13
Cars	219
Totals	235

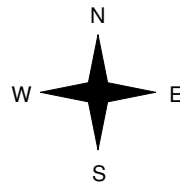
Cyclists	0
Trucks	2
Cars	75
Totals	77



Brant St



Ontario St




Cyclists	2
Trucks	0
Cars	2
Totals	4

2	3	86	91
4	3	88	



Brant St

Peds Cross: 

West Peds: 34


West Entering: 95

West Leg Total: 172

Cars	353
Trucks	14
Cyclists	6
Totals	373



Cars	35	217	252
Trucks	1	13	14
Cyclists	0	1	1
Totals	36	231	

Peds Cross: 

South Peds: 0

South Entering: 267

South Leg Total: 640

Comments

Brant St @ Ontario St

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 17:00:00

To: 18:00:00

Municipality: Burlington

Site #: 0000000005

Intersection: Brant St & Ontario St

TFR File #: 5

Count date: 27-Jun-2017

Weather conditions:

Cloudy/Wet

Person(s) who counted:

Cam


** Non-Signalized Intersection **

Major Road: Brant St runs N/S

North Leg Total: 815

North Entering: 473

North Peds: 26

Peds Cross: 

Cyclists	0	6	6
Trucks	0	8	8
Cars	71	388	459
Totals	71	402	



Cyclists	5
Trucks	7
Cars	330
Totals	342

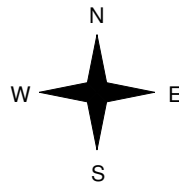
Cyclists	Trucks	Cars	Totals
1	3	249	253



Brant St



Ontario St




Cyclists	Trucks	Cars	Totals
0	0	2	2
0	0	74	74
0	0	76	



Brant St



Peds Cross: 

West Peds: 66


West Entering: 76

West Leg Total: 329

Cars	462
Trucks	8
Cyclists	6
Totals	476



Cars	178	328	506
Trucks	3	7	10
Cyclists	1	5	6
Totals	182	340	

Peds Cross: 

South Peds: 0

South Entering: 522

South Leg Total: 998

Comments

Brant St @ Ontario St

Total Count Diagram

Municipality: Burlington
Site #: 0000000005
Intersection: Brant St & Ontario St
TFR File #: 5
Count date: 27-Jun-2017

Weather conditions:
 Cloudy/Wet
Person(s) who counted:
 Cam

**** Non-Signalized Intersection ****

Major Road: Brant St runs N/S

North Leg Total: 2509
 North Entering: 1396
 North Peds: 63
 Peds Cross: ∇

	Cyclists	Trucks	Cars	Totals
North	0	5	179	184
South	17	44	1151	1212
Totals	17	49	1330	

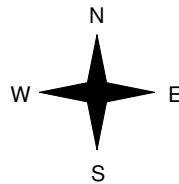
	Cyclists	Trucks	Cars	Totals
North	16	43	1054	1113
South	17	49	1330	1396
Totals	33	92	2384	

	Cyclists	Trucks	Cars	Totals
West	1	10	576	587
East	3	0	11	14
Totals	4	10	587	



Ontario St

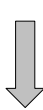
	Cyclists	Trucks	Cars	Totals
West	3	0	11	14
East	5	8	317	330
Totals	8	8	328	



Brant St

Peds Cross: ∇
 West Peds: 195
 West Entering: 344
 West Leg Total: 931

	Cars	Trucks	Cyclists	Totals
West	1468	52	22	1542
East	397	5	1	403
Totals	1865	57	23	



	Cars	Trucks	Cyclists	Totals
West	397	5	1	403
East	1043	43	13	1099
Totals	1440	48	14	

Peds Cross: ∇
 South Peds: 1
 South Entering: 1502
 South Leg Total: 3044

Comments

B

Appendix B: Active Transportation Memorandum



MEMO

TO : Soroush Salek, Ph.D., P.Eng.

FROM : Jaime Garcia, Ph.D., P.Eng.

DATE : April 17, 2020

SUBJECT : **City of Burlington Downtown Traffic Operation Extension**
Active Transportation Policy Review

1. INTRODUCTION

As part of the City of Burlington Downtown Traffic Operation Extension study, the following active transportation policy reports were reviewed:

- Taking a Closer Look at the Downtown: Preliminary Preferred Concept (SGL, January 2020)
- City of Burlington Pedestrian Charter (May 2009)
- City of Burlington Cycling Master Plan (DRAFT January 2020)

The relevant active transportation policies and recommendations - from the Downtown perspective, of each report as well as potential implications to the recommendations of the Traffic Operation Extension report are outlined in the following sections of this document.

2. ACTIVE TRANSPORTATION POLICY REVIEW

2.1. SGL Taking a Closer Look at the Downtown

The purpose of the SGL report (January 2020) is to provide a summary of the evaluation of concept 1 and concept 2 that were presented to the public and Council and to provide a description of the preliminary preferred concept.

2.1.1. Evaluation of Alternatives

An evaluation was prepared in order to determine the preliminary preferred concept. Active transportation was a factor in the evaluation and informed the Downtown policies as a whole and the recommendations for all precincts.

Several principles were developed from public engagement events which were used to guide the evaluation of the concepts. The principles that guided the evaluation are noted in detail in the previous report "Taking a Closer Look at the Downtown: Themes, Principles and Land Use Concepts" (October 2019).

Criteria and measures were developed based on the principles and themes. The criteria, measures and rationale for the preferred concept presented in **Table 2** include only the active transportation considerations.

Table 1: Principles relevant to Active Transportation

Criterion	Measure	Rationale for Preferred Concept
Green Space, Open Space and Parks		
Ability to incorporate new parks and trails into the existing urban fabric	Has new parkland, trails or open space been proposed?	<ul style="list-style-type: none"> An on-street trail connection is proposed to link the Rambo Creek trail to the existing Elgin Promenade and south to the waterfront trail along Elizabeth Street. An extension of Elgin promenade is further proposed to extend west of Brant Street to west of Burlington Avenue
Ability to enhance and create safe and inclusive public gathering places	Ability to create safe public spaces	<ul style="list-style-type: none"> Concept 1 is preferred over Concept 2 due to the visibility and public access to the proposed trail along Rambo Creek adjacent to the proposed John Street extension
Improve walkability of the Downtown	Potential to improve walkability of the Downtown and improve the comfort of the pedestrian.	<ul style="list-style-type: none"> Both options provide opportunities for improving walkability throughout the Downtown with proposed trails and opportunities for wider sidewalks. Concept 1 is preferred along Lower Brant Street and Lakeshore Road to create a sense of openness.
Preserving and Encouraging Places to Shop and Work		
Provide a range of employment opportunities	Ability to maintain and create vibrant places and streetscapes	<ul style="list-style-type: none"> Along Brant Street and Pine Street, the Official Plan should set a maximum store frontage to ensure a varied shopping street which can improve the walkability and vibrance of the shopping streets.
Transportation Network and Active Transportation		
Capacity of the road network	John Street Extension	<ul style="list-style-type: none"> Concept 1 is preferred as it extends John Street as a local road north adjacent to the expanded open space along Rambo Creek which creates a wider transition to the low-rise neighbourhood to the east.

2.1.2. Preliminary Preferred Concept

The study area for Downtown Burlington as defined in the SGL report as well as the Preliminary Preferred Concept are illustrated in **Figure 1**.

Active transportation improvements considered for the precincts are outlined in **Table 1** (as described in the SGL report). The limits of each of the precincts is shown in **Figure 1**. Following the completion of the report, the City of Burlington has modified some of the road identifications (*discussed below*).

Table 2: Active Transportation Recommendations by Precinct

Precinct	Active Transportation Recommendations
Lakeshore Precinct	<ul style="list-style-type: none"> The Lakeshore Precinct will serve as the gateway to the Waterfront with linkages between the waterfront trail and north south green connector streets and off-street trails. Lakeshore Road is identified as a <i>Pedestrian Priority Street</i> where the streetscape provides a safe and comfortable environment with Clear Path Zones and bump outs to narrow the distance to cross at key intersections.
Brant Main Street Precinct	<ul style="list-style-type: none"> Brant Street is identified as a <i>Pedestrian Priority Street</i>. New building should have a 6-metre setback from the curb to created enhanced public sidewalk space. Where possible the pavement width of Brant Street should be minimized and the sidewalk/boulevard space maximized to create a safe, comfortable and animated pedestrian environment with Clear Path Zones and bump outs to narrow the distance to cross at key intersections. Consideration should be given to converting Brant Street to a flex street south of Caroline Street.
Mid Brant Precinct	<ul style="list-style-type: none"> To support a walkable community the entire area must provide an accessible and attractive pedestrian environment with sidewalks, and greenway connections to adjacent residential neighbourhoods. The preliminary preferred concept proposes to extend John Street north to Victoria Avenue. It should be noted that after the preliminary preferred concept was presented in January, Council modified the concept to reflect that they are approving “a new transportation connection” in line with John Street north to Victoria Avenue.
Upper Brant Precinct	<ul style="list-style-type: none"> Development will generally achieve a height and density that reflects the precinct’s walking distance to higher-order transit at the Burlington GO Station and contribute to the creation of a transit, pedestrian and cycling oriented area. A new public urban park will be created along Ghent Avenue.

The January 2020 report identifies some precincts as “pedestrian priority streets” however, since January the City of Burlington has transitioned away from using the term “pedestrian priority street”

and instead uses the terms “Retail Main Streets”, “Mixed Use Streets”, and “Green Connector Streets.” These terms have various considerations for pedestrians.

Retail Main, Mixed-Use and Green Connector Streets

Retail Main Streets:

Shall be designed to cater to pedestrians and create a vibrant street life where pedestrians spend time for both leisure and shopping. The design of the public realm and the built form must respond to the primacy of pedestrians and create a safe, welcoming and comfortable environment for high volumes of pedestrians in all seasons. Redevelopment and changing tenants along these streets need to maintain and support the character and continuity of the street. Built form on these streets should respect the existing physical characteristics of the street, respond to changing markets, and promote community identity and character

Considerations for Retail Main Streets including the following:

- Retail or service commercial uses are required at grade
- Development will be required to maintain the existing character of small shops with narrow unit widths
- Development will be set back to expand the pedestrian realm and provide opportunities for patios and pedestrian amenities
- Servicing, loading, and parking access will be from a rear lane, not from the Retail Main Street frontage

The following streets are Retail Main Streets:

- Lakeshore Road between Hager Creek (just west of Locust Street) and Martha Street;
- Pine Street between Brant and Pearl;
- Elgin Street between Locust and Brant;
- Elgin Promenade between Brant and Pearl;
- Brant Street between Lakeshore Road and Victoria Ave;
- John Street between Lakeshore Road and Elgin Promenade;
- Elizabeth Street between Lakeshore Road and Elgin Promenade.

Mixed-Use Streets:

On Mixed Use Streets, retail, service commercial, or office uses are permitted at grade and may be required in some cases.

The following streets are Mixed Use Streets:

- Old Lakeshore Road;
- Pine Street between Pearl and Martha;
- James Street between Brant and Martha;
- Ontario Street between Locust and Brant;
- Caroline Street between Locust and John;

- Victoria Ave between Brant St and Rambo Creek;
- Locust Street between Lakeshore and Caroline;
- Brant Street between Victoria and Prospect;
- John Street between Elgin Promenade and Caroline Street;
- Elizabeth Street between Elgin Promenade and Maria Street;
- Pearl Street between Old Lakeshore Rd and James Street.

Green Connector Streets:

“Green Connector Streets” are public streets that incorporate enhanced pedestrian and /or cycling facilities within the street right of way and contribute to achieving an inter-connected network of parks, promenades and open spaces in the downtown. Green Connector Streets differ from promenades which comprise off-street public open space lands. Enhanced landscaping within the public right-of-way, limitations on driveways and differing setbacks may be considered along Green Connector Streets. The Downtown Urban Design Guidelines provide additional direction on the enhanced facilities.

The City’s network of existing and proposed parks and open spaces can be connected through active transportation along these routes, in combination with existing and proposed promenades/off-street trails.

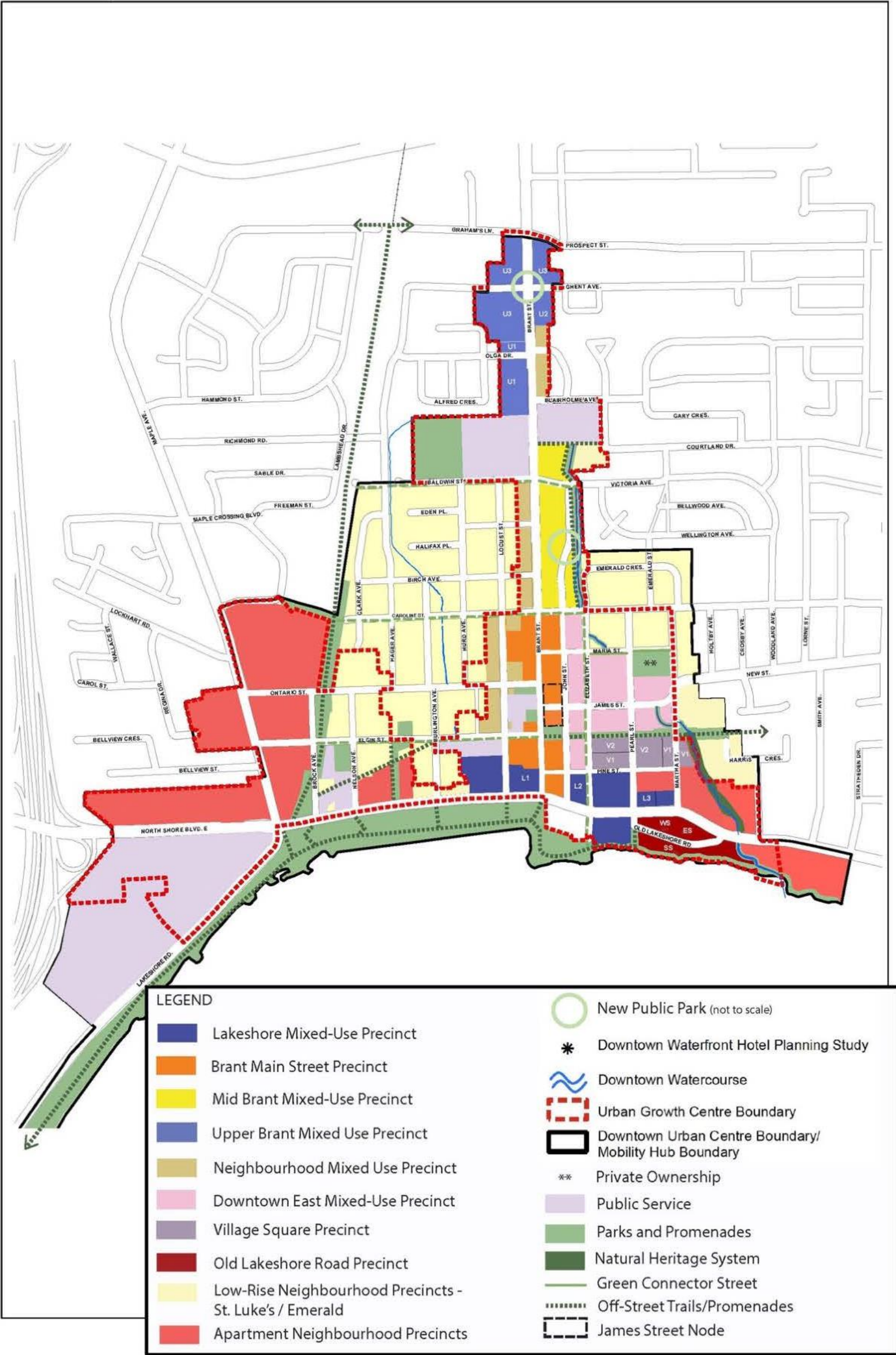


Figure 1: SGL Report Preliminary Preferred Concept

2.2. City of Burlington Pedestrian Charter

The City of Burlington Pedestrian Charter provides a vision for supporting walking within the City however, no location specific recommendations or actions are provided.

2.3. City of Burlington Cycling Plan

An updated version of the Burlington Cycling Plan was provided for review on February 2020. As part of the Top 10 Themes for Action identified by the document, the following are of relevance for the purpose of our review:

- A minimum grid within the short-term timeframe for people to experience different types of higher-order bikeways;
- Focus on the potential bike/walk to transit;
- Work towards an ultimate Spine Network for all users and abilities;
- Build quality and connected Local Streets Bikeways;
- Prioritize where funding is allocated with a focus on the above and with the view to unlock potential in the city; and
- Implement an intersection improvement program.

The Cycling Plan considers a phasing approach for the implementation of the identified Themes composed by the following elements:

- A network composed by Spines and Local Collectors; and
- Prioritization of selected elements of the network in the short, medium and long-term.

Segments of the proposed network considered as priorities for the Downtown Area are presented in **Figure 2** and **Table 3**.



Figure 2 Proposed Project Priority (Alta Planning, January 2020)

Table 3 Proposed Projects by Priority

Project ID	Street Name	Network Type	Proposed Facility Type	Final Prioritization	Length (m)
3	Elgin Street	Spine	Local Street Bikeway	Short-Term	788
7	Caroline Street	Spine	Local Street Bikeway	Short-Term	1491
8	Martha Street	Spine	Local Street Bikeway	Short Term	562
10	Brant Street	Spine	Protected Bikeway	Short Term	970
12	North Shore Blvd E.	Spine	Protected Bikeway	Short Term	371
13	Maple Avenue	Spine	Protected Bikeway	Short Term	2294
14	Lakeshore Road	Connector	Painted Buffered Bike Lane	Short Term	738
20	Lakeshore Road	Connector	Painted Buffered Bike Lane	Short Term	521
22	Locust Street	Spine	Local Street Bikeway	Short Term	876
32	Elgin Street	Spine	Multi-use Trail	Short-Term	376
45	Brant Street	Connector	Painted Buffered Bike Lane	Short-Term	367
47	Brock Avenue	Spine	Local Street Bikeway	Short-Term	215
65	Elizabeth Street	Spine	Local Street Bikeway	Medium-Term	557

The type of cycling facility and location along the roadways servicing the Downtown Area are shown in **Figures 3 and 4**. Although the Cycling Plan does not provide specific design criteria for each facility type, **Table 4** summarizes the recommended components of each facility type used for cost estimation purposes.

BURLINGTON CYCLING
MASTER PLAN

FACILITY TYPES

- Protected Bikeway
- Painted Bike Lane
- Local Street Bikeway
- Multi-Use Trail
- Intersection Improvement

FEATURES AND
BOUNDARIES

- GO Station
- Library
- Sports Facility
- Cultural Facility
- Community Centre
- School
- Park
- Railway
- Mobility Hub
- Waterbody
- Burlington

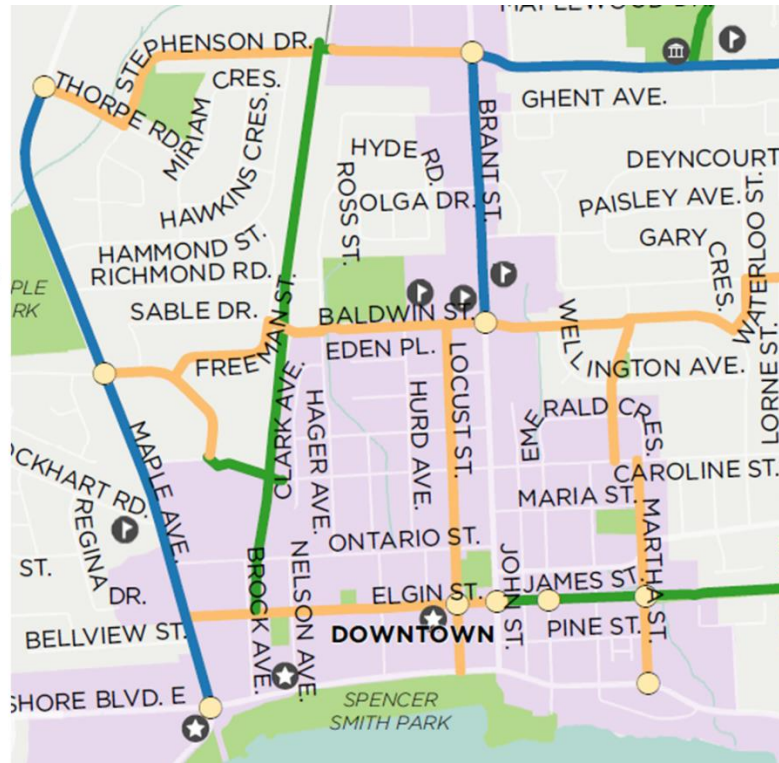


Figure 3 Minimum Grid (Alta Planning, September 2019)

BURLINGTON CYCLING
MASTER PLAN

SPINE NETWORK

- Multi-use Trail
- Multi-use Path
- Protected Bikeway
- Local Street Bikeway
- Painted Bike Lane
- Grade Separated Connector
- Highway Interchange Crossing

LOCAL CONNECTOR

- Multi-use Trail
- Multi-use Path
- Protected Bikeway
- Painted Buffered Bike Lane
- Painted Bike Lane
- Shared Use Lane
- Paved Shoulder
- Grade Separated Connector
- Highway Interchange Crossing

FEATURES AND
BOUNDARIES

- Intersection Improvement

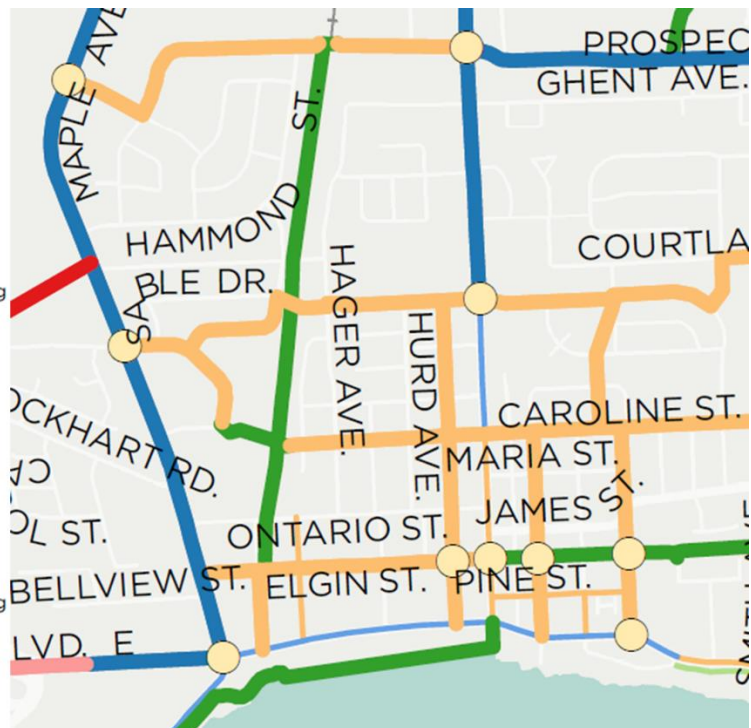


Figure 4 Proposed Network (Alta Planning, July 2019)

Table 4: Definition of each type of Facility

Facility Type	Definition	Components
Multi-Use Trail	<ul style="list-style-type: none"> Separated facilities that are shared by pedestrians (including people using motorized assistive-mobility devices), cyclists, and people using other non-motorized modes (skateboards, rollerblading, etc.) making them a low stress facility Bidirectional and can be treated with a marked centreline to delineate the space Outside of road right-of-way 	<ul style="list-style-type: none"> 3.0m wide asphalt surface; Signs (no intersection treatments) Controlled crossings at roadways not included
Protected Bikeway	<ul style="list-style-type: none"> On-road protected bike lanes and raised cycle tracks have been grouped together as one designation On-road with physical separation 	<ul style="list-style-type: none"> Precast concrete curb; Flexible delineators posts; Bicycle signals at every signalized intersection (mounted on existing poles) Pavement markings and signs
Local Street Bikeway	<ul style="list-style-type: none"> Shared roadway treatment that is beyond a signed route treatment Treatments are implemented at major and minor intersections that the local street bikeway crosses to prioritize and facilitate safer crossing for cycling traffic 	<ul style="list-style-type: none"> Shared lane markings; Bike Route signs; Speed humps
Painted Bike Lane	<ul style="list-style-type: none"> Buffered or unbuffered treatment 	NA
Shared Use Lane	<ul style="list-style-type: none"> General purpose lane with sufficient width to accommodate the automobiles and cyclists. The lanes can be marked with sharrow markings 	NA

3. POTENTIAL IMPLICATIONS TO THE TRAFFIC OPERATION EXTENSION FINDINGS AND RECOMMENDATIONS

As described in Section 1 of this report, relevant active transportation policies and recommendations that may have potential implications to the recommendations of the Traffic Operation Extension report were subjected to a further review.

It should be noted that additional network improvements approved by Council in December 2019 including: all-way stop controlled intersection at Caroline and John, and new pedestrian crossovers at Brant/Pine, Brant/Elgin and Brant/Maria, are not considered as part of the operational analysis and as such, there are not identified as part of this report.

A similar situation occurs for the following proposed improvements:

- Preliminary preferred concept for the extension of John Street north to Victoria Area. Although a preliminary preferred concept was presented to Council on January 2020, the detailed function, alignment, and design of the new transportation connection is not currently available and will be determined through a future comprehensive block planning exercise for the lands bounded by Brant, Victoria, Rambo Creek, and Caroline Street.
- The existing Elgin Promenade and the proposed new off-street trail along Rambo Creek in the Mid Brant Precinct. Although it is expected that these proposed improvements will enhance the walkability in the area under study, this effect was not considered as part of the operational analysis presented in the Traffic Operation Extension report since the trail's detailed design will not be known until a comprehensive block plan is completed.

3.1. Lakeshore Precinct

The SGL report identifies Lakeshore Road between Martha Street and Burlington Avenue as a *Pedestrian Priority Street* in which a safe and comfortable environment can be enhanced with treatments at key intersections. As noted above, the City of Burlington has transitioned away from using the term "pedestrian priority street" and instead uses the terms "Retail Main Streets", "Mixed Use Streets", and "Green Connector Streets." Lakeshore Road between Hager Creek (just west of Locust Street) and Martha Street is identified as a Retail Main Street.

From a cycling perspective, the Cycling Plan identifies painted buffered bike lanes along Lakeshore Road from Martha Street to Maple Avenue and protected bikeway west of Maple Avenue. The Cycling Plan also recommends intersection improvements at Martha Street and Maple Avenue as part of the short-term priority projects.

Since the Lakeshore Road segment from Martha Street to Locust Street already provides wider sidewalks and boulevards on both sides of the road, only the segment between Locust Street and Burlington Street may need to consider modifications to the current right-of-way elements to allow for wider sidewalks.

With respect of the proposed painted buffered bike lanes, the space currently allocated to bike lanes along Lakeshore Road between Maple Avenue and Locust Street on both sides of the roadway and between Locust Street and Brant Street (one side of the roadway) will need to be increased.

Since the existing painted bike lanes terminate at Maple Avenue the proposed protected bikeway for North Shore Boulevard East will need to consider the potential elimination of the existing boulevard (north side) or the reduction on the number of vehicular lanes. This is subject to Ministry of Transportation review and approval.

3.2. Brant Main Street Precinct

Similar to Lakeshore Road, Brant Street between Lakeshore Road and Victoria Avenue is now identified as Retail Main Street.

The cross-section along this segment of Brant Street already provides pedestrians with wider sidewalks, boulevards and curb extensions. It should be noted that unlike Lakeshore Road, on-street parking in both sides of the road is provided along Brant Street.

From a cycling perspective, pavement markings along the corridor identifies this segment of Brant Street as a shared route.

Since the proposed cycling network identifies this segment of Brant Street as a shared use lane, only the necessary intersection improvements required to support the Multi-Use Trail along James Street need to be considered as part of the traffic operational analysis.

3.3. Mid Brant Precinct

Although sidewalks and boulevards along Brant Street from Caroline Street to Victoria Street are not as wide as the previous segment of Brant Street, on-street parking is eliminated and bike lanes along both sides of the roadway are provided. Curb extension are not longer present, but raised median islands provides refuge for pedestrian crossing Brant Street at Birch Avenue and Blenheim Street.

The Cycling Plan identifies this segment of Brant Street as a Local Connector and recommends the implementation of painted buffered bike lanes on both sides of the road.

3.4. Upper Brant Precinct

The existing cross-section along Brant Street between Ghent Avenue and Victoria Avenue is the widest segment of the Precinct with 4 vehicular lanes, bike lanes on both sides of the road, limited on-street parking and curb-face .

The Cycling Plan identify this portion of Brant Street as part of the Spine Network and recommended the implementation of a Protected Bikeway.

3.5. Local Street Bikeways

The Cycling Plan identifies the following streets as Local Street Bikeways:

- Victoria Avenue;
- Martha Street;
- Elizabeth Street.

- Elgin Street;
- Locust Street; and
- Brock Avenue

No specific details are provided regarding the type of roadway treatment to be implemented as part of this type of bikeway, however improvements at the following intersections needs to be considered:

- Martha Street at New Street
- James Street at Elizabeth Street
- Locust Street and Elgin Street

3.6. Maple Avenue

Maple Avenue is identified by the SGL Report as part of the Apartment Neighbourhood Precincts from which no specific improvements to active transportation are specified. However, the Cycling Plan indicates the use of protected bikeways from Thorpe Road to Lakeshore Road with intersection improvements at Thorpe Road, Maple Crossing Boulevard and Lakeshore Road.

Although painted bicycle lanes are currently present at both sides of Maple Avenue the implementation of the proposed protected bikeway as well as the necessary improvements at signalized intersections may require changes to the current roadway cross-section.

During the preparation of this technical memorandum, the City of Burlington indicated that the type of cycling infrastructure to be implemented along Maple Avenue will be confirmed as part of the Maple Avenue Bike Lane EA study. Although this work is currently underway, it is not expected to be completed until late 2020 or early 2021.

Recommendations considered as part of the SGL report as well as the Cycling Plan in relation with the roadway network developed as part of the Downtown Traffic Operation Extension operational analysis are summarized in **Table 5** and graphically presented in **Figure 8 and 9**.

Table 5 Active Transportation Infrastructure – Potential Implications

Location	Segment	Considerations as part of Traffic Operational Analysis	Dimensions to be considered
Lakeshore Precinct	Lakeshore Road between Martha Street and Brant Street	Potential reduction of vehicular lanes width to provide additional space for buffered bike lanes. Intersection improvements at Martha Street.	Buffered Bike Lanes (see Figure 5a)

Location	Segment	Considerations as part of Traffic Operational Analysis	Dimensions to be considered
	Lakeshore Road between Locust Street and Burlington Street	Potential reduction of vehicular lanes width to provide additional space for wider sidewalks and buffered bike lanes.	Buffered Bike Lanes (see Figure 5a)
	Lakeshore Road between Burlington Street and Maple Avenue	Potential reduction of vehicular lanes width to provide additional space for buffered bike lanes. Intersection improvements at Maple Avenue.	Buffered Bike Lanes (see Figure 5a) Intersection Improvements (see Figure 6b)
	North Shore Boulevard East	Potential reduction of vehicular lanes width to provide additional space for protected bikeway.	Protected Bikeway (see Figure 5b)
Brant Main Street Precinct	Brant Street between Lakeshore Road and Caroline Street	Intersection improvements at James Street.	Intersection Improvements (Figure 7)
Mid Brant Precinct	Brant Street from Caroline Street to Victoria Street	Potential reduction of vehicular lanes width to provide additional space for buffered bike lanes.	Buffered Bike Lanes (see Figure 5a)
Upper Brant Precinct	Brant Street between Ghent Avenue and Victoria Avenue	Potential reduction of vehicular lanes width to provide additional space for wider sidewalks and protected bikeway. Intersection improvements at Victoria Street and Ghent Avenue.	Protected Bikeway (see Figure 5b) Intersection Improvements (see Figure 6b)
Local Street Bikeways	Martha Street at New Street	Intersection Improvements	Intersection Improvements (see Figure 6a)

Location	Segment	Considerations as part of Traffic Operational Analysis	Dimensions to be considered
	James Street at Elizabeth Street	Intersection Improvements	Intersection Improvements (see Figure 6a)
	Locust Street and Elgin Street	Intersection Improvements	Intersection Improvements (see Figure 6a)
Maple Avenue	Between Ontario Street and Lakeshore Road	Potential reduction of vehicular lanes width to provide additional space for protected bikeway. Intersection improvements at all signalized intersections	Protected Bikeway ¹ (see Figure 5b) Intersection Improvements (see Figure 6b)

¹ To be confirmed as part of the Maple Avenue Bike Lane EA Study

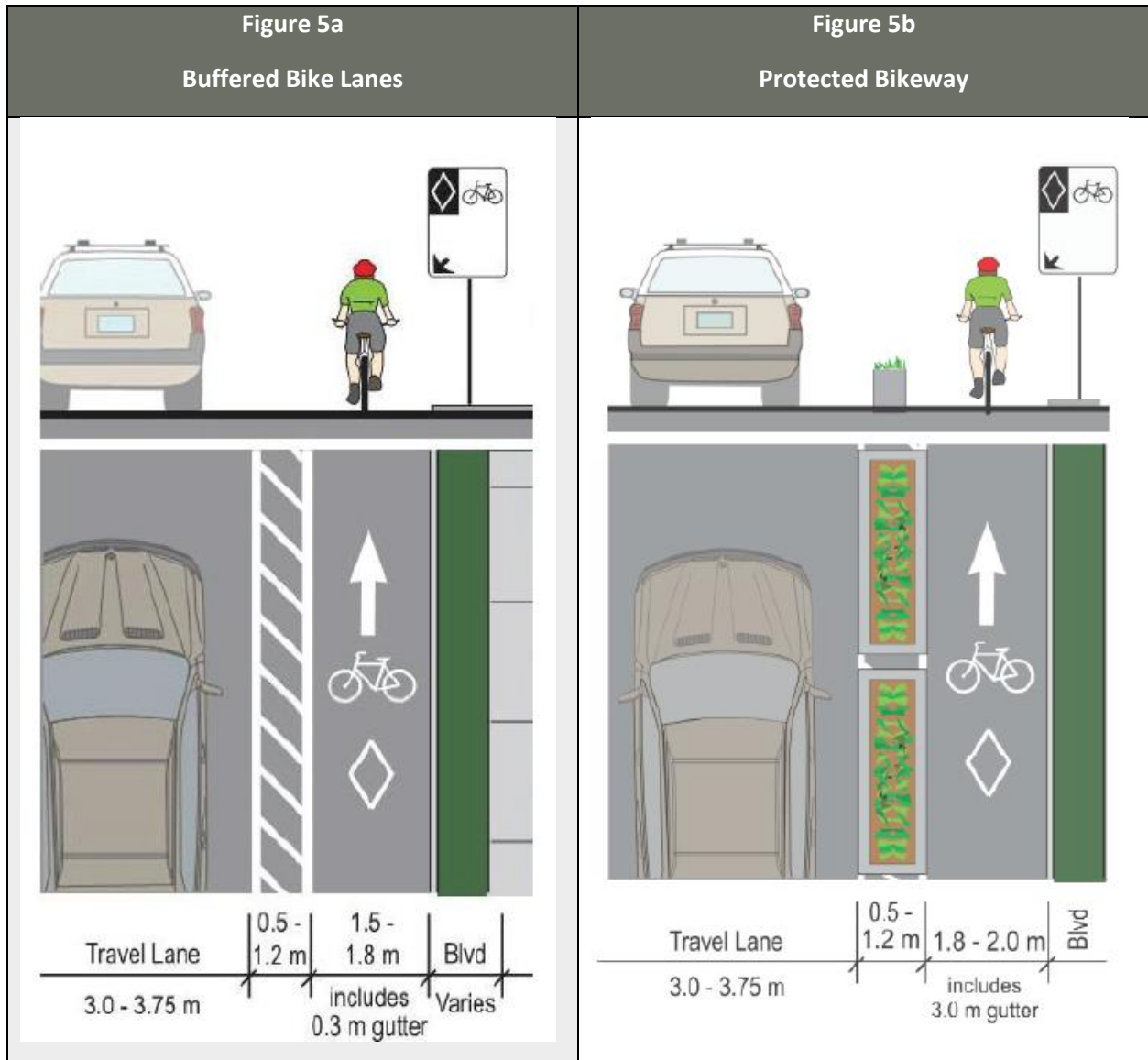


Figure 5 Cross-Sections of Separated Bicycle Lanes (OTM Book 18 Figure 4.54)

OTM Book Section 4.2.2.4 Design Applications

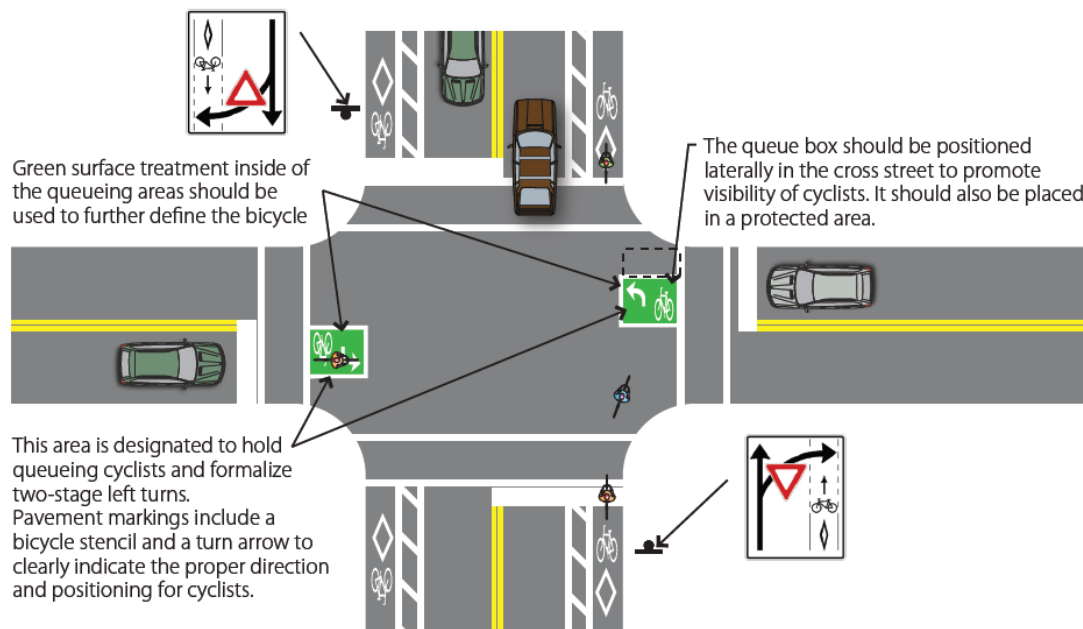


Figure 6a Buffered Bike Lanes

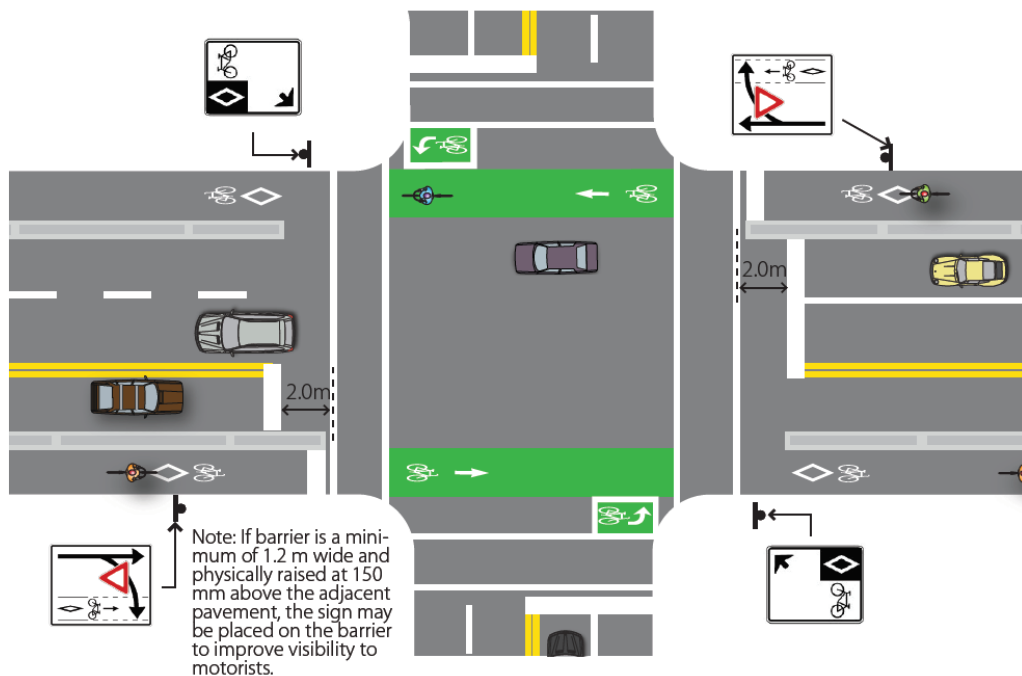


Figure 6b Protected Bikeway

Figure 6 Intersection Improvements (Cycling related)

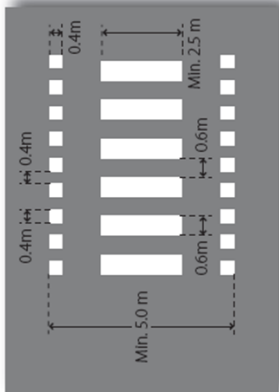


Figure 7 Intersection Improvements with Multi Use Trail (OTM Book 18 Figure 4.102)

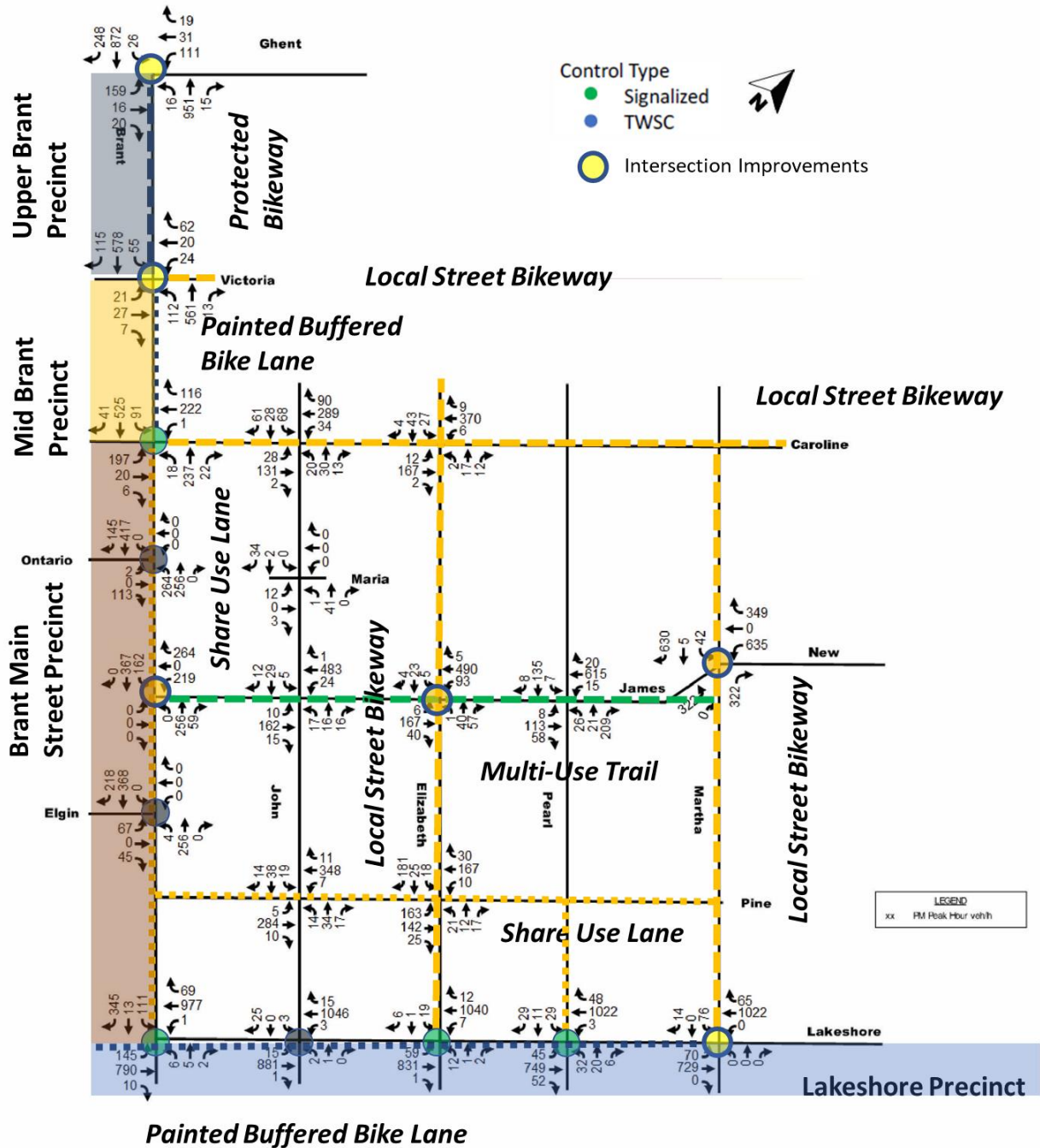


Figure 8 SGL Report and Cycling Plan Recommendations (Traffic Projections 2031 scenario)

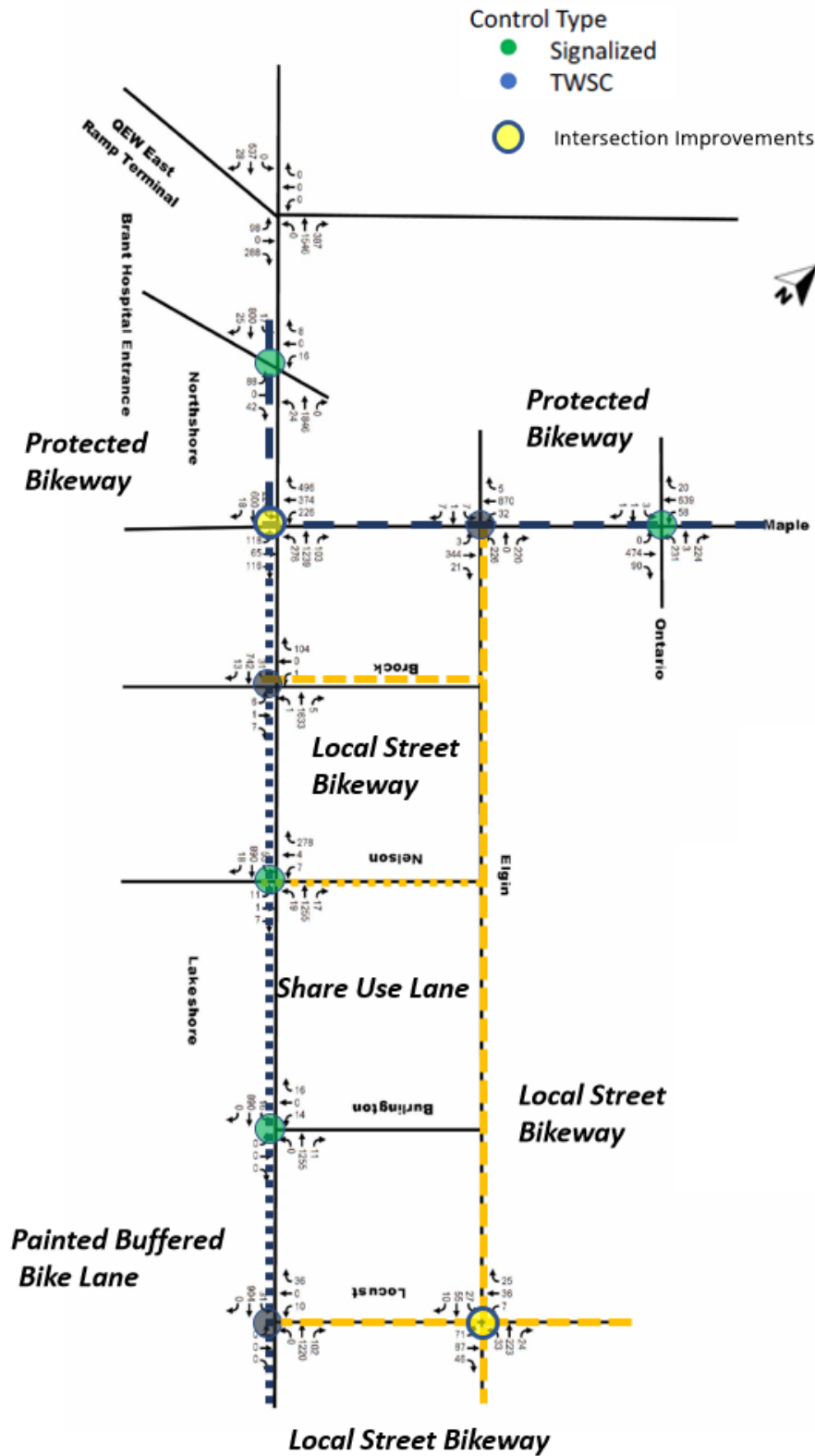


Figure 9 Cycling Plan Recommendations – west of Brant Street (Traffic Projections 2031 scenario)

























Appendix C: 2031 Baseline (Scenario 0) Results

HCM Signalized Intersection Capacity Analysis

1: Brant Street & Caroline Street

03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	20	6	1	222	116	18	237	22	91	525	41
Future Volume (vph)	197	20	6	1	222	116	18	237	22	91	525	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.5	3.5	3.5	3.5	3.5
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	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.91	1.00	0.97		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	0.93	1.00		0.97	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1695	1794	1390	1558	1657		1656	1792		1746	1797	
Flt Permitted	0.28	1.00	1.00	0.74	1.00		0.20	1.00		0.36	1.00	
Satd. Flow (perm)	497	1794	1390	1218	1657		353	1792		655	1797	
Peak-hour factor, PHF	0.90	0.91	0.58	0.80	0.80	0.90	0.84	0.91	0.79	0.90	0.92	0.66
Adj. Flow (vph)	219	22	10	1	278	129	21	260	28	101	571	62
RTOR Reduction (vph)	0	0	5	0	19	0	0	4	0	0	5	0
Lane Group Flow (vph)	219	22	5	1	388	0	21	284	0	101	628	0
Confl. Peds. (#/hr)	31		28	28		31	52		69	69		52
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	2%	0%	0%	2%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	42.0	42.0	42.0	32.0	32.0		26.9	26.9		36.0	36.0	
Effective Green, g (s)	41.0	44.0	44.0	34.0	34.0		28.9	28.9		35.0	38.0	
Actuated g/C Ratio	0.46	0.49	0.49	0.38	0.38		0.32	0.32		0.39	0.42	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	5.0	5.0	5.0	5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	306	877	679	460	625		113	575		316	758	
v/s Ratio Prot	c0.05	0.01			0.23			0.16		0.02	c0.35	
v/s Ratio Perm	c0.28		0.00	0.00			0.06			0.11		
v/c Ratio	0.72	0.03	0.01	0.00	0.62		0.19	0.49		0.32	0.83	
Uniform Delay, d1	19.4	11.9	11.8	17.4	22.8		22.1	24.6		18.7	23.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.05	0.86	
Incremental Delay, d2	7.7	0.1	0.0	0.0	4.6		3.6	3.0		0.5	9.5	
Delay (s)	27.1	12.0	11.8	17.4	27.4		25.7	27.7		20.2	29.4	
Level of Service	C	B	B	B	C		C	C		C	C	
Approach Delay (s)		25.2			27.3			27.5			28.2	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			81.0%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Brant Street & James Street

03/10/2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	219	264	256	59	162	367
Future Volume (vph)	219	264	256	59	162	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.5	3.1	3.1	3.5
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
Frpb, ped/bikes	1.00	0.96	1.00	0.90	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.98	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1656	1442	1773	1320	1585	1740
Flt Permitted	0.95	1.00	1.00	1.00	0.51	1.00
Satd. Flow (perm)	1656	1442	1773	1320	853	1740
Peak-hour factor, PHF	0.93	0.85	0.79	0.82	0.80	0.95
Adj. Flow (vph)	235	311	324	72	202	386
RTOR Reduction (vph)	0	238	0	18	0	0
Lane Group Flow (vph)	235	73	324	54	203	386
Confl. Peds. (#/hr)	21	15		57	57	
Heavy Vehicles (%)	9%	7%	6%	4%	5%	8%
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		2		1	2
Permitted Phases		4		2	2	
Actuated Green, G (s)	16.7	16.7	42.1	42.1	48.3	42.1
Effective Green, g (s)	18.7	18.7	44.1	44.1	46.3	44.1
Actuated g/C Ratio	0.23	0.23	0.55	0.55	0.58	0.55
Clearance Time (s)	6.0	6.0	6.0	6.0	3.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	387	337	977	727	541	959
v/s Ratio Prot	c0.14		0.18		c0.02	c0.22
v/s Ratio Perm		0.05		0.04	0.19	
v/c Ratio	0.61	0.22	0.33	0.07	0.38	0.40
Uniform Delay, d1	27.4	24.7	9.9	8.4	11.3	10.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	0.3	0.9	0.2	0.4	1.3
Delay (s)	30.1	25.1	10.8	8.6	11.7	11.6
Level of Service	C	C	B	A	B	B
Approach Delay (s)	27.2		10.4			11.6
Approach LOS	C		B			B




















Intersection Summary

HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

3: Brant Street & Lakeshore Road



















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	790	10	1	977	69	6	5	2	111	13	345
Future Volume (vph)	145	790	10	1	977	69	6	5	2	111	13	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.4	3.4	3.5	3.4	4.0	3.5	3.5	3.5	3.3	3.5	3.5
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	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	1.00		1.00	0.99			0.98		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1743	1832		1785	3415			1770		1722	1537	
Flt Permitted	0.17	1.00		0.19	1.00			0.43		0.74	1.00	
Satd. Flow (perm)	307	1832		352	3415			789		1344	1537	
Peak-hour factor, PHF	0.85	0.95	0.56	0.25	0.86	0.85	0.50	0.62	0.50	0.79	0.74	0.92
Adj. Flow (vph)	171	832	18	4	1136	81	12	8	4	141	18	375
RTOR Reduction (vph)	0	0	0	0	3	0	0	3	0	0	161	0
Lane Group Flow (vph)	171	850	0	4	1214	0	0	21	0	141	232	0
Confl. Peds. (#/hr)	28		12	28		12	31		7	7		31
Heavy Vehicles (%)	0%	1%	0%	0%	2%	2%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	82.3	74.3		74.3	74.3			21.7		21.7	21.7	
Effective Green, g (s)	80.3	76.3		76.3	76.3			24.7		24.7	24.7	
Actuated g/C Ratio	0.67	0.64		0.64	0.64			0.21		0.21	0.21	
Clearance Time (s)	3.0	6.0		6.0	6.0			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	289	1164		223	2171			162		276	316	
v/s Ratio Prot	c0.03	c0.46			0.36						c0.15	
v/s Ratio Perm	0.36			0.01				0.03		0.10		
v/c Ratio	0.59	0.73		0.02	0.56			0.13		0.51	0.73	
Uniform Delay, d1	25.0	14.8		8.0	12.3			38.9		42.3	44.6	
Progression Factor	0.98	1.26		0.84	0.83			1.00		1.00	1.00	
Incremental Delay, d2	2.7	3.4		0.1	1.0			0.4		1.6	8.5	
Delay (s)	27.2	22.1		6.9	11.2			39.2		43.9	53.1	
Level of Service	C	C		A	B			D		D	D	
Approach Delay (s)		23.0			11.2			39.2			50.7	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			23.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			84.3%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Elizabeth Street & James Street





















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	167	40	93	490	5	1	40	57	5	23	4
Future Volume (vph)	6	167	40	93	490	5	1	40	57	5	23	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
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	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.98			0.99	
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.97		1.00	1.00			0.94			0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1770	1748		1727	1864			1708			1792	
Flt Permitted	0.40	1.00		0.61	1.00			1.00			0.93	
Satd. Flow (perm)	753	1748		1107	1864			1703			1675	
Peak-hour factor, PHF	0.74	0.86	0.86	0.91	0.85	0.41	0.54	0.55	0.84	0.62	0.91	0.50
Adj. Flow (vph)	8	194	47	102	576	12	2	73	68	8	25	8
RTOR Reduction (vph)	0	5	0	0	0	0	0	52	0	0	7	0
Lane Group Flow (vph)	8	236	0	102	588	0	0	91	0	0	34	0
Confl. Peds. (#/hr)	13		16	16		13	7		13	13		7
Heavy Vehicles (%)	0%	3%	5%	1%	0%	0%	33%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	1	1	0	0	0	1	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	67.3	67.3		67.3	67.3			10.7			10.7	
Effective Green, g (s)	69.3	69.3		69.3	69.3			12.7			12.7	
Actuated g/C Ratio	0.77	0.77		0.77	0.77			0.14			0.14	
Clearance Time (s)	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	
Lane Grp Cap (vph)	579	1345		852	1435			240			236	
v/s Ratio Prot		0.14			c0.32							
v/s Ratio Perm	0.01			0.09				c0.05			0.02	
v/c Ratio	0.01	0.18		0.12	0.41			0.38			0.14	
Uniform Delay, d1	2.4	2.8		2.6	3.5			35.1			33.9	
Progression Factor	1.00	1.00		1.00	0.94			1.00			1.00	
Incremental Delay, d2	0.0	0.3		0.3	0.8			1.0			0.3	
Delay (s)	2.4	3.0		2.9	4.1			36.1			34.2	
Level of Service	A	A		A	A			D			C	
Approach Delay (s)		3.0			3.9			36.1			34.2	
Approach LOS		A			A			D			C	
Intersection Summary												
HCM 2000 Control Delay			8.9			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			53.0%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Elizabeth Street & Lakeshore Road






















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	831	1	7	1040	12	12	1	2	19	1	6
Future Volume (vph)	59	831	1	7	1040	12	12	1	2	19	1	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.3	3.0	3.1	3.3	3.5	3.5	3.5	3.5	3.1	3.3	3.3
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	1.00	1.00	1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00			0.98		1.00	0.97	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00			0.97		0.88	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1733	1837	1428	1691	3444			1694		1388	1585	
Flt Permitted	0.25	1.00	1.00	0.30	1.00			0.78		0.84	1.00	
Satd. Flow (perm)	449	1837	1428	532	3444			1364		1225	1585	
Peak-hour factor, PHF	0.82	0.95	0.25	0.29	0.95	0.76	0.54	0.25	0.50	0.70	0.25	0.71
Adj. Flow (vph)	72	875	4	24	1095	16	22	4	4	27	4	8
RTOR Reduction (vph)	0	0	1	0	0	0	0	4	0	0	7	0
Lane Group Flow (vph)	72	875	3	24	1111	0	0	26	0	27	5	0
Confl. Peds. (#/hr)	27		19	19		27	27		51	51		27
Heavy Vehicles (%)	2%	0%	0%	0%	1%	2%	0%	0%	0%	8%	0%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	99.9	99.9	99.9	100.9	100.9			6.1		6.1	6.1	
Effective Green, g (s)	102.9	102.9	102.9	102.9	102.9			9.1		9.1	9.1	
Actuated g/C Ratio	0.86	0.86	0.86	0.86	0.86			0.08		0.08	0.08	
Clearance Time (s)	7.0	7.0	7.0	6.0	6.0			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	385	1575	1224	456	2953			103		92	120	
v/s Ratio Prot		c0.48			0.32						0.00	
v/s Ratio Perm	0.16		0.00	0.05				0.02		c0.02		
v/c Ratio	0.19	0.56	0.00	0.05	0.38			0.26		0.29	0.04	
Uniform Delay, d1	1.5	2.3	1.2	1.3	1.8			52.3		52.4	51.4	
Progression Factor	0.33	0.30	1.00	0.83	0.72			1.00		1.00	1.00	
Incremental Delay, d2	0.9	1.2	0.0	0.2	0.3			1.3		1.8	0.1	
Delay (s)	1.4	1.9	1.2	1.3	1.6			53.6		54.2	51.5	
Level of Service	A	A	A	A	A			D		D	D	
Approach Delay (s)		1.9			1.6			53.6			53.4	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			3.4			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			73.5%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Pearl Street & Lakeshore Road





















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	749	52	3	1022	48	32	20	6	29	11	29
Future Volume (vph)	45	749	52	3	1022	48	32	20	6	29	11	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.4	3.5	3.5	3.1	3.5	3.3	3.5	3.5	3.5	3.2	3.5	3.5
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	1.00		1.00	0.95			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.94	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			0.99	1.00	0.96	1.00	
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1709	1833		1691	3482			1764	1501	1600	1680	
Flt Permitted	0.24	1.00		0.29	1.00			0.77	1.00	0.63	1.00	
Satd. Flow (perm)	427	1833		511	3482			1403	1501	1057	1680	
Peak-hour factor, PHF	0.74	0.93	0.81	0.37	0.97	0.70	0.57	0.67	0.37	0.92	0.50	0.92
Adj. Flow (vph)	61	805	64	8	1054	69	56	30	16	32	22	32
RTOR Reduction (vph)	0	1	0	0	2	0	0	0	14	0	29	0
Lane Group Flow (vph)	61	868	0	8	1121	0	0	86	2	32	25	0
Confl. Peds. (#/hr)	34		19	19		34	12		15	15		12
Heavy Vehicles (%)	2%	1%	0%	0%	1%	2%	3%	0%	0%	4%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	97.0	97.0		97.0	97.0			11.0	11.0	11.0	11.0	
Effective Green, g (s)	99.0	99.0		99.0	99.0			13.0	13.0	13.0	13.0	
Actuated g/C Ratio	0.82	0.82		0.82	0.82			0.11	0.11	0.11	0.11	
Clearance Time (s)	6.0	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)	352	1512		421	2872			151	162	114	182	
v/s Ratio Prot		c0.47			0.32							0.02
v/s Ratio Perm	0.14			0.02				c0.06	0.00	0.03		
v/c Ratio	0.17	0.57		0.02	0.39			0.57	0.01	0.28	0.14	
Uniform Delay, d1	2.1	3.5		1.9	2.7			50.8	47.8	49.2	48.4	
Progression Factor	0.31	0.31		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	1.4		0.1	0.4			4.9	0.0	1.3	0.4	
Delay (s)	1.6	2.5		1.9	3.1			55.7	47.8	50.6	48.8	
Level of Service	A	A		A	A			E	D	D	D	
Approach Delay (s)		2.4			3.1			54.5			49.4	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			6.9			HCM 2000 Level of Service			A			
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			74.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: John Street & Caroline Street

















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	131	2	34	289	90	20	30	13	68	28	61
Future Volume (Veh/h)	28	131	2	34	289	90	20	30	13	68	28	61
Sign Control	Free				Free				Stop		Stop	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.65	0.77	1.00	0.55	0.89	0.78	0.59	0.54	0.60	0.80	0.92	0.64
Hourly flow rate (vph)	43	170	2	62	325	115	34	56	22	85	30	95
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)										3		
Median type	None						None					
Median storage (veh)												
Upstream signal (m)	69											
pX, platoon unblocked				0.98				0.98	0.98	0.98	0.98	0.98
vC, conflicting volume	440				172			768	821	171	802	764
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	440				152			757	811	151	791	753
tC, single (s)	4.1				4.2			7.2	6.6	6.2	7.1	6.6
tC, 2 stage (s)												
tF (s)	2.2				2.3			3.6	4.1	3.3	3.5	4.1
p0 queue free %	96				95			85	80	98	64	90
cM capacity (veh/h)	1131				1367			229	279	888	234	300
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	43	172	62	440	112	210						
Volume Left	43	0	62	0	34	85						
Volume Right	0	2	0	115	22	95						
cSH	1131	1700	1367	1700	323	458						
Volume to Capacity	0.04	0.10	0.05	0.26	0.35	0.46						
Queue Length 95th (m)	0.9	0.0	1.1	0.0	12.0	18.9						
Control Delay (s)	8.3	0.0	7.8	0.0	22.7	22.1						
Lane LOS	A			A	C		C					
Approach Delay (s)	1.7			1.0	22.7		22.1					
Approach LOS					C		C					
Intersection Summary												
Average Delay				7.7								
Intersection Capacity Utilization				45.9%		ICU Level of Service					A	
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

8: John Street & Maria Street


















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	12	0	3	0	0	0	1	41	0	0	2	34
Future Volume (vph)	12	0	3	0	0	0	1	41	0	0	2	34
Peak Hour Factor	0.68	0.92	0.92	0.92	0.92	0.92	0.75	0.75	0.92	0.92	0.84	0.62
Hourly flow rate (vph)	18	0	3	0	0	0	1	55	0	0	2	55
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	21	0	56	57								
Volume Left (vph)	18	0	1	0								
Volume Right (vph)	3	0	0	55								
Hadj (s)	0.13	0.00	0.06	-0.57								
Departure Headway (s)	4.3	4.1	4.0	3.4								
Degree Utilization, x	0.02	0.00	0.06	0.05								
Capacity (veh/h)	820	847	870	1036								
Control Delay (s)	7.4	7.1	7.3	6.6								
Approach Delay (s)	7.4	0.0	7.3	6.6								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			7.0									
Level of Service			A									
Intersection Capacity Utilization			13.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

9: John Street & James Street


















03/10/2020

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	10	162	15	24	483	1	17	16	16	5	29	12		
Future Volume (Veh/h)	10	162	15	24	483	1	17	16	16	5	29	12		
Sign Control		Free			Free			Stop			Stop			
Grade		0%			0%			0%			0%			
Peak Hour Factor	0.37	0.67	0.57	0.81	0.93	0.64	0.44	0.53	0.74	0.69	0.74	0.67		
Hourly flow rate (vph)	27	242	26	30	519	2	39	30	22	7	39	18		
Pedestrians														
Lane Width (m)														
Walking Speed (m/s)														
Percent Blockage														
Right turn flare (veh)														
Median type	None			None										
Median storage veh														
Upstream signal (m)	69			64										
pX, platoon unblocked	0.90							0.90	0.90			0.90	0.90	0.90
vC, conflicting volume	521				268				926	890	255	926	902	520
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	408				268				859	820	255	860	833	407
tC, single (s)	4.1				4.2				7.5	6.5	6.7	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.3				3.8	4.0	3.7	3.5	4.0	3.3
p0 queue free %	97				98				78	89	97	97	85	97
cM capacity (veh/h)	1042				1235				178	266	686	213	261	581
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1									
Volume Total	295	30	521	91	64									
Volume Left	27	30	0	39	7									
Volume Right	26	0	2	22	18									
cSH	1042	1235	1700	250	300									
Volume to Capacity	0.03	0.02	0.31	0.36	0.21									
Queue Length 95th (m)	0.6	0.6	0.0	12.7	6.3									
Control Delay (s)	1.0	8.0	0.0	27.4	20.2									
Lane LOS	A	A		D	C									
Approach Delay (s)	1.0	0.4		27.4	20.2									
Approach LOS				D	C									
Intersection Summary														
Average Delay	4.3													
Intersection Capacity Utilization	38.6%			ICU Level of Service			A							
Analysis Period (min)	15													

HCM Unsignalized Intersection Capacity Analysis

10: Hotel Driveway/John Street & Lakeshore Road


















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	881	1	3	1046	15	2	1	0	3	0	25
Future Volume (Veh/h)	15	881	1	3	1046	15	2	1	0	3	0	25
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.50	0.70	0.25	0.37	0.72	0.50	0.50	0.25	0.92	0.37	0.92	0.50
Hourly flow rate (vph)	30	1259	4	8	1453	30	4	4	0	8	0	50
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	86			57								
pX, platoon unblocked	0.93			0.61			0.64	0.64	0.61	0.64	0.64	0.93
vC, conflicting volume	1483			1263			2114	2820	1261	2805	2807	742
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1372			1110			2057	3159	1106	3136	3139	576
tC, single (s)	4.5			4.1			7.5	6.5	6.9	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	92			98			76	36	100	0	100	87
cM capacity (veh/h)	380			387			17	6	126	1	6	396
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	30	1263	734	756	8	58						
Volume Left	30	0	8	0	4	8						
Volume Right	0	4	0	30	0	50						
cSH	380	1700	387	1700	9	10						
Volume to Capacity	0.08	0.74	0.02	0.45	0.87	5.82						
Queue Length 95th (m)	2.0	0.0	0.5	0.0	13.3	Err						
Control Delay (s)	15.3	0.0	0.7	0.0	763.2	Err						
Lane LOS	C		A		F	F						
Approach Delay (s)	0.4		0.3		763.2	Err						
Approach LOS					F	F						
Intersection Summary												
Average Delay				206.0								
Intersection Capacity Utilization				56.4%	ICU Level of Service			B				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

11: Elizabeth Street & Caroline Street




















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	167	2	6	370	9	2	17	12	27	43	4
Future Volume (Veh/h)	12	167	2	6	370	9	2	17	12	27	43	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.86	0.65	0.37	0.92	0.92	0.81	0.92	0.45	0.92	0.92	0.49
Hourly flow rate (vph)	13	194	3	16	402	10	2	18	27	29	47	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	133											
pX, platoon unblocked												
vC, conflicting volume	412			197			687	666	196	696	662	407
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	412			197			687	666	196	696	662	407
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	99			99			99	95	97	91	87	99
cM capacity (veh/h)	1147			1388			319	372	828	326	373	644
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1							
Volume Total	210	16	412	47	84							
Volume Left	13	16	0	2	29							
Volume Right	3	0	10	27	8							
cSH	1147	1388	1700	538	370							
Volume to Capacity	0.01	0.01	0.24	0.09	0.23							
Queue Length 95th (m)	0.3	0.3	0.0	2.3	6.9							
Control Delay (s)	0.6	7.6	0.0	12.3	17.6							
Lane LOS	A	A		B	C							
Approach Delay (s)	0.6	0.3		12.3	17.6							
Approach LOS				B	C							
Intersection Summary												
Average Delay	3.0											
Intersection Capacity Utilization	37.4%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

12: Pearl Street & James Street

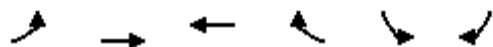
03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	113	58	15	615	20	26	21	209	7	135	8
Future Volume (Veh/h)	8	113	58	15	615	20	26	21	209	7	135	8
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.66	0.82	0.74	0.80	0.87	0.67	0.74	0.85	0.67	0.58	0.77	0.50
Hourly flow rate (vph)	12	138	78	19	707	30	35	25	312	12	175	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	119											
pX, platoon unblocked												
vC, conflicting volume	737			216			1050	976	177	1246	1000	722
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	737			216			1050	976	177	1246	1000	722
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	99			99			55	90	63	86	27	96
cM capacity (veh/h)	878			1366			79	246	848	87	238	430
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	12	216	19	737	372	203						
Volume Left	12	0	19	0	35	12						
Volume Right	0	78	0	30	312	16						
cSH	878	1700	1366	1700	406	223						
Volume to Capacity	0.01	0.13	0.01	0.43	0.92	0.91						
Queue Length 95th (m)	0.3	0.0	0.3	0.0	78.8	60.5						
Control Delay (s)	9.2	0.0	7.7	0.0	58.1	84.6						
Lane LOS	A		A		F	F						
Approach Delay (s)	0.5		0.2		58.1	84.6						
Approach LOS					F	F						
Intersection Summary												
Average Delay	25.0											
Intersection Capacity Utilization	65.0%			ICU Level of Service			C					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

13: Lakeshore Road & Martha Street

03/10/2020







Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	729	1022	65	76	14
Future Volume (Veh/h)	70	729	1022	65	76	14
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.79	0.94	0.95	0.57	0.59	0.64
Hourly flow rate (vph)	89	776	1076	114	129	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		117				
pX, platoon unblocked					0.84	
vC, conflicting volume	1190				2087	1133
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1190				2197	1133
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				0	91
cM capacity (veh/h)	587				36	248
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	89	776	1190	151		
Volume Left	89	0	0	129		
Volume Right	0	0	114	22		
cSH	587	1700	1700	41		
Volume to Capacity	0.15	0.46	0.70	3.69		
Queue Length 95th (m)	4.3	0.0	0.0	Err		
Control Delay (s)	12.2	0.0	0.0	Err		
Lane LOS	B			F		
Approach Delay (s)	1.3		0.0	Err		
Approach LOS				F		
Intersection Summary						
Average Delay			684.9			
Intersection Capacity Utilization			69.9%	ICU Level of Service		C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

14: Brant Street & Elgin Street

03/10/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	67	45	4	256	368	218
Future Volume (Veh/h)	67	45	4	256	368	218
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.74	0.62	0.97	0.92	0.83
Hourly flow rate (vph)	73	61	6	264	400	263
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				162	80	
pX, platoon unblocked	0.96	0.95	0.95			
vC, conflicting volume	676	400	663			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	588	344	620			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	84	91	99			
cM capacity (veh/h)	451	665	887			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	134	270	400	263		
Volume Left	73	6	0	0		
Volume Right	61	0	0	263		
cSH	529	887	1700	1700		
Volume to Capacity	0.25	0.01	0.24	0.15		
Queue Length 95th (m)	8.0	0.2	0.0	0.0		
Control Delay (s)	14.1	0.3	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	14.1	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			33.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

15: Brant Street & Ontario Street

03/10/2020






















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	113	264	256	417	145
Future Volume (Veh/h)	2	113	264	256	417	145
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.88	0.86	0.93	0.87	0.74
Hourly flow rate (vph)	4	128	307	275	479	196
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				56	207	
pX, platoon unblocked	0.74	0.69	0.69			
vC, conflicting volume	1466	577	675			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1167	161	303			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	79	65			
cM capacity (veh/h)	103	613	867			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	132	582	675			
Volume Left	4	307	0			
Volume Right	128	0	196			
cSH	533	867	1700			
Volume to Capacity	0.25	0.35	0.40			
Queue Length 95th (m)	7.8	12.9	0.0			
Control Delay (s)	14.0	8.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	14.0	8.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			4.8			
Intersection Capacity Utilization			76.0%	ICU Level of Service		D
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

16: Brant Street & Ghent Avenue






















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	16	20	111	31	19	16	951	15	26	872	248
Future Volume (vph)	159	16	20	111	31	19	16	951	15	26	872	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00	1.00		0.99		0.99	1.00		0.99	1.00	
Frt		1.00	0.85		0.98		1.00	1.00		1.00	0.97	
Flt Protected		0.96	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1761	1576		1761		1589	3332		1693	3236	
Flt Permitted		0.64	1.00		0.58		0.16	1.00		0.24	1.00	
Satd. Flow (perm)		1187	1576		1066		271	3332		426	3236	
Peak-hour factor, PHF	0.78	0.77	0.59	0.81	0.86	0.78	0.62	0.96	0.87	0.79	0.90	0.87
Adj. Flow (vph)	204	21	34	137	36	24	26	991	17	33	969	285
RTOR Reduction (vph)	0	0	25	0	7	0	0	1	0	0	23	0
Lane Group Flow (vph)	0	225	9	0	190	0	26	1007	0	33	1231	0
Confl. Peds. (#/hr)	7		12	12		7	23		16	16		23
Heavy Vehicles (%)	3%	0%	0%	0%	0%	14%	13%	8%	7%	6%	7%	4%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)		22.9	22.9		22.9		53.1	53.1		53.1	53.1	
Effective Green, g (s)		22.9	22.9		22.9		53.1	53.1		53.1	53.1	
Actuated g/C Ratio		0.25	0.25		0.25		0.59	0.59		0.59	0.59	
Clearance Time (s)		7.0	7.0		7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		302	401		271		159	1965		251	1909	
v/s Ratio Prot								0.30			c0.38	
v/s Ratio Perm		c0.19	0.01		0.18		0.10			0.08		
v/c Ratio		0.75	0.02		0.70		0.16	0.51		0.13	0.64	
Uniform Delay, d1		30.9	25.2		30.5		8.4	10.8		8.2	12.2	
Progression Factor		1.00	1.00		1.00		0.74	0.88		1.00	1.00	
Incremental Delay, d2		9.6	0.0		8.0		2.1	0.9		1.1	1.7	
Delay (s)		40.4	25.2		38.4		8.3	10.5		9.3	13.9	
Level of Service		D	C		D		A	B		A	B	
Approach Delay (s)		38.4			38.4			10.4			13.8	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.6									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			90.0								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

17: Brant Street & Victoria Avenue

03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	27	7	24	20	62	112	561	13	55	578	115
Future Volume (vph)	21	27	7	24	20	62	112	561	13	55	578	115
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	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00		0.99	1.00		0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.90		1.00	0.99		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)	1749	1849		1762	1659		1783	1868		1784	1881	1530
Flt Permitted	0.68	1.00		0.72	1.00		0.37	1.00		0.35	1.00	1.00
Satd. Flow (perm)	1256	1849		1336	1659		702	1868		658	1881	1530
Peak-hour factor, PHF	0.78	0.56	0.87	0.81	0.52	0.80	0.50	0.83	0.50	0.86	0.88	0.76
Adj. Flow (vph)	27	48	8	30	38	78	224	676	26	64	657	151
RTOR Reduction (vph)	0	7	0	0	69	0	0	1	0	0	0	37
Lane Group Flow (vph)	27	49	0	30	47	0	224	701	0	64	657	114
Confl. Peds. (#/hr)	2		24	24		2	25		26	26		25
Heavy Vehicles (%)	3%	0%	0%	0%	0%	3%	0%	1%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			6	
Permitted Phases	4			4			2			6		6
Actuated Green, G (s)	10.1	10.1		10.1	10.1		67.9	67.9		67.9	67.9	67.9
Effective Green, g (s)	10.1	10.1		10.1	10.1		67.9	67.9		67.9	67.9	67.9
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.75	0.75		0.75	0.75	0.75
Clearance Time (s)	6.0	6.0		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	3.0
Lane Grp Cap (vph)	140	207		149	186		529	1409		496	1419	1154
v/s Ratio Prot		0.03			c0.03			c0.38			0.35	
v/s Ratio Perm	0.02			0.02			0.32			0.10		0.07
v/c Ratio	0.19	0.24		0.20	0.25		0.42	0.50		0.13	0.46	0.10
Uniform Delay, d1	36.3	36.4		36.3	36.5		4.0	4.3		3.0	4.2	2.9
Progression Factor	1.00	1.00		1.00	1.00		1.42	1.42		0.38	0.30	0.01
Incremental Delay, d2	0.7	0.6		0.7	0.7		2.3	1.2		0.4	0.9	0.1
Delay (s)	36.9	37.0		37.0	37.2		8.0	7.4		1.6	2.1	0.2
Level of Service	D	D		D	D		A	A		A	A	A
Approach Delay (s)		37.0			37.2			7.5			1.7	
Approach LOS		D			D			A			A	

Intersection Summary

HCM 2000 Control Delay	8.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection Sign configuration not allowed in HCM analysis.

HCM Unsignalized Intersection Capacity Analysis

19: Lakeshore Road & Locust Street

03/10/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	904	1220	102	10	36
Future Volume (Veh/h)	31	904	1220	102	10	36
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.92	0.99	0.72	0.25	0.90
Hourly flow rate (vph)	43	983	1232	142	40	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		182	107			
pX, platoon unblocked	0.81				0.85	0.81
vC, conflicting volume	1374				2372	687
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	992				1685	143
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				42	94
cM capacity (veh/h)	571				68	716
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	43	983	821	553	80	
Volume Left	43	0	0	0	40	
Volume Right	0	0	0	142	40	
cSH	571	1700	1700	1700	125	
Volume to Capacity	0.08	0.58	0.48	0.33	0.64	
Queue Length 95th (m)	1.9	0.0	0.0	0.0	26.8	
Control Delay (s)	11.8	0.0	0.0	0.0	74.7	
Lane LOS	B				F	
Approach Delay (s)	0.5		0.0		74.7	
Approach LOS					F	
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			57.6%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

20: Lakeshore Road & Burlington Avenue

03/10/2020






















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	16	890	1255	11	14	16
Future Volume (vph)	16	890	1255	11	14	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	1.00		0.92	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1504	1759	1738		1708	
Flt Permitted	0.09	1.00	1.00		0.98	
Satd. Flow (perm)	145	1759	1738		1708	
Peak-hour factor, PHF	0.47	0.93	0.93	0.63	0.92	0.75
Adj. Flow (vph)	34	957	1349	17	15	21
RTOR Reduction (vph)	0	0	0	0	20	0
Lane Group Flow (vph)	34	957	1366	0	16	0
Confl. Peds. (#/hr)	34			34	4	
Heavy Vehicles (%)	20%	8%	9%	10%	0%	0%
Turn Type	Perm	NA	NA		Perm	
Protected Phases		2	2			
Permitted Phases	2				4	
Actuated Green, G (s)	100.0	100.0	100.0		8.0	
Effective Green, g (s)	100.0	100.0	100.0		8.0	
Actuated g/C Ratio	0.83	0.83	0.83		0.07	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	120	1465	1448		113	
v/s Ratio Prot		0.54	c0.79			
v/s Ratio Perm	0.23				c0.01	
v/c Ratio	0.28	0.65	0.94		0.15	
Uniform Delay, d1	2.2	3.7	7.8		52.8	
Progression Factor	1.02	1.30	1.04		1.00	
Incremental Delay, d2	3.4	1.3	12.1		0.6	
Delay (s)	5.6	6.1	20.2		53.4	
Level of Service	A	A	C		D	
Approach Delay (s)		6.1	20.2		53.4	
Approach LOS		A	C		D	
Intersection Summary						
HCM 2000 Control Delay			14.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.88			
Actuated Cycle Length (s)			120.0		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

21: East Parking Lot Entrance/Nelson Avenue & Lakeshore Road




















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	890	18	19	1255	17	11	1	7	7	4	278
Future Volume (vph)	53	890	18	19	1255	17	11	1	7	7	4	278
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			7.0			7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00			0.97			0.94	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			0.99			1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.94			0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			1.00	
Satd. Flow (prot)	1703	1863	1514	1805	3519			1591			1524	
Flt Permitted	0.13	1.00	1.00	0.13	1.00			0.83			0.99	
Satd. Flow (perm)	233	1863	1514	238	3519			1353			1510	
Peak-hour factor, PHF	0.90	0.94	0.71	0.64	0.93	0.57	1.00	0.25	0.58	0.44	0.50	0.78
Adj. Flow (vph)	59	947	25	30	1349	30	11	4	12	16	8	356
RTOR Reduction (vph)	0	0	10	0	1	0	0	9	0	0	25	0
Lane Group Flow (vph)	59	947	15	30	1378	0	0	18	0	0	355	0
Confl. Peds. (#/hr)	33		13	13		33	29		13	13		29
Heavy Vehicles (%)	6%	2%	0%	0%	2%	0%	0%	0%	14%	0%	25%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2			4			4		
Actuated Green, G (s)	74.2	74.2	74.2	74.2	74.2			32.8			32.8	
Effective Green, g (s)	74.2	74.2	74.2	74.2	74.2			32.8			32.8	
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.62			0.27			0.27	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			7.0			7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	144	1151	936	147	2175			369			412	
v/s Ratio Prot		c0.51			0.39							
v/s Ratio Perm	0.25		0.01	0.13				0.01			c0.24	
v/c Ratio	0.41	0.82	0.02	0.20	0.63			0.05			0.86	
Uniform Delay, d1	11.7	17.8	8.8	10.0	14.4			32.1			41.5	
Progression Factor	0.93	0.97	1.24	0.71	0.67			1.00			1.00	
Incremental Delay, d2	7.6	6.1	0.0	1.5	0.7			0.1			16.7	
Delay (s)	18.5	23.4	11.0	8.6	10.3			32.2			58.2	
Level of Service	B	C	B	A	B			C			E	
Approach Delay (s)		22.8			10.3			32.2			58.2	
Approach LOS		C			B			C			E	
Intersection Summary												
HCM 2000 Control Delay			21.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			13.0			
Intersection Capacity Utilization			77.9%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

22: West Parking Lot Entrance/Brock Avenue & Lakeshore Road






















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	742	13	1	1633	5	6	1	7	1	0	104
Future Volume (Veh/h)	31	742	13	1	1633	5	6	1	7	1	0	104
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.97	0.75	0.25	0.83	0.42	0.38	0.25	0.58	0.25	0.92	0.90
Hourly flow rate (vph)	38	765	17	4	1967	12	16	4	12	4	0	116
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		125			108							
pX, platoon unblocked	0.75			0.70			0.82	0.82	0.70	0.82	0.82	0.75
vC, conflicting volume	1979			782			1948	2828	765	2836	2839	990
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1635			471			898	1966	446	1975	1979	313
tC, single (s)	4.2			4.1			7.5	6.5	6.9	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	86			99			88	91	97	84	100	76
cM capacity (veh/h)	277			768			133	45	394	25	44	488
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	38	765	17	4	1311	668	32	120				
Volume Left	38	0	0	4	0	0	16	4				
Volume Right	0	0	17	0	0	12	12	116				
cSH	277	1700	1700	768	1700	1700	133	302				
Volume to Capacity	0.14	0.45	0.01	0.01	0.77	0.39	0.24	0.40				
Queue Length 95th (m)	3.8	0.0	0.0	0.1	0.0	0.0	7.1	14.6				
Control Delay (s)	20.0	0.0	0.0	9.7	0.0	0.0	40.3	24.6				
Lane LOS	C			A			E	C				
Approach Delay (s)	0.9			0.0			40.3	24.6				
Approach LOS							E	C				
Intersection Summary												
Average Delay			1.7									
Intersection Capacity Utilization			58.5%			ICU Level of Service			B			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

23: Lakeshore Road & North Shore Boulevard & Maple Avenue





















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	224	600	18	276	1239	103	118	65	116	226	374	496
Future Volume (vph)	224	600	18	276	1239	103	118	65	116	226	374	496
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	7.0
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	0.96		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	0.90		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)	1736	3310		1765	3490		1623	1532		1704	1881	1555
Flt Permitted	0.09	1.00		0.23	1.00		0.21	1.00		0.52	1.00	1.00
Satd. Flow (perm)	158	3310		423	3490		362	1532		939	1881	1555
Peak-hour factor, PHF	0.90	0.80	0.76	0.87	0.92	0.85	0.77	0.91	0.87	0.78	0.94	0.91
Adj. Flow (vph)	249	750	24	317	1347	121	153	71	133	290	398	545
RTOR Reduction (vph)	0	2	0	0	5	0	0	59	0	0	0	187
Lane Group Flow (vph)	249	772	0	317	1463	0	153	145	0	290	398	358
Confl. Peds. (#/hr)	16		30	30		16	23		47	47		23
Heavy Vehicles (%)	4%	8%	18%	2%	1%	12%	11%	4%	9%	4%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	60.8	46.2		64.8	48.2		37.6	29.8		38.8	30.4	30.4
Effective Green, g (s)	60.8	46.2		64.8	48.2		37.6	29.8		38.8	30.4	30.4
Actuated g/C Ratio	0.51	0.39		0.54	0.40		0.31	0.25		0.32	0.25	0.25
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	7.0
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)	272	1274		414	1401		195	380		357	476	393
v/s Ratio Prot	c0.11	0.23		c0.11	c0.42		0.05	0.09		c0.06	0.21	
v/s Ratio Perm	0.35			0.31			0.19			0.21		c0.23
v/c Ratio	0.92	0.61		0.77	1.04		0.78	0.38		0.81	0.84	0.91
Uniform Delay, d1	35.4	29.6		17.9	35.9		34.2	37.5		36.5	42.4	43.5
Progression Factor	1.43	0.80		1.25	0.84		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	32.2	2.1		7.2	34.8		18.4	0.6		13.1	12.1	24.9
Delay (s)	82.8	25.8		29.6	65.0		52.6	38.1		49.7	54.5	68.4
Level of Service	F	C		C	E		D	D		D	D	E
Approach Delay (s)		39.6			58.7			44.3			59.5	
Approach LOS		D			E			D			E	
Intersection Summary												
HCM 2000 Control Delay			53.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				19.0		
Intersection Capacity Utilization			103.9%			ICU Level of Service				G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

24: Brant Hospital Entrance/Apartment Entrance & North Shore Boulevard

03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	800	25	24	1846	0	88	0	42	16	0	8
Future Volume (vph)	17	800	25	24	1846	0	88	0	42	16	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0		7.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99		1.00		0.99	1.00
Frt	1.00	0.99		1.00	1.00		1.00		0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00		0.95	1.00
Satd. Flow (prot)	1805	3542		1804	3574		1759		1586		1794	1404
Flt Permitted	0.06	1.00		0.28	1.00		0.74		1.00		0.95	1.00
Satd. Flow (perm)	116	3542		537	3574		1366		1586		1794	1404
Peak-hour factor, PHF	0.66	0.96	0.69	0.82	0.91	0.80	0.66	0.92	0.57	0.53	0.92	0.40
Adj. Flow (vph)	26	833	36	29	2029	0	133	0	74	30	0	20
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	63	0	0	17
Lane Group Flow (vph)	26	867	0	29	2029	0	133	0	11	0	30	3
Confl. Peds. (#/hr)			5	5			5		5	5		5
Heavy Vehicles (%)	0%	1%	5%	0%	1%	0%	2%	0%	0%	0%	0%	13%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	Perm
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		8
Actuated Green, G (s)	81.0	81.0		88.8	88.8		18.2		18.2		18.2	18.2
Effective Green, g (s)	81.0	81.0		88.8	88.8		18.2		18.2		18.2	18.2
Actuated g/C Ratio	0.68	0.68		0.74	0.74		0.15		0.15		0.15	0.15
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0		7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	78	2390		437	2644		207		240		272	212
v/s Ratio Prot		0.24		0.00	c0.57							
v/s Ratio Perm	0.22			0.05			c0.10		0.01		0.02	0.00
v/c Ratio	0.33	0.36		0.07	0.77		0.64		0.05		0.11	0.01
Uniform Delay, d1	8.2	8.4		4.7	9.4		47.8		43.5		43.9	43.3
Progression Factor	0.91	0.90		0.62	0.62		1.00		1.00		1.00	1.00
Incremental Delay, d2	10.5	0.4		0.0	0.6		6.7		0.1		0.2	0.0
Delay (s)	18.0	7.9		2.9	6.4		54.5		43.6		44.1	43.3
Level of Service	B	A		A	A		D		D		D	D
Approach Delay (s)		8.2			6.4			50.6			43.8	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25: QEW East Ramp Entrance/QEW Toronto On Ramp & North Shore Boulevard

03/10/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑		↖		↗			
Traffic Volume (vph)	0	537	28	0	1546	387	98	0	288	0	0	0
Future Volume (vph)	0	537	28	0	1546	387	98	0	288	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		7.0		7.0			
Lane Util. Factor		0.95			0.95		1.00		1.00			
Frt		0.99			0.97		1.00		0.85			
Flt Protected		1.00			1.00		0.95		1.00			
Satd. Flow (prot)		3475			3432		1787		1568			
Flt Permitted		1.00			1.00		0.95		1.00			
Satd. Flow (perm)		3475			3432		1787		1568			
Peak-hour factor, PHF	0.92	0.85	0.83	0.92	0.87	0.86	0.81	0.92	0.89	0.92	0.92	0.92
Adj. Flow (vph)	0	632	34	0	1777	450	121	0	324	0	0	0
RTOR Reduction (vph)	0	3	0	0	15	0	0	0	288	0	0	0
Lane Group Flow (vph)	0	663	0	0	2212	0	121	0	36	0	0	0
Heavy Vehicles (%)	0%	3%	5%	0%	2%	2%	1%	0%	3%	0%	0%	0%
Turn Type		NA			NA		Perm		Perm			
Protected Phases		2			6							
Permitted Phases							4		4			
Actuated Green, G (s)		93.6			93.6		13.4		13.4			
Effective Green, g (s)		93.6			93.6		13.4		13.4			
Actuated g/C Ratio		0.78			0.78		0.11		0.11			
Clearance Time (s)		6.0			6.0		7.0		7.0			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		2710			2676		199		175			
v/s Ratio Prot		0.19			0.64							
v/s Ratio Perm							0.07		0.02			
v/c Ratio		0.24			0.83		0.61		0.21			
Uniform Delay, d1		3.6			8.2		50.8		48.5			
Progression Factor		1.00			0.51		1.00		1.00			
Incremental Delay, d2		0.2			2.1		5.2		0.6			
Delay (s)		3.8			6.3		56.0		49.1			
Level of Service		A			A		E		D			
Approach Delay (s)		3.8			6.3			50.9			0.0	
Approach LOS		A			A			D			A	




















Intersection Summary

HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

26: Maple Avenue & Driveway/Elgin Street


03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1	7	226	0	220	3	344	21	32	870	5
Future Volume (Veh/h)	7	1	7	226	0	220	3	344	21	32	870	5
Sign Control		Yield			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.45	0.25	0.62	0.76	0.92	0.74	0.92	0.87	0.75	0.59	0.93	0.25
Hourly flow rate (vph)	16	4	11	297	0	297	3	395	28	54	935	20
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)								243			129	
pX, platoon unblocked	0.91	0.91	0.91	0.91	0.91		0.91					
vC, conflicting volume	1554	1482	478	1004	1478	212	955			423		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1412	1333	230	808	1329	212	754			423		
tC, single (s)	7.5	6.5	7.2	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	71	97	98	0	100	63	100			95		
cM capacity (veh/h)	55	134	671	232	135	800	788			1147		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3			
Volume Total	31	297	297	3	263	160	54	623	332			
Volume Left	16	297	0	3	0	0	54	0	0			
Volume Right	11	0	297	0	0	28	0	0	20			
cSH	92	232	800	788	1700	1700	1147	1700	1700			
Volume to Capacity	0.34	1.28	0.37	0.00	0.15	0.09	0.05	0.37	0.20			
Queue Length 95th (m)	10.4	122.8	13.8	0.1	0.0	0.0	1.2	0.0	0.0			
Control Delay (s)	62.9	196.5	12.1	9.6	0.0	0.0	8.3	0.0	0.0			
Lane LOS	F	F	B	A			A					
Approach Delay (s)	62.9	104.3		0.1			0.4					
Approach LOS	F	F										
Intersection Summary												
Average Delay			31.3									
Intersection Capacity Utilization			52.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

27: Maple Avenue & Driveway/Ontario Street

















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕		↕	↕	
Traffic Volume (vph)	3	1	1	231	3	224	0	474	90	58	639	20
Future Volume (vph)	3	1	1	231	3	224	0	474	90	58	639	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0	7.0			7.0		7.0	7.0	
Lane Util. Factor		1.00		1.00	1.00			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		1.00	0.97			0.99		1.00	1.00	
Flpb, ped/bikes		0.99		0.99	1.00			1.00		0.99	1.00	
Frt		0.97		1.00	0.86			0.97		1.00	0.99	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1414		1780	1561			3434		1791	3535	
Flt Permitted		0.83		0.75	1.00			1.00		0.40	1.00	
Satd. Flow (perm)		1206		1400	1561			3434		751	3535	
Peak-hour factor, PHF	0.37	0.25	0.25	0.91	0.37	0.98	0.92	0.89	0.79	0.80	0.95	0.78
Adj. Flow (vph)	8	4	4	254	8	229	0	533	114	72	673	26
RTOR Reduction (vph)	0	3	0	0	173	0	0	19	0	0	3	0
Lane Group Flow (vph)	0	13	0	254	64	0	0	628	0	73	696	0
Confl. Peds. (#/hr)	19		14	14		19	17		13	13		17
Heavy Vehicles (%)	0%	0%	100%	0%	0%	1%	0%	2%	0%	0%	1%	11%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		19.7		19.7	19.7			46.3		46.3	46.3	
Effective Green, g (s)		19.7		19.7	19.7			46.3		46.3	46.3	
Actuated g/C Ratio		0.25		0.25	0.25			0.58		0.58	0.58	
Clearance Time (s)		7.0		7.0	7.0			7.0		7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		296		344	384			1987		434	2045	
v/s Ratio Prot					0.04			0.18			c0.20	
v/s Ratio Perm		0.01		c0.18						0.10		
v/c Ratio		0.04		0.74	0.17			0.32		0.17	0.34	
Uniform Delay, d1		23.0		27.8	23.7			8.7		7.9	8.8	
Progression Factor		1.00		1.26	2.42			1.00		1.00	1.00	
Incremental Delay, d2		0.1		7.9	0.2			0.4		0.8	0.5	
Delay (s)		23.0		42.9	57.7			9.1		8.7	9.3	
Level of Service		C		D	E			A		A	A	
Approach Delay (s)		23.0			50.0			9.1			9.2	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			19.7			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			66.2%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

28: John Street & Pine Street

















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	284	10	7	348	11	14	34	17	19	38	14
Future Volume (vph)	5	284	10	7	348	11	14	34	17	19	38	14
Peak Hour Factor	0.62	0.86	0.74	0.58	0.65	0.62	0.80	0.66	0.79	0.64	0.81	0.64
Hourly flow rate (vph)	8	330	14	12	535	18	18	52	22	30	47	22
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	352	565	92	99								
Volume Left (vph)	8	12	18	30								
Volume Right (vph)	14	18	22	22								
Hadj (s)	0.00	0.04	0.20	0.13								
Departure Headway (s)	5.4	5.1	6.7	6.6								
Degree Utilization, x	0.52	0.80	0.17	0.18								
Capacity (veh/h)	638	691	473	486								
Control Delay (s)	14.1	25.7	11.1	11.1								
Approach Delay (s)	14.1	25.7	11.1	11.1								
Approach LOS	B	D	B	B								
Intersection Summary												
Delay				19.5								
Level of Service				C								
Intersection Capacity Utilization				35.1%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

29: Locust Street & Elgin Street

















03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	27	55	10	33	223	24	71	87	46	7	36	25
Future Volume (vph)	27	55	10	33	223	24	71	87	46	7	36	25
Peak Hour Factor	0.62	0.56	0.74	0.64	0.81	0.71	0.75	0.75	0.71	0.43	0.67	0.85
Hourly flow rate (vph)	44	98	14	52	275	34	95	116	65	16	54	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	156	361	276	99								
Volume Left (vph)	44	52	95	16								
Volume Right (vph)	14	34	65	29								
Hadj (s)	0.02	-0.03	-0.06	-0.14								
Departure Headway (s)	5.6	5.2	5.4	5.7								
Degree Utilization, x	0.24	0.52	0.42	0.16								
Capacity (veh/h)	583	655	611	553								
Control Delay (s)	10.3	13.7	12.2	9.7								
Approach Delay (s)	10.3	13.7	12.2	9.7								
Approach LOS	B	B	B	A								
Intersection Summary												
Delay				12.2								
Level of Service				B								
Intersection Capacity Utilization				41.0%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

30: Elizabeth Street & Pine Street

03/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	163	142	25	10	167	30	21	12	17	18	25	181
Future Volume (vph)	163	142	25	10	167	30	21	12	17	18	25	181
Peak Hour Factor	0.45	0.59	0.77	0.50	0.72	0.74	0.53	0.75	0.78	0.71	0.88	0.50
Hourly flow rate (vph)	362	241	32	20	232	41	40	16	22	25	28	362
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	635	293	78	415								
Volume Left (vph)	362	20	40	25								
Volume Right (vph)	32	41	22	362								
Hadj (s)	0.10	-0.04	-0.04	-0.51								
Departure Headway (s)	6.4	6.7	7.8	6.3								
Degree Utilization, x	1.13	0.55	0.17	0.72								
Capacity (veh/h)	558	506	402	415								
Control Delay (s)	101.3	17.6	12.4	23.8								
Approach Delay (s)	101.3	17.6	12.4	23.8								
Approach LOS	F	C	B	C								
Intersection Summary												
Delay				56.5								
Level of Service				F								
Intersection Capacity Utilization				52.9%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis

118: Martha Street & New Street

03/10/2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	635	349	0	322	42	5
Future Volume (vph)	635	349	0	322	42	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	0.98	1.00		1.00	0.99	1.00
Frt	1.00	0.85		0.86	1.00	1.00
Flt Protected	0.95	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1646	1517		1550	1782	1583
Flt Permitted	0.95	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1646	1517		1550	1782	1583
Peak-hour factor, PHF	0.92	0.72	0.92	0.84	0.74	0.62
Adj. Flow (vph)	690	485	0	383	57	8
RTOR Reduction (vph)	0	50	0	78	0	0
Lane Group Flow (vph)	690	435	0	305	57	8
Confl. Peds. (#/hr)	6	5			5	
Heavy Vehicles (%)	8%	3%	2%	6%	0%	20%
Turn Type	Perm	Perm		Perm	Perm	NA
Protected Phases						8
Permitted Phases	6	6		2	8	
Actuated Green, G (s)	71.6	71.6		71.6	7.4	7.4
Effective Green, g (s)	71.6	71.6		71.6	7.4	7.4
Actuated g/C Ratio	0.80	0.80		0.80	0.08	0.08
Clearance Time (s)	6.0	6.0		6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	1309	1206		1233	146	130
v/s Ratio Prot						0.01
v/s Ratio Perm	c0.42	0.29		0.20	c0.03	
v/c Ratio	0.53	0.36		0.25	0.39	0.06
Uniform Delay, d1	3.2	2.6		2.3	39.2	38.1
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.5	0.8		0.5	1.7	0.2
Delay (s)	4.8	3.5		2.8	40.9	38.3
Level of Service	A	A		A	D	D
Approach Delay (s)	4.2		2.8			40.6
Approach LOS	A		A			D

Intersection Summary

HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Brant Street & Caroline Street

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	TR
Maximum Queue (m)	45.3	11.8	9.2	1.8	48.7	18.2	67.0	59.8	167.5
Average Queue (m)	24.6	2.8	1.0	0.1	38.8	3.9	26.8	14.7	83.8
95th Queue (m)	40.1	9.9	5.6	1.3	55.2	13.2	54.6	39.5	159.1
Link Distance (m)		178.6			45.6		182.8	339.7	339.7
Upstream Blk Time (%)					7				
Queuing Penalty (veh)					26				
Storage Bay Dist (m)	45.0		14.0	22.0		18.0			
Storage Blk Time (%)	0	0	0		31	0	15		
Queuing Penalty (veh)	0	1	0		0	1	3		

Intersection: 2: Brant Street & James Street

Movement	WB	WB	NB	NB	SB	SB
Directions Served	L	R	T	R	L	T
Maximum Queue (m)	47.4	46.2	71.0	18.5	24.5	51.6
Average Queue (m)	32.2	25.0	32.5	8.9	18.8	37.6
95th Queue (m)	50.2	44.3	63.9	21.8	30.7	56.9
Link Distance (m)	43.9	43.9	60.2			36.9
Upstream Blk Time (%)	4	3	3			20
Queuing Penalty (veh)	11	8	11			105
Storage Bay Dist (m)				11.0	17.0	
Storage Blk Time (%)			33	2	12	32
Queuing Penalty (veh)			19	5	45	52

Intersection: 3: Brant Street & Lakeshore Road

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	T	TR	LTR	L	TR
Maximum Queue (m)	59.9	96.3	5.8	71.3	78.8	15.2	151.9	23.5
Average Queue (m)	36.7	88.3	0.2	56.4	60.5	4.0	119.4	23.5
95th Queue (m)	73.2	99.5	4.2	64.6	72.9	12.1	169.4	23.8
Link Distance (m)		86.8		48.7	48.7	271.3	141.2	
Upstream Blk Time (%)		27		75	66		12	
Queuing Penalty (veh)		250		402	354		51	
Storage Bay Dist (m)	50.0		23.0					16.0
Storage Blk Time (%)	0	41		92			17	77
Queuing Penalty (veh)	1	59		1			61	85

Intersection: 4: Elizabeth Street & James Street

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	9.3	36.2	36.0	69.2	32.2	20.6
Average Queue (m)	1.7	12.8	10.6	28.7	13.9	7.8
95th Queue (m)	7.5	30.4	25.1	56.3	25.4	17.7
Link Distance (m)		43.0		100.9	167.3	242.4
Upstream Blk Time (%)		0		0		
Queuing Penalty (veh)		0		3		
Storage Bay Dist (m)	12.0		36.0			
Storage Blk Time (%)	0	6		4		
Queuing Penalty (veh)	0	0		4		

Intersection: 5: Elizabeth Street & Lakeshore Road

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	L	T	TR	LTR	L	TR
Maximum Queue (m)	20.4	37.0	31.7	112.1	113.8	46.1	20.0	19.4
Average Queue (m)	4.8	20.3	4.1	105.1	106.7	21.0	6.0	4.0
95th Queue (m)	13.8	38.5	26.6	109.4	112.0	52.0	16.8	12.5
Link Distance (m)		28.0		99.9	99.9	213.3		80.6
Upstream Blk Time (%)	0	6		70	64			
Queuing Penalty (veh)	0	52		381	348			
Storage Bay Dist (m)	72.0		35.0				16.0	
Storage Blk Time (%)	0	14		97			5	7
Queuing Penalty (veh)	0	8		7			0	1

Intersection: 6: Pearl Street & Lakeshore Road

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	TR	LT	R	L	TR
Maximum Queue (m)	14.5	60.2	12.1	106.7	112.1	131.5	12.6	14.4	26.9
Average Queue (m)	5.3	18.2	0.6	99.0	99.9	70.8	1.6	6.4	10.5
95th Queue (m)	13.9	43.6	6.7	104.2	108.7	181.2	9.8	14.9	22.5
Link Distance (m)		99.9		96.5	96.5	304.9			273.0
Upstream Blk Time (%)		0		59	37				
Queuing Penalty (veh)		2		307	192				
Storage Bay Dist (m)	49.0		19.0				15.0	7.0	
Storage Blk Time (%)		1		97		66	0	22	24
Queuing Penalty (veh)		0		3		4	0	9	7

Intersection: 7: John Street & Caroline Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	LT	R
Maximum Queue (m)	9.9	1.3	21.4	43.7	23.4	9.1	27.8	21.8
Average Queue (m)	2.1	0.0	1.4	7.8	9.1	3.7	11.8	9.6
95th Queue (m)	7.7	0.9	10.1	28.3	18.6	10.8	21.4	17.0
Link Distance (m)		45.6		43.4	94.3		156.2	
Upstream Blk Time (%)			0	0				
Queuing Penalty (veh)			0	1				
Storage Bay Dist (m)	18.0		35.0			24.0		31.0
Storage Blk Time (%)	0			1	0		0	0
Queuing Penalty (veh)	0			0	0		0	0

Intersection: 8: John Street & Maria Street

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (m)	13.7	13.1	9.2
Average Queue (m)	3.6	7.0	6.1
95th Queue (m)	11.3	13.9	13.0
Link Distance (m)	47.2	127.4	94.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 9: John Street & James Street

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	TR	LT	R	LT	R
Maximum Queue (m)	9.3	18.9	42.5	22.3	21.6	16.0	8.6
Average Queue (m)	0.7	1.6	6.6	6.4	5.6	5.5	3.1
95th Queue (m)	4.8	9.3	28.8	16.1	17.9	12.8	9.7
Link Distance (m)	43.9		43.0	165.9		127.4	
Upstream Blk Time (%)			2				
Queuing Penalty (veh)			7				
Storage Bay Dist (m)		17.0			14.0		24.0
Storage Blk Time (%)		0	4	1	1	0	
Queuing Penalty (veh)		0	1	0	0	0	

Intersection: 10: Hotel Driveway/John Street & Lakeshore Road

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	LT	TR	LTR	LTR
Maximum Queue (m)	14.3	47.3	49.1	50.6	8.1	33.1
Average Queue (m)	1.7	9.3	37.7	39.3	1.1	8.7
95th Queue (m)	7.6	32.9	46.6	50.4	5.3	23.8
Link Distance (m)		48.7	28.0	28.0	240.8	57.4
Upstream Blk Time (%)		1	77	70		
Queuing Penalty (veh)		5	407	368		
Storage Bay Dist (m)	14.0					
Storage Blk Time (%)	0	4				
Queuing Penalty (veh)	1	1				

Intersection: 11: Elizabeth Street & Caroline Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (m)	11.9	5.4	15.4	16.1	21.7
Average Queue (m)	1.3	0.2	0.6	6.4	9.8
95th Queue (m)	6.8	2.2	6.3	14.7	18.0
Link Distance (m)	43.4		110.1	242.4	125.4
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		6.0			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		0	0		

Intersection: 12: Pearl Street & James Street

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	9.2	5.2	8.6	14.6	45.7	47.3
Average Queue (m)	1.5	0.3	1.2	0.6	18.5	17.2
95th Queue (m)	7.0	2.8	6.1	10.9	33.1	33.1
Link Distance (m)		100.9		99.5	273.0	120.9
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	38.0		30.0			
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Intersection: 13: Lakeshore Road & Martha Street

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (m)	20.4	77.9	709.6	37.6
Average Queue (m)	6.5	6.0	696.8	13.8
95th Queue (m)	17.1	42.0	804.7	27.5
Link Distance (m)		96.5	705.0	
Upstream Blk Time (%)		0	92	
Queuing Penalty (veh)		3	0	
Storage Bay Dist (m)	18.0			
Storage Blk Time (%)	1	2		
Queuing Penalty (veh)	7	1		

Intersection: 14: Brant Street & Elgin Street

Movement	EB	NB	SB	SB
Directions Served	LR	LT	T	R
Maximum Queue (m)	28.0	38.8	63.7	18.8
Average Queue (m)	10.3	3.3	17.4	6.8
95th Queue (m)	19.6	21.3	59.4	20.4
Link Distance (m)	43.0	141.2	60.2	
Upstream Blk Time (%)			5	
Queuing Penalty (veh)			29	
Storage Bay Dist (m)				11.0
Storage Blk Time (%)			14	0
Queuing Penalty (veh)			30	1

Intersection: 15: Brant Street & Ontario Street

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (m)	32.1	42.8	138.1
Average Queue (m)	15.9	35.2	36.9
95th Queue (m)	27.5	49.9	115.5
Link Distance (m)	809.0	36.9	182.8
Upstream Blk Time (%)		14	1
Queuing Penalty (veh)		75	6
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 16: Brant Street & Ghent Avenue

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	L	T	TR
Maximum Queue (m)	59.7	28.3	60.7	22.5	47.8	49.7	35.5	203.1	185.2
Average Queue (m)	30.4	4.6	23.7	5.2	29.1	29.0	6.3	103.0	64.9
95th Queue (m)	52.3	17.0	43.6	16.0	44.9	48.6	22.2	189.8	171.7
Link Distance (m)	255.8		229.2		38.9	38.9		256.2	256.2
Upstream Blk Time (%)				0	2	2		1	0
Queuing Penalty (veh)				0	6	7		0	0
Storage Bay Dist (m)		25.0		45.0			30.0		
Storage Blk Time (%)	16	0		0	2		0	30	
Queuing Penalty (veh)	3	0		0	0		0	8	

Intersection: 17: Brant Street & Victoria Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	T	R
Maximum Queue (m)	18.0	23.0	19.8	34.9	27.3	96.1	25.8	57.3	24.1
Average Queue (m)	5.1	6.3	5.7	11.5	15.7	40.2	6.3	23.5	6.1
95th Queue (m)	14.0	16.3	15.0	24.3	29.3	83.2	17.4	45.5	17.3
Link Distance (m)		215.8		197.6		339.7		591.7	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	20.0		30.0		20.0		45.0		50.0
Storage Blk Time (%)	0	1		0	6	13		1	
Queuing Penalty (veh)	0	0		0	35	15		1	

Intersection: 18: Martha Street & James Street

Movement	EB	SB
Directions Served	L	R
Maximum Queue (m)	14.4	35.8
Average Queue (m)	1.1	8.9
95th Queue (m)	7.0	30.0
Link Distance (m)	99.5	16.4
Upstream Blk Time (%)		2
Queuing Penalty (veh)		11
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 19: Lakeshore Road & Locust Street

Movement	EB	EB	B57	WB	WB	SB
Directions Served	L	T	T	T	TR	LR
Maximum Queue (m)	67.6	112.3	99.0	103.3	109.3	26.8
Average Queue (m)	14.5	77.7	32.9	92.6	91.8	10.9
95th Queue (m)	53.4	131.6	99.7	105.0	122.2	21.9
Link Distance (m)		79.1	69.4	86.8	86.8	135.5
Upstream Blk Time (%)	0	22	10	38	28	
Queuing Penalty (veh)	0	195	91	254	186	
Storage Bay Dist (m)	170.0					
Storage Blk Time (%)	0	22				
Queuing Penalty (veh)	0	7				

Intersection: 20: Lakeshore Road & Burlington Avenue

Movement	EB	EB	B74	WB	B57	B57	SB
Directions Served	L	T	T	TR	T		LR
Maximum Queue (m)	43.4	149.5	36.5	101.0	100.1	87.3	23.0
Average Queue (m)	3.7	60.5	3.6	92.3	88.1	11.1	9.1
95th Queue (m)	23.2	153.2	23.9	97.0	100.0	57.5	20.2
Link Distance (m)		151.8	51.2	69.4	79.1	79.1	138.7
Upstream Blk Time (%)		2	0	64	35	1	
Queuing Penalty (veh)		19	2	798	222	9	
Storage Bay Dist (m)	75.0						
Storage Blk Time (%)		10					
Queuing Penalty (veh)		2					

Intersection: 21: East Parking Lot Entrance/Nelson Avenue & Lakeshore Road

Movement	EB	EB	EB	WB	WB	WB	B74	NB	SB
Directions Served	L	T	R	L	T	TR	T	LTR	LTR
Maximum Queue (m)	37.2	94.0	11.5	32.3	75.8	76.6	156.0	15.2	93.4
Average Queue (m)	10.4	74.2	1.8	7.9	70.1	70.6	153.0	3.0	53.4
95th Queue (m)	31.2	105.9	7.7	28.3	78.0	78.4	164.9	10.1	80.8
Link Distance (m)		88.0	88.0		51.2	51.2	151.8	110.3	119.0
Upstream Blk Time (%)		5			52	50	20		
Queuing Penalty (veh)		20			330	321	258		
Storage Bay Dist (m)	30.0			25.0					
Storage Blk Time (%)	0	29		0	77				
Queuing Penalty (veh)	0	16		0	15				

Intersection: 22: West Parking Lot Entrance/Brock Avenue & Lakeshore Road

Movement	EB	EB	WB	WB	WB	NB	SB	B71
Directions Served	L	T	L	T	TR	LTR	LTR	T
Maximum Queue (m)	26.5	62.0	3.2	99.8	98.3	24.7	40.8	23.6
Average Queue (m)	6.2	10.1	0.1	93.0	93.2	6.3	24.0	3.7
95th Queue (m)	17.4	39.2	1.6	96.5	96.5	21.4	41.0	16.4
Link Distance (m)		102.2		88.0	88.0	100.1	14.7	152.3
Upstream Blk Time (%)				31	36		48	
Queuing Penalty (veh)				240	274		0	
Storage Bay Dist (m)	30.0		30.0					
Storage Blk Time (%)	0	2		55				
Queuing Penalty (veh)	0	1		1				

Intersection: 23: Lakeshore Road & North Shore Boulevard & Maple Avenue

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	R
Maximum Queue (m)	97.8	106.0	98.3	37.4	119.2	128.6	58.9	78.3	67.5	167.0	157.6
Average Queue (m)	47.3	66.1	40.3	33.2	107.4	117.2	27.9	28.7	51.9	81.8	75.3
95th Queue (m)	84.3	103.6	86.9	45.4	115.2	127.9	48.6	57.1	80.7	146.6	141.1
Link Distance (m)		240.5	240.5		102.2	102.2		145.5		213.0	213.0
Upstream Blk Time (%)					43	46					0
Queuing Penalty (veh)					375	401					0
Storage Bay Dist (m)	150.0			30.0			120.0		60.0		
Storage Blk Time (%)				28	49				2	20	
Queuing Penalty (veh)				175	135				9	46	

Intersection: 24: Brant Hospital Entrance/Apartment Entrance & North Shore Boulevard

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	LT	R
Maximum Queue (m)	16.2	63.6	46.4	15.9	58.4	61.6	42.7	14.7	14.6	11.4
Average Queue (m)	4.3	27.6	14.0	3.1	27.6	35.6	21.0	6.5	4.2	2.3
95th Queue (m)	12.4	54.6	33.8	10.5	51.8	58.3	37.2	13.3	12.0	8.5
Link Distance (m)		94.2	94.2		240.5	240.5	169.0	169.0	111.1	111.1
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	83.0			50.0						
Storage Blk Time (%)						1				
Queuing Penalty (veh)						0				

Intersection: 25: QEW East Ramp Entrance/QEW Toronto On Ramp & North Shore Boulevard

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	T	TR	L
Maximum Queue (m)	35.6	25.4	43.8	50.0	48.9
Average Queue (m)	12.7	7.8	13.9	17.6	22.6
95th Queue (m)	28.2	20.7	33.6	37.5	41.0
Link Distance (m)	1122.8	1122.8	94.2	94.2	622.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 26: Maple Avenue & Driveway/Elgin Street

Movement	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	TR	L	T	TR
Maximum Queue (m)	11.2	45.0	79.1	5.3	1.2	9.1	0.9	1.7
Average Queue (m)	2.0	27.0	16.7	0.3	0.0	2.4	0.0	0.1
95th Queue (m)	7.3	45.7	45.4	2.6	0.9	7.8	0.7	1.2
Link Distance (m)	123.7		676.9		213.0		101.8	101.8
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)		38.0		38.0		30.0		
Storage Blk Time (%)		8						
Queuing Penalty (veh)		18						

Intersection: 27: Maple Avenue & Driveway/Ontario Street

Movement	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	T	TR	L	T	TR
Maximum Queue (m)	12.3	51.4	77.6	36.8	42.7	33.9	58.3	50.9
Average Queue (m)	1.0	30.6	20.5	15.8	22.6	9.3	26.1	22.3
95th Queue (m)	5.9	51.4	52.7	31.2	38.6	22.1	48.5	41.4
Link Distance (m)	145.4		809.0	101.8	101.8		167.8	167.8
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)		45.0				30.0		
Storage Blk Time (%)		3	0	0			5	
Queuing Penalty (veh)		7	0	0			3	

Intersection: 28: John Street & Pine Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	33.0	31.4	25.9	22.0
Average Queue (m)	20.0	16.1	9.7	10.1
95th Queue (m)	31.7	26.4	19.7	18.8
Link Distance (m)	28.4	38.3	57.4	165.9
Upstream Blk Time (%)	1	0		
Queuing Penalty (veh)	0	0		
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 29: Locust Street & Elgin Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	18.8	26.5	24.4	16.1
Average Queue (m)	10.3	15.6	12.3	8.5
95th Queue (m)	15.3	24.0	19.4	14.5
Link Distance (m)	676.9	25.5	135.5	113.2
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		1		
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 30: Elizabeth Street & Pine Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	30.6	26.4	16.1	27.0
Average Queue (m)	15.7	14.1	7.2	14.8
95th Queue (m)	25.8	22.2	14.8	23.8
Link Distance (m)	38.3	79.7	80.6	167.3
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 118: Martha Street & New Street

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	R	L	T
Maximum Queue (m)	110.9	27.5	23.4	24.2	12.0
Average Queue (m)	39.4	12.2	6.7	10.1	1.1
95th Queue (m)	94.6	33.2	18.9	20.7	7.0
Link Distance (m)	565.7		16.4		172.9
Upstream Blk Time (%)			1		
Queuing Penalty (veh)			3		
Storage Bay Dist (m)		20.0		20.0	
Storage Blk Time (%)	9	0		3	0
Queuing Penalty (veh)	31	2		0	0

Network Summary

Network wide Queuing Penalty: 8380























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Appendix D: 2031 Preferred Land Use Scenario with AT Improvements (Scenario 1) Synchro and SimTraffic Reports

HCM Signalized Intersection Capacity Analysis

1: Brant Street & Caroline Street

03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	20	6	1	222	116	18	237	22	91	525	41
Future Volume (vph)	197	20	6	1	222	116	18	237	22	91	525	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.1	3.1	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.0	3.0	3.0
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	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.91	1.00	0.97		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	0.93	1.00		0.97	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1705	1794	1390	1558	1657		1634	1691		1642	1696	
Flt Permitted	0.16	1.00	1.00	0.74	1.00		0.25	1.00		0.40	1.00	
Satd. Flow (perm)	278	1794	1390	1218	1657		437	1691		692	1696	
Peak-hour factor, PHF	0.90	0.91	0.58	0.80	0.80	0.90	0.84	0.91	0.79	0.90	0.92	0.66
Adj. Flow (vph)	219	22	10	1	278	129	21	260	28	101	571	62
RTOR Reduction (vph)	0	0	6	0	19	0	0	4	0	0	4	0
Lane Group Flow (vph)	219	22	4	1	388	0	21	284	0	101	629	0
Confl. Peds. (#/hr)	31		28	28		31	52		69	69		52
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	2%	0%	0%	2%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	38.0	38.0	38.0	23.7	23.7		31.4	31.4		40.0	40.0	
Effective Green, g (s)	37.0	40.0	40.0	25.7	25.7		33.4	33.4		39.0	42.0	
Actuated g/C Ratio	0.41	0.44	0.44	0.29	0.29		0.37	0.37		0.43	0.47	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	5.0	5.0	5.0	5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	277	797	617	347	473		162	627		348	791	
v/s Ratio Prot	c0.09	0.01			c0.23			0.17		0.01	c0.37	
v/s Ratio Perm	0.23		0.00	0.00			0.05			0.11		
v/c Ratio	0.79	0.03	0.01	0.00	0.82		0.13	0.45		0.29	0.79	
Uniform Delay, d1	20.5	14.1	13.9	23.0	30.0		18.7	21.4		16.1	20.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.04	0.85	
Incremental Delay, d2	14.2	0.1	0.0	0.0	14.8		1.6	2.3		0.4	7.5	
Delay (s)	34.7	14.1	14.0	23.0	44.8		20.3	23.7		17.1	24.8	
Level of Service	C	B	B	C	D		C	C		B	C	
Approach Delay (s)		32.0			44.7			23.5			23.7	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			29.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			81.0%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Brant Street & James Street

03/17/2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	219	264	256	59	162	367
Future Volume (vph)	219	264	256	59	162	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.5	3.1	3.1	3.5
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
Frpb, ped/bikes	1.00	0.96	1.00	0.90	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.98	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1656	1442	1773	1320	1585	1740
Flt Permitted	0.95	1.00	1.00	1.00	0.51	1.00
Satd. Flow (perm)	1656	1442	1773	1320	853	1740
Peak-hour factor, PHF	0.93	0.85	0.79	0.82	0.80	0.95
Adj. Flow (vph)	235	311	324	72	202	386
RTOR Reduction (vph)	0	238	0	18	0	0
Lane Group Flow (vph)	235	73	324	54	203	386
Confl. Peds. (#/hr)	21	15		57	57	
Heavy Vehicles (%)	9%	7%	6%	4%	5%	8%
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		2		1	2
Permitted Phases		4		2	2	
Actuated Green, G (s)	16.7	16.7	42.1	42.1	48.3	42.1
Effective Green, g (s)	18.7	18.7	44.1	44.1	46.3	44.1
Actuated g/C Ratio	0.23	0.23	0.55	0.55	0.58	0.55
Clearance Time (s)	6.0	6.0	6.0	6.0	3.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	387	337	977	727	541	959
v/s Ratio Prot	c0.14		0.18		c0.02	c0.22
v/s Ratio Perm		0.05		0.04	0.19	
v/c Ratio	0.61	0.22	0.33	0.07	0.38	0.40
Uniform Delay, d1	27.4	24.7	9.9	8.4	11.3	10.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	0.3	0.9	0.2	0.4	1.3
Delay (s)	30.1	25.1	10.8	8.6	11.7	11.6
Level of Service	C	C	B	A	B	B
Approach Delay (s)	27.2		10.4			11.6
Approach LOS	C		B			B




















Intersection Summary

HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

3: Brant Street & Lakeshore Road




















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	790	10	1	977	69	6	5	2	111	13	345
Future Volume (vph)	145	790	10	1	977	69	6	5	2	111	13	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.3	3.5	3.5
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	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	1.00		1.00	0.99			0.98		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1683	1749		1685	3260			1770		1722	1537	
Flt Permitted	0.17	1.00		0.19	1.00			0.41		0.74	1.00	
Satd. Flow (perm)	296	1749		332	3260			743		1344	1537	
Peak-hour factor, PHF	0.85	0.95	0.56	0.25	0.86	0.85	0.50	0.62	0.50	0.79	0.74	0.92
Adj. Flow (vph)	171	832	18	4	1136	81	12	8	4	141	18	375
RTOR Reduction (vph)	0	0	0	0	3	0	0	3	0	0	172	0
Lane Group Flow (vph)	171	850	0	4	1214	0	0	21	0	141	221	0
Confl. Peds. (#/hr)	28		12	28		12	31		7	7		31
Heavy Vehicles (%)	0%	1%	0%	0%	2%	2%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	82.9	74.3		74.3	74.3			21.1		21.1	21.1	
Effective Green, g (s)	80.9	76.3		76.3	76.3			24.1		24.1	24.1	
Actuated g/C Ratio	0.67	0.64		0.64	0.64			0.20		0.20	0.20	
Clearance Time (s)	3.0	6.0		6.0	6.0			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	287	1112		211	2072			149		269	308	
v/s Ratio Prot	c0.04	c0.49			0.37						c0.14	
v/s Ratio Perm	0.36			0.01				0.03		0.10		
v/c Ratio	0.60	0.76		0.02	0.59			0.14		0.52	0.72	
Uniform Delay, d1	25.1	15.5		8.1	12.7			39.4		42.8	44.8	
Progression Factor	0.96	1.28		0.82	0.82			1.00		1.00	1.00	
Incremental Delay, d2	2.7	4.1		0.2	1.2			0.4		1.8	7.8	
Delay (s)	26.8	24.0		6.7	11.6			39.9		44.7	52.5	
Level of Service	C	C		A	B			D		D	D	
Approach Delay (s)		24.4			11.6			39.9			50.5	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			23.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			84.3%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Elizabeth Street & James Street





















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	167	40	93	490	5	1	40	57	5	23	4
Future Volume (vph)	6	167	40	93	490	5	1	40	57	5	23	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0		6.0	6.0			7.0			7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.98			0.99	
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.97		1.00	1.00			0.94			0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1769	1748		1727	1864			1708			1792	
Flt Permitted	0.41	1.00		0.61	1.00			1.00			0.89	
Satd. Flow (perm)	762	1748		1107	1864			1702			1615	
Peak-hour factor, PHF	0.74	0.86	0.86	0.91	0.85	0.41	0.54	0.55	0.84	0.62	0.91	0.50
Adj. Flow (vph)	8	194	47	102	576	12	2	73	68	8	25	8
RTOR Reduction (vph)	0	5	0	0	1	0	0	48	0	0	7	0
Lane Group Flow (vph)	8	236	0	102	587	0	0	95	0	0	34	0
Confl. Peds. (#/hr)	13		16	16		13	7		13	13		7
Heavy Vehicles (%)	0%	3%	5%	1%	0%	0%	33%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	1	1	0	0	0	1	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	67.2	67.2		67.2	67.2			10.8			10.8	
Effective Green, g (s)	67.2	67.2		67.2	67.2			9.8			9.8	
Actuated g/C Ratio	0.75	0.75		0.75	0.75			0.11			0.11	
Clearance Time (s)	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	
Lane Grp Cap (vph)	568	1305		826	1391			185			175	
v/s Ratio Prot		0.13			c0.32							
v/s Ratio Perm	0.01			0.09				c0.06			0.02	
v/c Ratio	0.01	0.18		0.12	0.42			0.51			0.19	
Uniform Delay, d1	2.9	3.3		3.2	4.2			37.8			36.5	
Progression Factor	1.00	1.00		1.00	0.96			1.00			1.00	
Incremental Delay, d2	0.0	0.3		0.3	0.9			2.4			0.5	
Delay (s)	3.0	3.6		3.5	5.0			40.2			37.1	
Level of Service	A	A		A	A			D			D	
Approach Delay (s)		3.6			4.8			40.2			37.1	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			10.2			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			13.0			
Intersection Capacity Utilization			58.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Elizabeth Street & Lakeshore Road





















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	831	1	7	1040	12	12	1	2	19	1	6
Future Volume (vph)	59	831	1	7	1040	12	12	1	2	19	1	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.1	3.3	3.3
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	1.00	1.00	1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00			0.98		1.00	0.97	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00			0.97		0.88	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1636	1773	1428	1671	3325			1694		1388	1585	
Flt Permitted	0.25	1.00	1.00	0.30	1.00			0.78		0.84	1.00	
Satd. Flow (perm)	424	1773	1428	525	3325			1364		1225	1585	
Peak-hour factor, PHF	0.82	0.95	0.25	0.29	0.95	0.76	0.54	0.25	0.50	0.70	0.25	0.71
Adj. Flow (vph)	72	875	4	24	1095	16	22	4	4	27	4	8
RTOR Reduction (vph)	0	0	1	0	0	0	0	4	0	0	7	0
Lane Group Flow (vph)	72	875	3	24	1111	0	0	26	0	27	5	0
Confl. Peds. (#/hr)	27		19	19		27	27		51	51		27
Heavy Vehicles (%)	2%	0%	0%	0%	1%	2%	0%	0%	0%	8%	0%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	99.9	99.9	99.9	100.9	100.9			6.1		6.1	6.1	
Effective Green, g (s)	102.9	102.9	102.9	102.9	102.9			9.1		9.1	9.1	
Actuated g/C Ratio	0.86	0.86	0.86	0.86	0.86			0.08		0.08	0.08	
Clearance Time (s)	7.0	7.0	7.0	6.0	6.0			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	363	1520	1224	450	2851			103		92	120	
v/s Ratio Prot		c0.49			0.33						0.00	
v/s Ratio Perm	0.17		0.00	0.05				0.02		c0.02		
v/c Ratio	0.20	0.58	0.00	0.05	0.39			0.26		0.29	0.04	
Uniform Delay, d1	1.5	2.4	1.2	1.3	1.8			52.3		52.4	51.4	
Progression Factor	0.34	0.30	1.00	0.86	0.75			1.00		1.00	1.00	
Incremental Delay, d2	1.1	1.4	0.0	0.2	0.4			1.3		1.8	0.1	
Delay (s)	1.5	2.1	1.2	1.3	1.7			53.6		54.2	51.5	
Level of Service	A	A	A	A	A			D		D	D	
Approach Delay (s)		2.0			1.7			53.6			53.4	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			3.5			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			73.5%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Pearl Street & Lakeshore Road





















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	749	52	3	1022	48	32	20	6	29	11	29
Future Volume (vph)	45	749	52	3	1022	48	32	20	6	29	11	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.2	3.5	3.5
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	1.00		1.00	0.95			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	0.94	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			0.99	1.00	0.96	1.00	
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1631	1730		1671	3286			1764	1501	1600	1680	
Flt Permitted	0.24	1.00		0.29	1.00			0.77	1.00	0.63	1.00	
Satd. Flow (perm)	407	1730		504	3286			1403	1501	1058	1680	
Peak-hour factor, PHF	0.74	0.93	0.81	0.37	0.97	0.70	0.57	0.67	0.37	0.92	0.50	0.92
Adj. Flow (vph)	61	805	64	8	1054	69	56	30	16	32	22	32
RTOR Reduction (vph)	0	2	0	0	3	0	0	0	14	0	29	0
Lane Group Flow (vph)	61	867	0	8	1120	0	0	86	2	32	25	0
Confl. Peds. (#/hr)	34		19	19		34	12		15	15		12
Heavy Vehicles (%)	2%	1%	0%	0%	1%	2%	3%	0%	0%	4%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	96.9	96.9		96.9	96.9			11.1	11.1	11.1	11.1	
Effective Green, g (s)	98.9	98.9		98.9	98.9			13.1	13.1	13.1	13.1	
Actuated g/C Ratio	0.82	0.82		0.82	0.82			0.11	0.11	0.11	0.11	
Clearance Time (s)	6.0	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)	335	1425		415	2708			153	163	115	183	
v/s Ratio Prot		c0.50			0.34							0.02
v/s Ratio Perm	0.15			0.02				c0.06	0.00	0.03		
v/c Ratio	0.18	0.61		0.02	0.41			0.56	0.01	0.28	0.14	
Uniform Delay, d1	2.2	3.7		1.9	2.8			50.7	47.7	49.1	48.4	
Progression Factor	0.27	0.29		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	1.7		0.1	0.5			4.7	0.0	1.3	0.3	
Delay (s)	1.6	2.8		2.0	3.3			55.4	47.7	50.4	48.7	
Level of Service	A	A		A	A			E	D	D	D	
Approach Delay (s)		2.7			3.3			54.2			49.3	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			7.1			HCM 2000 Level of Service			A			
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			74.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: John Street & Caroline Street

















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	131	2	34	289	90	20	30	13	68	28	61
Future Volume (Veh/h)	28	131	2	34	289	90	20	30	13	68	28	61
Sign Control	Free				Free				Stop		Stop	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.65	0.77	1.00	0.55	0.89	0.78	0.59	0.54	0.60	0.80	0.92	0.64
Hourly flow rate (vph)	43	170	2	62	325	115	34	56	22	85	30	95
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)										3		
Median type	None						None					
Median storage (veh)												
Upstream signal (m)	69											
pX, platoon unblocked				0.99				0.99	0.99	0.99	0.99	0.99
vC, conflicting volume	440				172			768	821	171	802	764
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	440				158			761	814	157	794	757
tC, single (s)	4.1				4.2			7.2	6.6	6.2	7.1	6.6
tC, 2 stage (s)												
tF (s)	2.2				2.3			3.6	4.1	3.3	3.5	4.1
p0 queue free %	96				95			85	80	98	64	90
cM capacity (veh/h)	1131				1366			229	279	884	234	300

HCM Unsignalized Intersection Capacity Analysis

8: John Street & Maria Street


















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	12	0	3	0	0	0	1	41	0	0	2	34
Future Volume (vph)	12	0	3	0	0	0	1	41	0	0	2	34
Peak Hour Factor	0.68	0.92	0.92	0.92	0.92	0.92	0.75	0.75	0.92	0.92	0.84	0.62
Hourly flow rate (vph)	18	0	3	0	0	0	1	55	0	0	2	55
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	21	0	56	57								
Volume Left (vph)	18	0	1	0								
Volume Right (vph)	3	0	0	55								
Hadj (s)	0.13	0.00	0.06	-0.57								
Departure Headway (s)	4.3	4.1	4.0	3.4								
Degree Utilization, x	0.02	0.00	0.06	0.05								
Capacity (veh/h)	820	847	870	1036								
Control Delay (s)	7.4	7.1	7.3	6.6								
Approach Delay (s)	7.4	0.0	7.3	6.6								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			7.0									
Level of Service			A									
Intersection Capacity Utilization			13.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis


















9: John Street & James Street

03/17/2020

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	10	162	15	24	483	1	17	16	16	5	29	12		
Future Volume (Veh/h)	10	162	15	24	483	1	17	16	16	5	29	12		
Sign Control		Free			Free			Stop			Stop			
Grade		0%			0%			0%			0%			
Peak Hour Factor	0.37	0.67	0.57	0.81	0.93	0.64	0.44	0.53	0.74	0.69	0.74	0.67		
Hourly flow rate (vph)	27	242	26	30	519	2	39	30	22	7	39	18		
Pedestrians														
Lane Width (m)														
Walking Speed (m/s)														
Percent Blockage														
Right turn flare (veh)														
Median type	None			None										
Median storage veh														
Upstream signal (m)	69			64										
pX, platoon unblocked	0.89							0.89	0.89			0.89	0.89	0.89
vC, conflicting volume	521				268				926	890	255	926	902	520
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	395				268				852	811	255	852	825	394
tC, single (s)	4.1				4.2				7.5	6.5	6.7	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.3				3.8	4.0	3.7	3.5	4.0	3.3
p0 queue free %	97				98				78	89	97	97	85	97
cM capacity (veh/h)	1041				1235				178	266	686	213	261	584
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1									
Volume Total	295	30	521	91	64									
Volume Left	27	30	0	39	7									
Volume Right	26	0	2	22	18									
cSH	1041	1235	1700	250	300									
Volume to Capacity	0.03	0.02	0.31	0.36	0.21									
Queue Length 95th (m)	0.6	0.6	0.0	12.7	6.3									
Control Delay (s)	1.0	8.0	0.0	27.4	20.2									
Lane LOS	A	A		D	C									
Approach Delay (s)	1.0	0.4		27.4	20.2									
Approach LOS				D	C									
Intersection Summary														
Average Delay	4.3													
Intersection Capacity Utilization	38.6%			ICU Level of Service			A							
Analysis Period (min)	15													

HCM Unsignalized Intersection Capacity Analysis 10: Hotel Driveway/John Street & Lakeshore Road


















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	881	1	3	1046	15	2	1	0	3	0	25
Future Volume (Veh/h)	15	881	1	3	1046	15	2	1	0	3	0	25
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.50	0.70	0.25	0.37	0.72	0.50	0.50	0.25	0.92	0.37	0.92	0.50
Hourly flow rate (vph)	30	1259	4	8	1453	30	4	4	0	8	0	50
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	86			57								
pX, platoon unblocked	0.93			0.58			0.62	0.62	0.58	0.62	0.62	0.93
vC, conflicting volume	1483			1263			2114	2820	1261	2805	2807	742
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1368			1091			2066	3214	1088	3190	3193	570
tC, single (s)	4.5			4.1			7.5	6.5	6.9	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	92			98			75	28	100	0	100	87
cM capacity (veh/h)	381			375			16	6	124	1	6	398
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	30	1263	734	756	8	58						
Volume Left	30	0	8	0	4	8						
Volume Right	0	4	0	30	0	50						
cSH	381	1700	375	1700	8	7						
Volume to Capacity	0.08	0.74	0.02	0.45	0.97	7.89						
Queue Length 95th (m)	2.0	0.0	0.5	0.0	13.7	Err						
Control Delay (s)	15.3	0.0	0.7	0.0	873.6	Err						
Lane LOS	C		A		F	F						
Approach Delay (s)	0.4		0.3		873.6	Err						
Approach LOS					F	F						
Intersection Summary												
Average Delay				206.3								
Intersection Capacity Utilization				56.4%	ICU Level of Service			B				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

11: Elizabeth Street & Caroline Street




















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	167	2	6	370	9	2	17	12	27	43	4
Future Volume (Veh/h)	12	167	2	6	370	9	2	17	12	27	43	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.86	0.65	0.37	0.92	0.92	0.81	0.92	0.45	0.92	0.92	0.49
Hourly flow rate (vph)	13	194	3	16	402	10	2	18	27	29	47	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				None							
Median storage veh												
Upstream signal (m)	133											
pX, platoon unblocked												
vC, conflicting volume	412			197			687	666	196	696	662	407
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	412			197			687	666	196	696	662	407
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	99			99			99	95	97	91	87	99
cM capacity (veh/h)	1147			1388			319	372	828	326	373	644
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1							
Volume Total	210	16	412	47	84							
Volume Left	13	16	0	2	29							
Volume Right	3	0	10	27	8							
cSH	1147	1388	1700	538	370							
Volume to Capacity	0.01	0.01	0.24	0.09	0.23							
Queue Length 95th (m)	0.3	0.3	0.0	2.3	6.9							
Control Delay (s)	0.6	7.6	0.0	12.3	17.6							
Lane LOS	A	A		B	C							
Approach Delay (s)	0.6	0.3		12.3	17.6							
Approach LOS				B	C							
Intersection Summary												
Average Delay				3.0								
Intersection Capacity Utilization				37.4%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

12: Pearl Street & James Street

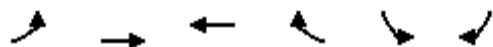
03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	113	58	15	615	20	26	21	209	7	135	8
Future Volume (Veh/h)	8	113	58	15	615	20	26	21	209	7	135	8
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.66	0.82	0.74	0.80	0.87	0.67	0.74	0.85	0.67	0.58	0.77	0.50
Hourly flow rate (vph)	12	138	78	19	707	30	35	25	312	12	175	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	119											
pX, platoon unblocked												
vC, conflicting volume	737			216			1050	976	177	1246	1000	722
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	737			216			1050	976	177	1246	1000	722
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	99			99			55	90	63	86	27	96
cM capacity (veh/h)	878			1366			79	246	848	87	238	430
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	12	216	19	737	372	203						
Volume Left	12	0	19	0	35	12						
Volume Right	0	78	0	30	312	16						
cSH	878	1700	1366	1700	406	223						
Volume to Capacity	0.01	0.13	0.01	0.43	0.92	0.91						
Queue Length 95th (m)	0.3	0.0	0.3	0.0	78.8	60.5						
Control Delay (s)	9.2	0.0	7.7	0.0	58.1	84.6						
Lane LOS	A		A		F	F						
Approach Delay (s)	0.5		0.2		58.1	84.6						
Approach LOS					F	F						
Intersection Summary												
Average Delay	25.0											
Intersection Capacity Utilization	65.0%			ICU Level of Service			C					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

13: Lakeshore Road & Martha Street

03/17/2020













Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	729	1022	65	76	14
Future Volume (Veh/h)	70	729	1022	65	76	14
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.79	0.94	0.95	0.57	0.59	0.64
Hourly flow rate (vph)	89	776	1076	114	129	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		117				
pX, platoon unblocked					0.83	
vC, conflicting volume	1190				2087	1133
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1190				2208	1133
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				0	91
cM capacity (veh/h)	587				35	248
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	89	776	1190	151		
Volume Left	89	0	0	129		
Volume Right	0	0	114	22		
cSH	587	1700	1700	40		
Volume to Capacity	0.15	0.46	0.70	3.81		
Queue Length 95th (m)	4.3	0.0	0.0	Err		
Control Delay (s)	12.2	0.0	0.0	Err		
Lane LOS	B			F		
Approach Delay (s)	1.3		0.0	Err		
Approach LOS				F		
Intersection Summary						
Average Delay			684.9			
Intersection Capacity Utilization			69.9%	ICU Level of Service		C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

14: Brant Street & Elgin Street

03/17/2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	67	45	4	256	368	218
Future Volume (Veh/h)	67	45	4	256	368	218
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.74	0.62	0.97	0.92	0.83
Hourly flow rate (vph)	73	61	6	264	400	263
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				162	80	
pX, platoon unblocked	0.96	0.95	0.95			
vC, conflicting volume	676	400	663			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	589	344	620			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	84	91	99			
cM capacity (veh/h)	451	665	887			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	134	270	400	263		
Volume Left	73	6	0	0		
Volume Right	61	0	0	263		
cSH	528	887	1700	1700		
Volume to Capacity	0.25	0.01	0.24	0.15		
Queue Length 95th (m)	8.0	0.2	0.0	0.0		
Control Delay (s)	14.1	0.3	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	14.1	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			33.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

15: Brant Street & Ontario Street

03/17/2020
























Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	113	264	256	417	145
Future Volume (Veh/h)	2	113	264	256	417	145
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.88	0.86	0.93	0.87	0.74
Hourly flow rate (vph)	4	128	307	275	479	196
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				56	207	
pX, platoon unblocked	0.74	0.70	0.70			
vC, conflicting volume	1466	577	675			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1170	174	315			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	79	65			
cM capacity (veh/h)	103	609	867			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	132	582	675			
Volume Left	4	307	0			
Volume Right	128	0	196			
cSH	530	867	1700			
Volume to Capacity	0.25	0.35	0.40			
Queue Length 95th (m)	7.8	12.9	0.0			
Control Delay (s)	14.0	8.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	14.0	8.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			4.8			
Intersection Capacity Utilization			76.0%	ICU Level of Service		D
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

16: Brant Street & Ghent Avenue






















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	16	20	111	31	19	16	951	15	26	872	248
Future Volume (vph)	159	16	20	111	31	19	16	951	15	26	872	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)		7.0	7.0		7.0		8.0	8.0		8.0	8.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00	1.00		0.99		0.99	1.00		0.99	1.00	
Frt		1.00	0.85		0.98		1.00	1.00		1.00	0.97	
Flt Protected		0.96	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1762	1576		1761		1483	3110		1580	3020	
Flt Permitted		0.65	1.00		0.58		0.17	1.00		0.25	1.00	
Satd. Flow (perm)		1190	1576		1049		261	3110		408	3020	
Peak-hour factor, PHF	0.78	0.77	0.59	0.81	0.86	0.78	0.62	0.96	0.87	0.79	0.90	0.87
Adj. Flow (vph)	204	21	34	137	36	24	26	991	17	33	969	285
RTOR Reduction (vph)	0	0	26	0	6	0	0	1	0	0	26	0
Lane Group Flow (vph)	0	225	8	0	191	0	26	1007	0	33	1228	0
Confl. Peds. (#/hr)	7		12	12		7	23		16	16		23
Heavy Vehicles (%)	3%	0%	0%	0%	0%	14%	13%	8%	7%	6%	7%	4%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)		21.7	21.7		21.7		54.3	54.3		54.3	54.3	
Effective Green, g (s)		21.7	21.7		21.7		53.3	53.3		53.3	53.3	
Actuated g/C Ratio		0.24	0.24		0.24		0.59	0.59		0.59	0.59	
Clearance Time (s)		7.0	7.0		7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		286	379		252		154	1841		241	1788	
v/s Ratio Prot								0.32				c0.41
v/s Ratio Perm		c0.19	0.01		0.18		0.10			0.08		
v/c Ratio		0.79	0.02		0.76		0.17	0.55		0.14	0.69	
Uniform Delay, d1		32.0	26.1		31.7		8.3	11.1		8.1	12.6	
Progression Factor		1.00	1.00		1.00		0.67	0.78		1.00	1.00	
Incremental Delay, d2		13.3	0.0		12.2		2.2	1.1		1.2	2.2	
Delay (s)		45.3	26.1		44.0		7.8	9.7		9.3	14.8	
Level of Service		D	C		D		A	A		A	B	
Approach Delay (s)		42.8			44.0			9.7			14.6	
Approach LOS		D			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			17.5									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			90.0							15.0		
Intersection Capacity Utilization			74.1%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

17: Brant Street & Victoria Avenue

03/17/2020

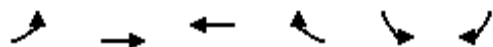
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	27	7	24	20	62	112	561	13	55	578	115
Future Volume (vph)	21	27	7	24	20	62	112	561	13	55	578	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00		0.99	1.00		0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.90		1.00	0.99		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)	1749	1849		1762	1659		1664	1743		1665	1756	1428
Flt Permitted	0.68	1.00		0.72	1.00		0.38	1.00		0.35	1.00	1.00
Satd. Flow (perm)	1256	1849		1336	1659		659	1743		617	1756	1428
Peak-hour factor, PHF	0.78	0.56	0.87	0.81	0.52	0.80	0.50	0.83	0.50	0.86	0.88	0.76
Adj. Flow (vph)	27	48	8	30	38	78	224	676	26	64	657	151
RTOR Reduction (vph)	0	7	0	0	69	0	0	1	0	0	0	39
Lane Group Flow (vph)	27	49	0	30	47	0	224	701	0	64	657	112
Confl. Peds. (#/hr)	2		24	24		2	25		26	26		25
Heavy Vehicles (%)	3%	0%	0%	0%	0%	3%	0%	1%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			6	
Permitted Phases	4			4			2			6		6
Actuated Green, G (s)	10.1	10.1		10.1	10.1		67.9	67.9		67.9	67.9	67.9
Effective Green, g (s)	10.1	10.1		10.1	10.1		66.9	66.9		66.9	66.9	66.9
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.74	0.74		0.74	0.74	0.74
Clearance Time (s)	6.0	6.0		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	3.0
Lane Grp Cap (vph)	140	207		149	186		489	1295		458	1305	1061
v/s Ratio Prot		0.03			c0.03			c0.40			0.37	
v/s Ratio Perm	0.02			0.02			0.34			0.10		0.08
v/c Ratio	0.19	0.24		0.20	0.25		0.46	0.54		0.14	0.50	0.11
Uniform Delay, d1	36.3	36.4		36.3	36.5		4.5	5.0		3.3	4.7	3.2
Progression Factor	1.00	1.00		1.00	1.00		1.27	1.27		0.52	0.40	0.09
Incremental Delay, d2	0.7	0.6		0.7	0.7		2.8	1.5		0.5	1.0	0.1
Delay (s)	36.9	37.0		37.0	37.2		8.6	7.8		2.2	2.9	0.4
Level of Service	D	D		D	D		A	A		A	A	A
Approach Delay (s)		37.0			37.2			8.0			2.4	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.9				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			13.0		
Intersection Capacity Utilization			68.7%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Sign configuration not allowed in HCM analysis.

HCM Unsignalized Intersection Capacity Analysis

19: Lakeshore Road & Locust Street

03/17/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	904	1220	102	10	36
Future Volume (Veh/h)	31	904	1220	102	10	36
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.92	0.99	0.72	0.25	0.90
Hourly flow rate (vph)	43	983	1232	142	40	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		182	107			
pX, platoon unblocked	0.80				0.84	0.80
vC, conflicting volume	1374				2372	687
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	963				1637	102
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				45	95
cM capacity (veh/h)	577				73	750
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	43	983	821	553	80	
Volume Left	43	0	0	0	40	
Volume Right	0	0	0	142	40	
cSH	577	1700	1700	1700	133	
Volume to Capacity	0.07	0.58	0.48	0.33	0.60	
Queue Length 95th (m)	1.9	0.0	0.0	0.0	24.7	
Control Delay (s)	11.7	0.0	0.0	0.0	66.5	
Lane LOS	B				F	
Approach Delay (s)	0.5		0.0		66.5	
Approach LOS					F	
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			57.6%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

20: Lakeshore Road & Burlington Avenue

03/17/2020






















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	16	890	1255	11	14	16
Future Volume (vph)	16	890	1255	11	14	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.2	3.2	3.2	3.2	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	1.00		0.92	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1437	1681	1661		1708	
Flt Permitted	0.09	1.00	1.00		0.98	
Satd. Flow (perm)	139	1681	1661		1708	
Peak-hour factor, PHF	0.47	0.93	0.93	0.63	0.92	0.75
Adj. Flow (vph)	34	957	1349	17	15	21
RTOR Reduction (vph)	0	0	0	0	20	0
Lane Group Flow (vph)	34	957	1366	0	16	0
Confl. Peds. (#/hr)	34			34	4	
Heavy Vehicles (%)	20%	8%	9%	10%	0%	0%
Turn Type	Perm	NA	NA		Perm	
Protected Phases		2	2			
Permitted Phases	2				4	
Actuated Green, G (s)	100.0	100.0	100.0		8.0	
Effective Green, g (s)	100.0	100.0	100.0		8.0	
Actuated g/C Ratio	0.83	0.83	0.83		0.07	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	115	1400	1384		113	
v/s Ratio Prot		0.57	c0.82			
v/s Ratio Perm	0.25				c0.01	
v/c Ratio	0.30	0.68	0.99		0.15	
Uniform Delay, d1	2.2	3.9	9.4		52.8	
Progression Factor	1.22	1.25	1.08		1.00	
Incremental Delay, d2	3.7	1.6	19.4		0.6	
Delay (s)	6.4	6.4	29.5		53.4	
Level of Service	A	A	C		D	
Approach Delay (s)		6.4	29.5		53.4	
Approach LOS		A	C		D	
Intersection Summary						
HCM 2000 Control Delay			20.3		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.92			
Actuated Cycle Length (s)			120.0		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

21: East Parking Lot Entrance/Nelson Avenue & Lakeshore Road






















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	890	18	19	1255	17	11	1	7	7	4	278
Future Volume (vph)	53	890	18	19	1255	17	11	1	7	7	4	278
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.2	3.2	3.2	3.2	3.2	3.2	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			7.0			7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00			0.97			0.94	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.94			0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			1.00	
Satd. Flow (prot)	1627	1780	1447	1725	3363			1602			1524	
Flt Permitted	0.14	1.00	1.00	0.15	1.00			0.78			0.99	
Satd. Flow (perm)	237	1780	1447	268	3363			1280			1510	
Peak-hour factor, PHF	0.90	0.94	0.71	0.64	0.93	0.57	1.00	0.25	0.58	0.44	0.50	0.78
Adj. Flow (vph)	59	947	25	30	1349	30	11	4	12	16	8	356
RTOR Reduction (vph)	0	0	9	0	1	0	0	9	0	0	39	0
Lane Group Flow (vph)	59	947	16	30	1378	0	0	18	0	0	341	0
Confl. Peds. (#/hr)	33		13	13		33	29		13	13		29
Heavy Vehicles (%)	6%	2%	0%	0%	2%	0%	0%	0%	14%	0%	25%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2			4			4		
Actuated Green, G (s)	77.4	77.4	77.4	77.4	77.4			29.6			29.6	
Effective Green, g (s)	77.4	77.4	77.4	77.4	77.4			29.6			29.6	
Actuated g/C Ratio	0.65	0.65	0.65	0.65	0.65			0.25			0.25	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			7.0			7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	152	1148	933	172	2169			315			372	
v/s Ratio Prot		c0.53			0.41							
v/s Ratio Perm	0.25		0.01	0.11				0.01			c0.23	
v/c Ratio	0.39	0.82	0.02	0.17	0.64			0.06			0.92	
Uniform Delay, d1	10.1	16.2	7.6	8.5	12.8			34.5			44.0	
Progression Factor	0.90	0.87	0.90	0.52	0.51			1.00			1.00	
Incremental Delay, d2	6.4	6.0	0.0	0.9	0.6			0.1			26.6	
Delay (s)	15.5	20.1	6.9	5.3	7.1			34.6			70.6	
Level of Service	B	C	A	A	A			C			E	
Approach Delay (s)		19.5			7.0			34.6			70.6	
Approach LOS		B			A			C			E	
Intersection Summary												
HCM 2000 Control Delay			20.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			13.0			
Intersection Capacity Utilization			77.9%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

22: West Parking Lot Entrance/Brock Avenue & Lakeshore Road






















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	742	13	1	1633	5	6	1	7	1	0	104
Future Volume (Veh/h)	31	742	13	1	1633	5	6	1	7	1	0	104
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.97	0.75	0.25	0.83	0.42	0.38	0.25	0.58	0.25	0.92	0.90
Hourly flow rate (vph)	38	765	17	4	1967	12	16	4	12	4	0	116
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		125			108							
pX, platoon unblocked	0.75			0.69			0.82	0.82	0.69	0.82	0.82	0.75
vC, conflicting volume	1979			782			1948	2828	765	2836	2839	990
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1639			460			902	1980	435	1990	1994	320
tC, single (s)	4.2			4.1			7.5	6.5	6.9	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	86			99			88	91	97	83	100	76
cM capacity (veh/h)	277			767			130	44	397	24	43	483
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	38	765	17	4	1311	668	32	120				
Volume Left	38	0	0	4	0	0	16	4				
Volume Right	0	0	17	0	0	12	12	116				
cSH	277	1700	1700	767	1700	1700	131	296				
Volume to Capacity	0.14	0.45	0.01	0.01	0.77	0.39	0.24	0.41				
Queue Length 95th (m)	3.8	0.0	0.0	0.1	0.0	0.0	7.2	15.1				
Control Delay (s)	20.1	0.0	0.0	9.7	0.0	0.0	41.2	25.2				
Lane LOS	C			A			E	D				
Approach Delay (s)	0.9			0.0			41.2	25.2				
Approach LOS							E	D				
Intersection Summary												
Average Delay			1.7									
Intersection Capacity Utilization			58.5%			ICU Level of Service			B			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

23: Lakeshore Road & North Shore Boulevard & Maple Avenue





















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	224	600	18	276	1239	103	118	65	116	226	374	496
Future Volume (vph)	224	600	18	276	1239	103	118	65	116	226	374	496
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.2	3.2	3.2	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	3.0	6.0		3.0	6.0		4.0	8.0		4.0	8.0	8.0
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	0.96		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	0.90		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)	1658	3163		1687	3335		1514	1430		1587	1756	1451
Flt Permitted	0.09	1.00		0.21	1.00		0.24	1.00		0.56	1.00	1.00
Satd. Flow (perm)	160	3163		372	3335		382	1430		941	1756	1451
Peak-hour factor, PHF	0.90	0.80	0.76	0.87	0.92	0.85	0.77	0.91	0.87	0.78	0.94	0.91
Adj. Flow (vph)	249	750	24	317	1347	121	153	71	133	290	398	545
RTOR Reduction (vph)	0	2	0	0	5	0	0	57	0	0	0	174
Lane Group Flow (vph)	249	772	0	317	1463	0	153	147	0	290	398	371
Confl. Peds. (#/hr)	16		30	30		16	23		47	47		23
Heavy Vehicles (%)	4%	8%	18%	2%	1%	12%	11%	4%	9%	4%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	56.2	43.6		64.1	48.5		39.9	32.4		39.9	32.4	32.4
Effective Green, g (s)	56.2	43.6		64.1	48.5		37.9	31.4		37.9	31.4	31.4
Actuated g/C Ratio	0.47	0.36		0.53	0.40		0.32	0.26		0.32	0.26	0.26
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	7.0
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)	232	1149		390	1347		181	374		332	459	379
v/s Ratio Prot	c0.11	0.24		c0.12	c0.44		0.05	0.10		c0.05	0.23	
v/s Ratio Perm	0.39			0.32			0.22			0.23		c0.26
v/c Ratio	1.07	0.67		0.81	1.09		0.85	0.39		0.87	0.87	0.98
Uniform Delay, d1	35.6	32.2		19.1	35.8		37.2	36.5		38.3	42.3	44.0
Progression Factor	1.40	0.84		1.35	0.87		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	78.7	3.0		10.5	49.7		28.6	0.7		21.5	15.7	40.8
Delay (s)	128.7	30.1		36.2	80.8		65.9	37.1		59.8	58.0	84.8
Level of Service	F	C		D	F		E	D		E	E	F
Approach Delay (s)		54.1			72.9			49.5			70.3	
Approach LOS		D			E			D			E	
Intersection Summary												
HCM 2000 Control Delay			65.9			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			21.0			
Intersection Capacity Utilization			104.7%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

24: Brant Hospital Entrance/Apartment Entrance & North Shore Boulevard

03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	800	25	24	1846	0	88	0	42	16	0	8
Future Volume (vph)	17	800	25	24	1846	0	88	0	42	16	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0		7.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99		1.00		0.99	1.00
Frt	1.00	0.99		1.00	1.00		1.00		0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00		0.95	1.00
Satd. Flow (prot)	1685	3305		1684	3336		1759		1586		1794	1404
Flt Permitted	0.06	1.00		0.28	1.00		0.74		1.00		0.95	1.00
Satd. Flow (perm)	109	3305		501	3336		1366		1586		1794	1404
Peak-hour factor, PHF	0.66	0.96	0.69	0.82	0.91	0.80	0.66	0.92	0.57	0.53	0.92	0.40
Adj. Flow (vph)	26	833	36	29	2029	0	133	0	74	30	0	20
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	63	0	0	17
Lane Group Flow (vph)	26	867	0	29	2029	0	133	0	11	0	30	3
Confl. Peds. (#/hr)			5	5			5		5	5		5
Heavy Vehicles (%)	0%	1%	5%	0%	1%	0%	2%	0%	0%	0%	0%	13%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	Perm
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		8
Actuated Green, G (s)	80.9	80.9		88.8	88.8		18.2		18.2		18.2	18.2
Effective Green, g (s)	80.9	80.9		88.8	88.8		18.2		18.2		18.2	18.2
Actuated g/C Ratio	0.67	0.67		0.74	0.74		0.15		0.15		0.15	0.15
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0		7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	73	2228		409	2468		207		240		272	212
v/s Ratio Prot		0.26		0.00	c0.61							
v/s Ratio Perm	0.24			0.05			c0.10		0.01		0.02	0.00
v/c Ratio	0.36	0.39		0.07	0.82		0.64		0.05		0.11	0.01
Uniform Delay, d1	8.4	8.6		4.7	10.4		47.8		43.5		43.9	43.3
Progression Factor	0.94	0.89		0.69	0.59		1.00		1.00		1.00	1.00
Incremental Delay, d2	12.2	0.5		0.0	0.3		6.7		0.1		0.2	0.0
Delay (s)	20.1	8.2		3.3	6.4		54.5		43.6		44.1	43.3
Level of Service	C	A		A	A		D		D		D	D
Approach Delay (s)		8.5			6.3			50.6			43.8	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			10.4				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			80.8%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

25: QEW East Ramp Entrance/QEW Toronto On Ramp & North Shore Boulevard

03/17/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑		↑		↑			
Traffic Volume (vph)	0	537	28	0	1546	387	98	0	288	0	0	0
Future Volume (vph)	0	537	28	0	1546	387	98	0	288	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0			6.0		7.0		7.0			
Lane Util. Factor		0.95			0.95		1.00		1.00			
Frt		0.99			0.97		1.00		0.85			
Flt Protected		1.00			1.00		0.95		1.00			
Satd. Flow (prot)		3243			3203		1787		1568			
Flt Permitted		1.00			1.00		0.95		1.00			
Satd. Flow (perm)		3243			3203		1787		1568			
Peak-hour factor, PHF	0.92	0.85	0.83	0.92	0.87	0.86	0.81	0.92	0.89	0.92	0.92	0.92
Adj. Flow (vph)	0	632	34	0	1777	450	121	0	324	0	0	0
RTOR Reduction (vph)	0	3	0	0	17	0	0	0	289	0	0	0
Lane Group Flow (vph)	0	663	0	0	2210	0	121	0	35	0	0	0
Heavy Vehicles (%)	0%	3%	5%	0%	2%	2%	1%	0%	3%	0%	0%	0%
Turn Type		NA			NA		Perm		Perm			
Protected Phases		2			6							
Permitted Phases							4		4			
Actuated Green, G (s)		94.1			94.1		12.9		12.9			
Effective Green, g (s)		94.1			94.1		12.9		12.9			
Actuated g/C Ratio		0.78			0.78		0.11		0.11			
Clearance Time (s)		6.0			6.0		7.0		7.0			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		2543			2511		192		168			
v/s Ratio Prot		0.20			c0.69							
v/s Ratio Perm							c0.07		0.02			
v/c Ratio		0.26			0.88		0.63		0.21			
Uniform Delay, d1		3.5			9.0		51.3		48.9			
Progression Factor		1.00			0.50		1.00		1.00			
Incremental Delay, d2		0.2			3.1		6.6		0.6			
Delay (s)		3.8			7.6		57.8		49.5			
Level of Service		A			A		E		D			
Approach Delay (s)		3.8			7.6			51.8			0.0	
Approach LOS		A			A			D			A	

Intersection Summary




















HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

26: Maple Avenue & Driveway/Elgin Street

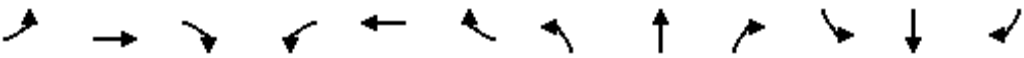
03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1	7	226	0	220	3	344	21	32	870	5
Future Volume (Veh/h)	7	1	7	226	0	220	3	344	21	32	870	5
Sign Control		Yield			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.45	0.25	0.62	0.76	0.92	0.74	0.92	0.87	0.75	0.59	0.93	0.25
Hourly flow rate (vph)	16	4	11	297	0	297	3	395	28	54	935	20
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)								243			129	
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90		0.90					
vC, conflicting volume	1554	1482	478	1004	1478	212	955			423		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1400	1321	210	792	1316	212	738			423		
tC, single (s)	7.5	6.5	7.2	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	71	97	98	0	100	63	100			95		
cM capacity (veh/h)	56	136	687	237	137	800	793			1147		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3			
Volume Total	31	297	297	3	263	160	54	623	332			
Volume Left	16	297	0	3	0	0	54	0	0			
Volume Right	11	0	297	0	0	28	0	0	20			
cSH	93	237	800	793	1700	1700	1147	1700	1700			
Volume to Capacity	0.33	1.25	0.37	0.00	0.15	0.09	0.05	0.37	0.20			
Queue Length 95th (m)	10.3	119.6	13.8	0.1	0.0	0.0	1.2	0.0	0.0			
Control Delay (s)	61.8	185.9	12.1	9.6	0.0	0.0	8.3	0.0	0.0			
Lane LOS	F	F	B	A			A					
Approach Delay (s)	61.8	99.0		0.1			0.4					
Approach LOS	F	F										
Intersection Summary												
Average Delay			29.7									
Intersection Capacity Utilization			52.4%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

27: Maple Avenue & Driveway/Ontario Street

















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	3	1	1	231	3	224	0	474	90	58	639	20
Future Volume (vph)	3	1	1	231	3	224	0	474	90	58	639	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)		7.0		7.0	7.0			8.0		8.0	8.0	
Lane Util. Factor		1.00		1.00	1.00			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		1.00	0.97			0.99		1.00	1.00	
Flpb, ped/bikes		0.99		0.99	1.00			1.00		0.99	1.00	
Fr _t		0.97		1.00	0.86			0.97		1.00	0.99	
Fl _t Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1414		1780	1561			3205		1671	3300	
Fl _t Permitted		0.83		0.75	1.00			1.00		0.40	1.00	
Satd. Flow (perm)		1208		1400	1561			3205		712	3300	
Peak-hour factor, PHF	0.37	0.25	0.25	0.91	0.37	0.98	0.92	0.89	0.79	0.80	0.95	0.78
Adj. Flow (vph)	8	4	4	254	8	229	0	533	114	72	673	26
RTOR Reduction (vph)	0	3	0	0	162	0	0	18	0	0	3	0
Lane Group Flow (vph)	0	13	0	254	75	0	0	629	0	73	696	0
Confl. Peds. (#/hr)	19		14	14		19	17		13	13		17
Heavy Vehicles (%)	0%	0%	100%	0%	0%	1%	0%	2%	0%	0%	1%	11%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		19.9		19.9	19.9			46.1		46.1	46.1	
Effective Green, g (s)		19.9		19.9	19.9			45.1		45.1	45.1	
Actuated g/C Ratio		0.25		0.25	0.25			0.56		0.56	0.56	
Clearance Time (s)		7.0		7.0	7.0			7.0		7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		300		348	388			1806		401	1860	
v/s Ratio Prot					0.05			0.20			c0.21	
v/s Ratio Perm		0.01		c0.18						0.10		
v/c Ratio		0.04		0.73	0.19			0.35		0.18	0.37	
Uniform Delay, d ₁		22.8		27.6	23.7			9.5		8.5	9.6	
Progression Factor		1.00		1.24	2.15			1.00		1.00	1.00	
Incremental Delay, d ₂		0.1		7.4	0.2			0.5		1.0	0.6	
Delay (s)		22.9		41.5	51.3			10.0		9.5	10.2	
Level of Service		C		D	D			B		A	B	
Approach Delay (s)		22.9			46.2			10.0			10.2	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			19.4			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			15.0			
Intersection Capacity Utilization			67.9%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

28: John Street & Pine Street

















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	284	10	7	348	11	14	34	17	19	38	14
Future Volume (vph)	5	284	10	7	348	11	14	34	17	19	38	14
Peak Hour Factor	0.62	0.86	0.74	0.58	0.65	0.62	0.80	0.66	0.79	0.64	0.81	0.64
Hourly flow rate (vph)	8	330	14	12	535	18	18	52	22	30	47	22
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	352	565	92	99								
Volume Left (vph)	8	12	18	30								
Volume Right (vph)	14	18	22	22								
Hadj (s)	0.00	0.04	0.20	0.13								
Departure Headway (s)	5.4	5.1	6.7	6.6								
Degree Utilization, x	0.52	0.80	0.17	0.18								
Capacity (veh/h)	638	691	473	486								
Control Delay (s)	14.1	25.7	11.1	11.1								
Approach Delay (s)	14.1	25.7	11.1	11.1								
Approach LOS	B	D	B	B								
Intersection Summary												
Delay				19.5								
Level of Service				C								
Intersection Capacity Utilization				35.1%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

29: Locust Street & Elgin Street

















03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	27	55	10	33	223	24	71	87	46	7	36	25
Future Volume (vph)	27	55	10	33	223	24	71	87	46	7	36	25
Peak Hour Factor	0.62	0.56	0.74	0.64	0.81	0.71	0.75	0.75	0.71	0.43	0.67	0.85
Hourly flow rate (vph)	44	98	14	52	275	34	95	116	65	16	54	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	156	361	276	99								
Volume Left (vph)	44	52	95	16								
Volume Right (vph)	14	34	65	29								
Hadj (s)	0.02	-0.03	-0.06	-0.14								
Departure Headway (s)	5.6	5.2	5.4	5.7								
Degree Utilization, x	0.24	0.52	0.42	0.16								
Capacity (veh/h)	583	655	611	553								
Control Delay (s)	10.3	13.7	12.2	9.7								
Approach Delay (s)	10.3	13.7	12.2	9.7								
Approach LOS	B	B	B	A								
Intersection Summary												
Delay				12.2								
Level of Service				B								
Intersection Capacity Utilization				41.0%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

30: Elizabeth Street & Pine Street

03/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	163	142	25	10	167	30	21	12	17	18	25	181
Future Volume (vph)	163	142	25	10	167	30	21	12	17	18	25	181
Peak Hour Factor	0.45	0.59	0.77	0.50	0.72	0.74	0.53	0.75	0.78	0.71	0.88	0.50
Hourly flow rate (vph)	362	241	32	20	232	41	40	16	22	25	28	362
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	635	293	78	415								
Volume Left (vph)	362	20	40	25								
Volume Right (vph)	32	41	22	362								
Hadj (s)	0.10	-0.04	-0.04	-0.51								
Departure Headway (s)	6.4	6.7	7.8	6.3								
Degree Utilization, x	1.13	0.55	0.17	0.72								
Capacity (veh/h)	558	506	402	415								
Control Delay (s)	101.3	17.6	12.4	23.8								
Approach Delay (s)	101.3	17.6	12.4	23.8								
Approach LOS	F	C	B	C								
Intersection Summary												
Delay				56.5								
Level of Service				F								
Intersection Capacity Utilization				52.9%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis

118: Martha Street & New Street

03/17/2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	635	349	0	322	42	5
Future Volume (vph)	635	349	0	322	42	5
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		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	0.98	1.00		1.00	0.99	1.00
Frt	1.00	0.85		0.86	1.00	1.00
Flt Protected	0.95	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1646	1517		1550	1782	1583
Flt Permitted	0.95	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1646	1517		1550	1782	1583
Peak-hour factor, PHF	0.92	0.72	0.92	0.84	0.74	0.62
Adj. Flow (vph)	690	485	0	383	57	8
RTOR Reduction (vph)	0	62	0	78	0	0
Lane Group Flow (vph)	690	423	0	305	57	8
Confl. Peds. (#/hr)	6	5			5	
Heavy Vehicles (%)	8%	3%	2%	6%	0%	20%
Turn Type	Perm	Perm		Perm	Perm	NA
Protected Phases						8
Permitted Phases	6	6		2	8	
Actuated Green, G (s)	71.6	71.6		71.6	7.4	7.4
Effective Green, g (s)	71.6	71.6		71.6	6.4	6.4
Actuated g/C Ratio	0.80	0.80		0.80	0.07	0.07
Clearance Time (s)	6.0	6.0		6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	1309	1206		1233	126	112
v/s Ratio Prot						0.01
v/s Ratio Perm	c0.42	0.28		0.20	c0.03	
v/c Ratio	0.53	0.35		0.25	0.45	0.07
Uniform Delay, d1	3.2	2.6		2.3	40.1	39.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.5	0.8		0.5	2.6	0.3
Delay (s)	4.8	3.4		2.8	42.7	39.3
Level of Service	A	A		A	D	D
Approach Delay (s)	4.2		2.8			42.3
Approach LOS	A		A			D

Intersection Summary

HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Arterial Level of Service: EB Lakeshore Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Lakeshore Road	23	61.9	113.9	0.2	8
West Parking Lot Ent	22	14.1	24.4	0.1	18
East Parking Lot Ent	21	21.6	53.9	0.1	14
	74	7.4	12.5	0.1	20
Burlington Avenue	20	24.8	47.1	0.2	17
	57	14.7	20.9	0.1	15
Locust Street	19	25.5	52.1	0.1	11
Brant Street	3	31.3	41.7	0.1	10
Hotel Driveway	10	3.7	9.5	0.1	35
Elizabeth Street	5	4.8	9.6	0.1	22
Pearl Street	6	7.4	16.3	0.1	27
Martha Street	13	6.5	16.1	0.1	28
Total		223.6	418.0	1.3	15

Arterial Level of Service: WB Lakeshore Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Martha Street	13	668.2	2896.0	0.7	4
Pearl Street	6	225.9	429.3	0.1	2
Elizabeth Street	5	214.2	222.3	0.1	2
John Street	10	55.3	258.7	0.1	3
Brant Street	3	74.8	112.7	0.1	4
Locust Street	19	54.0	61.8	0.1	6
	57	37.9	44.7	0.1	8
Burlington Avenue	20	39.9	351.7	0.1	7
	74	68.4	80.3	0.2	7
Nelson Avenue	21	56.2	83.6	0.1	4
Brock Avenue	22	28.7	86.7	0.1	11
Maple Avenue	23	67.7	81.0	0.1	6
Total		1591.1	4708.9	1.9	4

Arterial Level of Service: EB North Shore Boulevard

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
QEW East Ramp Entran	25	35.7	115.0	1.1	36
	62	9.2	17.4	0.1	23
Brant Hospital Entra	24	15.0	25.0	0.1	18
Lakeshore Road	23	61.0	82.4	0.3	12
Total		120.9	239.8	1.6	25

Arterial Level of Service: EB North Shore Boulevard

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Apartment Entrance	24	5.2	24.1	0.3	40
	62	1.7	10.3	0.1	40
QEW Toronto On Ramp	25	4.8	12.8	0.1	32
Total		11.7	47.2	0.5	38

Intersection: 1: Brant Street & Caroline Street

Movement	EB	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	T	R	TR	L	TR	L	TR
Maximum Queue (m)	51.1	66.6	12.9	49.9	19.0	53.1	80.4	202.6
Average Queue (m)	25.4	10.6	2.5	37.5	4.0	21.4	34.2	123.9
95th Queue (m)	45.1	65.6	10.9	56.0	13.9	46.9	118.2	273.9
Link Distance (m)		179.1		46.5		182.6	339.8	339.8
Upstream Blk Time (%)		2		6				12
Queuing Penalty (veh)		0		22				37
Storage Bay Dist (m)	45.0		14.0		18.0			
Storage Blk Time (%)	1	0	8	31	0	12		
Queuing Penalty (veh)	0	0	16	0	1	2		

Intersection: 2: Brant Street & James Street

Movement	WB	WB	NB	NB	SB	SB
Directions Served	L	R	T	R	L	T
Maximum Queue (m)	51.7	52.7	65.1	18.5	24.5	51.6
Average Queue (m)	37.0	28.2	35.7	6.6	19.6	35.7
95th Queue (m)	56.1	51.7	71.3	19.4	29.9	57.5
Link Distance (m)	47.3	47.3	60.0			36.7
Upstream Blk Time (%)	17	15	18			31
Queuing Penalty (veh)	44	39	59			165
Storage Bay Dist (m)				11.0	17.0	
Storage Blk Time (%)			41	1	25	25
Queuing Penalty (veh)			24	4	93	41

Intersection: 3: Brant Street & Lakeshore Road

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	T	TR	LTR	L	TR
Maximum Queue (m)	59.9	94.3	7.8	68.9	76.7	13.7	139.4	23.5
Average Queue (m)	36.2	87.8	0.3	55.8	59.0	3.8	87.8	21.8
95th Queue (m)	71.5	98.9	4.7	63.0	70.0	11.3	169.4	29.5
Link Distance (m)		86.8		49.2	49.2	272.0	142.0	
Upstream Blk Time (%)		33		78	69		9	
Queuing Penalty (veh)		303		416	371		35	
Storage Bay Dist (m)	50.0		23.0					16.0
Storage Blk Time (%)	11	35		83			15	64
Queuing Penalty (veh)	86	51		1			53	71

Intersection: 4: Elizabeth Street & James Street

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	12.9	32.8	37.5	68.3	38.5	28.2
Average Queue (m)	1.0	11.6	9.8	37.4	15.3	7.2
95th Queue (m)	6.6	28.6	29.1	85.2	31.8	21.3
Link Distance (m)		46.8		100.9	167.3	242.4
Upstream Blk Time (%)		0		13		
Queuing Penalty (veh)		0		84		
Storage Bay Dist (m)	12.0		36.0			
Storage Blk Time (%)	0	6		16		
Queuing Penalty (veh)	0	0		15		

Intersection: 5: Elizabeth Street & Lakeshore Road

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	L	T	TR	LTR	L	TR
Maximum Queue (m)	21.9	42.0	52.8	112.5	115.4	58.7	21.6	31.8
Average Queue (m)	5.6	20.5	4.0	104.9	106.8	22.4	5.9	5.3
95th Queue (m)	16.5	39.5	26.7	110.2	113.9	59.1	16.9	21.3
Link Distance (m)		28.4		99.9	99.9	213.9		81.0
Upstream Blk Time (%)	0	5		73	64			
Queuing Penalty (veh)	0	47		396	347			
Storage Bay Dist (m)	72.0		35.0				16.0	
Storage Blk Time (%)	0	17		98			4	8
Queuing Penalty (veh)	0	10		7			0	2

Intersection: 6: Pearl Street & Lakeshore Road

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	TR	LT	R	L	TR
Maximum Queue (m)	18.4	90.9	15.8	105.6	115.3	113.4	19.8	14.4	32.3
Average Queue (m)	4.7	22.3	0.6	98.4	101.5	45.9	2.5	6.5	11.4
95th Queue (m)	13.9	63.6	6.7	104.1	111.4	117.5	12.4	15.4	27.2
Link Distance (m)		99.9		96.4	96.4	305.6			273.9
Upstream Blk Time (%)		3		66	48				
Queuing Penalty (veh)		23		342	247				
Storage Bay Dist (m)	49.0		19.0				15.0	7.0	
Storage Blk Time (%)		5		98		61	0	21	22
Queuing Penalty (veh)		2		3		4	0	9	6

Intersection: 7: John Street & Caroline Street

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	TR	LT	R	LT	R
Maximum Queue (m)	13.7	6.0	40.1	21.1	9.1	28.2	20.7
Average Queue (m)	2.6	0.9	5.4	7.9	3.2	12.0	9.2
95th Queue (m)	9.1	4.8	22.4	17.5	10.2	21.2	17.3
Link Distance (m)			43.4	94.3		156.2	
Upstream Blk Time (%)			0				
Queuing Penalty (veh)			1				
Storage Bay Dist (m)	18.0	35.0			24.0		31.0
Storage Blk Time (%)	0		0	0		0	0
Queuing Penalty (veh)	0		0	0		0	0

Intersection: 8: John Street & Maria Street

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (m)	16.2	16.4	9.2
Average Queue (m)	3.9	6.4	6.4
95th Queue (m)	12.1	14.2	13.0
Link Distance (m)	47.2	127.0	94.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 9: John Street & James Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (m)	17.6	13.1	43.2	48.1	28.4
Average Queue (m)	1.1	1.0	12.8	17.1	12.8
95th Queue (m)	8.5	7.0	44.4	56.6	40.3
Link Distance (m)	47.3		46.8	166.1	127.0
Upstream Blk Time (%)	0		15		
Queuing Penalty (veh)	0		72		
Storage Bay Dist (m)		17.0			
Storage Blk Time (%)		0	17		
Queuing Penalty (veh)		0	4		

Intersection: 10: Hotel Driveway/John Street & Lakeshore Road

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	LT	TR	LTR	LTR
Maximum Queue (m)	14.7	48.0	49.8	51.2	10.6	20.6
Average Queue (m)	1.5	8.7	37.5	37.4	1.2	6.9
95th Queue (m)	8.0	33.8	47.5	49.5	6.0	17.7
Link Distance (m)		49.2	28.4	28.4	241.2	58.5
Upstream Blk Time (%)		1	83	69		
Queuing Penalty (veh)		7	437	366		
Storage Bay Dist (m)	14.0					
Storage Blk Time (%)	0	4				
Queuing Penalty (veh)	4	1				

Intersection: 11: Elizabeth Street & Caroline Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (m)	14.7	1.8	14.4	18.2	21.4
Average Queue (m)	1.8	0.1	0.6	6.7	9.7
95th Queue (m)	8.7	1.7	7.5	15.5	17.8
Link Distance (m)	43.4		110.1	242.4	125.4
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		6.0			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		0	0		

Intersection: 12: Pearl Street & James Street

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	7.4	2.6	8.4	19.9	68.6	62.2
Average Queue (m)	0.8	0.2	0.7	13.0	32.7	30.3
95th Queue (m)	5.2	1.9	4.6	68.1	99.7	85.6
Link Distance (m)		100.9		99.5	273.9	120.9
Upstream Blk Time (%)				13		10
Queuing Penalty (veh)				79		0
Storage Bay Dist (m)	38.0		30.0			
Storage Blk Time (%)				13		
Queuing Penalty (veh)				2		

Intersection: 13: Lakeshore Road & Martha Street

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (m)	22.1	77.8	709.5	81.6
Average Queue (m)	5.8	11.4	696.8	23.5
95th Queue (m)	16.0	58.5	810.6	71.0
Link Distance (m)		96.4	704.9	
Upstream Blk Time (%)		4	93	
Queuing Penalty (veh)		33	0	
Storage Bay Dist (m)	20.0			
Storage Blk Time (%)	0	8		
Queuing Penalty (veh)	2	6		

Intersection: 14: Brant Street & Elgin Street

Movement	EB	B72	NB	SB	SB
Directions Served	LR	T	LT	T	R
Maximum Queue (m)	34.2	5.1	63.8	48.2	18.2
Average Queue (m)	16.0	2.5	23.2	12.6	5.8
95th Queue (m)	44.6	14.8	101.4	50.9	19.1
Link Distance (m)	43.0	25.5	142.0	60.0	
Upstream Blk Time (%)	12	9	12	4	
Queuing Penalty (veh)	13	9	26	21	
Storage Bay Dist (m)					11.0
Storage Blk Time (%)				11	0
Queuing Penalty (veh)				24	1

Intersection: 15: Brant Street & Ontario Street

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (m)	97.3	49.9	148.5
Average Queue (m)	47.9	37.1	59.4
95th Queue (m)	187.5	56.6	169.1
Link Distance (m)	810.6	36.7	182.6
Upstream Blk Time (%)		27	14
Queuing Penalty (veh)		139	75
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 16: Brant Street & Ghent Avenue

Movement	EB	EB	WB	NB	NB	NB	B53	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	T	L	T	TR
Maximum Queue (m)	101.0	32.4	93.3	18.8	48.0	54.6	5.5	32.8	225.4	212.4
Average Queue (m)	51.7	5.6	42.4	4.8	27.3	26.8	0.2	6.7	123.5	94.5
95th Queue (m)	158.3	20.0	131.2	15.1	44.9	48.7	2.9	23.9	236.6	231.3
Link Distance (m)	256.2		230.3		38.9	38.9	591.9		256.2	256.2
Upstream Blk Time (%)	7		6		1	2			10	9
Queuing Penalty (veh)	0		0		4	6			0	0
Storage Bay Dist (m)		25.0		45.0				30.0		
Storage Blk Time (%)	25	0			1			0	38	
Queuing Penalty (veh)	5	0			0			0	10	

Intersection: 17: Brant Street & Victoria Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB	B53
Directions Served	L	TR	L	TR	L	TR	L	T	R	T
Maximum Queue (m)	18.8	44.7	19.3	61.8	27.3	97.9	20.6	161.2	24.1	12.5
Average Queue (m)	5.0	12.5	8.7	26.1	13.4	39.3	7.1	91.8	5.2	5.9
95th Queue (m)	14.8	44.9	25.3	103.8	27.8	82.2	17.3	400.2	16.0	34.3
Link Distance (m)		217.3		197.8		339.8		591.9		38.9
Upstream Blk Time (%)				5				11		10
Queuing Penalty (veh)				0				108		52
Storage Bay Dist (m)	20.0		30.0		20.0		45.0		50.0	
Storage Blk Time (%)	1	10	10	0	5	13		13		
Queuing Penalty (veh)	0	2	9	0	26	14		21		

Intersection: 18: Martha Street & James Street

Movement	EB	SB
Directions Served	L	R
Maximum Queue (m)	14.3	34.6
Average Queue (m)	1.2	8.8
95th Queue (m)	7.5	28.6
Link Distance (m)	99.5	16.4
Upstream Blk Time (%)		12
Queuing Penalty (veh)		77
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
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Intersection: 19: Lakeshore Road & Locust Street

Movement	EB	EB	B57	WB	WB	SB
Directions Served	L	T	T	T	TR	LR
Maximum Queue (m)	78.9	111.7	89.0	103.8	107.1	25.4
Average Queue (m)	13.0	79.2	36.6	83.7	83.1	11.0
95th Queue (m)	52.5	136.9	103.6	130.6	134.6	24.9
Link Distance (m)		79.1	69.4	86.8	86.8	135.7
Upstream Blk Time (%)	0	29	19	36	28	
Queuing Penalty (veh)	0	266	168	239	186	
Storage Bay Dist (m)	170.0					
Storage Blk Time (%)	0	29				
Queuing Penalty (veh)	1	9				

Intersection: 20: Lakeshore Road & Burlington Avenue

Movement	EB	EB	B74	WB	B57	B57	SB
Directions Served	L	T	T	TR	T		LR
Maximum Queue (m)	28.8	145.7	39.8	102.6	99.5	85.8	31.6
Average Queue (m)	3.8	74.0	11.7	86.0	79.1	8.3	12.5
95th Queue (m)	21.2	184.6	53.2	121.8	122.2	49.5	33.9
Link Distance (m)		151.8	51.3	69.4	79.1	79.1	139.3
Upstream Blk Time (%)		12	10	60	33	1	
Queuing Penalty (veh)		112	90	752	208	8	
Storage Bay Dist (m)	75.0						
Storage Blk Time (%)		21					
Queuing Penalty (veh)		3					

Intersection: 21: East Parking Lot Entrance/Nelson Avenue & Lakeshore Road

Movement	EB	EB	EB	WB	WB	WB	B74	NB	SB
Directions Served	L	T	R	L	T	TR	T	LTR	LTR
Maximum Queue (m)	37.2	92.9	7.0	32.3	81.3	78.4	156.2	22.5	108.8
Average Queue (m)	9.9	80.0	0.9	7.3	66.8	64.9	142.6	5.1	65.2
95th Queue (m)	30.1	104.7	5.4	26.2	93.1	95.5	208.8	18.3	106.7
Link Distance (m)		88.2	88.2		51.3	51.3	151.8	111.6	120.0
Upstream Blk Time (%)		17			50	48	21		7
Queuing Penalty (veh)		63			320	304	265		0
Storage Bay Dist (m)	30.0			25.0					
Storage Blk Time (%)	0	38		0	73				
Queuing Penalty (veh)	0	20		0	14				

Intersection: 22: West Parking Lot Entrance/Brock Avenue & Lakeshore Road

Movement	EB	EB	EB	WB	WB	WB	NB	SB	B71
Directions Served	L	T	R	L	T	TR	LTR	LTR	T
Maximum Queue (m)	26.8	76.4	20.8	9.0	100.6	101.2	17.2	48.9	53.3
Average Queue (m)	6.5	24.1	9.0	0.4	86.8	86.4	4.5	27.6	21.5
95th Queue (m)	19.0	78.5	57.2	5.7	126.0	125.2	14.3	50.2	77.6
Link Distance (m)		103.8	103.8		88.2	88.2	101.1	15.7	152.3
Upstream Blk Time (%)		9	9		29	34		56	
Queuing Penalty (veh)		41	40		222	263		0	
Storage Bay Dist (m)	30.0			30.0					
Storage Blk Time (%)	0	12			50				
Queuing Penalty (veh)	0	4			1				

Intersection: 23: Lakeshore Road & North Shore Boulevard & Maple Avenue

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	R
Maximum Queue (m)	104.0	144.0	136.0	37.4	115.8	124.2	63.7	88.1	67.4	202.7	165.6
Average Queue (m)	45.8	86.2	61.1	31.5	101.1	108.2	25.4	38.4	49.3	97.3	87.7
95th Queue (m)	89.3	175.2	161.8	47.6	142.0	147.6	52.3	94.5	78.3	198.7	170.7
Link Distance (m)		242.5	242.5		103.8	103.8		146.6		215.0	215.0
Upstream Blk Time (%)		7	7		40	44		7		8	2
Queuing Penalty (veh)		31	29		347	383		0		42	11
Storage Bay Dist (m)	150.0			30.0			120.0		60.0		
Storage Blk Time (%)		8		21	47			7	10	17	
Queuing Penalty (veh)		18		130	130			8	37	38	

Intersection: 24: Brant Hospital Entrance/Apartment Entrance & North Shore Boulevard

Movement	EB	EB	EB	B62	B62	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	T	T	L	T	TR	L	R	LT	R
Maximum Queue (m)	13.3	76.0	59.3	20.0	36.8	13.2	56.8	64.8	48.1	29.0	18.8	15.8
Average Queue (m)	3.5	32.3	19.9	6.2	6.9	3.3	24.3	31.6	20.6	8.2	5.6	2.5
95th Queue (m)	11.3	74.7	66.2	44.8	47.6	10.5	50.2	59.0	38.5	25.9	18.4	9.6
Link Distance (m)		94.1	94.1	94.2	94.2		242.5	242.5	170.5	170.5	112.6	112.6
Upstream Blk Time (%)		7	7	6	6							
Queuing Penalty (veh)		27	27	16	16							
Storage Bay Dist (m)	83.0					50.0						
Storage Blk Time (%)		7					1					
Queuing Penalty (veh)		1					0					

Queuing and Blocking Report
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Intersection: 25: QEW East Ramp Entrance/QEW Toronto On Ramp & North Shore Boulevard

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	TR	T	TR	L	R
Maximum Queue (m)	128.9	126.5	43.0	52.4	131.7	96.6
Average Queue (m)	28.7	24.8	14.4	17.7	30.7	17.6
95th Queue (m)	159.2	156.2	35.7	42.7	114.2	150.2
Link Distance (m)	1122.8	1122.8	94.2	94.2	622.7	622.7
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 26: Maple Avenue & Driveway/Elgin Street

Movement	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	TR	L	T	TR
Maximum Queue (m)	16.8	43.9	121.8	5.5	4.2	10.1	33.2	32.9
Average Queue (m)	2.8	27.0	22.1	0.4	0.4	2.0	7.7	8.0
95th Queue (m)	12.2	46.9	75.1	2.9	4.6	7.6	49.5	49.9
Link Distance (m)	125.2		678.4		215.0		102.4	102.4
Upstream Blk Time (%)							6	5
Queuing Penalty (veh)							25	24
Storage Bay Dist (m)		38.0		38.0		30.0		
Storage Blk Time (%)		13	0				7	
Queuing Penalty (veh)		28	0				2	

Intersection: 27: Maple Avenue & Driveway/Ontario Street

Movement	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	T	TR	L	T	TR
Maximum Queue (m)	11.6	51.4	50.8	34.9	39.6	31.9	76.0	72.9
Average Queue (m)	0.9	28.3	17.5	14.6	21.4	9.0	33.8	30.0
95th Queue (m)	5.5	51.2	40.5	30.2	37.6	21.8	89.5	85.5
Link Distance (m)	146.9		810.6	102.4	102.4		168.0	168.0
Upstream Blk Time (%)							5	5
Queuing Penalty (veh)							0	0
Storage Bay Dist (m)		45.0				30.0		
Storage Blk Time (%)		2	0	0		0	10	
Queuing Penalty (veh)		4	0	0		0	6	

Intersection: 28: John Street & Pine Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	33.0	34.4	27.3	19.1
Average Queue (m)	19.7	16.7	9.9	8.3
95th Queue (m)	30.7	29.4	21.0	16.4
Link Distance (m)	28.4	38.3	58.5	166.1
Upstream Blk Time (%)	1	0		
Queuing Penalty (veh)	0	0		
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 29: Locust Street & Elgin Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	51.9	28.0	36.5	34.5
Average Queue (m)	18.0	14.7	16.6	13.0
95th Queue (m)	67.7	23.6	44.8	46.1
Link Distance (m)	678.4	25.5	135.7	113.2
Upstream Blk Time (%)		0		2
Queuing Penalty (veh)		1		0
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 30: Elizabeth Street & Pine Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	31.5	27.4	14.3	25.6
Average Queue (m)	15.3	13.2	6.9	13.5
95th Queue (m)	25.6	21.6	14.4	22.6
Link Distance (m)	38.3	79.7	81.0	167.3
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 118: Martha Street & New Street

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	R	L	T
Maximum Queue (m)	214.3	27.5	20.8	24.9	24.4
Average Queue (m)	102.4	10.3	7.0	10.8	4.4
95th Queue (m)	385.8	31.2	18.3	22.2	18.1
Link Distance (m)	565.7		16.4		172.9
Upstream Blk Time (%)	11		1		
Queuing Penalty (veh)	0		3		
Storage Bay Dist (m)		20.0		20.0	
Storage Blk Time (%)	20	0		3	3
Queuing Penalty (veh)	71	2		0	1

Network Summary

Network wide Queuing Penalty: 10194























E

Appendix E: 2031 Preferred Land Use Scenario with AT Improvements and New Developments (Scenario 2) Synchro and SimTraffic Reports

HCM Signalized Intersection Capacity Analysis

1: Brant Street & Caroline Street

03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	20	6	1	222	298	18	292	22	230	590	41
Future Volume (vph)	197	20	6	1	222	298	18	292	22	230	590	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.1	3.1	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.0	3.0	3.0
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	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.91	1.00	0.95		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	0.93	1.00		0.98	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.92		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1705	1794	1390	1558	1562		1643	1699		1668	1700	
Flt Permitted	0.12	1.00	1.00	0.74	1.00		0.16	1.00		0.22	1.00	
Satd. Flow (perm)	218	1794	1390	1218	1562		277	1699		386	1700	
Peak-hour factor, PHF	0.90	0.91	0.58	0.80	0.80	0.90	0.84	0.91	0.79	0.90	0.92	0.66
Adj. Flow (vph)	219	22	10	1	278	331	21	321	28	256	641	62
RTOR Reduction (vph)	0	0	5	0	48	0	0	4	0	0	4	0
Lane Group Flow (vph)	219	22	5	1	561	0	21	345	0	256	699	0
Confl. Peds. (#/hr)	31		28	28		31	52		69	69		52
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	2%	0%	0%	2%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	42.0	42.0	42.0	30.0	30.0		23.0	23.0		36.0	36.0	
Effective Green, g (s)	41.0	44.0	44.0	32.0	32.0		25.0	25.0		35.0	38.0	
Actuated g/C Ratio	0.46	0.49	0.49	0.36	0.36		0.28	0.28		0.39	0.42	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	5.0	5.0	5.0	5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	231	877	679	433	555		76	471		278	717	
v/s Ratio Prot	c0.08	0.01			c0.36			0.20		0.09	c0.41	
v/s Ratio Perm	0.35		0.00	0.00			0.08			0.27		
v/c Ratio	0.95	0.03	0.01	0.00	1.01		0.28	0.73		0.92	0.97	
Uniform Delay, d1	20.8	11.9	11.8	18.7	29.0		25.4	29.5		23.0	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.37	1.07	
Incremental Delay, d2	44.4	0.1	0.0	0.0	41.1		8.8	9.7		28.8	24.4	
Delay (s)	65.1	12.0	11.8	18.7	70.1		34.2	39.2		60.3	51.7	
Level of Service	E	B	B	B	E		C	D		E	D	
Approach Delay (s)		58.3			70.0			38.9			54.0	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			56.4			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			96.3%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Brant Street & James Street

03/13/2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	233	264	272	72	162	437
Future Volume (vph)	233	264	272	72	162	437
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.5	3.1	3.1	3.5
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
Frpb, ped/bikes	1.00	0.96	1.00	0.90	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.98	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1656	1442	1773	1320	1589	1740
Flt Permitted	0.95	1.00	1.00	1.00	0.49	1.00
Satd. Flow (perm)	1656	1442	1773	1320	817	1740
Peak-hour factor, PHF	0.93	0.85	0.79	0.82	0.80	0.95
Adj. Flow (vph)	251	311	344	88	202	460
RTOR Reduction (vph)	0	235	0	21	0	0
Lane Group Flow (vph)	251	76	344	67	203	460
Confl. Peds. (#/hr)	21	15		57	57	
Heavy Vehicles (%)	9%	7%	6%	4%	5%	8%
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		2		1	2
Permitted Phases		4		2	2	
Actuated Green, G (s)	17.6	17.6	41.0	41.0	47.4	41.0
Effective Green, g (s)	19.6	19.6	43.0	43.0	45.4	43.0
Actuated g/C Ratio	0.25	0.25	0.54	0.54	0.57	0.54
Clearance Time (s)	6.0	6.0	6.0	6.0	3.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	405	353	952	709	515	935
v/s Ratio Prot	c0.15		0.19		c0.03	c0.26
v/s Ratio Perm		0.05		0.05	0.20	
v/c Ratio	0.62	0.22	0.36	0.09	0.39	0.49
Uniform Delay, d1	26.9	24.1	10.6	9.0	12.4	11.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.3	1.1	0.3	0.5	1.8
Delay (s)	29.7	24.4	11.7	9.3	12.9	13.5
Level of Service	C	C	B	A	B	B
Approach Delay (s)	26.8		11.2			13.3
Approach LOS	C		B			B




















Intersection Summary

HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

3: Brant Street & Lakeshore Road



















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	919	10	1	1043	78	6	5	2	128	13	400
Future Volume (vph)	155	919	10	1	1043	78	6	5	2	128	13	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.3	3.5	3.5
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	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	1.00		1.00	0.99			0.98		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1684	1750		1685	3258			1772		1722	1535	
Flt Permitted	0.13	1.00		0.06	1.00			0.49		0.74	1.00	
Satd. Flow (perm)	228	1750		114	3258			896		1344	1535	
Peak-hour factor, PHF	0.85	0.95	0.56	0.25	0.86	0.85	0.50	0.62	0.50	0.79	0.74	0.92
Adj. Flow (vph)	182	967	18	4	1213	92	12	8	4	162	18	435
RTOR Reduction (vph)	0	0	0	0	4	0	0	3	0	0	136	0
Lane Group Flow (vph)	182	985	0	4	1301	0	0	21	0	162	317	0
Confl. Peds. (#/hr)	28		12	28		12	31		7	7		31
Heavy Vehicles (%)	0%	1%	0%	0%	2%	2%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	77.2	68.6		68.6	68.6			26.8		26.8	26.8	
Effective Green, g (s)	75.2	70.6		70.6	70.6			29.8		29.8	29.8	
Actuated g/C Ratio	0.63	0.59		0.59	0.59			0.25		0.25	0.25	
Clearance Time (s)	3.0	6.0		6.0	6.0			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	235	1029		67	1916			222		333	381	
v/s Ratio Prot	c0.05	c0.56			0.40						c0.21	
v/s Ratio Perm	0.44			0.03				0.02		0.12		
v/c Ratio	0.77	0.96		0.06	0.68			0.09		0.49	0.83	
Uniform Delay, d1	33.9	23.3		10.5	16.9			34.7		38.6	42.7	
Progression Factor	0.97	1.19		0.80	0.86			1.00		1.00	1.00	
Incremental Delay, d2	10.9	15.5		1.6	1.9			0.2		1.1	14.3	
Delay (s)	43.8	43.1		10.1	16.5			34.9		39.7	57.0	
Level of Service	D	D		B	B			C		D	E	
Approach Delay (s)		43.2			16.5			34.9			52.5	
Approach LOS		D			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			33.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			93.8%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Elizabeth Street & James Street





















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	190	40	93	515	76	1	74	57	98	23	4
Future Volume (vph)	6	190	40	93	515	76	1	74	57	98	23	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0		6.0	6.0			7.0			7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			0.98			1.00	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			1.00			0.98	
Frt	1.00	0.97		1.00	0.96			0.96			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.96	
Satd. Flow (prot)	1777	1756		1728	1788			1759			1764	
Flt Permitted	0.24	1.00		0.59	1.00			1.00			0.54	
Satd. Flow (perm)	456	1756		1081	1788			1755			999	
Peak-hour factor, PHF	0.74	0.86	0.86	0.91	0.85	0.41	0.54	0.55	0.84	0.62	0.91	0.50
Adj. Flow (vph)	8	221	47	102	606	185	2	135	68	158	25	8
RTOR Reduction (vph)	0	7	0	0	10	0	0	22	0	0	2	0
Lane Group Flow (vph)	8	261	0	102	781	0	0	183	0	0	189	0
Confl. Peds. (#/hr)	13		16	16		13	7		13	13		7
Heavy Vehicles (%)	0%	3%	5%	1%	0%	0%	33%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	1	1	0	0	0	1	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	57.7	57.7		57.7	57.7			20.3			20.3	
Effective Green, g (s)	57.7	57.7		57.7	57.7			19.3			19.3	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.21			0.21	
Clearance Time (s)	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	
Lane Grp Cap (vph)	292	1125		693	1146			376			214	
v/s Ratio Prot		0.15			c0.44							
v/s Ratio Perm	0.02			0.09				0.10			c0.19	
v/c Ratio	0.03	0.23		0.15	0.68			0.49			0.89	
Uniform Delay, d1	5.9	6.8		6.4	10.3			31.0			34.3	
Progression Factor	1.00	1.00		0.94	0.81			1.00			0.86	
Incremental Delay, d2	0.2	0.5		0.4	3.1			1.0			30.9	
Delay (s)	6.1	7.3		6.5	11.5			32.0			60.4	
Level of Service	A	A		A	B			C			E	
Approach Delay (s)		7.3			10.9			32.0			60.4	
Approach LOS		A			B			C			E	
Intersection Summary												
HCM 2000 Control Delay			19.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			13.0			
Intersection Capacity Utilization			80.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Elizabeth Street & Lakeshore Road





















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	943	1	41	1145	12	12	1	2	19	1	6
Future Volume (vph)	59	943	1	41	1145	12	12	1	2	19	1	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.1	3.3	3.3
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	1.00	1.00	1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00			0.98		1.00	0.97	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00			0.97		0.88	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96		0.95	1.00	
Satd. Flow (prot)	1638	1773	1428	1674	3326			1694		1388	1585	
Flt Permitted	0.22	1.00	1.00	0.25	1.00			0.78		0.84	1.00	
Satd. Flow (perm)	375	1773	1428	446	3326			1364		1225	1585	
Peak-hour factor, PHF	0.82	0.95	0.25	0.29	0.95	0.76	0.54	0.25	0.50	0.70	0.25	0.71
Adj. Flow (vph)	72	993	4	141	1205	16	22	4	4	27	4	8
RTOR Reduction (vph)	0	0	1	0	0	0	0	4	0	0	7	0
Lane Group Flow (vph)	72	993	3	141	1221	0	0	26	0	27	5	0
Confl. Peds. (#/hr)	27		19	19		27	27		51	51		27
Heavy Vehicles (%)	2%	0%	0%	0%	1%	2%	0%	0%	0%	8%	0%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	99.9	99.9	99.9	100.9	100.9			6.1		6.1	6.1	
Effective Green, g (s)	102.9	102.9	102.9	102.9	102.9			9.1		9.1	9.1	
Actuated g/C Ratio	0.86	0.86	0.86	0.86	0.86			0.08		0.08	0.08	
Clearance Time (s)	7.0	7.0	7.0	6.0	6.0			7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	321	1520	1224	382	2852			103		92	120	
v/s Ratio Prot		c0.56			0.37						0.00	
v/s Ratio Perm	0.19		0.00	0.32				0.02		c0.02		
v/c Ratio	0.22	0.65	0.00	0.37	0.43			0.26		0.29	0.04	
Uniform Delay, d1	1.5	2.8	1.2	1.8	1.9			52.3		52.4	51.4	
Progression Factor	0.30	0.24	1.00	0.73	0.75			1.00		1.00	1.00	
Incremental Delay, d2	1.2	1.6	0.0	2.6	0.4			1.3		1.8	0.1	
Delay (s)	1.7	2.3	1.2	3.9	1.9			53.6		54.2	51.5	
Level of Service	A	A	A	A	A			D		D	D	
Approach Delay (s)		2.3			2.1			53.6			53.4	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			3.6			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			74.1%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Pearl Street & Lakeshore Road





















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	806	52	3	1079	48	32	20	6	29	11	29
Future Volume (vph)	45	806	52	3	1079	48	32	20	6	29	11	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.2	3.5	3.5
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	1.00		1.00	0.95			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.94	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			0.99	1.00	0.96	1.00	
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1732		1673	3289			1764	1501	1600	1680	
Flt Permitted	0.22	1.00		0.26	1.00			0.77	1.00	0.63	1.00	
Satd. Flow (perm)	382	1732		459	3289			1403	1501	1058	1680	
Peak-hour factor, PHF	0.74	0.93	0.81	0.37	0.97	0.70	0.57	0.67	0.37	0.92	0.50	0.92
Adj. Flow (vph)	61	867	64	8	1112	69	56	30	16	32	22	32
RTOR Reduction (vph)	0	1	0	0	2	0	0	0	14	0	29	0
Lane Group Flow (vph)	61	930	0	8	1179	0	0	86	2	32	25	0
Confl. Peds. (#/hr)	34		19	19		34	12		15	15		12
Heavy Vehicles (%)	2%	1%	0%	0%	1%	2%	3%	0%	0%	4%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	96.9	96.9		96.9	96.9			11.1	11.1	11.1	11.1	
Effective Green, g (s)	98.9	98.9		98.9	98.9			13.1	13.1	13.1	13.1	
Actuated g/C Ratio	0.82	0.82		0.82	0.82			0.11	0.11	0.11	0.11	
Clearance Time (s)	6.0	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)	314	1427		378	2710			153	163	115	183	
v/s Ratio Prot		c0.54			0.36							0.02
v/s Ratio Perm	0.16			0.02				c0.06	0.00	0.03		
v/c Ratio	0.19	0.65		0.02	0.43			0.56	0.01	0.28	0.14	
Uniform Delay, d1	2.2	4.0		1.9	2.9			50.7	47.7	49.1	48.4	
Progression Factor	0.21	0.21		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	1.8		0.1	0.5			4.7	0.0	1.3	0.3	
Delay (s)	1.5	2.7		2.0	3.4			55.4	47.7	50.4	48.7	
Level of Service	A	A		A	A			E	D	D	D	
Approach Delay (s)		2.6			3.4			54.2			49.3	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			6.9			HCM 2000 Level of Service			A			
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			77.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: John Street & Caroline Street

















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	270	2	34	471	90	20	30	13	68	28	61
Future Volume (Veh/h)	28	270	2	34	471	90	20	30	13	68	28	61
Sign Control	Free				Free				Stop		Stop	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.65	0.77	1.00	0.55	0.89	0.78	0.59	0.54	0.60	0.80	0.92	0.64
Hourly flow rate (vph)	43	351	2	62	529	115	34	56	22	85	30	95
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)									3	4		
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	69											
pX, platoon unblocked				0.90				0.90	0.90	0.90	0.90	0.90
vC, conflicting volume	644				353				1154	1206	352	1186
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	644				230				1116	1174	229	1153
tC, single (s)	4.1				4.2				7.2	6.6	6.2	7.1
tC, 2 stage (s)												
tF (s)	2.2				2.3				3.6	4.1	3.3	3.5
p0 queue free %	95				95				67	63	97	16
cM capacity (veh/h)	951				1172				104	153	736	101
											166	506
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	43	353	62	644	112	210						
Volume Left	43	0	62	0	34	85						
Volume Right	0	2	0	115	22	95						
cSH	951	1700	1172	1700	168	202						
Volume to Capacity	0.05	0.21	0.05	0.38	0.67	1.04						
Queue Length 95th (m)	1.1	0.0	1.3	0.0	31.0	75.0						
Control Delay (s)	9.0	0.0	8.2	0.0	61.3	123.3						
Lane LOS	A			A			F			F		
Approach Delay (s)	1.0			0.7			61.3			123.3		
Approach LOS							F			F		
Intersection Summary												
Average Delay			23.6									
Intersection Capacity Utilization			48.8%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

8: John Street & Maria Street


















03/13/2020

																				
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Lane Configurations																				
Sign Control		Stop			Stop			Stop			Stop									
Traffic Volume (vph)	12	0	43	0	45	0	40	41	0	0	2	34								
Future Volume (vph)	12	0	43	0	45	0	40	41	0	0	2	34								
Peak Hour Factor	0.68	0.92	0.92	0.92	0.92	0.92	0.75	0.75	0.92	0.92	0.84	0.62								
Hourly flow rate (vph)	18	0	47	0	49	0	53	55	0	0	2	55								
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																
Volume Total (vph)	65	49	108	57																
Volume Left (vph)	18	0	53	0																
Volume Right (vph)	47	0	0	55																
Hadj (s)	-0.16	0.03	0.18	-0.57																
Departure Headway (s)	4.2	4.4	4.4	3.7																
Degree Utilization, x	0.07	0.06	0.13	0.06																
Capacity (veh/h)	827	789	791	934																
Control Delay (s)	7.5	7.6	8.0	6.9																
Approach Delay (s)	7.5	7.6	8.0	6.9																
Approach LOS	A	A	A	A																
Intersection Summary																				
Delay			7.6																	
Level of Service			A																	
Intersection Capacity Utilization			27.7%	ICU Level of Service		A														
Analysis Period (min)			15																	

HCM Unsignalized Intersection Capacity Analysis

9: John Street & James Street


















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	165	15	24	487	22	17	16	16	25	29	22
Future Volume (Veh/h)	20	165	15	24	487	22	17	16	16	25	29	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.37	0.67	0.57	0.81	0.93	0.64	0.44	0.53	0.74	0.69	0.74	0.67
Hourly flow rate (vph)	54	246	26	30	524	34	39	30	22	36	39	33
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		69			64							
pX, platoon unblocked	0.74						0.74	0.74		0.74	0.74	0.74
vC, conflicting volume	558			272			1004	985	259	1005	981	541
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	225			272			828	803	259	830	798	202
tC, single (s)	4.1			4.2			7.5	6.5	6.7	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.8	4.0	3.7	3.5	4.0	3.3
p0 queue free %	95			98			73	86	97	80	82	95
cM capacity (veh/h)	1001			1230			144	218	682	176	219	623
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1							
Volume Total	326	30	558	91	108							
Volume Left	54	30	0	39	36							
Volume Right	26	0	34	22	33							
cSH	1001	1230	1700	206	248							
Volume to Capacity	0.05	0.02	0.33	0.44	0.44							
Queue Length 95th (m)	1.4	0.6	0.0	16.6	16.6							
Control Delay (s)	1.9	8.0	0.0	35.5	30.3							
Lane LOS	A	A		E	D							
Approach Delay (s)	1.9	0.4		35.5	30.3							
Approach LOS				E	D							
Intersection Summary												
Average Delay			6.6									
Intersection Capacity Utilization			39.1%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

10: Hotel Driveway/John Street & Lakeshore Road


















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	1027	1	3	1121	15	2	1	0	3	0	25
Future Volume (Veh/h)	15	1027	1	3	1121	15	2	1	0	3	0	25
Sign Control	Free				Free				Stop		Stop	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.50	0.70	0.25	0.37	0.72	0.50	0.50	0.25	0.92	0.37	0.92	0.50
Hourly flow rate (vph)	30	1467	4	8	1557	30	4	4	0	8	0	50
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)	86			57								
pX, platoon unblocked	0.92			0.37			0.41	0.41	0.37	0.41	0.41	0.92
vC, conflicting volume	1587			1471			2374	3132	1469	3117	3119	794
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1459			1421			2877	4733	1416	4696	4701	594
tC, single (s)	4.5			4.1			7.5	6.5	6.9	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	91			96			0	0	100	0	100	87
cM capacity (veh/h)	344			178			2	0	47	0	0	378
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	30	1471	786	808	8	58						
Volume Left	30	0	8	0	4	8						
Volume Right	0	4	0	30	0	50						
cSH	344	1700	178	1700	1	0						
Volume to Capacity	0.09	0.87	0.04	0.48	13.78	Err						
Queue Length 95th (m)	2.3	0.0	1.1	0.0	Err	Err						
Control Delay (s)	16.5	0.0	2.4	0.0	Err	Err						
Lane LOS	C		A		F	F						
Approach Delay (s)	0.3		1.2		Err	Err						
Approach LOS					F	F						
Intersection Summary												
Average Delay				Err								
Intersection Capacity Utilization				64.1%	ICU Level of Service			C				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

11: Elizabeth Street & Caroline Street




















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	167	141	6	370	9	184	17	12	27	43	4
Future Volume (Veh/h)	12	167	141	6	370	9	184	17	12	27	43	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.86	0.65	0.37	0.92	0.92	0.81	0.92	0.45	0.92	0.92	0.49
Hourly flow rate (vph)	13	194	217	16	402	10	227	18	27	29	47	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		133										
pX, platoon unblocked				0.92			0.92	0.92	0.92	0.92	0.92	
vC, conflicting volume	412			411			794	772	302	804	876	407
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	412			322			736	713	205	747	825	407
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	99			99			14	94	96	89	83	99
cM capacity (veh/h)	1147			1155			263	322	757	276	277	644
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1							
Volume Total	424	16	412	272	84							
Volume Left	13	16	0	227	29							
Volume Right	217	0	10	27	8							
cSH	1147	1155	1700	285	293							
Volume to Capacity	0.01	0.01	0.24	0.96	0.29							
Queue Length 95th (m)	0.3	0.3	0.0	74.7	9.3							
Control Delay (s)	0.4	8.2	0.0	82.1	22.2							
Lane LOS	A	A		F	C							
Approach Delay (s)	0.4	0.3		82.1	22.2							
Approach LOS				F	C							
Intersection Summary												
Average Delay			20.3									
Intersection Capacity Utilization			52.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

12: Pearl Street & James Street

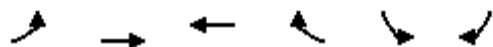
03/13/2020






												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	229	58	15	711	20	26	21	209	7	135	8
Future Volume (Veh/h)	8	229	58	15	711	20	26	21	209	7	135	8
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.66	0.82	0.74	0.80	0.87	0.67	0.74	0.85	0.67	0.58	0.77	0.50
Hourly flow rate (vph)	12	279	78	19	817	30	35	25	312	12	175	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)	119											
pX, platoon unblocked												
vC, conflicting volume	847			357			1300	1227	318	1498	1251	832
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	847			357			1300	1227	318	1498	1251	832
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	98			98			0	86	56	76	0	96
cM capacity (veh/h)	799			1213			0	174	707	49	169	372
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	12	357	19	847	372	203						
Volume Left	12	0	19	0	35	12						
Volume Right	0	78	0	30	312	16						
cSH	799	1700	1213	1700	0	154						
Volume to Capacity	0.02	0.21	0.02	0.50	Err	1.32						
Queue Length 95th (m)	0.4	0.0	0.4	0.0	Err	98.8						
Control Delay (s)	9.6	0.0	8.0	0.0	Err	239.7						
Lane LOS	A		A		F	F						
Approach Delay (s)	0.3		0.2		Err	239.7						
Approach LOS					F	F						
Intersection Summary												
Average Delay				Err								
Intersection Capacity Utilization				70.0%	ICU Level of Service				C			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

13: Lakeshore Road & Martha Street

03/13/2020













Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations					 	
Traffic Volume (veh/h)	105	751	1056	74	82	37
Future Volume (Veh/h)	105	751	1056	74	82	37
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.79	0.94	0.95	0.57	0.59	0.64
Hourly flow rate (vph)	133	799	1112	130	139	58
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		117				
pX, platoon unblocked					0.80	
vC, conflicting volume	1242				2242	1177
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1242				2422	1177
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	76				0	75
cM capacity (veh/h)	561				22	234
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	133	799	1242	197		
Volume Left	133	0	0	139		
Volume Right	0	0	130	58		
cSH	561	1700	1700	30		
Volume to Capacity	0.24	0.47	0.73	6.52		
Queue Length 95th (m)	7.3	0.0	0.0	Err		
Control Delay (s)	13.4	0.0	0.0	Err		
Lane LOS	B			F		
Approach Delay (s)	1.9		0.0	Err		
Approach LOS				F		
Intersection Summary						
Average Delay			831.5			
Intersection Capacity Utilization			82.7%	ICU Level of Service		E
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

14: Brant Street & Elgin Street

03/13/2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	72	48	4	280	445	225
Future Volume (Veh/h)	72	48	4	280	445	225
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.74	0.62	0.97	0.92	0.83
Hourly flow rate (vph)	78	65	6	289	484	271
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				162	80	
pX, platoon unblocked	0.91	0.89	0.89			
vC, conflicting volume	785	484	755			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	623	358	663			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	81	89	99			
cM capacity (veh/h)	405	610	799			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	143	295	484	271		
Volume Left	78	6	0	0		
Volume Right	65	0	0	271		
cSH	478	799	1700	1700		
Volume to Capacity	0.30	0.01	0.28	0.16		
Queue Length 95th (m)	9.9	0.2	0.0	0.0		
Control Delay (s)	15.7	0.3	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	15.7	0.3	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			37.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

15: Brant Street & Ontario Street

03/13/2020























Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (veh/h)	2	113	264	272	487	145
Future Volume (Veh/h)	2	113	264	272	487	145
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.88	0.86	0.93	0.87	0.74
Hourly flow rate (vph)	4	128	307	292	560	196
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				56	207	
pX, platoon unblocked	0.67	0.62	0.62			
vC, conflicting volume	1564	658	756			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1243	137	295			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	77	61			
cM capacity (veh/h)	79	567	782			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	132	599	756			
Volume Left	4	307	0			
Volume Right	128	0	196			
cSH	477	782	1700			
Volume to Capacity	0.28	0.39	0.44			
Queue Length 95th (m)	8.9	15.0	0.0			
Control Delay (s)	15.4	9.3	0.0			
Lane LOS	C	A				
Approach Delay (s)	15.4	9.3	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			5.1			
Intersection Capacity Utilization			80.5%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

16: Brant Street & Ghent Avenue






















03/13/2020

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	159	16	20	111	31	19	16	1188	15	26	1076	248	
Future Volume (vph)	159	16	20	111	31	19	16	1188	15	26	1076	248	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.0	3.0	3.0	3.0	3.0	3.0	
Total Lost time (s)		7.0	7.0		7.0		8.0	8.0		8.0	8.0		
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95		
Frpb, ped/bikes		1.00	0.98		1.00		1.00	1.00		1.00	0.99		
Flpb, ped/bikes		1.00	1.00		0.99		1.00	1.00		1.00	1.00		
Frt		1.00	0.85		0.98		1.00	1.00		1.00	0.97		
Flt Protected		0.96	1.00		0.97		0.95	1.00		0.95	1.00		
Satd. Flow (prot)		1762	1576		1761		1486	3112		1584	3040		
Flt Permitted		0.65	1.00		0.57		0.11	1.00		0.17	1.00		
Satd. Flow (perm)		1191	1576		1044		174	3112		280	3040		
Peak-hour factor, PHF	0.78	0.77	0.59	0.81	0.86	0.78	0.62	0.96	0.87	0.79	0.90	0.87	
Adj. Flow (vph)	204	21	34	137	36	24	26	1238	17	33	1196	285	
RTOR Reduction (vph)	0	0	26	0	6	0	0	1	0	0	20	0	
Lane Group Flow (vph)	0	225	8	0	191	0	26	1254	0	33	1461	0	
Confl. Peds. (#/hr)	7		12	12		7	23		16	16		23	
Heavy Vehicles (%)	3%	0%	0%	0%	0%	14%	13%	8%	7%	6%	7%	4%	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA		
Protected Phases		4			4			2			6		
Permitted Phases	4		4	4			2			6			
Actuated Green, G (s)		21.4	21.4		21.4		54.6	54.6		54.6	54.6		
Effective Green, g (s)		21.4	21.4		21.4		53.6	53.6		53.6	53.6		
Actuated g/C Ratio		0.24	0.24		0.24		0.60	0.60		0.60	0.60		
Clearance Time (s)		7.0	7.0		7.0		7.0	7.0		7.0	7.0		
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)		283	374		248		103	1853		166	1810		
v/s Ratio Prot								0.40			c0.48		
v/s Ratio Perm		c0.19	0.01		0.18		0.15			0.12			
v/c Ratio		0.80	0.02		0.77		0.25	0.68		0.20	0.81		
Uniform Delay, d1		32.2	26.3		32.0		8.7	12.3		8.3	14.2		
Progression Factor		1.00	1.00		1.00		0.51	0.70		1.00	1.00		
Incremental Delay, d2		14.2	0.0		13.4		4.8	1.7		2.7	4.0		
Delay (s)		46.5	26.3		45.4		9.2	10.3		11.0	18.2		
Level of Service		D	C		D		A	B		B	B		
Approach Delay (s)		43.8			45.4			10.3			18.0		
Approach LOS		D			D			B			B		
Intersection Summary													
HCM 2000 Control Delay			18.7									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.80										
Actuated Cycle Length (s)			90.0							15.0			
Intersection Capacity Utilization			79.7%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

17: Brant Street & Victoria Avenue

03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	27	7	24	20	62	112	798	13	55	782	115
Future Volume (vph)	21	27	7	24	20	62	112	798	13	55	782	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00		0.99	1.00		0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.90		1.00	1.00		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)	1749	1849		1762	1659		1672	1747		1675	1756	1428
Flt Permitted	0.68	1.00		0.72	1.00		0.26	1.00		0.21	1.00	1.00
Satd. Flow (perm)	1256	1849		1336	1659		452	1747		368	1756	1428
Peak-hour factor, PHF	0.78	0.56	0.87	0.81	0.52	0.80	0.50	0.83	0.50	0.86	0.88	0.76
Adj. Flow (vph)	27	48	8	30	38	78	224	961	26	64	889	151
RTOR Reduction (vph)	0	7	0	0	69	0	0	1	0	0	0	29
Lane Group Flow (vph)	27	49	0	30	47	0	224	986	0	64	889	122
Confl. Peds. (#/hr)	2		24	24		2	25		26	26		25
Heavy Vehicles (%)	3%	0%	0%	0%	0%	3%	0%	1%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			6	
Permitted Phases	4			4			2			6		6
Actuated Green, G (s)	10.1	10.1		10.1	10.1		67.9	67.9		67.9	67.9	67.9
Effective Green, g (s)	10.1	10.1		10.1	10.1		66.9	66.9		66.9	66.9	66.9
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.74	0.74		0.74	0.74	0.74
Clearance Time (s)	6.0	6.0		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	3.0
Lane Grp Cap (vph)	140	207		149	186		335	1298		273	1305	1061
v/s Ratio Prot		0.03			c0.03			c0.56			0.51	
v/s Ratio Perm	0.02			0.02			0.50			0.17		0.09
v/c Ratio	0.19	0.24		0.20	0.25		0.67	0.76		0.23	0.68	0.11
Uniform Delay, d1	36.3	36.4		36.3	36.5		5.9	6.8		3.6	6.0	3.2
Progression Factor	1.00	1.00		1.00	1.00		1.38	1.39		0.58	0.44	0.45
Incremental Delay, d2	0.7	0.6		0.7	0.7		7.9	3.3		1.2	1.8	0.1
Delay (s)	36.9	37.0		37.0	37.2		16.0	12.8		3.3	4.4	1.6
Level of Service	D	D		D	D		B	B		A	A	A
Approach Delay (s)		37.0			37.2			13.4			4.0	
Approach LOS		D			D			B			A	
Intersection Summary												
HCM 2000 Control Delay			11.4				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			13.0		
Intersection Capacity Utilization			81.1%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Sign configuration not allowed in HCM analysis.

HCM Unsignalized Intersection Capacity Analysis

19: Lakeshore Road & Locust Street

03/13/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	1043	1337	106	10	46
Future Volume (Veh/h)	31	1043	1337	106	10	46
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.92	0.99	0.72	0.25	0.90
Hourly flow rate (vph)	43	1134	1351	147	40	51
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		182	107			
pX, platoon unblocked	0.74				0.33	0.74
vC, conflicting volume	1498				2644	749
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	969				2015	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				0	94
cM capacity (veh/h)	532				16	807
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	43	1134	901	597	91	
Volume Left	43	0	0	0	40	
Volume Right	0	0	0	147	51	
cSH	532	1700	1700	1700	35	
Volume to Capacity	0.08	0.67	0.53	0.35	2.62	
Queue Length 95th (m)	2.1	0.0	0.0	0.0	82.7	
Control Delay (s)	12.4	0.0	0.0	0.0	979.8	
Lane LOS	B				F	
Approach Delay (s)	0.5		0.0		979.8	
Approach LOS					F	
Intersection Summary						
Average Delay			32.4			
Intersection Capacity Utilization			65.0%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

20: Lakeshore Road & Burlington Avenue

03/13/2020






















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	31	1029	1382	11	14	16
Future Volume (vph)	31	1029	1382	11	14	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.2	3.2	3.2	3.2	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	1.00		0.92	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1437	1681	1662		1708	
Flt Permitted	0.04	1.00	1.00		0.98	
Satd. Flow (perm)	61	1681	1662		1708	
Peak-hour factor, PHF	0.47	0.93	0.93	0.63	0.92	0.75
Adj. Flow (vph)	66	1106	1486	17	15	21
RTOR Reduction (vph)	0	0	0	0	20	0
Lane Group Flow (vph)	66	1106	1503	0	16	0
Confl. Peds. (#/hr)	34			34	4	
Heavy Vehicles (%)	20%	8%	9%	10%	0%	0%
Turn Type	Perm	NA	NA		Perm	
Protected Phases		2	2			
Permitted Phases	2				4	
Actuated Green, G (s)	100.0	100.0	100.0		8.0	
Effective Green, g (s)	100.0	100.0	100.0		8.0	
Actuated g/C Ratio	0.83	0.83	0.83		0.07	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	50	1400	1385		113	
v/s Ratio Prot		0.66	0.90			
v/s Ratio Perm	c1.09				c0.01	
v/c Ratio	1.32	0.79	1.09		0.15	
Uniform Delay, d1	10.0	4.9	10.0		52.8	
Progression Factor	1.62	1.25	1.28		1.00	
Incremental Delay, d2	199.2	2.4	48.4		0.6	
Delay (s)	215.4	8.5	61.2		53.4	
Level of Service	F	A	E		D	
Approach Delay (s)		20.2	61.2		53.4	
Approach LOS		C	E		D	
Intersection Summary						
HCM 2000 Control Delay			43.4		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.21			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			90.1%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

21: East Parking Lot Entrance/Nelson Avenue & Lakeshore Road






















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	994	18	19	1382	17	11	1	7	7	4	278
Future Volume (vph)	53	994	18	19	1382	17	11	1	7	7	4	278
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.2	3.2	3.2	3.2	3.2	3.2	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			7.0			7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00			0.97			0.94	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.94			0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			1.00	
Satd. Flow (prot)	1627	1780	1447	1725	3365			1602			1524	
Flt Permitted	0.11	1.00	1.00	0.09	1.00			0.77			0.99	
Satd. Flow (perm)	189	1780	1447	158	3365			1266			1510	
Peak-hour factor, PHF	0.90	0.94	0.71	0.64	0.93	0.57	1.00	0.25	0.58	0.44	0.50	0.78
Adj. Flow (vph)	59	1057	25	30	1486	30	11	4	12	16	8	356
RTOR Reduction (vph)	0	0	9	0	1	0	0	9	0	0	32	0
Lane Group Flow (vph)	59	1057	16	30	1515	0	0	18	0	0	348	0
Confl. Peds. (#/hr)	33		13	13		33	29		13	13		29
Heavy Vehicles (%)	6%	2%	0%	0%	2%	0%	0%	0%	14%	0%	25%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2			4			4		
Actuated Green, G (s)	77.8	77.8	77.8	77.8	77.8			29.2			29.2	
Effective Green, g (s)	77.8	77.8	77.8	77.8	77.8			29.2			29.2	
Actuated g/C Ratio	0.65	0.65	0.65	0.65	0.65			0.24			0.24	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			7.0			7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	122	1154	938	102	2181			308			367	
v/s Ratio Prot		c0.59			0.45							
v/s Ratio Perm	0.31		0.01	0.19				0.01			c0.23	
v/c Ratio	0.48	0.92	0.02	0.29	0.69			0.06			0.95	
Uniform Delay, d1	10.8	18.3	7.5	9.2	13.5			34.8			44.7	
Progression Factor	0.91	1.05	0.87	0.44	0.52			1.00			1.00	
Incremental Delay, d2	8.9	9.2	0.0	1.7	0.4			0.1			33.5	
Delay (s)	18.8	28.3	6.5	5.7	7.4			34.9			78.2	
Level of Service	B	C	A	A	A			C			E	
Approach Delay (s)		27.3			7.4			34.9			78.2	
Approach LOS		C			A			C			E	
Intersection Summary												
HCM 2000 Control Delay			23.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			13.0			
Intersection Capacity Utilization			83.4%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

22: West Parking Lot Entrance/Brock Avenue & Lakeshore Road






















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	996	13	1	1690	5	6	1	7	1	0	104
Future Volume (Veh/h)	31	996	13	1	1690	5	6	1	7	1	0	104
Sign Control		Free			Free			Yield			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.97	0.75	0.25	0.83	0.42	0.38	0.25	0.58	0.25	0.92	0.90
Hourly flow rate (vph)	38	1027	17	4	2036	12	16	4	12	4	0	116
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		125			108							
pX, platoon unblocked	0.71			0.56			0.71	0.71	0.56	0.71	0.71	0.71
vC, conflicting volume	2048			1044			2245	3159	1027	3167	3170	1024
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1650			691			993	2278	661	2289	2293	197
tC, single (s)	4.2			4.1			7.5	6.5	6.9	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	85			99			84	84	95	65	100	79
cM capacity (veh/h)	258			515			100	24	231	11	24	548
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	38	1027	17	4	1357	691	32	120				
Volume Left	38	0	0	4	0	0	16	4				
Volume Right	0	0	17	0	0	12	12	116				
cSH	258	1700	1700	515	1700	1700	85	213				
Volume to Capacity	0.15	0.60	0.01	0.01	0.80	0.41	0.38	0.56				
Queue Length 95th (m)	4.1	0.0	0.0	0.2	0.0	0.0	11.8	24.5				
Control Delay (s)	21.4	0.0	0.0	12.0	0.0	0.0	70.7	41.7				
Lane LOS	C			B			F	E				
Approach Delay (s)	0.8			0.0			70.7	41.7				
Approach LOS							F	E				
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			65.6%			ICU Level of Service		C				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

23: Lakeshore Road & North Shore Boulevard & Maple Avenue





















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	224	754	18	276	1366	103	118	65	116	226	374	496
Future Volume (vph)	224	754	18	276	1366	103	118	65	116	226	374	496
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.2	3.2	3.2	3.2	3.2	3.2	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	3.0	6.0		3.0	6.0		4.0	8.0		4.0	8.0	8.0
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	0.96		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	0.90		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)	1658	3169		1690	3342		1514	1430		1587	1756	1451
Flt Permitted	0.09	1.00		0.12	1.00		0.25	1.00		0.57	1.00	1.00
Satd. Flow (perm)	164	3169		208	3342		395	1430		945	1756	1451
Peak-hour factor, PHF	0.90	0.80	0.76	0.87	0.92	0.85	0.77	0.91	0.87	0.78	0.94	0.91
Adj. Flow (vph)	249	942	24	317	1485	121	153	71	133	290	398	545
RTOR Reduction (vph)	0	1	0	0	5	0	0	56	0	0	0	159
Lane Group Flow (vph)	249	966	0	317	1601	0	153	148	0	290	398	386
Confl. Peds. (#/hr)	16		30	30		16	23		47	47		23
Heavy Vehicles (%)	4%	8%	18%	2%	1%	12%	11%	4%	9%	4%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	53.5	42.5		63.5	49.5		40.5	33.0		40.5	33.0	33.0
Effective Green, g (s)	53.5	42.5		63.5	49.5		38.5	32.0		38.5	32.0	32.0
Actuated g/C Ratio	0.45	0.35		0.53	0.41		0.32	0.27		0.32	0.27	0.27
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	7.0
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)	210	1122		332	1378		187	381		337	468	386
v/s Ratio Prot	c0.11	0.30		c0.14	c0.48		0.04	0.10		c0.05	0.23	
v/s Ratio Perm	0.42			0.36			0.22			0.23		c0.27
v/c Ratio	1.19	0.86		0.95	1.16		0.82	0.39		0.86	0.85	1.00
Uniform Delay, d1	34.0	36.0		32.1	35.2		36.6	36.0		37.7	41.7	44.0
Progression Factor	1.45	0.83		1.37	0.86		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	119.6	8.2		32.0	79.4		23.4	0.7		19.5	13.8	45.4
Delay (s)	168.7	38.3		75.8	109.8		60.0	36.6		57.2	55.5	89.3
Level of Service	F	D		E	F		E	D		E	E	F
Approach Delay (s)		65.0			104.2			46.7			70.9	
Approach LOS		E			F			D			E	
Intersection Summary												
HCM 2000 Control Delay			81.1			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.10									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			21.0			
Intersection Capacity Utilization			108.2%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

24: Brant Hospital Entrance/Apartment Entrance & North Shore Boulevard

03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	954	25	24	1973	0	88	0	42	16	0	8
Future Volume (vph)	17	954	25	24	1973	0	88	0	42	16	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0		7.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99		1.00		0.99	1.00
Frt	1.00	0.99		1.00	1.00		1.00		0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00		0.95	1.00
Satd. Flow (prot)	1685	3310		1684	3336		1759		1586		1794	1404
Flt Permitted	0.05	1.00		0.23	1.00		0.74		1.00		0.95	1.00
Satd. Flow (perm)	88	3310		407	3336		1366		1586		1794	1404
Peak-hour factor, PHF	0.66	0.96	0.69	0.82	0.91	0.80	0.66	0.92	0.57	0.53	0.92	0.40
Adj. Flow (vph)	26	994	36	29	2168	0	133	0	74	30	0	20
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	63	0	0	17
Lane Group Flow (vph)	26	1028	0	29	2168	0	133	0	11	0	30	3
Confl. Peds. (#/hr)			5	5			5		5	5		5
Heavy Vehicles (%)	0%	1%	5%	0%	1%	0%	2%	0%	0%	0%	0%	13%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	Perm
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		8
Actuated Green, G (s)	80.9	80.9		88.8	88.8		18.2		18.2		18.2	18.2
Effective Green, g (s)	80.9	80.9		88.8	88.8		18.2		18.2		18.2	18.2
Actuated g/C Ratio	0.67	0.67		0.74	0.74		0.15		0.15		0.15	0.15
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0		7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	59	2231		342	2468		207		240		272	212
v/s Ratio Prot		0.31		0.00	c0.65							
v/s Ratio Perm	0.30			0.06			c0.10		0.01		0.02	0.00
v/c Ratio	0.44	0.46		0.08	0.88		0.64		0.05		0.11	0.01
Uniform Delay, d1	9.1	9.2		5.1	11.6		47.8		43.5		43.9	43.3
Progression Factor	0.89	0.83		0.60	0.72		1.00		1.00		1.00	1.00
Incremental Delay, d2	19.7	0.6		0.0	0.5		6.7		0.1		0.2	0.0
Delay (s)	27.8	8.3		3.1	8.8		54.5		43.6		44.1	43.3
Level of Service	C	A		A	A		D		D		D	D
Approach Delay (s)		8.8			8.7			50.6			43.8	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			11.7				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			17.0		
Intersection Capacity Utilization			84.4%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

25: QEW East Ramp Entrance/QEW Toronto On Ramp & North Shore Boulevard

03/13/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑		↑		↑			
Traffic Volume (vph)	0	608	28	0	1619	442	98	0	371	0	0	0
Future Volume (vph)	0	608	28	0	1619	442	98	0	371	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.0	3.0	3.0	3.0	3.6	3.6	3.6	3.6	3.6	3.6
Total Lost time (s)		6.0			6.0		7.0		7.0			
Lane Util. Factor		0.95			0.95		1.00		1.00			
Frt		0.99			0.97		1.00		0.85			
Flt Protected		1.00			1.00		0.95		1.00			
Satd. Flow (prot)		3246			3196		1787		1568			
Flt Permitted		1.00			1.00		0.95		1.00			
Satd. Flow (perm)		3246			3196		1787		1568			
Peak-hour factor, PHF	0.92	0.85	0.83	0.92	0.87	0.86	0.81	0.92	0.89	0.92	0.92	0.92
Adj. Flow (vph)	0	715	34	0	1861	514	121	0	417	0	0	0
RTOR Reduction (vph)	0	3	0	0	18	0	0	0	270	0	0	0
Lane Group Flow (vph)	0	746	0	0	2357	0	121	0	147	0	0	0
Heavy Vehicles (%)	0%	3%	5%	0%	2%	2%	1%	0%	3%	0%	0%	0%
Turn Type		NA			NA		Perm		Perm			
Protected Phases		2			6							
Permitted Phases							4		4			
Actuated Green, G (s)		92.1			92.1		14.9		14.9			
Effective Green, g (s)		92.1			92.1		14.9		14.9			
Actuated g/C Ratio		0.77			0.77		0.12		0.12			
Clearance Time (s)		6.0			6.0		7.0		7.0			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		2491			2452		221		194			
v/s Ratio Prot		0.23			c0.74							
v/s Ratio Perm							0.07		c0.09			
v/c Ratio		0.30			0.96		0.55		0.76			
Uniform Delay, d1		4.2			12.4		49.4		50.8			
Progression Factor		1.00			0.52		1.00		1.00			
Incremental Delay, d2		0.3			7.0		2.8		15.6			
Delay (s)		4.5			13.4		52.1		66.4			
Level of Service		A			B		D		E			
Approach Delay (s)		4.5			13.4			63.2			0.0	
Approach LOS		A			B			E			A	

Intersection Summary





















HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

26: Maple Avenue & Driveway/Elgin Street


03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1	7	226	0	220	3	344	21	32	870	5
Future Volume (Veh/h)	7	1	7	226	0	220	3	344	21	32	870	5
Sign Control		Yield			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.45	0.25	0.62	0.76	0.92	0.74	0.92	0.87	0.75	0.59	0.93	0.25
Hourly flow rate (vph)	16	4	11	297	0	297	3	395	28	54	935	20
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)								243			129	
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90		0.90					
vC, conflicting volume	1554	1482	478	1004	1478	212	955			423		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1400	1321	210	792	1316	212	738			423		
tC, single (s)	7.5	6.5	7.2	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	71	97	98	0	100	63	100			95		
cM capacity (veh/h)	56	136	687	237	137	800	793			1147		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3			
Volume Total	31	297	297	3	263	160	54	623	332			
Volume Left	16	297	0	3	0	0	54	0	0			
Volume Right	11	0	297	0	0	28	0	0	20			
cSH	93	237	800	793	1700	1700	1147	1700	1700			
Volume to Capacity	0.33	1.25	0.37	0.00	0.15	0.09	0.05	0.37	0.20			
Queue Length 95th (m)	10.3	119.6	13.8	0.1	0.0	0.0	1.2	0.0	0.0			
Control Delay (s)	61.8	185.9	12.1	9.6	0.0	0.0	8.3	0.0	0.0			
Lane LOS	F	F	B	A			A					
Approach Delay (s)	61.8	99.0		0.1			0.4					
Approach LOS	F	F										
Intersection Summary												
Average Delay			29.7									
Intersection Capacity Utilization			52.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

27: Maple Avenue & Driveway/Ontario Street

















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	3	1	1	231	3	224	0	474	90	58	639	20
Future Volume (vph)	3	1	1	231	3	224	0	474	90	58	639	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.6	3.6	3.6	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)		7.0		7.0	7.0			8.0		8.0	8.0	
Lane Util. Factor		1.00		1.00	1.00			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		1.00	0.97			0.99		1.00	1.00	
Flpb, ped/bikes		0.99		0.99	1.00			1.00		0.99	1.00	
Frt		0.97		1.00	0.86			0.97		1.00	0.99	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1414		1780	1561			3205		1671	3300	
Flt Permitted		0.83		0.75	1.00			1.00		0.40	1.00	
Satd. Flow (perm)		1208		1400	1561			3205		712	3300	
Peak-hour factor, PHF	0.37	0.25	0.25	0.91	0.37	0.98	0.92	0.89	0.79	0.80	0.95	0.78
Adj. Flow (vph)	8	4	4	254	8	229	0	533	114	72	673	26
RTOR Reduction (vph)	0	3	0	0	162	0	0	18	0	0	3	0
Lane Group Flow (vph)	0	13	0	254	75	0	0	629	0	73	696	0
Confl. Peds. (#/hr)	19		14	14		19	17		13	13		17
Heavy Vehicles (%)	0%	0%	100%	0%	0%	1%	0%	2%	0%	0%	1%	11%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		19.9		19.9	19.9			46.1		46.1	46.1	
Effective Green, g (s)		19.9		19.9	19.9			45.1		45.1	45.1	
Actuated g/C Ratio		0.25		0.25	0.25			0.56		0.56	0.56	
Clearance Time (s)		7.0		7.0	7.0			7.0		7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		300		348	388			1806		401	1860	
v/s Ratio Prot					0.05			0.20			c0.21	
v/s Ratio Perm		0.01		c0.18						0.10		
v/c Ratio		0.04		0.73	0.19			0.35		0.18	0.37	
Uniform Delay, d1		22.8		27.6	23.7			9.5		8.5	9.6	
Progression Factor		1.00		1.24	2.15			1.00		1.00	1.00	
Incremental Delay, d2		0.1		7.3	0.2			0.5		1.0	0.6	
Delay (s)		22.9		41.4	51.3			10.0		9.5	10.2	
Level of Service		C		D	D			B		A	B	
Approach Delay (s)		22.9			46.2			10.0			10.2	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			19.4			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			15.0			
Intersection Capacity Utilization			67.9%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

28: John Street & Pine Street

















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	292	10	7	353	11	14	34	17	19	38	14
Future Volume (vph)	5	292	10	7	353	11	14	34	17	19	38	14
Peak Hour Factor	0.62	0.86	0.74	0.58	0.65	0.62	0.80	0.66	0.79	0.64	0.81	0.64
Hourly flow rate (vph)	8	340	14	12	543	18	18	52	22	30	47	22
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	362	573	92	99								
Volume Left (vph)	8	12	18	30								
Volume Right (vph)	14	18	22	22								
Hadj (s)	0.00	0.04	0.20	0.13								
Departure Headway (s)	5.4	5.1	6.8	6.7								
Degree Utilization, x	0.54	0.82	0.17	0.18								
Capacity (veh/h)	636	688	471	484								
Control Delay (s)	14.6	27.1	11.2	11.2								
Approach Delay (s)	14.6	27.1	11.2	11.2								
Approach LOS	B	D	B	B								
Intersection Summary												
Delay				20.3								
Level of Service				C								
Intersection Capacity Utilization				35.4%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

29: Locust Street & Elgin Street

















03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	27	63	10	33	230	24	75	87	46	7	36	35
Future Volume (vph)	27	63	10	33	230	24	75	87	46	7	36	35
Peak Hour Factor	0.62	0.56	0.74	0.64	0.81	0.71	0.75	0.75	0.71	0.43	0.67	0.85
Hourly flow rate (vph)	44	113	14	52	284	34	100	116	65	16	54	41
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	171	370	281	111								
Volume Left (vph)	44	52	100	16								
Volume Right (vph)	14	34	65	41								
Hadj (s)	0.02	-0.03	-0.06	-0.19								
Departure Headway (s)	5.7	5.3	5.5	5.7								
Degree Utilization, x	0.27	0.55	0.43	0.18								
Capacity (veh/h)	571	642	597	543								
Control Delay (s)	10.8	14.5	12.7	10.0								
Approach Delay (s)	10.8	14.5	12.7	10.0								
Approach LOS	B	B	B	A								
Intersection Summary												
Delay				12.7								
Level of Service				B								
Intersection Capacity Utilization				41.9%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

30: Elizabeth Street & Pine Street







03/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	163	150	25	10	172	30	21	46	17	18	25	181
Future Volume (vph)	163	150	25	10	172	30	21	46	17	18	25	181
Peak Hour Factor	0.45	0.59	0.77	0.50	0.72	0.74	0.53	0.75	0.78	0.71	0.88	0.50
Hourly flow rate (vph)	362	254	32	20	239	41	40	61	22	25	28	362
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	648	300	123	415								
Volume Left (vph)	362	20	40	25								
Volume Right (vph)	32	41	22	362								
Hadj (s)	0.10	-0.04	-0.01	-0.51								
Departure Headway (s)	6.7	7.1	8.0	6.5								
Degree Utilization, x	1.21	0.59	0.27	0.75								
Capacity (veh/h)	523	483	398	415								
Control Delay (s)	133.7	19.7	14.0	26.7								
Approach Delay (s)	133.7	19.7	14.0	26.7								
Approach LOS	F	C	B	D								
Intersection Summary												
Delay				70.9								
Level of Service				F								
Intersection Capacity Utilization				54.4%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis

118: Martha Street & New Street

03/13/2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	726	349	0	416	42	0
Future Volume (vph)	726	349	0	416	42	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		1.00	0.99	
Frt	1.00	0.85		0.86	1.00	
Flt Protected	0.95	1.00		1.00	0.95	
Satd. Flow (prot)	1646	1517		1550	1782	
Flt Permitted	0.95	1.00		1.00	0.95	
Satd. Flow (perm)	1646	1517		1550	1782	
Peak-hour factor, PHF	0.92	0.72	0.92	0.84	0.74	0.62
Adj. Flow (vph)	789	485	0	495	57	0
RTOR Reduction (vph)	0	55	0	101	0	0
Lane Group Flow (vph)	789	430	0	394	57	0
Confl. Peds. (#/hr)	6	5			5	
Heavy Vehicles (%)	8%	3%	2%	6%	0%	20%
Turn Type	Perm	Perm		Perm	Perm	
Protected Phases						8
Permitted Phases	6	6		2	8	
Actuated Green, G (s)	71.6	71.6		71.6	7.4	
Effective Green, g (s)	71.6	71.6		71.6	6.4	
Actuated g/C Ratio	0.80	0.80		0.80	0.07	
Clearance Time (s)	6.0	6.0		6.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1309	1206		1233	126	
v/s Ratio Prot						
v/s Ratio Perm	c0.48	0.28		0.25	c0.03	
v/c Ratio	0.60	0.36		0.32	0.45	
Uniform Delay, d1	3.6	2.6		2.5	40.1	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	0.8		0.7	2.6	
Delay (s)	5.7	3.5		3.2	42.7	
Level of Service	A	A		A	D	
Approach Delay (s)	4.8		3.2			42.7
Approach LOS	A		A			D
Intersection Summary						
HCM 2000 Control Delay			5.6		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.59			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			56.9%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Arterial Level of Service: EB Lakeshore Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Lakeshore Road	23	22.2	36.3	0.2	16
West Parking Lot Ent	22	12.4	23.4	0.1	19
East Parking Lot Ent	21	21.1	38.6	0.1	14
	74	7.6	12.7	0.1	20
Burlington Avenue	20	44.9	128.1	0.2	11
	57	23.8	30.0	0.1	11
Locust Street	19	32.6	120.7	0.1	9
Brant Street	3	31.9	40.8	0.1	10
Hotel Driveway	10	4.0	10.3	0.1	34
Elizabeth Street	5	4.7	9.4	0.1	22
Pearl Street	6	5.0	13.5	0.1	32
Martha Street	13	3.9	12.5	0.1	34
Total		214.3	476.3	1.3	15

Arterial Level of Service: WB Lakeshore Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Martha Street	13	574.2	2632.4	0.7	4
Pearl Street	6	176.8	314.3	0.1	2
Elizabeth Street	5	170.2	389.3	0.1	2
John Street	10	42.6	170.5	0.1	4
Brant Street	3	60.9	75.0	0.1	5
Locust Street	19	42.5	50.2	0.1	8
	57	31.7	38.6	0.1	9
Burlington Avenue	20	31.8	327.6	0.1	8
	74	53.5	65.5	0.2	9
Nelson Avenue	21	44.3	53.2	0.1	5
Brock Avenue	22	34.9	284.5	0.1	9
Maple Avenue	23	87.8	116.7	0.1	5
Total		1351.1	4517.7	1.9	5

Arterial Level of Service: EB North Shore Boulevard

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
QEW East Ramp Entran	25	159.2	237.9	1.1	17
	62	52.7	60.7	0.1	7
Brant Hospital Entra	24	78.8	113.0	0.1	5
Lakeshore Road	23	169.5	199.7	0.3	5
Total		460.3	611.3	1.6	10

Arterial Level of Service: EB North Shore Boulevard

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed
Apartment Entrance	24	6.6	25.6	0.3	38
	62	2.0	10.6	0.1	39
QEW Toronto On Ramp	25	5.3	13.4	0.1	31
Total		14.0	49.6	0.5	36

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Intersection: 1: Brant Street & Caroline Street

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	TR
Maximum Queue (m)	49.4	27.0	13.1	9.2	53.1	25.2	98.3	137.6	271.6
Average Queue (m)	28.3	3.9	1.2	0.3	48.1	5.3	44.4	43.0	147.5
95th Queue (m)	45.8	15.8	6.8	4.5	51.0	18.8	84.7	103.9	291.2
Link Distance (m)		179.1			46.5		182.6	339.8	339.8
Upstream Blk Time (%)					42				3
Queuing Penalty (veh)					233				11
Storage Bay Dist (m)	45.0		14.0	22.0		18.0			
Storage Blk Time (%)	2	1	0		63	1	34		
Queuing Penalty (veh)	1	1	0		1	2	6		

Intersection: 2: Brant Street & James Street

Movement	WB	WB	NB	NB	SB	SB
Directions Served	L	R	T	R	L	T
Maximum Queue (m)	52.4	50.8	64.0	19.8	24.5	54.6
Average Queue (m)	35.7	26.5	31.4	9.5	18.9	41.2
95th Queue (m)	55.8	48.4	57.9	22.6	31.1	57.7
Link Distance (m)	47.3	47.3	60.0			36.7
Upstream Blk Time (%)	9	3	2			35
Queuing Penalty (veh)	23	8	7			208
Storage Bay Dist (m)				11.0	17.0	
Storage Blk Time (%)			32	2	12	45
Queuing Penalty (veh)			23	6	54	72

Intersection: 3: Brant Street & Lakeshore Road

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	T	TR	LTR	L	TR
Maximum Queue (m)	59.9	96.1	1.4	63.8	78.8	13.5	153.2	23.5
Average Queue (m)	35.8	89.8	0.1	56.9	61.4	3.0	128.9	23.5
95th Queue (m)	71.3	93.8	1.0	62.6	72.9	9.7	172.2	23.9
Link Distance (m)		86.8		49.2	49.2	272.0	142.0	
Upstream Blk Time (%)		34		73	64		21	
Queuing Penalty (veh)		358		416	370		103	
Storage Bay Dist (m)	50.0		23.0					16.0
Storage Blk Time (%)	0	46		91			21	76
Queuing Penalty (veh)	1	71		1			87	98

Intersection: 4: Elizabeth Street & James Street

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	12.9	38.1	44.8	90.3	67.2	46.0
Average Queue (m)	1.2	14.5	14.9	45.8	21.4	20.1
95th Queue (m)	7.1	31.1	41.9	85.0	55.8	37.1
Link Distance (m)		46.8		100.9	167.3	242.4
Upstream Blk Time (%)		0		2		
Queuing Penalty (veh)		0		17		
Storage Bay Dist (m)	12.0		36.0			
Storage Blk Time (%)	0	8	0	14		
Queuing Penalty (veh)	0	0	0	13		

Intersection: 5: Elizabeth Street & Lakeshore Road

Movement	EB	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	LTR	L	TR
Maximum Queue (m)	20.7	49.6	0.4	52.9	112.4	115.8	53.9	21.7	30.1
Average Queue (m)	4.7	23.6	0.0	25.4	105.6	107.1	26.5	6.3	5.6
95th Queue (m)	13.8	42.3	0.3	67.8	110.1	112.9	73.2	18.1	21.4
Link Distance (m)		28.4			99.9	99.9	213.9		81.0
Upstream Blk Time (%)	0	8			69	58			
Queuing Penalty (veh)	0	80			391	330			
Storage Bay Dist (m)	72.0		12.0	35.0				16.0	
Storage Blk Time (%)	0	18			97			4	11
Queuing Penalty (veh)	0	11			40			0	2

Intersection: 6: Pearl Street & Lakeshore Road

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	TR	LT	R	L	TR
Maximum Queue (m)	36.7	82.7	21.0	107.9	113.1	122.4	22.2	14.2	30.7
Average Queue (m)	5.4	21.7	1.5	99.3	102.2	63.2	2.1	6.7	10.4
95th Queue (m)	19.7	51.4	11.4	104.9	110.2	200.7	11.2	15.3	23.7
Link Distance (m)		99.9		96.4	96.4	305.6			273.9
Upstream Blk Time (%)		0		60	39	5			
Queuing Penalty (veh)		0		329	213	0			
Storage Bay Dist (m)	49.0		19.0				15.0	7.0	
Storage Blk Time (%)		2	0	98		56	0	22	23
Queuing Penalty (veh)		1	0	3		3	0	9	7

Intersection: 7: John Street & Caroline Street

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	TR	LT	R	LT	R
Maximum Queue (m)	11.4	35.9	48.8	44.6	27.0	155.5	38.5
Average Queue (m)	2.3	5.0	40.9	16.0	4.8	81.3	29.3
95th Queue (m)	8.8	23.5	58.3	35.5	17.6	185.7	49.0
Link Distance (m)			43.4	94.3		156.2	
Upstream Blk Time (%)		0	25			27	
Queuing Penalty (veh)		0	138			0	
Storage Bay Dist (m)	18.0	35.0			24.0		31.0
Storage Blk Time (%)	0	0	35	12	0	4	56
Queuing Penalty (veh)	0	0	12	2	0	2	54

Intersection: 8: John Street & Maria Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	18.9	13.7	19.5	12.0
Average Queue (m)	8.3	7.0	8.7	6.1
95th Queue (m)	16.8	13.6	16.1	13.3
Link Distance (m)	47.2	43.4	127.0	94.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: John Street & James Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (m)	21.9	15.3	43.5	26.9	27.7
Average Queue (m)	2.8	1.6	11.3	10.6	10.7
95th Queue (m)	12.8	8.9	40.4	23.4	21.3
Link Distance (m)	47.3		46.8	166.1	127.0
Upstream Blk Time (%)			3		
Queuing Penalty (veh)			14		
Storage Bay Dist (m)		17.0			
Storage Blk Time (%)		0	8		
Queuing Penalty (veh)		0	2		

Intersection: 10: Hotel Driveway/John Street & Lakeshore Road

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	LT	TR	LTR	LTR
Maximum Queue (m)	17.6	51.3	52.5	50.8	14.4	27.9
Average Queue (m)	2.1	12.6	38.2	39.4	2.1	8.3
95th Queue (m)	9.4	41.4	47.6	50.4	9.2	21.3
Link Distance (m)		49.2	28.4	28.4	241.2	58.5
Upstream Blk Time (%)		1	74	62		
Queuing Penalty (veh)		13	430	363		
Storage Bay Dist (m)	14.0					
Storage Blk Time (%)	1	5				
Queuing Penalty (veh)	5	1				

Intersection: 11: Elizabeth Street & Caroline Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (m)	16.9	9.8	65.6	170.2	25.6
Average Queue (m)	1.4	0.7	21.9	96.5	11.1
95th Queue (m)	8.2	4.9	55.1	219.9	20.6
Link Distance (m)	43.4		110.1	242.4	125.4
Upstream Blk Time (%)				3	
Queuing Penalty (veh)				4	
Storage Bay Dist (m)		6.0			
Storage Blk Time (%)		0	20		
Queuing Penalty (veh)		1	1		

Intersection: 12: Pearl Street & James Street

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	10.5	6.7	8.6	40.1	80.9	58.7
Average Queue (m)	1.4	0.4	1.0	6.3	27.9	23.4
95th Queue (m)	7.0	2.9	5.3	43.6	62.5	48.5
Link Distance (m)		100.9		99.5	273.9	120.9
Upstream Blk Time (%)				1		
Queuing Penalty (veh)				7		
Storage Bay Dist (m)	38.0		30.0			
Storage Blk Time (%)				2		
Queuing Penalty (veh)				0		

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Intersection: 13: Lakeshore Road & Martha Street

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (m)	27.1	96.9	709.5	80.4
Average Queue (m)	8.9	13.3	709.1	26.1
95th Queue (m)	21.6	61.7	717.8	57.8
Link Distance (m)		96.4	704.9	
Upstream Blk Time (%)		1	98	
Queuing Penalty (veh)		6	0	
Storage Bay Dist (m)	20.0			
Storage Blk Time (%)	2	3		
Queuing Penalty (veh)	12	3		

Intersection: 14: Brant Street & Elgin Street

Movement	EB	NB	SB	SB
Directions Served	LR	LT	T	R
Maximum Queue (m)	29.3	33.9	53.4	18.6
Average Queue (m)	11.3	2.2	30.4	10.3
95th Queue (m)	22.9	15.2	77.2	24.6
Link Distance (m)	43.0	142.0	60.0	
Upstream Blk Time (%)	0		10	
Queuing Penalty (veh)	0		67	
Storage Bay Dist (m)				11.0
Storage Blk Time (%)			26	0
Queuing Penalty (veh)			59	2

Intersection: 15: Brant Street & Ontario Street

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (m)	47.8	45.4	151.0
Average Queue (m)	25.5	35.9	82.6
95th Queue (m)	65.7	50.2	197.9
Link Distance (m)	810.6	36.7	182.6
Upstream Blk Time (%)		17	5
Queuing Penalty (veh)		93	30
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 16: Brant Street & Ghent Avenue

Movement	EB	EB	WB	NB	NB	NB	B53	B53	SB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	T	T	L	T	TR
Maximum Queue (m)	72.4	31.9	60.9	31.2	54.7	57.1	1.1	5.5	37.3	275.4	274.8
Average Queue (m)	32.7	7.0	28.4	5.8	31.3	32.3	0.0	0.2	8.4	265.8	266.3
95th Queue (m)	57.0	22.8	52.8	19.0	50.4	53.5	0.8	3.0	27.3	273.1	273.3
Link Distance (m)	256.2		230.3		38.9	38.9	591.9	591.9		256.2	256.2
Upstream Blk Time (%)				0	2	3				88	77
Queuing Penalty (veh)				0	11	14				0	0
Storage Bay Dist (m)		25.0		45.0					30.0		
Storage Blk Time (%)	18	0		0	2				0	39	
Queuing Penalty (veh)	4	0		0	0				0	10	

Intersection: 17: Brant Street & Victoria Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB	B53
Directions Served	L	TR	L	TR	L	TR	L	T	R	T
Maximum Queue (m)	19.0	25.9	21.9	33.3	27.3	138.1	52.2	238.0	40.8	11.8
Average Queue (m)	5.3	7.0	5.9	12.3	17.1	59.7	10.4	68.2	10.4	1.2
95th Queue (m)	15.3	19.0	16.2	25.4	29.4	113.2	29.4	255.0	36.0	13.8
Link Distance (m)		217.3		197.8		339.8		591.9		38.9
Upstream Blk Time (%)								1		0
Queuing Penalty (veh)								11		3
Storage Bay Dist (m)	20.0		30.0		20.0		45.0		50.0	
Storage Blk Time (%)	0	1	0	0	6	19		9	0	
Queuing Penalty (veh)	0	0	0	0	46	22		15	0	

Intersection: 18: Martha Street & James Street

Movement	EB	NB	SB
Directions Served	L	T	R
Maximum Queue (m)	31.4	10.5	36.2
Average Queue (m)	2.9	0.8	11.8
95th Queue (m)	15.8	5.4	34.1
Link Distance (m)	99.5	283.4	16.4
Upstream Blk Time (%)			3
Queuing Penalty (veh)			24
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

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Intersection: 19: Lakeshore Road & Locust Street

Movement	EB	EB	B57	WB	WB	SB
Directions Served	L	T	T	T	TR	LR
Maximum Queue (m)	78.9	111.7	97.2	101.1	108.9	35.9
Average Queue (m)	14.3	101.8	84.1	93.4	95.1	11.4
95th Queue (m)	55.3	108.2	116.2	99.8	116.3	24.2
Link Distance (m)		79.1	69.4	86.8	86.8	135.7
Upstream Blk Time (%)	0	45	31	33	27	
Queuing Penalty (veh)	0	471	322	242	194	
Storage Bay Dist (m)	170.0					
Storage Blk Time (%)	0	45				
Queuing Penalty (veh)	0	14				

Intersection: 20: Lakeshore Road & Burlington Avenue

Movement	EB	EB	B74	WB	B57	B57	SB
Directions Served	L	T	T	TR	T		LR
Maximum Queue (m)	82.4	180.7	78.2	101.0	100.5	70.3	20.6
Average Queue (m)	23.8	154.7	27.0	92.9	89.8	13.1	7.9
95th Queue (m)	79.5	213.7	76.9	98.5	101.3	63.4	18.0
Link Distance (m)		151.8	51.3	69.4	79.1	79.1	139.3
Upstream Blk Time (%)		21	5	56	33	3	
Queuing Penalty (veh)		212	52	770	229	20	
Storage Bay Dist (m)	75.0						
Storage Blk Time (%)	0	44					
Queuing Penalty (veh)	0	14					

Intersection: 21: East Parking Lot Entrance/Nelson Avenue & Lakeshore Road

Movement	EB	EB	EB	WB	WB	WB	B74	NB	SB
Directions Served	L	T	R	L	T	TR	T	LTR	LTR
Maximum Queue (m)	35.0	95.3	10.2	32.3	80.0	78.2	156.5	18.7	116.7
Average Queue (m)	11.5	87.9	1.7	8.7	71.1	70.8	152.6	4.0	68.3
95th Queue (m)	32.7	102.7	7.6	27.2	80.1	79.7	163.4	11.9	109.1
Link Distance (m)		88.2	88.2		51.3	51.3	151.8	111.6	120.0
Upstream Blk Time (%)		16			44	44	16		1
Queuing Penalty (veh)		78			307	309	226		0
Storage Bay Dist (m)	30.0			25.0					
Storage Blk Time (%)	0	36		0	69				
Queuing Penalty (veh)	1	19		2	13				

Intersection: 22: West Parking Lot Entrance/Brock Avenue & Lakeshore Road

Movement	EB	EB	EB	WB	WB	WB	NB	SB	B71
Directions Served	L	T	R	L	T	TR	LTR	LTR	T
Maximum Queue (m)	31.5	97.7	43.0	9.1	100.6	98.0	46.9	47.2	68.4
Average Queue (m)	6.8	36.1	1.6	0.4	93.8	93.1	20.0	30.8	19.7
95th Queue (m)	20.3	93.0	22.2	5.6	98.3	96.8	49.3	49.9	63.8
Link Distance (m)		103.8	103.8		88.2	88.2	101.1	15.7	152.3
Upstream Blk Time (%)		1	0		28	34		70	
Queuing Penalty (veh)		4	0		231	282		0	
Storage Bay Dist (m)	30.0			30.0					
Storage Blk Time (%)	0	11			60				
Queuing Penalty (veh)	1	4			1				

Intersection: 23: Lakeshore Road & North Shore Boulevard & Maple Avenue

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	R
Maximum Queue (m)	157.5	255.6	256.2	37.4	118.6	126.2	71.0	74.4	67.5	171.7	178.0
Average Queue (m)	152.5	241.8	238.1	35.0	109.4	115.6	32.6	28.7	46.2	75.0	96.2
95th Queue (m)	188.8	278.2	285.7	44.7	115.7	122.2	64.6	56.4	76.4	139.3	169.0
Link Distance (m)		242.5	242.5		103.8	103.8		146.6		215.0	215.0
Upstream Blk Time (%)		40	28		45	50				0	0
Queuing Penalty (veh)		201	140		403	447				0	2
Storage Bay Dist (m)	150.0			30.0			120.0		60.0		
Storage Blk Time (%)	8	76		44	43			0	3	16	
Queuing Penalty (veh)	29	169		303	119			0	12	37	

Intersection: 24: Brant Hospital Entrance/Apartment Entrance & North Shore Boulevard

Movement	EB	EB	EB	B62	B62	B62	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	T	T		L	T	TR	L	R	LT
Maximum Queue (m)	90.4	122.3	128.0	108.4	110.5	125.5	40.1	71.2	75.8	40.9	18.8	16.6
Average Queue (m)	23.3	92.9	87.5	57.1	56.5	57.2	4.7	31.4	39.2	20.3	7.9	4.1
95th Queue (m)	84.5	150.5	156.3	136.5	138.8	153.4	19.4	60.0	66.9	36.4	18.5	13.1
Link Distance (m)		94.1	94.1	94.2	94.2	94.2		242.5	242.5	170.5	170.5	112.6
Upstream Blk Time (%)	0	59	49	30	37	39						
Queuing Penalty (veh)	0	290	240	99	121	126						
Storage Bay Dist (m)	83.0						50.0					
Storage Blk Time (%)	0	61						2				
Queuing Penalty (veh)	0	10						0				

Intersection: 24: Brant Hospital Entrance/Apartment Entrance & North Shore Boulevard

Movement	SB
Directions Served	R
Maximum Queue (m)	14.5
Average Queue (m)	2.3
95th Queue (m)	9.1
Link Distance (m)	112.6
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 25: QEW East Ramp Entrance/QEW Toronto On Ramp & North Shore Boulevard

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	TR	T	TR	L	R
Maximum Queue (m)	217.3	221.3	47.0	50.3	101.4	153.4
Average Queue (m)	115.8	114.2	15.4	18.8	27.7	78.0
95th Queue (m)	351.6	355.3	34.3	39.5	72.6	255.7
Link Distance (m)	1122.8	1122.8	94.2	94.2	622.7	622.7
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

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Intersection: 26: Maple Avenue & Driveway/Elgin Street

Movement	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	TR	L	T	TR
Maximum Queue (m)	9.0	45.4	112.6	5.5	2.4	7.2	7.4	4.1
Average Queue (m)	2.2	25.1	25.8	0.2	0.1	1.6	0.2	0.3
95th Queue (m)	7.6	44.7	88.1	2.0	1.9	6.4	5.2	3.9
Link Distance (m)	125.2		678.4		215.0		102.4	102.4
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)		38.0		38.0		30.0		
Storage Blk Time (%)		13	0				0	
Queuing Penalty (veh)		28	0				0	

Intersection: 27: Maple Avenue & Driveway/Ontario Street

Movement	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	T	TR	L	T	TR
Maximum Queue (m)	10.7	50.5	51.3	34.2	39.6	31.9	56.9	48.9
Average Queue (m)	0.8	28.0	16.4	15.7	21.5	8.8	26.5	22.7
95th Queue (m)	5.3	47.5	33.9	31.0	36.0	22.8	46.4	41.0
Link Distance (m)	146.9		810.6	102.4	102.4		168.0	168.0
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)		45.0				30.0		
Storage Blk Time (%)		1	0	0		0	4	
Queuing Penalty (veh)		3	0	0		0	3	

Intersection: 28: John Street & Pine Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	33.0	33.8	24.2	21.0
Average Queue (m)	19.9	17.1	10.4	10.1
95th Queue (m)	30.2	28.3	20.6	17.6
Link Distance (m)	28.4	38.3	58.5	166.1
Upstream Blk Time (%)	1	0		
Queuing Penalty (veh)	0	0		
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report
2031 AT Scenario with Developments

03/13/2020

Intersection: 29: Locust Street & Elgin Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	17.3	24.6	24.2	18.9
Average Queue (m)	9.6	15.7	11.9	9.3
95th Queue (m)	14.9	23.5	19.3	15.5
Link Distance (m)	678.4	25.5	135.7	113.2
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	1			
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 30: Elizabeth Street & Pine Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	33.3	27.4	21.3	29.6
Average Queue (m)	14.8	14.9	9.5	14.2
95th Queue (m)	25.3	23.9	17.4	24.4
Link Distance (m)	38.3	79.7	81.0	167.3
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 118: Martha Street & New Street

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	R	L	T
Maximum Queue (m)	214.7	27.5	21.8	22.0	3.7
Average Queue (m)	64.2	13.0	8.4	10.0	0.1
95th Queue (m)	186.9	33.9	20.8	20.4	1.9
Link Distance (m)	565.7		16.4		172.9
Upstream Blk Time (%)	2				
Queuing Penalty (veh)	7				
Storage Bay Dist (m)		20.0		20.0	
Storage Blk Time (%)	12	0		3	
Queuing Penalty (veh)	41	2		0	

Network Summary

Network wide Queuing Penalty: 11942

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